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Impact of soil salinity and water-logging on cropping pattern in Tungabhadra Project Command Area (TBP)

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The proportion of degraded land to the total land holding was 44.40 per cent. Of this, the share of water-logged, moderately saline soils and severely saline soils was 17.53 per cent, 16.83 per cent and 10.04 per cent respectively. Paddy was the main crop grown in the study area. Cotton, maize, bajra and sunflower were also grown. Paddy was cultivated on all kinds of soils, while cotton was grown on normal soils, moderately saline affected soils and water-logged soils. Whereas, maize and sunflower were grown on normal and moderately saline affected soils only. The proportion of land left fallow in the case of severely saline affected soils was very high (70%). It was quite alarming and the situation was so worst that farmers were not able to grow single blade of grass on severely saline affected soils.

Introduction

The basic need of any agricultural country would be to provide enough food to its growing population. Creation of irrigation potential through major and medium irrigation projects is one of the strategies to meet the food requirement of the growing population. Unfortunately the development of irrigation and its indiscriminate use have brought in adverse effects like land degradation in the form of water-logging and salinity/alkalinity. Available reports indicated that about 50 per cent of the irrigated area in the world is either salinised or has the danger of becoming water-logged. In India also there has been a progressive increase in the area under water-logging and salinity. This has led to crop substitution, decline in crop productivity and eventually farm income. The corresponding effects of macro-level are decline in total production, migration, buildup of pests and diseases and regional disparities. Some work has been done to collect the information regarding the extent of salt affected soils in India and its impact on farm economy. However, impact of land degradation have not been analysed in detail in Karnataka. Hence an attempt has been made in this paper to study the extent of soil salinity and water-logging and to

study the cropping pattern on the sample farms.

Methodology

Thunga-Bhadra Project area in Karnataka was purposively selected at the first stage as it had maximum area under soil salinity and water-logging as compared to other command areas in the state. TBP command area has four main canals namely, Left Bank High Level Canal, Left Bank low Level Canal, Right Bank High Level Canal and Right Bank low Level Canal. Of these, two distributaries from Left Bank low Level Canal and one distributary from Right Bank High Level Canal were selected for the study based on the area under higher proportion of salinity and water-logging. To represent the head reach, middle reach and tail reach of the distributaries, 15 normal and 15 problematic farms from each of these reach were selected and thus the sample constituted 45 normal and 45 problematic farms in a distributary. In all, 270 farms were selected for the study. Data on land holding and cropping pattern were collected with the help of pre-tested schedule. Tabular analysis was employed to study the extent of soil salinity and water-logging and cropping pattern on sample farms by working out simple averages and percentages.

Results and Discussion

The average size of holding and extent of land degradation on sample farms are given in Table-1. The total number of sample farms selected for study was 270 comprising 135 farms each in the category of normal soils and problematic soils. The average size of holding for farms with normal soils was 3.45 hectares and that for problematic soils was 4.28 hectares. The proportion of degraded land to the total holding was 44.40 per cent (1.90 ha). Of the total degraded land, the area under water-logged condition was 0.75 hectares (17.53%), moderately saline area was 0.72 hectare (16.82%), while, an area of 0.43 hectare (10.05%) was severely affected by salinity. The findings of the study revealed that the proportion of degraded land was alarming. The various land degradation processes like water-logging and soil salinity are responsible for the land degradation process in the study area. Faulty irrigation, lack of proper drainage and cultivation of irrigation intensive crops have resulted in land degradation. There seems to be some sort of inevitability about salinity and water-logging problem due to development of large scale irrigation projects and it is also true with the TBP command area. Another reason for the land degradation is the prevalence of black cotton soils whose porosity is very poor and has speeded the process of water buildup and rise in water to create conditions of water-logging and salinity. The high temperature particularly in summer has hasten the process of bringing salts to the subsurface of the soils and resulted in soil salinity.

It is apparent from the data presented in Table 2 that paddy, cotton, maize, sunflower and bajra were the major crops

grown under the normal and moderately saline soils. Paddy occupied major proportion of gross cropped area in all types of soils. The share of paddy in gross cropped area was 41.28 per cent on normal soils, 45.37 per cent on moderately saline soils, 30.06 per cent on severely saline affected soils and 53.87 per cent on water-logged. Paddy was the only crop grown on severely saline affected soil. Cotton occupied little more than one-fourth of the gross cropped area on all types of soils except severely saline affected soils. Maize and sunflower were grown only on normal soils and moderately saline affected soils. Maize occupied 13.86 per cent and 10.45 per cent of the gross cropped area on normal and moderately saline affected soils respectively. While proportion area devoted for sunflower was 3.26 per cent and 2.36 per cent of the gross cropped area on normal and moderately saline affected soils, respectively.

