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ORIGINAL ARTICLE

Changing Pattern of Land Utilization in North-Western India

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ABSTRACT

Human use of land is called Land Utilization. This research is devoted to the study of spatio-temporal analysis of general land utilization of North-Western India (Punjab, Haryana and Rajasthan states) at district level. The general land utilization pattern has been classified as Forest, Land Not Available for Cultivation, Other Uncultivated Land Excluding Fallow, Fellow Land, Net Sown Area, Area Sown More Than Once and Total Cropped Area. Data have been classified into five categories. The study reveals that there are great spatio-temporal variations in land utilization pattern in North-Western India. The districts with dissected and undulating topography are having higher proportion of forest land, land not available for cultivation and fallow land while districts are having flat terrain; developed agricultural infrastructural facilities are having higher percents of net sown area, area sown more than once and total cropped area. North-Western India has witnessed many changes in land utilization pattern due to improved accessibility and agricultural practices with growing demands for food.

***Key Words**: district, spatio-temporal variations, topography, infrastructure*

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INTRODUCTION

Land holds a central position in human existence and development. The term of land utilization is related to land use. When man uses the land according to his needs the word 'land utilization' is used. Limits of land utilization are changed by time to time, because various dimensions of land utilization have been changed as the needs of man have been changed. According to FAO, land utilization concerns the function or purpose for which land is used by the population; it can be defined as "the human activities that are directly related to land, making use of its resources or having an impact on them."

The changing man-environment relationship also plays an important role in defining the land utilization of the particular region. The pattern of land utilization is complex and dynamic. The land utilization pattern varies from region to region. The present pattern of land utilization is a result of long continued operation of the whole range of environmental factors but modified by socio economic and historical elements.

STUDY AREA

Our study is related with the changing pattern of land utilization in North-Western India. North-Western India is extended between 23º3' N to 32º32' N latitudes and 69º30' E to 78º17' E longitudes, comprising 72 districts of Punjab, Haryana and Rajasthan states with 4,36,813 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.

DATA SOURCE AND METHODOLOGY

This research is devoted to the spatio-temporal analysis of general land utilization of North-Western India at district level. The general land utilization pattern has been classified as Forest, Land Not Available for Cultivation, Other Uncultivated Land Excluding Fallow, Fellow Land, Net Sown Area, Area Sown More Than Once and Total Cropped Area. The present study is based on secondary data .The data obtained for the period of 1980-81 and 2010-11 from Statistical Abstracts of the States, converted in to the percentage to the total geographical area. To avoid the fluctuations, three years' data is averaged and used for analysis. Data have been classified into five categories i.e. Very Low, Low, Medium, High and Very High. The analysis gives the proper understanding of the general land utilization and relevant aspects which can provide the base for further investigation.

DISTRICT-WISE SPATIAL DISTRIBUTION OF LAND UTILIZATION PATTERN

Land utilization pattern anywhere and at any scale involves much complexity and closely guarded mixture of various types of uses but it is for the case of study and analysis that the general land utilization pattern is studied. From 1980-81 to 2010-11, the study area has experienced so many significant changes in land utilization patterns. During this time period socio-economic development played very important role in bringing changes in land utilization patterns.

1. FOREST LAND:

Forest lands are an integral part of the natural environment. This category includes actually forested areas on the lands, classed or administered as forest under any legal enactment dealing with forest whether state-owned or private expect in areas not cadastrally surveyed. Table 1 and Map 1 shows the spatial district wise distribution of forest land in the study area.

Punjab:

Forest land recorded overall positive volume of changes of 1.47 percent in Punjab during study time. It was 4.37 percent to the states total area in 1980-81 which increased to 5.84 percent in 2010-11. In 1980-81, 83.3 percent districts of Punjab were in very low category. Only one districts (Rupnagar) was in high category and one district (Hoshiarpur) was in very high category. Overall picture remained same in 2010-11, where 75 percent districts were in very low category, highest forest percent recorded in Hoshiarpur (31.76 percent) followed by Rupnagar (25.63 percent) and S. A. S. Nagar (16.22 percent). These districts are having hills, dissected and undulating topography. Due to physical conditions, cultivation of crops is not possible, thus most of land is under forest.

Haryana:

Forest land recorded overall negative volume of changes of 2.10 percent in the state during study period due to urban growth and agricultural development. Area under forest was 2.99 percent in 1980-81 which decreased alarmingly to 0.88 percent in 2010-11. In 1980-81, 91.7 percent districts were in very low category and 5 percent district was in low category. Highest percent was recorded in Yamunanagar (8.72 percent) and lowest recorded in Mewat (0.00 percent). Most of the districts of Punjab and Haryana are under agriculture, so there are low share of forest land.

Rajasthan:

Rajasthan is the largest state of India with reference to area, but had only 4.24 percent of

the country's forest land. It was 6.10 percent to states total geographical area in 1980-81 which increased to 8.01 percent in 2010-11. Rajasthan state has better condition than Punjab and Haryana about forest land. In 1980-81, 61.5 percent districts were under very low category, 15.4 percent districts were in high category and 7.7 percent districts were under very high category. Higher presents area of forest was recorded in Sirohi (28.33 percent) followed by Kota (26.22 percent) and Bundi (23.24 percent). In 2010-11, 31.3 percent districts were under very low category. 37.5 percent districts were under low category. 9.4 percent districts and 15.6 percent districts were under high & very high category respectively. Baran, Bundi, Karuali, Sirohi, Banswara, Chittorgarh, Kota districts had higher share of forest land. Lower share of forest land was found in western sandy desert districts.

2. LAND NOT AVAILABLE FOR CULTIVATION:

This includes absolutely barren and uncultivable land like mountains, deserts, etc. which cannot be brought under plough except at exorbitant cost and land covered by buildings, roads and railways and water or otherwise appropriated for non-agricultural purpose. The table 2 and Map 2 depict the spatial distribution of this category at district level.

Punjab:

Land not available for cultivation has experienced positive volume of change in the state. In 1980-81 land not available for cultivation had recorded 10.50 percent and in 2010-11, it was 10.58 percent. A positive volume of change of 0.08 is recorded during the investigation period. Almost all districts of Punjab were under very low and low category during the study period. Kapurthala, Ludhiana, S.A.S. Nagar and Rupnagar districts had higher share under land not available for cultivation. Expansions of settlements and presence of urban centers resulted in proportion of land not available for cultivation.

Haryana:

Haryana experienced positive volume of change under this category of land utilization. It was 9.79 percent in 1980-81 which increased significantly by 4.32 percent and extent to 14.11 percent in 2010-11. In 1980-81, the number of eight districts, two districts and two districts were under very low, low and medium category respectively. In 2010-11, six districts, eight districts, three districts, two districts and one districts were under very low, low, medium, high and very high category respectively. Panchkula, Faridabad, Gurgaon, Kaithal, Karnal, Yamunanagar, Panipat, Sonipat, Mahendragarh and Rewari districts had higher area under land not available for cultivation. The development of industrial area in Panchkula, Gurgaon and Faridabad districts lead to high percentage of non-agricultural land. In use of other districts, urbanization resulted in high proportion of land not available for cultivation.

