Executive Brief

District-wise Cost of Cultivation of Important Crops in Punjab

Manjeet Kaur **Sukhpal Singh**

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H.S. Kingra **Jatinder Sachdeva**

Department of Economics and Sociology
Punjab Agricultural University
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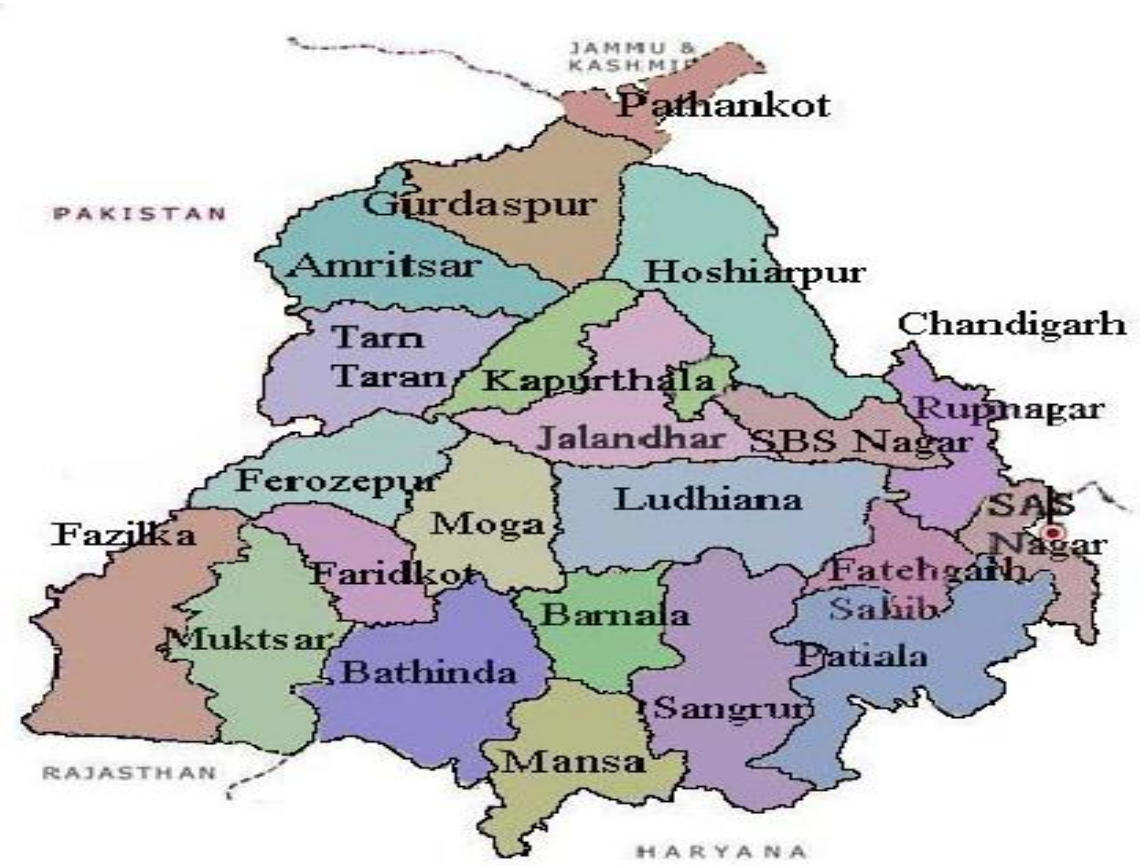

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FOREWORD

The state of Punjab, comprising of 22 districts, is one of the developed state in the country and is an excellent example of vibrant culture and economic prosperity. The State which is known as 'Granary of India' contributed 46 per cent of India's wheat and 27 per cent of India's rice to the central pool of food grains during 2015-16. Agriculture continues to be a major contributor to the state's economy with 27.38 per cent Gross Value Added (GVA) being contributed by agriculture and allied sector during 2014-15(Q). Also, a sizeable proportion of 35.7 per cent of the total workforce is employed in agriculture and allied activities for its livelihood. Punjab has been a pioneer of the green revolution and has exhibited a remarkable transformation in all the sectors of the economy. The adoption of high yielding varieties of seeds, increased use of chemicals and irrigation enabled the desired increase in production to make India self-sufficient in food grains, thus improving the economic scenario of the country.

The technology led growth strategy paid rich dividends to its peasantry, labour force and the state, resulting in appreciable increase in revenue of the state. By the end of 1990, the production potential of the available technology was utilized in such a manner that the rate of increase in the profitability of major crops started to decline. Agriculture in the state has entered the next phase of development where high productivity and high value products prevail but regional disparities exist. These disparities assume significant thrust for reorientation of development policies in the state. For a long time, the modifications in technologies and formulation of certain policies and agricultural practices have had uneven impact across various regions which have been a major cause for the persistence of regional disparities in crop productivity and farm income. To address this issue, there is an urgency to have reliable estimates for economic variables of crop sector for recent years at district level which will inter-alia help in preparing appropriate strategies for the development of the low productivity regions of the state. Keeping the importance of this issue, it was decided by Government of Punjab to study the district-wise Cost of Cultivation of major crops under 13th Finance Commission grant. This study provides recent estimates of district level productivity of major crops, input use and returns which may be of great help to the policy planners, agricultural scientists and academicians.

Recognizing the significant contribution of crop sector in the GVA of the state, the Economic and Statistical Organisation, Department of Planning, Punjab has provided financial support for this study to the Department of Economics and Sociology, Punjab Agricultural University, Ludhiana. I appreciate the efforts of the research team of the Department of Economics and Sociology, PAU, Ludhiana for undertaking this comprehensive project and its timely successful completion. I hope this work will be useful for the policy planners of the state for formulating efficient policies for achieving higher goals of the society. This study will also serve as an archive on assessing the costs and returns of the principal crops for future reference.

Place: Chandigarh
Dated:

(M. L. Sharma)
Economic Advisor
Government of Punjab

PREFACE

Punjab state having just 1.53 per cent of the total geographical area of India, produced about 17 per cent of wheat, 11 per cent of rice and 6 per cent of cotton in the country. As a result, the state has been contributing upto 78 per cent of wheat and 60 per cent rice to the centeral pool of food reserve. But still increasing farm productivity and doubling farm income is the prime thrust of the union as well as state governments. To achieve the broader objective of agricultural development, the knowledge of costs of cultivation and returns from different crops of the state, is of paramount importance. Moreover, there is an urgent need of the region-specific information which is considered as key parameter for addressing the micro level issues of the economy. The inter-regional differences in the input use and output received primarily exists due to the inter- regional variations of agro-economic resource endowments. The extent of regional differences in cost of cultivation/production of a particular crop depends on the relative share of different inputs and their respective prices in various regions. In view of these regional differences, The Department of Economics and Sociology undertook the present study to examine the district-wise cost of cultivation of major crops in the state.

As per the findings of the report, wheat, paddy, potato, cotton, maize, sugarcane and basmati emerged as the major crops cultivated in different districts of the state occupying area above 5000 ha. The cropping intensity was the highest to the tune of 262 per cent in Amritsar district and the lowest at 139 per cent in Pathankot district. Wheat and paddy were the principal crops grown in all the districts of the state. The variability of yield in case of wheat in the whole state ranged from the lowest at 3589 kilograms per hectare in Pathankot district to the highest at 4945 kilograms per hectare in Barnala district. For paddy the yield ranged from the lowest at 4451 kilograms per hectare again in Pathankot district to the highest at 7579 kilograms per hectare in Sangrur district. Correspondingly the returns in the respective districts ranged from Rs63228 per hectare to Rs87148 per hectare in case of wheat crop and Rs62253 per hectare to Rs109971 per hectare in case of paddy. During the survey period, the cotton growers in all the districts could not even cover the costs incurred on cultivation/production of the crop while sugarcane cropping was a profitable venture in all the cultivating districts. All the districts except Moga showed negative returns in potato enterprise in the state during the study year. The Pathankot district lagged behind in terms of productivity and returns amongst the state. The critical overview of the crop production scenario of the state recommends initiation of region specific policies in the low performing districts in order to bring them at par with other districts for productivity improvements.

The financial grant provided by the Economic and Statistical Organisation, Department of Planning, Government of Punjab for the study is gratefully acknowledged. We are thankful to Sh. M L Sharma, Economic Advisor, Sh. Jagdeep Singh, Joint Director and Ms. Deepinder Kaur, Dy. ESA for their help at various stages of the study. The administrative and professional support from the Punjab Agricultural University for the study is appreciable. We are indebted to Sumit Bhardwaj and Rakhi Arora, Research Fellows for their unrelenting and untiring work during extra hours. We appreciate the Data Collection Assistants for working with zeal in collecting reliable data from farmers. We are thankful to Research Fellows, Data Entry Operators and Technical staff of this department for successfully handling this research project. We express our gratitude to the farmers for sparing their valuable time in providing detailed information for the study. However, deficiencies and errors, if any, are ours.

Authors

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Chapter-I

Description and Significance of the Study

India is an agrarian economy with agriculture as a pre-dominant sector. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. It is merely not a source of livelihood but a way of life. It is the basic foundation of economic development and its performance sets the pace of growth in the economy as a whole. Agriculture, along with livestock, fisheries and forestry, is one of the largest contributors to the Gross Value Added (GVA). As per estimates by the Central Statistics Organisation (CSO), the share of agriculture and allied sectors was 18.5 per cent of the total GVA during 2015–16. The contribution of agriculture to nation's total exports is also significant, as it accounts for 13 per cent share. The growth of agriculture sector has direct impact on poverty eradication. Hence, development of agriculture is logical and unavoidable for the general economic development of our country because it provides food, livelihood and employment to a large chunk of population besides being a source of raw material for the expansion of industrial sector. Thus, the agricultural trends in India determine the magnitude and trends of national income.

The importance of agriculture in the context of Punjab is also paramount as it has a significant share in the employment and livelihood of the people. Punjab has strong agriculture base with huge production of principal crops such as wheat, rice, maize, sugarcane and cotton. Punjab, having only 1.53 per cent area of India contributed about 46 per cent wheat and 27 per cent rice to the central pool during 2015-16. Being the largest contributor of main cereals to the central pool, Punjab has earned the title of 'Granary of India'. The contribution of agriculture and allied sectors in state Gross Value Added (GVA) at current prices was 27.38 percent during 2014-15.

The state of Punjab has been classified into three agro-climatic zones on the basis of homogeneity, rainfall distribution, soil texture, cropping pattern etc. These zones are sub-mountainous zone, central zone and south-western zone also referred as wheat-maize, wheat-paddy and wheat-cotton zones. The rate of growth of agriculture has picked up and sustained over the longer period of time in all the zones of the state but disparities in agricultural development continues to persist in Punjab Agriculture. In view of the predominant position of the agricultural sector in the country, collection and maintenance of agricultural statistics assumes great importance.

The agricultural statistics system in India is very comprehensive and provides data on a wide range of topics such as crop area and production, land use pattern, sources of irrigation, distribution of land holdings, agricultural prices and market intelligence, livestock, fisheries, forestry, etc. It has been subjected to review several times since independence so as to make it adaptive to contemporary changes in agricultural practices. Studies on cost of production of agricultural commodities have been of paramount interest to researchers and policy-makers. The need for reliable and representative estimates regarding cost of production of agricultural crops is obvious for formulating an appropriate strategy for planned agricultural development.

In a vast country like India with marked variations in agro-climatic conditions, it becomes essential to collect state-wise and region-wise data on cost of production of various crops. Crop-wise information on costs and returns is utilized by the farmers in allocating their scarce resources in an efficient way. Such information is also very useful to organizations which are closely related to agricultural sector. The financial sector uses such information to make provisions of credit and crop insurance packages to farm sector. It has immense importance for administrators and policy planners in terms of decision making for fixation of scale of finance and Minimum Support Prices (MSP) of different crops, selecting production strategies and identifying regional comparative advantages in crop production with a view to enhance the productivity and income of farmers.

Recognizing the importance of region-specific studies, The Economic and Statistical Organisation, Government of Punjab, initiated an adhoc project, 'District-wise cost of cultivation study of important crops in Punjab' for collection of cost of cultivation data on uniform basis for all important crops in all the districts of Punjab. This cost of cultivation survey was an important mechanism for data generation on cost structure of crops. The survey was initiated simultaneously in all the 22 districts of the state. It is expected that the conclusions drawn from the present study on district-wise information will be used for the financial sector to determine scale of finance and to devise policies for the development of underdeveloped regions particularly sub-mountainous region and crop specific policies to support the farmers in case of repeated crop failures and high risk crops. This study will also be very helpful in framing suitable policies on much needed diversification of agriculture in the state.

Chapter-II

Methodology

There are 22 districts in Punjab state. All the districts of the state were selected for the study. The crops having more than 5000 hectare of area were considered for the study in each district as per the latest data available in Statistical Abstracts of Punjab, 2014, Government of Punjab. The information regarding the major crops selected in respective districts to generate cost estimate is incorporated in Table 1.1.

Table 1.1: District wise selection of crops

Sr. No.	District	Crops
1.	Amritsar	Wheat, Paddy, Basmati, Potato and Peas
2.	Barnala	Wheat, Paddy, Cotton
3.	Bathinda	Wheat, Paddy, Cotton and Potato
4.	Faridkot	Wheat, Paddy, Basmati and Cotton
5.	Fatehgarh Sahib	Wheat, Paddy
6.	Fazilka	Wheat, Paddy, Basmati and Cotton
7.	Ferozepur	Wheat, Paddy and Basmati
8.	Gurdaspur	Wheat, Paddy, Basmati and Sugarcane
9.	Hoshiarpur	Wheat, Paddy, Maize, Sugarcane and Potato
10.	Jalandhar	Wheat, Paddy, Maize Sugarcane and Potato
11.	Kapurthala	Wheat, Paddy, Maize and Potato
12.	Ludhiana	Wheat, Paddy, Potato
13.	Mansa	Wheat, Paddy, Cotton
14.	Moga	Wheat, Paddy, Potato
15.	Pathankot	Wheat, Paddy, Basmati and Maize
16.	Patiala	Wheat, Paddy
17.	Rupnagar	Wheat, Paddy, Maize
18.	Sangrur	Wheat, Paddy, Basmati and Cotton
19.	SAS Nagar	Wheat, Paddy, Maize
20.	SBS Nagar	Wheat, Paddy, Maize and Sugarcane
21.	Sh Muktsar Sahib	Wheat, Paddy, Basmati and Cotton
22.	Tarn Taran	Wheat, Paddy, Basmati

It was observed that wheat and paddy were the main crops cultivated in all the districts of Punjab. Cotton crop covered more than 5000 hectare area in Barnala, Bathinda, Faridkot, Fazilka, Mansa and Sangrur. Potato was another major crop in six districts namely

Amritsar, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana and Moga covering more than 5000 hectare. Maize cultivation was done in Hoshiarpur, Jalandhar, Pathankot, Rupnagar, SAS Nagar and SBS Nagar. Sugarcane was grown in four districts of the sate viz. Gurdaspur, Hoshiarpur, Jalandhar and SBS Nagar. More than 5000 hectare area under cultivation of peas was found only in Amritsar district.

Sampling Technique

Three stage sampling technique was used for the selection of farm households in each district.

Selection of Blocks

At the first stage of sampling, three blocks from each district were selected having higher area under the selected crops. In case either the number of crops were more than three or number of blocks in the district were ten or more; one additional block was selected, making a sample of four blocks from that district (Table 2). The name of selected blocks has been given in Appendix-I.

Selection of Villages

At the second stage of sampling, two villages/ cluster of villages from each selected blocks were chosen randomly. While selecting the sample villages due consideration was given to the higher area under particular crops grown in that district (Table 2). The name of selected villages has been given in Appendix-I.

Selection of Sample Households and sample size

For the selection of sample households a complete enumeration of operational holdings in the selected villages was done, incorporating information on size of owned land, leased in land, leased out land and cropping pattern. A sample of 15 farm households from each village was selected. Thus, a sample of 30 farm households for each block was selected from different farm size categories namely marginal (<1ha), small (1-2 ha), semi-medium (2-4 ha), medium (4-10 ha) & large (>10 ha) proportionate to number of holdings in each size group in that district as per the information published in Statistical Abstracts of Punjab, 2014 on the official website of Economic and Statistical Organisation, Government of Punjab (*www.esopb.gov.in*). **Thus total sample size consisted of 73 blocks, 146 villages and 2190 farm households in the Punjab state** (Table 1.2).

Table 1.2: District wise selected number of blocks, villages and sample households

Sr. No.	District	Total No. of Blocks in each district	No. of Blocks	No. of Villages	No. of Farming Households
1	**Amritsar**	9	4	8	120
2	**Barnala**	3	3	6	90
3	**Bathinda**	8	4	8	120
4	**Faridkot**	2	2	4	60
5	**Fatehgarh Sahib**	5	3	6	90
6	**Fazilka**	5	3	6	90
7	**Ferozepur**	6	3	6	90
8	**Gurdaspur**	11	4	8	120
9	**Hoshiarpur**	10	4	8	120
10	**Jalandhar**	11	4	8	120
11	**Kapurthala**	5	3	6	90
12	**Ludhiana**	12	4	8	120
13	**Mansa**	5	3	6	90
14	**Moga**	5	3	6	90
15	**Pathankot**	6	3	6	90
16	**Patiala**	8	3	6	90
17	**Rupnagar**	5	3	6	90
18	**Sangrur**	10	4	8	120
19	**SAS Nagar**	3	3	6	90
20	**SBS Nagar**	5	4	8	120
21	**Sh Muktsar**	4	3	6	9
22	**Tarn Taran**	8	3	6	90
Total	**22**	**146**	**7**	**14**	**2190**

Preparation of Schedule and Data Collection

The Comprehensive Schedule for collection of requisite data was prepared which includes information regarding socio-economic characteristics of farm household; inventory details w.r.t. land, building, irrigation and machinery and implements; cropping pattern; crop wise input use & their prices; labour use(family & hired labour); machine use; running costs & upkeep operations of machinery; major & minor repairs; output details and marketing etc.

The data were collected for the agricultural year 2015-16. Cost accounting method was used for the collection of data from the selected farm households. For this purpose Data Collection Assistants were appointed in selected villages who regularly visited the selected farmers to record the details on input use, cost of inputs, labour hours, machine use etc on various operations of crop cultivation. Data Collection process was monitored and supervised regularly by the trained Research Fellows and Scientists of the department.

Analysis of Data

The collected data were thoroughly checked, compiled, tabulated and analysed. Descriptive statistics such as averages and percentages were used to analyse the costs and returns structure of different crops for each district. Following cost concepts were used for estimating the magnitude of returns and costs for different crops:

Cost A1: All actual expenses in cash and kind incurred in production by owner which includes:

i. Value of hired human labour
ii. Value of owned machine labour
iii. Hired machinery charges
iv. Value of seed (both farm produced and purchased)
v. Value of insecticides and pesticides
vi. Value of manure (owned and purchased)
vii. Value of fertilizers
viii. Irrigation charges
ix. Depreciation on implements & farm buildings
x. Land Revenue
xi. Interest on working capital
xii. Miscellaneous expense (artisans etc.)

are referred as **paid out cost**.

Cost A_2 = Cost A_1 + Rent paid for leased- in land

Cost A_2+FL = Cost A_2 + Imputed value of family labour

Cost B_1 = Cost A_1 + Interest on value of owned capital assets (excluding land)

Cost B_2 = Cost B_1 + Rental value of owned land (net of land revenue) and rent paid for leased-in land.

Cost C_1 = Cost B_1 + Imputed value of family labour

Cost C_2 = Cost B_2 + Imputed value of family labour

Total Costs (C2): The total cost includes Paid out Costs (A1) + rent paid for leased-in land, imputed value of family labour, interest on value of owned capital assets (excluding land), rental value of owned land (net of land revenue).

The various components in the cost of cultivation of crops under study were estimated in the line with the methods provided in the manual of Cost of Cultivation Surveys, Directorate of Economics and Statistics in the Ministry of Agriculture (DESMOA). A brief description of the evaluation of these components is as follows:

Human labour

The hired labour includes both attached and casual labour. While casual labour was paid wage according to prevailing market rate and number hours worked on the specified crops the attached labour, which is a joint cost, was apportioned according to the number of hours worked on each crop in a year. The value of family labour was imputed based on the prevailing market wage rate.

Chemical fertilizers

Chemical fertilizers were evaluated as per the purchased price.

Farmyard manure

The farm produced manure was evaluated as per the prevailing price in the locality. In case it was purchased, then it was evaluated on the basis of the purchase price.

Plant protection chemicals

The cost of plant protection chemicals like insecticide, herbicide and pesticide were estimated on the basis of actual purchase.

Farm produced and purchased seed

The cost of farm-produced seed was obtained as per the prevailing market prices in the local area. In case it is purchased, then evaluation was done on the basis of the purchase price.

Owned/hired machinery charges

Owned machinery charges were calculated on the basis of the cost of maintenance of farm machinery which included diesel, power, lubricants and depreciation,

repair and maintenance expenses. Hired machinery charges for each crop was the actual amount paid for the hired service of machinery.

Interest on working and fixed capital

The interest on working capital is charged at the rate of 12.5 per cent for half the period of the crop. The interest on the present value of fixed assets was charged at the rate of 10 per cent.

Rental value of land

The rental value of owned land was estimated on the basis of prevailing rents for a similar type of land in the given area or as reported by the sample farmers, subject to the ceiling of fair rent given in the legislation. The rent paid for leased-in land was evaluated the actual rent paid. For each specific crop, rent was apportioned as per its share in the gross value of output. However, due to crop failure in case of cotton, the value of cotton output was assumed to be at normal productivity level instead of that achieved during the study year.

Chapter-III

District wise cost and returns structure of major crops

For an effective planning for continuous agricultural development, the knowledge of costs and returns from different crops is of utmost importance. Further to be more precise on policy front, this information needs to be region specific as the inter-regional differences in use of inputs and the outputs received thereof cannot be ruled out. This is primarily due to the inter-regional variations of agro-economic/socio/natural resource endowments. The extent of regional differences in cost of cultivation of a particular crop depends on the relative share of different inputs and their respective prices in various regions. With similar soil-climate complex and uniform crop production technology, the inter-regional variations in yield can be of marginal order. Under such situation uniform input use may not lead to the significant differences in cost of cultivation/production and for this the only reason expected is the differences on account of variation in prices paid for inputs and received for outputs. However, in reality, depending on the intensity of input use or difference in natural resource endowments or both, the productivity differences are commonly observed among the regions as well as among the farmers of same area. Similarly, inter-regional variations in output prices and input prices like rate of wages, custom hiring services, rental value of land, etc. cannot be ruled out. Thus, any one or combination of above discussed factors may lead to significant variations in monetary cost per unit of area or output of a given crop.

The main objective of this chapter is to provide insight into the summary cost of cultivation of important crops grown in each of twenty-two districts of Punjab State. We know that farmers differ with respect to the extent of resources owned and their use. Similarly, some of the resources are owned by farmers fully, some partially and some are hired in different proportions. The farmers give different weightage to different resources while making the crop production decisions. Cost of crop cultivation analysis has, therefore, been carried out by using various farm management cost and production concepts. The relative magnitudes of costs and returns from the crop enterprise indicate the net profitability of the crop cultivation. The details provided in this chapter regarding inter-district variations in cost of crop cultivation/production and profitability thereof may help in eliciting some general conclusions important for policy formulation. The results are presented in two sections. In section-I details of land holding, cropping pattern in the state,

district-wise and crop-wise cost of cultivation and returns from different crops are discussed and section-II encapsules the comparative scenario of cost of cultivation and returns across different crops in Punjab. The analysis has been presented using paid out costs (costs A1) and total costs (costs C2).

The **Cost A1** relates to an owner farm situation where farmers contribute land and other resources.

The **Cost A2+ FL** includes cost A1 (paid out cost), Rent paid for leased- in land and imputed value of family labour.

The **Cost C2** is a very comprehensive and business like concept. It includes returns to labour in the farm of imputed value of farm labour, the price of capital is provided by way of interest charged on the capital and the price of land is paid by providing rent as the imputed value of land. The residual is a return to management for his managerial function which also includes risk & uncertainty element that any entrepreneur takes in launching a business.

. SECTION-I

The total operational area on the sampled farms detailed in Table 2.1 was estimated at 8911.6 hectare; out of which owned and managed land amounted to 7345.1 hectare (82.42 %) and leased-in land was 1566.5 hectare (17.58 %).

Table 2.1 Land holdings details of the sample farms in Punjab, 2015-2016

S.NO	Particulars	Total Area (ha)	Per Farm Area (ha)	Share (%)
1	Land owned & Managed	7345.1	3.35	82.42
2	Leased in	1566.5	0.72	17.58
3	Operational Area (1+2)	8911.6	4.07	100.00

The Cropping pattern deals with the crops grown by sampled households in an agricultural year. During the study year 2015-16 the cropping pattern followed by the sampled farmers in Punjab state is depicted in Table 2.2. The Table states that the gross cropped area among the sampled households of the state was 8.06 hectares per farm. The major crops viz. wheat, paddy and basmati were grown on 3.17, 2.49 and 0.76 hectare area per farm respectively. The respective share of wheat, paddy and basmati among the gross cropped area was 39.35 per cent, 30.85 per cent and 9.41 per cent. The other crops grown in state were cotton, potato, maize and sugarcane respectively occupying 3.75 per cent, 3.13 per cent, 2 per cent and 1.35 per cent of the gross cropped area with 0.30, 0.25,

0.16 and 0.11 hectare land per farm under cultivation. Jointly *rabi* and *kharif* fodder were sown on 7.02 per cent area of the gross cropped area. The total area under other crops constituted 3.15 per cent of the gross cropped area. The cropping intensity in the state was observed to be 198 per cent.

