

## INVITED ARTICLE

# Land Resource Information for Sustainable Agriculture Development in Andhra Pradesh

From 2017 the UN Millennium Development Goals have lead to the UN Sustainable Development Goals (SDG). There are 17 goals with a large number of action plans. Among them, a very important one is Goal 2 "End hunger, achieve food security and improved nutrition and promote sustainable agriculture". To achieve the goal the problem is that the Human population is increasing and the per capita availability of land and water is shrinking. Therefore, there is no option except to produce more and more food and other agricultural commodities from diminishing land and water resources.

Land, soil, water, forests, bio-diversity and above all climate/ weather are our precious natural resources. The demand on finite land resources are increasing at an alarming rate due to ever growing population and rapidly expanding urbanization. The per capita land availability in India was 0.5 ha in 1951-52, which declined to 0.14 ha by 2000 AD and may further come down to 0.09ha by 2020. The food production, no doubt, increased from 52 (in1950) to almost 210 (2004) and 252 million tons (2014-15). In recent years food grain production remained static or started declining in Total Factor Productivity (TFP) due to human induced land degradation problems and climate change the most predominant challenges of 21 st Century. Their impact on Indian agriculture is enormous. To feed another more than one billion people from the same patch of land there by 2025 AD is an urgent need to develop new standards for agricultural production, which is possible with the help of proper land evaluation and using weather as non-monetary input.

### National Bureau of Soil Survey and Land Use Planning

Developing technologies to slow down degradation processes or reclaim the soils to normalcy and ensure sustainability of our food production system are the major issues confronting the agricultural scientists today. It is a great challenge to them to develop ways and means to increase food production on sustainable basis. In this context, land capability based land use planning to ensure food security and clean and safe environment for healthy life is of paramount importance.



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To achieve this goal, strong foundations were laid down by earlier and most contemporary researchers of India working in National Bureau of Soil Survey and Land Use Planning. They did highest quality research and developed tools, services pertaining to soil resource mapping, land degradation assessment, agro-ecological zoning, land evaluation for different purposes, development of land suitability criteria for major crops and methodologies for integrated land use plans at different levels. The same scientific spirit must continue not only in NBSS&LUP but also across the country in core establishments of agricultural research.

Whatever may be the progress in inland and marine aquaculture and fisheries, not more than 10 per cent of the food needs of the growing human population can be met through aquaculture. Therefore, soil is our main anchor for food and nutrition security. Therefore, the Government of India has taken several steps like providing soil health cards to farmers and the launching of more crops per drop movement. These steps will be successful only if they are backed up by appropriate scientific data. It is in this context that again the younger generation of scientists shall work on these lines in a dedicated manner and big way.

The need of the hour is that the younger generation of scientists across the Indian sub continent must work and do exploratory and innovative research in core areas of research in agronomy, soil science and agricultural chemistry,

agrometeorology and climate change, nanotechnology, biotechnology etc. With reference to soil/ land, the issues that must be addressed include land/ soil resources of our country along with details on soil type, extent, distribution, potential and constraints for agriculture with current land use scenario with degradation status. Equally important are improving the existing information on different soil survey techniques used for soil mapping and generation of generalized, semi- detailed, and detailed soil information according to scale of mapping in addition the status of soil/ land resource information in the country on different scales. Also, agro- climatic zonation, delineating soil- agro- environments for agricultural planning at national, regional, state, district watershed and village levels is essential. There exist a need also for soil- site requirement criteria for major crops based on their crop growth requirements to assess best suited land and choice of crops for each parcel of land to produce more per unit of land. Land evaluation approaches used to assess the land capability, irrigation, productivity/ fertility - capability, crop suitability assessments and delineation of prime agricultural and marginal lands, use of simulation models for crop growth and yield predictions, steps and methodologies followed in developing integrated land use plans at village, watershed, district and state levels are also essential.

### **Soil resources of Andhra Pradesh**

The NBSSLUP, Regional Centre, Bangalore under Soil Resource Mapping Project with the help of State Agricultural Department characterized and mapped the soil resources of Andhra Pradesh at 1: 250, 000 scale. The soil resource mapping was carried out by using remote sensing and satellite imaginary data with adequate ground truth ( soil observations). Under the delineation of crop growing situations the Length of Growing Period (LGP) for successful local crop

planning was done. Soil degradation status was assessed using modified GLASOD method. The study revealed that water erosion is the major degradation problem causing loss of top soil and terrain deformation. Quantification of soil loss in the State was done using universal soil loss equation. Assessment of soil fertility status was done and soil fertility maps for N,P,K and Zn were prepared.

The agricultural drought prone areas were identified. It was established that the length of growing period required by different crops are 90 days for minor millets, 80-120 days for medium duration pulses, 100-150 days for major millets and oilseeds, 120-150 days for upland rice. 150-180 days for cotton/castor and pigeon pea and perennial horticultural crops. Therefore, the research concluded that the areas with <90 days LGP can hardly support any crop and is categorized as chronically drought prone. The delineation of potential areas for dominant horticultural crops grown in the State viz., mango, banana, citrus, and cashew were done. In addition, soil and prevailing climatic conditions of major fruit crop growing tracts were evaluated for delineating potential areas for high input use.

Availability of any resource information is vital for mankind development and for safe environment. Land resource information is critical to prioritize the agricultural developmental programmes while meeting the competing demands of land for non- agricultural sector. This is the only way to safe guard our prime agricultural lands for producing the food for millions. To address other important issues like environment land degradation it is very pertinent to have basic land resource data base. Over all, it is the time that researchers, policy makers, development agencies, primary and other secondary stakeholders look critically at the capabilities and abilities of spatially diverse land resources for food security in India in general and Andhra Pradesh in particular.

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