

# **Time Series Model Analysis of the Conflict over the Ganges Water Resources between Bangladesh and India**

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## **ABSTRACT**

Bangladesh and India conflict over the Ganges water resources. The history of this conflict is described by our mathematical model, and the conflict process is analyzed and understood deeply. Further analysis with some scenario is done assuming near future situation.

Bangladesh and India have conflicted over the Ganges water resources for about 30 years. The Ganges has been important water resources from the old ages. This situation of the water resources between these two countries changed drastically in 1975. India constructed the Farakka Barrage over the Ganges in the Indian area near the border. India and Bangladesh had no consensus about this construction at all. India made it unilaterally. They made treaty about water resources usage of the Ganges after construction, in 1975, 1977, and 1996. They are sometimes operative and inoperative depending on political background of the two countries.

Three treaties are different in some points. However, those are generally advantageous to India, which is placed on the upstream of the river. Bangladesh is more vulnerable to flood and drought than India because of the Farakka Barrage. Bangladesh government might not make a plan about its national water resources usage without considering the effect of the Farakka Barrage. Sometimes flood and drought in Bangladesh can be said as a man made disaster.

Our mathematical model is composed of behavior decision model and conflict analysis. Behavior decision model describes the change of sense of value with time sifting. This model consists of mutual influence model and oblivion model. The mutual influence model describes the mutual influence between the players, and the oblivion model describes the change in a time target of the person's oblivion. Conflict analysis is one method of stability analysis based on game theory. It produces equilibriums on settings of players, their options, and their preference.

These two models are combined and analysis is done circularly between them, and this process makes it possible to take a time shaft of the conflict into consideration. After the method of model setting up is shown, the Farakka problem is described as a case study by applying the model to the history. Furthermore, analysis with some scenario is done assuming near future situation.