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Migrant Farm Workers in Punjab: A Spatio-Temporal Analysis

Sucha Singh and Dhian Kaur, Chandigarh

ABSTRACT: The study examines spatio-temporal changes in distributional pattern of migrant workers especially the farm labour in Punjab. The data on migrant labour, available from the Census of India, have been used to study changes during 1991-2011 and for the migrant agricultural labourers during 1991 and 2001. The analysis reveals that the state has witnessed an increase of 58.0 per cent in rural migrant workers during 1991-2011. The central region with high cropping intensity and industrial development has recorded a very high increase of such workers in comparison to rural and agricultural southwestern Punjab. However, there has been a decline in the number of migrant agricultural labourers in the vast areas distributed in the central plains and north-eastern sub-mountainous region during same period. The study recommends for the formulation a policy so as to provide the farmers affordable farm technology to thwart the acute shortage of farm labour during the peak farm operations.

***Keywords*: Migrant Worker, Migrant Agricultural Labour, Farm Mechanization, Landholdings, Non - Farm Jobs, Urbanization, Scheduled Castes**

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Introduction

Agricultural labour in Punjab is closely linked with the changes in farming practices (Singh, 2020). It reflects the complexity of market forces and technical factors, influencing the demand for labour on farms in the state. In the late 1960's and early 1970's, the introduction of modern production technology called "Green Revolution" for wheat and paddy crops unleashed the forces of change that influenced productivity, production and employment (Billings and Singh, 1970; Chadha, 1986; Bhalla and Singh, 2001; Rathi, 2020). Increased farm mechanisation was accompanied by higher labour absorption in the production process due to the increase in cropping intensity, HYV seeds, pesticides, weedicides, chemical fertilisers, expansion in irrigated area and higher land productivity (Grewal and Kahlon, 1974; Sidhu and Johl, 2002).

A huge demand thus created for agricultural labour in Punjab attracting migrant worker mainly from the backward states of eastern India (Grewal and Sidhu, 1979; GOP, 2009; Rathi, 2020). It was quite difficult to meet the labour requirements from local labour market during the peak periods of operations. The numbers of migrant agricultural labour in the state increased rapidly during the nineties (Sidhu et al. 1997). Interestingly, seasonal migration of labour during peak periods of agricultural operations led to the change in the agrarian structure of Punjab. Migrant agricultural labour started replacing the local labour in most of the agricultural operations especially the paddy transplantation in Punjab by the end of nineties (Singh, 1995; GOP, 2004; Rathi, 2020). The inflow of migrant labour accelerated during the 1990s compared with the 1980s (Singh et al. 2007). Moreover, the changes such as the rapid capitalisation of agriculture and mechanization of various farm operations brought about by the Green Revolution and followed by the New Economic Policy of 1991, have led

to the displacement of labour (local and migrant) from farm operations and transference to the non-agriculture sectors (Jodhka, 2008; Institute of Applied Manpower Research, 2013; Singh, 2016). Thus, the employment of migrant labour has been changing over time and space in the state.

However, as evident from an in-depth analysis of literature review on the theme, most of the studies on migrant labour have been conducted from the economic perspective. The spatio-temporal perspective is largely missing in such studied. Finding a research gap, the present paper focuses on spatio-temporal variations in distributional pattern of migrant workers especially the agricultural labourers with reference to Punjab.

Research objectives, data sources and methodology

The main objectives of the study are to analyse the spatio-temporal changes in the distribution pattern of migrant workers, and to study the changing pattern of migrant agricultural labour (total, male and female) in Punjab.

For the purpose, the secondary sources of data have been pressed into service. Data available from Census of India, *Migration Tables of D-Series,* published by the Office of the Registrar General and Census Commissioner of India, New Delhi, have been calculated and tabulated at the district level. According to Census of India, a person is considered as the migrant agricultural labour if the place in which he/she is enumerated in the census is other than his place of immediate last residence and the reason for migration is employment as an agricultural labour.

