

Paradise in Peril: Dams, Development and Domination



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Abstract: *Damming rivers is often seen as the panacea of the neo-liberal development paradigm. It is believed to be the fit all solution to problems of agricultural production, flood control, irrigation in arid and semi-arid regions, electricity generation as well as urban development. The industrialization of the world and the adoption of a capital intensive, mechanized and market-oriented production process has dramatically altered the environment as resource-extraction and resource consumption increased manifold. Nature, in fact, became a source of supply of raw materials for feeding the ever growing needs of modernization and development as well as a dump-yard for material waste, slowly heading towards a perilous condition. The paper, therefore, seeks to explore and investigate the issue of damming rivers as a domineering force over nature explicating the power of science over nature.*

Keywords: *Dams, Development, Capitalism, environment, social justice*

I. INTRODUCTION

Water is one of the vital elements of sustenance of life on this blue planet- the Earth. Water is the critical life sustaining element for humanity ranging from human consumption, agricultural productions, energy generation and maintenance of ecological balance and bio-diversity. The demand of water for both agricultural and non agricultural uses has grown rapidly because of increasing population, increase in per capita income, industrialization as well as urbanization. But the supply of water (surface and ground water) has not increased with its demand; thereby pushing the world towards an imminent water crisis. Climate change is effecting a change in the patterns of rainfall and snowfall; the glaciers which are the largest reserves of fresh water, the only form of water suitable for human use are melting; sea water is rising and there has been a change in the global temperatures leading to a change in the entire eco- systems. This has generated competition and conflict among nations and states over access to and use of water at different levels which not only threatens the basic human right of access to safe drinking water, but, also puts the livelihoods of millions of people at risk. The 'Report of the World Commission on Dams (2000)' states that less than 2.5% of water in the Earth is fresh, less than 33% of the fresh water is fluid and less than 1.7% of this fluid water runs in streams [1].

And with the population of the world touching 7 billion and less than 2 percent of fresh water available, the demand for water to meet the ever growing needs of the people with present infrastructure will far exceed the available supply. Rivers are one of the most fundamental sources of surface fresh water which have been utilized for human use around the world through various human actions like building dams, embankments, reservoirs, canals etc. Dams are the barriers constructed to obstruct the natural flow of water in rivers and lakes so as to store water in reservoirs for irrigation purposes or for generating electricity or to be used for navigation facilities etc. They are the engineering marvels that seem to defend the instrumentalist view that nature needs to be controlled and used for advancement of human lives. Whether it is for greater irrigation facilities to increase crop production, generation of hydro electricity or flood control or any other purposes, large dam projects became one of the most favored areas of development projects around the world. Numerous dams were constructed like the Hoover dam or the massive Grand Coulee dam in the United States of America (USA) or the High Aswan Dam on the Nile or the Bhakra Nangal in India which were considered as monuments of progress and prosperity. However, recent literatures on dams have gradually exposed the not so rosy picture of these monumental marvels specially the report of the World Commission on Dams - *Dams and Development*. It has been observed that the social and ecological costs of dams far outweigh the economic benefits. Millions of people are displaced, large hectares of land are submerged and promises of rehabilitation and resettlement barely materialize while Environmental Impact Assessments (EIAs) are partially conducted. Amidst all these, the larger question remains to be asked is that of its beneficiaries. Who derive larger share of benefits from constructing dams? Do the fear factors regarding loss of livelihood and that of environmental distress addressed? Are dams, particularly large dams indispensable for the contemporary development paradigm? Hence, attempts are made to look into the intersections of dams as a need for development to 'manage' water resources and its implications on the environment and society.

II. MARCHING TOWARDS PROGRESS-THE 'INDISPENSABLE' NEED OF DAMS?

Dams have been conceptualized as a means to address the ever growing water needs of an increasing population. They are, in fact, regarded as a keystone in the management of water resources. Since the ancient times, dams were constructed to store water or supply water mainly for irrigation purposes.

Revised Manuscript Received on April 30, 2020.

