

## MICRONUTRIENT STATUS OF ARID SOILS UNDER THREE PREDOMINANT LAND USE SYSTEMS IN ARID ZONE

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### ABSTRACT

To find out the changes in micronutrient status of arid soils due to change in land use pattern, surface soil samples (0-15 cm depth) from 105 representative sites were collected from the three predominant land use systems in Bikaner (Rajasthan) viz. (i). Permanent natural range land, (ii) Lands under rain fed cropping for last many years and (iii) Lands brought under canal/ tube well irrigation for last 10-15 years. The samples were analyzed for important soil characteristics like pH, EC, organic carbon and DTPA extractable micronutrients. The absolute value of soil organic carbon was very low in all the land use systems. Among the three land use systems, the soils under natural rangelands have higher organic carbon as compared to rain fed and irrigated conditions. Reduction in organic carbon was more under arable rain fed cultivated soils compared to irrigated conditions. Regarding micronutrients (Zn, Fe, Cu and Mn), comparatively higher amount was observed under natural rangelands followed by arable rain fed soils and minimum in irrigated condition. Per cent reduction in available micronutrients was more in irrigated soils compared to rain fed cultivated soils. On an average, Fe, Zn, Mn and Cu were reduced by 32.4, 24.0, 23.8 and 12.0 percent in irrigated lands over natural rangeland systems.

### INTRODUCTION

The arid zone of Rajasthan accounts for about 61 per cent of total hot arid zone of the country. It has a mean annual rainfall from 100 to 450 mm. Land use in this region is subjected to many limitations and problems. The predominant land use system in arid zone is rainfed farming mixed with animal husbandry and natural rangeland systems. Introduction of Indira Gandhi canal and availability of good quality ground water in some of the areas has resulted in a significant increase in cultivated areas of the region. Irrigation has brought about several changes in the land use pattern of arid ecosystem. The traditional crops of *pearlmillet*, *moth bean* and *clusterbean* have been replaced by groundnut and cotton based cropping pattern under tube well and canal irrigation, respectively. Continuous practice of these nutrient exhaustive cropping pattern and use of high analysis fertilizers alone devoid of micronutrients may affect their availability in soils and create nutritional imbalance in soil-plant system. Soil alkalinity, calcareousness, excess of carbonate and bicarbonate ions further aggravates the situation (Rakkiyapan and Thanguvelu, 2000). The information on micronutrients under different land use systems is scanty. Therefore there is need to monitor the availability of micronutrient status of soils under these land use systems.

### MATERIAL AND METHODS

A survey was conducted from 1999 to 2002 in the Bikaner district under three land use systems viz (i) Permanent natural rangelands, (ii) Lands under rain fed cropping for last many years and (iii) Lands brought under canal/ tube well irrigation for last 10-15 years. The mean annual rainfall of the area is 275mm with 55 % coefficient of variation. The soils of the area are predominantly light textured and classified under *Torrripsamments*, *Calciorhids* and *Camborhids*. Natural rangelands are largely