Geography Optional - 2023 - 24

WATERSHED MANAGEMENT

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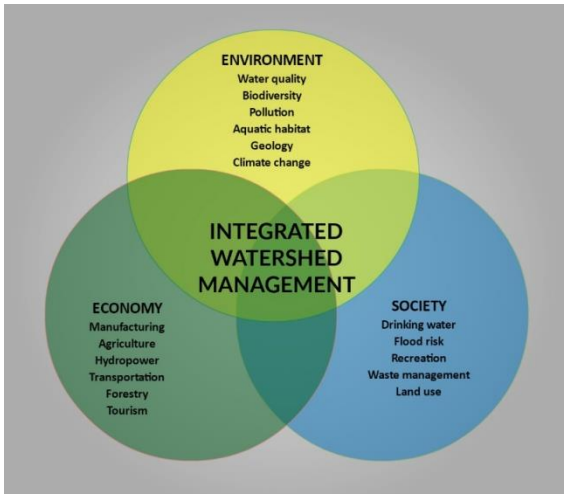
A watershed is the land area from which water drains to a particular waterbody. Watersheds come in all shapes and sizes, and they cross county, state, and national boundaries. A watershed planning and management approach, which is key to meeting clean water goals, represents a comprehensive and integrated way to protect all water resources, including uplands, drainage basins, wetlands, surface water, and groundwater.



Conservation Authorities rely on an Integrated Watershed Management (IWM) approach to protect water resources and address escalating environmental challenges from the impacts of climate change and rapid urbanization.

Our activities on the land impact the health and sustainability of natural resources and can threaten how much water remains available, as well as, how well we can adapt to the impacts of climate change. IWM is an approach that requires us to manage human activities and natural resources, together, on a watershed basis taking into consideration the connected interests and needs of the environment, economy and society.

Scientific management of water is increasingly recognized as being vital to India's growth and ecosystem sustainability. The Government of India is being proactive about water management and has created the Ministry of Jal Shakti to consolidate interrelated functions pertaining to water management. The newly formed Jal Shakti Ministry launched the Jal Shakti Abhiyan - a campaign for water conservation and water security in 1592 water stressed blocks in 256 districts, to ensure five important water conservation interventions. These will be water conservation and rainwater harvesting, renovation of traditional and other water bodies/tanks, reuse, bore well recharge structures, watershed development and intensive afforestation. These water conservation efforts will also be supplemented with special interventions including the development of Block and District Water Conservation Plans, promotion of efficient water use for irrigation and better choice of crops through Krishi Vigyan Kendra. The Jal Shakti Abhiyan is a time-bound, mission-mode water conservation campaign. Government is advocating the

adoption of best practices in water sector across India and recognizes that data-based decision making is going to be key to effective water management.

The Composite Water Management Index

The National Institution for Transforming India (NITI) Aayog has developed the Composite Water Management Index (CWMI) to enable effective water management in Indian states.

The CWMI is the first comprehensive collection of country-wide water data in India based on in-depth structured questionnaires followed by focus group discussions to generate qualitative information. It represents a major step towards creating a culture of data-based decision-making for water in India, which can encourage "competitive and cooperative federalism" in the country's water governance and management.

The Index and this associated report are expected to:

- establish a clear baseline and benchmark for state-level performance on key water indicators;
- uncover and explain how states have progressed on water issues over time, including identifying high-performers and under-performers, thereby inculcating a culture of constructive federal competition amongst states; and
- Identify areas for deeper engagement and investment on the part of the states. Eventually, NITI Aayog plans to develop the Index into a composite, national-level data management platform for all water resources in India.

The Comprehensive Water Management Index (CWMI) measures the performance of States on a comprehensive set of water indicators and reports relative performance .Such a benchmarking exercise can go a long way in creating a common frame for progress for water in India and also highlight the need for specific improvements.

States are displaying progress in water management, but the overall performance remains well-below of what is required to adequately tackle India's water challenges. ~80% of the states assessed on the Index over the last three years have improved their water management scores, with an average improvement of +5.2 points. But worryingly, 16 out of the 27 states still score less than 50 points on the Index (out of 100), and fall in the low-performing category. These states collectively account for ~48% of the population, ~40% of agricultural produce, and ~35% of economic out put of India.

