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REGIONAL DISPARITIES IN LEVELS OF AGRICULTURAL DEVELOPMENT IN PUNJAB: A BLOCK LEVEL STUDY

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Abstract

Although agriculturally Punjab is the most developed state of India, yet striking regional disparities exist in its agricultural development. It has been observed that most of the studies related to regional disparities in agriculture are carried out either at state level or at district level. Surprisingly, studies related to regional disparities in agricultural development at 'Community Development Block' level are completely absent. The present study therefore attempts to examine the regional disparities in the levels of agricultural development at block level for the state of Punjab. The study is based on secondary data obtained from 'Block-at-a-glance' published by Economic Adviser to Government of Punjab. Based on HDI technique of UNDP, composite index of agricultural development has been computed taking 18 indicators. The study highlights that central and south-western parts of the state are agriculturally more developed than north-eastern foothill tract.

Introduction

Agriculture predominates in the economy of Punjab, where about 82 per cent of the geographical area of the state is under the category of net area sown. Punjab has 4.1 million hectares of net area sown out of which 3.7 million hectares is sown more than once in a year, bringing the annual crop acreage to 7.8 million hectares (Govt. of Punjab, 2015).

High yielding varieties (HYV) of rice and wheat, extensive use of synthetic fertilizers, increase in the use of insecticides and pesticides, introduction of agricultural engineering, farm mechanization, multi cropping pattern, reclamation of land, agricultural credit and marketing, rural electrification and transportation, etc. have made Punjab a surplus producer not only in food grains like wheat, rice and maize but also in other crops like sugarcane, potato and cotton. Now Punjab has become a food surplus state and accounts for largest share in the central pool for food grains. The yield per hectare of important crops like wheat, rice, maize, barley, gram, sugarcane potato and cleaned cotton is higher in the state than in the country as a whole.

The most important characteristic in the grand success story of the agricultural development process in Punjab is that it picked up the momentum at extremely rapid speed under green revolution and reached a plateau level rather too early. Agricultural production in the state has reached at a saturation level which needs a new direction to come out of the wheat-rice rotation regime. McGuirk and

Mundalak, (1991) examined the transformation of Punjab's agriculture with respect to its incentives vis-a-vis constraints. It concluded that overall yields for crops like wheat and rice improved due to the advances made in using high yielding varieties of such crops and better irrigation facilities. Singh (2004) highlighted the role of fertilizer-subsidy and its equitable distribution for agricultural development. Economic implications of technologies and agricultural practices of Punjab have been examined by Sidhu et al. (2010). They found that adoption of intensive agricultural practices in Punjab has been a threat owing to more and more exploitation of underground water resources, environmental deterioration, falling bio-diversity and increasing higher productivity risks involved in it. Kaur and Sharma (2012) put forward that the free electricity subsidy is regressive for the state, as the large farmers having the higher capacity to pay the power charges are receiving greater benefits from the power subsidy as compared to small and marginal farmers. Singh et al. (2013) investigated patterns of regional disparities in the use of modern agricultural inputs in Punjab and these were found to be reduced during 1993-94 to 2003-04 period.

Role of infrastructure in the growth of agriculture of Punjab has been analyzed by Singh and Kaur (2014). They found that number of regulated markets, storages, number of commercial and cooperative banks and production of wheat and rice were significantly related to agricultural development and were positively related to each other. Kumar and Kumar (2015) reviewed the challenges and reforms for Punjab's agricultural economy and found that although main benefits of green revolution were the surplus food grains, generation of more employment opportunities in agricultural and non-agricultural sectors, yet it added many problems for the farmers like development duality, uneven progress in crop production, wide disparity in the distribution of inter-farm income and social tensions in rural areas.

Agricultural innovation challenges in Punjab were analyzed by Singh (2015) and found that underlying cause of state's agricultural problems was the inefficiency in the governance. Employment patterns of agricultural labor in Punjab have been examined by Sharma (2016). He found that agriculture has contributed significantly in the economy of the state during green revolution but now structural transformation has reduced income generation of the rural economy. He also highlighted that the worst sufferers have been the small and marginal farmers as agricultural machinery has replaced the human labor. Apart from stagnation, contrasting agricultural disparities are also witnessed in the state, which call for analyzing and this study is a step in this direction.