Table 2.2 Cropping pattern on sample farms in Punjab, 2015-2016

S.NO	Crop	Total Area (ha)	Per Farm Area (ha)	Share (%)
1	Wheat	6946.4	3.17	39.35
2	Paddy	5446.11	2.49	30.85
3	Basmati	1660.67	0.76	9.41
4	*Kharif* Fodder	677.77	0.31	3.84
5	Cotton	661.71	0.30	3.75
6	*Rabi* Fodder	560.84	0.26	3.18
7	Potato	551.84	0.25	3.13
8	Maize	352.32	0.16	2.00
9	Sugarcane	238.79	0.11	1.35
10	Spring Maize	139.61	0.06	0.79
11	*Rabi* Oilseed	93.1	0.04	0.53
12	Sunflower	62.56	0.03	0.35
13	*Rabi* Pulses	55.13	0.03	0.31
14	Peas	41.19	0.02	0.23
15	Pulses	34.93	0.02	0.20
16	*Kharif* Other Crop	34.82	0.02	0.20
17	Other Crops	32.66	0.01	0.18
18	*Rabi* Other Crop	27.92	0.01	0.16
19	Summer Vegetable	20.14	0.01	0.11
20	*Kharif* Pulses	8.19	0.0037	0.05
21	*Rabi* Sun Flower	7.71	0.0035	0.04
22	*Kharif* Oilseed	0.61	0.0003	0.00
Gross Cropped Area (GCA)		17655	8.06	100.00
Crop Intensity (%)		198		

District-wise and Crop-wise Cost of Cultivation and Returns from Different Crops

WHEAT

Wheat is one of the principle crops grown in all the districts during the *rabi* season in Punjab. The various components of cost of cultivation of wheat are detailed in Table 2.3. The paid out cost per hectare was estimated at Rs 23749; it remained in the range of Rs 21178 and Rs 26225 per hectare at the state level. The total cost of cultivation of wheat was estimated at Rs 59443 per hectare in Punjab state. The total cost ranged from Rs 50533 per hectare to Rs 69316 per hectare across different districts. It consists of costs A1 (Rs 23749); Rs 7581 rental value of leased-in land; Rs 34051 cost A2+FL; Rs 21823 imputed value of owned land; Rs 2721 imputed value of family labour and Rs 3568 interest on fixed capital.

The imputed value of family labour was low in district Kapurthala (Rs 2074/ha) and high in district Rupnagar (Rs 3850/ha). The interest on fixed capital ranged from Rs 3211 per hectare in district Jalandhar to Rs 4960 per hectare in Barnala district.

The yield and returns from wheat crop across different districts of Punjab for agricultural year 2015-16 as discussed in Table 2.4 reveals that the per hectare yield in the state was 4451 kilograms per hectare. The gross returns were estimated at Rs 77919 per hectare and the return over paid out cost A1 was Rs 54170 per hectare. The average returns over total cost A2+FL was Rs 43868 and cost C2 was Rs 18746. The yield, gross returns, returns over costs A1, A2+FL and costs C2 remained low in Pathankot district due to low yield (3489 kg/ha).

Table 2.3 Cost of cultivation of wheat across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Amritsar	25985	7073	2855	35913	17866	3214	56993
Barnala	23576	9478	2717	35771	21587	4960	62318
Bathinda	24312	9044	2798	36154	22166	2539	60859
Faridkot	23016	6364	3063	32443	20889	4626	57958
Fatehgarh	23644	8997	2551	35192	20374	3819	59385
Fazilka	21328	3240	2314	26882	21555	2096	50533
Ferozepur	24411	4240	2637	31288	22523	4280	58091
Gurdaspur	23471	2941	3349	29761	24471	3364	57596
Hoshiarpur	23190	7845	2644	33679	18114	3603	55396
Jalandhar	24232	11955	2359	38546	16446	3211	58203
Kapurthala	25080	9125	2074	36279	16935	3443	56657
Ludhiana	25069	16655	2924	44648	14439	3259	62346
Mansa	24303	5723	2628	32654	28361	4684	65699
Moga	24908	12543	2779	40230	20134	4012	64376
Pathankot	21178	1099	2537	24814	28539	3616	56969
Patiala	23457	2049	2815	28321	25179	4280	57780
Rupnagar	23627	7650	3850	35127	20422	3612	59161
Sangrur	23478	2740	2862	29080	25373	4609	59062
SAS Nagar	26225	8109	2958	37292	28040	3984	69316
SBS Nagar	26014	13897	2565	42476	18696	3288	64460
Sh. Muktsar Sahib	22494	5840	2985	31319	29537	2521	63377
Tarn Taran	23063	11851	2279	37193	22250	3634	63077
Punjab*	**23749**	**7581**	**2721**	**34051**	**21823**	**3568**	**59443**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

Table 2.4 Productivity and profitability of wheat across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Amritsar	4553	80028	54043	44115	23035
Barnala	4945	87148	63572	51377	24830
Bathinda	4623	80486	56174	44332	19627
Faridkot	4664	78397	55381	45954	20439
Fatehgarh	4637	81362	57718	46170	21977
Fazilka	4573	75765	54437	48883	25232
Ferozepur	4459	76684	52273	45396	18593
Gurdaspur	4503	78426	54955	48665	20830
Hoshiarpur	3987	71092	47902	37413	15696
Jalandhar	4438	77985	53753	39439	19782
Kapurthala	4315	76108	51028	39829	19451
Ludhiana	4661	83645	58576	38997	21299
Mansa	4622	79684	55381	47030	13985
Moga	4472	78808	53900	38578	14432
Pathankot	3589	63228	42050	38414	6259
Patiala	4523	80341	56884	52020	22561
Rupnagar	4129	77968	54341	42841	18807
Sangrur	4562	80614	57136	51534	21552
SAS Nagar	4782	83002	56777	45710	13686
SBS Nagar	4568	82615	56601	40139	18155
Sh Muktsar Sahib	4518	77431	54937	46112	14054
Tarn Taran	4565	78777	55714	41584	15700
Punjab*	**4451**	**77919**	**54170**	**43868**	**18746**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

PADDY

The comprehensive analysis of cost of cultivation of paddy is presented in the Table 2.5. It is notable from the Table that the paid out cost incurred on paddy cultivation in the state was Rs 32503. The paid out cost ranged from Rs 24502 per hectare to Rs 36521 per hectare across different districts of the state.

Table 2.5 Cost of cultivation of paddy across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Amritsar	33056	15254	5786	54096	20799	2826	77721
Barnala	30800	6401	5543	42744	32649	3409	78802
Bathinda	36521	11711	4963	53195	27617	4079	84891
Faridkot	31870	5021	5586	42477	30415	3185	76077
Fatehgarh	29998	14662	5659	50319	25968	4395	80682
Fazilka	32990	1382	4135	38507	24801	4047	67355
Ferozepur	35705	1927	5118	42750	27653	4616	75019
Gurdaspur	30721	4372	5890	40983	24577	4400	69960
Hoshiarpur	30164	5641	6378	42183	20558	4718	67459
Jalandhar	32972	11445	4096	48513	17986	4704	71203
Kapurthala	31218	8760	7004	46982	27786	5542	80310
Ludhiana	30930	20661	5277	56868	22818	4203	83889
Mansa	34811	4434	5883	45128	27984	3032	76144
Moga	35227	10799	5130	51156	34783	4793	90732
Pathankot	24502	0	5359	29861	33560	3442	66863
Patiala	33268	2449	4005	39722	29720	4616	74058
Rupnagar	32825	14857	7231	54913	23658	4052	82623
Sangrur	34884	3139	4642	42665	36530	4022	83217
SAS Nagar	34787	10044	6462	51293	24861	4750	80904
SBS Nagar	31959	17298	6121	55378	20105	3732	79215
Sh Muktsar Sahib	30219	3637	4775	38631	30268	3360	72259
Tarn Taran	34102	7129	3532	44763	27660	4832	77255
Punjab*	**32503**	**9614**	**5481**	**47597**	**26535**	**4153**	**78286**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level.

The cost A2+FL and total cost were estimated at Rs 47597 and Rs 78286 per hectare. The costs C2 is the summation of all these costs namely, costs A2+FL, imputed value of owned land (Rs 26535) and interest on fixed capital (Rs 4153). The per hectare imputed value of family labour was estimated between Rs 3532 in Tarn Taran and Rs 6462 in SAS Nagar. The rate of interest on fixed capital ranged from Rs 2826 per hectare to Rs 4832 per hectare in the study period. The returns from paddy crop over different cost estimates have been calculated and presented in Table 26.

Table 2.6 Productivity and profitability of paddy across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Amritsar	5175	75176	42120	21080	-2546
Barnala	7255	105052	74252	62308	26250
Bathinda	6989	101131	64610	47936	16240
Faridkot	6965	100853	68983	58376	24776
Fatehgarh	7076	102602	72604	52283	21920
Fazilka	5785	83188	50198	44681	15833
Ferozepur	6298	91258	55553	48508	16239
Gurdaspur	5394	78590	47869	37607	8630
Hoshiarpur	5434	78793	48629	36610	11334
Jalandhar	6154	89233	56261	40720	18030
Kapurthala	6889	99855	68637	52873	19545
Ludhiana	7268	104587	73657	47719	20698
Mansa	6231	90350	55539	45222	14206
Moga	7579	109896	74669	58740	19164
Pathankot	4451	62253	37751	32392	-4610
Patiala	6454	93583	60315	53861	19525
Rupnagar	6236	91934	59109	37021	9311
Sangrur	7579	109971	75087	67306	26754
SAS Nagar	6186	89590	54803	38297	8686
SBS Nagar	6408	92772	60813	37394	13557
Sh Muktsar Sahib	6894	99067	68848	60436	26808
Tarn Taran	5723	82984	48882	38221	5729
Punjab*	**6495**	**94034**	**61530**	**46436**	**15747**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

The yield of paddy crop per hectare was estimated to be 6494 kg on the sampled farms in Punjab. The Gross returns were worked out at Rs 94034 per hectare. A comprehensive analysis of the returns of the paddy crop depicted that the returns over costs A1, which included all paid out expenses was Rs 61530; over cost A2+FL were Rs 46436 and the returns over costs C2 was Rs 15747 per hectare. The returns over costs C2 in Amritsar and Pathankot districts were negative to the extent of Rs 2546 and Rs 4610 per hectare mainly due to low yield of crop in these districts during the study period.

BASMATI

The results in the Table 2.7 show the detailed analysis of all the costs presented as cost of cultivation of basmati crop. All the paid up expenses named as costs A1 were estimated at Rs 33944 per hectare in Punjab. The total cost of cultivation at the state level amounted to Rs 71426 out of which the rental value of leased-in land accounted for Rs 5222 per hectare; the the imputed value of family labour; the imputed value of owned land and interest on fixed capital was estimates at Rs 5725, Rs 22635 and Rs 3900 per hectare. During the study period the paid out cost and the components of fixed cost were estimated highest in district Sangrur. Hence, the costs C2 was estimated highest in district Sangrur.

Table 2.7 Cost of cultivation of basmati across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Amritsar	34139	7051	7900	49090	21733	4958	75781
Faridkot	30150	5461	6837	42448	24944	3366	70758
Fazilka	29819	576	5384	35779	23000	4694	63473
Ferozepur	33362	1785	5442	40589	21776	4033	66398
Gurdaspur	33648	3492	5599	42739	20323	3387	66449
Pathankot	32543	0	3982	36525	26985	3257	66767
Sangrur	36908	5696	4892	47496	24852	5128	77476
Sh Muktsar Sahib	34722	7172	5493	47387	22576	3021	72984
Tarn Taran	35992	7109	4234	47335	21661	4505	73501
Punjab*	**33944**	**5222**	**5725**	**44891**	**22635**	**3900**	**71426**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

The yield per hectare of basmati crop was recorded as 4039 kilograms per hectare in Punjab which accrued the gross returns of Rs 70307 per hectare to the sampled households during 2015-16 (Table 2.8). The per hectare returns over costs A1 was Rs 36363, over cost A2+FL was Rs 25416 and over costs C2 were negative at Rs 1119. The basmati crop accrued losses in three out of nine basmati growing districts due to lower prices and due to lower crop yield in another two districts (Amritsar and Gurdaspur) during the study period. The magnitude of loss in district Amritsar was Rs 8626/ha; Faridkot (Rs 1345/ha); Gurdaspur (Rs 5192/ha); Pathankot (Rs 6448/ha) and Tarn Taran (Rs 2890/ha) respectively.

Table 2.8 Productivity and profitability of basmati across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Amritsar	3800	67155	33016	18065	-8626
Faridkot	3935	69413	39263	26965	-1345
Fazilka	4297	74725	44906	38946	11252
Ferozepur	4359	74257	40895	33668	7859
Gurdaspur	3524	61257	27609	18518	-5192
Pathankot	3363	60319	27776	23794	-6448
Sangrur	4543	81141	44233	33645	3665
Sh Muktsar Sahib	4492	76813	42091	29426	3829
Tarn Taran	4037	70611	34619	23276	-2890
Punjab*	**4039**	**70307**	**36363**	**25416**	**-1119**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

COTTON

The expenses incurred on cultivation of cotton were also studied as per different heads. The information, thus obtained is incorporated in Table 2.9. The analysis of the table reveals that, all the actual expenses paid out by the farmers during the study period i.e. costs A1 was Rs 38132 per hectare in Punjab state. The cost A2+FL was measured to be Rs 48287 per hectare. The total cost of cultivation of cotton in the state was Rs 73364, which was highest in district Sangrur (Rs 77769/ha) and lowest in district Faridkot (Rs 68222/ha). The imputed value of family labour and interest on fixed capital per hectare amounted to Rs 6381 and Rs 2892 respectively in the state. The average rental value of leased-in land was Rs 3774 and imputed valued of owned land was found to be Rs 22186 per hectare.

The results in the Table 2.10 indicate the yield and profitability of cotton enterprise based on costs A1, A2+FL and costs C2 in the Punjab state on the sampled household during the year 2015-16. The productivity per hectare of cotton was observed to be 665 kg kilograms. The gross return of per hectare from the crop was recorded at Rs 32142. The returns over paid out cost, A2+FL and total cost were negative in all the districts due to low yield and damage caused to the crop by white fly. The overall loss of Rs 5990 per hectare was recorded on costs A1, Rs 16145 on A2+FL and Rs 41222 on costs C2.

Table 2.9 Cost of cultivation of cotton across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Barnala	31098	9023	8140	48261	21839	3932	74032
Bathinda	37682	6001	7491	51174	22021	3441	76636
Faridkot	30760	4049	5932	40741	24877	2604	68222
Fazilka	42928	4032	5249	52209	19418	2720	74347
Mansa	33660	2684	7913	44257	21964	2652	68873
Sangrur	35291	2313	5999	43603	31514	2652	77769
Sh Muktsar Sahib	33704	0	4699	38403	21855	3151	63409
Punjab*	**38132**	**3774**	**6381**	**48287**	**22186**	**2892**	**73364**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

Table 2.10 Productivity and profitability of cotton across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Barnala	493	25695	-5403	-22566	-48337
Bathinda	620	30124	-7558	-21050	-46512
Faridkot	369	16567	-14193	-24174	-51655
Fazilka	818	39786	-3142	-12423	-34561
Mansa	579	27430	-6230	-16827	-41443
Sangrur	567	27080	-8211	-16523	-50689
Sh Muktsar Sahib	448	22020	-11684	-16383	-41389
Punjab*	**665**	**32142**	**-5990**	**-16145**	**-41222**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

POTATO

The structure of cost of cultivation of potato on the sampled households in Punjab state is given in Table 2.11. Amongst the per hectare cultivation costs, paid out cost A1 i.e. all paid out expenses were estimated at Rs 75002. The paid out expenses ranged from Rs 64462 in district Hoshiarpur to Rs 87699 per hectare in Moga district. The major fixed cost components namely, rental value of leased-in land, imputed value of family labour, imputed value of owned land and interest on fixed capital were, Rs 10824; Rs 3631, Rs 24984 and Rs 4834 per hectare respectively. The costs C2, which is the summation of all the above mentioned cost was derived to be Rs 119276 per hectare.

Table 2.11 Cost of cultivation of potato across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Amritsar	80216	9858	2643	92717	21085	5314	119116
Bathinda	74608	6879	4667	86154	33403	4578	124135
Hoshiarpur	64462	10064	4554	79080	26478	4706	110264
Jalandhar	69743	14446	3100	87289	22470	4970	114729
Kapurthala	74338	8550	2746	85634	30244	5665	121543
Ludhiana	79141	13671	4095	96907	24043	4778	125728
Moga	87699	8252	3180	99131	23201	3176	125508
Punjab*	**75002**	**10824**	**3631**	**89458**	**24984**	**4834**	**119276**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

The productivity and profitability of potato cultivation on the sampled household during the year 2015-16 across different districts in Punjab is provided in the Table 2.12. Per hectare productivity of potato was observed to be 23567 kilograms and with the gross return of Rs 112517 per hectare from the crop. The returns over paid out cost were estimated as Rs 37515, over cost A2+FL were Rs 23059 and the returns over total cost were found negative to the extent of Rs 6759 per hectare respectively. Potato being the labour intensive crop, the expenses incurred on cultivation was quite high; as a result the returns on costs C2 were negative in all the cultivating districts except Moga. The low returns from potato cultivation were due to the low prices received by the farmer during the study year.

Table 2.12 Productivity and profitability of potato across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Amritsar	25354	116375	36159	23658	-2741
Bathinda	27438	111124	36516	24970	-13011
Hoshiarpur	17309	105066	40604	25986	-5198
Jalandhar	21964	109600	39857	22311	-5129
Kapurthala	19813	108972	34634	23338	-12572
Ludhiana	28043	114415	35274	17508	-11313
Moga	28651	127783	40084	28652	2275
Punjab*	**23567**	**112517**	**37515**	**23059**	**-6759**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

MAIZE

The Table 213 depicts the cost of cultivation of maize crop among different districts in Punjab. Among the cost of cultivation the major expenses were incurred on paid out cost to the tune of Rs 25881 per hectare. The cost A2+FL was Rs 35444 and the total cost of cultivation was found to be Rs 50911 per hectare. The total cost of cultivation of maize ranged from lowest at Rs 40919 per hectare in district Pathankot to highest at Rs 66105 per hectare in district SAS Nagar.

Table 2.13 Cost of cultivation of maize across different districts of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Hoshiarpur	26682	2721	4099	33502	11106	3793	48401
Jalandhar	24599	15816	5024	45439	5145	4013	54597
Kapurthala	26689	3362	4697	34748	14299	3161	52208
Pathankot	15557	0	5336	20893	16763	3263	40919
Rupnagar	26190	2402	5662	34254	12899	2542	49695
SAS Nagar	28383	9931	5814	44128	18953	3024	66105
SBS Nagar	26991	7130	2940	37061	10540	3814	51415
Punjab*	**25881**	**5119**	**4444**	**35444**	**11987**	**3481**	**50911**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

The estimates of fixed components of total cost at state level were Rs 5119 as rent for leased-in land, Rs 4444 as imputed value of family labour; Rs 11987 as imputed value

of owned land and Rs 3481 for interest on fixed capital. The recorded yield of maize in the state was 3631 kilogram/hectare (Table 2.14). The gross return per hectare was found to be Rs 43256.

Table 2.14 Productivity and profitability of maize across different districts of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Hoshiarpur	3830	41771	15089	8269	-6630
Jalandhar	3967	48430	23831	2991	-6167
Kapurthala	3481	40906	14217	6158	-11302
Pathankot	1963	29893	14336	9000	-11026
Rupnagar	3492	45391	19201	11137	-4304
SAS Nagar	4220	53956	25573	9828	-12149
SBS Nagar	3625	42680	15689	5619	-8735
Punjab*	**3631**	**43256**	**17375**	**7812**	**-7655**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

The return over paid out cost A1, A2+FL and total cost C2 was Rs 17375, Rs 7812 per hectare and Rs (-) 7655 per hectare respectively. Cultivation of maize in the state was no more a profitable enterprise because of low price received by the farmer across all the districts namely; Hoshiarpur (RS 6630/ha); Jalandhar (Rs 6167/ha); Kapurthala (Rs 11302/ha); Pathankot (RS 11026/ha); Rupnagar (RS 4304/ha); SAS Nagar (RS 12149/ha) and SBS Nagar (RS 8735/ha) respectively.

SUGARCANE

The information on various components of costs of cultivation of sugarcane is presented in the Table 2.15. Sugarcane being the yearly crop, the paid out expenses were quite high estimated at Rs 82580 per hectare. The cost A2+FL was Rs 114092 and the costs C2 which included the cost A2+FL; imputed value of owned land (Rs 53223/ha); imputed value of family labour (Rs 8159/ha) and interest on fixed capital (Rs 6147/ha) was figured at Rs 173462 per hectare in the state.

The information presented in the Table 2.16 shows that the productivity and profitability in sugarcane cultivation in Punjab. The yield of crop per hectare was estimated at Rs 75522 kg which accrued the gross returns of Rs 225852 per hectare. The return over costs A1 was Rs 143271, over cost A2+FL was Rs 111759 and over costs C2

was Rs 52390 per hectare in the state. The sugarcane cultivation was profitable enterprise across all the districts of the state during the study period.

Table 2.15 Cost of cultivation of sugarcane across different district of Punjab state, 2015-16

(Rs/ha)

District	Cost A1	Rental value of leased-in land	Imputed value of family labour	Cost A2+FL	Imputed value of owned land	Interest on fixed capital	Cost C2
	(1)	(2)	(3)	(4)= (1+2+3)	(5)	(6)	(7)= (4+5+6)
Gurdaspur	83249	3685	7582	94516	72213	7293	174022
Hoshiarpur	86803	24404	7744	118951	51759	5706	176416
Jalandhar	87972	61778	5398	155148	16224	7012	178384
SBS Nagar	71226	36958	10937	119121	40920	4887	164928
Punjab*	**82580**	**23352**	**8159**	**114092**	**53223**	**6147**	**173462**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

Table 2.16 Productivity and Profitability of sugarcane across different district of Punjab state, 2015-16

(Rs/ha)

District	Yield (Kg/ha)	Gross return	Returns		
			Cost A1	Cost A2+FL	Cost C2
Gurdaspur	76820	227908	144659	133392	53886
Hoshiarpur	78378	237483	150680	118532	61067
Jalandhar	65442	206197	118225	51049	27813
SBS Nagar	71860	207648	136422	88527	42720
Punjab*	**75522**	**225852**	**143271**	**111759**	**52390**

*Weighted average

Note: The weight of area under the crop in each district is used to work out the average crop estimates at state level

SECTION-II

Comparative Scenario of Cost of Cultivation and Returns across Different Crops in Punjab, 2015-16

The section presents information regarding the minimum and maximum costs, yield, gross returns from selected crops and the cost ratio to gross returns across different districts in Punjab.

The crop wise information on minimum and maximum paid out cost in Punjab is registered in Table 2.17. The average paid out cost per hectare of major crops viz. wheat, paddy, basmati, cotton, potato, maize, sugarcane and peas in the state was estimated at Rs 23749, Rs 32503, Rs 33944, Rs 38132, Rs 75002, Rs 25881, Rs 82850 and Rs 67922 respectively. The minimum paid out cost was found in district Pathankot for wheat, paddy and maize estimated at Rs 21178, Rs 24502 and Rs 15557 per hectare respectively. The paid out cost was minimum for basmati in Fazilka (Rs 29819/ha); cotton in Faridkot (Rs 30760/ha); potato in Hoshiarpur (Rs 64462/ha) and sugarcane in SBS Nagar (Rs 71226/ha) respectively.

Table 2.17. Crop wise minimum and maximum paid out cost (Cost A1) in Punjab, 2015-16

(Rs/ha)

Crop	Minimum		Maximum		State average
	Cost	District	Cost	District	
Wheat	21178	Pathankot	26225	SAS Nagar	23749
Paddy	24502	Pathankot	36521	Bathinda	32503
Basmati	29819	Fazilka	36908	Sangrur	33944
Cotton	30760	Faridkot	42928	Fazilka	38132
Potato	64462	Hoshiarpur	87699	Moga	75002
Maize	15557	Pathankot	28383	SAS Nagar	25881
Sugarcane	71226	SBS Nagar	87972	Jalandhar	82850
Peas	67922	Amritsar	67922	Amritsar	67922

The maximum paid out cost for the crops wheat and maize was estimated at Rs 26225/hectare and Rs 28383/hectare in SAS Nagar, it was mainly due to higher rental value of land. The cost A1 was maximum for paddy in Bathinda district (Rs 36908/ha); basmati in

Sangrur (Rs 36908/ha); cotton in Fazilka (Rs 42928/ha); potato in Moga (Rs 87699/ha) and sugarcane in Jalandhar (Rs 87972/ha). The paid up costs in these respective districts were higher for cotton due to heavy expenses on plant protection and low yield on the other hand the vegetables like potato and peas were labour intensive and the seed costs was higher as compared to other crops. Sugarcane, being the annual crop the paid costs were higher.

Table 2.18 examines the minimum and maximum total cost per hectare in Punjab. The average total cost per hectare in the state was Rs 59443 for wheat crop, which was minimum in Fazilka district (Rs 50533/ha) and maximum in SAS Nagar at Rs 69316 per hectare. The per hectare average costs C2 for the crops paddy, basmati, cotton, potato, maize, sugarcane and peas was Rs 78286, Rs 71426, Rs 73364, Rs 119276, Rs 50911, Rs 173462 and Rs 112941 respectively. The costs C2 for paddy crop was minimum in Pathankot district at Rs 66863 per hectare and maximum in district Moga at Rs 90732. The per hectare total cost for basmati, cotton, potato, maize and sugarcane was Rs 63473, Rs 63409, Rs 110264 and Rs 40919 were the minimum estimated costs in the respective districts viz. Fazilka, Sh Muktsar Sahib, Hoshiarpur, Pathankot and SBS Nagar. Peas were majorly grown only in Amritsar district; hence, there was no minimum or maximum variation in the costs C2.

Table 2.18. Crop wise minimum and maximum total cost (Cost C2) in Punjab, 2015-16

(Rs/ha)

Crop	Minimum		Maximum		State average
	Cost	District	Cost	District	
Wheat	50533	Fazilka	69316	SAS Nagar	59443
Paddy	66863	Pathankot	90732	Moga	78286
Basmati	63473	Fazilka	77476	Sangrur	71426
Cotton	63409	Sh Muktsar Sahib	77769	Sangrur	73364
Potato	110264	Hoshiarpur	125728	Ludhiana	119276
Maize	40919	Pathankot	66105	SAS Nagar	50911
Sugarcane	164928	SBS Nagar	178384	Jalandhar	173462
Peas	112941	Amritsar	112941	Amritsar	112941

The maximum total cost per hectare for paddy, basmati, cotton, potato, maize and sugarcane was estimated at Rs 90732, Rs 77476, Rs 77769, Rs 125728, Rs 66105 and Rs 178384 respectively in the districts, Moga, Sangrur (both for basmati & cotton), Ludhiana, SAS Nagar and Jalandhar.

