

MEMORANDUM OF UNDERSTANDING

for

Land Resource Inventory of Telangana State

(A step towards enhancing Agricultural Productivity)

between

**Department of Agriculture, Govt. of Telangana
Hyderabad**

&

**National Bureau of Soil Survey and Land Use Planning (NBSS&LUP),
Nagpur**

Signed on 3rd day, November, 2014 at Hyderabad (12.30 pm)

1. PREAMBLE

During the post green revolution era, the country had witnessed many fold increase in food-grain production from 72.35 MT (1965-66) to 257.13 MT (2012-13) (Indiastat.com). However, agriculture practiced on blanket applications of green revolution technologies resulted in various kinds of degradation of resources including land and water. Increasing extent and severity of erosion, dwindling water resources, emptied river basins, increasing risk of contamination of drinking water with selenium, fluoride and arsenic, increasing risk of desert expansion, declining pH and nutrient stock in the lower Indo-Gangetic plains and rising pH in the arid and semi arid regions, increasing area under low balance of multiple nutrients in different combinations are the major emerging issues. As a result, total and partial productivity factors have declined for many crops. In the present conditions of natural resources, increasing productivity will be a great challenge for the planners, scientists and farmers in meeting the future targeted food grain production in the coming years, if this trend continues, the projected need of food grain production of 350 million tons by 2030 (Vision 2030, IISS, Bhopal) and 450 million tons by 2050 (Vision 2050, NBSS&LUP-in press) will be an extremely arduous task. Increasing incidence of flood, recurrence of dry spell and declining average per capita availability of land (from 2.7 ha in 1971 to 1.1 ha as on date) are further complicating the situation for agrarians. Predicted change in the climate is also not encouraging for the farming community.

Soil survey was earlier carried out of the entire country by National Bureau of soil survey and Land Use Planning (NBSS&LUP) ICAR at 1:250,000 scale for district level planning. Moreover, some of the states have been partly or fully covered through soil survey at 1:50, 000 scale for taluk/mandal level planning. However, lack of site specific data, particularly on soils and situations- specific recommendations have been the cause of failure for most of the developmental schemes that have been in operation in the country. Site specific soil and site characteristics are prerequisites for developing such site specific land use plans. Land resource inventory consisting of soil and site characteristics on 1:10000 scales provides such database, which sets the path for using right land use and right agro-techniques on each parcel of land. Availability of high resolution remote sensing data together with slope/ gradient maps (derived from Digital Surface Model – DSM from CARTOSAT Stereo at 10 m resolution), land use and land cover on 1:10000 scale through BhuvanGeoportal environment would further spin new dimensions in developing such site specific data more accurately and precisely. Precise and quantified mapping of degree and length of slope together with curvature, as derived from DSM, may further help to develop rain water management technique that may change vast acreage of

mono-cropped rainfed area into the land of blossoming agriculture of double cropping. The importance of such online database, that would be made available from Geoportal of NBSS&LUP and Bhuvan of NRSC, ISRO, is further enhanced, if it is disseminated among the farmers, scientists and planners through an interactive mode.

Keeping this in view, National Bureau of Soil Survey and Land Use Planning (ICAR), Nagpur has planned to undertake a country level project on **“Land resource inventory on 1:10000 scale for agricultural land use planning using geo-spatial techniques”** in a phased manner. In the project, data on soil and site characteristics will be developed by conducting soil survey on 1:10000 scale and other data required for land use planning will be collated from different sources in local GIS environment. This gigantic task is being undertaken on a consortium mode, involving state departments, Govt of India Organizations like Soil and Land Use Survey of India (SLUSI), National Remote Sensing Centre (NRSC), ICAR Institutes and State Agricultural Universities.

Telangana is one of the pioneer states to have taken up soil mapping at 1:50,000 scale in all the districts. The maps are expected to be ready by the end of year 2014-15. Medak district is one, which has been surveyed by NBSS&LUP at this scale. In further advancement in the endeavour, the Govt. of Telangana has expressed keen interest in initiating the LRI Project in the state and invited the authorities of NBSS&LUP to give a presentation on the proposed LRI Project methodology, coordination, etc. The officials from the Govt. of Telangana and Prof. Jai Shankar Telangana State Agricultural University (PJTSAU) had attended the meeting, which was chaired by APC and Principal Secretary (Agril.). All the participants have agreed launching the LRI Project under the terms and conditions contained in this MoU.