Rajasthan:

Land not available for cultivation in Rajasthan is larger than Punjab and Haryana because of barren and uncultivable land which was 8.52 percent and 6.95 percent in 1980-81 and 2010-11 respectively whereas Punjab and Haryana had loss more than 2 percent under barren and uncultivable land. Land not available for cultivation in Rajasthan has experienced negative volume of change of 0.46 percent during the study period. It was 12.93 percent in 1980-81 which reduced to 12.47 percent in 2010-11. In 1980-81 there was only one districts Udaipur (39.92 percent) was under very high category, rest of the districts were under medium, low and very low category with equal proportion. In 2010-11 more than 80 percent districts were under very low and low category. Higher share of land not available for cultivation were in Udaipur, Rajsamand, Dungarpur, Bhilwara, and Sirohi districts. These districts have mountains of Aravalli, so there were higher share of land not available for cultivation.

3. OTHER UNCULTIVATED LAND EXCLUDING FALLOW LAND:

This denotes land available for cultivation either not taken up for cultivation or abandoned later on for one reason or the other and includes culturable waste, permanent pastures and other grazing land and lands under miscellaneous tree crops and groves. Table 3 and Map 3 illustrate the spatial district wise distribution of above land utilization category in north-western India.

Punjab:

Other uncultivated land excluding fallow land was overall less than one percent to total geographical area of the state. It was 0.95 percent in 1980-81 and reduced to 0.24 percent in 2010-11. Area under this category was declined by 0.71 percent during study period. All districts were under very low category in both point of time. In 1980-81, highest area was recorded in Firozpur (3.81 percent), followed by Rupnagar (3.44 percent) districts. In 2010-11, highest area was found in Rupnagar. Most of the districts are agriculturally healthy and are having flat land, fertile soils, well developed irrigational facilities, which are the main reasons accounted for very low proportion of other uncultivated land excluding fallow land.

Haryana:

Positive volume change of 0.11 percent was recorded in other uncultivated land excluding fallow land in the state. It was 1.36 percent in 1980-81 which increased to 1.47 percent in 2010-11. All districts of Haryana were under very low category. Highest percent area was recorded in Sonipat (5.49 percent) followed by Rohtak (3.63 percent), Ambala (2.14 percent) and Karnal (2.05 percent) in 1980-81. In 2010-11, Panchkula, Rohtak, Karnal, Rewari, Jhajjar, Panipat and Sonipat districts had higher proportion of other uncultivated land excluding fallow. Undulating and dissected topography and soil erosion are main reasons for high share in Haryana.

Rajasthan:

6.38 percent volume of negative change is recorded in other uncultivated land excluding fallow land in Rajasthan during the study period. Area under this category was 24.17 percent in 1980-81 which reduced to 17.38 percent in 2010-11. This decline was due to decrement in the share of culturable waste land. There were 78.1 percent districts and 15.6 percent districts were under very low and low category respectively in 1980-81. 61.5 percent districts and 26.9 percent districts were in 2010-11 under above categories. There was one district (Jaisalmer) under was very high category in both point of time. Jaisalmer, Bikaner, Bhilwara, Chittorgarh, Dungarpur, Barmer, Udaipur and Ajmer districts have higher proportion of the uncultivated land excluding fallow land due to presence of sand dunes or rugged topography.

4. FALLOW LAND:

It denotes cultivable land which after abandonment remains uncultivated over a long period called. “Old fallow”, those kept uncultivated during the current year is called “current fallows”. Table 4 show the spatial district wise distribution of fallow land in the study area (Map 4).

Punjab:

During the study period, fallow land has experienced a negative volume change of 0.16 percent in the state. In 1980-81 fallow land covered 0.89 percent and in 2010-11, it is 0.73 percent. Fallow land other than current fallows was 0.08 percent in 2010-11. There was no area under fallow land other than current fallows recorded in 1980-81. All districts were under very low category in 1980-81 whereas 95 percent districts and 5 percent districts were under very low and low category respectively in 2010-11. Muktsar, S. B. S. Nagar, Mansa districts had comparatively higher share of fallow land.

Haryana:
In 1980-81 fallow land covered 4.03 percent and in 2010-11, it is 2.83 percent which shows a decrease of 1.20 percent in the state. Follow land other than current fallows was 0.07 percent in 2010-11. There was no area under fallow land other than current fallows in 1980-81. All districts were registered in very low and low category in both point of time. Mewat (7.03 percent), Bhiwani (5.44 percent), Jhajjar (5.41 percent), Faridabad (5.38 percent) and Panipat (5.13 percent) districts have higher share of fallow land in the state. In case of Bhiwani and Jhajjar districts, the main reason is the occurrence of sand dunes, whereas in Panipat flood plains are responsible. In Faridabad district presence of rocky hills are the main reasons which account for high share of fallow land.

Rajasthan:
During the study period fallow land has had a significant negative change of 3.54 percent in Rajasthan. It was 12.20 percent in 1980-81 and 8.65 percent in 2010-11; fallow land other than current fallows was 6.10 percent in 1980-81 which reduced to 5.04 percent in 2010-11. Current fallow was 6.09 percent and 3.61 percent in respective years. There were 15.4 percent districts in very low category and 46.2 percent districts in low category in 1980-81, whereas in 2010-11, 25 percent districts were in very low category and 43.8 percent districts were in low category. Highest percentage of follow land recorded in Jodhpur (27.48 percent), followed by Barmer (18.03 percent), Bikaner (17.34 percent), Pali (16.83 percent) and Jalore (15.88 percent). The main reason is the occurrence of sand dunes which account for high share of fallow land.

5. NET AREA SOWN:
Net area sown represents the area sown with crops at least once in any of the crop season of the year. Spatial distribution of net sown area has been shown in table 5 and Map 5.

Punjab:
During 1980-81 to 2010-11, Punjab state has experienced slightly negative volume of changes in net sown area. In 1980-81 net sown area covered 83.22 percent of the total reporting area and during 2010-11 it occupies 82.57 percent and in this way registered a negative volume of changes of 0.66 percent. In 1980-81, 25 percent districts were under high category and 75 percent districts were under very high category. Whereas in 2010-11, one district was under medium category and two districts were under high category, remaining 85 percent districts were under very high category. Highest area was recorded in Taran Taran (90.46 percent) and lowest area was recorded in Rupnagar (54.86 percent) in 2010-11. Taran Taran, Jalandhar, Faridkot, Firozpur, Moga, Muktsar, Fatehgarh Sahib, Bhatinda, Sangrur districts are blessed with flat topography, fertile soils and developed irrigation facilities. Owing to these reasons, net area sown has recorded high share in these districts.

Haryana:
During 1980-81 to 2010-11, the state has recorded negative volume of change in net sown area. In 1980-81 net sown occupied 81.46 percent of the total reporting area and in 2010-11 it occupies 79.57 percent area and thus register a negative volume of change of 1.88 percent. In 1980-81, 83.3 percent districts were in very high category and remaining 16.7 percent districts were in high category. In 2010-11 65 percent districts were under very high category, 30 percent districts were under high category and remaining was under medium category. Sirsa, Fatehabad, Kaithal, Jind, Kurukshetra, Ambala and Rohtak districts have high share of net sown area. Panchkula, Faridabad, Gurgaon, Panipat, Sonipat and Yamunagar districts have comparative low share of net sown area. Main reason responsible for low share of net sown area in these districts are infertile soils, undulating and dissected topography, number of urban centers and industrial development.