During the study period the average yield per hectare of major crops viz. wheat, paddy, basmati, cotton, potato, maize, sugarcane and peas in the state was estimated at 4451 kg, 6495 kg, 4039 kg, 665 kg, 23567 kg, 3631 kg, 75522 kg and 5553 kg respectively (Table 2.19).

Table 2.19. Crop wise minimum and maximum yield in Punjab, 2015-16

(Kg/ha)

Crop	Minimum		Maximum		State average
	Yield	District	Yield	District	
Wheat	3589	Pathankot	4945	Barnala	4451
Paddy	4451	Pathankot	7579	Moga	6495
Basmati	3363	Pathankot	4543	Sangrur	4039
Cotton	369	Faridkot	818	Fazilka	665
Potato	17309	Hoshiarpur	28651	Moga	23567
Maize	1963	Pathankot	4220	SAS Nagar	3631
Sugarcane	65442	Jalandhar	78378	Hoshiarpur	75522
Peas	5553	Amritsar	5553	Amritsar	5553

The yield of wheat, paddy, basmati and maize was recorded minimum in Pathankot district at 3589 kg, 4451 kg, 3363 kg and 1963 kg respectively. The yield of cotton and potato were estimated minimum at 369 kg and 17309 kg in the districts Faridkot and Hoshiarpur. The maximum yield of wheat was recorded in Barnala district at 4945 kg; 7579 kg in case of paddy in Moga district. For basmati, cotton, potato, maize and sugarcane the maximum yield was found in district Sangrur (4543 kg); Fazilka (818 kg); Moga (28651 kg); SAS Nagar (4220 kg) and Hoshiarpur (78378 kg) respectively.

The gross returns on major crops on sampled households in all the districts of Punjab has been recorded and presented in Table 2.20. The gross returns per hectare for major crops such as wheat, paddy, basmati, cotton, potato, maize, sugarcane and peas in the state was estimated at Rs 77919, Rs 94034, Rs 70307, Rs 32142, Rs 112517, Rs 43256, Rs 225852 and Rs 117917 respectively. Again the gross returns for wheat, paddy, basmati and maize were recorded minimum in Pathankot district at Rs 63228, Rs 62253 and Rs 29893 respectively. The gross returns for wheat, paddy, basmati and maize were highest in district Barnala (Rs 87148); Sangrur (Rs 109971 for paddy & Rs 81141 for basmati) and SAS Nagar (Rs 43256) respectively. The gross returns for cotton were minimum in Faridkot at Rs 16567 and maximum in Fazilka at Rs 32142. In case of potato the gross returns were lowest in Hoshiarpur at Rs 105066 and highest in Moga at Rs 127883 and for sugarcane crop, the returns were low in Jalandhar (Rs 206197) and high in Hoshiarpur (Rs 237483).

Table 2.20. Crop wise minimum and maximum gross returns in Punjab, 2015-16

(Rs/ha)

Crop	Minimum		Maximum		State average
	Returns	District	Returns	District	
Wheat	63228	Pathankot	87148	Barnala	77919
Paddy	62253	Pathankot	109971	Sangrur	94034
Basmati	60319	Pathankot	81141	Sangrur	70307
Cotton	16567	Faridkot	39786	Fazilka	32142
Potato	105066	Hoshiarpur	127783	Moga	112517
Maize	29893	Pathankot	53956	SAS Nagar	43256
Sugarcane	206197	Jalandhar	237483	Hoshiarpur	225852
Peas	117917	Amritsar	117917	Amritsar	117917

The results in Table 2.21 indicate the returns per hectare returns over paid out cost in Punjab state. The returns over costs A1 were minimum for wheat (Rs 42050) and paddy (Rs 37751) in district Pathankot and maximum in district Barnala (Rs 63572) and Sangrur (Rs 75087) with the state average of Rs 54170 and Rs 61530 respectively for both the crops. The returns over costs A1 in case of basmati were low at Rs 27609 in Gurdaspur and high at Rs 44906 in Fazilka with the average return of Rs 36363 in the state. For potato, maize and sugarcane the returns over costs A1 were low in Kapurthala (Rs 34634 for potato & Rs 14217 for maize) and Jalandhar (Rs 118225 for sugarcane). The returns for these respective crops were higher in district Hoshiarpur (Rs 40604 for potato & Rs 150680 for sugarcane) and SAS Nagar (Rs 25573 for maize). The average return over costs A1 for potato, maize and sugarcane was estimated at Rs 37515, Rs 17375 and Rs 143271 respectively. The returns over costs A1 were negative in case of cotton cultivation in the state. The average per hectare loss over costs A1 was Rs 5990 in the state; which was low in Fazilka (Rs 3142) and high in Faridkot (Rs 14193).

Table 2.21. Crop wise minimum and maximum returns over paid out cost (cost A1) in Punjab, 2015-16

(Rs/ha)

Crop	Minimum		Maximum		State average
	Returns	District	Returns	District	
Wheat	42050	Pathankot	63572	Barnala	54170
Paddy	37751	Pathankot	75087	Sangrur	61530
Basmati	27609	Gurdaspur	44906	Fazilka	36363
Cotton	-14193	Faridkot	-3142	Fazilka	-5990
Potato	34634	Kapurthala	40604	Hoshiarpur	37515
Maize	14217	Kapurthala	25573	SAS Nagar	17375
Sugarcane	118225	Jalandhar	150680	Hoshiarpur	143271
Peas	49995	Amritsar	49995	Amritsar	49995

The returns per hectare over costs C2 as discussed in Table 2.22 reveals that the overall returns for the crops basmati, cotton, potato and maize were negative in the state to the extent of Rs 1119, Rs 41222, Rs 6759 and Rs 7655 respectively. The returns over total cost in the state for wheat were Rs 18746, Rs 15747 for paddy; Rs 52390 for sugarcane and Rs 4976 for peas. The returns over costs C2 for wheat and paddy were minimum in Pathankot at Rs 6259 and Rs (-) 4610, while they were maximum in Fazilka (Rs 25232 for wheat) and Shri Muktsar Sahib (Rs 26808 for paddy). The negative returns over total cost were observed in case of basmati in Amritsar district (Rs 8626); cotton in Faridkot (Rs 51655); potato in Bahinda (Rs 13011) and maize in SAS Nagar (Rs 12149). The maximum returns over toata cost for these respective crops were found in Fazilka (Rs 11252 for basmati & Rs (-) 34561 for cotton); potato in Moga (Rs 2275); maize in Rupnagar (Rs (-) 4304) and sugarcane in Hoshiarpur (Rs 61067).

Table 2.22. Crop wise minimum and maximum returns over total cost (cost C2) in Punjab, 2015-16

(Rs/ha)

Crop	Minimum		Maximum		State average
	Returns	District	Returns	District	
Wheat	6259	Pathankot	25232	Fazilka	18746
Paddy	-4610	Pathankot	26808	Shri Muktsar Sahib	15747
Basmati	-8626	Amritsar	11252	Fazilka	-1119
Cotton	-51655	Faridkot	-34561	Fazilka	-41222
Potato	-13011	Bathinda	2275	Moga	-6759
Maize	-12149	SAS Nagar	-4304	Rupnagar	-7655
Sugarcane	27813	Jalandhar	61067	Hoshiarpur	52390
Peas	4976	Amritsar	4976	Amritsar	4976

Cost Ratios to Gross Returns

Cost ratios are used as measure of efficiency on a farm. The ratios indicate the proportion of the gross income consumed by these expenses. The following cost ratios are worked out for different crops:

Gross Ratio: It is the ratio of total costs to gross income. The gross ratio indicates the part of gross income used by the total costs.

$$\text{Gross Ratio} = \frac{\textit{Total Cost}}{\textit{Gross Income}}$$

The gross ratio in case of wheat, paddy and sugarcane was 76.3 per cent, 83.3 per cent and 76.8 per cent, while the ratio was higher in case of other crops (Table 2 23).

Table 2.23. Crop wise total cost (C2) ratio to gross returns

(Rs/ha)

Crop	Gross returns	Total cost (cost C2)	Total cost ratio (%)
Wheat	77919	59443	76.3
Paddy	94034	78286	83.3
Basmati	70307	71426	101.6
Cotton	32142	73364	228.2
Potato	112517	119276	106.0
Maize	43256	50911	117.7
Sugarcane	225852	173462	76.8
Peas	117917	112941	95.8

It was 95.8 per cent in case of peas; 101.6 per cent in case of basmati; 106 per cent in case of potato and 1178.7 per cent in case of maize, which was due to low returns on account of low price realized by the sampled farmers during the survey period. In case of cotton cultivation the gross ratio was found to be 228.2 per cent which indicates a substantial loss accrued to the farmer because of the failure of crop.

Paid-out Ratio: The paid out cost ratio is the ratio of all the actual paid out expenses to gross returns; it indicates the proportion of gross income consumed by these expenses.

$$\text{Paid-out Ratio} = \frac{\textit{Paid out cost}}{\textit{Gross Income}}$$

The information related to ratio of paid out cost to gross returns per hectare for major crops is given in Table 2.24. The paid out cost ratio to gross returns for wheat, paddy, and sugarcane was 30.5 per cent, 34.6 per cent and 36.7 per cent.

Table 2.24. Crop wise paid out cost (A1) ratio to gross returns

(Rs/ha)

Crop	Gross returns	Paid out cost (cost A1)	Paid out cost ratio (%)
Wheat	77919	23749	30.5
Paddy	94034	32503	34.6
Basmati	70307	33944	48.3
Cotton	32142	38132	118.6
Potato	112517	75002	66.7
Maize	43256	25881	59.8
Sugarcane	225852	82850	36.7
Peas	117917	67922	57.6

The ratio was higher in case of basmati, peas, maize, potato and cotton with 48.3 per cent, 57.6 per cent, 59.8 per cent, 66.7 per cent and 118.6 per cent respectively. The paid out cost ratio was more than 100 per cent in case of cotton due to failure of crop resulting into very low yield and negative returns over paid out costs during the study year. In other crops highest ratio was observed in potato to the extent of 66.7 per cent.

A2+FL Ratio: The A2+FL ratio is the ratio of the cost A2 and imputed value of family labour to gross returns.

$$\text{A2+FL Ratio} = \frac{A2+FL}{Gross\ Income}$$

It measures the amount of income swiped out by leased-in land rent and imputed family labour along with all the paid out costs. The ratio was computed highest in case of cotton crop with 150.2 per cent. The ratio ranged from 43.7 per cent to 150.2 per cent (Table 2.25).

Table 2.25. Crop wise Cost (A2+FL) ratio to gross returns

(Rs/ha)

Crop	Gross returns	Cost A2+FL	A2+FL ratio (%)
Wheat	77919	34051	43.7
Paddy	94034	47597	50.6
Basmati	70307	44891	63.8
Cotton	32142	48287	150.2
Potato	112517	89458	79.5
Maize	43256	35444	81.9
Sugarcane	225852	114092	50.5
Peas	117917	79140	67.1

Land Cost Ratio: The land cost ratio refers to the rent of leased-in land and imputed value of rent for owned land. It indicates how much gross income is wiped out by the land rent. It is

important to mention that the rental value of owned land was estimated either at the one-third value of gross return from the crop or at the prevailing rents for a similar type of land in the given area whichever is less. The proportion of lease-in land constituted 17 per cent in the operational size of holding among the sampled households.

$$\text{Land Cost Ratio} = \frac{\boldsymbol{Land\ cost}}{\boldsymbol{Gross\ Income}}$$

The land cost ratio to the gross returns was also estimated during the study period and the information thus obtained in incorporated in Table 2.26. The land cost ratio per hectare for wheat, paddy, basmati, potato, maize, sugarcane and peas was estimated at 37.7 per cent, 38.4 per cent, 39.6 per cent, 31.8 per cent, 39.5 per cent, 33.9 per cent and 30.9 per cent respectively. The land cost ratio was again highest in case of cotton per hectare (80.8 per cent) during the study period due to low gross returns from the crop.

Table 2.26. Crop wise land cost ratio to gross returns

(Rs/ha)

Crop	Gross returns	Land cost	Land cost ratio (%)
Wheat	77919	29404	37.7
Paddy	94034	36149	38.4
Basmati	70307	27857	39.6
Cotton	32142	25960	80.8
Potato	112517	35808	31.8
Maize	43256	17106	39.5
Sugarcane	225852	76575	33.9
Peas	117917	36401	30.9

Chapter-IV

Policy Inputs and Actionable Recommendations

On the basis of findings of the report, "District-wise cost of cultivation study of important crops in Punjab" the policy inputs are as under:

1. Human labour one of the major components of the operational cost constitutes significant proportion of the total cost of cultivation of crops in the state. It accounted for 15 to 26 per cent of the total cost of cultivation across different crops. The high cost on this component is observed in the labour intensive crops particularly in the operations like paddy transplanting, cotton picking, and many operations vegetable cultivation. Due to mono-culture of wheat-paddy crop rotation, the window period of employment got squeezed to few weeks. As a result, the paradoxical situation emerged in the farming sector as the shortage of labour witnessed in the peak season whereas vast semi-employment or under employment became key issue for the other period during the year. Therefore, this under employed workforce must be engaged in off-farm activities during the lean period. **Moreover, some of the agricultural activities especially on marginal and small farms need to be covered under MGNREGS and effectively implemented in the state. This act may provide employment opportunities to under employed workforce in the off-season. Moreover, the profitability of small farms may enhance through coverage of many farm activities under MGNREGS which further reduce the cost of cultivate on these farms.**

2. Machine Labour is another major cost component in the total cost of cultivation in the state. It comprises of working expenses, maintenance cost and depreciation which accounts for 8 to 16 per cent of the total cost of cultivation across different crops. As the technology is neutral to size, the small size of holdings are not good enough to realize the gains of economies of scale. As a result, farms incurred higher machine costs in crop cultivation. **To curtail machine costs and improve profitability in agriculture sector there is need to develop and promote affordable and efficient low cost farm machinery along with**

subsidized credit facilities to the farmers. There is need to develop and strengthen Agro Machinery Service Centres (AMSCs) on cooperative basis. At present there are 1500 AMSCs in the state. Along with strengthening of existing centres, the AMSCs should be extended to the entire state comprising of 12581 villages. These centres may ensure timely availability of required machinery to farmers in general and small farmers in particular at reasonable custom hiring rates.

3. Punjab Agriculture is highly mechanised. The present study comes out with the startling fact that the fixed costs accounted for more than half of the total cost of cultivation in most of the crops cultivated in state. The prime reasons for high fixed costs are the capital intensive farm technologies along with overheated land lease market in state. The rental rates for agricultural land in the state are determined by the demand driven factors. Due to lack of alternative employment opportunities outside the farm sector a significant proportion of farm households in order to utilize the family owned resources especially labour and capital investments compete for leasing in the limited land available for this purpose. This process pushes the rental rates beyond its economic rationale. Land lease rates are very high in Punjab agriculture. Lease deeds being verbal only, the Punjab Securities of Land Tenures Act, 1953 according to which the rent exceed one-third of the value of the produce becomes in-applicable. The high agricultural land lease rates calls for major institutional and policy changes.

i) Thus some policy measures should be devised to implement the land tenures act effectively which can help in rationalizing the rental rates of agricultural land and thus enhance the income of lessee farmers.

ii) Through policy decisions the government should lay more emphasis on the skill development among the rural masses and create employment opportunities in the non-farm sector to absorb the surplus labour available with the farm households.

iii) The development and availability of low cost farm specific machinery, pooled machinery services on cooperative lines and provision of low cost credit for the same can address the issue of overcapitalization.

4. The economic well being of farmers depend upon the profitability of the crops grown which in turn along with costs incurred depend upon the realized productivity and prices. The present study revealed significant inter-district variations in the productivity of important crops in state. The productivity gap between the districts represent the untapped productivity reservoir at the current level of technology. A number of technological and socio-economic factors might be the reason for productivity differentials. **In the absence of any technological breakthrough, the highest priority should be given to identify factors responsible for productivity variations and to bridge the gap in order to raise the average crop productivity levels and thus the income level of farmers. No doubt, the research and extension linkages in Punjab are fairly strong but the farmer, extension workers and scientists interface is required to make qualitative improvement by targeting low productivity farmers and regions to address the productivity gaps and doubling farm income.**

5. Wheat and paddy turns out to be the most profitable crops in *Rabi* and *Kharif* seasons in the state. Comparative low returns along with relatively high production and marketing risk in alternative crops (maize, potato, sugarcane) is the major bottleneck in direction of much needed diversified ecological sustainable cropping pattern in the state**: i)** M**ore research efforts to develop production technologies in order to minimise the production risk involved in cultivation of alternative crops to wheat and paddy, ii) The market risks, should be addressed by devising the agricultural price policy through market stabilisation and effective minimum support prices of alternative crops.**

6. Cotton is a commercial crop and was also known as ‘white gold’ for the state. Unfortunately, during the study year, the crop severely damaged due to pest attack and did not cover even the paid out costs thus yielded negative returns in many cases. The failure of this crop resulted in huge losses to the cotton growers in south-western Punjab. **Development of adequate crop protection technologies along with strict enforcement of quality norms for seed, insecticides and fertilizers are the need of time to avert such large scale crop failure in future. This also demands for establishment of some institutional mechanism like farm income stabilization fund, crop insurance policy at minimal premium on individual farm basis by the government which may provide relief to the farmers in such situations.**

7. Crop loan should be provided to the farmers as per the variable costs of different crops at district level.

Actionable Recommendations

On the basis of above policy inputs, the actionable recommendations are as follows:

1. Some of the agricultural activities especially on marginal and small farms need to be covered under MGNREGS and effectively implemented in the state. This will help in reducing the cost of cultivation along with providing the employment particularly to the small farmers.

2. The development and promotion of the low cost affordable and efficient farm machinery along with subsidized credit facilities is of utmost significance for enhancing profitability of farmers.

3. There is need to develop and strengthen Agro Machinery Service Centres (AMSCs) on cooperative basis. At present there are 1500 AMSCs in the state. Along with strengthening of existing centres, the AMSCs should be extended to all the villages of the state.

4. Implement the Punjab Securities of Land Tenures Act, 1953 effectively to rationalizing the rental rates of agricultural land and thus enhance the income of lessee farmers.

5. The Government should emphasise more on the skill development among the rural masses to absorb the surplus labour available with the farm households in the non-farm sector.

6. Involvement of crop scientists and the extension personnel is suggested to address the productivity gaps and doubling farm income.

7. Massive/heavy funds should be allocated for agricultural research to develop production technologies in order to minimise the production risk involved in cultivation of alternative crops to wheat and paddy.

8. To address the market risk, the government should devise the agricultural price policy through market stabilisation and effective minimum support prices of alternative crops.

9. Development of adequate crop protection technologies along with strict enforcement of quality norms for seed, pesticides and fertilizers are the need of time to check crop failure risk as happened in case of cotton.

10. Establishment of some institutional mechanism like farm income stabilization fund, crop insurance policy at minimal premium on individual farm basis by the government to provide relief to the farmers in case of crop failure and to support them in case of price crash.

11. The study on cost of cultivation estimates variation for all crops across district. Therefore, the scale of finance should be fixed for each crop at district level.

Annexure-I

Table: District wise selection of blocks and villages

S.No	District	Block	Village
1.	Amritsar	Ajnala	1. Bal Labha Darya
			2. Talwandi Nahar
		Verka	1. Jahangir
			2. Loharka
		Rayya	1. Pheruman
			2. Jalupur Khera
		Jandiala	1.Nawankot
			2.Chauhan
2.	Barnala	Barnala	1. Nangal
			2. Dangarh
		Mehal Kalan	1. Dhaner & Gagewal
			2. Moom
		Sehna	1. Sukhpura
			2. Dhilwan
3.	Bathinda	Rampura	1. Nandgarh Kotra
			2. Gill Khurd
		Bathinda	1. Burj Mehma
			2.Mehma Sarja & Nahinwala
		Bhagta Bhai Ka	1. Dayal Pura Bhai Ka
			2. Salabtpura
		Talwandi Saboo	1. Jagaram Tirth
			2. Bhagwanpura
4.	Faridkot	Faridkot	1. Golewala
			2. Tehna
		Kotkapura	1. Ramiana
			2. Ghaneye wala
5.	Fatehgarh Sahib	Amloh	1. Tibbi 2. Shahpur
		Bassi Pathana	1. Kheri Bir Singh
			2. Dhunda
		Sirhind	1. Rurkee & Kharora
			2. Tarkhan Majra

6.	Fazilka	Abohar	1. Sitogunno
			2. Amarpura
		Fazilka	1. Keriya
			2. Jandwala Bhame Shah
		Khuyyian Sarwar	1. Alamgarh
			2. Nihal Khera
7.	Ferozepur	Zira	1. Shahwala
			2 Meehan Singh Wala.
		Ghal Khurd	1. Feroze Shah & Mashi Bugra
			2. Vajedka
		Guru Har Sahai	1. Kohar Singh Wala
			2. Karma
8.	Gurdaspur	Dina Nagar	1. Jharoli
			2. Mattama
		Dhariwal	1. Bhumbli
			2. Tibber
		Gurdaspur	1. Zaffarwal
			2. Jhawar
		Batala	1.Sekhwan
			2.Veronangal
9.	**Hoshiarpur**	Hoshiarpur -I	1. Khadiala Sainian
			2. Sarian
		Hoshiarpur - II	1. Patti
			2. Bilaspur
		Bhunga	1. Pandori Atwal
			2. Dallewal
		Tanda	1. Harshi / Jaja
			2. Kandhala Jattan
10.	Jalandhar	Shahkot	1. Bajwa Kalan
			2. Parjian Kalan
		Phillaur	1. Bansian & Thalla
			2. Partapura and Kalyanpura
		Adampur	1. Latera Kalan
			2. Baroli Kalan & Badhiana
		Jalandhar-II	1. Nussi & Maksuda
			2. Khalwan

11.	Kapurthala	Kapurthala	1. Ibban
			2. Khojewal
		Phagwara	1. Domeli
			2. Bhulla Rai
		Sultanpur Lodhi	1. Dalla
			2. Boolpur & Thatha
12.	Ludhiana	Doraha	1. Ghaloti
			2. Kartarpur
		Samrala	1. Chehlan
			2. Seh & Salaudi
		Sidhwan Bet	1. Rasoolpur
			2. Majri
		Pakhowal	1. Bheela
			2. Sarabha
13.	Mansa	Mansa	1. Kotra Kalan
			2. Rarh
		Budhladha	1. Borewal & Gurne Kalan
			2. Kulana
		Jhunnir	1. Bhame Kalan
			2. Banawala & Peron
14.	Moga	Nihal Singh wala	1. Lohara
			2. Rama
		Moga I	1. Ramowala
			2. Killi Chahala
		Dharamkot	1. Bhinder Kalan
			2. Kishanpura Khurd
15.	Pathankot	Narot Jaimal	1. Kolaiya
			2.Darshopur & Chela Amda Gurdaspur
		Dhar Kalan	1. Badsudal
			2. Tretti
		Pathankot	1. Manwal
			2. Chak Dhariwal

16.	Patiala	Sanaur	1. Assarpur & Noorpur Kheri
			2. Jogipur
		Nabha	1. Benaheri
			2. Babarpur
		Patiala	1. Dhablan
			2. Mehmadpur Jattian
17.	RupNagar	Anandpur Sahib	1. Bassowal
			2. Mujjair
		Noorpur Bedi	1. Kalwan
			2. Saskaur
		Rupnagar	1. Khabra and Gosalan
			2. Lodhi Majra
18.	Sangrur	Sunam	1. Marad Khera
			2. Khadial
		Sangrur	1. Akoi sahib
			2. Saro
		Lehra Gaga	1. Sangatpura
			2. Dhindsa
		Malerkotla	1. Bhudan
			2. Momanabad
19.	SAS Nagar	Kharar	1. Baroli
			2. Rudki
		Majri	1. Bhajauli and Serhali
			2. Gunnu Majra
		Dera Bassi	1. Satabgarh
			2. Baroli
20.	SBS Nagar	Aur	1. Chakdana
			2. Urapar
		Nawanshahr	1. Daulatpura
			2. Majara Khurd
		Banga	1. Surapur
			2. Bhora
		Saroya	1. Saheengra
			2. Diyalan and Hiyatpura

21.	Shri Muktsar Sahib	Lambi	1. Singhewala
			2. Sham Khera
		Gidderbaha	1. Kot Bhai
			2. Kotli
		Muktsar	1. Sangu Dhaun
			2. Bhullar
22.	Tarn Taran	Valtoha	1. Madder
			2. Poonia
		Khadoor Sahib	1. Bhalaipur Dogra
			2. Hothial
		Patti	1. Nathuchak
			2. Sarihali Khurd

Annexure-II

Crop- Wheat									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Gurdaspur	2202	1919	4841	56	1408	1878	599	2058	6382	21343
2	Pathankot	2487	2339	4209	312	1498	1996	365	2830	4300	20336
3	Amritsar	2747	2272	5138	167	1601	2478	465	2363	6556	23787
4	Tarn Taran	2526	2243	4996	100	1503	1625	618	2122	5685	21418
5	Kapurthala	2400	2363	5197	96	1967	914	544	2396	6583	22460
6	Jalandhar	2568	2216	5076	65	1734	1004	1088	1973	5870	21594
7	SBS Nagar	2503	2473	4919	108	1876	2169	875	2326	6702	23951
8	Hoshiarpur	2782	1485	4421	32	1453	1759	452	3758	5248	21390
9	Rup Nagar	2202	2102	5017	77	1992	678	428	3448	5592	21536
10	SAS Nagar	2852	2940	6041	99	2048	3486	491	2246	4963	25165
11	Ludhiana	2859	2539	5473	58	1789	1467	488	1873	6247	22793
12	Ferozepur	2380	3907	5038	142	2033	709	914	1982	4667	21772
13	Fazilka	2396	1883	4921	146	2181	301	107	1890	5369	19194
14	Faridkot	2232	2796	4992	28	2074	1792	635	2093	4448	21090
15	Sh Muktsar Sahib	2236	1828	4834	89	2115	1688	378	1954	4784	19906
16	Moga	2274	2452	5621	66	1877	2031	685	1840	5589	22435
17	Bathinda	2379	2930	4825	138	1993	2159	873	1369	4771	21437
18	Mansa	2111	3890	5112	63	2029	647	1164	1784	5841	22641
19	Sangrur	2310	2281	5506	72	1565	603	786	1094	5586	19803
20	Barnala	2453	2604	4830	152	1846	1725	359	1496	4733	20198
21	Patiala	2453	1823	5793	37	1577	1677	319	2102	5168	20949
22	Fatehgarh Sahib	2625	1965	5923	162	1613	1138	260	2119	5845	21650
Punjab		**2454**	**2420**	**5124**	**103**	**1808**	**1542**	**586**	**2142**	**5497**	**21675**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-III