Though the Census of India released the data of D-Series of 2011 by states in the mid-July, 2019 but data on migrant workers by place of last residence and industrial category have not been published yet. Hence, the paper used tables "D-3: Migrants by Place of Last Residence, Duration of Residence and Reason for Migration-2011" to analyse spatial variations of the total migrant workers and their rural-urban composition at the district level. However, the data from table D11 (S): "Migrant Workers by Place of Last Residence and Industrial Category-1991" and table D8: "Migrant Workers by Place of Last Residence and Industrial Category-2001" have been analysed for examining the patterns of distribution of migrant agricultural labour in the state.

The state has witnessed changes in administrative units between 1991 and 2011. In 1991, Punjab had twelve districts, increased to seventeen by 2001 and then to twenty in 2011. New districts carved out during 1991-2011 were from the twelve districts. For making data comparable, the district boundaries were adjusted using the equivalence table, used by Census of India for comparing data sets of different Census years (GOI, 2011). These equivalence tables have been used to study the spatio-temporal changes in the migrant workers during 1991-2011 and for migrant agricultural labour during 1991-2001.

Data migrant agricultural labourers have been tabulated in absolute numbers and percentage at the district level for 1991 and 2001 to study urban-rural and male-female composition of migrant labour. For cartographic representation of data ArcGIS 10.0 software has been used.

For studying the relationship between migrant agricultural labourers and size of landholdings imple linear regression method has been used. A direct relationship between the sizes of landholdings with the higher use of migrant agricultural labour has been assumed.

RESULT AND DISCUSSION

Migrant workers in Punjab: An overview

Agricultural and agro-industrial development in India especially in the post-Green Revolution phase generated a huge demand for labour, which was beyond the capacity of local labour market to meet. This led to in-migration of labour in Punjab from the rural areas of backward states especially Uttar Pradesh and Bihar (GOP, 2009). In 1991, the total number of migrant workers was 1.6 million, which rose to 2.32 million by 2011. Every fourth migrant cited the search for work as a reason for his/her migration to Punjab. In 2011, migrant workers made nearly 6.0 per cent in total workers of the state.

Table 1: Punjab: Percentage share of migrant workers by districts, 2011

District	Per cent in total	Level	Per cent of total		
			Rural	Urban	Total
Ludhiana	28.39	High	67.14	32.86	100
S.A.S Nagar	10.81	High	56.32	43.68	100
Jalandhar	10.49	High	64.85	35.15	100
Bathinda	6.96	High	66.95	33.05	100
Patiala	6.47	High	61.34	38.66	100
Hoshiarpur	5.17	Moderate	81.94	18.06	100
Amritsar	5.13	Moderate	56.93	43.07	100
Firozpur	3.61	Moderate	70.37	29.63	100
Kapurthala	3.49	Moderate	71.01	28.99	100
Fatehgarh Sahib	3.49	Moderate	79.57	20.43	100
Sangrur	2.94	Low	72.73	27.27	100
Rupnagar	2.25	Low	72.17	27.83	100
Gurdaspur	1.79	Low	62.12	37.88	100
Barnala	1.74	Low	73.43	26.57	100
S.B.S. Nagar	1.66	Low	81.56	18.44	100
Sri Muktsar Sahib	1.63	Low	71.74	28.26	100
Moga	1.32	Low	58.52	41.48	100
Mansa	1.19	Low	74.25	25.75	100
Faridkot	0.98	Low	57.61	42.39	100
Tarn Taran	0.48	Low	61.83	38.17	100
Punjab	**100**		**66.73**	**33.27**	**100**

Source: Census of India (2011). *D-3 Migration Tables, Punjab,* Office of the Registrar General and Census Commissioner of India, New Delhi. Accessed from www.censusindia.gov.in