2. PARTIES CONCERNED

- 2.1 Commissioner & Director of Agriculture, Govt. of Telangana, Hyderabad
- 2.2 Director, National Bureau of Soil Survey and Land Use Planning, ICAR, Nagpur

3. AUTHORIZED SIGNATORY

For and on behalf of Department of Agriculture, Govt. of Telangana

Commissioner & Director of Agriculture, Department of Agriculture, Govt. of Telangana, Hyderabad

For and on behalf of NBSS&LUP, Nagpur

**Director, National Bureau of Soil Survey and Land Use Planning (ICAR),
Nagpur**

4. FOCAL POINTS AND CONTACT ADDRESS, PHONE, EMAIL, etc

a. Department of Agriculture, Telangana

Sl. No	Name	Contact Address	Phone	Email
1	Dr. B. Janardhan Reddy	Commissioner & Director, Department of Agriculture, Govt. of Telangana, Hyderabad	040- 23232107	janardhan_b2001@yahoo.co.in

b. NBSS&LUP, Nagpur

Sl. No	Name	Contact Address	Phone	Email
1	Dr. S. K. Singh	Director, National Bureau of Soil Survey and Land Use Planning (ICAR), Nagpur	0712- 2500545	skcssri@gmail.com

5. EFFECTIVE DATE (Date of commencement, date of signing & duration of MOU)

- 5.1. **Date of signing:** The date of signing in MOU shall be the date on which authorized signatory of the organisations affix his / her signature.
- 5.2. **Effective date:** This MOU will come into effect from the date of signing the MOU.
- 5.3. **Duration:** This MOU is valid for duration of **4 ½ years** (November 2014- April 2019). In case of unavoidable circumstances, the duration shall be altered with mutual understanding.

6. SCOPE OF WORK

The aim of the project is to:

1. To characterize and map the soil resources of all the villages in different mandals of Telangana State at 1:10000 scale.
2. To suggest optimal land use plan at village level for intensification of agriculture and rejuvenation of fallow lands.
3. To develop Village level Land Resource Information System (LRIS) in GIS environment.

7. MATERIAL AND METHOD

(a) Material

The following material or data needed for the project shall be acquired:

Satellite data:

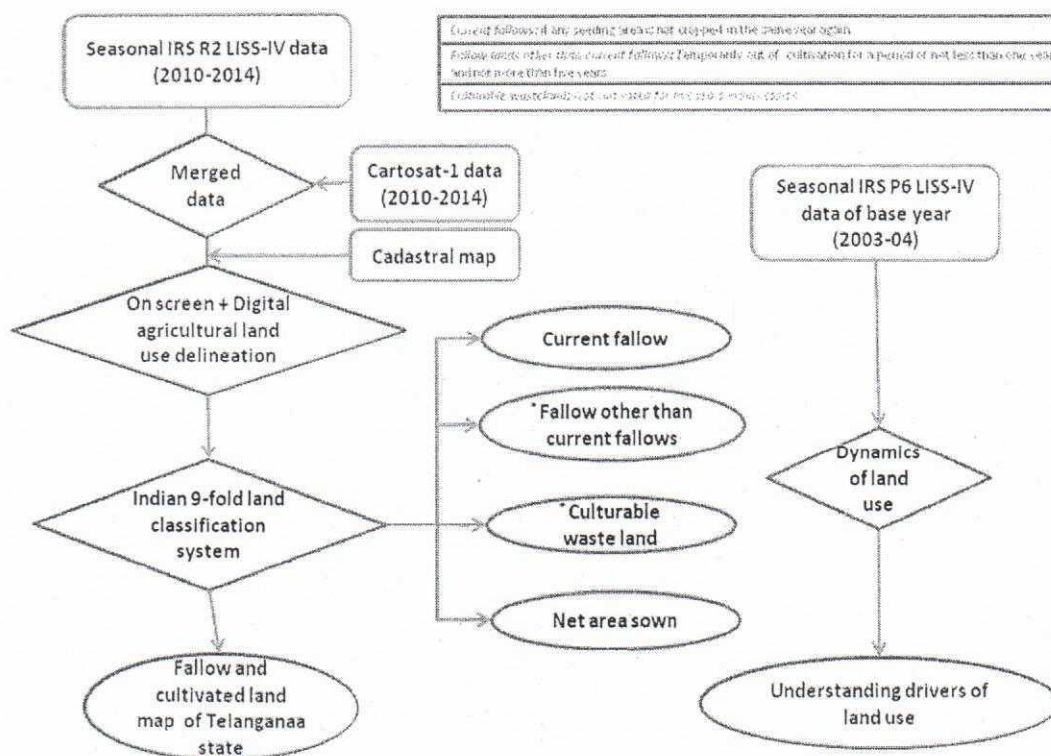
- Cartosat 1A stereo-pair data of Telangana state for five consecutive years from 2010 to 2014.
- Seasonal data of IRS P6 LISS-IV of Telangana state for five consecutive years from 2010 to 2014 as well as for the base year of 2003-04.
- Cartosat DEM (Digital Elevation Model) of 10m spatial resolution.
- Digitized cadastral map of Telangana state.