Objectives

Major objectives of the study are:

- to examine the levels of agricultural development in Punjab; and
- to analyze regional disparities in the levels of agricultural development.

Study Area

Punjab is a triangular piece of land which extends from 29° 30′N to 32° 32′ N latitudes and 73° 55′E to 76° 50′ E longitudes (Fig.1). The state covers a geographical area of 50,362 km² and has a population of 27,704,236 persons according to Census of India, 2011. The state supports 2.29 per cent of the country's total population with 1.53 per cent of the total

Source: Census of India and Statistical Abstract, Punjab.

Fig. 1

land area. In 2014, it had 12163 inhabited villages, 146 blocks, 82 tehsils and 22 districts. With about 85 per cent of the geographical area under cultivation, Punjab is agriculturally most developed state of India. However, there exist vast regional disparities in its agricultural development.

Data and Methodology

The present study is based on secondary data obtained from various government publications such as block-at-a glance (2013-14); village directories (2013-14) and statistical abstracts of Punjab (2013, 2014 and 2015). The development block has been taken as the basic unit to study regional disparities, because most of the government policies regarding agricultural development are formulated and implemented at block level. In order to find out levels of agricultural development and identify regional disparities among various indicators of agricultural development at block level, 18 variables have been taken into account (Table 1). Following Human Development Index, the technique used was a three-step exercise: firstly, deprivations score of each development block was worked out and secondly, it was converted into a development score. The development scores of each block on eighteen indicators were summed up to arrive at the block's composite agricultural development index as under:

$$\text{Deprivation Score} = \frac{\text{Value of the block at top position} - \text{Value of the specific block}}{\text{Value of the block at top position} - \text{Value of the block at bottom position}}$$

Development Score = 1- Deprivation Score

For example, for the indicator of total cropped area per agricultural worker, deprivation and development scores were calculated as:

$$\text{Deprivation Score} = \frac{4.60 - 2.91}{4.60 - 1.73} = 0.58$$

where, 4.60 is the highest value for the block at top position (Bhagta Bhai Ka), and 1.73 is for the bottom ranking block (Jandiala) and 2.91 for Mehal Kalan block. Therefore, deprivation score for Mahal Kalan block is 0.58.

Thus, development Score for Mehal Kalan Block = 1-0.58 = 0.42

$$\text{Composite Index} = \frac{\text{Summation of development scores of all the 18 indicators used}}{18}$$

Composite index for overall agricultural development was equal to summation of component indices of all 18 indicators.

$$\text{Composite Index} = \frac{0.42, 1, 0.96, 0.94 \ldots\ldots\ldots N}{18} = 0.60$$

For example, composite index of overall agricultural development for Mehal Kalan block (Barnala district) was 0.60, highest for any development block in Punjab and the lowest one for Dhar Kalan block (Pathankot district) was 0.16 only, while state average comes to be 0.33.

For comparability of development blocks, normalized index of all the development blocks was calculated by taking state average as 100.

$$\text{Normalized Index} = \frac{\text{Composite index value}}{\text{State average}} \times 100$$

The composite index of the state (0.33) was given the score of 100. The composite indices of all the development blocks were normalized with respect to state average. Henceforth, normalized index for Mehal Kalan and Dhar Kalan were computed as 178 and 49, respectively.

Results and Discussion

Spatial Pattern of Agricultural Development

(i) Areas at High Level of Agricultural Development

This category of blocks includes development blocks recording normalized

Table 1
Punjab: Indicators for Levels of Agricultural Development

Parameters	Indicators
Agricultural Infrastructure	Total cropped area per agricultural worker
	Net irrigated area as per cent of net area sown
	Intensity of irrigation
	Area under high yielding variety of major food crops as per cent of total cropped area
Agricultural Implements	Electric operated tube wells per thousand hectares of net area sown
	Diesel operated tube wells per thousand hectares of net area sown
	Tractors per thousand hectares of net area sown
	Harvesters per thousand heathers of net area sown
	Threshers per thousand hectares of net area sown
	Reapers per thousand hectares of net area sown
Agricultural Institutional Environment	Agricultural co-operative institutions as per cent of total inhabited villages
	Godowns as per cent of total inhabited villages
	Purchase centers as per cent of total inhabited villages
	Agro-service centers as per cent of total inhabited villages
Agricultural Productivity	Production of principal crops per hectare of net area sown
	Production of principal crops per hectare of total cropped area
	Production of principal crops per agricultural worker
	Intensity of cropping
COMPOSITE INDEX OF AGRICULTURAL DEVELOPMENT	

