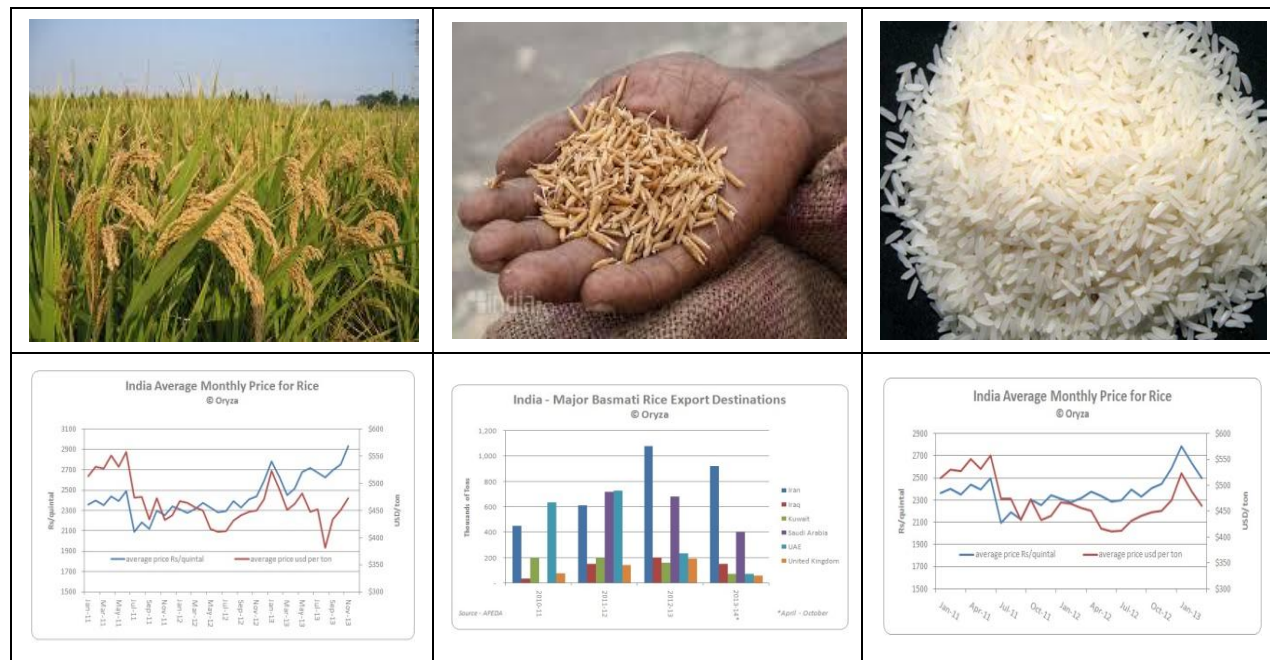


RELATIONSHIP BETWEEN WHOLESALE PRICES, RETAIL PRICES, EXPORT PRICES (FOB), PRICES REALIZED BY FARMERS AND DETAILS OF CONTRIBUTING FACTORS FOR THE PRICE DIFFERENCE FOR BASMATI RICE IN PUNJAB



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PREFACE

Price relationships in agricultural commodities had significant influence on decisions relating to the type and volume of agricultural production. Prices of high value crops have always been subjected to price volatility disadvantage to producers and final consumers but benefitted to the large number of intermediaries. While positive price incentives to farmers help the government to achieve self-sufficiency, fluctuations in agricultural prices spill over to other sectors of the economy leading to increase in the overall rate of inflation. It is, therefore, necessary to study the farm level crop profitability and market price of agricultural commodities.

In view of this, present study was undertaken with emphasis on cost structure, profitability and marketing aspects of basmati rice in Punjab. Unlike non-basmati rice, basmati rice does not get price support/procurement by the government resulting in wider market/price sensitivities. Thus there was need to study the production cost and market/price behaviour of this crop to address the profitability and market – related sensitivities of basmati cultivation for framing suitable agricultural policies to watch the interests of both producers as well as the consumers.

We express our gratitude to Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi for financial support to take up this study. We are also thankful to Dr. CSC Sekhar, Agricultural Economics Research Unit, Institute of Economic Growth (IEG), Delhi for coordination of this study.

Authors

RELATIONSHIP BETWEEN WHOLESALE PRICES, RETAIL PRICES, EXPORT PRICES (FOB), PRICES REALIZED BY FARMERS AND DETAILS OF CONTRIBUTING FACTORS FOR THE PRICE DIFFERENCE FOR BASMATI RICE IN PUNJAB

ABSTRACT

The nature of markets of agricultural commodities and imperfections in these markets influence the price transmission and the final consumer prices. Changes in domestic and global fundamentals, poor market intelligence, poor infrastructure facilities, large number of intermediaries, lack of awareness about quality standards etc. are the main causes for market related risks. In this context, it is important to study the farm level crop profitability along with the analysis of price relationships in movement of these commodities from farm gate to the retail level. The present study is an attempt to analyze the behaviour of prices of basmati rice, both over years as well as across the selected markets along with enquiry into the relationship among farm harvest prices, wholesale prices, retail prices and export prices. The specific objectives of the study were (i) To study the cost structure and profitability of basmati cultivation in state, (ii) to study the relationship between movements in market prices at important markets and (iii) to study the divergence among farm harvest prices, wholesale prices, retail prices and export prices and the relationship between these movements. The study has been based on both primary as well as secondary data. The reference period for the study was 2013-14. The average operational farm size and cropping intensity on sample farms in state was 4.82 ha and 194 per cent respectively. Wheat and basmati were major crops on all the farm size categories and on average accounted for 44.77 and 32.00 per cent of the gross cropped area. On overall sample farms Pusa Basmati 1121 was the most dominating variety of basmati which accounted for nearly 90 per cent of the total area under basmati crop. The average per farm basmati production on overall farms was 123.54 quintals. The marketed surplus of basmati accounted for 97.73 per cent of total basmati production on sample farms and it increased both in absolute as well as proportionate terms with the increase in farm size.