Rajasthan:
During the study period, net sown area has experienced a significant volume of positive change of 9.00 percent in Rajasthan due to improvement in the irrigational facilities. In 1980-81, net sown area covered 44.81 percent and 2010-11, it was 53.61 percent. In 1980-81 only one district Churu (77.37 percent) was under very high category. Six districts namely Ganganagar (73.51 percent), Jhunjhunnu (73.44 percent) Nagaur (66.29 percent), Sikar (65.16 percent), Bharatpur (61.32 percent) and Tonk (60.71 percent) were under high category. In 2010-11 two district Hanumangarh (83.89 percent) and Bharatpur (77.88 percent) were under very high category. Jhunjhunnu (71.24 percent), Nagaur (70.85 percent), Churu (69.22 percent), Ganganagar (66.33 percent), Dausa (63.54 percent), Jalore (62.8 percent) and Tonk (61.32 percent) districts had higher proportion of net sown area.

6. AREA SOWN MORE THAN ONCE:
This represents the areas on which crops are cultivated more than once during the agricultural year. This is obtained by deducting net sown area from total cropped area. The Table 6 and Map 6 show the spatial district wise distribution of this category in the study area.

Punjab:
The area sown more than once has registered a positive volume of change of 22.90 percent during the study period. It was 51.07 percent in 1980-81, which increased significantly and extended to 73.97 percent in 2010-11. There was no districts registered under very low and very high category in 1980-81. About 58 percent districts were under high category. Ludhiana followed by Sangrur and Patiala districts had highest area under area sown more than once. In 2010-11, there was no districts was in very low and low category. 70 percent districts were under very high category. Faridkot, Barnala, Kapurthala, Sangrur, Muktsar, Moga, Mansa and Patiala districts had more than 80 percent area under area sown more than once due to developed irrigational facilities.

Haryana:
In Haryana state, area sown more than once has experienced a positive volume of changes during 1980-81 to 2010-11. In 1980-81, it was 42.06 percent and in 2010-11, it was 67.56 percent in this way, area sown more than once registered a positive growth of 25.50 percent.
In 1980-81, there was no district was recorded under very low and very high category. About 67 percent districts were under medium category. Highest area was recorded in Kurukshetra (60.24 percent) followed by Jind (53.64 percent) and Bhiwani (50.72 percent). In 2010-11, there was no district was registered under very low category. 45 districts were under very high category. Jind (84.17 percent), Fatehabad (80.24 percent), Karnal (78.65 percent), Kaithal (78.51 percent) and Bhiwani (76.32 percent) districts had significant area sown more than once as irrigational facilities are well developed in these districts.

Rajasthan:
Rajasthan state had 6.08 percent area sown more than once in 1980-81, which had increased to 22.36 percent in 2010-11 and registered a positive volume of change 16.28 percent. In 1980-81, all districts of Rajasthan were under very low and low category. Alwar (22.23 percent) followed by Jhunjhunnu (21.08 percent) districts had the higher area sown more once. In 2010-11, still there was no district under very high and high category. 50 percent districts were under very low category. Hanumangarh (40.10 percent), Jhunjhunnu (39.38 percent), Alwar (36.48 percent), Dausa (35.22 percent) and Bharatpur (34.25 percent) districts had comparative higher proportion area sown more than more due to adequate irrigational facilities.

Table 1: Spatial District wise Distribution of Forest Land

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	< 6.0	10	83.3	11	91.7	16	61.5	15	75.0	19	95.0	10	31.3
Low	6.0 - 12.0	0	0.00	1	8.3	1	3.8	1	5.0	1	5.0	12	37.5
Medium	12.0 - 18.0	0	0.00	0	0.00	3	11.5	2	10.0	0	0.00	2	6.3
High	18.0 - 24.0	1	8.3	0	0.00	4	15.4	0	0.00	0	0.00	3	9.4
Very High	> 24.0	1	8.3	0	0.00	2	7.7	2	10.0	0	0.00	5	15.6
Total		12	100.0	12	100.00	26	100.0	20	100.0	20	100.00	32	100.0

Map 1: Forest Land of North Western India

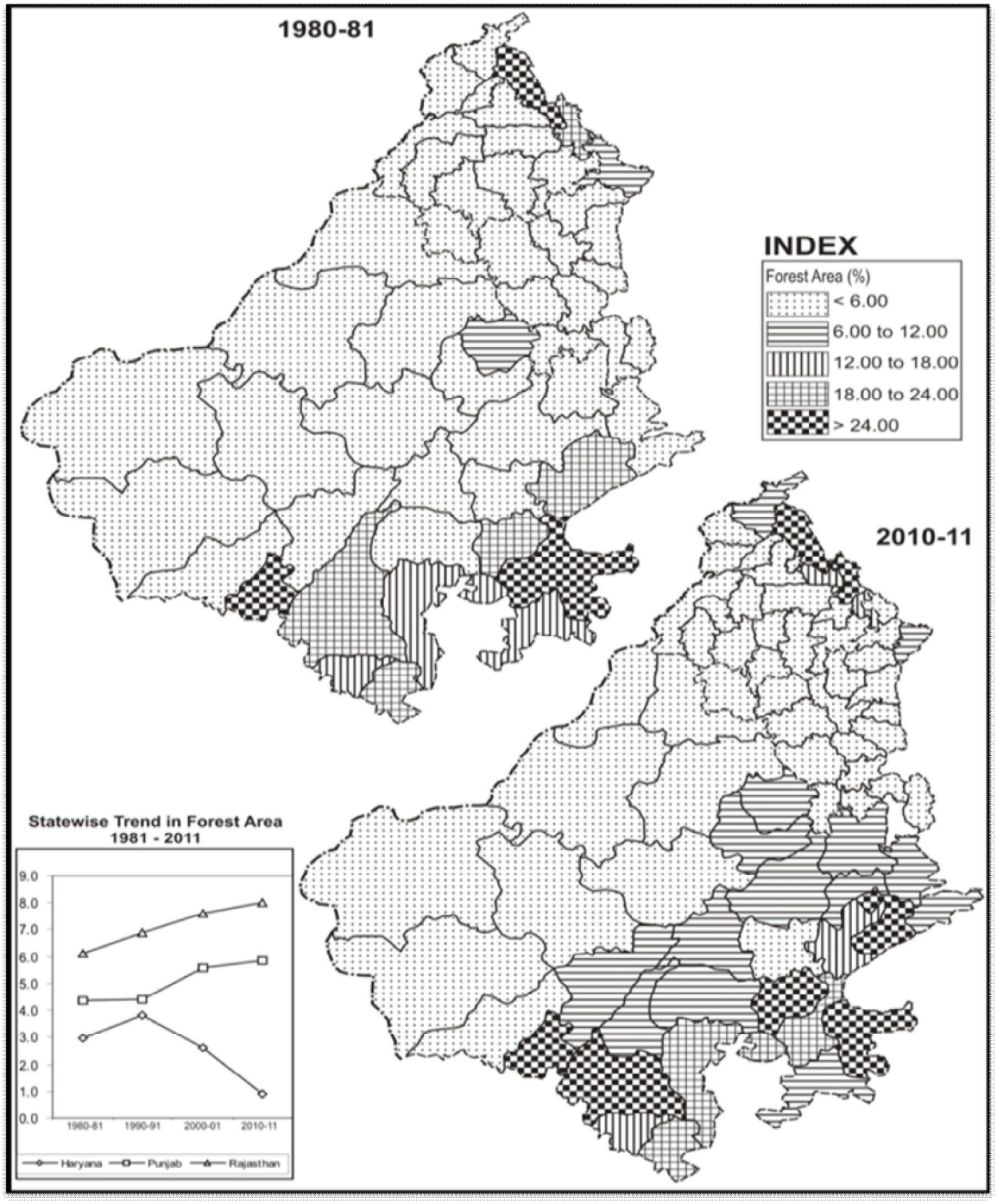


Table 2: Spatial District wise Distribution of Land Not Available for Cultivation

