JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Socio-Economic and Environmental Impact of Large Dams-A Study

Dr Ramya S
Assistant Professor, Department of Sociology
Karnataka State Open University,
Muktagangothri Mysore.570006

Abstract: -

There is a growing concern that dam projects cause irreversible environment change, which are often complex, multiple, and essentially negative. Large dams have enormous consequences for people's lives and livelihoods, including controversial issues such as displacement and resettlement. The opponents of dam construction argue that the social and economic consequences (and environmental) of large dams are more far-reaching than those associated with other infrastructure projects because of the huge impact across time and space in both the ecosystem and in social, economic, and cultural structures. Provided that such communities are relocated with adequate compensation, new economic opportunities and social benefits, they can exploit the new circumstances as a chance to strengthen their income-earning capacity and thus their living standards. The new settlement may provide upgraded infrastructure facilities and reduced exposure to nature hazards Developing and developed countries perceive dam removal in different contexts due to their technical and economic strengths. Therefore, it is unlikely to define unique combinations of socio-economic benefits in developing and developed worlds. Decisions regarding dam removal should incorporate social, economic, and geographic considerations in regionally explicit contexts. Overall, dam removal should be seen as equally important as dam building in the overall planning process on water storage infrastructure developments.

Keywords: - Large Dams, River, Environment. Projects, construction, agricultural, instability, tourisms.

I. INTRODUCTION:

The main dam functions are irrigation, hydropower, water supply, and flood control, while other functions include recreation, navigation, and fish farming. Irrigated agriculture ensured largely by dams, contributes about 40% of world agricultural production, while hydropower dams generate around 20% of global electricity production. Dams store large volumes of water during extreme rainfall events, reducing the likelihood of downstream flood disasters. Additionally, most of the world's urban, agricultural, and industrial regions' water security is sustained by these large storages India's demand for water is growing at an alarming rate and population growth is forecast to peak at 1.6 billion by 2050. This will increase the strain on water resources as a rapidly growing economy and a large agricultural sector stretch India's supply of water even further. Climate change is expected to exacerbate the problem by causing erratic and unpredictable weather and could diminish the supply of water, especially that from glaciers. As demand for potable water starts to outstrip supply incoming years, India could face a number of linked problems such as food shortages and interstate and international water conflict. Water is considered as one of the fundamental basis element of

development, economic prosperity and social wellbeing and its shortage will cause many limitations in modern world. Water shortages directly and indirectly effect on many industrial sectors such as the control, storage and water supply, distribution types, transmission, factor productivity, planning, conservation management and in this regard, it is considered to be constructed large and small dams and irrigation networks of rivers in different countries to take advantage of the water potential to meet the needs and objectives such as drinking, agriculture, industry, generating hydropower energy, flood control. In additions, dams provide water during a year; they can be used for fishery, boating and recreational opportunities and tourist purposes. Besides all the benefits mentioned regarding to dam construction and especially for large dams, construction of dams and power plants can be short-term and long-term negative consequences on environmental situation where the dam is constructed directly and indirectly. For this reason, the below are some of the damaging environmental effects of dams according to the guidelines of the International Committee on Large Dams.

Impacts of Dams

The International Commission of Large Dams (ICOLD) defines large dams as dams with a height of 15 m or more from foundation to crest. Dams between 10 and 15 m also fall into this category if: crest length is over 500 m or spillway discharge over 2000 m3 s −1 or reservoir capacity is more than one million cubic meters. At present, more than 45 000 large dams and an estimated 800 000 small dams regulate the world's rivers: some have been built to supply water including irrigation, control floods, provide for navigation, fishing and recreation, and importantly to generate electricity. The reservoirs have played an instrumental role in economic development; however, there has been growing controversy about the failure of these projects to address environmental and social concerns. Opponents of large dam projects claim that the benefits are outweighed by their environmental and social costs and the related direct and indirect economic concerns.

ENVIRONMENTAL IMPACT OF LARGE DAMS:

Below are some of the damaging environmental effects of dams according to the guidelines of the International Committee on Large Dams.

i. Physical and Chemical Effects: Creation barrier motion of flow, sedimentation in reservoirs, severe erosion along the river, valve blockage, raising humidity, climate changes, ground shaking, increased surface evaporation, rising ground water and changing lands to salinity.

ii. Biological Effects: Reduction in nutrient concentrations downstream of dams, growth of phantoms, Growth of river plant, extinction of some species, getting limited fish spawning areas, thermal stratification, serious changes in water quality, increased opacity of water, Releasing of toxic substances (pesticides, toxic metals such as arsenic, lead, nickel, mercury, cobalt, and zinc etc.), increasing the concentration of pollutants in the intake water in periods of water shortage, deterioration of vegetation, Greenhouse gas emissions.

iii. Health Effects: source of many infectious diseases (ex. malaria), creating a favorable environment for oviposition of mosquito or other insects.