Crop- Paddy									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Gurdaspur	1887	2672	3666	147	2751	1753	4344	7480	3238	27939
2	Pathankot	1496	2946	2490	479	1723	1787	2990	6945	2206	23061
3	Amritsar	1992	2323	4096	147	3293	1212	5568	7738	3492	29860
4	Tarn Taran	1914	2336	3325	236	3229	1716	4597	10324	3116	30793
5	Kapurthala	1850	2307	4039	50	3317	319	2575	6878	3926	25261
6	Jalandhar	1958	3165	4197	28	3172	1173	3148	8751	3522	29114
7	SBS Nagar	1660	4740	4102	12	2125	1872	5107	7583	3686	30887
8	Hoshiarpur	1761	1910	3731	194	1961	1988	4294	8275	3695	27809
9	Rup Nagar	1744	5154	3818	165	2391	1604	4138	9385	3438	31837
10	SAS Nagar	1570	4309	3943	737	3044	2594	5940	7935	2893	32964
11	Ludhiana	1551	2849	3986	284	4214	1402	2507	7337	3710	27840
12	Ferozepur	1778	4375	3634	102	4249	2428	4113	7699	3172	31550
13	Fazilka	1887	8128	4101	116	4186	454	2248	7737	3578	32436
14	Faridkot	1548	4419	3510	141	4101	1967	2072	7317	2879	27954
15	Sh Muktsar Sahib	1661	3215	3571	77	4094	2409	2299	7348	2569	27243
16	Moga	1754	2398	3806	91	4892	1634	5483	7544	3722	31324
17	Bathinda	1700	2754	4021	182	4127	2017	4822	6530	3401	29554
18	Mansa	1954	3332	4080	239	4103	589	2152	7361	3493	27303
19	Sangrur	1666	2318	4026	421	4053	1044	4295	8250	3698	29772
20	Barnala	1520	2840	3776	72	4005	1632	1909	6718	2977	25449
21	Patiala	1523	2786	3732	175	3986	2731	3246	8858	3114	30151
22	Fatehgarh Sahib	1619	2633	3651	439	3791	1525	2437	7110	3328	26533
Punjab		**1727**	**3359**	**3786**	**206**	**3491**	**1629**	**3649**	**7777**	**3312**	**28938**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-IV

Crop- Basmati									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Gurdaspur	2443	3236	2793	145	3148	1595	4337	9927	3175	30799
2	Pathankot	1987	7753	2386	171	1029	1998	6373	9653	1185	32535
3	Amritsar	2392	1852	2949	104	3678	1926	4203	10703	3174	30981
4	Tarn Taran	2253	2485	3156	110	3207	1928	4296	11543	3878	32856
5	Ferozepur	2007	5117	2204	108	4697	2411	4066	8250	2537	31397
6	Fazilka	2314	3380	3080	172	3172	632	1419	7646	3637	25452
7	Faridkot	2276	5010	2476	228	4504	1542	1200	7583	2580	27399
8	Sh Muktsar Sahib	2211	3536	2442	36	4482	4067	4698	7918	2292	31681
9	Sangrur	2094	1737	3041	180	3861	963	7613	9561	4142	33193
Punjab		**2220**	**3790**	**2725**	**139**	**3531**	**1896**	**4245**	**9198**	**2956**	**30699**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-V

Crop- Cotton									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Fazilka	5636	4720	3972	44	6898	4751.38	501	11856	1763	40142
2	Faridkot	5785	4391	3372	81	5183	1669.26	567	7638	1793	30479
3	Sh Muktsar Sahib	5302	2962	3541	7	6476	3214.65	342	6860	1465	30169
4	Bathinda	6052	7146	3852	16	7176	1083.14	491	6859	1393	34068
5	Mansa	5532	3332	3960	77	5947	652.26	1320	5161	2717	28699
6	Barnala	6106	2225	3945	53	6388	1515.24	368	6022	1451	28074
7	Sangrur	6969	2445	4513	80	6906	1910.25	769	5130	1220	29942
Punjab		**5912**	**3889**	**3879**	**51**	**6425**	**2114**	**623**	**7075**	**1686**	**31653**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-VI

Crop- Maize									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Pathankot	2585	1898	2241	294	1038	1155	613	3759	1066	14650
2	Kapurthala	2819	1851	4365	95	1544	1012	460	9414	1954	23514
3	Jalandhar	4078	1920	3964	125	1236	1359	559	6897	2181	22319
4	Hoshiarpur	3852	1365	4370	112	1468	1492	740	7960	2993	24352
5	SBS Nagar	3040	1769	3961	26	1112	1696	900	9822	2897	25224
6	Rup Nagar	3371	1165	4447	681	1852	816	109	8826	3204	24471
7	SAS Nagar	3775	2344	4155	196	1538	1845	751	8731	2449	25784
Punjab		**3360**	**1759**	**3929**	**218**	**1398**	**1339**	**590**	**7916**	**2392**	**22902**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-VII

Crop- Sugarcane									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Gurdaspur	18488	3269	6365	516	6040	2559	3872	32331	997	74797
2	Jalandhar	19542	3634	7273	1344	5837	1562	2212	34733	3008	79146
3	SBS Nagar	14464	3525	5885	654	6287	3596	3437	26281	210	64339
4	Hoshiarpur	18484	4213	7623	278	6166	2923	2758	36362	799	79606
Punjab		**17835**	**3660**	**6787**	**698**	**6083**	**2660**	**3070**	**32427**	**1254**	**74472**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-VIII

Crop- Potato									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Amritsar	35257	3967	12022	560	2862	4138	1073	14895	985	75758
2	Kapurthala	32930	5714	11046	1567	2492	2274	964	11302	217	68506
3	Jalandhar	31244	4524	9501	467	2354	2285	691	13291	925	65281
4	Hoshiarpur	28196	3685	9529	475	2824	3907	950	9525	1680	60771
5	Ludhiana	30111	5780	14503	829	3241	3690	404	13694	1181	73433
6	Moga	37093	6465	14151	765	4145	5150	1496	11296	49	80610
7	Bathinda	27972	5911	12809	1977	2885	4383	1092	13819	162	71010
Punjab		**31829**	**5149**	**11937**	**949**	**2972**	**3690**	**953**	**12546**	**743**	**70767**

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

Annexure-IX

Crop- Peas									Per Hectare Cost		
S.No	District	Seed Cost	Diesel Oil	Chemical Fertilizers	Organic Manure	Pesticides & Insecticides	Repair & Maintenance & Other operation costs*	Irrigation Charges**	Hired Labour		Total
									Human Labour	Machine Labour	
1	Amritsar	28653	2866	6632	386	2647	3004	862	16058	2622	63730

*Repair, maintenance and depreciation of owned machinery excluding irrigation machines & diesel cost.

**Includes repair, maintenance and depreciation of owned irrigation machinery excluding diesel charges, if any.It also include charges of hired irrigation.

Note- 1. Animal use in agricultural operations in Punjab is almost nil. Hence, Feed cost is nil.

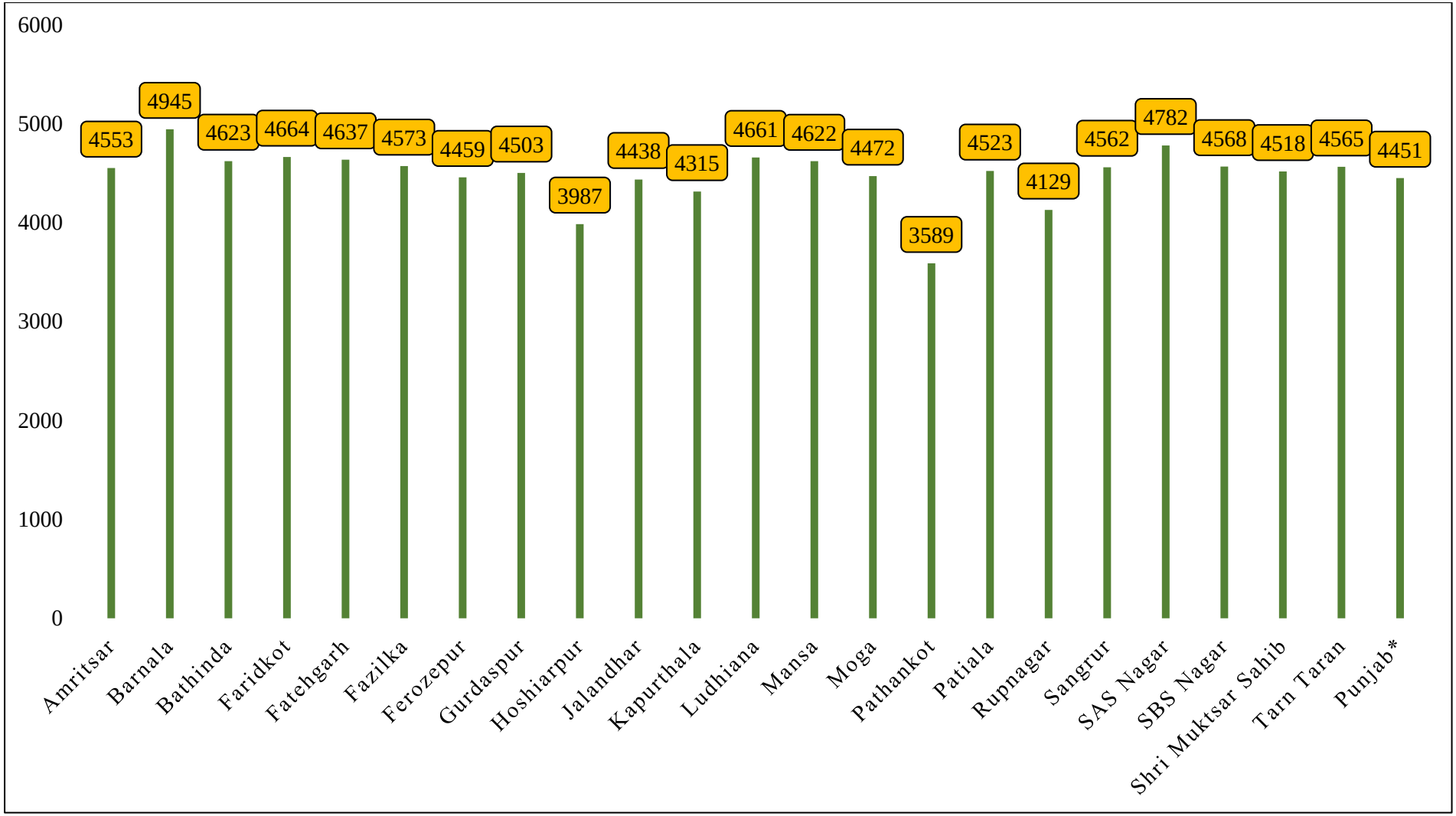
2. Electricity is supplied free of cost to agricultural sector in Punjab. Hence, the charges on this account are nil.

3. Market charges

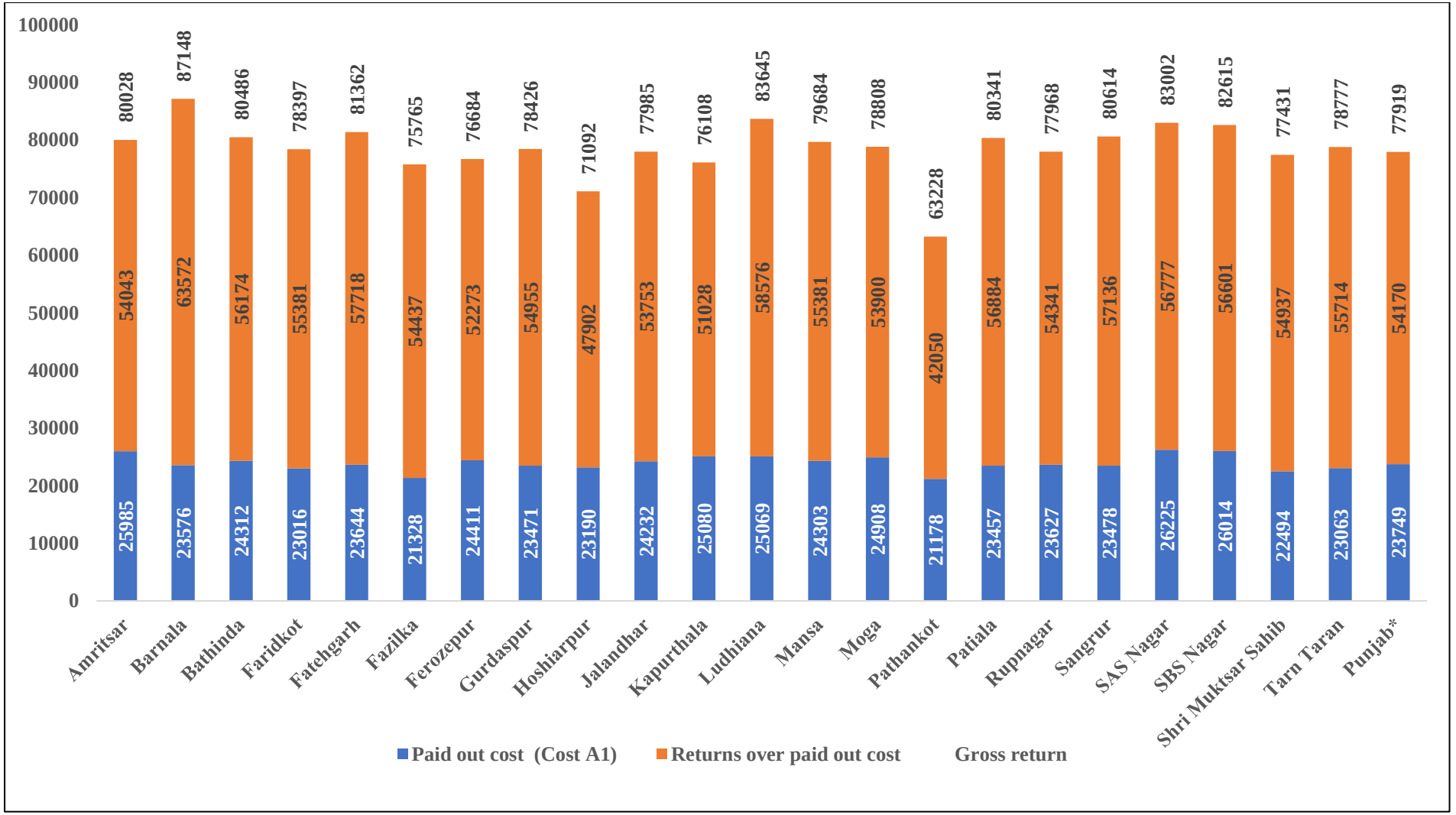
Annexure-X

Total Cost (Rs Per/ ha)									
S.No	**District/ Crop**	**Wheat**	**Paddy**	**Basmati**	**Cotton**	**Maize**	**Sugarcane**	**Potato**	**Peas**
1	Gurdaspur	21343	27939	30799				74797	
2	Pathankot	20336	23061	32535			14650		
3	Amritsar	23787	29860	30981		75758			63730
4	Tarn Taran	21418	30793	32856					
5	Kapurthala	22460	25261			68506	23514		
6	Jalandhar	21594	29114			65281	22319	79146	
7	SBS Nagar	23951	30887				25224	64339	
8	Hoshiarpur	21390	27809			60771	24352	79606	
9	Rup Nagar	21536	31837				24471		
10	SAS Nagar	25165	32964				25784		
11	Ludhiana	22793	27840			73433			
12	Ferozepur	21772	31550	31397					
13	Fazilka	19194	32436	25452	40142				
14	Faridkot	21090	27954	27399	30479				
15	Sh Muktsar Sahib	19906	27243	31681	30169				
16	Moga	22435	31324			80610			
17	Bathinda	21437	29554		34068	71010			
18	Mansa	22641	27303		28699				
19	Sangrur	19803	29772	33193	29942				
20	Barnala	20198	25449		28074				
21	Patiala	20949	30151						
22	Fatehgarh Sahib	21650	26533						
Punjab		**21675**	**28938**	**30699**	**31653**	**70767**	**22902**	**74472**	**63730**

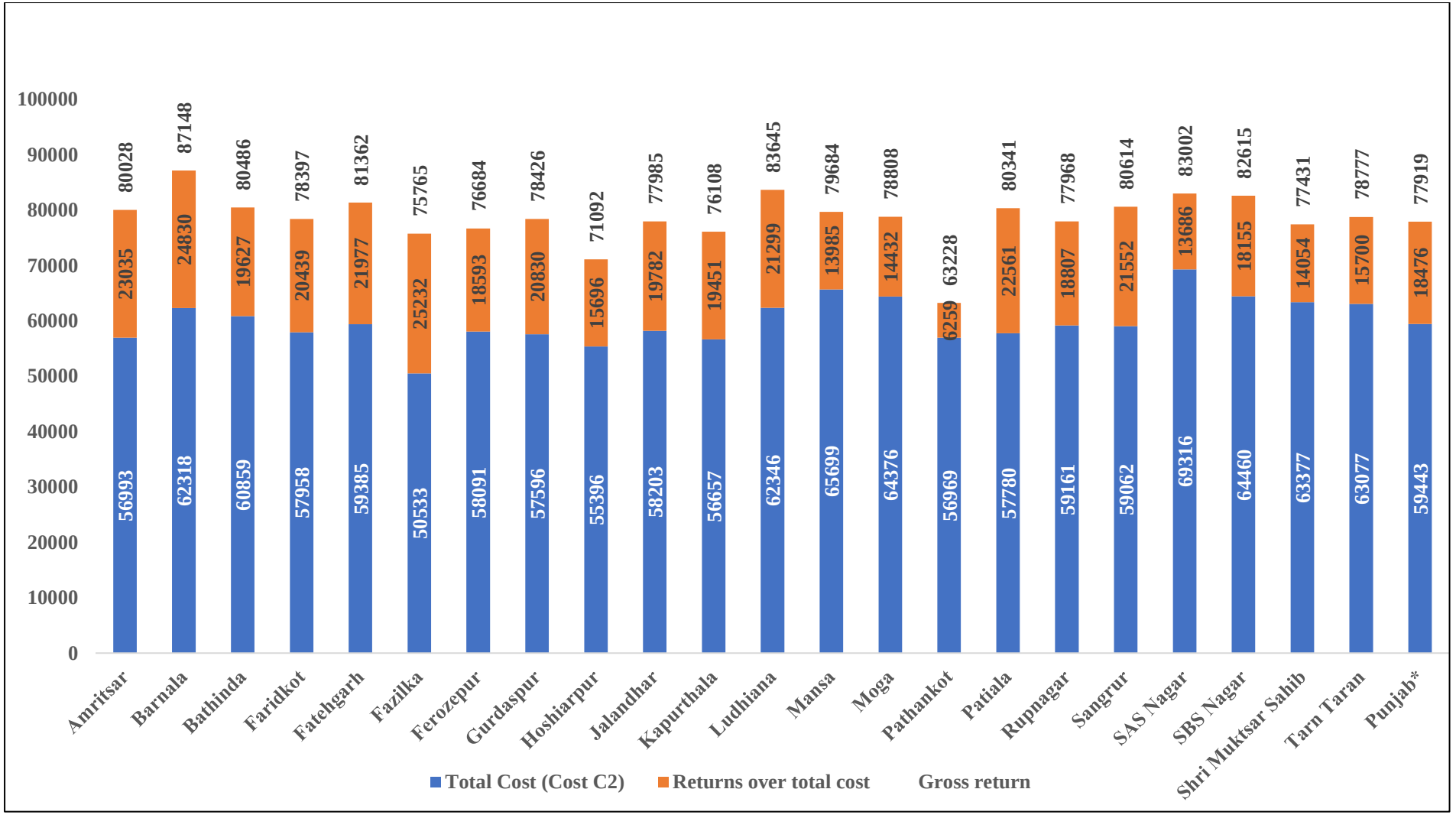
District wise yield of wheat crop in Punjab, 2015-16



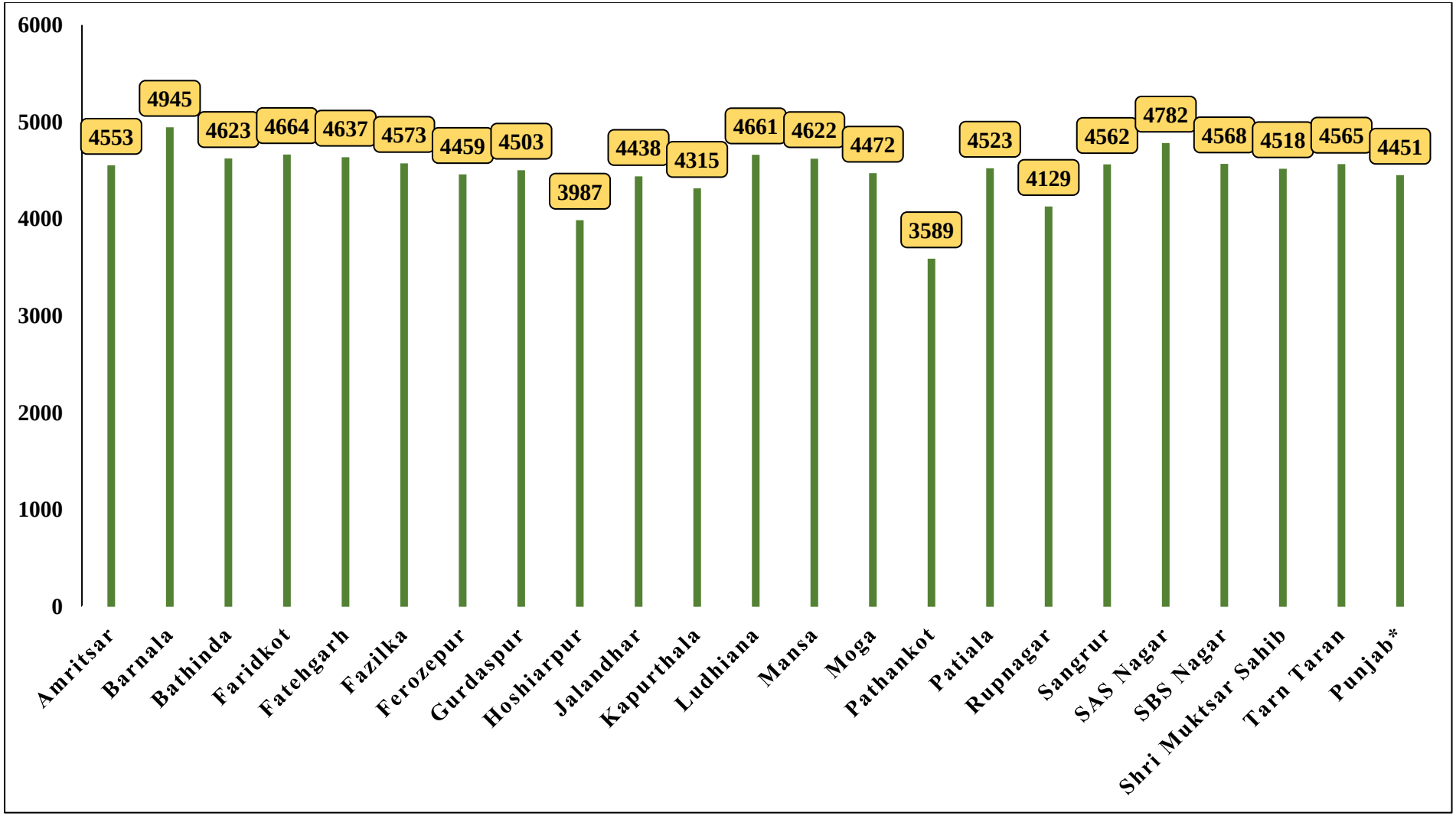
District wise returns over paid out cost (cost A1) for wheat crop in Punjab, 2015-16



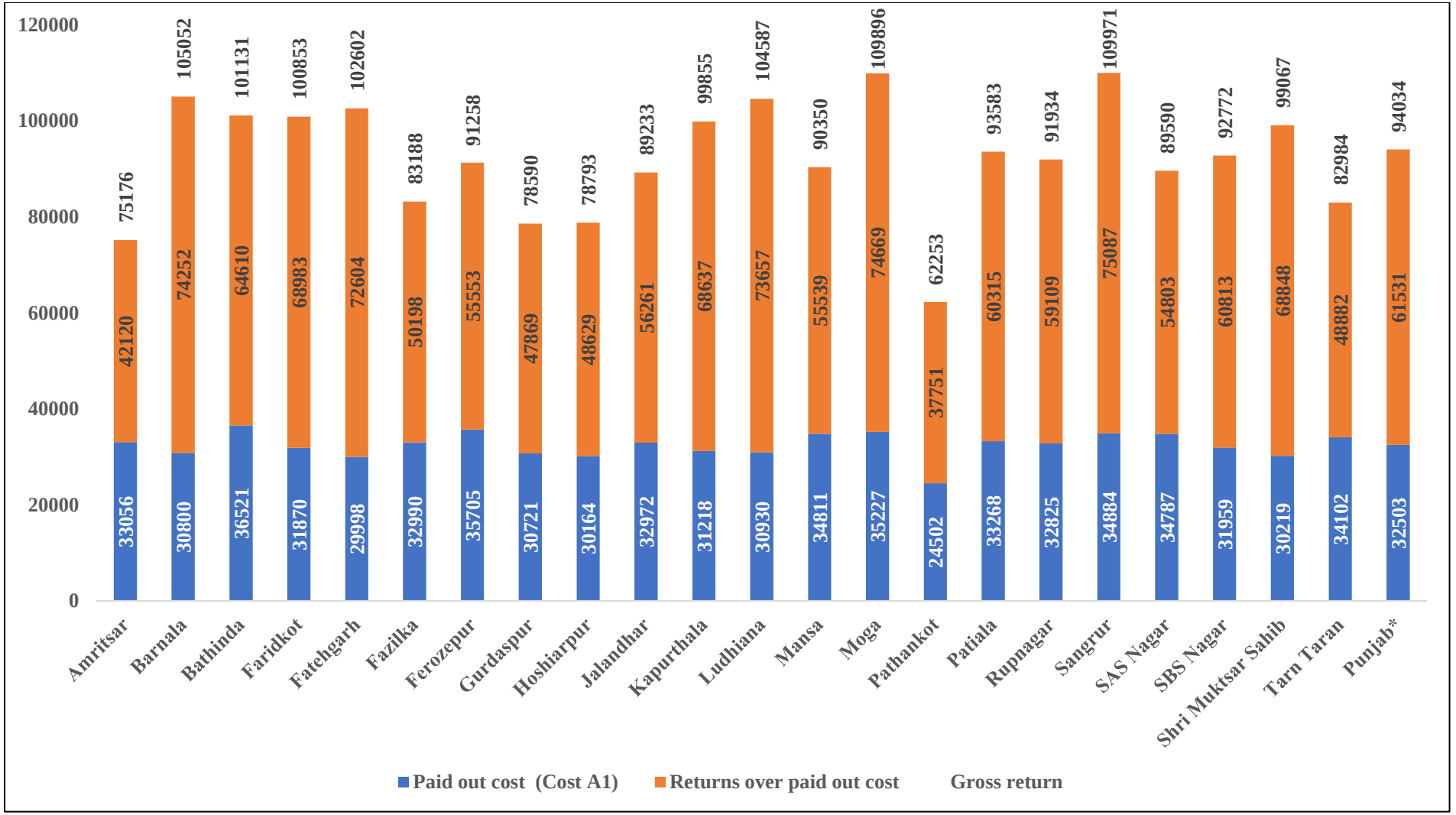
District wise returns over total cost (cost C2) for wheat crop in Punjab, 2015-16



