Linking of Ganga-Cauvery in the context of India's fresh water scenario

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Introduction

During the last two decades, 'The Cauvery Water Dispute' has engaged the attention of the people, the Judiciary, the executive of our nation, to the point of despair. All of a sudden the attention has been on the mega-dream of linking 'Holy Ganga' with 'Holy Cauvery. The political lords have become mesmeric with this conceptual project, hibernating for decades, that has now found a wide publicity.

There has been no detailed study of river regimes as well as the obvious impact of the project on hydro-geo-environment. Every river has its own established regime and its study on a Scientific basis calls for an extensive explorative as well as geo-technical hydro-geological and socio-environmental assessment. River diversion from its established course could be a public health hazard, therefore, needs concurrent in depth study.

The Case study of Sardar Sarovar Project across the River Narmada vividly portrays inadequacies of much needed impact studies of two high dams and thirty dams of comparable magnitude in Narmada Basin. The Independent Review Report (Bradford Morse Report-1992) castigated the World Bank, Union Government, State Governments and Narmada Authorities for failure to comply with detailed studies. With the result, the World Bank had to withdraw funding of the Project. Such are the enormous studies involved even in one river system, what to speak of rivers linking from North to South on varying geo-morphological terrain.

If drought relief is the basis for such a Mega project, it is all the more necessary to examine each river basin development in its own socio-geomorphological existing setup. One has to establish whether each river basin either individually or collectively two or three river basins in the same geo-morphological setup can be examined for water resources development, so as to provide relief to drought prone area of the region. Perhaps, it is possible. Therefore, this needs to be addressed and the plan of action should be towards fulfilling this task of detailed study of such a scheme.

Given a Scientific approach and attitude, the abundant water available in River Cauvery, both Surface and Ground water could be effectively identified for allocation. In a timeframe of thirty years each basin state could be made self-sufficient and the entire basin community could become prosperous. Such is the Bounty of Nature's gift. On the same basis of cooperative endeavour the ghost of drought could be erased out from the peninsular states by utilizing their own river systems without resorting to linking with Ganga-Bramhaputra system. These aspects require due engineering and related studies.

Therefore, a cautious well organized and

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managed scheme has to be projected after detailed study, it is too premature for the Parliament and the States Legislatures to endorse project of this magnitude. It is equally necessary to inform the concerned regional people and take their acceptance.

Fresh Water Scenario

Water is the nectar of life; the essential ingredient for survival. There is no substitute for water. The Oil crisis in recent times brought confrontation in the Middle East and continues to dominate. The limited availability of fresh water in the Middle East is taking a new dimension of conflict; Israel is proposing to divert the Mediterranean sea waters through Gaza strip to their land for irrigation drinking water and energy requirements after desalination. The confrontation on this vital water resource is bound to grow and widen. This growing awareness, implies that we should evolve a healthy environment that presents encouraging readiness to face these challenges.

In contrast to the Middle East region, India is blessed with a bounty of Fresh Water. The Himalayas, the Vindhyan, the Western and Eastern Ghats intercept the monsoon rainfall and thus the rivers flow in abundance during a short period of rainfall. This is so since time immemorial. Yet, paradoxically, civilization after civilization have lived in a peripheral way without utilizing the advantage of this perennial bounty and subjected itself into the ravages of floods and scourge of famines. Not that nothing was done; it was attempted in isolation according to the generous attitudes of native kings and leaders in rural community. Hundreds and thousands of irrigation/water tanks all over peninsular India, low dams in Vijayanagar kingdom period and classic works like Jalsamudra of Rajasthan built in seventeenth century, the several anicuts across the river Cauvery both in Karnataka and Tamilnadu bear testimony for the concern to avail fresh water. During the British Rule in the early part of 19th and 20th Century significant engineering works were carried out which became the forerunner of Dam Engineering. To illustrate a few, the canal system in undivided Punjab, Madras Presidency and Marikanive Dam in Karnataka and Bavanipattana Water supply dam (1888-Orissa) represented scientific approach to impound and utilise water. These works still continue to serve effectively. In fact these later works formed ground rules in assessing hydrological aspects of river flow and assessing the engineering and geological parameters of storage works. They formed model of engineering practices in river training, formation of barrages and providing gates for release of floodwater and execution of canal system. The Services rendered by the stalwarts like Late Sir Arthur Cotton, Kennedy, Russell and the band of army officers of British Period need to be remembered with gratitude.