Sectors	Weights
1. Sources augmentation and restoration of water bodies	5
2. Sources augmentation (Ground water)	15
3. Major and medium irrigation - Supply side management	15

4. Watershed development -Supply side management	10
5. Participatory irrigation practices Demand side management	10
6. Sustainable on farm water use practices -Demand side management	10
7. Rural drinking Water	10
8. Urban water supply and Sanitation	10
9. Policy and governance	15
Total	**100**

High-performers continue to demonstrate strong water management practices, but low-performers are struggling to cope up.

Top performers such as Gujarat, Andhra Pradesh, Madhya Pradesh, and Himachal Pradesh have further increased their scores over the last three years, with improvement ranging from 4 to 11 points.

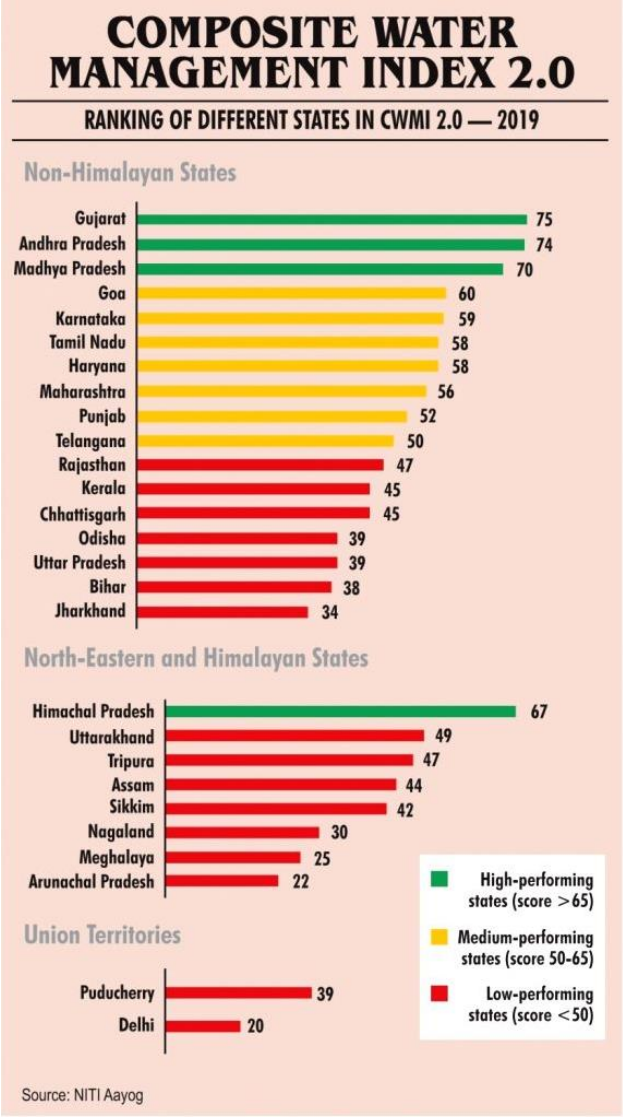
On the other end, out of the 14 **low-performing states** from FY 15-16, only Haryana, Goa, and Telangana have been able to cross the 50-point threshold. Jharkhand, Uttar Pradesh, Odisha, Bihar, Nagaland, and Meghalaya still score less than 40 points, and the average improvement in low-performing category over the last three years stands at 3.1 points, lower than 5.2-point average improvement observed across states.

Large economic contributors have low-water management scores; poor management here can hamper India's economic progress. Uttar Pradesh, Rajasthan, Kerala, and Delhi, 4 of the top 10 contributors to India's economic output ,have scores ranging from 20 points to 47 points on the CWMI.

Given the **indispensable role of water in any form of economic activity**, water shortages can lead to reduced output in these states, and as a consequence, threaten India's aspirations to be an economic superpower in the future. These four states collectively account for over a quarter of India's population, and reduced economic activity will reduce employment and livelihood opportunities in these large population clusters.

Food security is also at risk, given that large agricultural producers are struggling to manage their water resources effectively. None of the top 10 agricultural producers in India, except Gujarat and Madhya Pradesh, score more than 60 points on the CWMI. This is concerning given that assessment on almost half of the Index scores is directly linked to water management in agriculture.