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With the progress of human civilization and with technological innovation, there was a greater need to tap the renewable water supplies and dams began to be constructed for specific purposes like irrigation, navigation, flood control, sedimentation control and hydropower generation. Dams are considered as a significant aspect of water resource management policies.

They are looked at as engineering marvels that transform rivers into a series of reservoirs and canals which are imperative for increasing food production and provide electricity for the ever growing industries thereby fuelling economic development. Foreign financiers, industrialists, private companies have ardently promoted dams in the developing countries. The World Bank is the biggest financier of dams in these countries apart from the Food and Agricultural Organization (FAO) and the United Nations Development Programme (UNDP) which have also played an important role in promoting dams in the Third World. In other words, the worth of a dam can be aptly described as: Now what we need is a great big dam,

To throw a lot o' water out across that land, People could work and stuff would grow, And you could wave goodbye to the old skid row. Woody Guthrie, 'Washington Talkin' Blues', 1941 [2] A large dam is defined by the International Commission on Large Dams (ICOLD) as a structure with at least 'a height of 15 meters from the foundation or, if the height is between 5 to 15 meters, having a reservoir capacity of more than 3 million cubic meters' [3]. In fact, the role of dams has been vastly acknowledged in the management of limited water resources which are unevenly distributed across regions and also subject to seasonal variations. Dams are basically of two types - run-of-river dams which have very limited storage capacity and are built primarily for power generation and storage dams for multiple purposes. Run-of-river dams generally have smaller reservoirs and generate electricity in proportion to the flow of the river at any given time. While storage dams have large reservoirs and are used for various purposes like generate electricity, supply water for agricultural, industrial and household purposes, control flooding and assist river navigation by providing regular flow of water. Most dams are single purpose dams but multipurpose dams are growing in number. Irrigation and hydropower generation account for the most common purposes of dams. Among the single purpose dams, 48 % are for irrigation, 17% for hydropower (production of electricity), 13% for water supply, 10% for flood control, 5% for recreation and less than 1% for navigation and fish farming [4].

Dams are being considered as the cheapest mode of electricity generation. The most advantageous reason for constructing dams for generating hydro electricity over other forms of electricity generation is that they use renewable sources i.e. water unlike thermal or oil power plants. Moreover, reservoirs can store water during lean season and generate electricity during peak hours. The vast quantum of water in the reservoirs also acts as steady supply of water for irrigation with minimum seasonal variations. The water can also be sent to treatment plants and made suitable for drinking purposes. Reservoirs can be used to hold back water during monsoons to control flooding downstream and release adequate water during the dry seasons thereby

balancing the flow of water in a river. Most dams in Asia (89%) are intended for irrigation while in Europe, South America and Australia, 20% to 30% of the dams are used for power generation and 13% to 14% for water supply. North America has the highest proportion of multipurpose projects as well as flood control dams in the world [5].

Flood control and navigation did not receive much attention as important functions behind the rationale of constructing dams. 'Hydro-electric dams are often considered fairly successful in terms of achieving their national-level objectives: they provide the expected electricity, sometimes even more than expected if the climatic conditions are right. Irrigation dams often have more mixed results because irrigated agriculture involves a highly complex set of technical, economic, organizational and cultural factors' [6].

Globally, the number of dam projects increased rapidly throughout the 20th century as countries required more and more electricity to fuel industrialization and build a robust economy. However, decommissioning of dams has been initiated in the West due to multiple factors like decreasing availability of good dam sites, dam safety and maintenance as well as growing awareness about environmental and social costs of dams but continues to be in full swing in the developing countries. Damming rivers still is an attractive and important priority for policy makers in Asia. 'According to international projections, the total number of dams in developed countries in the next ten years is likely to remain about the same, while much of the dam building in the developing world, in terms of aggregate storage-capacity buildup, is expected to be concentrated in Asia, especially China' [7].

