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A Comparative Study on Three Gorges Dam Project

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Abstract:

The Three Gorges Dam in the River i.e., Yangtze River is recently the largest project of construction in the world. The managing of project is performed using a systems approach because of its compounded nature or its complexity, social integration, technological and environmental systems and close-fitting coupling that is needed by the schedule. This papers deals with the theoretical concepts of TGD analysis on the basis of World Commission on Dams' Seven Strategic priorities and five key points of Decision shows that an inappropriate and insufficient process was basically used for Planning the China's Three Gorges Dam. The major findings of this paper is that the planning of TGD is done using non participatory research. The Three Gorges Dam Project proposal is introduced approximately 80 years ago and has seen in the Chinese Government. When the dam construction become economically and technologically feasible, the participatory research requires the assessment and the thorough consideration of the secondary issues i.e., social and environmental.

***Keywords**: Three Gorges Dam, Social-integration, Close-fitting Coupling*

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Introduction

The Three Gorges Dam also termed as TGD is considered as one of the largest water project of China. This project was famous as in the history of the world as well. Like it is famous it was also being controversial because of numerous factors like economic impact, massive environmental impact and the social impacts. The Three Gorges Dam is positioned at the upper reaches of the Yangtze River and hence known as a significant comprehensive Hydropower project. This project is an incredible project which affects the ecological environment and shows the impact on the downstream survival of animals. The Dongting Lake is one of the largest lake that join the Yangtze River and the three gorges dam is basically stretched two kilometers more than across the greatest river i.e. Yangtze. The name termed as three gorges because of the reason that the three gorges named as Xiling, Wu and Qutang which are consider as most scenic landscape and the three gorges of designed by immense limestone cliffs.

Figure 1 Three Gorges Dam

This Dam is present in Sandouping town, at the middle section of Xiling Gorge. The dam is around 200 m in height and also 40 million cubic meter in volume. It created reservoir of 600 km in length with the storage capacity of same volume. The project is approved officially on 3 April 1992 by the National People's Congress and hence on December 14, 1994 formally the construction started. Hence in 2003 the first electricity produced and finally in 2006, almost the working of dam was completed. As with the detailing of project, it is analyzed that the maximum number of water behind the dam was likely to occur around 2008. In October 18 2006, at the north side of the dam around 14 generators had already installed and

with their result they extended to the capacity approx. 9,800MWe later the water level raised to around 156 meters. By the end of 2007, the 7 generators was completed at the south side. At the same time around 2007, the turbines are generated i.e. 62 billion kWhr of electricity which is considered as the two-third of the major level used by the complete project.

Dr. Sun Yat-sen who is considered as the pioneer of Democratic revolution of China was initiated the idea of the developing the hydropower of Three Gorges as well as the improvement of the navigation conditions of Yangtze. In his first article (1919) named as Industry Planning and later in 1924 another article Principles of People's Livelihood he illustrated the development of hydropower of Three Gorges. This projects is one of the major hydropower project which contain the large amount of advantages in flood hindrance and control measure, shipping, power generations and water supply **(Gleik, 2014)**

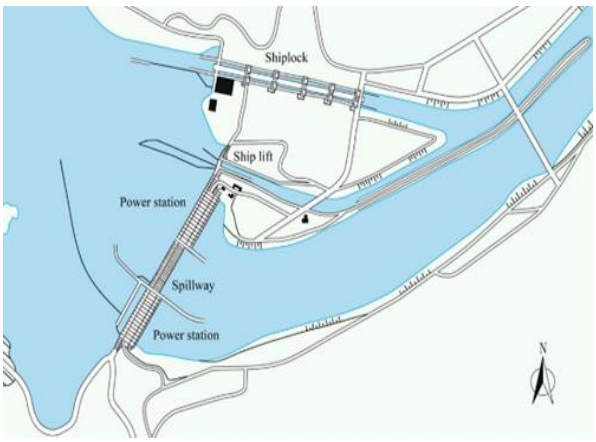

Figure 2. Structural View of Three Gorges Dam

Advantages of Three Gorges Dam Project

- **Flood Control –** The project is considered as irreplaceable for the control and prevention of major floods in both the middle and lower reaches of Yangtze. The upper Yangtze creates flood peaks as more than that to be carrying capacity of the lower and middle reaches. This is more prominently focus on Jingjiang where the

flood water level lowers as the ground outside the banks.

It is specific as in case of extraordinary occurring of flood which overtop the dykes that eventually threatening around 15 million people in the Jiangham and areas of Dongting Lakes.