On the positive side, greater focus on water governance and increased data discipline amongst states is building a pathway for driving long-term success. States have displayed strongest improvement on the Policy and Governance theme amongst the nine themes included in the Index, with the median score rising by ~30% over the last three years. This indicates an increasing institutional ability of states to design policies to counter water-related risks. Further, data discipline, a driving principle behind development of the Index, is evolving as a practice amongst states. Data reporting on the Index is improving across states, and cases of states not reporting data on indicators have reduced by~70%.



Going forward, states need to build on this momentum, and upgrade their water management practices to show outcomes and not just outputs. Several disparities exist in water management amongst states. There are clear opportunities for high-performing states to become torchbearers of good water management practices in the country. Improved knowledge-sharing amongst states can enable them to learn from each other and solidify water management practices across the board. States should actively seek out guidance and solutions from one another and encourage diffusion of knowledge(including through exchange program of scientists and administrators) across borders. NITI Aayog is fully prepared to support cooperative federalism in this critical area. This will also help the country cooperate and coordinate its response to tackle the present water crisis that the country is facing. States also need to track the overall outcomes of their policy making and water administration, and make sure that improved legal, administrative, and operational outputs are leading to outcomes like increased groundwater levels, rejuvenated surface water sources, and improved piped water supply for rural and urban inhabitants. Without an outcome-based approach, state investments in water management are unlikely to have a desired positive impact on their water situations.

Social and Political risks

Achieving food security for India, with its rising population, is going to be a significant challenge, and water scarcity will make the goal tougher to attain. India will host more than 1.5 billion people by 2030, and serving the food needs of its entire population will be a daunting task. Water shortages in the country are going to make this task harder. Wheat and rice, India's two major staple crops for Indians, are already being affected by water-related issues. About 74% of the area under wheat cultivation and 65% of the area under rice cultivation faces significant levels of water scarcity. These trends are expected to only get worse if immediate measures are not taken. Estimates suggest that the water demand-supply gap in agriculture could be as high as 570 BCM by 2030. Groundwater resources, which account for 62% of irrigation water, are declining in 52% of the cases and highlight a serious water concern for the agriculture sector. Key reasons for this decline include a lack of well-considered water pricing for agricultural use, energy subsidies that promote over-extraction, and sub-optimal matching of crops with the agro-climatic and water zones in states. Further, our international trade in agricultural commodities is contributing to large quantities of virtual water loss through the export of water-intensive crops.

As an illustration, India exported more than 10 trillion litres of embedded or virtual water through the export of ~37 lakh tonnes of Basmati rice in 2019 alone, which could have been used to grow much larger quantities of other crops, such as wheat or millet, that have smaller water requirements. As another illustration, Punjab, which produces more than 10% of India's paddy, utilizes groundwater for meeting 80% of its paddy irrigation needs, thus depleting its own and the country's groundwater resources. Production challenges are being felt across agrarian states as regions run out of their primary irrigation sources. Increasing consumer preferences for high-value crops and dairy and meat products, which require significantly higher amounts of water for production, will only further exacerbate the country's food security challenges. Climate change will also contribute to these challenges as increasing temperature levels, floods, and droughts create unfavorable environmental conditions for cultivation and impact crop productivity.

Participatory and decentralized rural water management

Recognizing the levels and threat of water scarcity in the country, a number of states have designed participatory irrigation management program to promote decentralized water management and drive adoption of sustainable water management practices. This chapter highlights some of the prominent program states have implemented with such an approach. All states must learn from these models and potentially replicate them to tackle their respective water challenges.

State Success Stories:

- MUKHYA MANTRI JAL SWAVLAMBHAN ABHIYAN (MJSA), RAJASTHAN
- NEERU-CHETTU PROGRAMME, ANDHRA PRADESH
- JALYUKT SHIVAR ABHIYAN, MAHARASHTRA
- MISSION KAKATIYA, TELANGANA
- SUJALAM SUFALAM YOJANA, GUJARAT
- KAPIL DHARA YOJANA, MADHYA PRADESH
- PANI BACHAO PAISE KAMAO, PUNJAB

Risk of exceeding the carrying capacity of urban hubs

Urban hubs are likely to witness severe water shortages in the future, which could risk urban growth in India and reduce quality of life for urban citizens. India's urban population is expected to reach 600 million by 2030, and fulfilling its water needs will be a great challenge. Estimates suggest that the demand-supply gap for the domestic sector will stand at ~50 BCM in 2030, with the demand expected to double by that time. The present situation is also not ideal. 5 of the world's 20 largest cities underwater stress are in India, with Delhi being second on the list. Additionally, 8 million children below the age of 14 in urban India are at risk due to poor water supply.

