

**APPLICATION OF REMOTE SENSING TECHNIQUES
FOR MAPPING AND MONITORING OF
SALT-AFFECTED AND WATERLOGGED
AREAS IN GUJARAT**

by

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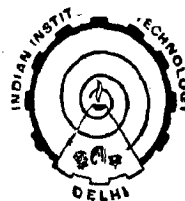
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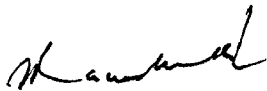
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CERTIFICATE

This is to certify that the thesis entitled, "APPLICATION OF REMOTE SENSING TECHNIQUES FOR MAPPING AND MONITORING OF SALT-AFFECTED AND WATERLOGGED AREAS IN GUJARAT", Being submitted by Mr. Mahesh Dutt Joshi to the Indian Institute of Technology, Delhi, India, for the award of the degree of DOCTOR OF PHILOSOPHY, is a record of bonafide research work carried out by him under our supervision and guidance. The thesis work, in our opinion, has reached the standard, fulfilling the requirement for Doctor of Philosophy degree. The research report and the results presented in this thesis have not been submitted, in part or in full, to any other University or Institute for the award of any degree or diploma.



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ABSTRACT

The growing population of Asian Countries in general and India in particular has compelled planners to device ways and means to increase production. The resources available from the land are to be multiplied. Therefore under-utilised or unproductive land is required to be brought under productive use. Salinity or salt-affected soil is one of the major problems of the land. To bring such land under productive use, it is necessary to map and monitor these areas so that remedial and protective measures could be taken in time.

Ground methods of mapping and monitoring such areas are expensive, time consuming and laborious. The method of remote sensing in general and use of satellite data in particular can prove very useful to prepare maps at semi-detail level and to monitor these areas. Waterlogging is also one of the problems in command areas which subsequently turns the soil into salt-affected land in many parts. Satellite remote sensing can be utilized for monitoring such areas. Some studies were undertaken earlier using satellite data in combination with aerial data but present study utilizes only satellite data for monitoring these areas.

The objective of the present study is to find out the possibility of utilizing satellite data for such studies in combination with collateral data in different parts of Gujarat state having varying environments. The choice of manual analysis techniques have been dictated by limitations of availability of digital image processing facilities and also the fact that human interpreter is flexible and can work selectively under the

prevailing conditions. However, digital image processing has also been attempted to some extent for studying the suitability of that method. Maximum use of the collateral data in the country has been one of the principles of the study.

The methodology was tried out in one of the most salt-affected states of India, in different pockets having varying environmental conditions. It was found that the salinity mapping and monitoring is possible by using satellite data. The accuracy of maps prepared for detection of salinity levels was ranging between 75 and 90 percent. Monitoring of waterlogged areas was also found to be possible. In some cases, it was possible to extract more information from remotely sensed data compared to those from ground methods.

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