ABSTRACT

While sustainable development of an economy requires efficient utilization of its critical natural resources like groundwater, addressing their excessive use and subsequent ecological damages has become important challenges. The problem is aggravated further with the changing climatic conditions and farming practices. Hence, there is a need for deeper understanding of changes in agricultural production and yield following the changing farming practices and their impact on groundwater potentiality. This research deals with these aspects in the context of the Hooghly district of West Bengal, India. The specific research objectives include understanding the trends and fluctuations of rainfall, investigating the changes in agricultural production and yield with shifting farming practices, and identifying groundwater potential zones (GWPZs). The study uses secondary data and applies statistical tools along with the techniques of remote sensing (RS) and geographical information system (GIS) in combination with the analytical hierarchy process (AHP) to address the research objectives. The study finds increasing trend of non-monsoonal rainfall in larger parts of the district. Similar trends are observed in case of annual rainfall as well. There has also been significant increase in yearly precipitation in some areas. Further, following the changes in climatic conditions and farming technologies, there has been increasing emphasis on use of chemical fertilizers, though it has no strong association with changes in production and yield. Further, while the district in general has high groundwater potentially along with favourable agro-climatic conditions, its excessive use has resulted in semi-critical and critical status for many blocks. The findings, therefore, provide important insights in respect of planning for and management of groundwater including that of irrigation systems and farming practices.

***Keywords**:* Climate change, farming practices, chemical fertilizers, production and yield, groundwater potentiality, India