



## Dryland Agriculture and Secondary Salinization in Canal Commands of Arid Rajasthan

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### Abstract

The drylands in India occupy about 80 million ha, and is spread over arid, semiarid and sub humid climatic zones presenting nearly 57% of the net cultivated area. The drylands are characterized by low precipitation, highly variable rainfall patterns, high evapotranspiration rates, inadequate available nutrients in native soils, poor quality of ground water, severe land degradation processes, short growing period and low crop yields. Despite these bio-physical constraints, the region has high human and livestock population, which mostly depend on agriculture and allied activities with limited natural resources resulting in over-exploitation of the resources. Presently degradation of natural resources (land, water, and biodiversity), decreasing farm profitability, low input-use efficiency (fertilizer, water, energy, and labor), environmental pollution (soil, water), climate change and scarcity of farm labour are threatening the sustainability of agricultural production in the drylands. Large-scale drive for modernization of agriculture in the northern and western parts of the Rajasthan, through IGNP and Narmada canal brought about considerable prosperity to the farmers. Some of the positive impacts of introduction of irrigation in the desert includes improvement in micro-climate, change in land use/ cropping pattern, improvement of soil and associated soil fertility and biological properties, but it has also brought in its wake the problems of water logging and secondary salinization. Lack of proper drainage, excess irrigation, seepage from the canals and poor planning under such situation have resulted in a rise in water table, followed by salinity build-up. In this perspective, some of the successful technologies on soil and water management in drylands provide a higher and stable crop yields and other associated profits like improving/maintaining soil quality, input use efficiency, environmental quality, well-being of farmers and reductions in land degradations, cost of cultivation, and help in climate change mitigation and adaptation. The present paper deals with the extent, significance, characteristics of and constraints of dryland agriculture along with suitable technological options to improve agricultural productivity with special reference to hot arid regions of India.

**Key words:** Dryland agriculture; Secondary salinization; Waterlogging; Canal command area; Poor-quality groundwater; Arid regions

### Introduction

A key question facing agricultural scientists in the 21<sup>st</sup> century is how to produce sufficient amounts of food and feed and obtain good farm income while protecting and improving environmental quality (Robertson and Swinton, 2005). At present, depletion and / or degradation of natural resources (land, water, and biodiversity),

decreasing farm profitability, low input-use efficiency (fertilizer, water, energy, and labor), environmental pollution (soil, water, air), climate change and scarcity of farm labour are threatening the sustainability of crop production systems. The problem of ensuring an adequate supply of agricultural produce along with protecting natural resources is particularly acute in dryland, which cover around 41% of the world's land area, and is home to about one third of the human population. These regions are characterized by low precipitation, highly variable rainfall patterns, high evapotranspiration rates, poor soils, severe land degradation processes, a short crop growing season and low crop yields. Interest in dryland

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