Software:

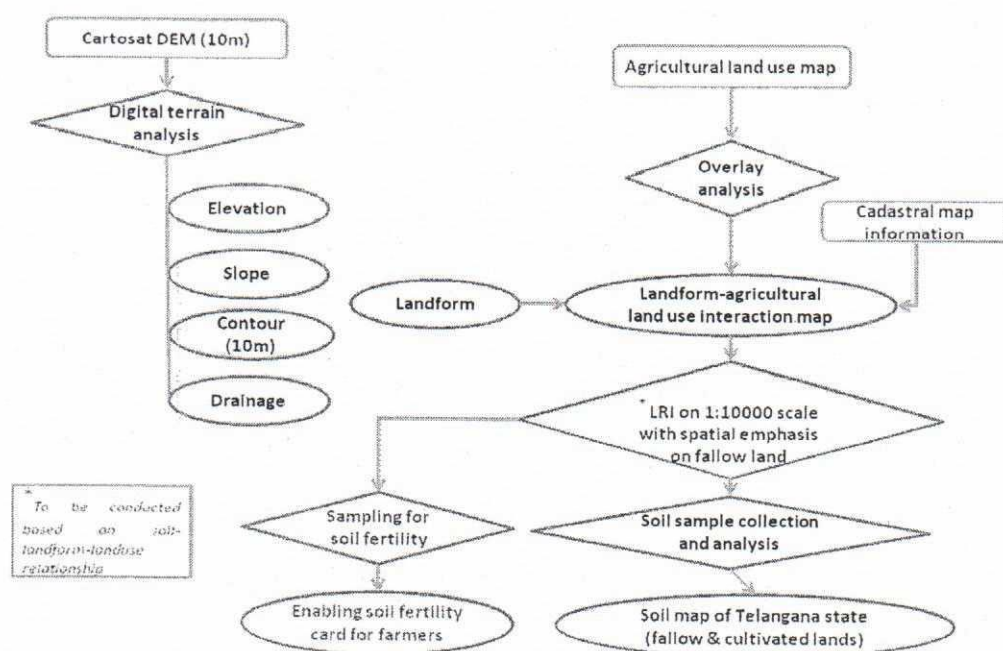
- Global Mapper version 15.1 or latest.

(b) Techniques/Methodology

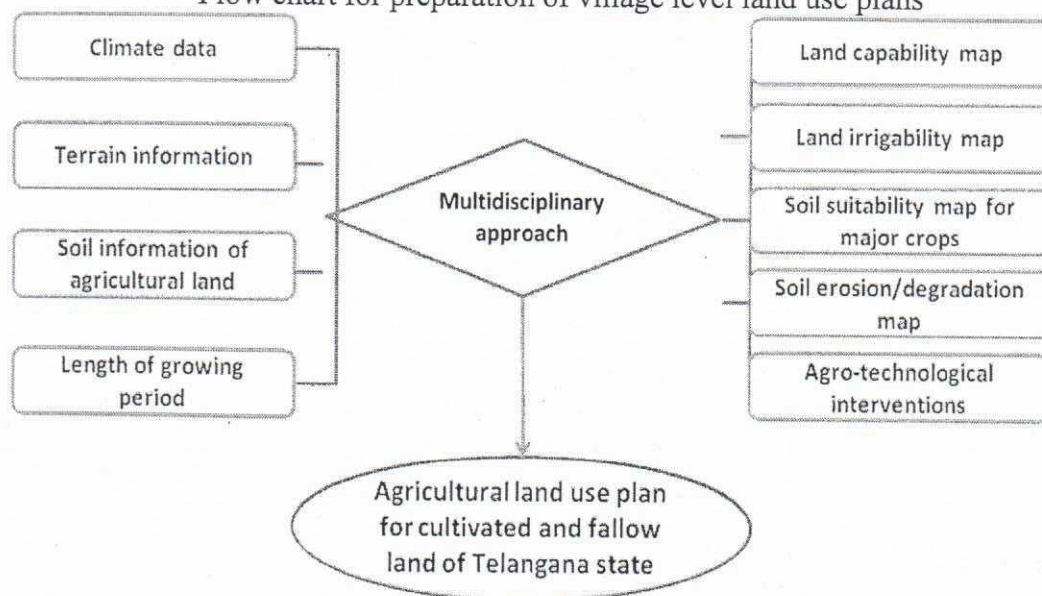
Flow chart to identify cultivable and fallow lands