Water supply infrastructure in the major metropolitan cities of the country, which was never designed to cater to such large population sizes, will be unable to serve the urban population. As of 2014, no major city in India supplied 24x7 water to its entire urban population, and only 35% of urban households in India have piped water in their dwelling as the primary source to support drinking water needs, while others rely on piped water to plot/yard, tube wells, and public taps amongst other sources. These water delivery challenges will further exacerbate as migration to major urban cities in search of better livelihood opportunities continues, and additional stress is put on the already insufficient water resources and inadequate infrastructure. As of 2015, India treated only 30% of the wastewater generated in the country. Lack of adequate infrastructure in cities to handle their own wastewater will add to the problem, and improper solid waste management may even lead to contamination of remaining groundwater resources.

In such circumstances, water shortages will become more frequent and water rationing by states will intensify further. Industrial growth in and around cities will be severely compromised as companies will move their operations to more water-secure locations. All these challenges can together create serious water scarcity conditions for urban dwellers where their basic water needs are not met. This will also endanger the aspirations of rural Indians seeking a better life in urban India, and nip rural-urban migration forces that are a part of India's journey towards becoming an industrialized modern economy.

Economic risks

Water shortages in the country can hamper industrial operations and other economic activity, and lead to muted economic growth. Industrial activity accounts for ~30% of GDP contribution at the national level and holds significant importance in India's economy. Estimates suggest that industrial water requirement will quadruple between 2005 and 2030,48 highlighting the significant rise in demand by the sector over time. Additionally, a recent study reports that industries will need to draw three times the water compared to their actual consumption by 2030 due to water efficiency challenges.

Water shortages are already impacting, and will continue to impact, the sector in the form of erratic and insufficient water supply, hampering production processes and efficiency. It is possible that this shortage will drive up the cost of water and lead to a disproportionate impact on the Small-to-Medium Enterprise(SME) and Micro, Small and Medium Enterprise (MSME) segment. This can severely impact industrial production processes and cripple India's aspirations to be an economic superpower in the future. Worst affected industries are likely to include water-intensive sectors such as food & beverages, textiles, and paper and paper products. Amongst these, the textiles industry alone contributes 4% towards India's GDP, 14% to national industrial production, and accounts for 17% of the country's foreign exchange earnings. Several incidents where water shortages have impacted production processes have emerged in the recent years. These impacts have ranged from industries operating at reduced capacity, to temporary shutdown of operations, and even curtailment of expansion projects. As reported in 2016, a steel plant in Vishakhapatnam, Andhra Pradesh was forced to operate on reduced capacity due to lower water availability. Furthermore, a staple fibre plant of a major textile company in Nagda, Madhya Pradesh was shut down for 2 months in 2015 due to water shortages.

Water scarcity is also going to have serious upstream impacts on India's economy through its banking sector, which is already stressed. According to a recent report, 39% of the portfolio of Indian banks is exposed to sectors that face high levels of operational water risk, including agriculture and allied activities (13.3%), power (6.8%), and basic metal and metal products (4.8%). These risks can include actual water scarcity for production and/or regulatory and reputational risks from water contamination and conflicts with local communities due to over extraction from local sources. These water risks in bank portfolios can degrade the quality of bank assets through unanticipated and premature write-offs, downward revaluations, conversions to liabilities, and eventually, a rise in total non-performing assets (NPAs). The potential of such large-scale degradation in assets should trigger alarm bells for lenders as they look towards funding India's growth story over this decade and more to come.

Risk of energy shortages

70% of India's thermal power plants are likely to face high water stress by 2030, severely hampering India's energy production and economic activity. Thermal power constituted more

than 83% of India's total utility power generation in 2016,60 and remains a major source of energy for all commercial activities. This critical source of energy will be threatened as freshwater resources decline, since 90% of thermal power plants in India rely on freshwater sources for cooling, an essential process in thermal energy production. About 40% of India's thermal power plants are in water-scarce regions and are already beginning to face operational challenges. 14 of India's 20 largest thermal utilities faced at least one shutdown between 2013-16 due to water scarcity, which cost companies and investors USD 1.4billion. If energy shortages intensify in India in the future due to thermal power shutdowns, businesses will become further vulnerable to power cuts and operational inefficiencies. This will reduce economic output, increase the cost of doing business, and slow down economic growth. To address some of these challenges, MoEFCC, for the first time in 2015-16, introduced regulations for thermal power plants, putting mandatory limits on their water consumption. Regulations like these are need of the hour and should be seen as great examples by other regulators in the country to learn from.