The distribution of migrant workers among the districts of Punjab makes an interesting reading. In 2011, more than one-fourth or 28.4 per cent of total migrant workers came to Ludhiana district followed by S.A.S Nagar (Mohali) with 10.8 per cent, Jalandhar with 10.5 per cent, Bathinda with about 7.0 per cent, and Patiala with 6.5 per cent. The top-ranking seven districts, each having more than 5.0 per cent, had, in combine, about three-fourths (or 73.4 per cent) of total migrant workers (Table 1). On the other side of the scale were seven districts, namely Gurdaspur, Barnala, S.B.S. Nagar, Sri Muktsar Sahib, Moga, Mansa, Faridkot and Tarn Taran districts which shared only less than 2.0 per cent, each, of the total migrant workers in the state. Their combined share, which made only about 11.0 per cent in total migrant workers, was about two-fifths of total such workers in Ludhiana district. Geographically speaking, more urban-industrial districts located in the Central corridor received high shares of migrant workers, against low to very low shares of such workers were received by districts located in more rural and agricultural southwestern Punjab.In their rural-urban distribution, two-thirds or 66.7 per cent of migrant workers came to rural areas to work as wage labourers in agricultural operations. Among districts, the share ranged from a high of about 82.0 per cent in Hoshiarpur district to a low of only 56.3 per cent in S.A.S Nagar (Mohali). On the whole, three of each five districts in the state had this share higher than the state average (66.7 per cent). On the other side, in the four districts namely S.A.S. Nagar, Amritsar, Moga and Faridkot, this share was less than 60.0 per cent. In other words, the share of such workers in these districts was high in urban areas than that of the rural areas. It can be assumed that a considerable part of the labour demand for agricultural operations in these districts was fulfilled from the locally available labourers.

Briefly, the demand for labour in agricultural operations has been the major pull factor, attracting the migrant workers from other states to the rural parts of the state.

In the following, an attempt has been to examine changes in the proportion of migrant workers at the district level. As already stated, there has been an increase of as many as eight districts in Punjab during 1991-2011. Table 2 depicts the clubbing of districts in 2011 according to 1991 for having a more realistic picture of changes in proportional share of migrant workers at the district level taking place during 1991-2011.

Table 2: Punjab: Equivalence Table-1(Districts Clubbed as Groups)

District-1991	**District-2011**
Gurdaspur	Gurdaspur
Amritsar	Amritsar - Tarn Taran
Kapurthala	Kapurthala
Sangrur	Sangrur –Barnala
Rupnagar	Rupnagar - SAS Nagar
Bathinda	Bathinda – Mansa
Firozpur – Faridkot	Firozpur - Faridkot - Moga - Sri Muktsar Sahib
Ludhiana – Patiala	Ludhiana - Patiala - Fatehgarh Sahib
Jalandhar – Hoshiarpur	Jalandhar - Hoshiarpur - SBS Nagar

Source: Census of India (2011). *Administrative Atlas of India*, 2011

Punjab has witnessed an increase of 2.12 lakh migrant workers during 1991-2011: from 3.63 lakh in 1991 to 5.75 lakh in 2011, registering an increase of 58.0 per cent (Table 3). All the districts except Gurdaspur have recorded an increase, ranging from a low of 7.0 per cent in Firozpur-Faridkot-Moga-Sri Muktsar Sahib districts, as a group, to a high of 120.0 per cent in Bathinda-Mansa districts. In other words, while Gurdaspur district registered an absolute decline of more than 600 migrant workers, Bathinda-Mansa districts, in combine, more than doubled the number of such labourers. Absolute decline in number of migrant labour in Gurdaspur needs a further probing. On the whole, only the three combinations of districts, namely Bathinda-Mansa, Jalandhar-Hoshiarpur-SBS Nagar, and Ludhiana-Patiala-Fatehgarh Sahib districts recorded an increase in share of migrant labour, which is higher than or equal to the state average (58.0 per cent). The rest of the combinations of districts recording low to very low of the state average indicated to a high skewness in increase of the number of the migrant labour among the districts in the state (Table 3). The districts having either the big urban-industrial centres located in them and/or facing the problem of labour availability at the local level have attracted higher shares of migrant labour during 1991-2011. Jalandhar, SBS Nagar, Ludhiana, Patiala and Bathinda districts fall in this category.