Flow chart of the methodology to be adopted in LRI:



Flow chart for preparation of village level land use plans



8. DELIVERABLES:

The LRI Project would provide following data in hard and soft copies

1. Village wise soil and thematic maps, duly super imposed with survey number boundaries
2. Suggested land use and land treatment maps
3. Soil survey report of each mandal along with physico-chemical and soil profile characteristics.
4. The entire information shall be uploaded in a web based geoportal for access to all the functionaries and the farming community.

9. APPLICABLE DOCUMENTS:

Research Project Proposals (RPP-1) approved by IRC of NBSS&LUP, Nagpur. Project proposal submitted to Department of Agriculture, Govt. of Telangana. Presentation approved by APC & Principal Secretary, Agriculture, Govt. of Telangana State in presence of dignitaries of the state.

10. INITIATION OF THE PROJECT:

To start with, the Director NBSS&LUP proposed to take up a pilot project in one mandal in Medak District, as the same district was surveyed by the NBSS&LUP at 1:50, 000 Scale. The APC & Principal Secretary, Agriculture suggested to cover atleast three mandals from different agro-ecological and socio-economic situations, so as to develop a comprehensive technological backup in replicating the programme in rest of the state. It was agreed and interactively decided to cover Indervelli Mandal (Adilabad District), Gajwel Mandal (Medak District) and Thimmajipet Mandal (Mahaboobnagar District) under the pilot project.

11. DURATION OF THE PILOT PROJECT:

It is decided to commence the project from 1st November 2014 and complete the task by end of April 2015 over a period of six months.

12. STATE WIDE MAPPING:

Out of the total geographical area of 114.8 lakh ha, the LRI project would cover 75.8 lakh ha by excluding the area under forest and non-agricultural lands.

13. DURATION OF THE MAIN PROJECT:

Although intensive field work would demand a longer time duration, the Govt of Telangana is desirous of completing the task in four years, commencing from May 2015 to April 2019 in a phased manner. The APC & Principal Secretary, Agriculture suggested to cover all the districts simultaneously to induce enthusiasm among the farmers all over and include the feedback in the project.

The suggestion was agreed to by the Director of NBSS&LUP, subject to the support of the State Govt. in providing digitized cadastral maps, collateral data etc.

14. FUNDING OF THE PROJECT:

FUNDING AGENCY: Department of Agriculture, Govt. of Telangana.

While the services of NBSS&LUP and the acquisition of satellite data are obligatory on the part of Govt. of India, the State Govt would support the working expenditure, amounting to Rs. 18.15 crores (Table), which shall be released in phased manner. The cost of working expenditure on soil survey is estimated to be at Rs.23 per ha.

The funds for the pilot project have been estimated at Rs.25 lakhs, which will be released before the commencement of pilot project i.e., November 2014. The said amount would not only be required for working expenses, but also to establish initial infrastructure. This amount will be a part of the total project cost. The balance amount of Rs. 17.90 crores may be released in four equal instalments, commencing from April 2015.

The project proposals, separately for the pilot study and the state wide survey would be submitted by NBSS&LUP shortly.

S.No	Activities	Cost (lakh)
1	Contingency for field work (including imagery, manpower, TA, DA, vehicle hiring <i>etc.</i>)	1500
2	Chemicals, equipment and preparation maps & reports	100
3	Training, review and workshop	50
4	Total	1650
5	Over head cost @10%	165.0
6	Grand Total	1815.0

15. DIGITIZED VILLAGE CADASTRAL MAPS:

Digitised data of village cadastral maps is a pre-requisite for commencing the field work. It is understood that the digitization process of the village cadastral maps is being carried out by the State Remote Sensing Centre. The state authorities have agreed to arrange the digital data as desired.

16. SOIL FERTILITY MAPPING:

Surface soil samples shall be collected by the NBSS&LUP from each block of 10 ha in the three mandals proposed under pilot project and analysed for N, P,K,S and micro nutrients. Soil analytical data will be provided to the Dept. of Agriculture by April 2015 for preparing Soil Health Cards using Department's software.

The soil sampling and analysis in rest of the state will, however, be organized by the State Dept. of Agriculture.