Environmental risks

The rich biodiversity of India faces a serious threat from human activities undertaken in pursuit of creating additional water sources. Red flags have already been raised over the cumulative impact of climate change, increasing temperatures, and human engineering of hydrological flows through dam construction and river diversion, on India's fragile biodiversity. Building dams on rivers slows down the water flow, leading to sedimentation and reduction in nutrients carried by the rivers, whereas linking rivers can change salinity levels and monsoon patterns. Such changes in water composition and environmental factors can seriously harm the local flora and fauna that thrive on these water resources.

The impact on biodiversity can manifest in the form of changing migration patterns, decline, and even extinction of species' population, all of which can lead to the destruction of biodiversity hotspots in the long run. As per an international study, 35 species are impacted on average in Indian hotspots due to human activities. The Western Ghats, the Himalayas, and the North-East fall in the category of hotspots with threatened species, and developmental activities in these areas have led to ecosystem damage in some cases. Six dams have been constructed on the Kali River in the Western Ghats of India, and such development projects have contributed to the decrease of forest cover from 85% to 55% between 1973 and 2016. This is likely to have caused significant damage to its biodiversity hotspots, which host 325 and 190 species of flora and fauna, respectively.

Risk of desertification

~30% of Indian land is impacted by desertification and land degradation, and this outcome is strongly linked to poor water management. Water management and desertification have a two-way relationship. Extensive groundwater extraction contributes to loss of vegetation cover, which eventually leads to desertification. Increasing desertification and land degradation

diminish green cover, which reduces the land's capacity to recharge groundwater and regional water tables.

Water erosion, which is a loss of soil cover due to rainfall and surface run-off, is responsible for ~11% of desertification, making it the biggest cause of desertification in India. There are also perverse incentives that promote complacency on desertification and degradation close to urban areas—degraded land is easier to acquire for infrastructure and construction projects than fertile agricultural land. Therefore, a stronger emphasis is required on controlling this contributing factor to desertification and land degradation. The cost of land degradation has been estimated at ~2.5% of India's 2014-15 GDP. Land degradation can also cause up to 4% losses in Agricultural Gross Domestic Product in the future for India, which could drive food prices up. Such events should be a major concern for a country like India, where a significant population still lives in poverty and the government invests heavily in food subsidies.

RIVER INTER-LINKING

The National River Linking Project (NRLP) formally known as the National Perspective Plan, envisages the transfer of water from water 'surplus' basins where there is flooding to water 'deficit' basins where there is drought/scarcity, through inter-basin water transfer projects.

Digging further into the term 'surplus' as per the Government, states that it is the extra water available in a river after it meets the humans' requirement of irrigation, domestic consumption and industries thereby underestimating the need of the water for the river itself. The term 'deficit' has also been viewed in terms of humans only and not from the river's perspective, which includes many other factors.

History behind river interlinking

While the timeline has the history since the project's conception 125 years ago, our focus is on the most recent event which brought it back into the limelight.

- In 2002, the then President of India Abdul Kalam mentioned the river linking project during a speech. He proposed it as a solution to India's water woes after which an application requesting an order from the Supreme Court on that matter was submitted. The application was converted into a writ petition and finally, in October 2002, the Supreme Court ordered the Central Government to initiate work on inter-linking the major rivers of the country.
- In the same year, a task force was appointed and a deadline of 2016 was set to complete the entire project that would link 37 rivers but nothing concrete happened until almost a decade ago. On Feb 27, 2012, the Supreme Court ordered the constitution of a "Special Committee for Interlinking of Rivers" headed by the Minister of Water Resources.