But has the era of big dams really ended? There might be stagnation on new dam projects in the West, but the focus has now shifted to the Asian giants and other developing countries where dams are still being vehemently pursued as an important part of the development agenda. Thousands of large dams are under construction or are on board. China plans to build two mega dams on the Yangtze river, the 14,400 MW Xiluodu (as the second most powerful dam in the world after the Three Gorges dam) and the 6000 MW Xiangjiaba. The Indian government plans to build more than 100 mega projects in the state of Arunachal Pradesh to tap its huge water resource potentiality like the 2000 MW Lower Subansiri project and the 20,000 MW Dihang project on the river Brahmaputra. Series of large dams are being planned on the river Amazon in Brazil. There is no doubt that the dam industry has been going through turbulent times but it looks unlikely that there is any stopping to the craze behind this gigantism.

III. CAPITALIST AGENDA, DAM-BUILDING AND DEVELOPMENT

Dams are being projected as the emblem of development, the 'modern day temples' which could control the power of water and reinforce the idea of modern science which assumes human beings as supreme over nature.

The control of river through a series of dam projects reveals the capitalist planning behind in which hydraulic profit has become the watchword. The state having the legitimacy of control over resources under its territorial jurisdiction is the major agency behind the flourishing of the dam industry aided by foreign capital and sponsored by global capitalism. The development virus unleashed by the belief in capitalism drives the craze behind corporatism and private profit associating it with the insatiable consumption of the earth's resources. At the heart of the system which tries to grow continually into an empire, is to perpetually expand the consumption base through increased production or rather exploitation of the natural resources. Thus we see rivers being dammed, land and oceans being drilled for oil, forests being devoured for mining so on and so forth. Dammed rivers were identified as the metaphor for the new, modern and civilized nation with a formidable strength of technocrats and bureaucrats. Large dams became the symbols of gigantism and the technical masterpieces to pursue the goal of national development whereas undammed rivers were considered as water 'wasted.'

Lars Lovgren in giving an account of the large dam debate in Sweden categorically points out the nexus between the state and the private interests in the dam industry. He points out that in Sweden, Vattenfall is the dominant player in the electricity market and produces nearly 50 percent of electricity in the country through its hydro and nuclear projects and having exhausted the domestic market, it started explorations and dam constructions in Third World countries like in Laos, the Theun Hinboun [8]. Similar situation has been observed in the state of Arunachal Pradesh in India where the state government has entered into Memorandum of Understandings (MoUs) with a number of private companies like Reliance Energy, DS Constructions, Jaypee Associates etc to harness the hydroelectric power potential of the state's rivers through construction of dams. Since the 1990s the thrust has been to attract private investors into the dam building industry as government subsidies and state control have been gradually pushed to the periphery in the wake of market driven globalized economy. The idea that the massive dams symbolize the might and progress of the state has been reaffirmed by the pro-dam lobby which view dams as instruments of 'taming' the waters and instill 'value' in the rivers. 'Value' is regarded as economic value of the river measured in terms of its hydroelectric power generating capacity and irrigation capacity to fuel the engines of industrialization and energy security. Dams, in fact, 'have been promoted as an important means of meeting perceived needs for water and energy services and as long-term, strategic investments with the ability to deliver multiple benefits.....Regional development, job creation and fostering an industry base with export capability are most often cited as additional considerations for building large dams' [9]. Notably, this has reinforced the idea of 'hydraulic capitalism'[10] through large dams. In all such considerations, nature is viewed as having an 'instrumental value' for satisfying the needs of human beings to steer the wheel of development and its management and conservation is seen in light of the shallow ecology perspective which

believes in conservation and protection of the environment for human interests.

IV. WHOSE PARADISE? CONSEQUENCES AND COROLLARIES

Environment provides human societies with all the necessary ingredients to satisfy their needs and is instrumental for the advancement of human civilization and thereby for the advancement of human well being. The incessant drive towards the fantasy of development incorporates in its core the destruction and exploitation of the nature to the fullest, particularly in the present day globalised era. Foster et al mentions James Gustave Speth who writes that 'capitalism is incapable of sustaining the environment [11].' Technological advances decreased mortality rates with improved healthcare facilities leading to an increasing population accompanied by rapid transformation of the countryside into burgeoning cities, teeming with millions of people with new taste of production as well as consumption. Thus, a new consumerist culture was set in tune by the industrial revolution necessitating new ways of nature exploitation which is to be increased manifold later in the 20th century by the globalizing tendencies.

