

Annexure 2a
Annexure 2a

SPACE APPLICATION CENTRE
AHMEDABAD-380 015

**DESERTIFICATION STATUS MAPPING OF INDIA
(SECOND CYCLE)**

(Sponsored by MoEF)

WORK PLAN

PARTICIPATING AGENCIES

SPACE APPLICATION CENTRE (ISRO), AHMEDABAD

and

NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING, NAGPUR
REGIONAL CENTRE, BANGALORE

March-2013

1. Introduction

Desertification is the continuous degradation of land under the influence of natural and anthropological causes in arid, semi-arid and dry-sub humid conditions. Desertification affects two third countries of the world and one third of the earth's surface, on which one billion people live (one sixth of world's population). The causes for desertification are mainly improper management practices, overgrazing, tree felling, over cultivation etc. The vegetal degradation, erosion processes, water logging and salinization leads to loss of soil fertility, soil compaction and soil crusting. In addition to this, urbanization, mining and recreation will also have adverse effects on the land leading to desertification.

To assess the status of desertification for entire country is a herculean task requiring fast, accurate, cost effective and less laborious method like satellite remote-sensing. For a long time, there existed no substantial base data on the status of desertification in India. Under the auspices of UNCCD-TPN 1 (United Nations Convention for Combating Desertification-Thematic Net work Programme-1) a pilot project on Desertification Status Mapping (DSM), sponsored by MoEF, was taken up in 2001, at 1:50,000 scale covering about 16 study areas in both hot and cold desert regions of the country. About 14 different organizations of the country participated in the programme and standards about the indicators of desertification, methodology, classification system etc. were harmonized. Finally the project was successfully completed and led to the operationalization of DSM using remote sensing data. In view of non-availability of desertification/land degradation status map (DSM) for the country and also to fulfill India's commitment towards preparation of regional DSM under TPN-1 of UNCCD, the task of desertification /land degradation status mapping, sponsored by DOS was taken up on 1:500,000 scale for the entire country using Indian Remote Sensing Satellite (IRS)-Resourcesat AWiFS data. For the first time a national level spatial inventory of desertification status has been carried out for the entire country giving information in various land degradation processes and their severity.

The desertification status map (DSM) maps for the first time showed various processes of degradation like vegetal degradation, water erosion, wind erosion,

salinization, alkalization, water logging, frost heaving, frost shattering, mass wasting, manmade etc. occurring in India. The two main processes of degradation were water erosion and vegetal degradation in forests and scrublands. The study revealed that about 105.48 m ha is under various processes and severity of desertification which is nearly 32.07% of the total geographical area of the country. This means that nearly one third of country is under land degradation /desertification. A desertification and land degradation atlas of India was also brought out. A spatial inventory of desertification/land degradation of Indian had been extensively used by the Ministry of Environment and Forests, Govt. of Indian in the national reporting to UNCCD.

2. Project on Desertification Status Mapping of India (2nd Cycle):

As desertification is a dynamic process and the first cycle of mapping was done using satellite data of 2003-04, MOEF has requested SAC to take up the second cycle of mapping using latest satellite data and compare the results with the ones achieved from the previous cycle so as to know the change in status of desertification over the years. Accordingly, SAC has taken up the 2nd Cycle of DSM mapping at the behest of MOEF.

It is in this context, this proposal has been prepared for entrusting the work to the participating agencies in Desertification Status Mapping-2nd Cycle.

3. Objectives:

The main objectives are

- To prepare a desertification status map of Karnataka and Andhra Pradesh states on 1:500,000 scale using recent AWiFS data (2012-13)
- To prepare a desertification status map of selected vulnerable areas of Karnataka and Andhra Pradesh. Viz. Bellary, Chamarajanagar, Ananthpur and Mahabubnagar districts using LISS III (2002-03) and latest available LISS-III data on 1:50,000 scale (2012-13).
- To Compare desertification status map of 2nd cycle with previous cycle
- To develop Desertification Vulnerability modeling for Bellary district, Karnataka
- To prepare desertification combating plan for a cluster of villages/watersheds at 1:10,000 scale