Table 3: Punjab: Change in number and percent share of migrant workers, 1991- 2011

District	Total		Change (in %)	Rural		Change (in %)	Urban		Change (in %)
	1991	2011		1991	2011		1991	2011	
Gurdaspur	10963	10302	-6.0	6220	6400	3.0	4743	3902	-18.0
Amritsar-Tarn Taran	22160	32208	45.0	4320	18470	328.0	17840	13738	-23.0
Kapurthala	15220	20077	32.0	6220	14257	129.0	9000	5820	-35.0
Sangrur-Barnala	18367	26878	46.0	7550	19618	160.0	10817	7260	-33.0
Rupnagar-S.A.S.Nagar	37084	75055	102.0	13650	44322	225.0	23434	30733	31.0
Bathinda-Mansa	21260	46808	120.0	7340	31836	334.0	13920	14972	8.0
Firozpur-Faridkot-Moga-Sri Muktsar Sahib	40678	43332	7.0	18580	28997	56.0	22098	14335	-35.0
Ludhiana-Patiala-Fatehgarh Sahib	139645	220355	58.0	27360	148283	442.0	112285	72072	-36.0
Jalandhar-Hoshiarpur-SBS Nagar	57134	99499	74.0	23976	71193	197.0	33158	28306	-15.0
Punjab	**362,511**	**574,514**	**58.0**	**115216**	**383376**	**233.0**	**247295**	**191138**	**-23.0**

Source: Computed from Census of India (1991). *D-11(S) Migration Tables, Punjab,* and Census of India (2011). *D-3 Migration Tables, Punjab,* Office of the Registrar Genera and Census Commissioner of India, New Delhi retrieved from www.censusindia.gov.in

Rural-urban classification of the change in number and the share of migrant labour make an interesting story. While the number of such workers during 1991-2011 increased by more than twice or 233.0 per cent in rural Punjab, urban areas witnessed a dip by 23.0 per cent during this period. With the exception of Bathinda-Mansa combination, where has been a marginal increase of 8.0 per cent in migrant workers in the urban areas, all other districts recorded a decline in the number of such workers. Ludhiana-Patiala-Fatehgarh Sahib, Kapurthala, Firozpur-Faridkot-Moga-Sri Muktsar Sahib, Sangrur-Barnala, Rupnagar-SAS

Nagar, and Amritsar-Tarn Taran, combinations, recording a decline is percentage share of urban migrant labourers more than or equal to the state average (-23.0 per cent).

Obviously, rural and urban areas present a contrasting picture of change in the number as well as the share of migrant labourers in the state during 1991-2011. Against the average increase of 233.0 per cent in migrant labourers in the rural Punjab, it was as high as 442.0 per cent or more than four times increase in Ludhiana-Patiala-Fatehgarh Sahib group of districts. This group was followed by Bathinda-Mansa with 334.0 per cent) and Amritsar-Tarn Taran with 328.0 per cent. Against this, Gurdaspur district registered a marginal increase of 3.0 per cent in the number of such workers. In addition, Kapurthala, Sangrur-Barnala, and Firozpur-Faridkot-Moga-Sri Muktsar Sahib combination recording low to very increase in share of migrant workers during 1991-2011. This conforms to the changes taking place in the spatial organization of Punjab economy in the post-reforms period. For example, Rupnagar-SAS Nagar combination, where the number of migrant workers in rural areas more than doubled during 1991-2011, benefitted from the spill-over effect from Chandigarh. With liberalization and privatization of Indian economy after 1991 a number of private colonizers developed residential colonies in towns such as Zirakpur, Dera Bassi, Kharar, Mullapur, and Naya Gaon. In addition, with privatization of higher education in India, several engineering and medical colleges/universities have been established in the areas located in the surroundings of Chandigarh. This attracted a large number of migrant labourers to work in construction activities, milk and vegetable services, and lower level jobs in medical and engineering colleges. The dominant majority of such migrant workers are residing in nearby villages of such towns. The almost the same is true for Ludhiana-Patiala-Fatehgarh Sahib districts. Bathinda-Mansa benefitted from the political patronage it received during the previous government in Punjab between 2007 and 2017.