Water Resources

Land Resources and Water resources are environmentally interlinked. The geographical area of the country is 328. 3 million hectares of which cultivable area is 186 million hectares which is 56 percent of geographical area. The net cultivated area as in 1990 was 141 million hectares, which is almost 75 percent of cultivable area. There is no possibility of extension of cultivable area. In fact industrialization, establishment of big industries like Steel plants, Aluminum plants take bulk of lands and urban colonization toll a harsh impact on cultivable lands. This is the price that the development pays. These activties demand aditional availability and means of providing industrial and drinking water supply and related urban sewage/pollution treatment etc.

When compared to other developed countries of Europe and United States of America, the water resources in India is substantial. Yet, it must be remembered that its spread regional, seasonal, and its spatial distribution over its geographical area is very uneven. Large tracts of Karnataka, Rajasthan, Gujarat and coastal Orissa/ Andhra Pradesh are semiarid and arid. In fact the Karnataka has the biggest semi arid region, about 79 percent exceeding that of Rajasthan, and mostly hard rock stratum. This constitutes the real problems that bring in social upsurge for want of developmental works which hinges on adequate provision of much needed fresh water.

All the more the region calls for specialised action plan. Any neglect would produce an ethnic mood of Chambal valley which produced bandits prior to Chambal Valley Development. It is not political peace negotiations that transformed hostile, ethnic temperament of the valley, it was the Chambal canal that brought prosperity to Bhind and Morena districts and that has done the trick–30000 cusecs flow in the canal metamorphosed the Chambal valley-what is otherwise an arid Region.

According to CWC's brochure entitled "Water Resources Of India" April 1998, the total water resources of our country are as follows:

1. Nationally available surface water resources-1880 kilo cubic meters.
2. Actually utilisable surface water resources, having regard to topographic, locational and other Constraints, 690.309 Kilo cubic meters.
3. Actually utilisable ground water resources 418. 540 Kilo cubic meters.
4. Total utilisable water resources (2+ 3) 1108. 849 Kilo cubic meters.

Say 1110. 000 Kilo cubic meters.

Resource Development:

It may be observed from the previous para, that utilisable water from both surface and ground water, regarded as one hydrological unit, could be about 1110. 000 Kilo cubic meters. One of the cardinal principles enshrined in the National Water Policy (1987) is to conserve this nature's bounty. Therefore, the conservation-implies and means conservation of water to an effective utilisable commodity. It may be relevant to observe that U. S. A. which already has almost the same water potential as India has storage capacity of about 70 million Ham which is 230 percent of India's ultimate storage capacity. As of now, the storage capacity created in our country is about 50 per cent of ultimate possibility. USSR has built in storage capacity of the order of 112 million Ham. With the same water potential as that of us. America has 40,000 large dams while we are barely around three thousand dams completed and another 700 are in various stages of construction. In such a situation, there is an urgency to have greater emphasis for creating water utility structures, than we have done in the last fifty years.

Impact of Dams

In the last two or three decades of water resources development, there has been a growing awareness amongst the masses on the impact of large-scale projects. This is so all over the world. In developed countries, more in USA, the dam building activity has been practically halted. The well-known USBR has to restructure its organisation to Water management and monitoring of the projects already commissioned. With the result, the vast experience in water planning, resource mobilisation and specialised construction Industries are available. The financers have grouped themselves and considerable funding for third world projects

are available. Developing countries like South Africa, India, Pakistan, SriLanka and China are the playing grounds for utilising this package of hard earned experience and finance. China undertook the famous 'Three Gorges dams'. The feasibility study of the project was carried out by a joint venture of Canadian engineering firms(Acres International, B. C. Hydro International, Hydro-Quebec International, SNC) which advised to build the dam at an early date. The study was funded by CIDA, Supervised by CIDA, the World Bank and China's Ministry of water resources and Electric Power. The study could not be pursued, more so the additional studies on the environmental and resettlement aspects. Canada suspended the work on the project shortly after the 1989 confrontation in Tiananmen Square. It is of importance to observe that the jury of International Water Tribunal (Feb-92- WPDC-may 92)"The tribunal found the Canadian feasibility study for the Three Gorges project 'inadequate' saying that it lacked a catchment area treatment plan upstream, and a disaster management plan downstream, and failed to account for population which would be forced out if flood waters rose to the maximum level in the reservoir". The jury felt that the 'very high ecological and socio-economic risks of Dam had not been adequately addressed because the feasibility study starts with the objective of justifying the project to secure international funding, not withstanding the project is being executed with full steam. We, in India are not unfamiliar of the problems referred above as in the last three decades the same issues are agitating the minds of intellectuals as much commoner.

