

ABSTRACT

The pressure on land and water is enormous in recent times due to a very severe increase in population. This problem needs to be tackled through a well-planned and scientific approach. The main aim of any planner is to increase the production of the existing land utilizing the water resources optimally without endangering the existing ecology and fragile environment. Nowadays Remote Sensing and GIS together provide geoinformation support in terms of relevant, reliable and timely information needed for economic development as well as environmental protection. In this context, the objective of planning surface water resource for a watershed situated in Midnapore District, West Bengal has been considered here.

In the present study, the various characteristics of the watershed components of the study area have been analysed using the satellite data of IRS-1C LISS-III and merged data of IRS-1C LISS-III and PAN data. The subwatersheds of the study area were prioritised by different methods such as Morphometric analysis method, Sediment Yield Index (SYI) method, SCS runoff curve number method and a newly proposed method which is a combination of SYI and morphometric analysis named as Silt Morphometry Index (SMI) method. The results of prioritisation have been compared to find out the top priority subwatershed accurately and to take up conservation measures. The microwatersheds within the top priority subwatershed have also been prioritised following the same method as subwatersheds. In these prioritised watershed components, recommendations were made to build check dams to achieve soil conservation and also to increase the surface water availability. The variation of storage due to these proposed structures in different months throughout the year was also determined. A significant increase in the storage capacity can be obtained due to the proposed soil and water conservation structures as well as conservation measures such as evaporation control.

It was concluded from the results that the morphometric analysis method could be used for prioritisation whenever there is a time constraint and soil information is either not available or partially available. Out of all the methods mentioned above, the SMI method appears to be a better alternative for prioritising subwatersheds and microwatersheds.