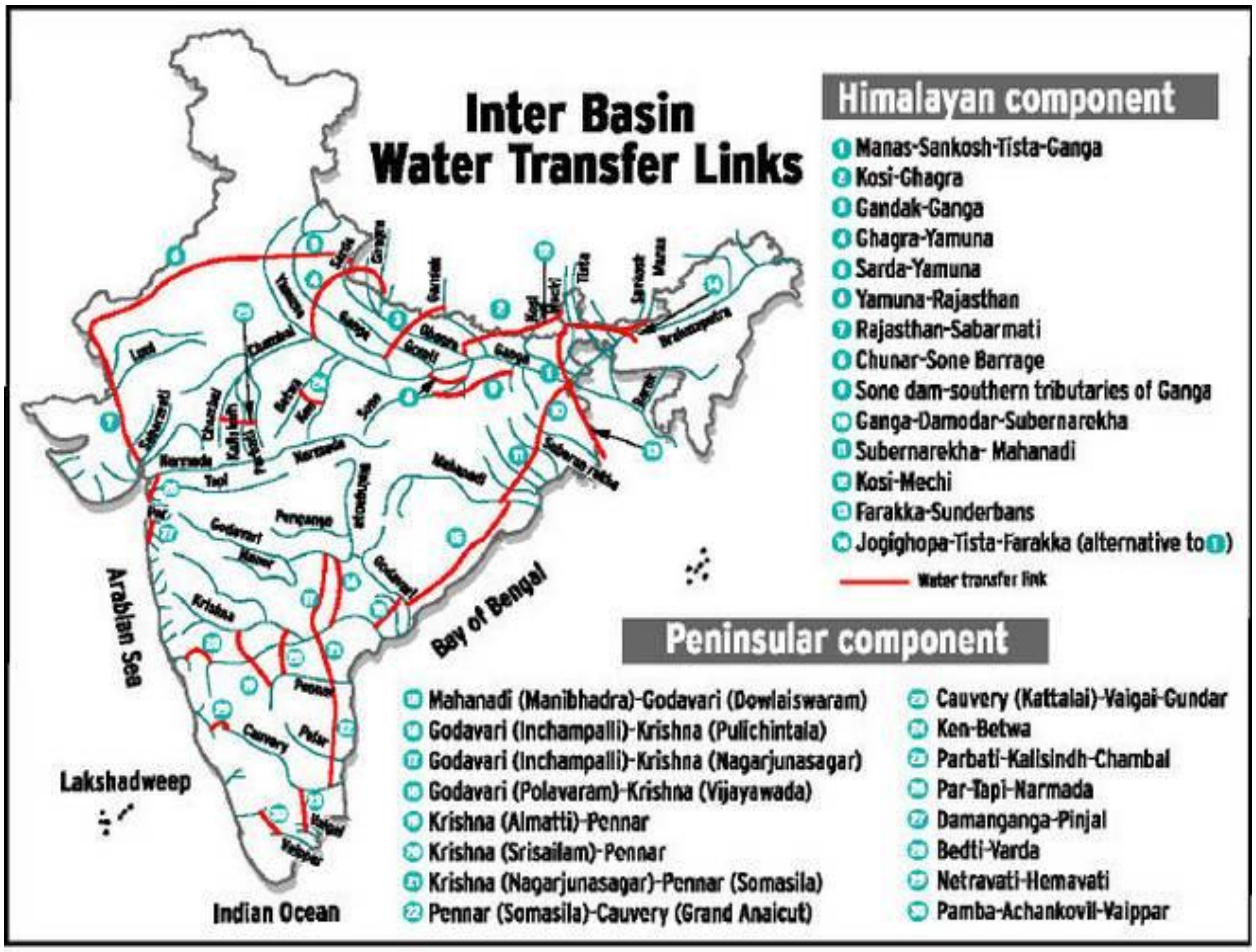
- Now here arises the question of judicial intervention. Ramaswamy R Iyer in his paper says that the accountable body to deal with such matters is Parliament and not the Supreme Court. The Supreme Court's responsibility is to ensure that the fundamental rights of citizens should not be denied, but as to how the fundamental rights will be ensured to the person is not in its ambit.
- The UPA Government was not in favour of the interlinking project, but with the coming of the NDA Government, river linking is once again in the limelight. Budget 2014-15 has earmarked Rs. 100 crore to expedite the preparation of Detailed Project Reports for this purpose.

Scope of the Project

The National River Interlinking Project will comprise of 30 links to connect 37 rivers across the nation through a network of nearly 3000 storage dams to form a gigantic South Asian Water Grid. It includes two components:

•**Himalayan Rivers Development Component** under which 14 links have been identified. This component aims to construct storage reservoirs on the Ganga and Brahmaputra rivers, as well as their tributaries in India and Nepal. The aim is to conserve monsoon flows for irrigation and hydropower generation, along with flood control. The linkage will transfer surplus flows of the Kosi, Gandak and Ghagra to the west. A link between the Ganga and Yamuna is also proposed to transfer the surplus water to drought-prone areas of Haryana, Rajasthan and Gujarat.