4. Participating Agencies

Space Application Centre (ISRO), Ahmadabad

&

**National Bureau of Soil Survey and Land Use Planning, Regional Centre
Bangalore**

5. Duration of Study: March 2013 – December 2014

6. Guidelines

6.1 Desertification status mapping of Karnataka and Andhra Pradesh

The methodology has been already developed and operationally applied during the DSM project cycle 1 carried out earlier. In the proposed study about 6 quadrant scenes of multirate AWiFS digital data will be interpreted on screen visually and limited ground checks will be carried out throughout the state. Standard, authentic and published maps will be used for base information, including forest boundaries. Desertification Status Maps (DSM) will be prepared for entire Karnataka and Andhra Pradesh states on 1:500,000 scale. The DSM, thus prepared will be compared with the DSM prepared during previous cycle and the change detection will be assessed and mapped.

6.2 Desertification Status Mapping of Vulnerable areas:

DSM for 4 vulnerable districts of Karnataka and Andhra Pradesh viz. Bellary, Chamarajanagar, Anantpur and Mahabubnagar will be carried out on 1:50,000 using 3 season LISS-III data of two different time series so as to compare the change in the status of the desertification in these areas over the years. Three season LISS III data of preferably 2003-04 & 2012-13 would be used for the said purpose.

6.3 Change detection of the desertification status: The status of desertification in the state of Karnataka and Andhra Pradesh will be monitored for 2 different time frame

separated by about 8 years and a change detection assessment be made for the entire state as well as selected vulnerable areas.

6.4 Desertification Vulnerability Modeling: Bellary is selected for carrying out multi-parametric weighted index based desertification vulnerability modeling. Assessment of vulnerability towards desertification is an essential step towards its mitigation. Various parameters like Climate type, soil type, land use/Land cover, representative vegetation of the area and anthropogenic factors play significant roles in the process of desertification. Climate Index (CI), Soil Index (SI), Vegetation Index (VI), Land-use Index (LUI) and Socio-Economic Index (SEI) at 1:50,000 scale shall be computed for one district in the state. LUI as well as VI maps shall be generated from LISS-3 datasets. CI could be derived from the rainfall and temperature data. SI can be derived from soil type map while SEI requires information on employment, income, education, dependent members etc. Systematic integration of the indices shall yield intensity of vulnerability towards desertification of the study area.

6.5 Combating Plan: Desertification combating will be prepared for a cluster of few villages in Bellary district, Karnataka using various layers in GIS environments.

7. Deliverables

Finally a report will be prepared. All the maps, data bases, vector layers etc. along with the report will be submitted to Space Applications Centre, Ahmedabad by December 2014.

8. Monthly progress report will be submitted by NBSS &LUP to SAC before 20th day of every month. Utilization certificate at the end of every financial year and the final utilization certificate at the end of the project will also be submitted by NBSS & LUP to SAC accordingly.

9. Budget (in INR)

S.No	Head of Account	Years		Total (in INR)
		2012-13	2013-14	
1	Services including research fellow salary/data analysis/soil sample collection and analysis/institutional charges etc	666000	1554000	2220000
2	Travel (including field work)	150000	355000	505000
3	Vectorisation/cartographic work/report/atlas etc.	50000	116000	166000
4	Contingency	5000	13000	18000
5	Total	871000	2038000	2909000

10. Time schedule

S.No	Activities	Schedule	Responsibility
1	Data collection, indenting, procurement and shipping to collaborative agency	March 2013	SAC
2	DSM preparation at 1: 500 000 scale for Andra Pradesh using AWIFS, field work and finalization of maps	April-August 2013	NBSS&LUP
3	DSM of selected vulnerable districts of Andhra Pradesh using LISS III data, field work and finalization of DSM maps, desertification and combating plan	June 2013 - Jan 2014	NBSS&LUP
4	Vectorisation and digital database creation+ vulnerability analysis for one district	April 2014	NBSS&LUP
5	Change detection, report writing for 1: 0.5 m scale	Sept 2013	NBSS&LUP/SAC
6	Submission of final report, digital data based and DSM maps etc to SAC	Dec 2014	NBSS&LUP

- अहमदाबाद / Ahmedabad-380 015

