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RESEARCH PAPER

An Analysis of Intensity of Cropping in North-Western India

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ABSTRACT

Agriculture is the backbone of Indian economy. India has witnessed remarkable growth in agriculture production with some negative impacts. The agricultural land is limited but population is growing rapidly, which demand more food. To feed the growing population, boosting the intensity of cropping is urgency. The present research paper deals with the levels of cropping intensity in North Western India at district level from 1980 to 2011. The present study shows that most part of Punjab and Haryana had higher level of cropping intensity because of developed infrastructural facilities. On other hand western part of Rajasthan along with arid parts of Punjab and Haryana had lower level of cropping intensity due to adverse environment and poor infrastructure. To enhance the cropping intensity, it is necessary to give adequate attention towards the infrastructural facilities.

***Key words**: agriculture; arid parts; Haryana; infrastructural facilities; Punjab; Rajasthan*

INTRODUCTION

Agriculture has been and is a way of life in India. Agriculture is the mainstay of Indian economy. India's agricultural development has its major achievements and successes on many fronts in the last few decades. Though India's agriculture has not grown at a robust rate and certainly not as well as in many other countries starting from a similar situation. Its impact has been widespread, with many positive effects but many negative too. The costs are social, cultural, and environment, to indicate a few. Agriculture has grown rapidly in the areas of green revolution in India, but it has had several known environmental effects in their localities and beyond. The domains the environment effects could be on soil, water, air and biodiversity and their nature could be physical, chemical or biological. Agricultural lands are limited, while population is growing rapidly. Size of land holding is decreasing. Presently central and state's governments are working for agricultural development through five year plans as agricultural development, its management and relationship with various socio-economic aspects is one of the burning issues in present time. Increasing population demand more food and there are only two ways to satisfy the increasing food and other agricultural demands of the country; either increasing the net area under cultivation or intensifying cropping over the existing area. The net sown area of the country has reached a point where it is not possible to make any remarkable increase. Thus, raising the cropping intensity is the only viable option left.

STUDY AREA AND OBJECTIVE

This work has been done on three states in north-western India. These states are Punjab, Haryana and Rajasthan. North-Western India is extended between 23°3' N to 32°32' N latitudes and 69°30' E to 78°17' E longitudes, comprising 72 districts of Punjab, Haryana and Rajasthan with 436813 square kilometers area which accounts for 13.29 percents of the total geographical area of India. The study area is inhabited by 12,16,78,329 persons (2011) which accounts for 10.05 percents of India's population; out which 6,37,60,035 are males and 5,79,18,294 are females. Density of population is 279 persons per square kilometer.

The main objective of the present study is to analyse and present the intensity of cropping in the north-western India for the years 1980-81 to 2010-11.

DATA SOURCE AND METHODOLOGY

The present research is based on secondary data collected from Directorate of Economics and Statistics of Punjab, Haryana and Rajasthan ranging between years 1980 to 2011 at district level as district was the study unit. Cropping intensity is defined as a ratio between net sown area and total cropped area. It thus indicates the additional percent share of the area sown more than once to net sown area. It can be expressed as-

$$\text{Intensity of Cropping} = \frac{\text{Total Cropped Area}}{\text{Net Sown Area}} \times 100$$

The intensity of cropping, therefore, refers to raising a number of crops from the same field during one agricultural year. Thus on a given field in a year when (i) only one crop of either Kharif or rabi is raised, the index of cropping is 100% (termed as single cropping), (ii) the crops i. e. both Kharif and rabi are raised, the index of cropping becomes 200% (designated as double cropping) and three or more crops are taken, cropping intensity rises to 300% or more (i.e. multiple cropping). The higher index of cropping intensity reflects higher land utilization efficiency. The intensity of cropping is directly related with assured irrigation which enables farmers to go for multiple cropping and use higher quantity of fertilizers and HYV seeds. Hence, besides irrigational facilities, early maturing high yielding variety of seeds, selective mechanization (such as the use of tractors, pumping sets and seed drills), plant protection measures through the use of insecticides, pesticides etc. do have role in affecting the intensity of cropping. The table and map show the spatial district wise distribution of cropping intensity in the study area.

VERY LOW LEVEL OF INTENSITY OF CROPPING

Punjab: There was no district of Punjab under this category during the study period.

Haryana: Similar to Punjab state, none district of Haryana was under this category.

Rajasthan: In 1980-81, 50 percent districts of the state were under very low category. Barmer (101.90 percent), Jodhpur (102.80 percent), Bikaner (103.26 percent), Nagaur (108.23 percent), Churu (108.57 percent) and Pali (109.64 percent) districts had cropping intensity less than 110 percent. In 2010-11, 21.88 percent districts were under this category. Barmer (106.04 percent), Jodhpur (110 percent), Bikaner (111.92 percent), Pali (112.42 percent), Ajmer (113.15 percent) and Nagaur (115.40 percent) districts had cropping intensity less than 120 percent.