Dams are static monuments which try to 'tame' the natural free flowing rivers for different purposes. The vibrancy and wildness of a river is sought to be tamed as well as altered by dams. Damming the world's rivers has led to a profound change in the watersheds and river morphology. Environment impacts of large dams are becoming visible on public policy making through their impacts on watersheds, riverine ecology, water quality etc. Large dams cause significant changes in river hydrology, sediment load, riparian vegetation, submergence of land, destruction of fish species etc. Moreover, socially these projects attract strong opposition due to large scale displacement of people and huge submergence of land, including forest cover, thereby, uprooting communities from their natural habitat and depriving them of their livelihood. Whatever be the objectives, dams radically transform the areas in which they are built. They change the landscape and ecosystems and also the local socio-economic milieu. This can be analyzed through the following juxtapositions:

V. THE SOCIAL CONSEQUENCES OF DAMS

Pushed as a development agenda, construction of large dams has been justified on economic, social and political grounds by the powerful dam lobby including politicians, bureaucrats and technocrats. Economically, dams have been projected as a huge source of revenue generation through supply of electricity for residential and industrial purposes, irrigation etc. Socially, they are supposed to raise the living standards and facilitate urbanization and politically, they are supposed to be the symbols of modernity and development for the nations to boast of. If such were the projections of benefits of dams, then one needs to ponder upon as to why have dams become one of the most debated issues of contemporary political discourses and social discontentment?

The WCD which was set up in 1998 as a response to the emerging controversies around large dams, in its report published in 2000 estimated that the most serious negative implications of dams are on the ecosystems and project affected and riverine communities. Downstream impacts include loss of biodiversity, impact on floodplains, wetlands, estuaries and marine ecosystems that are irreversible while ‘millions ...

have also suffered serious harm to their livelihoods and had the future productivity of their resources put at risk’[12]. These observations reflect the disproportion of the principles of equity and just distribution of resources amongst affected communities and those who enjoy benefits from dams. In most cases, it has been observed that dam affected communities are tribes and indigenous populations who depend on nature for their sustenance and have developed their culture, identity, social and economic systems around their natural resources. Large dams can have severe and long-lasting effects on the lives and livelihoods of the affected communities through loss of both tangible resources like land, cattle, forests and intangible resources like cultural heritage. Given the fact that dams submerge huge tracts of land, including forest cover and prime agricultural land and results in large scale displacement of people, their immediate social impacts are felt more concretely by those displaced or those who have lost their land. Having said that, it would be futile to ignore the impacts felt by downstream communities as they face serious threats to their livelihoods due to the dams built upstream. The WCD report estimated that about 40-80 million people had been displaced by large dams while populations living in downstream of large dams have experienced serious turmoil through loss of livelihood opportunities. There is loss of food security as well as loss of physical, cultural and spiritual security for the river dependent communities. This leads to the presupposition that dams can be considered as a threat to the notion of human security itself.

The WCD report also points out that those displaced by large dams were not rehabilitated, resettled or compensated satisfactorily. Resettlement programmes can only lead to physical relocation of the affected communities but cannot restore their lost livelihoods since livelihood patterns are created over long periods of interactions with the host environment. Communities develop their skills and lifestyles in conjunction with their immediate surroundings and when there is loss of their natural and cultural habitat due to submergence and consequent displacement, communities, particularly the poor, marginalized and the vulnerable groups are likely to suffer from the large scale social and environment costs of large dams. These losses have long term implications for those displaced which manifest differently across class, caste and gender. From a gender perspective, displacement and loss of natural resources can severely impair and restrict gender equity with women being doubly victimized due to the existing social differentiation between men and women. The time spent by women in collecting fuel, fodder and water gets lengthened causing serious implications for their health status; women are more vulnerable to sexual and physical abuse and other forms of violence in camps set up due to displacement while

resource scarcity would also result in lowering of nutritional intake of women. Bina Srinivasan (2001) argues that ‘not only has gender to be integrated into any conceptual framework involving equity, it has to be seen at all levels and all stages of dam planning and execution [13]’. Studies have shown how the forced displacement of people by the Sardar Sarovar project in India have led to a seizure of their livelihoods and enforced increased alienation of the people. What such a development model ignores is the fact that a large proportion of the population is displaced from their natural environment depriving them of their livelihood besides impinging on the communities’ rights to resources as well as ecological damage.