Notwithstanding a decline of 23.0 per cent points in number of migrant workers in urban Punjab during 1991-2011, Rupnagar- S.A.S. Nagar group (31.0 per cent) and Bathinda-Mansa group (8.0 per cent) of districts recorded increase. The decrease in the proportion of urban migrant workers can be attributed to the place of enumeration of migrants as most of the migrant workers tend to settle in the rural areas for the low rent residential accommodations in the surrounding villages from where they compute to work in non-farm works like construction and manufacturing units in the nearby urban-industrial centre.

Migrant agricultural workers in Punjab

In 2001, Patiala district ranked at the top with 13.4 per cent of the total migrant agricultural workers in the state. It was followed by Firozpur (12.9 per cent), Ludhiana (12.2 per cent) and Hoshiarpur (10.8 per cent) districts. These four top ranking districts, each having more than 10.0 per cent of the total migrant workers, in combine, had nearly half of the total such workers. Against this, low ranking eight districts, each having less than 5.0 per cent of migrant agricultural workers, had, in combine, only about one-fifth or 20.0 per cent of total such workers (Table 4).

Table 4: Punjab: Classification of districts by their shares in total Migrant Agricultural Labourers, 2001	
Category	**District**
High (> 10.0 per cent)	Patiala (13.43), Firozpur (12.87), Ludhiana (12.24), Hoshiarpur (10.82) **Total= 4**
Moderate (5.0 -10.0 per cent)	Jalandhar (7.17), Sangrur (6.13), Bathinda (6.02), Mansa (5.86), Sri Muktar Sahib (5.30) **Total= 5**
Low (<5.0 per cent)	Rupnagar (4.80), Kapurthala (2.91), Gurdaspur (2.86), SBS Nagar (2.81), Fatehgarh Sahib (2.10), Amritsar (1.97), Moga (1.45) Faridkot (1.23) **Total= 8**
Source: Census of India (2001). *D-8 Migration Tables, Punjab,* Directorate of Census Operations, Punjab, Chandigarh.	

Among the migrant workers 52.0 per cent constitutes the males and remaining about 48.0 per cent females (Table 5). However, there are marked variations. In most of the eastern and northern districts of the state, the proportion of male migrant agricultural labourers is high (>65.0 per cent) - mostly seasonal going back after the peak season. In the western and southern Punjab, female migrant agricultural labour shares high proportion in the total migrant agricultural labour, due to large number of females from neighbouring states of Rajasthan and Haryana for farm operations related with cotton.

Table 5: Punjab: Composition of migrant workers by districts, 2001

District	Male	Female	Rural	Urban
Fatehgarh Sahib	85.35	14.65	83.22	16.78
Jalandhar	85.20	14.80	75.85	24.15
Ludhiana	84.13	15.87	62.85	37.15
S.B.S. Nagar	82.09	17.91	94.88	5.12
Kapurthala	81.99	18.01	77.14	22.86
Rupnagar	73.89	26.11	88.11	11.89
Amritsar	69.13	30.87	64.84	35.16
Moga	69.09	30.91	83.98	16.02
Hoshiarpur	66.55	33.45	94.78	5.22
Faridkot	64.06	35.94	75.02	24.98
Gurdaspur	44.12	55.88	89.22	10.78
Sangrur	36.33	63.67	84.92	15.08
Firozpur	31.45	68.55	94.41	5.59
Sri Muktsar Sahib	30.64	69.36	93.56	6.44
Bathinda	25.42	74.58	83.57	16.43
Patiala	24.84	75.16	91.12	8.88
Mansa	17.81	82.19	94.23	5.77
Punjab	**51.88**	**48.12**	**85.37**	**14.63**

Interestingly, migrant agricultural labourers come to rural areas of the state. The state average for such workers being more than 85.0 per cent, this share is more than 90.0 per cent in the six districts namely SBS Nagar, Hoshiarpur, Firozpur, Mansa, Sri Muktsar Sahib and Patiala. In these districts, the local agricultural labour shifted to non-farm occupations (Singh, 1995; Sidhu and Singh, 2004; GOP, 2004; Singh, 2012; and Rathi, 2020). The studies reveal that the majority of the migrant workers suffer from severe unemployment and under

employment, low wages, large families, poor economic conditions and indebtedness in their home states (GOP, 2004).

