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Estimation of Potential Recharge and Groundwater Resources - A Case Study in Low Barid Area, Bangladesh

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Abstract

The study area consists of eight upazillas of north-west region of Bangladesh. This is one of the driest part of Bangladesh, normally less rain from November to April. The study area has been irrigated using about 2000 Deep Tubewells. It covers only 80% of the total cultivable area. The remaining 20% area is planned to cover by installation of additional Deep Tubewell under Bangladesh Multipurpose Development Authority (BM-DA). To ensure long term sustainability the consequences of the groundwater development in the region need to be analyzed. This study tried to explore the appropriate modelling technique to increase agricultural production through optimal utilisation of available water resources using MODFLOW. From the study it can be seen that groundwater resources are inadequate in Raninagar, Durgapur and Puthia upazillas of the study area. Present withdrawals of groundwater to fulfil the requirement of Boro in excess of potential recharges and available resources have created the tendency of continuous lowering of groundwater level in these 3 Upazillas. The deficit indicates a non-sustainable situation with increasing draw down. 80% coverage of Boro for all cultivable land of Upazillas will incur an additional draw down, for which, quite a large number of shallow Tubewell need to be replaced by Deep Tubewell. Monitoring of groundwater level in these Upazillas need to be carefully continued for future action. Vertical percolation of rainwater is the main source of groundwater; increasing duration of percolation time and area by construction of water control structures on the rivers and Kharies will increase groundwater recharge. There is a possibility of increase of groundwater recharge by conservation of surface water in rivers and kharies in the post monsoon by retention structures. Conjunctive use of surface water—groundwater irrigation should be promoted and a conjunctive water allocation plan must be established.

Keywords: Bangladesh, Groundwater, irrigation , Low Barind, Modflow, Recharge potential