iv. Economic and Social Effects: increasing urban population, immigration of people, destruction of roads and power transmission lines, lack of access to some of Points of the range, loss of valuable agricultural lands, unemployment, destruction of historical and archaeological sites, destruction of some places with specific topographic.

v. Impacts of Dams on Noise Pollution: During the construction phase, disturbing the peace of leaving wildlife, increased risk of loss of animals, demolishing there habitat. Large dams and power plants, has caused large changes in the environment and it will lead to the destruction of many environmental structures and migration of bird species due to noise

vi. Effect of Dams on Ecosystems of Aquatic Organisms: Increasing of BOD in water formation of anaerobic degradation environment, formation of dark and funky environment, the exceeding of phytoplankton, growing of macro-flora in the water, decline in fish populations, increasing evaporation and transpiration, making a barrier to stop fish from passing.

socio-economic impacts

. The construction of a dam on a river can block or delay upstream fish migration and thus contribute to the decline and even the extinction of some species that depend on longitudinal movements along the stream continuum during certain phases of their life cycle. This paper summarizes dam removal impacts on the local economy and in-dusty, culture, history and heritage, property value, recreation, aesthetics, and disaster avoidance from identified studies worldwide. It demonstrates that these impacts may vary depending on geography and between developed and developing countries. It concludes that dam removal should consider the cost, environmental, and the socio-economic impacts while including all stake-holders who could be positively and negatively impacted by dam removal. Large dams can remarkably effect on the environment as a non- stabilizing factor in nature in various stages of construction, operation and end of life by stopping the flow of the river and stored water on its up-steam site. However, if the environment cannot tolerate this instability, the results of the destruction of this structure will gradually rise and the objective of dam construction will be lost. In this paper, we will review the environmental impact of construction large dams on some rivers across the country and we will separately examine the use of several large dams as an important and effective option.

Social impacts of large dams

Future DAMS researchers are evaluating how the post-project benefit streams from dams promote or undermine equity within (eg gender) and between vulnerable populations (eg upstream-downstream). Moreover, we will determine how impacts of dams on local populations (on community cohesion, livelihoods, asset tenure, gender equality) can best be addressed within practical operational frameworks (the safeguards agenda) to ensure more equitable distribution of benefits (the positive benefits agenda).

What is the environmental impact of Dams?

- **Habitat fragmentation:** Unless specifically engineered to allow fish to pass through them, **dams present a barrier** to fish that need to migrate to spawn and reproduce downstream and upstream along a river. This not only impacts the populations of the fish themselves, but it can negatively impact other species in the food chain that either eat that fish or are preyed upon by that fish.
- **Flooding and the destruction of surrounding habitat:** Dammed rivers **create a reservoir upstream** from the dam, which spills out into the surrounding environments and floods ecosystems and habitats that once existed there. Such flooding can kill or displace many different organisms, including plants, wildlife, and humans.
- **Greenhouse gases:** The flooding of surrounding habitat around dams kills trees and other plant life that then decomposes and releases large amounts of **carbon** into the atmosphere. Because the river is no longer flowing freely, the water becomes stagnant and the bottom of the reservoir becomes becomes depleted of oxygen. This lack of oxygen creates a situation where **methane** (a very potent greenhouse gas) is produced from the decomposition of the plant materials at the bottom of the reservoir that eventually gets released into the atmosphere, contributing to global climate change.
- **Sediment builds up behind the dam:** Because a dammed river no longer flows freely, the sediment that would have otherwise been deposited naturally downstream begins to build up behind the dam, forming new riverbanks, river deltas, alluvial fans, braided rivers, oxbow lakes, levees and coastal shores. These changes in sedimentation can lead to dramatic alterations in plant life and animal life and how they are distributed.
- **Downstream sediment erosion:** Due to the restrictions in the sediment flow above a dam, the lack of sediment that would have once flowed downstream ultimately leads to a **deficiency in sediment load**, and therefore, leads to an **increase in downstream erosion.** This lack of sediment load causes the riverbed to deepen and narrow over time, a compromised water table, the homogenization of the river's flow, reduced wildlife support, and a reduction in sediment that reaches coasts and deltas.
- **Negative impacts on local fish populations:** Typically, local fish species **will not be adapted to the new environment** that is present after a dam is built and do not survive, leading to the extirpation of local populations. Many factors impact their survival, including the blockage of migration routes, a disconnection from the river's flood plain, changes in a river's flow, changes in temperature, turbidity, dissolved oxygen, and changes in local plant life.
- Organic materials from within and outside the river that would normally wash downstream get built up behind dams and start to consume a large amount of oxygen as they decompose. In some cases this triggers algae blooms which, in turn, create oxygen-starved "**dead zones**" incapable of supporting river life of any kind.

- Also, **water temperatures in dam reservoirs can differ** greatly between the surface and depths, further complicating survival for marine life evolved to handle natural temperature cycling. And when dam operators release oxygen-deprived water with unnatural temperatures into the river below, they harm downstream environments as well.