Source: Block at Glance, 2013-14, Govt. of Punjab.

index more than 111 (Table 2; Table 3; Fig. 2). Although Punjab is agriculturally most developed state, yet regional disparities persist in various dimensions of its development, such as agricultural infrastructure, agricultural institutional environment, agricultural implements and agricultural production. The areas of high level of agricultural development, accounting for 26.1 per cent of total blocks (Table 3) made a plateau shaped pattern, with vast top at northern and central Malwa region which gradually waned towards all parts of the state (Fig. 2). This pattern was in conformity with distribution of infrastructural facilities but was broadly opposite of the physical quality of land. The upper Bari Doab and Bist Doab are better placed than the Malwa region in terms of soil fertility. Among different parts of the state, northern and central parts of Malwa region were found the most developed. This zone extended from Sidwan Bet block in the north to Andana block in the south and from Khanna block in the East to Kot Kapura block in the West. This tract alone accounted for 29 blocks, out of 38 highly agriculturally developed blocks in the whole state. All the blocks of Ludhiana and Barnala districts fall in this category.

(ii) Areas at Moderately High Level of Agricultural Development

Development blocks recording normalized index ranging between 100-111 are included in the category of moderately high level of agricultural development (Table 2; Fig. 2). The highly developed belt comprising 27.4 per cent of total blocks (Table 3) was surrounded by moderately high agriculturally developed areas (Fig. 2). It covered southern Bist Doab, eastern Malwa, and blocks of Sangrur, Bathinda, Moga and Firozpur districts. Although these areas were at moderately high level of agricultural development, yet they differed on account of the nature of indicators responsible for such development. Some areas, such as southern Bist Doab and south-eastern Malwa, were better placed in agricultural infrastructure while others, such as southern tip of Malwa covering whole of Mansa district and north eastern Bist Doab, were better in agricultural implements in a strictly comparative sense. Southern Malwa was ahead in institutional environment of agriculture. Parts of south-western Malwa covering entire Barnala district was slightly ahead in agricultural productivity. On the whole, agricultural infrastructure was found to be the major factor responsible for keeping all these areas at moderately high level of agricultural development.

(iii) Areas at Moderate Level of Agricultural Development

The development blocks that have witnessed normalized index (85-99) are grouped as areas of moderate level of agricultural development (Table 2; Fig.2). These blocks covered parts of south-western Malwa, parts of south-eastern Malwa, central part of Upper Bari Doab and patches in Bist Doab. These areas also differed among themselves in respect of agricultural infrastructure, implements, institutions and productivity. Parts of south-east, eastern Malwa and central part of Upper Bari Doab included in this category are better placed in agricultural infrastructure but lacked in agricultural productivity and agricultural implements, respectively. South-western Malwa and western Upper Bari Doab showed better agricultural productivity than their infrastructure and institutional environment. These patches spreading over 22.6 per cent of total blocks (Table 3) of Punjab could have