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	<10.0	6	50.0	8	66.7	7	26.9	10	50.0	6	30.0	10	31.3
Low	10-17.5	5	41.7	2	16.7	8	30.8	9	45.0	8	40.0	16	50.0
Medium	17.5-25	1	8.3	2	16.7	10	38.5	1	5.0	3	15.0	3	9.4
High	25-32.5	0	0	0	0	0	0.00	0	0.00	2	10.0	1	3.1
Very High	>32.5	0	0	0	0	1	3.8	0	0.00	1	5.0	2	6.3
Total		12	100.0	12	100.00	26	100.0	20	100.0	20	100.00	32	100.0

Map 2: Land Not Available For Cultivation of North Western India

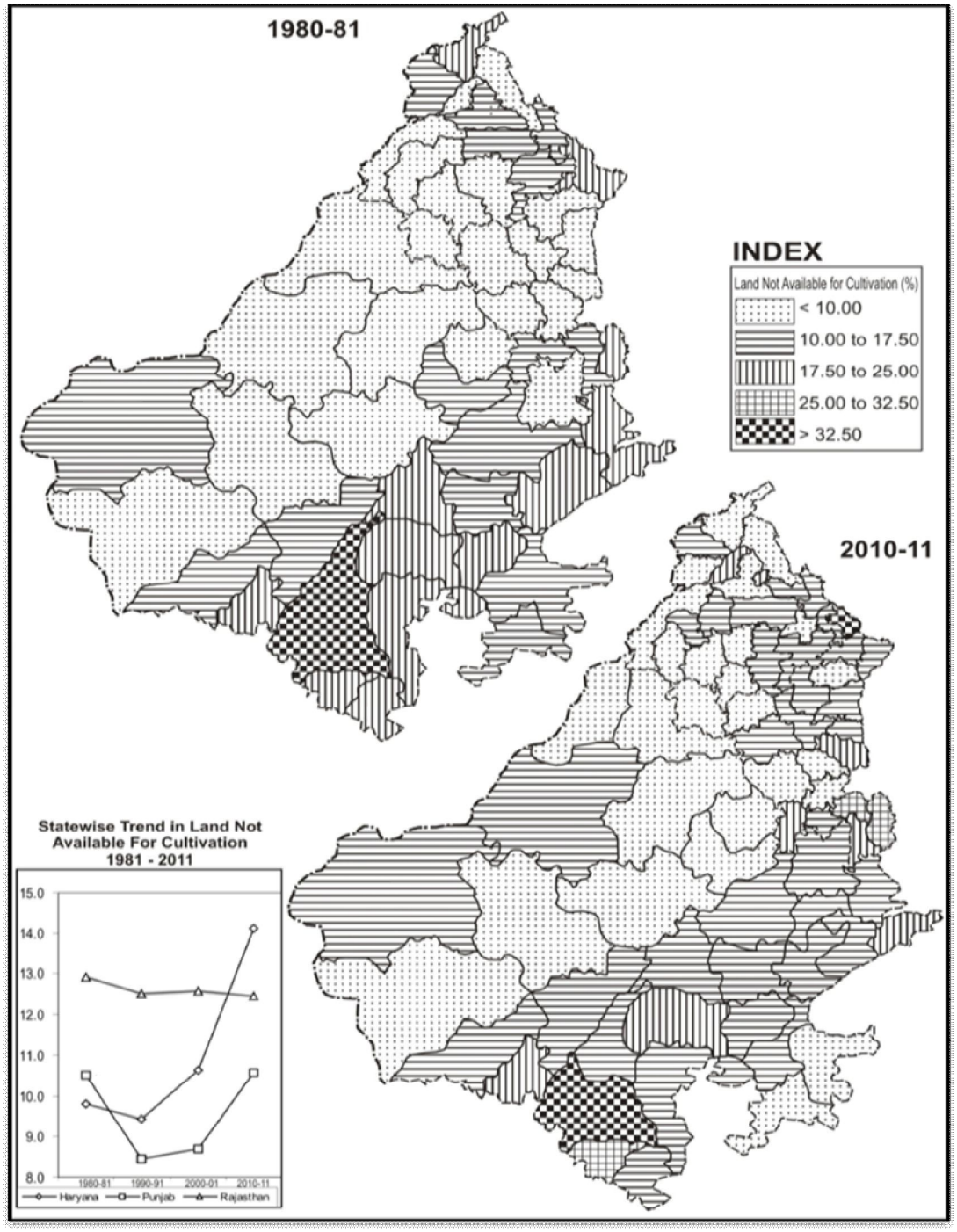


Table 3: Spatial District wise Distribution of Other Uncultivated Land Excluding Fallow Land

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	<15.70	12	100.0	12	100.0	16	61.5	20	100.0	20	100.0	25	78.1
Low	15.7-31.4	0	0	0	0	7	26.9	0	0.00	0	0.00	5	15.6
Medium	31.4-47.1	0	0	0	0	1	3.8	0	0.00	0	0.00	1	3.1
High	47.1-62.8	0	0	0	0	1	3.8	0	0.00	0	0.00	1	3.1
Very High	>62.8	0	0	0	0	1	3.8	0	0.00	0	0.00	0	0.00
Total		12	100.0	12	100.00	26	100.0	20	100.0	20	100.00	32	100.0

