Title: IMPACTS OF CLIMATE CHANGE ON COMMAND AREA DEVELOPMENT OF TEESTA BARRAGE PROJECT

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ABSTRACT

The impacts of climate change on agricultural food production are global concerns, and they are very important for Bangladesh. Climate change may have repercussions on the command area development of Phase-II of the Teesta Barrage Project (TBP), which is now at the implementation stage. This study was accomplished to find out the possible effects of climate change on TBP and the possible mitigation measures. A farmers' survey was conducted to assess the farmers' awareness about climate change and possible mitigation measures. Discussion meetings with officials of TBP were also held to assess the preparation of the project authority in mitigating the adverse effects of climate change.

In this study, meteorological data were taken from the prediction of Hadley Centre's generated two climate models (HadCM3 and PRECIS) with A2 and B2 scenarios and the flow of Teesta river was taken from the outputs of CLASIC project, for the future horizons of 2025 and 2050. From the analysis, it was found that due to climate change the future crop water requirement would increase by 2.8% to 9.2% and 1.7% to 21.0% for Phase-I and for Phase-II by 4.1% to 10.3% and 3.1% to 14.9% for the projection years of 2025 and 2050, respectively compared to the baseline period of 1990. Similarly, for the same projection years, the rainfall would decrease by 0.2% to 8.6% and 1.6% to 19.0% for Phase-I and for Phase-II by 7.0% to 23.7% and 3.0% to 15.1%. As a result, the future flow of Teesta river would decrease during the critical period of October by 11.1% to 20.1%, 28.9% to 31.4% and 23.9% to 30.6% in 2025 and by 5.4% to 24.8%, 15.3% to 32.8% and 12.2% to 23.0% in the project year of 2050 for the 1st, 2nd and 3rd decades, respectively. During the 1st and 2nd decades of October the scheme water requirement may exceed the maximum capacity (283 m^3/sec) of the canal head regulator. All models showed that with the present cropping pattern the TBP may face problem to meet the future increased demand due to the adverse effects of climate change. It should be noted that, because of coarse resolution, variability and uncertainty in assumptions made and scenarios developed, the results of the climate change models are only indicative.

From the technical feasibility analysis of possible mitigation measures it was revealed that by shifting to earlier transplanting dates or by introducing short duration Aman variety, it is possible to evade the shortfall in discharge of Teesta river during the critical period of October. Keeping the present transplanting schedule, augmentation of the water availability for irrigation during October is feasible either by rainwater harvesting through on-farm reservoir or by internal river linking to the TBP.

From the farmers' survey it was evident that they are totally unaware of global warming and climate change but they have observed some changes in their local climate. When asked about the adoption of technically feasible climate change mitigation options, the on-farm reservoir was unacceptable to them as it takes away land permanently out of production. Farmers were not very enthusiastic about either earlier transplanting or short duration variety but would adopt them if necessary. The project officials believe that the future climate change scenario would not be as severe as predicted by the models due to spatial variation of climate. At present they have no preparation to mitigate the adverse impacts of climate change but would opt for flow augmentation from the internal rivers if needed.