

## **AN ABSTRACT OF A THESIS**

### **A VALIDATION OF THE NASA FLOOD DETECTION SYSTEM IN BANGLADESH**

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Because the NASA Global Flood Detection System (FDS) has only been in real-time operation since 2006, little research has been done to understand how the system performs quantitatively. Qualitative validation has been done using news reports and other media. This study provided a quantitative assessment of how the FDS performs. Using ground measured stream flow and rainfall data as “truth,” satellite-based rainfall 3B42 V6 and FDS flood potential estimations were analyzed for three very distinct river systems in Bangladesh: (1) Ganges – a snowmelt-fed river regulated by upstream India; (2) Brahmaputra – a snow-fed river that is also braided; and (3) Meghna – a rain-fed and relatively flashier river. This quantitative assessment showed that the effectiveness of the NASA Global Flood Detection System can vary as a function of season and drainage basin characteristics. Overall, the study shows that the NASA Flood Detection System has great potential for flood-prone countries like Bangladesh that face tremendous hurdles in transboundary flood management. The system has a high probability of detection overall, but increased false alarms during the monsoon period and in regulated basins such as the Ganges threaten the credibility of the FDS flood warnings for these situations. For this reason, FDS users are cautioned to verify FDS estimates during the monsoon period and along regulated rivers before implementing flood management practices. Planned improvements in hydrologic modeling by NASA should transform the FDS into a more accurate and useful tool for real-time decision making on flood management around the world.