Table 2
Punjab: Blocks by the Levels of Agricultural Development, 2013-14

Block	District	CI*	NI**	Block	District	CI*	NI**	Block	District	CI*	NI**
Mahal Kalan	Barnala	0.60	178	Nihal Singh Wala	Moga	0.35	104	Kalanaur	Gurdaspur	0.31	94
Sehna	Barnala	0.59	174	Dera Bassi	SAS Nagar	0.35	104	Mansa	Mansa	0.30	91
Barnala	Barnala	0.58	172	Nawanshahar	SBS Nagar	0.35	104	Bhikhiwind	Tarn Taran	0.30	91
Sidhwan Bet	Ludhiana	0.57	171	Chamkaur Sahib	Rupnagar	0.35	104	Rupnagar	Rupnagar	0.30	91
Raikot	Ludhiana	0.56	167	Sirhind	Fatehgarh Sahib	0.34	103	Batala	Gurdaspur	0.30	91
Pakhowal	Ludhiana	0.55	165	Moga -I	Moga	0.34	102	Sri Hargobindpur	Gurdaspur	0.30	91
Delhon	Ludhiana	0.53	158	Phillaur	Jalandhar	0.34	102	Budhlada	Mansa	0.29	88
Phul	Bathinda	0.50	149	Khamano	Fatehgarh Sahib	0.34	101	Naushehra Panuan	Tarn Taran	0.29	88
Khanna	Ludhiana	0.50	147	Zira	Moga	0.34	101	Dhariwal	Gurdaspur	0.28	85
Doraha	Ludhiana	0.49	146	Ajnala	Amritsar	0.34	101	Dera Baba Nanak	Gurdaspur	0.28	85
Nathana	Bathinda	0.47	141	Tarsika	Amritsar	0.34	101	Chola Sahib	Tarn Taran	0.28	85
Ludhiana -II	Ludhiana	0.47	139	Malerkotla -I	Sangrur	0.34	101	Valtoha	Tarn Taran	0.28	85
Sudhar	Ludhiana	0.46	138	Bassi Pathana	Fatehgarh Sahib	0.34	101	Patti	Tarn Taran	0.28	85
Samrala	Ludhiana	0.46	138	Ghall Khurd	Firozpur	0.34	101	Kahnuwan	Gurdaspur	0.27	82
Bhagta Bhai Ka	Bathinda	0.46	137	Aur	SBS Nagar	0.34	101	Gurdaspur	Gurdaspur	0.27	82
Machhiwara	Ludhiana	0.46	137	Abohar	Fazilka	0.33	100	Adampur	Jalandhar	0.27	82
Rampura	Bathinda	0.45	133	Bhikhi	Mansa	0.33	100	Tanda	Hoshiarpur	0.27	82
Sunam	Sangrur	0.44	131	Harsha Chinna	Amritsar	0.33	100	Khadur Sahib	Tarn Taran	0.27	82
Ludhiana -I	Ludhiana	0.43	129	Bhunerheri	Patiala	0.33	100	Tarn Taran	Tarn Taran	0.27	82
Jagraon	Ludhiana	0.43	128	Banga	SBS Nagar	0.33	100	Jalandhar East	Jalandhar	0.26	79
Nadala	Kapurthala	0.43	127	Jandiala	Amritsar	0.33	100	Bamial	Pathankot	0.26	79
Andana at Moonak	Sangrur	0.42	125	Talwandi Sabo	Bathinda	0.33	100	Lambi	Sri Muktsar Sahib	0.26	79
Phagwara	Kapurthala	0.41	123	Amloh	Fatehgarh Sahib	0.33	100	Dasuya	Hoshiarpur	0.25	76