- **Production of methyl-mercury:** The stagnant water in reservoirs creates a situation where the decomposition of organic matter from decaying plants can transform inorganic mercury into methymercury. Unfortunately, methyl-mercury tends to bio-accumulate and cause toxic effects in humans and wildlife that eat the fish in reservoirs.

Economic Impacts:

Dams have brought considerable benefits to many countries and regions. They have enabled improvement and expansion of hydropower generation; irrigated agriculture; water supply for domestic and industrial uses; water for ecological services and pollution control; flood control; and reduced vulnerability to droughts. Dam assessment is by its nature a complex undertaking. First, many of the benefits and costs associated with dam development have quite different time streams, with hydropower and irrigated agriculture benefits materializing relatively quickly, flood control and drought reduction benefits being episodic, and some environmental costs only appearing decades later. Second, these benefits and costs are faced by different sectors and there are inter relationships between sectors so that, for example, agricultural expansion may bring in population that makes the region more resilient and able to take advantage of opportunities in industrial sectors at later times. Lastly, the effects of dams are distributed across different spatial scales, from local to basin, to regional to national, and in some cases, to transnational.

IV. CONCLUSION:

Adverse and inconsistent impacts of large dams in India can be found in precipitation socio – economic, string, lack of proper utilization management, water loss issues, displacement of people and dam lake water problems in order to provide drinking water due to the poor quality. It must be admitted that conceptual for all definitions provided of sustainable development are based on system integration, relationship system of economic, social and environmental factors and emphasis on responding to the needs of the current generation and next generations and accepting capacities and limitations of environment, so, the only way to achieve sustainable development is enough attention to all ecosystems in downstream and upstream dams that have decided to build them. Although the only natural input to any surface water system is precipitation within its watershed, the total quantity of water in that system at any given time is also dependent on many other factors. These factors include storage capacity in lakes, wetlands and artificial reservoirs, the permeability of the soil beneath these storage bodies, the runoff characteristics of the land in the watershed, the timing of the precipitation and local evaporation rates. Human activities can have a large and sometimes devastating impact on these factors. Humans often increase storage capacity by constructing reservoirs and decrease it by draining wetlands. Water conservation is a practice in which the effective and efficient way of use water that reduce the demand of water for establishment. For example, recycling of wastewater comes from domestic and industrial activity used for some other purposes like cleaning,

agricultural, etc. For the successful management of ageing dams, the dam removal process should be incorporated as a critical component in a dam's planning phase. The process should include all stakeholders who are positively and negatively impacted by an existing dam and consist of up-and-down-stream communities, engineers, dam managers, and policymakers.

REFERENCES:

1]Barker, R. (2004). Evolution of Irrigation in South and Southeast Asia. In Comprehensive Assessment of Water Management in Agriculture Series (Vol.5).

2] Bednarek, A. T., & Hart, D. D. (2005). Modifying Dam Operations to Restore Rivers: Ecological Responses to Tennessee River Dam Mitigation. Ecological Applications, 15,997-1008. https://doi.org/10.1890/04-0586

3]Bellmore, J. R., Duda, J. J., Craig, L. S., Greene, S. L., Torgersen, C. E., Collins, M. J., & Vittum, K. (2017). Status and Trends of Dam Removal Research in the United States. Wires Water, 4, e1164. https://doi.org/10.1002/wat2.1164 Berga, L. (2009). Dams and Floods. In: Y. Takahasi (Ed.), Water Storage, Transport and

4] Akash Kumar Gupta, "A research paper on dams and its impact on fishery", International Journal of Multidisciplinary Education and Research, ISSN: 2455-4588, Issue 2; March 2018. Volume 3, pp 18-20.

5] Bhalme SP, Nagar naik PB. "Analysis of Drinking Water of Different Places", International Journal of Engineering Research and Applications (IJERA). 2012; (2) 3:3155- 3158.

6] Sapan Parekh, Jariwala Khushboo, Parikh Aayush, Viradya Pruthika, etl, (2018) "Environmental Aspects of Tehri Dam", thesis report of Sarvajanik College of Engineering & Technology, Surat, Gujarat.

7] Jhaa Medha and Sanjay Tignathb, "Assessment and impacts of surface water environment in and around Jabalpur city", Madhya Pradesh, India, e-Journal Earth Science India. 2009; 2(2):111-116.

8] Coad, B. W. (1980) "Environmental change and its impact on the freshwater fishes of Iran". Biological conservation, 19, 51-80.

9] Hooshmand, A., Veysi, S. & Moradzadeh, M. 2012. Investigation of Groundwater Salinity Resources Using GIS (Case study: Gotvand-Aghili plain). Advances in Environmental Biology, 6, 629-635.

10] Joolaee, L., Behrouzi-Rad, B., Esmaeili, H. R. & Tabiee, O. 2011. Sivand Dam as an Alternative Wetland for Wintering Water birds in Fars Province, Southern Iran. Journal homepage: www. wesca. net, 6.