VI. THE ENVIRONMENTAL CONSEQUENCES OF DAMS

Dams are being pursued as an integral component of a neo-liberal market driven capitalist development agenda in contemporary times for various purposes. But the cautionary point is that dams, particularly large dams, produce large scale ecological consequences, both for upstream and downstream ecosystems. They disrupt and block the natural course of the river bringing in considerable changes in the river morphology. In upstream areas, dams results in permanent destruction of many terrestrial ecosystems through submergence and inundation leading to loss of valuable forest resources as well as precious flora and fauna. Reservoirs trap essential water minerals and obstruct the migration of numerous aquatic species. While in downstream areas, dams result in changes in the flow regime, sediment transport, water temperature and water quality having long term implications for fish migration and marine ecosystems. Changes in sediment transport have far-fetched implications for the flood plains and the coastal areas where vegetation owes a great deal to the soil and sediments and other nutrients washed down by the rivers. Such changes might stretch to hundreds of kilometres downstream of dams causing severe damage to livelihoods of communities who depend on the flood plain ecosystems for their sustenance. Further, dams also bring changes in hydraulic characteristics and geo-morphological characteristics of a river; aquatic life and their habitat; riparian vegetation and associated fauna and also in the direct use of the resources of the river and its floodplain by local people [14]. Overall, dams reduce normal flooding and flow of the river and fragment floodplain ecosystems from the riverine ecosystems. Each river is unique, so is its landscape and also each dam. And hence, to calculate the exact environmental consequences of dams in purely quantitative terms might turn out to be an upheaval task as some consequences can be of short term while others might surface after a long time of completion of dams. But the veracity of the situation is that dams alter the entire linkage of the riverine ecosystems which took thousands of years of adaptation and destroy species diversity. Commenting on the death of the Colorado delta with the Colorado river being dammed, impounded and diverted as part of ‘river engineering’,

McCully describes how damming rivers results in turning a 'floodplain river' into a 'reservoir river' and can be regarded as a 'huge, long term and largely irreversible environmental experiment without a control [15].' He further contends that permanent submergence of huge tracts of forests cover, wetlands, watershed, wildlife and prime agricultural land are perhaps the greatest damage done to the environment by dams. alterations in the natural course of rivers in the name of 'management' of rivers has led to the extinction of many endangered species and de-linked the local ecosystems from the river, the loss of which is irreparable, unalterable and beyond restoration.

VII. RESULT

The contemporary development paradigm projects nature as all resourceful to cater to the needs of humanity thereby leading to massive exploitation of the nature. It rests on the premise of dominance and control over nature, quite oblivious of the fact that there is a limit. Of late, the concept of De-growth debunks such projections and focuses on the need of balanced and sustainable use of natural resources for human sustenance. In the backdrop of the above, it can be concluded that sustaining rivers and livelihoods by understanding, protecting and restoring ecosystems at river-basin level is vital to promote equitable human development and welfare of all. Given the fact that large dams have far-reaching consequences, it is imperative to integrate the issues of equity, distribution, rights and social justice in the planning and execution frameworks of the development process so as to obliterate the inequities inherent in the present frameworks.

VIII. CONCLUSION

Dam building has been a key policy priority of the modern states. India has been planning to tap the unused water resources to meet its ever-growing energy needs without paying heed to the impending socio-economic shocks upon the downstream communities. Though the states exercise paramount power on water legislations, but owing to the increasing power of the centre, the dam building exercises have acquired new impetus.

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