Dhuri	Sangrur	0.41	123	Bhogpur	Jalandhar	0.33	100	Garhshankar	Hoshiarpur	0.25	76
Kotkapura	Faridkot	0.41	123	Verka	Amritsar	0.33	100	Nakodar	Jalandhar	0.25	76
Sultanpur Lodhi	Kapurthala	0.41	121	Majri	SAS Nagar	0.33	100	Jalandhar West	Jalandhar	0.25	76
Lehragaga	Sangrur	0.41	121	Guru Har Sahai	Firozpur	0.33	100	Muktsar	Sri Muktsar Sahib	0.25	76
Dhilwan	Kapurthala	0.40	118	Sanaur	Patiala	0.33	100	Gandiwind	Tarn Taran	0.24	73
Fazilka	Fazilka	0.39	117	Ferozpur	Firozpur	0.33	100	Mahilpur	Hoshiarpur	0.24	73
Sangrur	Sangrur	0.39	116	Rayya	Amritsar	0.32	97	Hajipur	Hoshiarpur	0.24	73
Arniwala	Fazilka	0.39	116	Malout	Sri Muktsar Sahib	0.32	99	Sardulgarh	Mansa	0.24	73
Sherpur	Sangrur	0.39	115	Mehatpur	Jalandhar	0.32	98	Dina Nagar	Gurdaspur	0.24	73
Rurka Kalan	Jalandhar	0.38	114	Kot Ise Khan	Moga	0.32	98	Jhunir	Mansa	0.23	70
Jalalabad	Fazilka	0.38	114	Attari	Amritsar	0.32	98	Dorangla	Gurdaspur	0.23	70
Patran	Patiala	0.38	113	Morinda	Rupnagar	0.32	98	Mukerian	Hoshiarpur	0.23	70
Patiala	Patiala	0.38	113	Lohian	Jalandhar	0.32	98	Talwara	Hoshiarpur	0.23	70
Baghapurana	Moga	0.38	113	Rajpura	Patiala	0.32	98	Balachaur	SBS Nagar	0.22	67
Dirba	Sangrur	0.38	112	Mamdot	Firozpur	0.32	98	Hoshiarpur-I	Hoshiarpur	0.21	64
Malerkotla -II	Sangrur	0.37	111	Faridkot	Faridkot	0.32	98	Saroya	SBS Nagar	0.21	64
Bhawanigarh	Sangrur	0.37	110	Fatehgarh Churian	Gurdaspur	0.32	98	Nurpur Bedi	Rupnagar	0.20	61
Moga -II	Moga	0.37	109	Khuian Sarwar	Fazilka	0.32	98	Bhunga	Hoshiarur	0.19	58
Kharar	SAS Nagar	0.37	109	Gidderbaha	Sri Muktsar Sahib	0.32	97	Gharota	Pathankot	0.19	58
Maur	Bathinda	0.37	109	Chogawan	Amritsar	0.31	94	Hoshiarpur-II	Hoshiarpur	0.18	55
Kapurthala	Kapurthala	0.37	109	Makhu	Firozpur	0.31	94	Anandpur Sahib	Rupnagar	0.18	55
Sangat	Bathinda	0.37	109	Majitha	Amritsar	0.31	94	Pathankot	Pathankot	0.18	55
Nabha	Patiala	0.36	108	Ghanaur	Patiala	0.31	94	NarotJaimalSingh	Pathankot	0.17	52
Samana	Patiala	0.36	108	Shahkot	Jalandhar	0.31	94	Sujjanpur	Pathankot	0.17	52
Bathinda	Bathinda	0.36	107	Khera	Fatehgarh Sahib	0.31	94	Dhar Kalan	Pathankot	0.16	49
Nurmahal	Jalandhar	0.36	106	Qadian	Gurdaspur	0.31	96	**Punjab**	**State average**	**0.33**	**100**