•**Peninsular Rivers Development Component** or the Southern Water Grid, which includes 16 links that propose to connect the rivers of South India. It envisages linking the Mahanadi and Godavari to feed the Krishna, Pennar, Cauvery, and Vaigai rivers. This linkage will require several large dams and major canals to be constructed. Besides this, the Ken river will also be linked to the Betwa, Parbati, Kalisindh, and Chambal rivers.



Source: National Water Development Agency

Major advantages of ILR

• Create the potential to increase agricultural production by an additional 100 per cent over the next five years;

• Avoid the losses to the extent of $550 million by the loss of crops because of extreme draught or flood condition;

• Save $ 565215000 a year in foreign exchange by avoiding importing oil;

• Unify the country by involving every Panchayat as a share holder and implement agency;

• Provide for enhancing the security of the country by an additional waterline of defense;

• Provide employment to the 10 lakh people for the next 10 years;

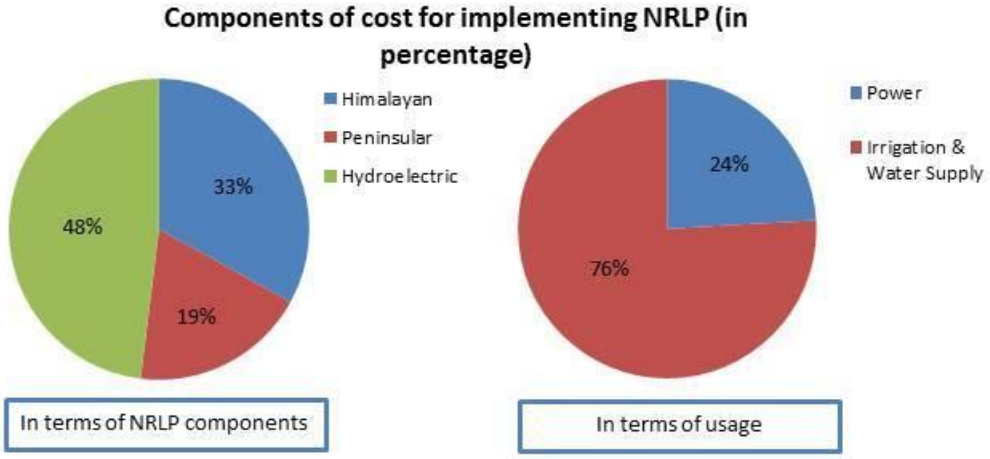
• Eradicate the flooding problems which recur in the northeast and the north every year;

• Solve the water crisis situation by providing alternative, perennial water resources;

• The large canals linking the rivers are also expected to facilitate inland navigation too;

• Increasing food production from about 200m tones a year to 500m;

• Boost the annual average income of farmers, from the present $40 per acre of land to over $500.



Major disadvantages of ILR

• Environmental costs (deforestation, soil- erosion, etc.)

• Rehabilitation: not an easy task

• Social unrest/Psychological damage due to forced resettlement of local people (for example, Sardar Sarovar Project)

• Political effects: strained relationship with neighbors (Pakistan, Bangladesh)

Issues and challenges

Inter-River Linking Project involves multifaceted issues and challenges related to economic, ecological, and social costs.

- IRL project has caused much anger and protest in our neighboring nation, Bangladesh. It is grappled with fear that diversion of water from the Brahmaputra and the Ganges, which provide 85% of the country's fresh water flow in the dry season, would result into an ecological disaster.
- Indian National Water Development Agency plans to dig hundreds of reservoirs and more than 600 canals. This may trigger an alarm among environmentalists to raise their voice against this plan. Environmentalists are quite concerned about the ecological