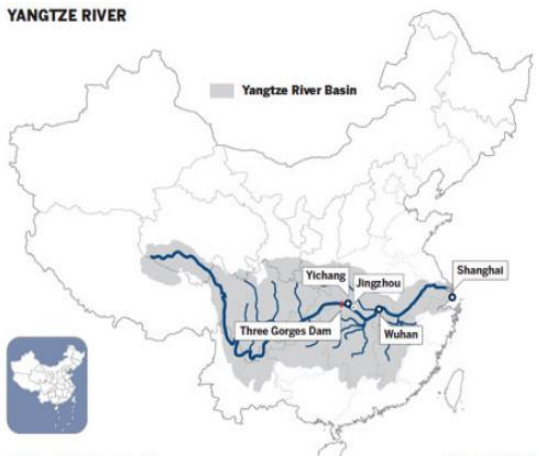

Figure 3 Flood control region praise three gorges dam

- **Shipping –** The Yangtze River helps in significant role for the economical and shipping benefits of the upper area. As we all know that the river navigation is the only means for the long distance and most importantly the cost effective transportation of the cargo. The three gorges dam as discussed earlier is one of the largest system for ship locks and also helpful in permitting large quantities of cargo for the movement into the upper reaches of Yangtze.

- **Environmental Impacts** – The environmental impact of China is significantly dependent on the thermal power as much of the electricity of China is utilizing electricity by the thermal power plants while burning the dirty fossils fuels. The government help in removing and discarding the pollution enterprises from the river or reservoir edge as well as the treatment facilities for the sewage so as to improve the quality of water in Three Gorges Dam. After the evaluation it was analyzed that every year in the city of Chongqing contain one billion tons of water which is undertreated into the three gorges reservoir.

Figure 4 Environmental impact of three gorges dam

Power Generation – The three gorges dam is one of the important component for the China's energy program as well as the power production. The power generation is also significant as it is helpful in measuring the proportion of balance of the energy sources and hence the electricity is transmitted from west to east and also unifying the electricity supply arrangement for the entire country. It is noted that the total capacity installed for the three gorges dam is approximately 18,200 MW having the normal input of 84.7 TWh. After all that aspect it is concluded that the Three Gorges Project is supposed to be the leading station for the national grid in the future aspect of Three Gorges Dam Project **(Huang and Wu, 2018)**

Figure 4. Power generation in Three Gorges Dam

Review Literature

Tullos (2008) stated about the Environmental Impact Process so as to minimize the negative environmental impact which is connected with the large dams. This paper discussed about the Environment Impact Process for the Three Gorges

Project of China so as to study the feedback of impact process and its policy. The paper also cover the investigation between the weather patterns i.e. the impact as chosen by EAI and the decisions connected with the dam. It focus on the importance of the impact as an approach for the consideration of risk which help research priority. The analysis eventually challenge the environmental sustainability perimeter of the project. Hence, lastly the recommendation of these changes will improve the feedback between policy and science and importantly environment sustainability large dams.

Hu et al. (2009) stated about the Three Gorges Dam on upper Yangtze River in China which disturbs the continuation of the Changjiang Sediment delivery to the downstream and coastal areas. The study depends upon higher values is published by the CWRC with the estimation of the other studies. Hence the proposed cascade reservoir on the present on the lower Jinshajiang with potential trap 91% of sediment into the operational to next decade. The paper covers the reflective impacts on the estuary morphology, coastal waters all expected.

Dai et al. (2012) discussed about the disadvantage in the separation of the impact risky climate events by the human activities river catchment, hence a unique data is available for the catchment of the Yangtze at the same time when Three Gorges Project initiated their impact. The analysis shows the impact about the extreme climatic conditions which cancel the impact of the large dam like Three Gorges Dam. The available data support the hypothesis about the climatic conditions in catchment area (drought occur in 2006). This study focus on the case for the Three Gorges Project that can argued and important for other relevant cases of human interference with that of the extreme climatic condition.

Xiao, Zhang and Zuo (2017) stated about the utilization of weathered rock mass in the Three Gorges dam which is considered as the key geotechnical issues for China. The paper shows the weathered crust rock mass in Three Gorges Dam having the thickness of 40-70m with the four different weathering state rock. Hence also it being feasible with the lower part of the weakly weathered zone after the consolidation. The paper focus on the saved large amount of the investment of the Three Gorges Project by the use of lower part of the weakly weathered rock as dam foundation**.**

Conclusion

This paper concludes that the TGP is beneficial by using a systems approach in their project's execution. The problems in the dam projects are related to dam building and the filling of empty reservoirs. There are some other problems such as slit, earthquakes, landslides, people's relocation and electricity production. This paper have tried to make this TGP work beneficial for the stakeholders. Sometimes, it becomes important to consider the economic benefits that results in forming the TGD project. The major and important part of that is beneficial to society of China is the ability to reduce the damage caused by the floods, increase in trade and energy production that makes TGD project beneficial. The dam proposal takes 80 years in approximation and when the dam construction finally become technologically and economically feasible. The project of TGD mainly focuses with the participation on the basis of their needs and impact assessment.

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