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## Effects of Dams on Environment: A Study in Global Perspective

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**Abstract:** Dams have been important to human civilisation since ancient times. Dam construction dates back to as ancient as the Mesopotamia civilisation. Earlier in the agrarian society dams were important as they supplied with water to fields. According to an estimate there are around 45000 dams which divert water from almost all the flowing rivers in the world. America has the most number of dams in the world followed by China. India ranks third in the number of dams. Till the year 2000 around 19 percent of the world electricity was generated from dams. Dams also play a crucial role in supplying water to the fields for irrigation. However, dams have their own cons too. According to a study, around 40 million people have been displaced due to construction of dams on their land. Also, dams are a threat to the marine life of reservoir upon which they are built. Thus, further we will look at the pros and cons of dam construction and their effects on the environment.

**Keywords:** Dams, Narmada Bachao Andolan, Hydro Power, Agrarian Society, Sustainable Development.

**Introduction:** Dams have been central to the progress of a nation. From 1930 to 1970 dams became an important symbol for the development and progress of a nation. It not only gave humans technical advancement but made us believe that we can control the natural resources. This ideology led to a sharp rise in the construction of dams around the 1970s. It is

noteworthy here that there was once a time when foundation of 2-3 new dams was established everyday around the world. Dams were believed to be very crucial to economy as they supplied water to the fields, generated electricity, provided new jobs etc. In 1977 the World Bank published its first report regarding investments of banks in dam construction. In 1998, World

Dam Commission (WDC) was established. This commission after gave a report after 2 years which discussed in detail all the merits and de-merits of dams construction. However, because of the large no of dams more and more people were being displaced and this led to many protest and movements against dams in India and around the world. Famous movements like the 'Narmada Bachao Andolan' were being started in India to protect the rights of those displaced due to dams construction.

**Research Methodology:** The present research paper is based on the secondary sources of data collection. Most of the research material has been taken from the various journals and reference books including some official websites related to the research problem. However, the research is exploratory in nature, nevertheless, to pace the study; the researcher has also used some observational facts.

**Research Objectives:** This research paper aims at the following research objectives:

- To point out the historical background of dam construction.
- To list the de-merits of constructing dams.
- To identify the human efforts against dams.

**The Race for Building Dams:** According to the definition given by International Commission, the dams with 15 meter height from base or 5-15 meter tall dams with a capacity to hold 3 million cubic meter of water fall into the category of large dams. Some scholars argue that these large dams are beneficial to the society as they on the technical side have more merits than small dams. Though, it is noteworthy here that large no of people are displaced in construction of both kind of dams. To further explain this, given below is a table.

**Table 1: World's Largest Hydropower Projects**

S. No.	Name	River	Country	Capacity (MW)	Year Completed
1.	Itaipu	Parana	Brazil/Paraguay	12,600	1983
2.	Guri	Caroni	Venezuela	10,300	1986
3.	Sayano-Shushenk	Yenisei	Russia	6,400	1989

4.	Grand Coulee	Columbia	USA	6,180	1942
5.	Krasnoyarsk	Yenisei	Russia	6,000	1968
6.	Church Falls	Churchill	Canada	5,428	1971
7.	La Grande 2	La Grande	Canada	5,328	1979
8.	Bratsk	Angara	Russia	4,500	1961
9.	Ust-Ilim	Angara	Russia	4,320	1977
10.	Tucuruí	Tocantins	Brazil	3,960	1984

(Source: <http://www.ehso.com/ehshome/energydams.htm>)

From the following table we can see that the most number of largest hydro power projects were built from 1970 to 1990s. Also, Russia has the most number of largest dams. That was the time when dams were considered precious to the economy and so there was a race to build more and more dams on every possible river after the 1970s which is clear from the table given above. Moreover, we can see from the table that these dams provide a large amount of electricity which is often used as a plus point by those debating in favour of dams. It has however been argued that earlier it was necessary to build dams for survival but now it is mere exploitation of resources.

### Effects on Environment and Humans:

Often, very little attention is paid on what effects the dams may have on the

environment. Everyone is busy searching for monetary benefits out of these types of projects. The main contributor that is the people whose land is acquired are often deprived of the benefits of the dams and all the money earned from it goes to the already rich people. It also affects the environment in a very serious way. A few of them are:

- **Ecology of the River:** A dam terribly affects the ecology of the river which it is built upon. Due to collection of water in reservoir and its sudden release, most of the marine animals get trapped in rotating turbines and get killed. Also, the standing water stagnates and leads to high death rate of fishes and other marine animals. This was scientifically proved when the

northern Thailand saw a sudden sharp decrease in the fish catching. This was because China increased the height of its dams. Thus although there was an increase in electricity production of china but the fisheries sector of Thailand was affected. This could have also lead to international conflicts. Often some nations use dams as weapons to create pressure on other countries. Due to excessive construction of dams in the Tigris Euphrates basin of Turkey, Syria and Iraq, the ecology of the region is deeply disturbed. It is noteworthy here that in order to keep the ecology stable at maximum of 15 million water per cubic meter should flow through the dams. Seeing these ill effects, certain attempts have been made to remove already constructed dams. For instance in case of America, there are around 75000 dams out of which less than 500 have been removed which are 10 meter or less in height. Even though, if the dams are removed, they would have terribly upset the

flow and ecology of the river permanently until then. Moreover, removal of dams can lead to floods in the plain areas as due to removal of dams, sludge flows down to the plains. Moreover, these dams are corroded because of the mud flowing down into the dams from the hilly areas. This has reduced the life of Bhakra Dam in India from 88 years to 47 years whereas that of Hirakund from 110 years to 35 years. Dams can also increase or decrease the temperature of the rivers thus killing the marine life in the rivers and around it. Some canals and other water bodies emerge from dams. The soil in these canals is degraded due to dams. As a result of which fluoride, calcium and other minerals get imbalanced in the soil. Which, through crops lead to gastrointestinal diseases, goitre etc in humans.

- **Bursting of Dams:** Due to the large amount of water stored, it has a huge potential therefore, the structure holding it needs to be very strong. This makes dams building

expensive. To cut on these costs, often some engineers try cost cutting methods which makes the structure weak. This makes the dams faulty and it might burst leading to a catastrophe. One such incident occurred at the St Francis Dam, United States where the reservoir busted on March 12, 1928. About 47 million kilometres of water swept away around 500 people. Another such incident happened in 1963; a dam in Vaiont Valley in Italy killed about 2,600 people. The dam was just 3 years old and the water rose over 60 meters high. However, not all dams burst due to faulty construction, some burst because of the natural calamities. Two large dams, the Banqiao and the Shimantan, and about sixty other small dams burst during typhoon Nina washing away tens of thousands of people in China in 1975. Some scientists have also stated that the sheer volume of water the dams hold can cause earthquakes. Thus the dams which power houses can become weapons

of mass destruction. India is also currently under such risk, the construction of Tihri Dam in India was sanctioned despite the area being prone to high risk of earthquakes. Diseases like malaria also increase in the areas adjacent to dams because of the large volume of standing water.

## **Movements Against Dam**

**Construction:** Due to increase in number of dams its ill effects were soon visible. This gave rise to many movements in many places of the world to stop construction of dams. Although there is a large number of such movements but in this paper we shall cover only some of them. In the decade of 1960s a protest was started in the Grand Canyon of America. A proposal was passed in the 1950 to build dams in the Colorado plateau. However, a series of protest was started by the Sierra Club. David Brouver and other environmentalists later agreed to build dam on the Grand Canyon on one condition that there would be no construction in the Erko Park. However, later they agreed that after this project they won't compromise on any new

project. In 1963 two more projects were proposed but the protests became stronger. Soon after this the front page of New York Times and Washington Post were published with advertisement explaining that construction on Grand Canyon would destroy its natural resources. As a result, many people flooded the authorities with letter in support of the environmentalists. They were able to gather a massive support and because of harsh criticism this project was cancelled in 1967. It was a perfect example of very first success of the environmentalist in protecting the natural resources against the ill effects of dams.

Taking a look at the scenario in India, Hirakund dam was constructed in India post independence. Because of this many people were forced to migrate and were displaced. This led to protests but this yielded no results. The dam was finally built. Similarly the famous 'Narmada Bachao Andolan' was started to stop the construction of a large number of dams on the river Narmada. The displaced farmers were soon joined by many environmentalists; social workers etc and a massive series of protests were started. Lead by Medha Patkar this movement saw a

massive wave of protests to stop the project which was funded by the World Bank. Finally the court ruled the decision in favour of the protestant and order to stop the construction of these projects on the river. Similarly in case of the construction of Tihri Dam no movement helped. Sunder Lal Bahugana Fought for nearly 20 years but nothing worked. In India, these movements didn't work out very well but in the world many successful movements have set an example. Like the Grand Canyon movement and the famous Franklin river dispute.

**Conclusion:** To conclude, it can be said that often projects on the name of progress damages our heritage and natural resources. However, sustainable development is the only way out. Dams lead to a massive list of problems. Hence, a nation must pay attention to construction and development of dams and other projects in areas with rich biodiversity. Moreover, other alternatives can be looked upon the meet the energy demands of a nation which were to be fulfilled by the dams. Support of people for sustainable development is very necessary. Mass awareness can prevent the harm to our environment and save these resources for

our coming generations. Also, the government needs to build small barrages where necessary to stop the harm cause by large dams.

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