impact of the project of such huge magnitude. The water flowing into the sea is not waste; it is a crucial link in the water cycle. With the link broken, the ecological balance of land and oceans, freshwater and sea water. It is a particular characteristic of gigantic river valley projects which work against, and not with, the logic of the river." As this project is of massive estimated cost, a long-term planning and a 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 the dams, canals, tunnels, and captive electric power generation will also involve huge financial burdens. This certainly requires financial assistance from the private sector, as well as global capital agencies. Mobilization of global capital may ultimately entail the risk of destroying social welfare measures. The rehabilitation of project-affected people in water infrastructure projects will also pose a burning question before the concerned authorities. The construction of reservoirs and river linking canals in the peninsular component alone expect to displace more than 583,000 people and submerge large areas of forest, agriculture and non-agriculture land.
- Transfer of water is bound to be unacceptable as no state is likely to transfer water to another foregoing possible future use of such water. Domestic and regional geo-politics play a pivotal role on the discussions on ILR. As of now, there is no mechanism as of now to deal with matters concerning interbasin transfers. There are also important institutional and legal issues to be sorted out. Each of the 30 schemes of the ILR is supposed to get through several statutory, legal and procedural steps. None of the schemes have gone through any of it. The Union ministry of environment and forests has already said no to the project. No state is ready to give water to another state. In India's constitution, water is essentially a state subject. Several states including Kerala, Andhra Pradesh, Assam and Sikkim have already opposed ILR projects.
- There will be several environmental impacts of ILR including mergence of land and forests, destruction of rivers, aquatic and terrestrial biodiversity, downstream impacts, destruction of fisheries, salinity ingress, pollution concentration, destruction of groundwater recharge and increased methane emission from reservoirs, among others.

Unfortunately, there is no comprehensive assessment of all such possible impacts for a single link in any credible way.

Successful implementation of this project largely looms upon timely release of water from the surplus basin to the deficit basin. The Government of India has constituted a task force to examine the project, comprised of experts from science, engineering, economics, and social sciences and including as official stakeholders one member from a water deficit state and one member from a water surplus state.

It will address the following broad issues: provide guidance for norms of appraisal of individual projects vis-à-vis their economic viability, socio-economic impacts, environmental impacts, and preparation of resettlement plans; develop a mechanism for speedy consensus amongst states; prioritize different projects; propose organizational structures for implementing the project; consider funding modalities for the project; and consider the international ramifications of the project.

Amidst rapid development and urbanization, outdated systems of managing water resources; it is the high time for India to come forward in all-out manner to transform this dream project into a big reality.

Fact is that the ILR projects are site and requirement specific depending upon the hydrological, geological, topographical and regional conditions. It is essential that needed environmental safeguards are properly implemented in a coordinated manner by various agencies.

We have to develop a range of models that agree to use shared data sets and explore definitions of water use/ consumption. If water transferred from water abundant rivers to waterdeficit areas, there would be adequate supply for everyone in every part of the country. It also appears to promote national integration and a fair sharing of the country's natural water wealth. India's river linking project shows and promises a great concern for water conservation and optimum use of available water resources.

Undoubtedly, it is the need of the hour to have a water mission like as IRL, which will enable availability of water to the fields, villages, towns and industries throughout the year, even while maintaining environmental purity to combat with both fold and drought simultaneously. The problem of providing domestic water supplies in areas away from the rivers will largely remain unsolved, even if the interlinking project is completed. IRL Project may not have much effect on improving the supply situations in the vast dry areas that are in the higher parts of the basins and away from the rivers to be interlinked rivers, and therefore, most critically will have to depend on local rain water.

Thus, the gigantic construction in the name of delivering water to the water scarce areas may prove to be not the most cost-effective way of doing so. Most of the rural areas are suffering from water scarcity; there is no alternative available at local level for harvesting of water. For these areas, the option of long-distance transfer may not be a good idea.

Some of the major criticisms of the project are about its socioeconomic viability, environmental impacts, displacement and rehabilitation of affected people, the challenge of resource mobilization, geo-political constraints, as well as domestic political dynamics.

Ministry of Environment and Forests put out a 23-point concern about the environmental implications of the proposed interlinking project. These included

- the submergence of forests and cultivable areas,
- displacement and resettlement and
- serious implications in terms of bio-diversity loss.

Scientists are also doubtful that river diversion would bring drastic changes in the physical and chemical compositions of the sediment load, river morphology and the shape of the delta formed at the river mouth. All these have serious economic and livelihood implications that are merely ignored by the project.

There is an urgent need to take Socio- environmental concerns related to IRL Project so a very detailed hydrological, geological, meteorological and environmental analysis of the project would be imperative in the benefit of India. There is an acute need for examining the presuppositions on which the whole interlinking project has been conceived.

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