

Environmental studies of locust breeding grounds using satellite data-a case study of western Rajasthan desert (India)

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In the desert region, Locusts are the main insect pests of rangelands adversely affecting the annual production and cause serious damage to the national economy. The paper incorporates results of the research work carried out on the breeding ground and surveillance of locusts of western parts of Rajasthan desert (India) using satellite remote sensing and GIS techniques at regional level using multi-thematic layer spatial and non-spatial information based on IRS P6 AWiFS and LISS-III geo-coded digital satellite data products for suitable dates at 1: 250, 000 scale and other ancillary data. The integrated analysis was carried out to identify clusters of locust habitat.

The vegetation status at 30 spots and other areas of scheduled desert area was delineated, classified, mapped and divided into five vegetation classes such as high (above 80%), moderate (between 51 to 80 %), low (between 31 to 50%), very low (between 11 to 30%) and nil (below 10%). Vegetation available on the ground identified through digital image processing of satellite data using Normalized Differential Vegetation Index (NDVI) for forecasting of vulnerable areas for the upsurge of desert locusts. The locust data (mainly types, population and location) was plotted to see the breeding behavior of desert locusts. From analysis it was observed that the populations are noticed in vegetation classes "moderate" and "high". A point coverage using hand-held Global Positioning System (GPS) created in Arc/Info was also used. Out of 270 locations, 35 locations are highly sensitive where locusts were observed more than four times. The results of the integrated spatial analysis were compared with results of ground truth data. There are seven clusters where favourable conditions exist for locust breeding. It was concluded that remote sensing and GIS technology could be utilized regularly with support of limited ground truth for identification and monitoring of locust breeding grounds.

Biography

Dr. Sarvesh Palria is Professor (Environmental Science) and Head in the Department of Remote Sensing and Geo-informatics, M.D.S. University, Ajmer, Rajasthan (India). He obtained PhD. from Sukhadia University, Udaipur (India) in 1984. He served more than 8 years as Scientist/Engineer, Space Applications Centre, (ISRO), Department of Space, Ahmedabad (India). He has worked as Project Investigator/Project coordinator in many National and International research projects sanctioned by University Grants Commission, New Delhi, Ministry of Environment and ISRO. He is having more than 70 research papers published in Journals/Proceedings/Research and Scientific reports.

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