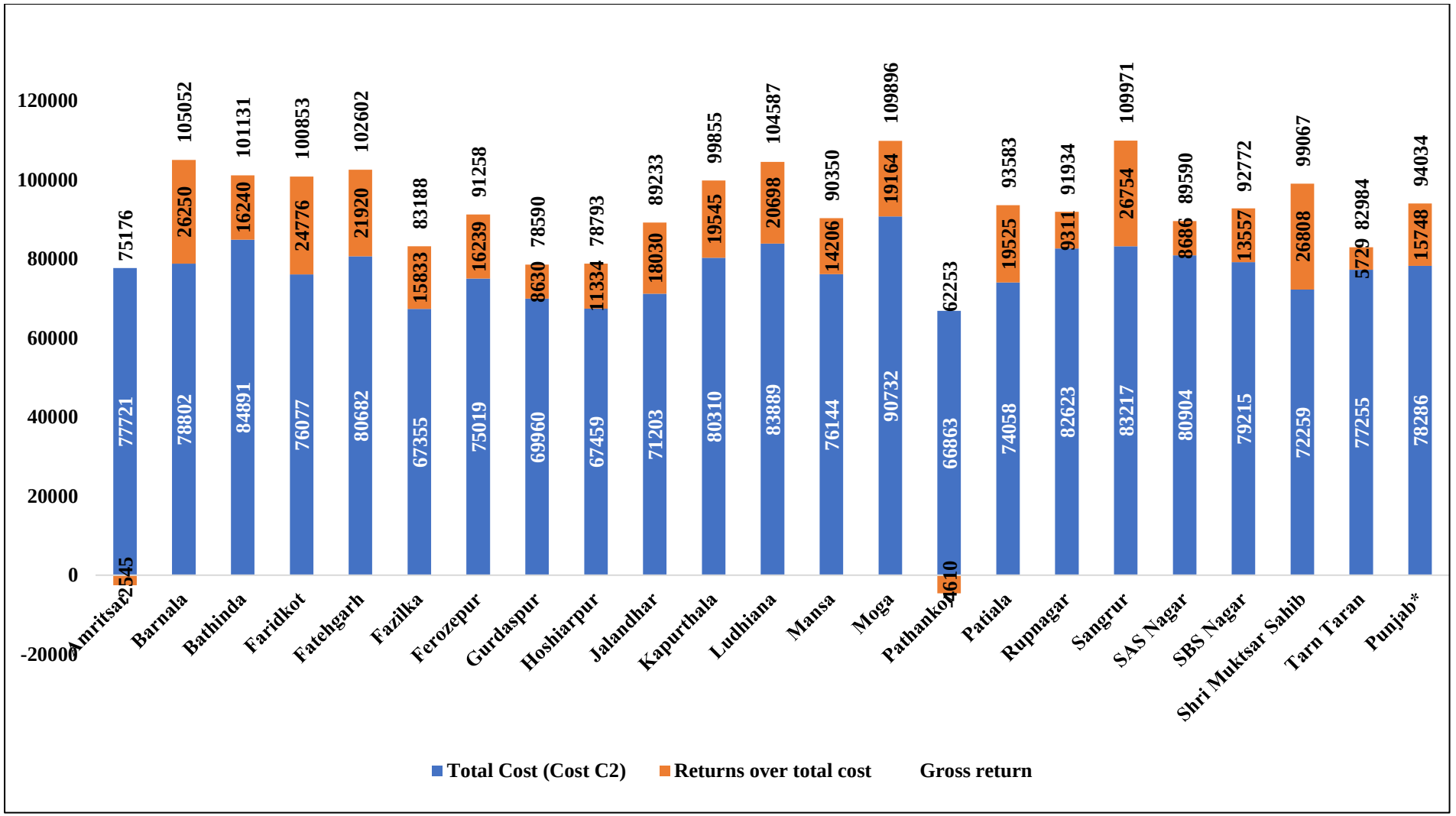
District wise yield of paddy crop in Punjab, 2015-16



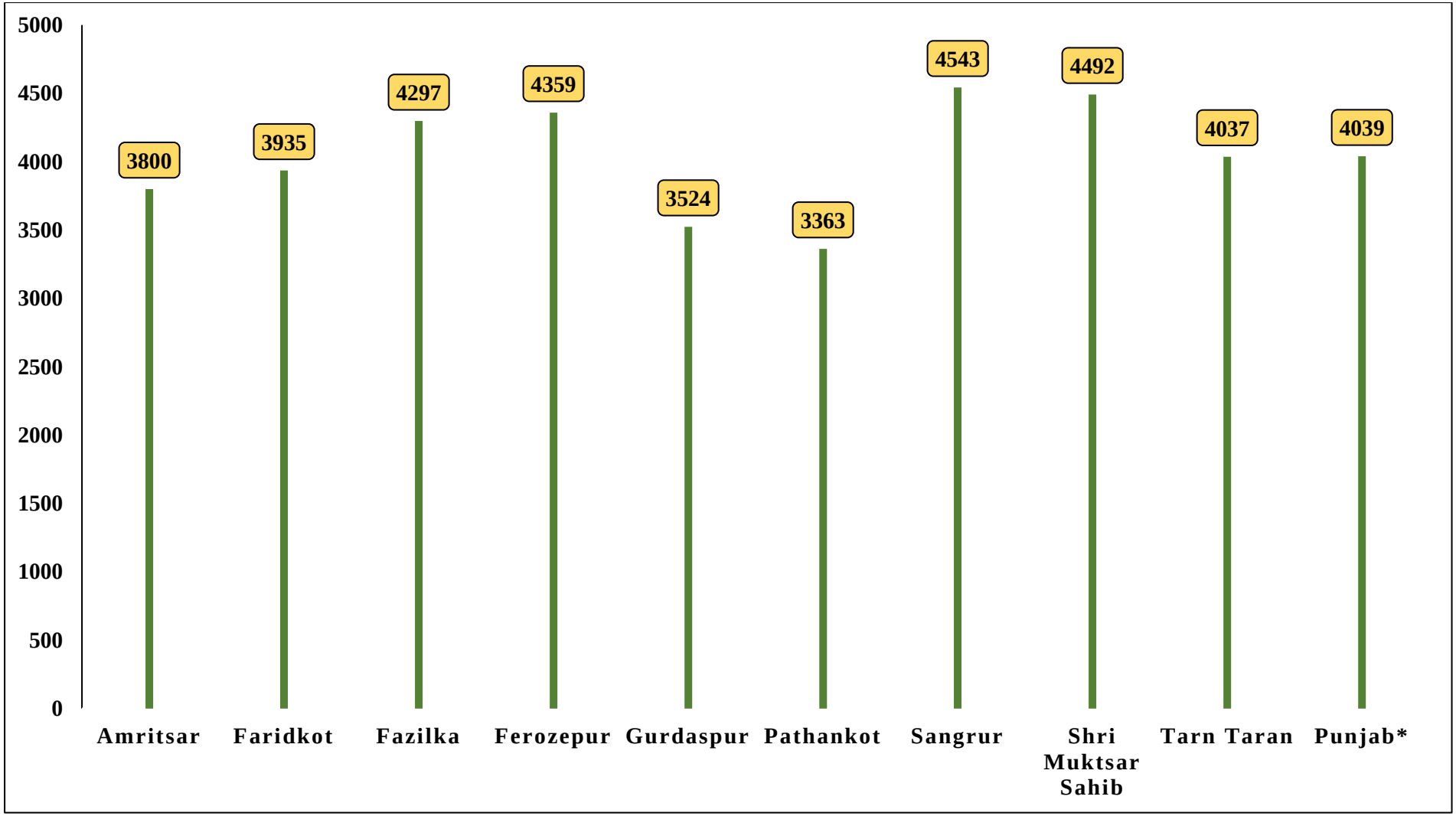
District wise returns over paid out cost (cost A1) for paddy crop in Punjab, 2015-16



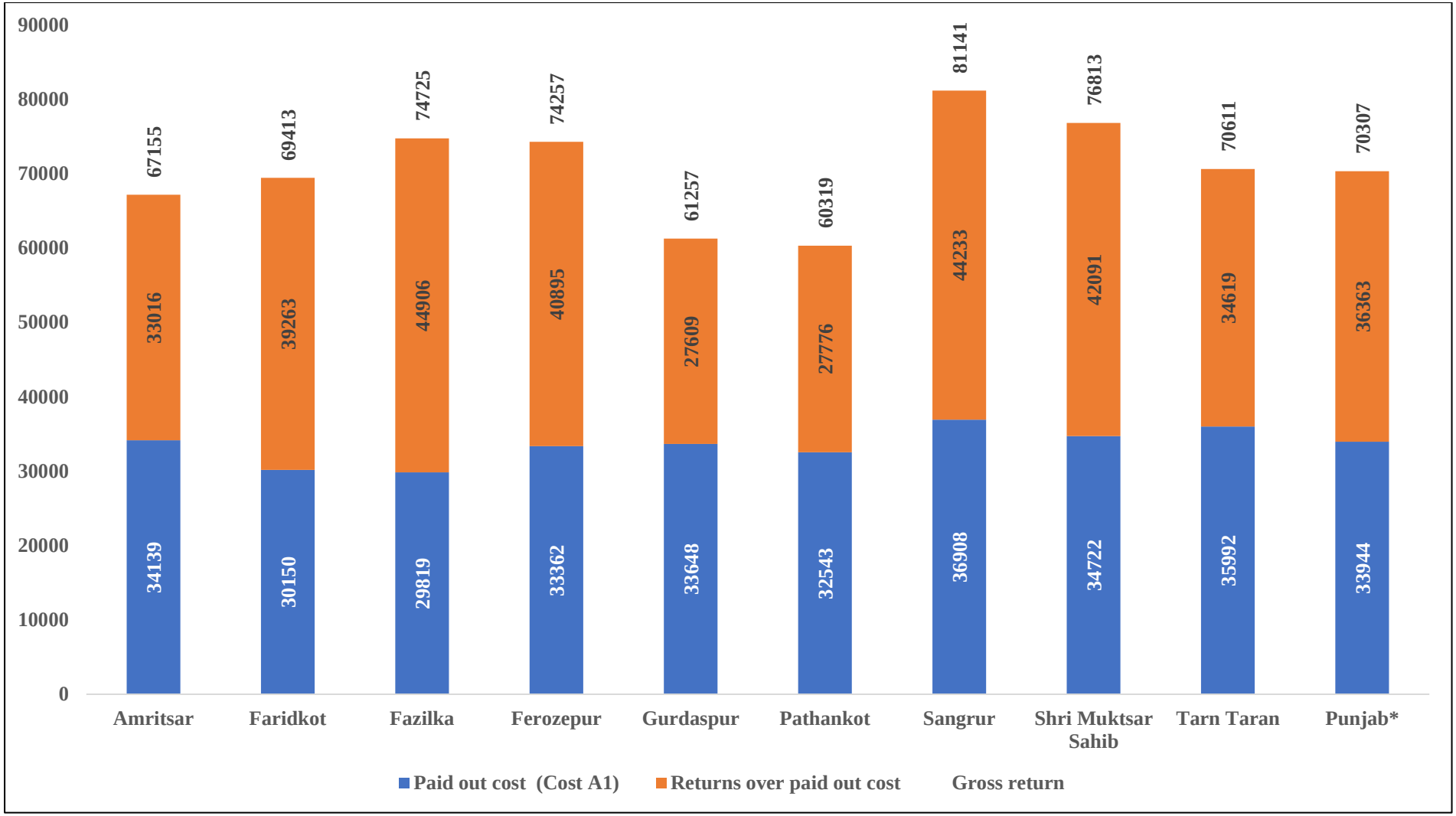
District wise returns over total cost (cost C2) for paddy crop in Punjab, 2015-16



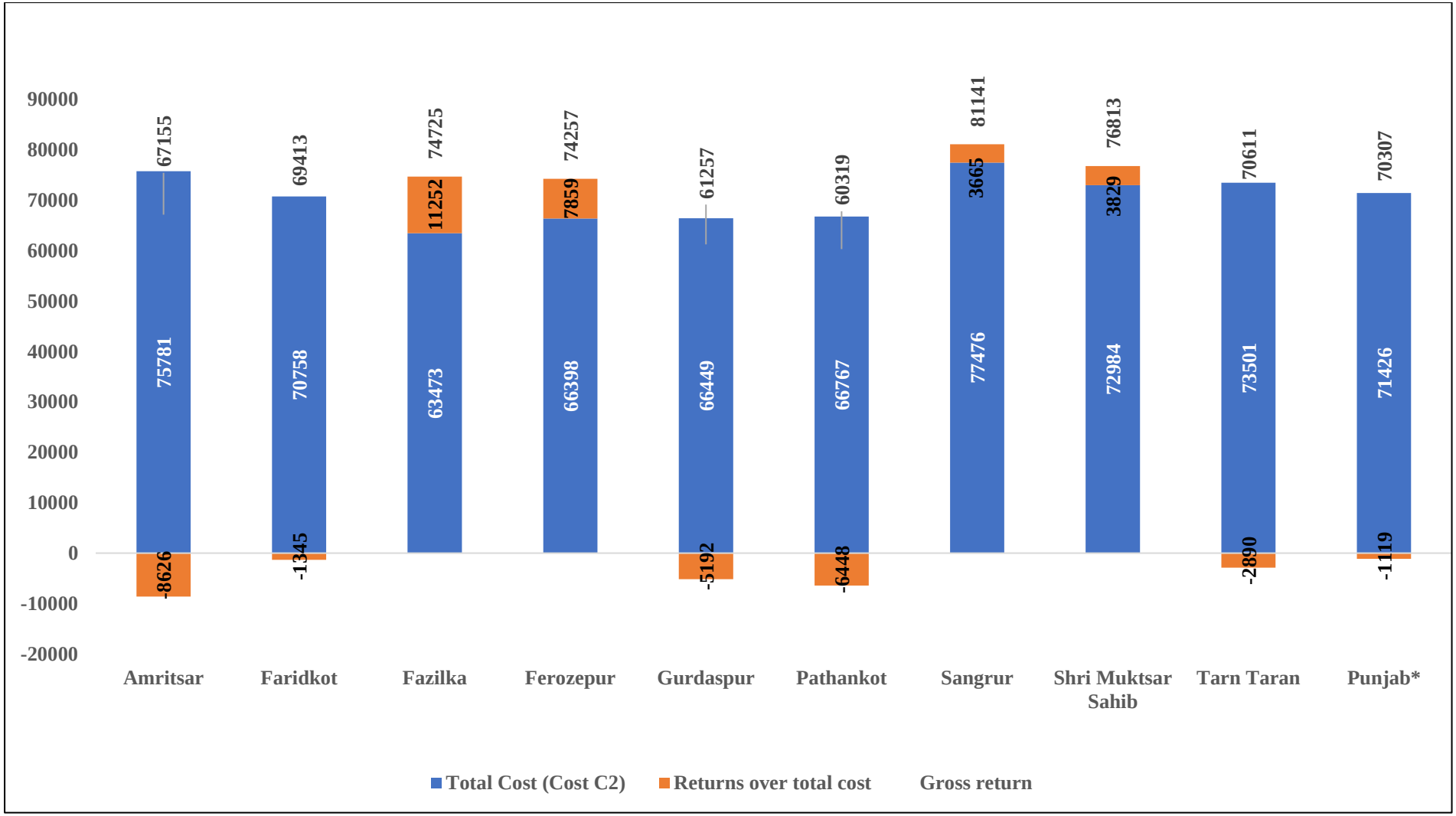
District wise yield of basmati crop in Punjab, 2015-16



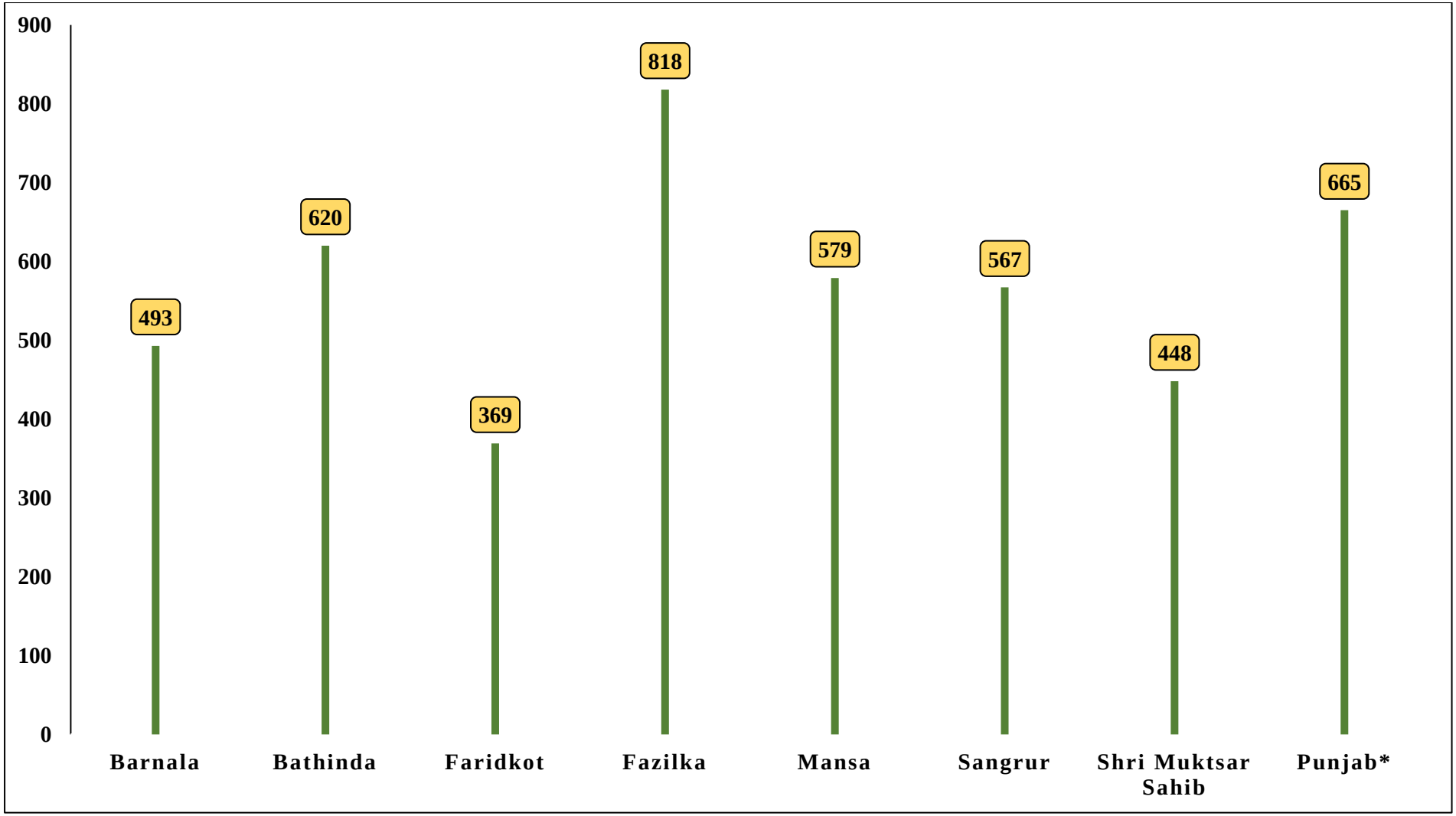
District wise returns over paid out cost (cost A1) for basmati crop in Punjab, 2015-16



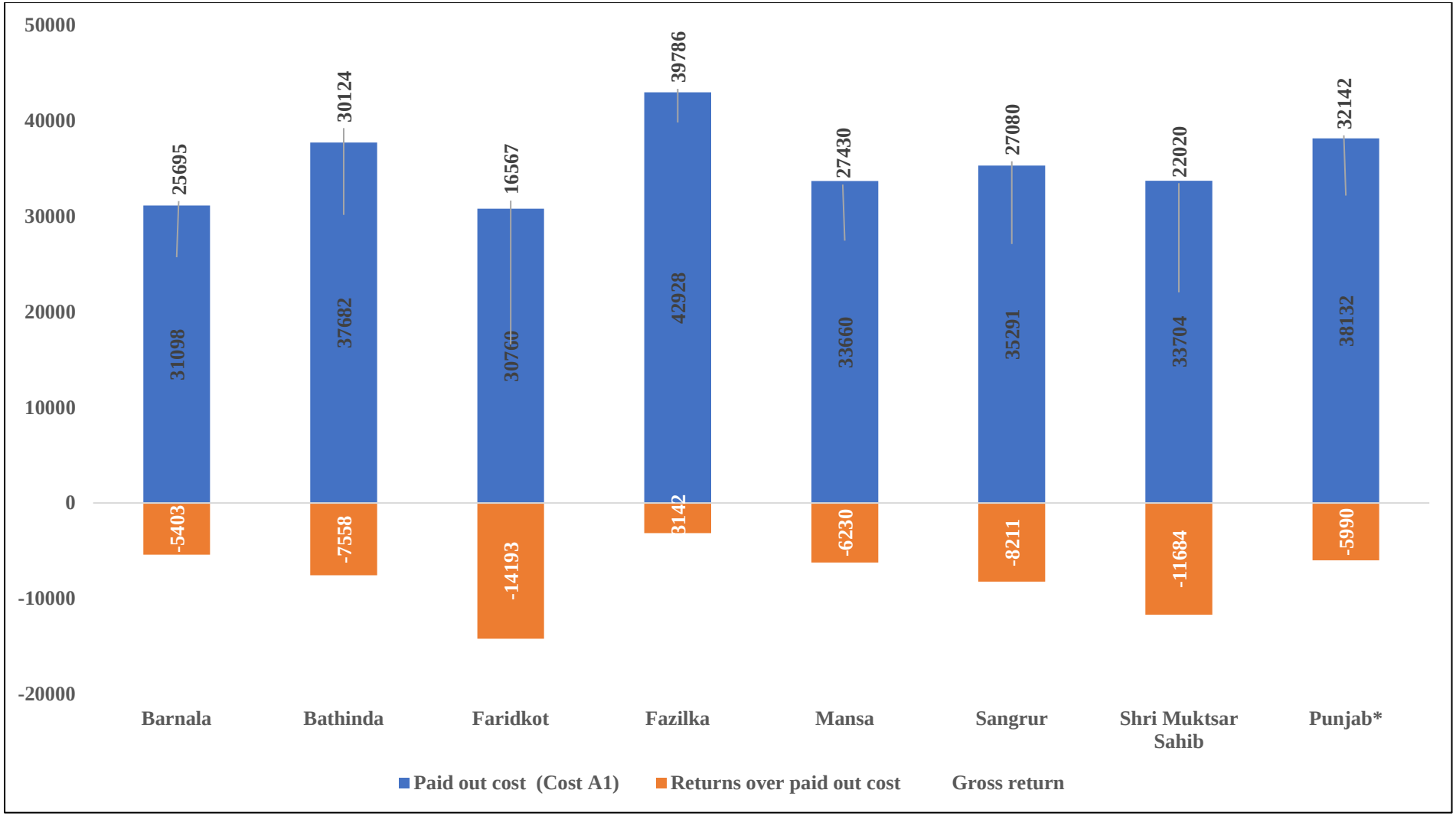
District wise returns over total cost (cost C2) for basmati crop in Punjab, 2015-16