Distribution of migrant agricultural workers at district level

The share of migrant agricultural workers differs widely across districts in the state. In 2001, it ranged from a maximum of 26.6 per cent in Firozpur district to a minimum of only 3.7 per cent in Amritsar district, range difference being of more than seven times. The state average being 10.1 per cent, districts have been categorized into the three categories: (i) Areas of high migrant agricultural workers (>20.0 per cent), (ii) Areas of moderate migrant agricultural workers (10.0-20.0 per cent), and (iii) Areas of low migrant agricultural workers (>10.0 per cent). In the following, these areas have been discussed in the detail.

(i) Areas of high migrant agricultural workers (>20.0 per cent)

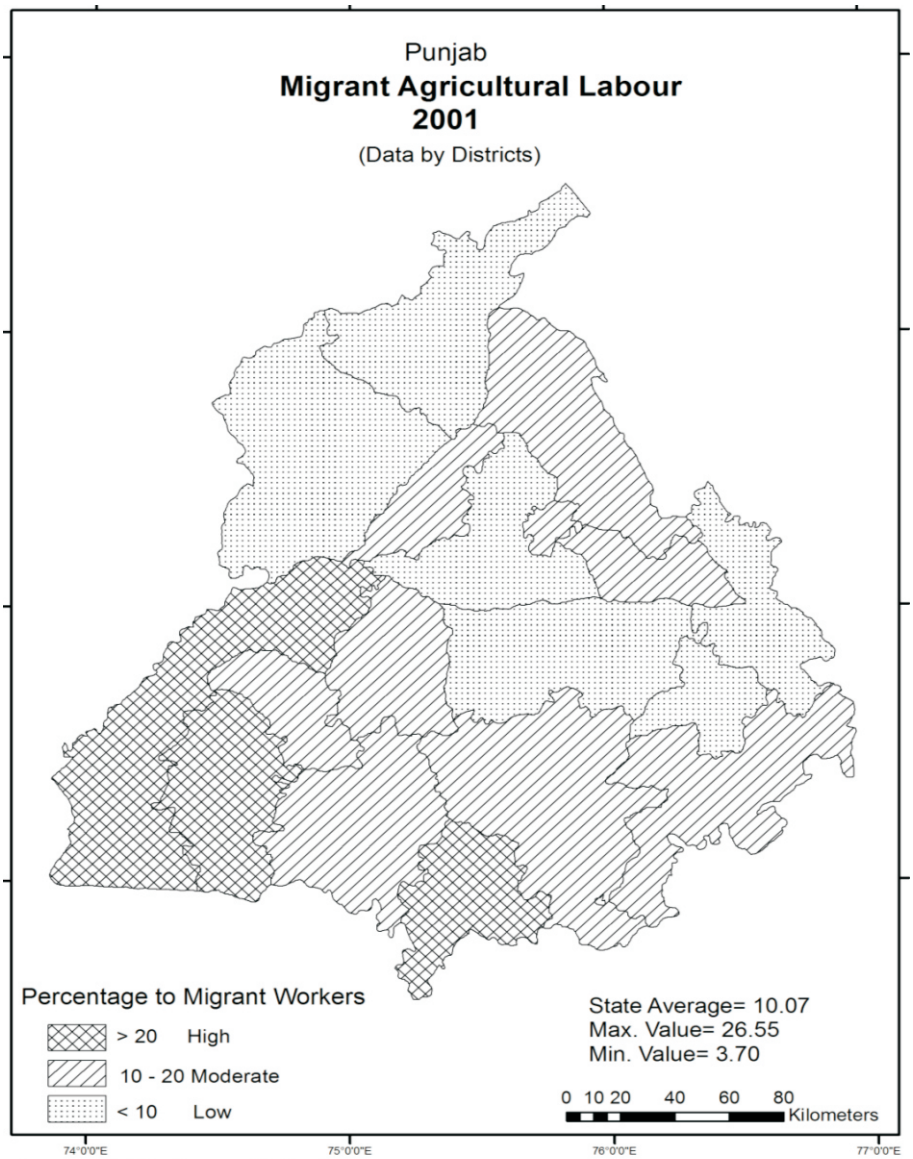
In the three districts of Firozpur (26.6 per cent), Sri Muktsar Sahib (24.5 per cent) and Mansa (23.8 per cent), where the share of such workers in total agricultural labourers was higher than 20.0 per cent, were located in the southwestern region of the state (Map 1). This region generates a higher demand for agricultural labour due to relative large size of landholdings (Singh and Kaur, 2012), needing to hire labourers in large number to perform various farm operations. In addition, cotton cultivation in this part of the state demand more than labourers for cotton plucking.