Thus, there is turmoil in the process of river harnessing. There is emotional awakening and that has led to a fair amount of scientific study on areas which seldom drew attention in yester years except cosmetic attempts. The Silent Valley movement of seventies and the Chipco Andolan are the fore runners of this awakening. This is now followed by Narmada Bacho Andolan.

Now the ongoing projects, the Narmada Dam Complex as well as Tehri Hydroelectric Project are snailing towards their avowed completion. A monumental study by an independent review panel (Braford Morse's Report) castigates the Sardar Sarovar Project authorities as well as World Bank. According to this report, " the history of the environmental aspects of Sardar Sarovar is a history of non-compliance. The nature and magnitude of environmental problems and solutions remain elusive. This feeds the controversy surrounding the projects. As with the Resettlement and rehabilitation issues, this has placed our review in difficult position. To complete our work, we have had to assemble basic ecological information to establish the likely effects of the projects up stream, downstream, and in the command area. This work should have been done by others before the Projects were approved". The case is no different in respect of Tehri Project. There is thus an intellectual neglect. Those who share concern for both economic development and the conservation of environment of which water is as much an ingredient as much the human habitat, should lose no further Time in building up an adequate comprehensive data base, not speculative, evolve a generally acceptable methodology for environment studies and make the appraisal of projects and their impact assessment, objective and unbiased. Credentials of researchers/scientists/ engineers should be such that cannot be doubted. It is essential that the information so collected and evaluated should be available to the public before the project is implemented. Let not the water resources development projects in the coming decades get into Quagmire Foundations.

At this stage one must recapitulate the basic facts about Sardar Sarovar-Narmada Complex. The Narmada river is the only river that was left unutilised before these mega

projects were conceived and feasibility studies were initiated three decades back and later construction was taken with World Bank participation and review by its Staff personnel. The project envisages no less than 30 large dams, 135 medium dams and 3000 small dams on the stem and tributaries of the main river. The geomorphological spread is very vast. Consider the upstream utilisation by various schemes contained in the basin development plan/to what extent the terminal structure (Sardar Sarovar) would receive its evaluated storage for release to its vast network of main canal and its subsidiary canals. In what timeframe, in the coming this would be materialized? This remains a very inconvenient question!! There seems to be a need to reappraise the whole impact of the entire basin projects vis-a-vis the two mega projects. That is the picture that emerges out.

Rehabilitating existing storage dams and upgrading the utilities

In the light of serious issues concerning the mega projects illustrated above and since they are in troubled waters and its reevaluation, if done, to meet the national needs may take some more time and therefore it is more appropriate to address our efforts to review all the storage and Hydropower utilities that are under use for a detailed review by experts, to find a way of augmenting the water and energy sector.

In contrast to the new multi-purpose projects in the yet to be assessed environmental impact, the existing storage dams and its hydropower Plants and canal system are in a known established regime and environment. The Civil engineering utilities are in service over a decade or more. We are no longer in a speculative realm. The modernization and safety could be definitive and fund requirement would be clear. The development could be step by step. We have over three thousand dams in service. Its modernisation and safety review is likely to be of added advantage and substantial. It is likely, that by such measures at least 25 to 30 percent additional benefits may be introduced.

The refurbishment of existing Hydro-plants at these storage dams would definitely be far more beneficial and economical and environmental friendly than establishing equivalent Thermal plants and captive plants for a specific industry.