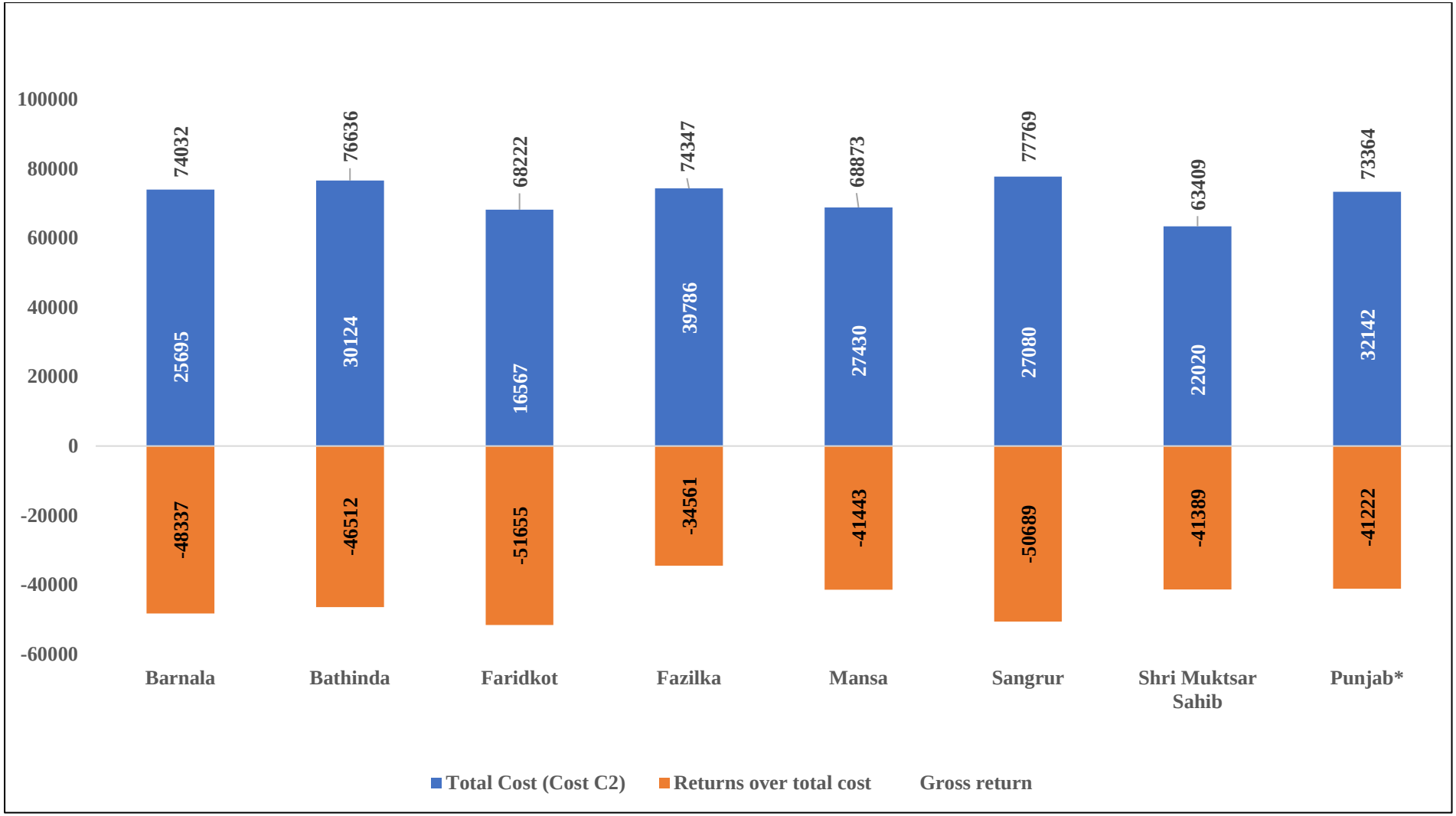
District wise yield of cotton crop in Punjab, 2015-16



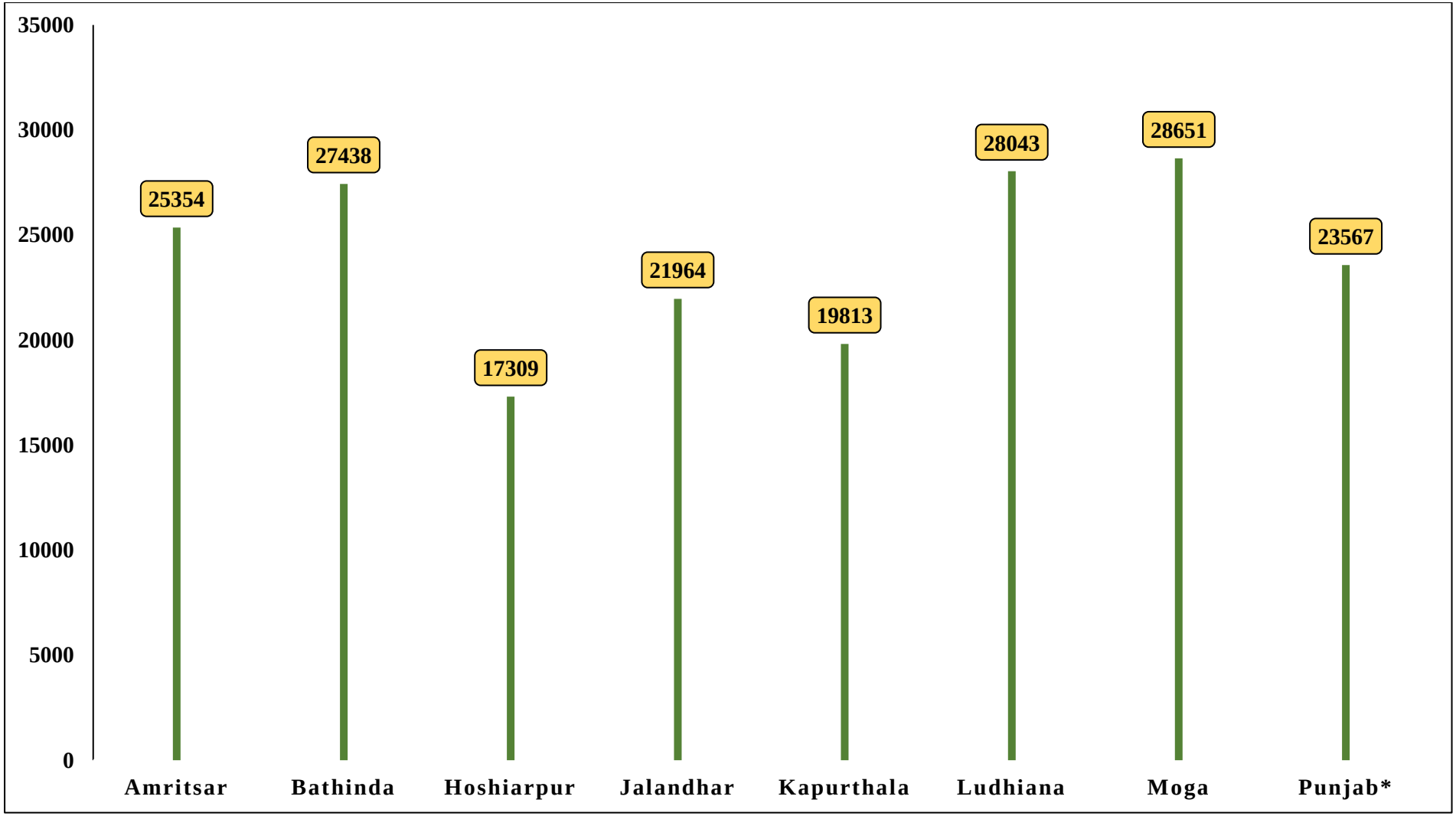
District wise returns over paid out cost (cost A1) for cotton crop in Punjab, 2015-16



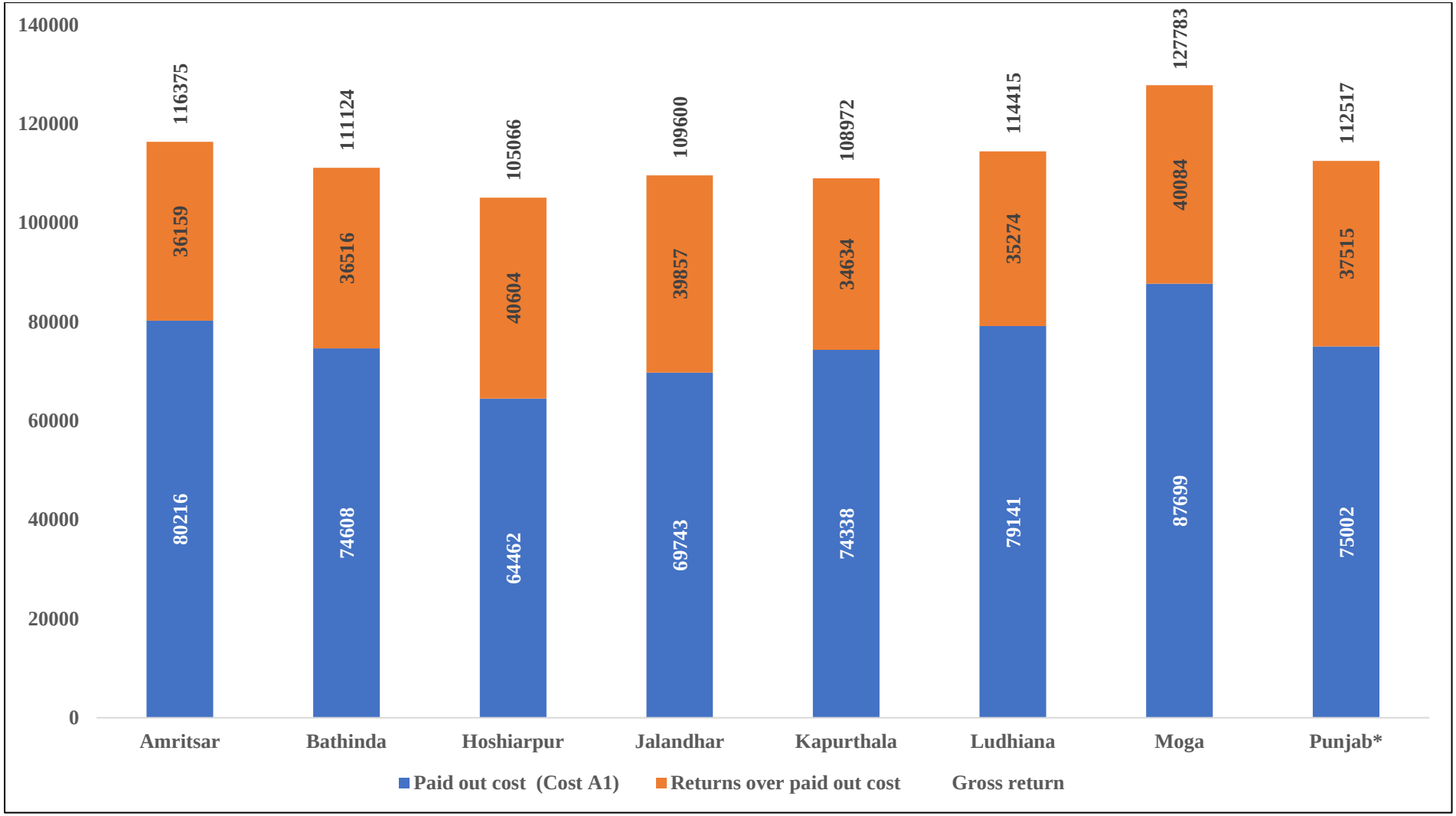
District wise returns over total cost (cost C2) for cotton crop in Punjab, 2015-16



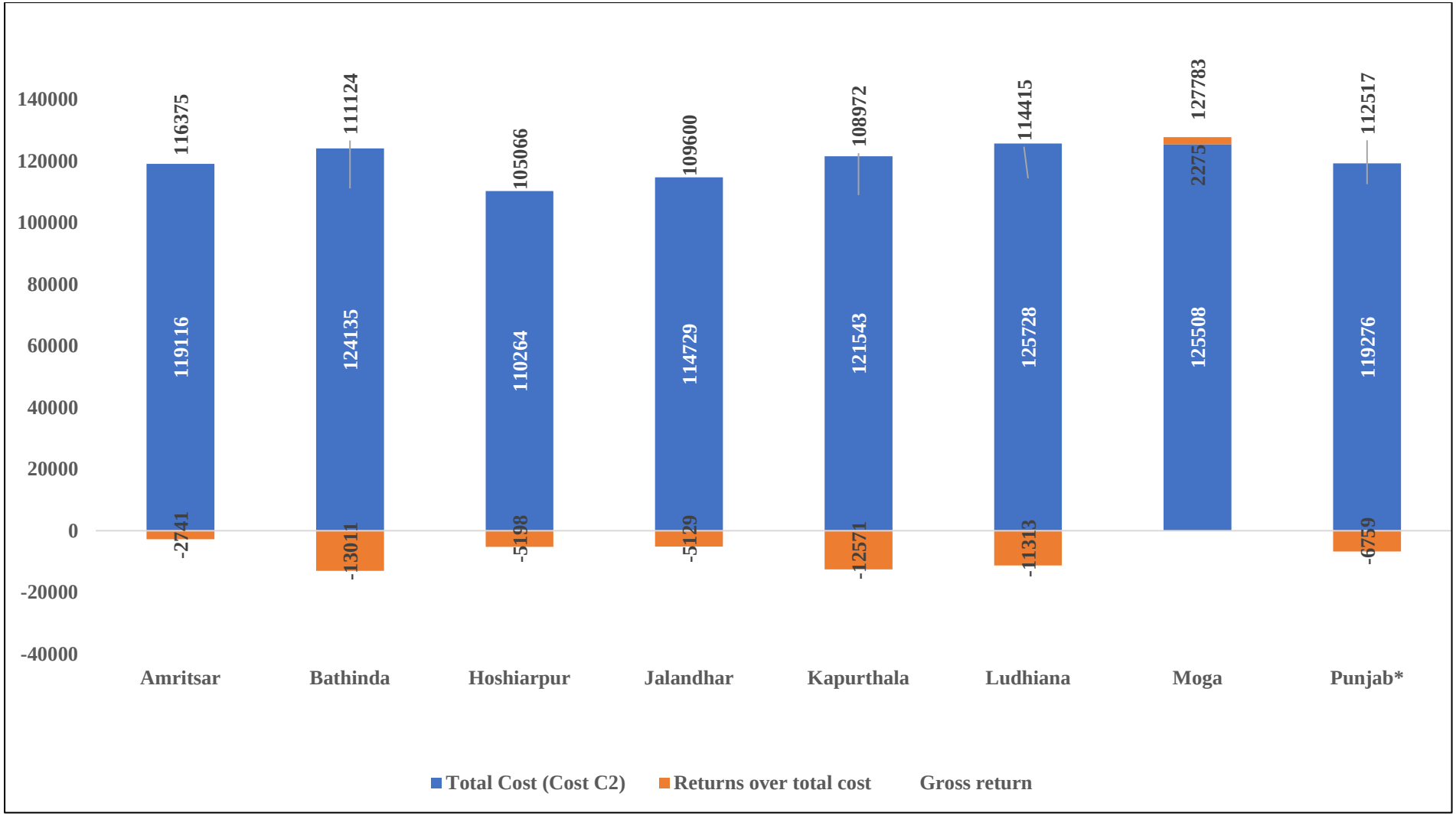
District wise yield of potato crop in Punjab, 2015-16



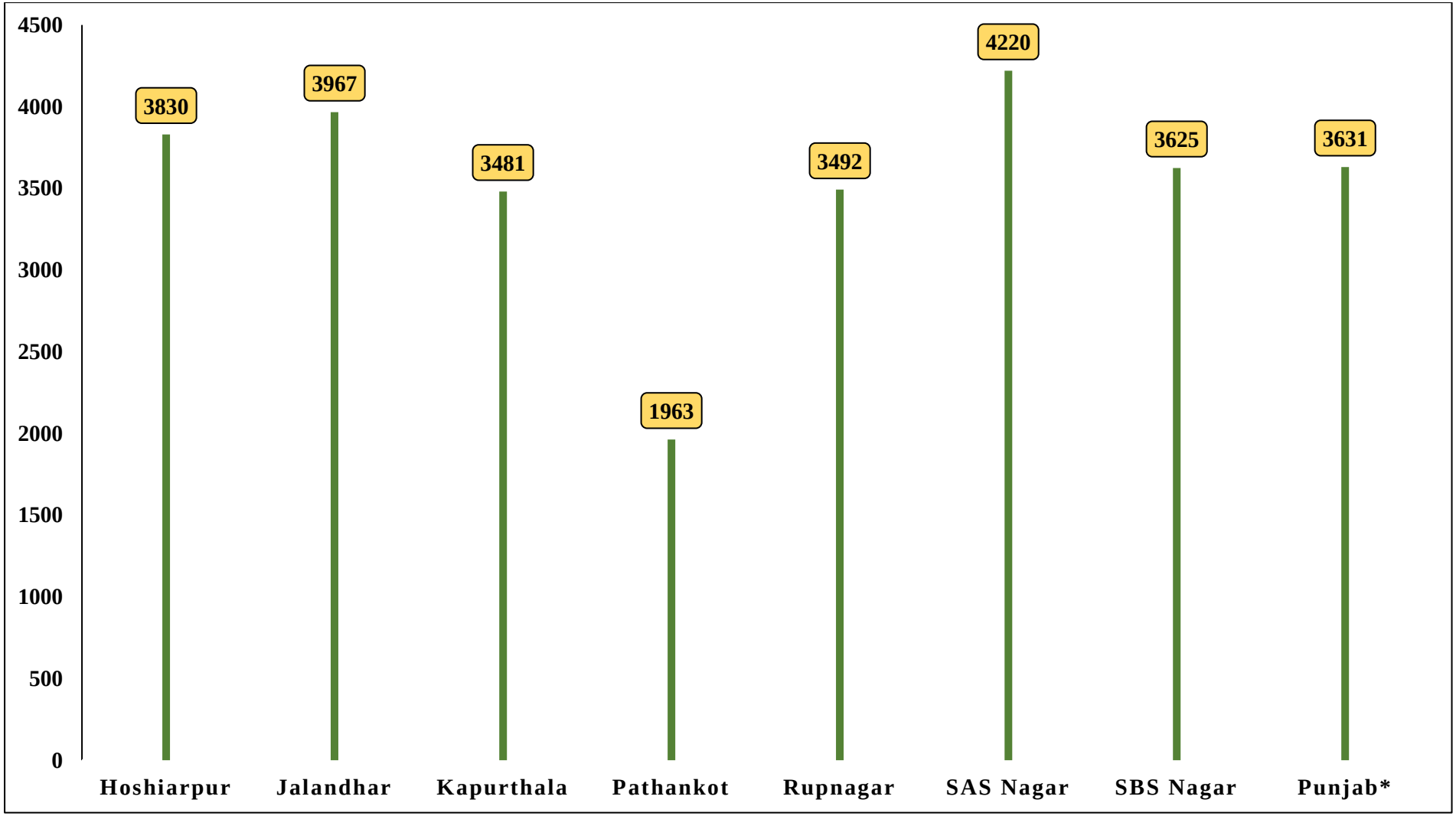
District wise returns over paid out cost (cost A1) for potato crop in Punjab, 2015-16



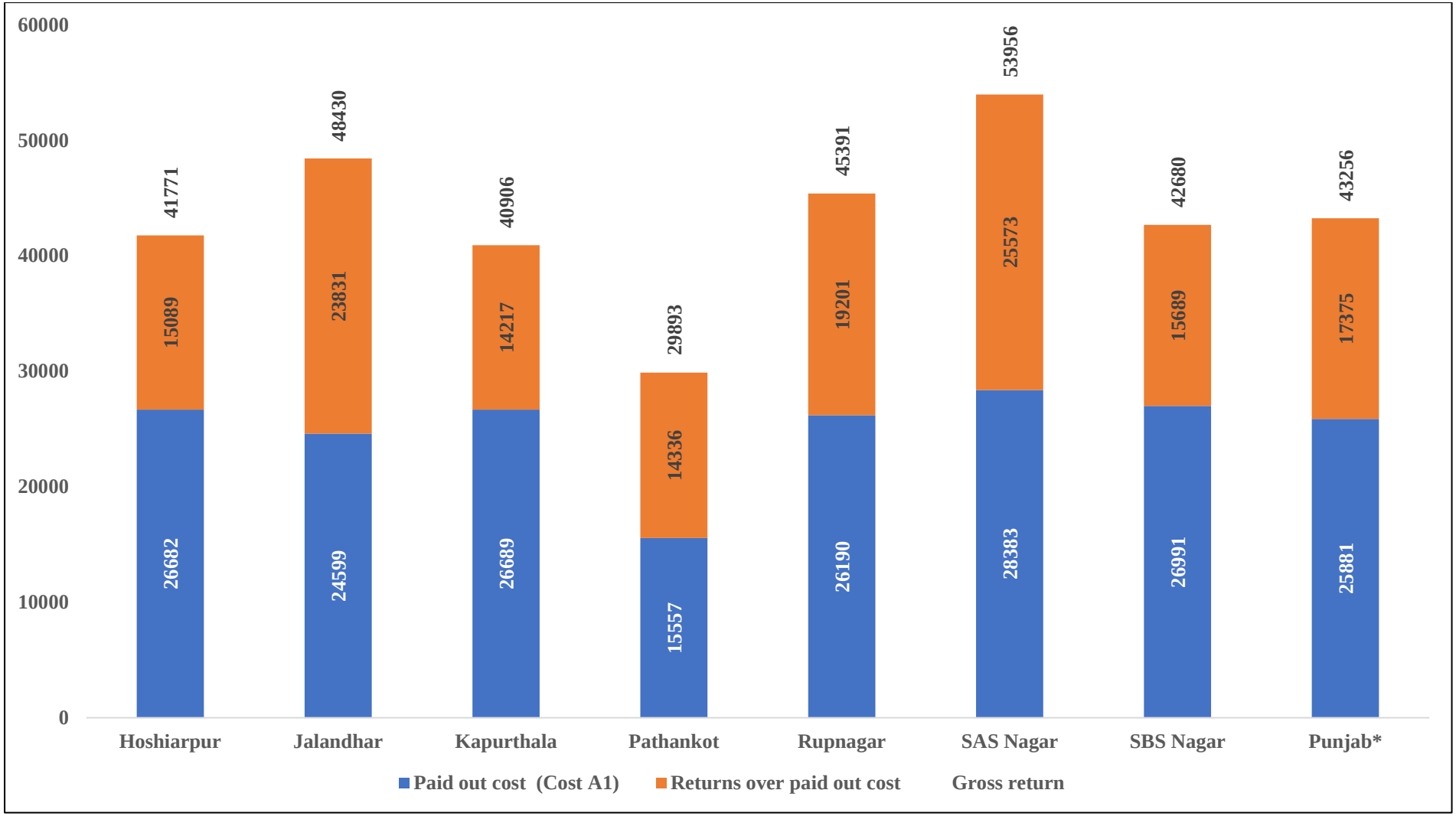
District wise returns over total cost (cost C2) for potato crop in Punjab, 2015-16



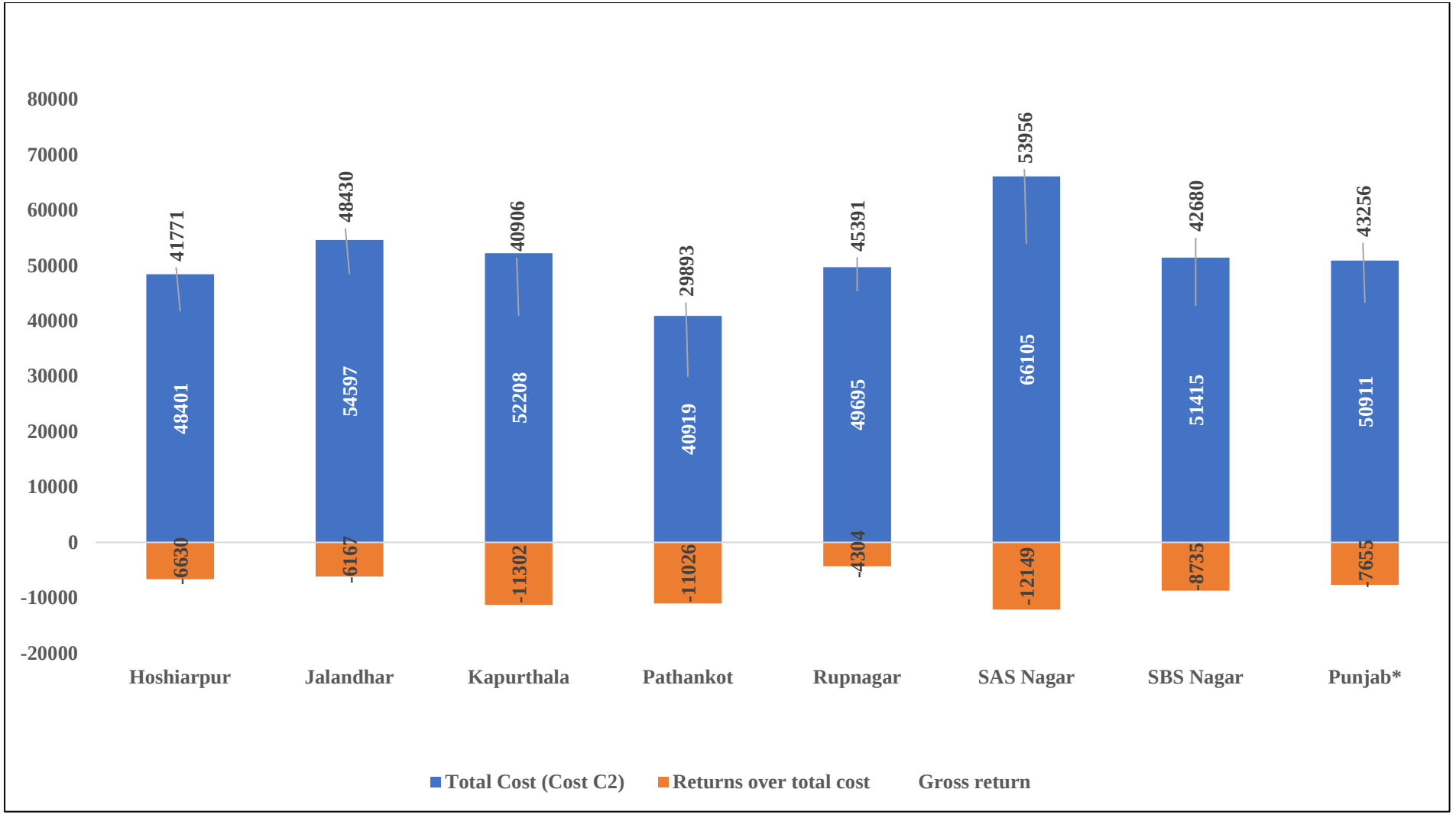
District wise yield of maize crop in Punjab, 2015-16