(ii) Areas of moderate migrant agricultural workers (10.0-20.0 per cent)

In another eight districts, where the share of migrant agricultural labourers ranged between 10.0 and 20.0 per cent, are distributed in different parts of the state. Three of these (Bathinda, Faridkot and Moga) are located in southwestern plains, another four in the Central plains (Kapurthala, S.B.S. Nagar, Sangrur and Patiala), and remaining one Hoshiarpur in the north eastern sub-mountainous region. It was observed by the first author during the field work that there is a considerable competition from local labour in these districts, having large shares of scheduled castes in their total population. Hence, these districts fall in moderate category.

(ii) Areas of low migrant agricultural workers (<10.0 per cent)

In remaining six districts the share of such labourers was low share (<10.0 per cent) were distributed the central plains (Amritsar, Jalandhar, Ludhiana and Fatehgarh Sahib) and the north-eastern sub-mountainous region of region (Gurdaspur and Rupnagar). In most of these districts intensive cultivation is practised with the use of machinery on relatively small sized landholdings. All the three types of labour (migrant, local and family) are used to perform different farm operations. This came to the notice of the first author during the field work conducting in 2017. Relatively high level of urban-industrial development in the region also explains the low proportion of migrant agricultural labourers coming in these pockets. In addition, the use of local labour is comparatively higher for manual operations of sugarcane and wheat crops.



Map 1

Briefly, high proportion of migrant agriculture labour in districts of southwestern plains is explained by the huge labour demand on large size holdings compared with the districts of central plains region. In order to quantify their relationship, linear regression diagram has been drawn by taking selected factors. (Table 6 and Fig. 1) The large landholdings (explanatory factor) are positively associated with migrant agricultural labour (response) by indicating a value of .024075, significant at $p<0.05$. The result validates the hypothesis that the size of landholdings is positively related with employment of migrant agricultural labour in the state (see also Singh et al. 2007).

Table 6: Punjab: Linear regression between migrant agricultural Labour and Landholdings, 2001				
Sr. No.	**District**	**Migrant labour (%)**	**Large landholdings (%)**	
1	Rupnagar	1.86	5.15	
2	Amritsar	4.88	3.7	
3	Ludhiana	8.74	4.04	**r= 0.5437**
4	Patiala	8.24	13.65	
5	Gurdaspur	2.19	8.63	
6	Fatehgarh Sahib	7.85	8.94	
7	Hoshiarpur	2.87	18.65	**P-Value= .024075**
8	Jalandhar	5.33	9.42	
9	Moga	7.63	10.35	
10	Kapurthala	6.78	10.04	
11	SBS Nagar	2.91	17.64	**Significant at p< .05**
12	Sangrur	8.21	12.42	
13	Firozpur	12.89	26.55	
14	Bathinda	13.61	14.53	
15	Faridkot	10.58	12.07	
16	Mansa	10.04	23.81	
17	Sri Muktsar Sahib	17.59	24.47	
Punjab		**7.28**	**10.07**	

Sources: (i) Census of India (2001). D-8 Migration Tables, Punjab, Directorate of Census Operations, Punjab, Chandigarh. (ii)Agricultural Census of Punjab (2001-02).