Poverty and its eradication

The objectives of eradication of poverty, upliftment of Rural mass both economically and socially is only possible if water and/ land development are taken together. There is an irreversible damage taking place all over the states, in the removal of land mass by mining industries, and forest cover thereby causing erosion of the land material. Stream and river sources are affected. Considerable sediments are being carried in the river streams. A number of water storage utilities are being filled with increased proportion of sediments. The Bhadra and Tungabhadra in Karnataka. and the streams of Orissa are examples to illustrate., where ore deposits form the sediments deposition. It would be worthwhile to get them removed for recycling and processing. It is also necessary to enact a ceiling on land use for mining in the river basins of the country for a period of another fifty years. Toxic wastes should not be released to the natural streams, without treatment as is being done in most of the industries. In the last fifty years millions of hectares of forestland, exceeding 50 million hectares have been destroyed for unspecified reasons other than Water storage works by Timber lobby. It must be noted as documented that in the last fifty years in developing all the irrigation projects, the country has not destroyed or utilised more than two million hectares of

prime forest land. There is considerable disinformation by vested interests. In order to take a holistic approach of River basin development and corresponding effective utilisation of water. People's awareness, orientation and channelisation is paramount. It must also be noted that the rural people are more conscious of the relevance and importance of conservation of water. This is well reflected in their readiness to participate at micro level in rural development. This has been well brought out by 'the statement of shared concern' in the Citizens fifth report and signed by numerous scientists, environmentalists and social workers and the Article 'Towards a green Millennium' published by THE HINDU dated March 14th 1999. Replication of the illustrated Micro projects of socio-agro development has a far effective means of rural development without any injurious impact on community as well as the land mass.

Discussions

Management of water is crucial to our development; our involvement is too intimate to neglect. There is an urgency to make effective use of available water. Sir Arthur Cotton, the visionary identified the flow of mighty Godavari as a 'Golden Flow', while Sir M. Visweswariah called the mighty Gerusoppa water fall with roaring water ' Oh! What a waste'. These two visionaries' active engineering measures have contributed to the development of drought prone regions of Cauvery and Godavari basins in 20th century. That is what 'mystic Vision' with sustained logical- scientific method of evaluation would bring a success to the vision. Sir Arthur Cotton's deep study and formulations is an engineering Bible for assessment of water availability in the drought prone regions of Indian Peninsula. In fact the adoption of evaluation indicated could hopefully resolve the enigma of Cauvery Dispute.

Even now, the Cauvery River Dispute baffles ordinary citizen. While other peninsular river disputes relating to Godavari, Krishna and Narmada, mainly about interstate utilisation of hitherto untapped surplus waters (1990), the core of the Cauvery dispute relates to the 're-sharing' of waters in its totality.

The Karnataka State after reorganization of states has the highest drought region of 79 per cent. All the drought prone regions of erstwhile Madras Presidency, native States of Hyderabad and Mysore and part of Bombay presidency have been brought together in this new State of Karnataka. Thereby the task of Karnataka developing these regions become of utmost importance. Equally, Tamilnadu has 64 percent drought area. It is characteristic of Cauvery Basin, although the river passes through semi-arid region. A resolution of resharing of Cauvery waters on sound lines of TIMEFRAME development, which is possible would go a long way and open new vistas of inter-basin States development. But it is not to be. Instead with Judiciary's activism, the union government ignited the Phantom Inappropriate Ganga-Cauvery Link.

It may be noted that NWDA preliminary blue print envisages diversion and interlinking through eastern coastal region, a cyclone prone region. While mid-west and low coastal area of Tamilnadu that is considered severely drought prone and suffers from time immemorial.

Based on IMD data, Central Water Commission has identified the drought prone regions of Peninsular India, as indicated in Table-1.

It must be remembered that from time immemorial these regions under study have been subjected to spells of droughts. In recent past, the British attempted niggardly ameliorative effort, though aware of its dimension and impact on land and its inhabitants. With the improved technology, agronomical inputs, it is for the independent

Table-1: Status of drought prone regions of Peninsular India

Sl No	State	Area	Drought area (hectares)	Percentage
1.	AndhraPradesh	2, 76, 62, 000	1, 25, 62, 382	45%
2.	Karnataka	1, 9 1, 77, 000	1, 52, 40, 095	79%
3.	Maharashtra	3, 07, 76, 000	1, 24, 18, 056	40%
4.	Tamilnadu	1, 30, 07, 000	83, 27, 619	64%
5.	Rajasthan*	3, 42, 22, 000	2, 14, 08, 800	63%
6.	Gujarat *	1, 95, 98, 000	1, 20, 91, 618	62%
7.	Orissa*	1, 55, 78, 000	22, 90, 000	15%

* *Adjoining states for comparative perspective*

India to address its serious concern effectively. It cannot be denied that some measure of development has been executed since the Second Irrigation Commission's recommendations and State Government's own initiative. Yet the ISSUE is of great human dimension. A high priority is justified. Look at the drought data projected and it encompasses all the 'friendly' neighboring States- AP,Karnataka, Maharashtra and Tamilnadu who suffer acute famine condition and still bind to the gravity of the problem. Do they expect succour to come from North, where the socio- political moorings are no different?