17. PROJECT CO-ORDINATION:

It was informed that different GOI Organizations like NRSC, CRIDA, SLUSI and State organizations like Dept. of Agriculture, PJTSAU and State Remote Sensing Centre will be the primary organizations coordinating the project. However, the active role will be of the Dept. of Agriculture.

18. PROJECT MONITORING AND EVALUATION:

A regular mechanism of Project Monitoring and Evaluation shall be in force through half yearly review meetings involving members of all the coordinating organizations to look at the progress and the issues related with the project.

19. WARRANTY: – Not applicable

20. CONFIDENTIALITY:

Collaborating organizations will maintain utmost confidentiality in data sharing. During the tenure of the agreement and thereafter, partners undertake on their behalf and on behalf of their employees/ representatives to maintain strict confidentiality and prevent disclosure thereof of all the information and data exchanged/ generated pertaining to this agreement. However, the data can be published and shared jointly for scientific publications with mutual consent of the parties. The database to be generated through this project shall be uploaded on NBSS&LUP Geoportal and the website of Department of Agriculture, Govt. of Telangana.

21. INTELLECTUAL PROPERTY RIGHTS:

The original information, the originals of any reports and documents or materials prepared or inventory or information produced as a result of the services and all intellectual property rights therein, unless otherwise specifically stated in the MoU, shall be and shall remain property of NBSS&LUP and Directorate of Agriculture, Govt. of Telangana.

Further, One set of all the field data collected by NBSS&LUP for preparing LRI such as geo-referenced profiles, analytical data of profile horizons, physical characteristics studies done to arrive at themes of study is furnished to the Department of Agriculture / Director of Research of PJTSAU for their reference, research study and future use. Similarly, all the shape files generated to arrive at thematic maps of the project in GIS environment, in addition to soft copies of thematic maps of the project, will be provided to C & DA, Department of Agriculture / Director of Research, PJTSAU for future use and research purpose”

22. CHANGE IN SCOPE OF WORK:

Any change in scope of work would be with mutual consent of the parties. Separate amendment to MoU to such extent has to be signed.

23. FORCE MAJEURE:

Neither party shall be held responsible for non-fulfilment of their respective obligation under the agreement due to exigency of one or more of the unforeseen events such as acts of God, war, flood, earthquake, cyclones, strikes, lockouts, epidemics, riots, civil commotion, etc. provided on the occurrence and cessation of such events, they are affected thereby shall give notice in writing to other party within one month of such occurrence or cessation. If the force-majeure conditions continue beyond six months, the parties shall then mutually decide about the future course of action.

24. INDEMNITY BOND:

All the collaborating organizations shall exercise reasonable skill, care and diligence in the performance of the contract for generating the deliverables.

25. ARBITRATION:

In the event of any difference relating to the interpretation and application of the provisions of the agreement, such dispute or difference shall be referred to Deputy Director General (NRM), ICAR, New Delhi and APC & Pricipal Secretary, Agriculture, Govt. of Telangana.

29. PREMATURE TERMINATION OF MOU:

In the event of failure in executing the agreed programme/activities within the stipulated time frame, the MOU may be cancelled/ terminated by giving necessary notice in this regard. NBSS&LUP and Commissioner & Director, Department of Agriculture, Govt. of Telangana have equal rights to seek premature termination, if any collaborating agency is not honouring the terms and conditions.

IN WITNESS WHEREOF, the Parties have caused this MoU to be signed in their respective names on the day, the month and the year herein before mentioned.

Signed on 03 (day) Nov, (month) 2014 (Year) at 12:30

Signed for and on behalf of
NBSS&LUP, Nagpur



Name: Dr. S. K. Singh
Designation: Director,
NBSS&LUP (ICAR), DIRECTOR
National Bureau of Soil Survey
& Land Use Planning
Amravati Road, Nagpur - 440 033

Address: NBSS&LUP, Amravati Road, Nagpur

Date: 03.11.2014

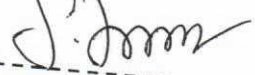
Place: Hyderabad


Signed for and on behalf of
Directorate of Agriculture,
Govt. of Telangana



Name: Dr. B. Janardhan Reddy
Designation: Commissioner &
Director of Agriculture,
Department of Agriculture,
Hyderabad,
Govt. of Telangana

Address: Department of Agriculture,
Govt. of Telangana, Hyderabad

Witness: 1. 
(Dr. S. Thayalan)
Principal Scientist &
Head (IC)
NBSS&LUP, B'lore

2. 
(J. Dharma Naik)
Addl. D.A. - I