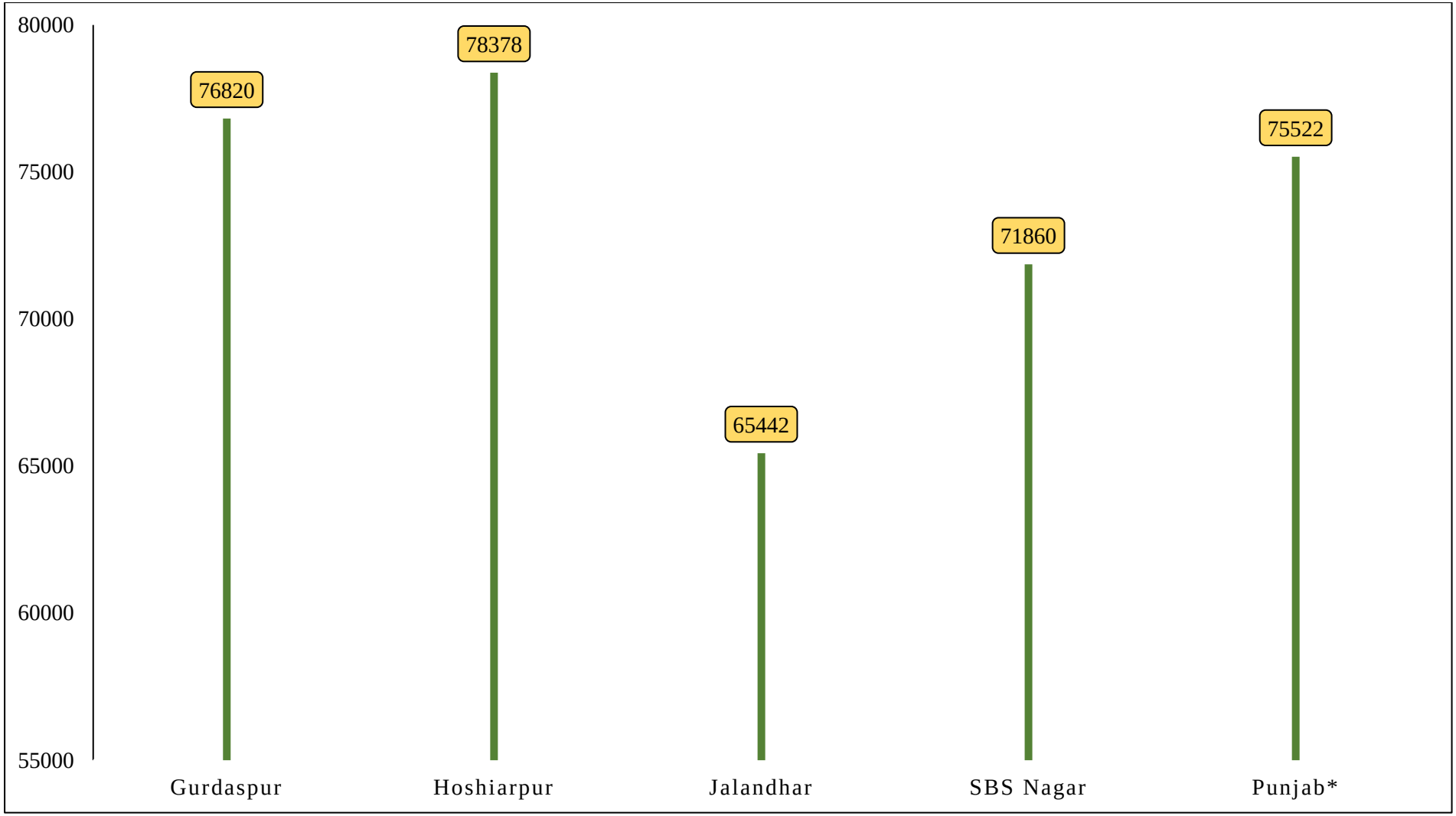
District wise returns over paid out cost (cost A1) for maize crop in Punjab, 2015-16



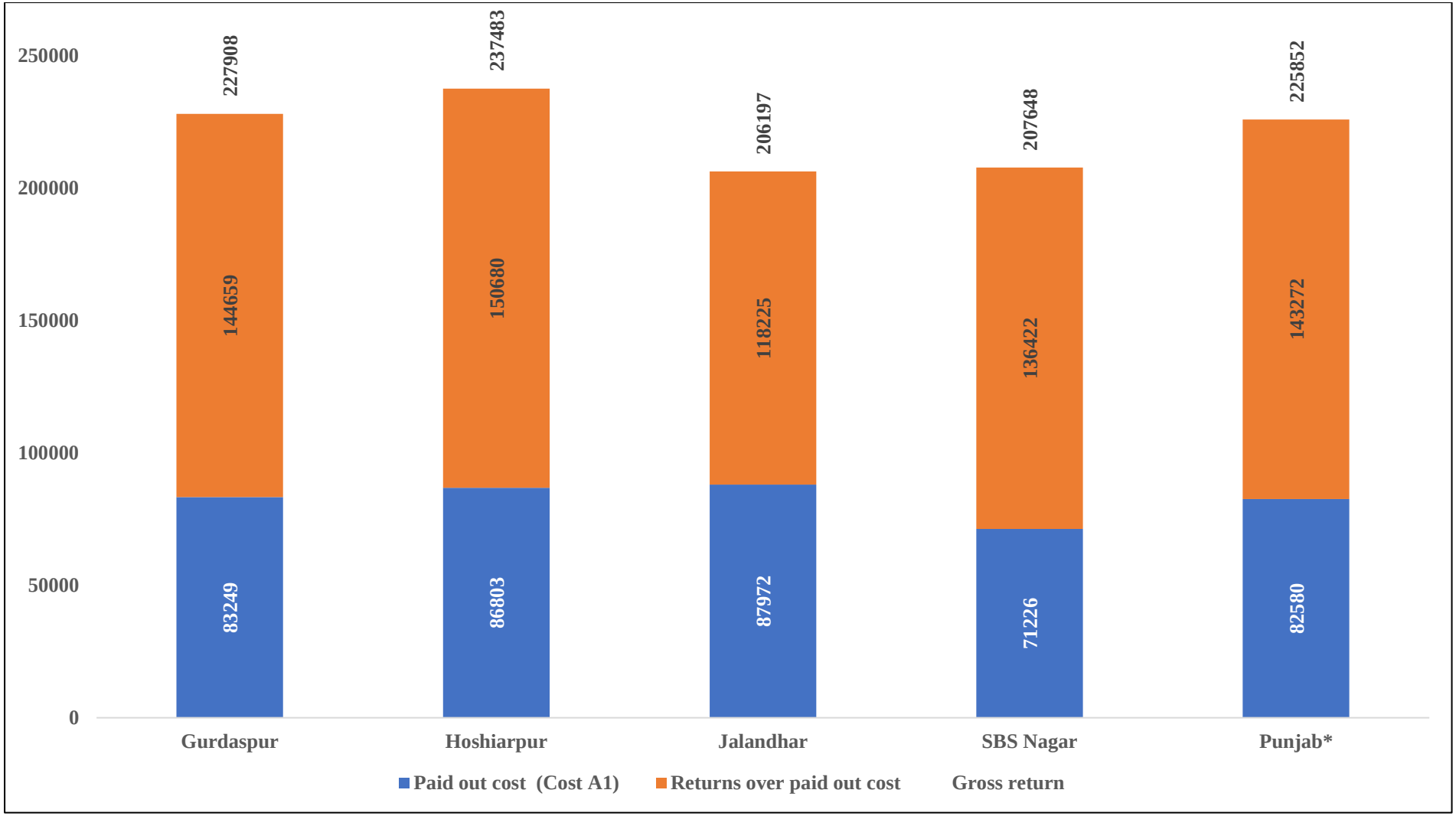
District wise returns over total cost (cost C2) for maize crop in Punjab, 2015-16



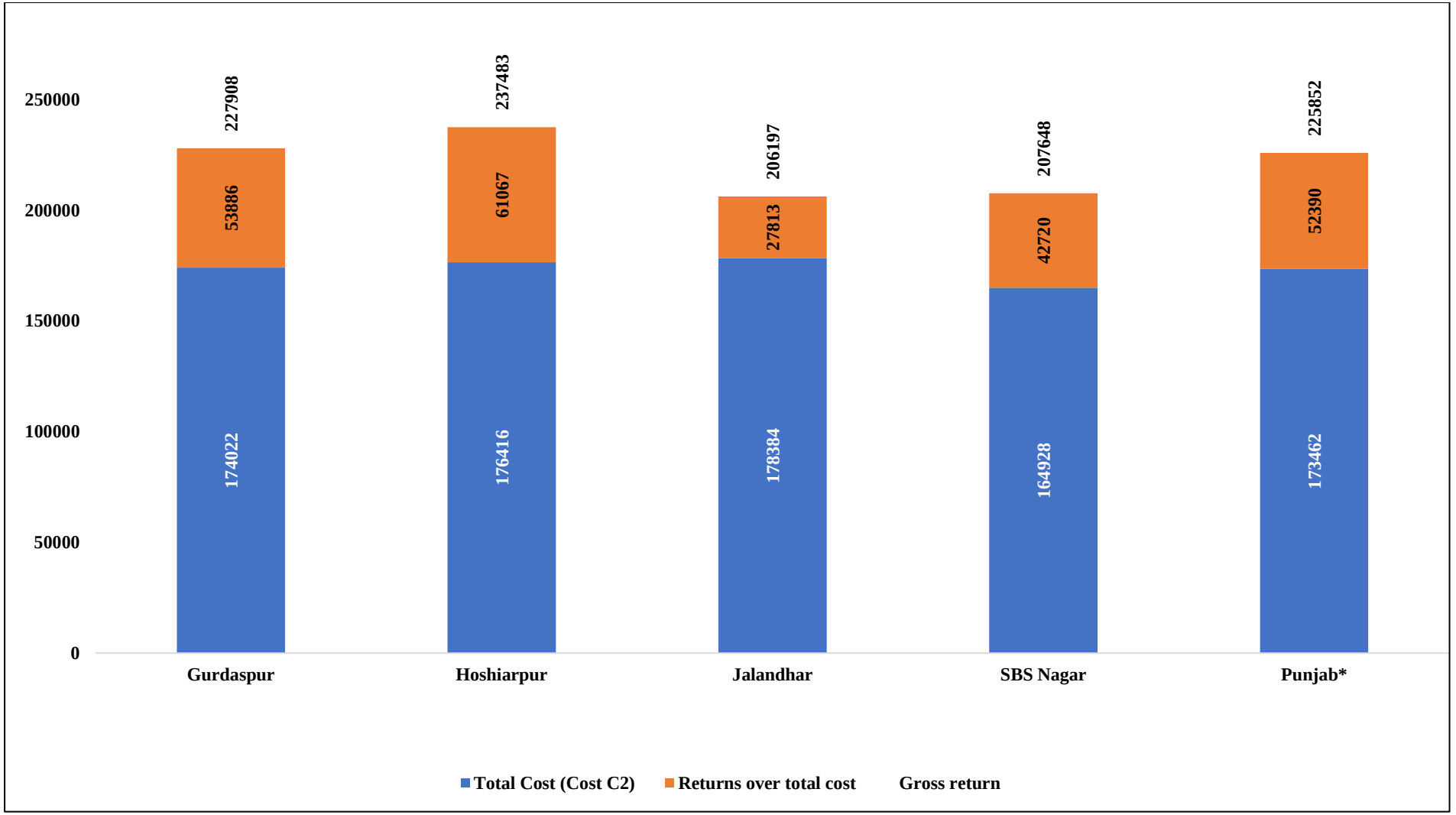
District wise yield of sugacane crop in Punjab, 2015-16



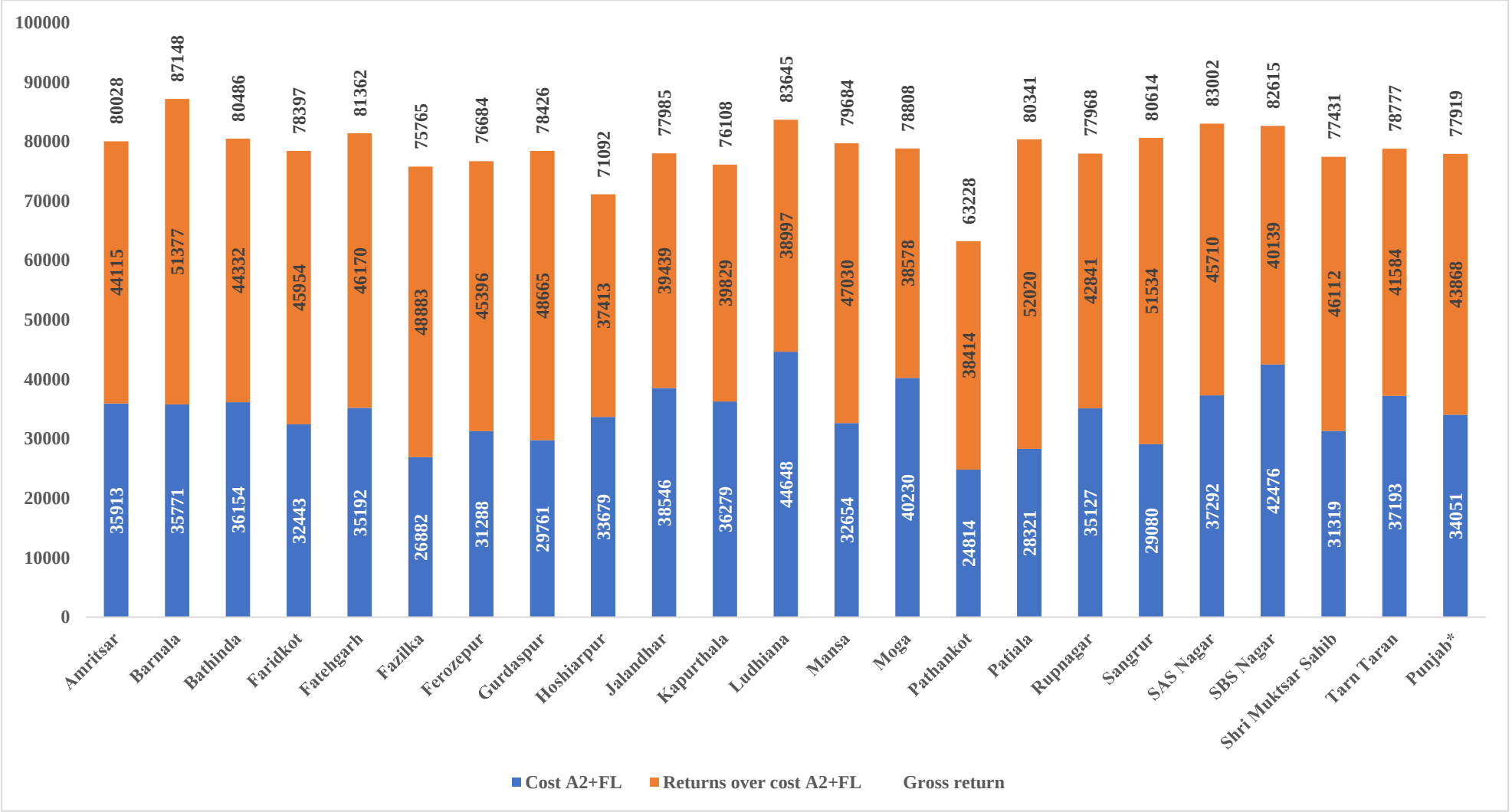
District wise returns over paid out cost (cost A1) for sugarcane crop in Punjab, 2015-16



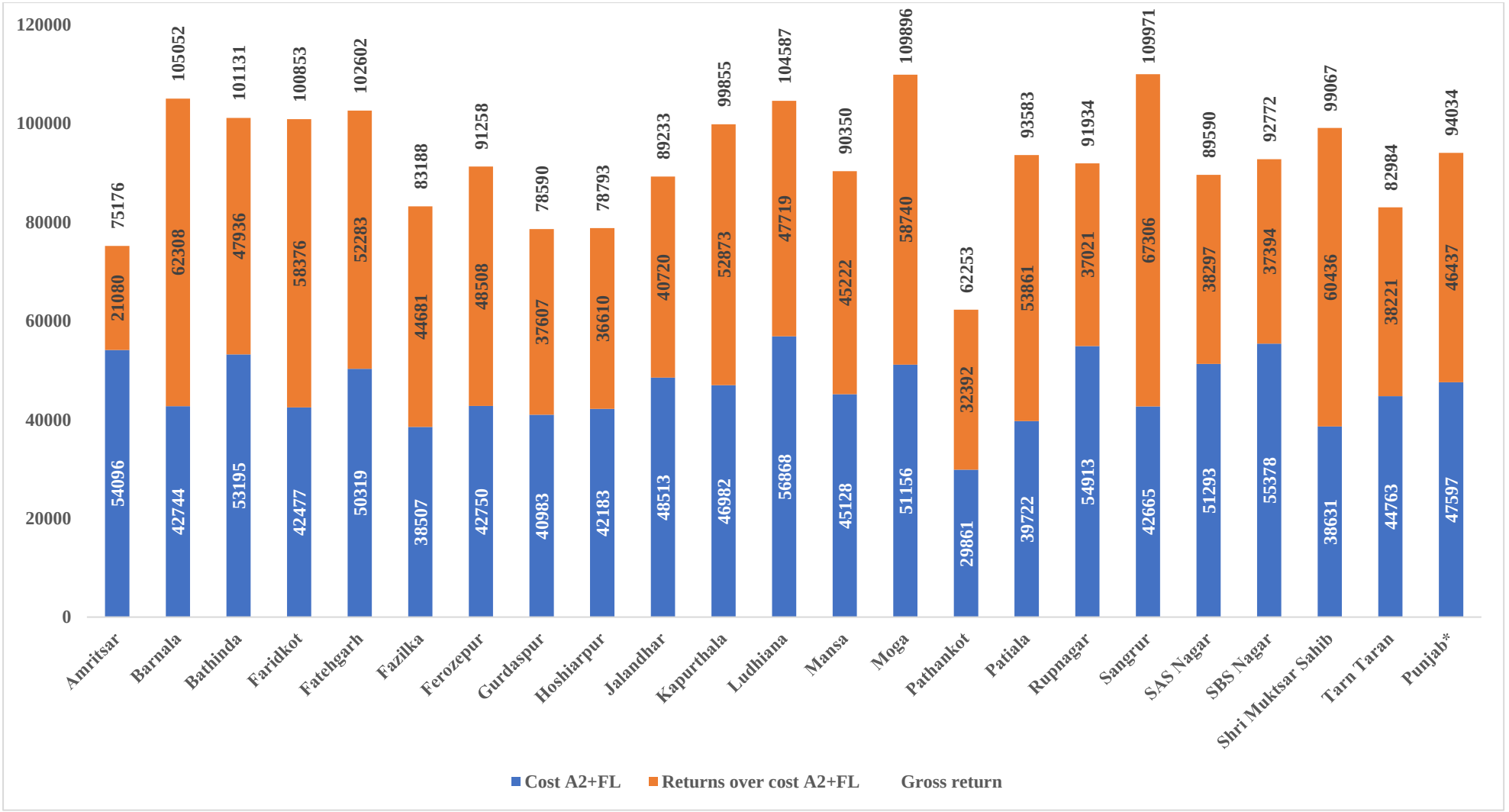
District wise returns over total cost (cost C2) for sugarcane crop in Punjab, 2015-16



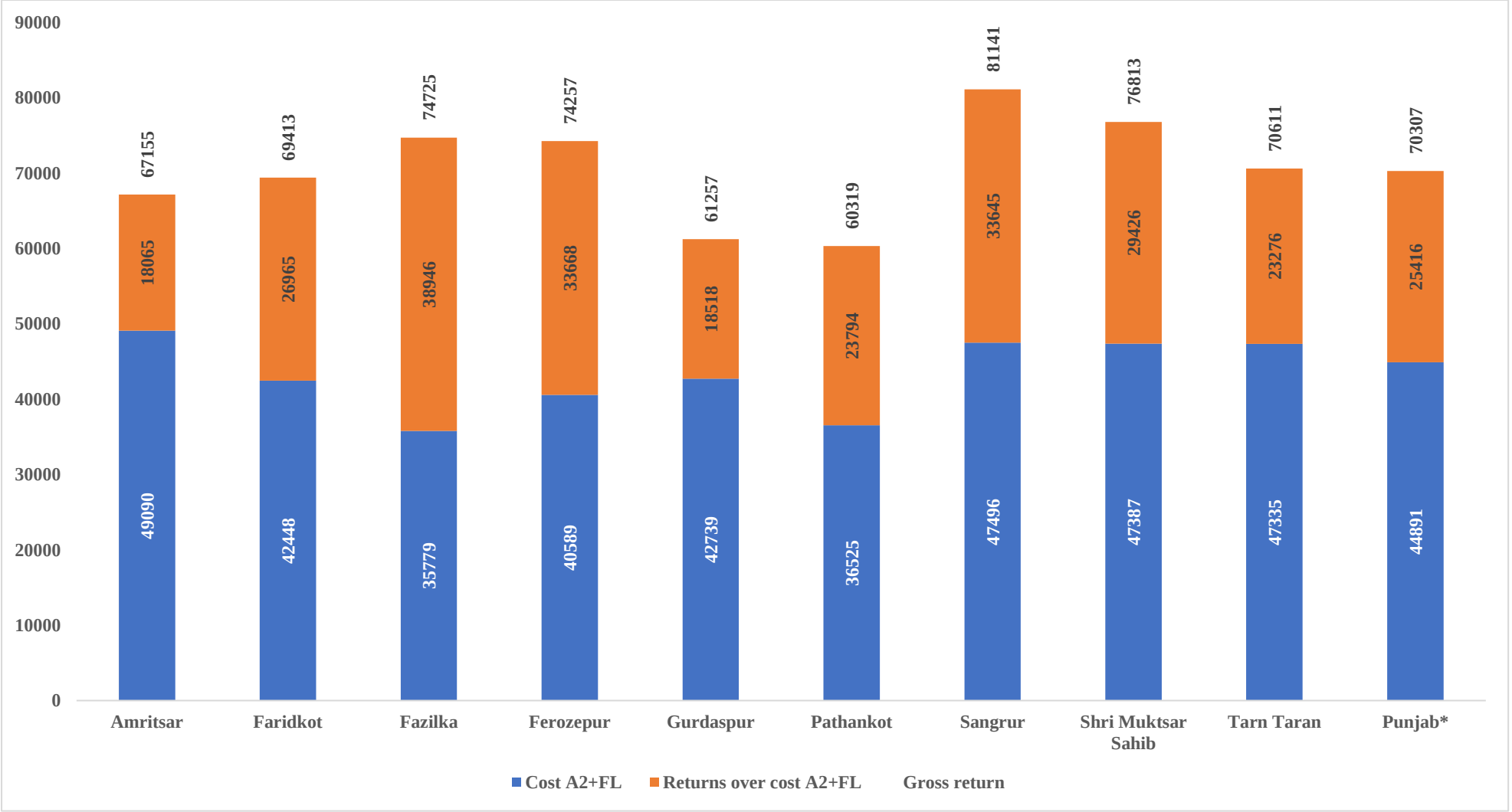
District wise returns over cost A2+FL for wheat crop in Punjab, 2015-16



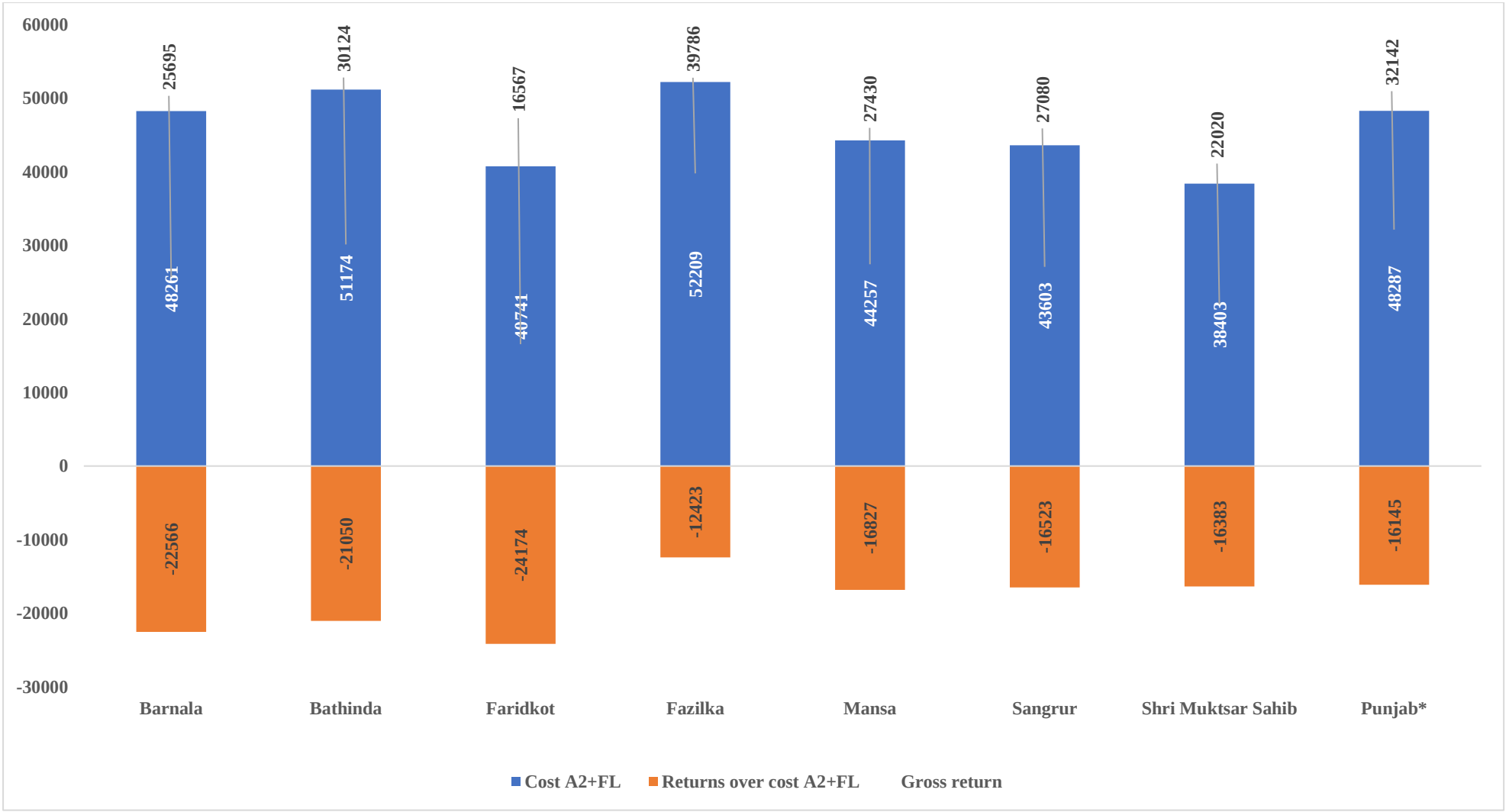
District wise returns over cost A2+FL for paddy crop in Punjab, 2015-16