LOW LEVEL OF INTENSITY OF CROPPING

During the study period, there was no district of Punjab and Haryana was under this category.38.46 percent districts of Rajasthan were under this category in 1980-81. Main districts were Ajmer (121 percent), Ganganagar (124 percent), Bharatpur (124.33 percent), Jhalawar (125.82 percent), Jaipur (126.32 percent) and Jhunjhunu (128.70 percent). In 2010-11 percents decreased by 10 percent point to 28.13 percent. Tonk (121.45 percent), Churu (123.87 percent), Jalore (125.70 percent), Sawai Madhopur (128.75 percent) districts had cropping intensity less than 130 percent.

MEDIUM LEVEL OF INTENSITY OF CROPPING

Punjab: In 1980-81, 41.67 percent districts of Punjab were under this category. In 2010-11, there was only one district (S. A. S. Nagar) had medium level of cropping intensity. Kapurthala (146.28 percent), Rupnagar (150 percent), Hoshiarpur (152.85 percent), Faridkot (158.17 percent) and Bhatinda (158.36 percent) districts had medium level of cropping intensity in 1980-81.

Haryana: In 1980-81, 83.33 percent districts of Haryana state were under this category. Sirsa (140.31 percent), Rohtak (141.63 percent), Faridabad (144.53 percent), Mahendragarh (145.56 percent), Ambala (149.06 percent) districts had cropping intensity less than 150 percent. In 2010-11, Jhajjar (147.93 percent), Ambala (156.09 percent) and Rohtak (158.45 percent) districts were under medium level category.

Rajasthan: Only three districts, Dungarpur (144.26 percent), Chittorgarh (147.82 percent) and Udaipur (147.98 percent) were under this category in 1980-81. In 2010-11, more than 40 percent districts were under this category. Dausa (155.43 percent), Jhunjhunu (155.27 percent), Bundi

(155.16 percent), Baran (153.87 percent), Karuali (153.19 percent) and Kota (151.46 percent) districts had cropping intensity more than 150 percent.