Map 3: Other Uncultivated Land Excluding Fallow Land of North Western India

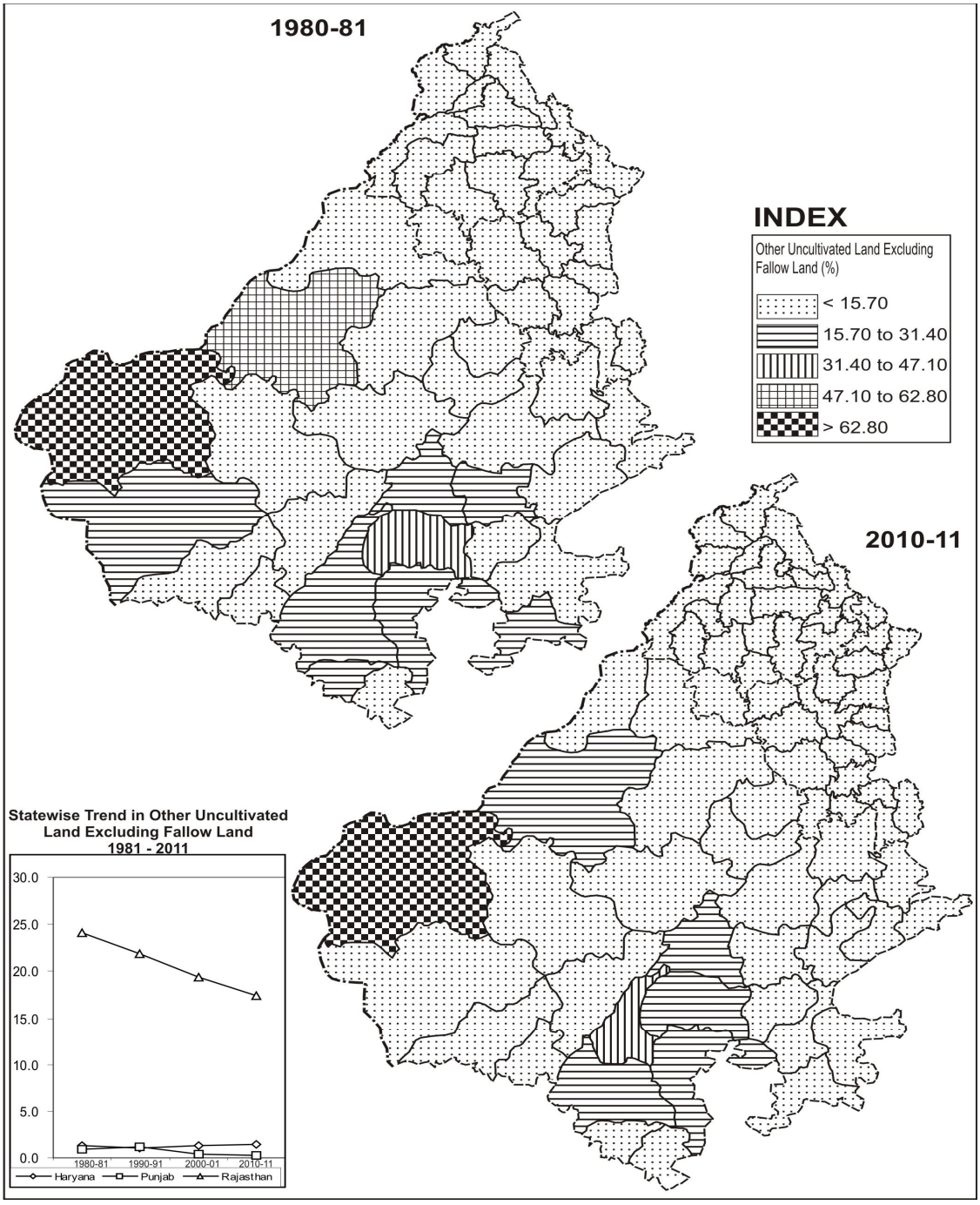


Table 4: Spatial District wise Distribution of Fallow Land

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	<5.8	12	100.0	10	83.3	4	15.4	19	95.0	19	95.0	8	25.0
Low	5.8-11.6	0	0.00	2	16.7	12	46.2	1	5.0	1	5.0	14	43.8
Medium	11.6-17.4	0	0.00	0	0.00	5	19.2	0	0	0	0	6	18.8
High	17.4-23.2	0	0.00	0	0.00	4	15.4	0	0	0	0	3	9.4
Very High	>23.2	0	0.00	0	0.00	1	3.8	0	0	0	0	1	3.1
Total		12	100.0	12	100.0	26	100.0	20	100.0	20	100.0	32	100.0

Map 4: Fallow Land of North Western India

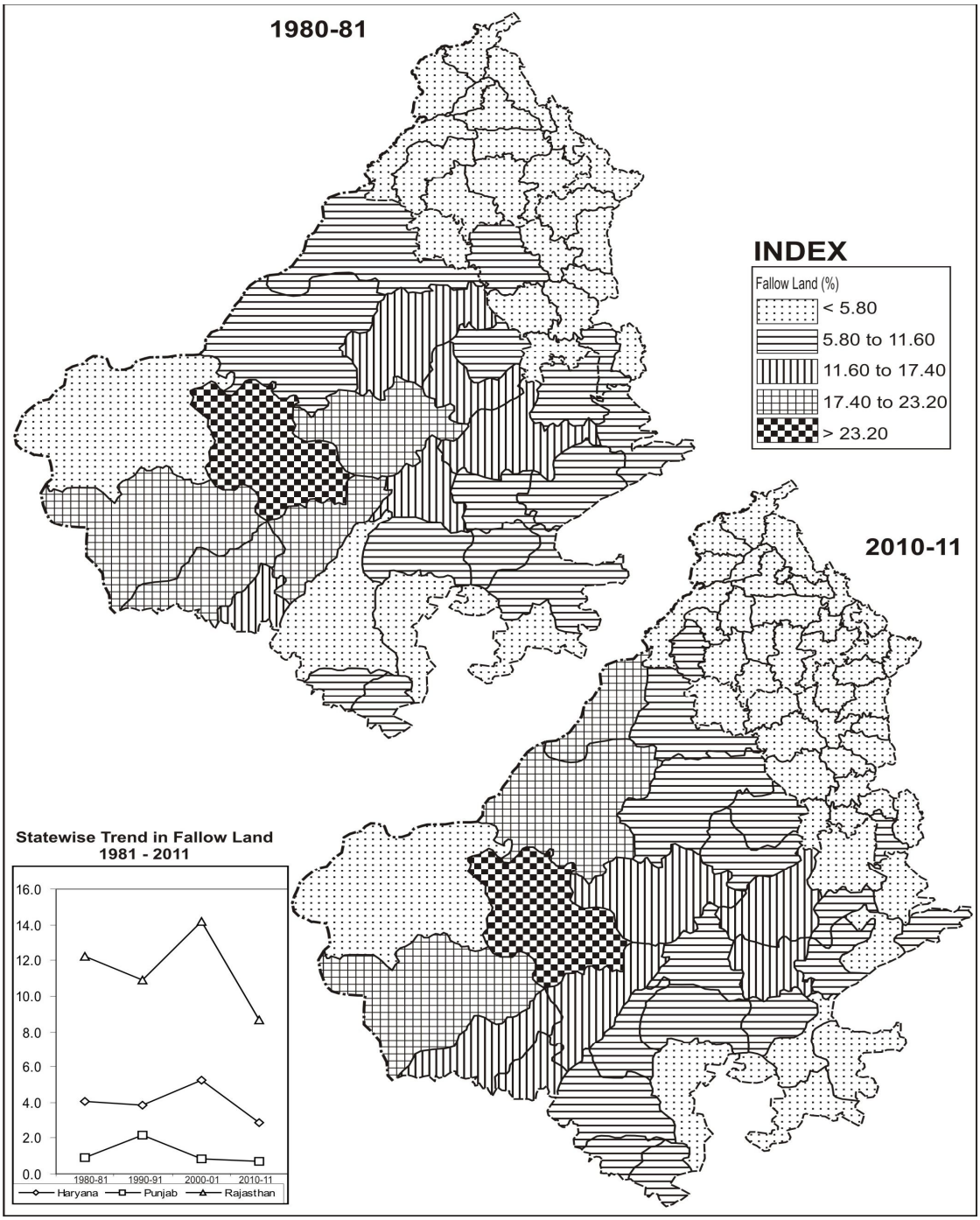


Table 5: Spatial District wise Distribution of Net Area Sown

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	<24.1	0	0.00	0	0.00	2	7.7	0	0.00	0	0.00	2	6.3
Low	24.1-41.3	0	0.00	0	0.00	6	23.1	0	0.00	0	0.00	7	21.9
Medium	41.3-58.5	0	0.00	0	0.00	11	42.3	1	5.0	1	5.0	10	31.3
High	58.5-75.7	3	25.0	2	16.7	6	23.1	2	10.0	6	30.0	11	34.4
Very High	>75.7	9	75.0	10	83.3	1	3.8	17	85.0	13	65.0	2	6.3
Total		12	100.0	12	100.0	26	100.0	20	100.0	20	100.0	32	100.0