CI: Composite index* *NI**: Normalized index*

Source: Calculated from the values of different blocks in respect of various indicators of agricultural development.

Table 3
Punjab: Percentage of Development Blocks according to Level of Agricultural Development, 2013-14

Level of Development	Composite Index	Number of Blocks	Percentage of Blocks
High	0.44	38	26.1
Moderately High	0.34	40	27.4
Moderate	0.31	33	22.6
Low	0.23	35	23.9

Source: Compiled from Table 2

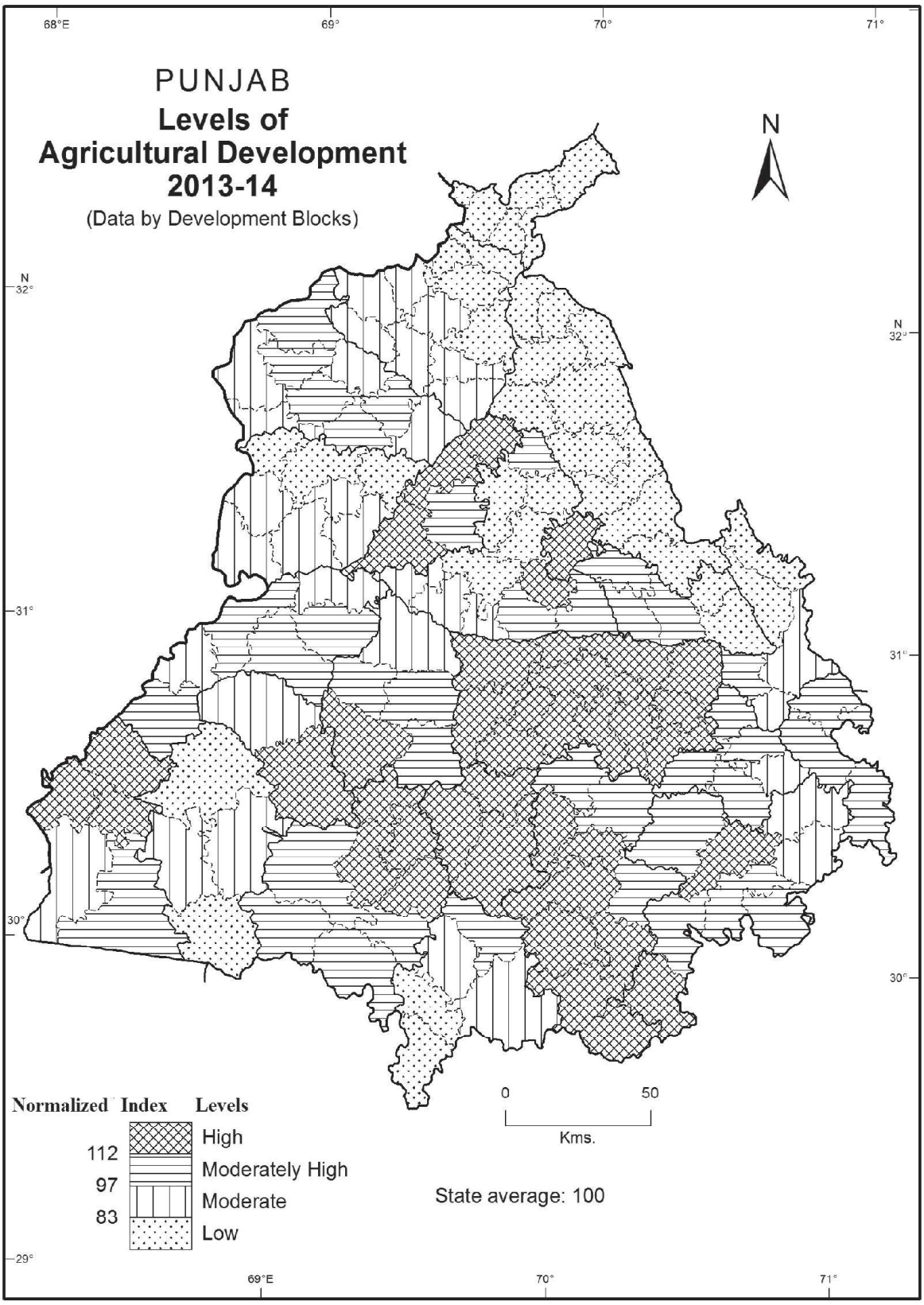
PUNJAB
Levels of
Agricultural Development
2013-14
(Data by Development Blocks)
N
68°E
69°
70°
71°
32°
31°
30°
29°
0
50
Kms.
Normalized Index Levels
112
97
83
High
Moderately High
Moderate
Low
State average: 100

Fig. 2

develop faster than other less developed areas if necessary infrastructure and implements are provided.

(iv) Areas at Low Level of Agricultural Development

Low level of agricultural development (normalized index less than 85) prevailed in Siwalik and Foot-hill dissected zone and parts of south-eastern Malwa region of Punjab (Table 2; Fig. 2). These regions comprising 23.9 per cent of total blocks (Table 3) were lacking agricultural infrastructure and institutional environment. The low level of agricultural development in these areas was due to denuded and dissected topography, soil erosion, destruction of farm land, coarse and stony soils which were not easy to plough and quite deep groundwater table. However, low agricultural productivity and inadequate implements are the reasons for low level of agricultural development in other parts of Punjab.

Regional Disparities in Different Indicators of Agricultural Development

The different indicators of agricultural development showed varying degree of regional disparity (Table 4). The disparity was the most acute in agricultural productivity represented by production of principal crops per agricultural worker, production of principal crops per hectare of net area sown and production of principal crops per hectare of total cropped area. The disparity index of these three indicators was 7.80, 7.06 and 6.86, respectively (Table 4). The disparity was of moderate degree in agricultural implements and institutional environment of agriculture. It was of the lowest order in agricultural infrastructure which formed the base of agricultural development. Agricultural infrastructure was represented by total cropped area per agricultural worker, net irrigated area as per cent of net area sown, intensity of irrigation and area under high yielding variety of major food crops. Their disparity index was 1.06, 0.96, 0.36 and 0.65, respectively (Table 4).