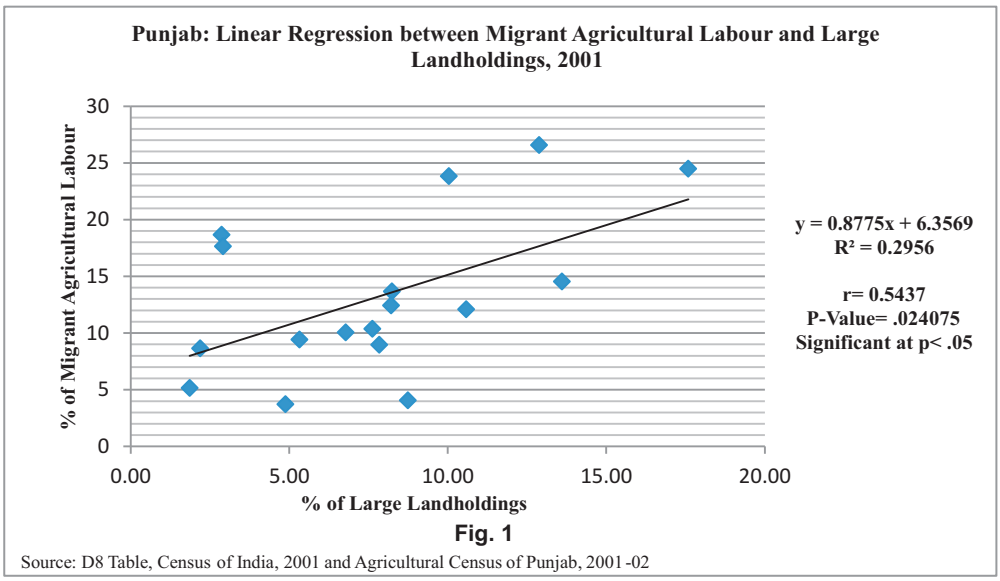


Fig. 1

Source: D8 Table, Census of India, 2001 and Agricultural Census of Punjab, 2001-02

Conclusions and recommendations

The study reveals that high proportion of migrant labourers came to mainly the central plains of Punjab having high intensive cultivation of crops like paddy and vegetables coupled with higher level of industrial development than rural agrarian southwestern plains. A contrasting situation has been notice with regard to rural and urban migrant labourers in the state. While

the number of migrant labourers in rural areas registered an increase more than twice (233.0 per cent) during 1991-2011, the number of such workers in urban areas registered a decline by 23.0 per cent during the same period.

Better wage rates and higher number of employment days have attracted rural migrant workers attracted to Punjab from the rural backward areas of other states in India. In addition, an offer of accommodation and ration by the farmers helped the process of labour in-migration to rural areas of Punjab.

In Punjab, the districts which received the higher shares of migrant agricultural labour had large to medium land holdings. The male migrant labourers from the states in eastern India came in maximum number to agriculturally developed districts in the inner parts of Punjab, while districts sharing borders with neighbouring Haryana and Rajasthan received higher number of female migrant labourers. Rural areas of all districts received a higher proportion of migrant agricultural labourers, due to low availability of local agricultural labourers during the peak farm operations.

Linear regression analysis run on the data proved the hypothesis that the migrant agricultural labour is positively correlated with the size of landholdings in the state. Engagement of local scheduled castes labour in farm operations in parts of southwestern plains, central plains and north eastern sub-mountainous region has led to a relatively lower proportion of migrant labour. Most parts of central plains and north eastern sub-mountainous region have witnessed a decline in such workers on account of the shift of labour from the farm to non-farm works such as construction. Also the shift of local labour from sugarcane operations has led to an increase in migrant agricultural labour in some pockets.

In sum, most parts of Punjab have experienced a decline in the proportion of migrant agricultural labour after 1991 mainly due to increased mechanization and shift of workers from farm to non-farm sectors. This has resulted in acute shortage of migrant agricultural labour especially in the central plains region. In view of the fact that the local agricultural labour in almost all districts have shifted to other non-farm occupations, the study recommends the formulation of a policy for providing appropriate machinery to the farmers on custom hiring basis. This can be done through cooperatives at an affordable cost, helping in addressing the problem of acute shortage of agricultural labour particularly migrants during peak farm operations such as paddy transplanting, and potato and sugarcane harvesting especially in the central and north eastern sub-mountainous region of Punjab.

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