Map 5: Net Sown Area of North Western India

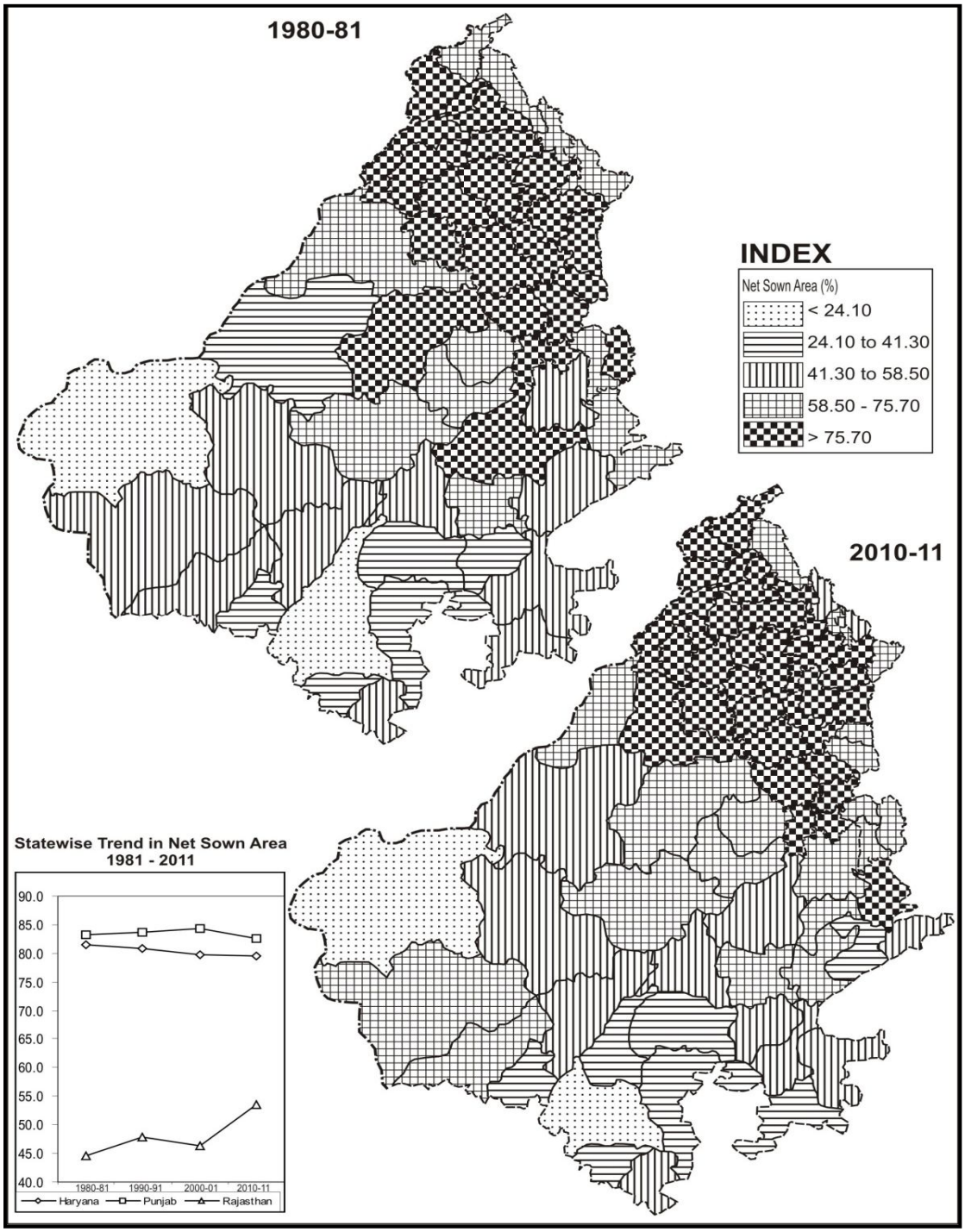


Table 6: Spatial District wise Distribution of Area Sown More Than Once

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	<17.3	0	0.00	0	0.00	23	88.5	0	0.00	0	0.00	16	50.0
Low	17.3-34.6	2	16.7	2	16.7	3	11.5	0	0.00	0	5.0	12	37.5
Medium	34.6-51.9	3	25.0	8	66.7	0	0.00	3	15.0	7	35.0	4	12.5
High	51.9-69.2	7	58.3	2	16.7	0	0.00	3	15.0	3	15.0	0	0.00
Very High	>69.2	0	0.00	0	0.00	0	0.00	14	70.0	9	45.0	0	0.00
Total		12	100.0	12	100.0	26	100.0	20	100.0	20	100.0	32	100.0