Conclusions

The level of agricultural development, derived from four agricultural subsets comprising eighteen variables depicted a south to north gradient. This pattern was in conformity with agricultural production and distribution of infrastructural facilities in the state. In agricultural development index, the highest variation to the tune of 48.6 per cent was explained by the indicator; production of principal crops per agricultural worker. The second most important indicator was the harvesters per thousand hectares of net area sown and this indicator accounted for 16 per cent variation. The third significant indicator with above 10 per cent contribution to the total variation in agricultural development index was electric operated tube wells per thousand hectares of net area sown (13.4 per cent). The remaining indicators explained less than 10 per cent variation in agricultural development index.

The central and northern Malwa tract alone accounted for 76 per cent of the highly developed blocks in the entire state. This highly agriculturally developed region was surrounded by an extensive zone with moderately high level of agricultural development. It covered southern Bist Doab, eastern Malwa and blocks of Sangrur, Bathinda, Moga and Firozpur districts. On the whole, agricultural infrastructure was found to be the main factor responsible for keeping all these areas at moderately high level of

Table 4
Punjab: Regional Disparities in Different Indicators of Agricultural Development

Indicator	Indicator-wise Position in the results			Disparity Index*
	Block at Top Position	Block at Bottom Position	State Average	
Total cropped area per agricultural worker	4.60	1.73	2.70	1.06
Net irrigated area as per cent of net area sown	100.0	8.0	95.16	0.96
Intensity of irrigation	203.0	135.0	188.05	0.36
Area under high yielding variety of major food crops	94.50	40.97	82.30	0.65
Electric operated tube wells per thousand hectares of net area sown	420.08	1.12	202.01	2.07
Diesel operated tube wells per thousand hectares of net area sown	265.64	0.03	67.76	3.91
Tractors per thousand hectares of net area sown	225.42	0.63	75.00	2.99
Harvesters per thousand hectares of net area sown	19.39	0.02	2.18	8.88
Threshers per thousand hectares of net area sown	135.40	0.01	26.98	5.01
Reapers per thousand hectares of net area sown	25.83	0.02	4.15	6.21
Agricultural cooperative institutions as per cent of total inhabited villages	90.63	6.76	33.68	2.49
Purchase centers as per cent of total inhabited villages	21.43	0.00	5.46	3.92
Agro service centers as per cent of total inhabited villages	21.43	0.00	3.13	6.84
Godowns as per cent of total inhabited villages	40.48	0.00	3.17	12.76
Production of principal crops per hectare of net area sown	275.03	0.57	38.87	7.06
Production of principal crops per hectare of total cropped area	143.69	0.29	20.89	6.86
Production of principal crops per Agricultural Workers	450.17	0.92	190	7.80
Intensity of cropping	301.0	100.0	190.0	1.05

Source: Compiled by Authors

agricultural development. Moderately developed areas were found in the form of clusters in south-western Malwa, south-eastern Malwa, central part of Upper Bari Doab and Bist Doab. These areas could have been developed faster than other less developed areas, if necessary infrastructure and implements were provided. Low level of agricultural development prevailed in Siwaliks and Foothill dissected zone and southernmost tip of the state covering Jhunir and Sardulgarh blocks. The Siwaliks and Foothill dissected zone alone accounted for 66 per cent of agriculturally least developed blocks in the whole state.

The intensive use of farm land (twice the landholding size) and the over dependence on wheat-rice combination has led to over-exploitation of soil and groundwater. Rice cultivation, which was carried out on 3.9 lakh hectare in 1970-71 increased to 28.2 lakh hectares by the year 2011-12. It has a direct impact on the groundwater table. Populist policies of the state government for supplying free electricity to farmers has further led to the lowering of groundwater table, as they use more and more power supply to pump out groundwater through tube-wells. Such populist policies need to be revised for saving the groundwater as well as lessening the burden on state exchequer.

For sustainable agricultural development, it is necessary to enhance the groundwater table, preferring low water dependent crops, ensuring better marketing facilities, creating employment opportunities and securing better livelihood for small and marginal farmers. Agriculture production cost need to be curtailed through mechanization, financial support and sharing agricultural machinery on custom hiring basis. The blocks with low level of agricultural development should be given top priority in the state inducements like capital assistance, assured minimum prices and promotion of crop diversification.

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