A small proportion of the total cropped area covered Bajra, chilli and jowar. Paddy occupied the largest area in the total cropped area in all kinds of soils in view of its high tolerance to salts and water-logging conditions. Cotton was another crop grown on all kinds of soils except severely saline affected soils. Because of its commercial importance, it was cultivated on a larger proportion of the total cropped area. It is apparent from the results presented in the Table 2 that crop production was highly limited on degraded soil conditions. The concerning fact is that a large proportion of land (70%) specially, severely saline affected soils was left fallow. The incidence of these problems led to two situations, either crop productivity reduced to larger extent or problem of water-logging led and salinity

to abandonment of cultivation. Above all the continued cultivation of paddy in both the problems of water-logging led and salinity to abandonment of cultivation. Above all the continued cultivation of paddy in both

the seasons led to occurrence of salinity and water-logging. The black soils in the command area and flood irrigation have greatly contributed for the occurrence of this problem.

Table 1 : Extent of land degradation on sample farms in TBP command area

Sl. No.	Particulars	Normal farms	Problematic farms
1.	Sample size	135	135
2.	Average size of holding	3.45	4.28
(3)	(i) Degraded land-		
	a) Moderately saline soils	-	0.72 (16.82)
	b) Severely saline soils	-	0.43 (10.05)
	c) Water-logged soils	-	0.75 (17.52)
	Total degraded land	-	1.90 (44.40)
	ii) Normal soils	-	2.34 (54.60)
iii)	Total	3.45	4.28
		(100.00)	(100.00)

Table 2 : Major crops grown under different soil types on the sample farms in TBP command area (Per cent to gross cropped area)

Sl. No.	Crops	Normal soils	Moderately saline soils	Severely saline soils	Water-logged soils
1.	Paddy	41.28	45.37	30.06	53.87
2.	Cotton	28.34	26.12	-	26.28
3.	Malze	13.86	10.45	-	-
4.	Bajra	1.84	1.14	-	0.
5.	Sunflower	3.26	2.36	-	-
6.	Chilli	1.50	-	-	-
7.	Jowar	1.24	1.86	-	-
8.	Others	1.86	-	-	-
9.	Fallow	6.82	12.70	69.94	18.96

Note : Figures in parentheses indicate percentage to the total

Economics of Layers and Broiler Poultry Farms in Dharwad District
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India has long history of supplying the chicken to other countries from which the egg, meat and dual type breeds were developed for commercial exploitation. Poultry production gained significance only over the last four decades. Poultry industry has attained technological improvements contributing significantly to the nation's economy in terms of the value of the products, employment generation and in improving the living standards of those employed in it. India now ranks sixth in egg production and eighteenth in broiler production in the world. The egg production has gone up by 4-6 per cent and broiler production 8-10 per cent every year since last decade. The country's annual egg production is around 27 billion. The per capita availability in India during the year 1998-99 was 36 eggs and 850 gms respectively during 1998. However, there exists a wide disparity in their consumption levels between urban and rural areas. Poultry enterprise was initially practiced on a small scale for a quite long period and commercial exploitation gained significance only during the last two decades. With the introduction of the exotic breeds 1955 and the hybrid broilers in the sixties, the poultry industry, during that period was characterized by both desi and old hybrids. Layers in the latter category managed to produce around 240 eggs from 2.5 Kgs of feed, while the broilers yielded one Kgs of meat per bird. The development of Babcock layer breed in the early Eighties which produced 295 eggs in a year at relatively lesser consumption compared to ordinary breeds and the Ven Cobb broiler breed which yielded one kgs of meat from 1.9 kgs of feeds contributed to a remarkable growth of 4 to 6 per cent in egg production. Layer production has exhibited growth from 1975 and broiler meat production, from 1985 onwards (Singhal, 1995). The poultry production activities in India are mostly confined to four southern states viz., Andhra Pradesh, Tamil Nadu, Karnataka and Kerala and the Western State of Maharashtra. These five states contribute 55.9 per cent of the total egg production and 59.6 per cent of broilers production in the country. Hence, a national policy to popularise poultry production in such states will help to bridge the gap and improve the per capita availability of egg and meat in turn the nutritional standards in the country. Several inherent advantages in poultry production have facilitated this phenomenal growth. Poultry production can be undertaken intensively with not much investment requirement, the pay back period is minimum because of shorter generation interval in both layer and broiler production.