Map 6: Area Sown More Than Once of North Western India

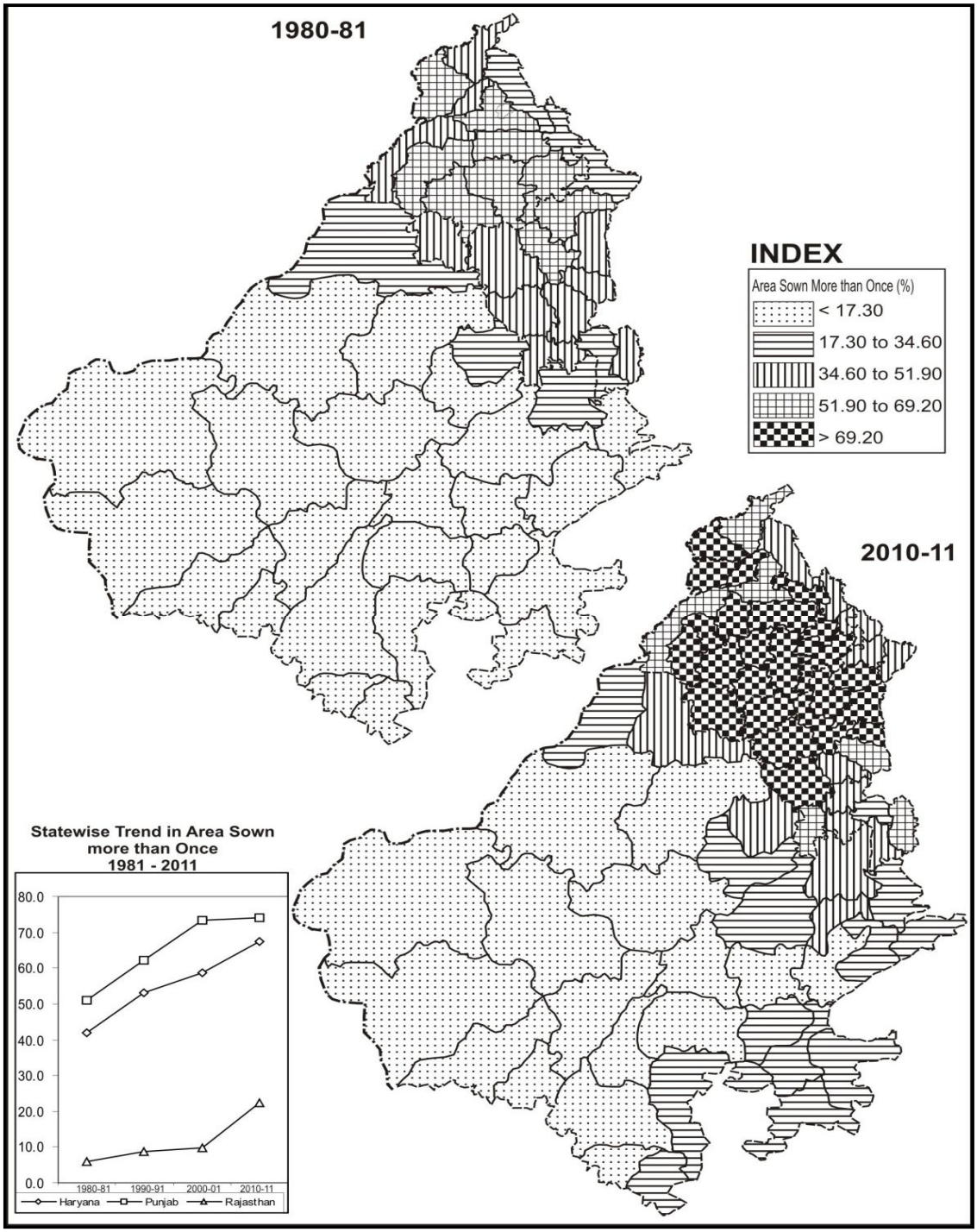


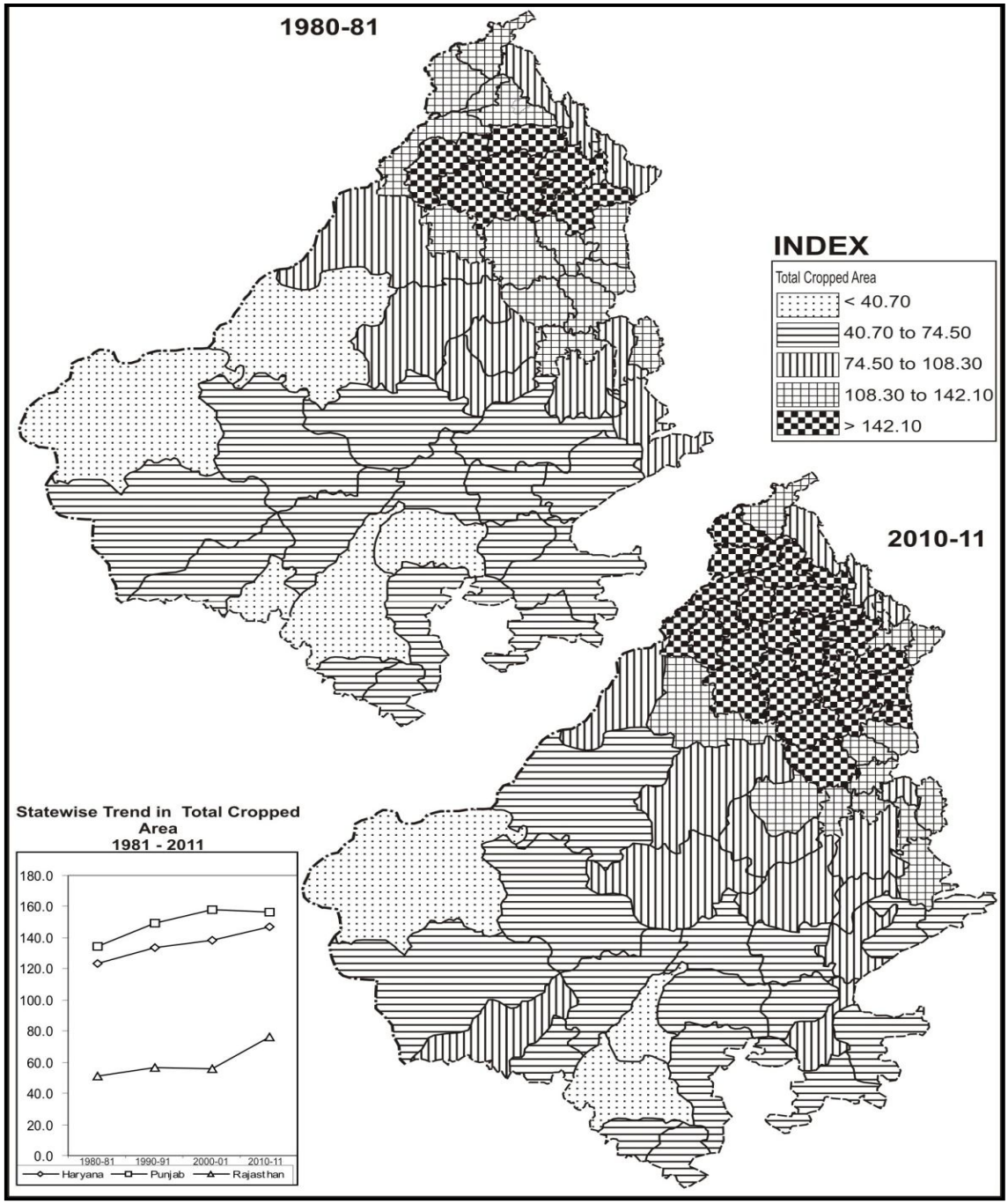
Table 7: Spatial District wise Distribution of Total Cropped Area

Category	Value	1980-81						2010-11					
		Punjab		Haryana		Rajasthan		Punjab		Haryana		Rajasthan	
		1	2	1	2	1	2	1	2	1	2	1	2
V. Low	<40.7	0	0.00	0	0.00	5	19.2	0	0	0	0	3	9.4
Low	40.7-74.5	0	0.00	0	0.00	15	57.7	0	0	0	0	16	50.0
Medium	74.5-108.3	2	16.7	2	16.7	6	23.1	3	15.0	2	10.0	10	31.3
High	108.3-142.1	5	41.7	9	75.0	0	0.00	1	5.0	9	45.0	3	9.4
V. High	>142.1	5	41.7	1	8.3	0	0.00	16	80.0	9	45.0	0	0.00
Total		12	100.0	12	100.0	26	100.0	20	100.0	20	100.0	32	100.0

Note:- 1=Number of Districts 2=Percents to Total Districts

Source of all tables (1-7): Statistical Abstracts of Punjab, Haryana and Rajasthan

Map 7: Total Cropped Area of North Western India



7. TOTAL CROPPED AREA:

This represents the total area sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowing in a year (Table 7 and Map 7). This total area is also known as gross cropped area or total area sown which is illustrated at district level in north-western India.