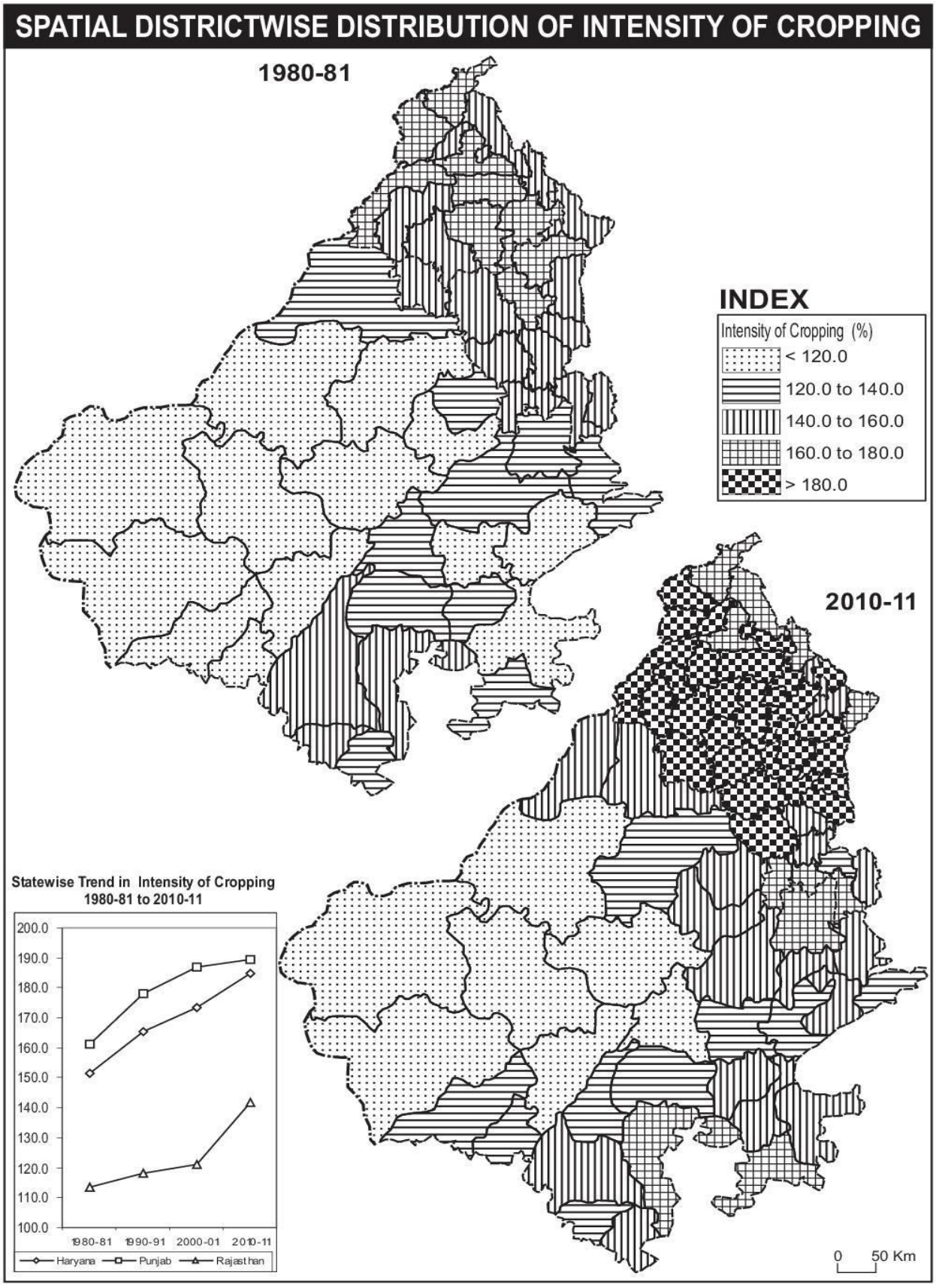

Fig. 1: Spatial Districtwise Distribution of Intensity of Cropping

HIGH LEVEL OF INTENSITY OF CROPPING

Punjab: Ludhiana (176.07 percent), Patiala (173.24 percent), Sangrur (170.51 percent), Gurdaspur (167.87 percent), Amritsar (166.96 percent), Firozpur (161.80 percent) and Jalandhar (161.37 percent), districts had high level of cropping intensity in 1980-81. These districts accounts for 58.33 percent districts of the state; while in 2010-11, only 20 percent district viz. Rupnagar (178.48 percent), Hoshiarpur (178.48 percent), Jalandhar (177.42 percent) and Gurdaspur (175.12 percent) were under this category.

Haryana: There were only two districts- Kurukshetra (167.96 percent) and Jind (164.02 percent) under this category in 1980-81; while in 2010-11, four district- Mahendragarh (176.65 percent), Yamunagar (165.34 percent), Mewat (164.53 percent) and Rewari (162.53 percent) were under this category.

Rajasthan: In 1980-81, there was no district had high level of cropping intensity; while in 2010-11, only three districts viz. Chittorgarh (170.30 percent), Jhalawar (162.58 percent) and Alwar (160.81 percent) were under high level of cropping intensity.

VERY HIGH LEVEL OF INTENSITY OF CROPPING

In 1980-81, there was no district of the study area was under this category. In 2010-11, 75 percent districts of the Punjab were under this category. Muktsar, Sangrur, Faridkot, Patiala, Barnala, Kapurthala, Mansa and Amritsar districts had cropping intensity more than 190 percent.

In Haryana state, 60 percent districts were under very high level category in 2010-11. Karnal, Jind, Panipat and Bhiwani districts had cropping intensity more than 190 percent, while in Rajasthan; there was no district under this category in 2010-11.

CONCLUSION

Thus, it can be concluded that the most of the districts of Punjab and Haryana had high level of cropping intensity due to fertile soil, comparatively flat land, adequate irrigational facilities, use of improved seeds of HYV's, higher use of machinery and comparatively high amount of rainfall. Western and central districts of Rajasthan with arid districts of Punjab & Haryana had experienced low to moderate level of cropping intensity due to presences of sand dunes, rocky structure, merely absence of irrigational facilities and HYV's seeds, less use of agriculture machinery and low rainfall . These areas need more planning and budget in peasant's training and infrastructural facilities to boost the production level.

Table 1: Spatial District wise Distribution of Intensity of Cropping

Category	Value	1980-81						2010-11					
		Punjab		Haryana		Rajasthan		Punjab		Haryana		Rajasthan	
		1	2	1	2	1	2	1	2	1	2	1	2
Very Low	<120	0	0.00	0	0.00	13	50.00	0	0.00	0	0.00	7	21.88
Low	120-140	0	0.00	0	0.00	10	38.46	0	0.00	1	5.00	9	28.13
Medium	140-160	5	41.67	10	83.33	3	11.54	1	5.00	3	15.00	13	40.63
High	160-180	7	58.33	2	16.67	0	0.00	4	20.00	4	20.00	3	9.38
Very High	>180	0	0.00	0	0.00	0	0.00	15	75.00	12	60.00	0	0.00
Total		**12**	**100.0**	**12**	**100.0**	**26**	**100.00**	**20**	**100.0**	**20**	**100.0**	**32**	**100.0**

Note:

1. *Number of Districts*
2. *Percents to Total Districts*

Source: Statistical Abstracts of Punjab, Haryana and Rajasthan

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