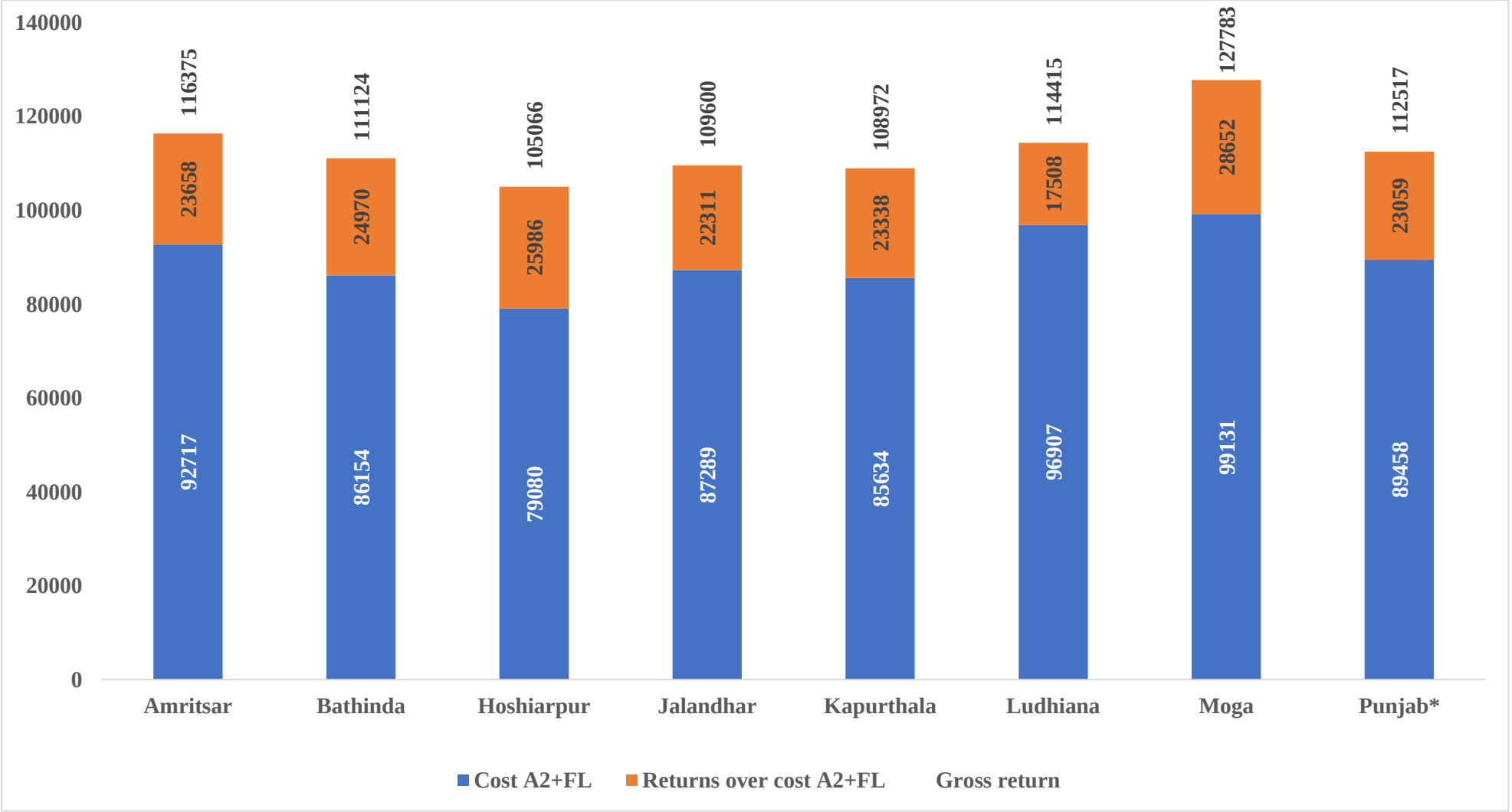
District wise returns over cost A2+FL for basamti crop in Punjab, 2015-16



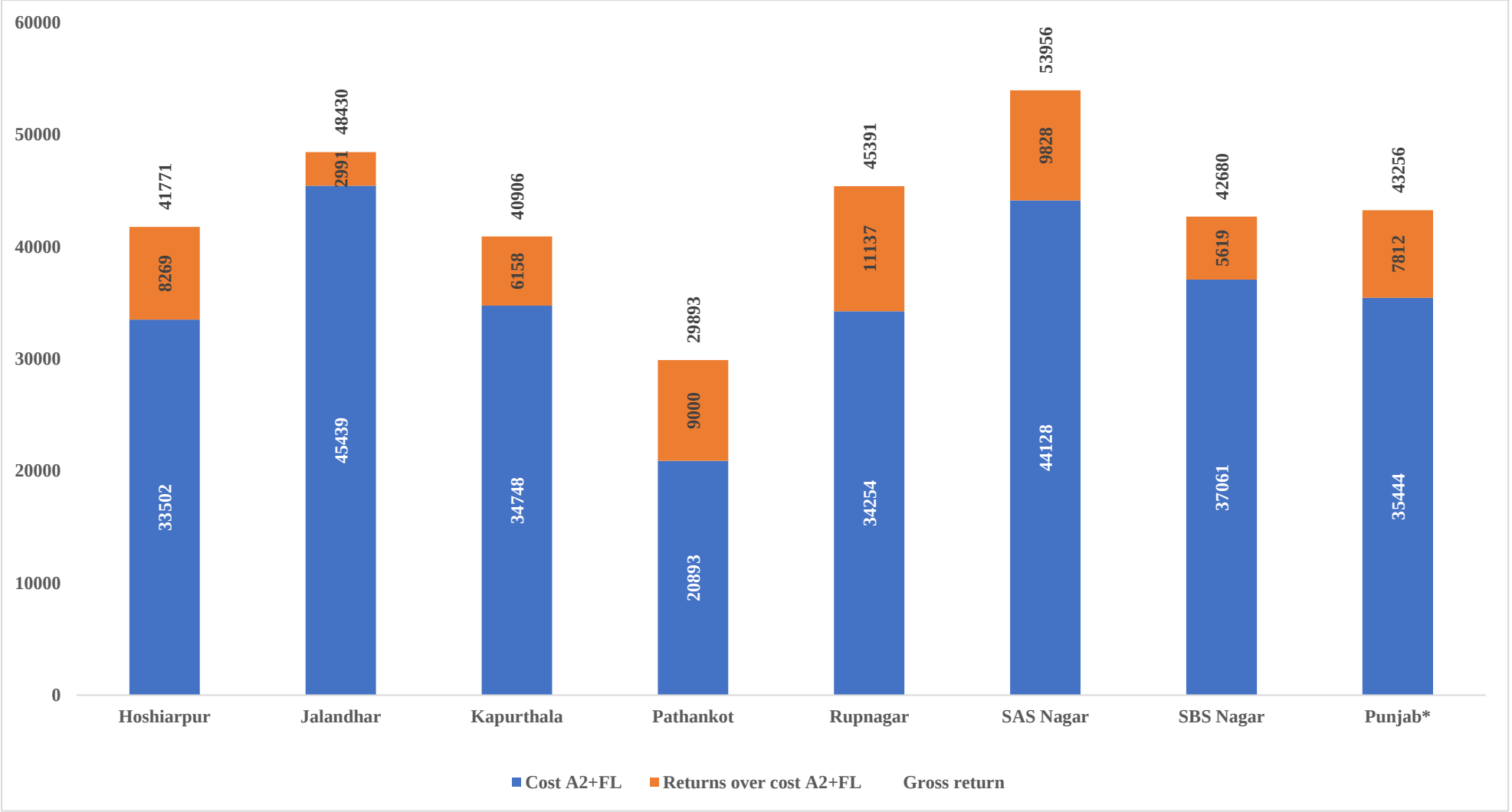
District wise returns over cost A2+FL for cotton crop in Punjab, 2015-16



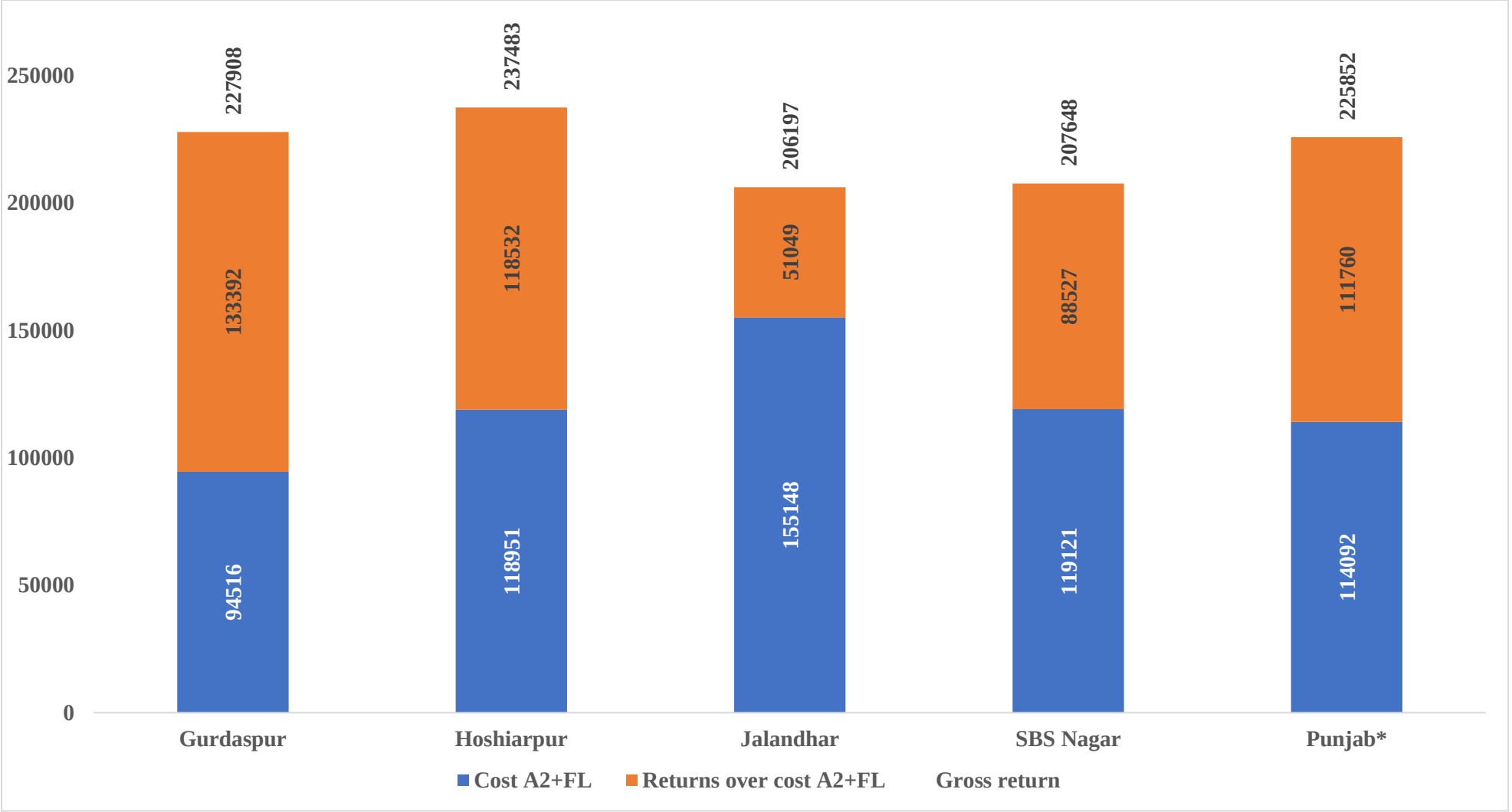
District wise returns over cost A2+FL for Potato crop in Punjab, 2015-16



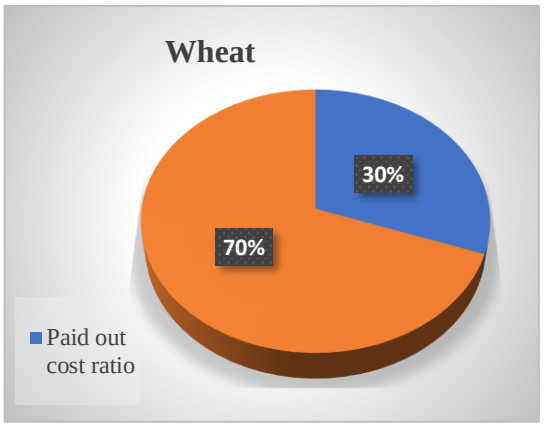
District wise returns over cost A2+FL for maize crop in Punjab, 2015-16

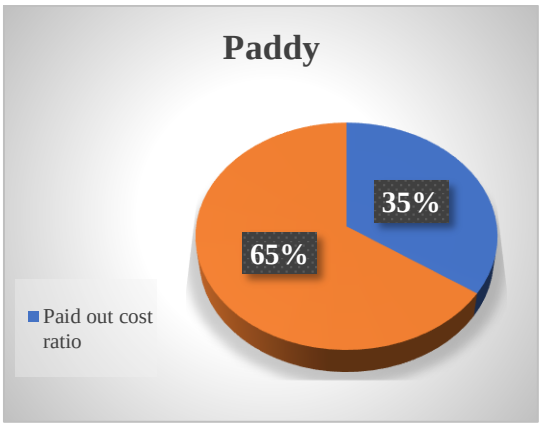


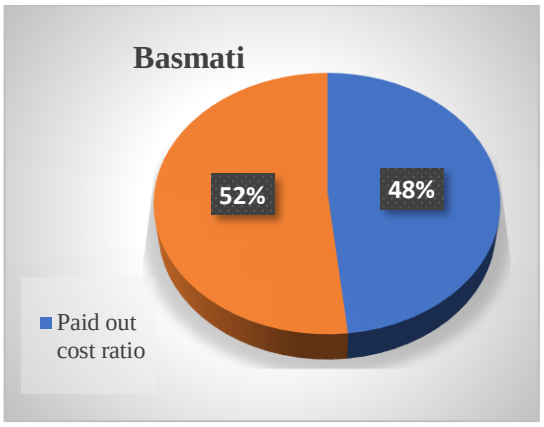
District wise returns over cost A2+FL for Sugarcane crop in Punjab, 2015-16

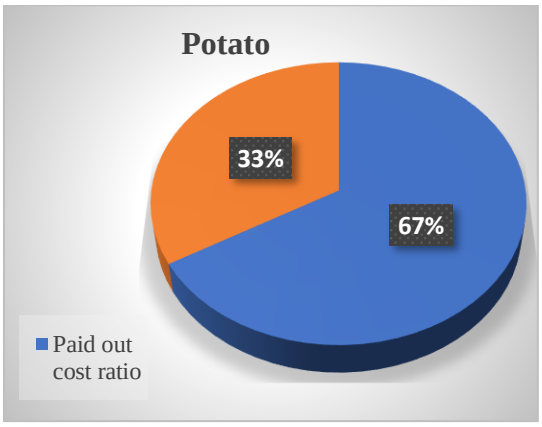


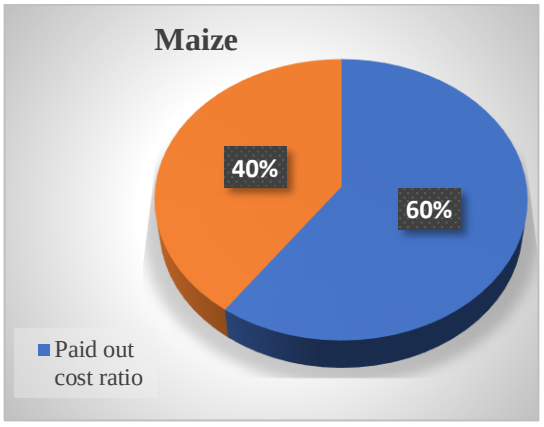
Paid out cost ratio to gross returns for different crops in Punjab, 2015-16

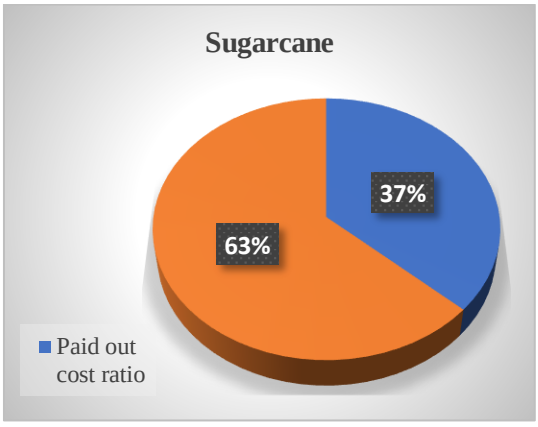


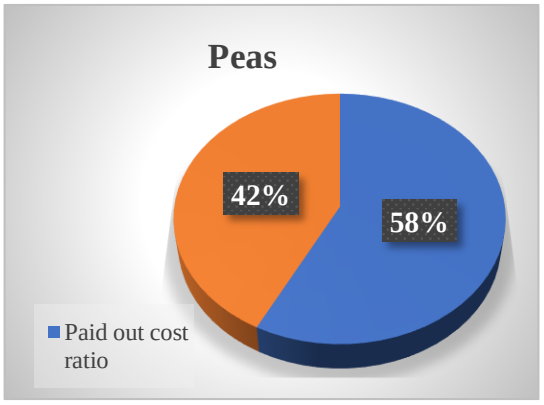


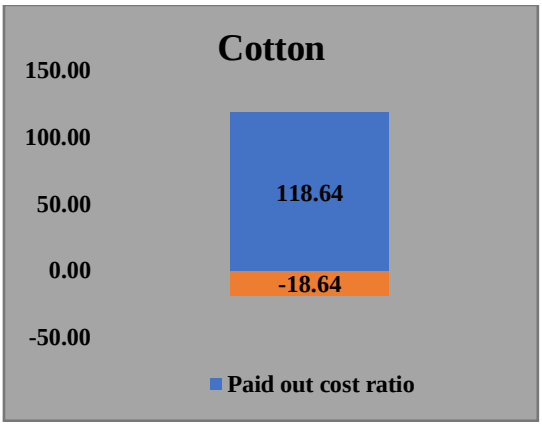




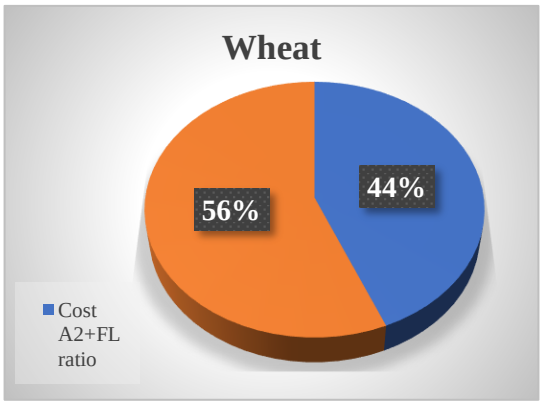


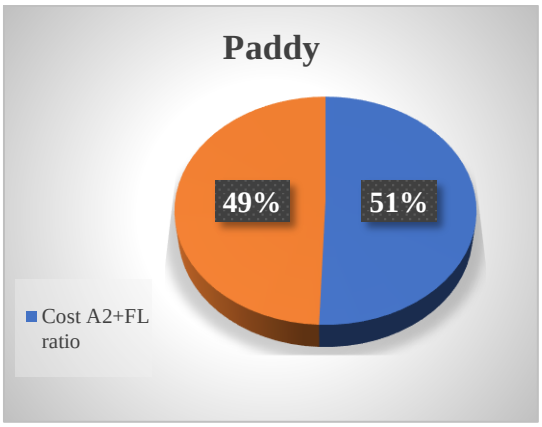


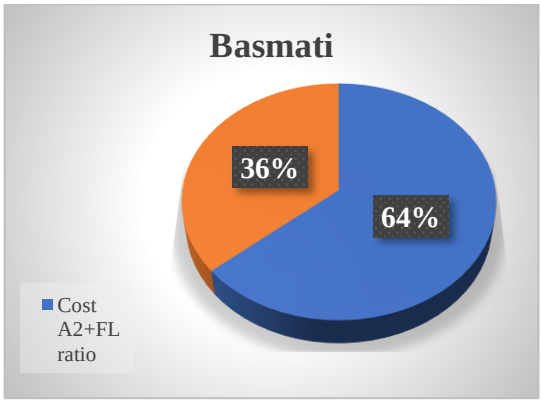


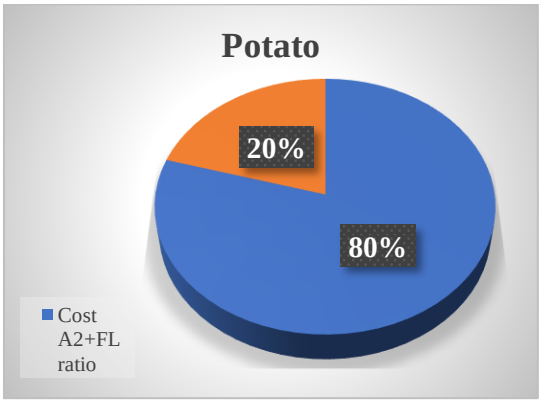


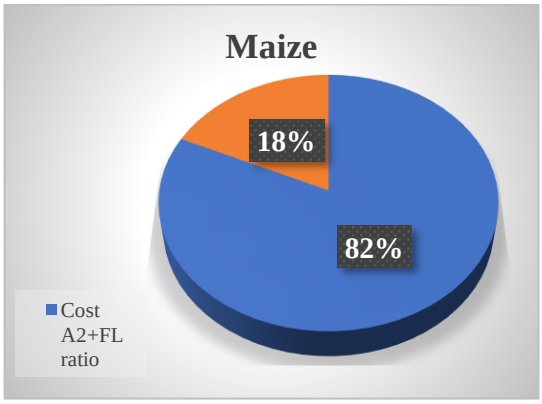
Cost A2+Fl ratio to gross returns for different crops in Punjab, 2015-16

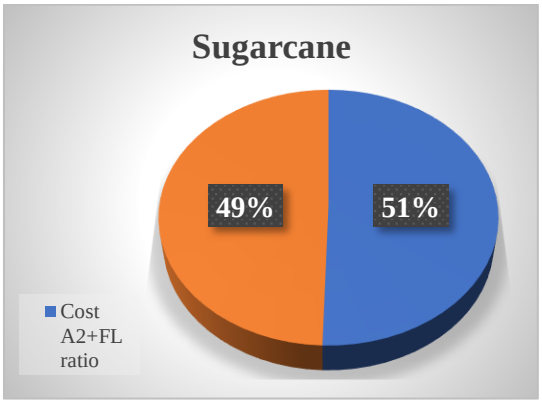


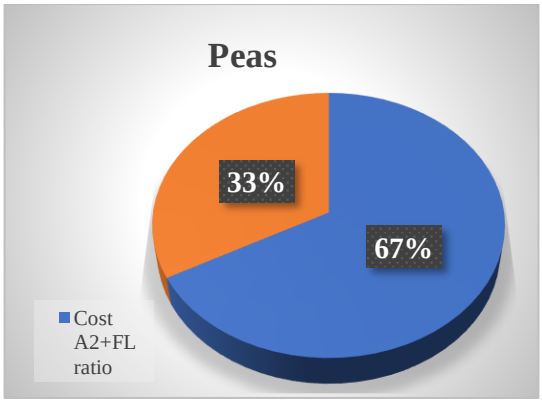


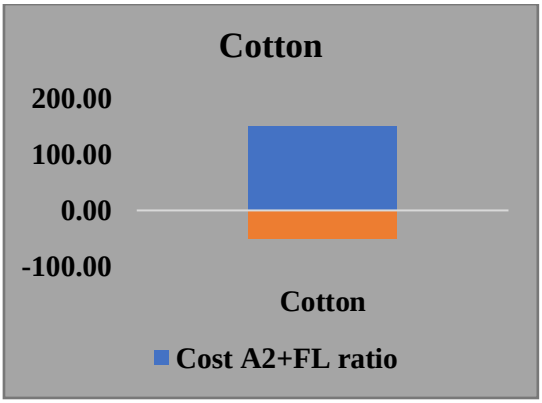




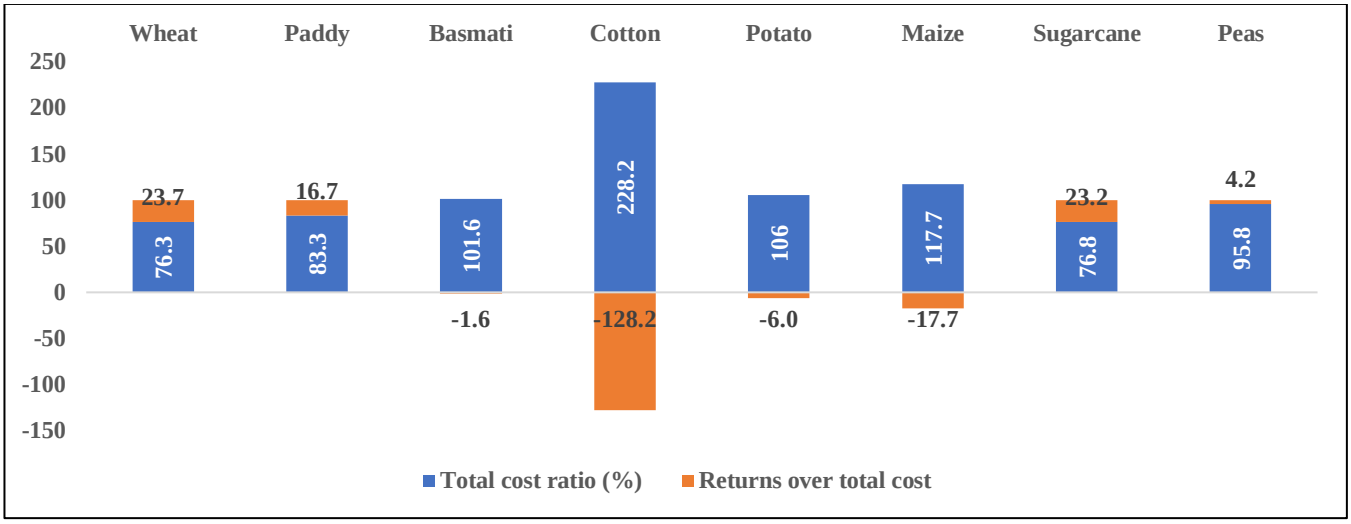








Crop wise total cost ratio to gross returns in Punjab, 2015-16



Rental value of land ratio to gross returns for different crops in Punjab, 2015-16