Punjab:

Total cropped area was 134.29 percent in 1980-81 which increased to 156.53 percent in 2010-11. During the study period that cropped area registered a positive volume of change of 22.24 percent in the state. More than 80 percent districts of Punjab were under very high and high category in 1980-81. There was no district under very low and low category. Highest area was recorded in Sangrur (153.49 percent) followed by Ludhiana (152.17 percent). Lowest area was recorded in Rupnagar (90.14 percent) followed by Hoshiarpur (98.38 percent). In 2010-11, 80 percent districts were under very high category. Highest area was registered in Faridkot (175.69 percent), followed by Barnala (174.23 percent), Sangrur (171.19 percent) and Moga (170.70 percent), lowest area was recorded in Rupnagar (97.92 percent).

Haryana:

Total cropped area in the state recorded positive volume of change of 23.62 percent from 1980-81 to 2010-11. Total cropped area was 123.52 percent in 1980-81 which increased to 147.14 percent in 2010-11. More than 83 percent districts were under very high and high category in 1980-81. Highest area was recorded in Kurukshetra (148.88 %) followed by Jind (137.42 %), Bhiwani (137.36 %) and Hisar (134.09 percent). Lowest area was recorded in Ambala (99.11 percent) followed by Gurgaon (100.96 percent). In 2010-11, 90 percent districts were registered under very high and high category. Fatehabad (170.83 percent) had the highest area, followed by Jind (169.18 percent), Sirsa (167.37 percent), Kaithal (167.11 percent), Kurukshetra (161.51 percent) and Bhiwani (160.52%) lowest area was in Panchkula (78.95 %) followed by Gurgaon (97.50 %).

Rajasthan:

Total copped area had changed significantly during 1980-81 to 2010-11. In 1980-81, it was 50.70 percent and in 2010-11 it increased to 75.98 percent. This had recorded 25.28 percent positive volume of change. There was no district under very high and high category in 1980-81. More than 75 percent districts were registered under very low and low category. Jhunjhunnu (94.52 percent), Ganganagar (91.16 percent), Churu (84.00 percent), Alwar (79.74 percent) districts had significant area. In 2010-11, there was no district under very high category. 50 percent districts were under low and 31.3 percent districts were under medium category. Highest area was recorded Hanumangarh (123.99 percent) followed by Bharatpur (112.12 percent). Lowest area was registered in Jaisalmer (17.25 percent).

COMPARISON

Rajasthan is the largest state of the study region followed by Punjab and Haryana. Area under forest was 4.37%, 2.99% and 6.10% in Punjab, Haryana and Rajasthan respectively in 1980-81 whereas in 2010-11, these percents were 5.84%, 0.88% and 8.01%. The area under forest was decreased in Haryana while increased in Punjab and Rajasthan. Encroachment of forest land for agricultural and urban activities is responsible for decline in forest land in Haryana. Land not available for cultivation registered minor changes. Area put to non agricultural uses has been increased in all three states as expansions of urban settlements and amenities. Barren and un-culturable land has declined due to above reason. The same condition was also registered in other uncultivated land excluding fallow land. The highest percent was registered in Rajasthan (17.38%) followed by Haryana (1.47%) and Punjab (0.24%) in 2010-11 whereas these percents were

24.17%, 1.36% and 0.95% respectively. Percent area of fallow land was negligible in Punjab and Haryana due to advance farm management. In case of Rajasthan area under fallow land was 12.20% and 8.65% respectively in 1980-81 and 2010-11 due to lack of irrigational facilities. The net area sowed registered positive volume of change in Rajasthan due to improvement of other culturable land. The percent of NSA was around 80 percent in Punjab and Haryana during the study period. In Rajasthan this percent was 44.61% in 1980-81 and 53.61% in 2010-11. The area under area sown more than once has increased significantly in the study region due to agricultural development. These percents were 51.07%, 42.06% and 6.08% in Punjab, Haryana and Rajasthan respectively in 1980-81 while in 2010-11, these percents were 67.56%, 73.97% and 22.36%.

The increment in the area sowed more than once resulted in increment in total cropped area. The area under this category was about 150% in Punjab and Haryana while Rajasthan had half of this percent. Physical and socio-economic adversities lead to lower proportion of TCA in Rajasthan.

CONCLUSION

The research reveals that there are great spatio-temporal variations in land utilization patterns of the study area. The districts with dissected and undulating topography are having higher proportion of forest land while districts are having flat terrain; developed agricultural infrastructural facilities are agriculturally developed. The share of land not available for cultivation is high in those districts which are more urbanized and have developed network of land transportation whereas districts with deprived socio-economic progress are having lower proportion of land not available for cultivation. Share of fallow land is high in western sandy desert; along Aravalli and Shiwalik, where sandy soils and physical constraints are more feasible. The percents of net sown area, area sown more than once and total cropped area is higher in most of the districts of Punjab and Haryana with districts of eastern plain and Ghaggar plain of Rajasthan. These districts are having flat topography, well developed irrigational facilities, fertile soils, etc. On the other hand the south-western districts of Punjab-Haryana; western and central districts of Rajasthan are having undulating topography, presence of sand dunes, less fertile soil, inadequate irrigational facilities and lesser use of agricultural implements; which lead to lower proportion of area under these categories. During the study period, North-Western India has experienced many changes in general and agricultural land utilization pattern due to enhanced accessibility, improved agricultural practices and implements, etc. Growing demands for food and increasing population pressure have further boost this process. With the lapse of time, more intense and unanticipated changes in the study area may be witnessed. Improvement in agricultural technology with planning for sustainable agricultural development may be fulfill people' growing demands.

REFERENCES

1. Chouhan T.S. (1987): Agricultural Geography- A Case Study of Rajasthan State. Academic Publication, Jaipur.
2. Gupta D.P. and Shangari K.K. (1980): Agricultural Development in Punjab. New Delhi: Agricole Publishing Academy.
3. Gurjar R.K. (1993): Irrigation for Agricultural Modernization. Jodhpur: Scientific Publisher.
4. Husain M. (2014): Systematic Agricultural Geography. Jaipur: Rawat Publications.
5. Iqbal Comred (1979): High Yielding Varieties of Seeds and Their Impact on Agricultural Development. In Ali Mohammad, Dynamics of Agricultural Development in India. Delhi: Concept Publishing Company.
6. Kumar P. and Sharma S.K. (2008): Agricultural Geography (Hindi). Bhopal: Madhya Pradesh Hindi Granth Academy.
7. Mahaliyanaarachchi R.P. and Bandara R.M.A.S. (2006): Commercialization of Agriculture and Role of Agricultural Extension. Sabaragamuwa University Journal, 6(1): 13-22.
8. Ray S. (2007): Oxford Handbook of Agriculture in India. New Delhi: Oxford University Press.
9. Singh J. and Dhillon S.S. (1984): Agricultural Geography. New Delhi: Tata McGraw Hill Publishing Co. Ltd.
10. Shafi Md. (2006): Agricultural Geography. New Delhi: Pearson Education Ltd.