River potential of Peninsular India

Take a look at River potential that traverse this geographical unitary region whose geomorphological conditions are different from that of Gangetic belt.

Maharashtra

East flowing Rivers: Godavari and Krishna
West flowing Rivers: Narmada, Tapi and eight rivers covering an area of 32, 573 sq. km

Andhra Pradesh

Several small and big streams between river Mahanadi and Godavari, draining an area of 23, 905 sq. km; Godavari- Krishna, several small and big streams between Krishna and Pennar rivers draining an area of 24, 669 sq. km; and several streams between Pennar river and Cauvery draining an area of 16478 sq. km.

Karnataka

Godavari, Krishna, Pennar and. several streams between Pennar and Cauvery draining an area of 6, 256 sq. km, and west-flowing rivers of Cauvery basin draining an area of 25, 095 sq km.

Tamilnadu & Pondicherry

Several streams between Pennar & Cauvery draining an area of 42, 315 sq. km;
Several streams between Cauvery and Kanyakumari draining an area of 35, 095sq. km;
West Flowing streams draining an area of 4, 702sq. km.

Kerala

West flowing streams and to Cauvery draining an area of 32, 925 sq. km

Ground water resources

While dealing with water resources and its regional utilization, the rechargeable ground water annually should be treated together

as one entity and conjuctively utilised. There is an abundance of ground water in deltaic regions of the basins with number of exploitable acquifers in the deltaic riverine deposits. A well-documented GSI memoirs substantiates this Data. There has been no national and rational ground water Act. The CGWD has formulated an Act, yet not implemented. Some states follow and some states have their own acts which are being implemented. Notably Tamilnadu. There should be a uniform code and ground rules applicable all over.

Based on second Irrigation Commission Report (1972), the total water availability in Peninsular rivers below the Vindyan Divide is indicated in Table-2:

Table-2: Total water available in Peninsular States (MCM).

Sl No	Water Resource	MH	AP	KTA	TN	KLA	Total
1.	East flowing rivers	-	99,686	1,622	46,074	-	57,322
2.	Godavari	57,819	27,169	1,652	-	-	86,640
3.	Krishna	16,826	18,458	27,500	-	-	62,784
4.	Pennar	-	6,001	857	-	-	6,858
5.	Cauvery	-	-	11,105	8,782	3,569	23,456
6.	West Flowing	14,323	-	12,627	2,068	15,797	44,815
7.	Tapi	14,217	-	-	-	-	14,217
8.	Ground Water	7,768	10,604	6,165	7,090	3,329	34,956
	Total	**1,10,953**	**71,858**	**61,528**	**64,014**	**22,695**	**3,31,018**

Thus it is evident that there is sufficient water available in Peninsular States. How prudently the neighbouring states in a co-operative way utilize this bounty of Nature depends on enlightened governance of gifted nature bounty towards regional homogeneity of prosperity.

Conclusions

Recently with the drought relief as the basis, linking of Ganga -Cauvery has been projected. It is all the more necessary to examine each river basin development in its own Socio-geomorphological existing setup. One has to establish whether such river basin / collectively two or three river basins in the same geomorphological set up cannot be examined for water resource development to provide relief to drought prone area of the region. Perhaps it is possible. Therefore this needs to be addressed and the plan of action should be towards fulfilling the task of detailed study of such a scheme and duly processed and cleared by the Planning Commission

1. In the light of the background presented and the futility of linking of Ganga-Cauvery Scheme, the Parliament may initiate a fresh thinking on this vital issue of need for water resource development in the drought prone Peninsular States by availing its own abundant water available in the region. It could be cost-effective than the proposed Ganga-Brahmaputra-Cauvery mega link.
2. Parliament may constitute a commission on the lines of irrigation Commission, with a Timeframe.
3. Based on the finding of the Commission, the report could be examined by the states legislatures

and public institutions and a Detailed Engineering Project be presented to the Planning Commission for clearance. This perhaps is the right direction. It is needless to emphasize that when dealing with WATER WE MUST MEND OUR WAYS in order to avoid recurring crisis, which could trigger off water war no sooner.