The variable cost of cultivation of overall basmati (all varieties) on the sample farms including cost involving the post harvest operations of basmati paddy was Rs. 30256 per ha. In overall variable input cost of basmati cultivation, the major share was contributed by labour cost to the tune of about 50 per cent followed by the machine cost at about 19 per cent. The other cost components like expenses on pesticides/weedicides and fertilizers and manures accounted for about 14 and 13 per cent of the variable input cost respectively. Post harvest/marketing cost on overall sample farms was Rs 1325 per ha and among various components, unloading and cleaning accounted for the major proportion of it followed by transportation cost, kind payments and marketing losses. Per ha gross returns and returns over variable cost (ROVC) on overall sample farms were Rs 164658 and Rs 134402 respectively. About 96 per cent of the sample farmers had disposed of their basmati output through regulated markets. While 3.23 per cent of overall farmers had sold in the village market there were only of about half per cent of the total farmers who sold their produce through other channel (particularly directly to processor). It was observed that sample farmers had sold 82.43 per cent of their marketed surplus during the crop harvesting period consisting months of October and November. Rice millers were the major source of supply for wholesalers and exporters where as retailers had mainly sourced their supply from the wholesalers. The decomposition of time series data of basmati paddy prices revealed the presence of considerable seasonality in study markets and prices remained relatively low during harvesting period. Movement of de-seasonalised prices around trend line exhibits the presence of oscillatory movements pointing towards existence of the cyclical patterns in basmati paddy prices during the past years. Price linkages of different Punjab markets evaluated through correlation coefficients revealed that basmati paddy markets in state were well integrated. In domestic wholesale and retail trade the percentage mark-up turned out to be 4.42 and 11.90 per cent respectively. In domestic market the farmer's net price accounted for about 68 - 73 per cent of the consumer's purchase price for different basmati varieties. Among intermediaries in domestic market, net margin of rice miller, wholesaler and retailer for different basmati varieties accounted for 4.31-8.06, 3.40-3.43 and 8.40-9.47 per cent of the consumer's rupee. Export is the major channel for basmati marketing as nearly 85 per cent of the head rice of basmati is being exported, primarily to the gulf countries. The exporter's average percentage mark-up was 10.76 per cent. Farmer's share in export price was 77.47 to 79.52 per cent. The net margin of miller and exporter accounted for 4.34 - 4.86 per cent and 5.01- 5.92 percent of export price respectively. According to farmer's perceptions, the marketing related problems in basmati cultivation viz. price volatility, lack of remunerative price, lack of MSP/Government procurement, lack of market information and collusion among traders were the major problems being faced by them. Major problems of wholesalers were regarding the competition from other wholesalers, poor road network and problem of high marketing charges/taxes. The major problems perceived by sample retailers were competition from large organized retail chains, competition from other retailers and the poor infrastructure. Infrastructure related problems, problem of chemical residue and uncertainty of government export policy were perceived as high and severe problems by the basmati exporters. Basmati cultivation is important from ecological as well as farm incomes point of view, thus both State as well as Central Governments should frame a policy to save farmers from price fluctuations through ensuring some minimum income support to its cultivators. Wider coverage to collecting and dissemination of agricultural market intelligence/information may help the farmers in making adequate marketing decisions. To ensure good price of farmer's output, there is need to encourage the farmers to opt for storage through creation of efficient storage structures at farm level and realize higher prices during the lean period. The production related problems need to be handled through improvement in the knowledge of farmers regarding new techniques and technologies. Improvement in road and other infrastructure in markets can solve the problems being faced by different market intermediaries. The problem of chemical residue on account of heavy use of insecticides and fungicides in basmati cultivation needs immediate intension to address the quality concerns in exports.

Chapter 1

Introduction

1.1 Brief Introduction of the Study

About half of the population in India relies on agriculture as its principal source of income. Indian farmers are vulnerable to both production and market risk throughout their life. Vagaries of monsoon, occurrence of pest and diseases, etc., marked the risks associated with the production. Price fluctuations due to changes in domestic and global fundamentals, poor market intelligence, poor infrastructure facilities with inadequacy of storage, processing and logistics, transportation facilities, large number of intermediaries, lack of awareness about quality standards etc. are the main causes for market related risks. Even then, the farmers achieved surplus production in most of the commodities but failed to reap the real benefits in terms of higher income from agriculture. Instability in commodity prices has always been a major concern of producers, processors, traders as well as the consumers in an agriculture dominated country like India. Farmers' direct exposure to price fluctuations, for instance, makes it too risky for many farmers to invest in otherwise profitable activities (Sahadevan, 2008).

The huge geographical area and myriad of agro climatic niches in the country exert a strong influence on the supply of the most of the agricultural commodities particularly for high value crops (HVCs). The output variations in these HVCs lead to wide fluctuations in their prices exposing the growers to more risk as compared to the growers of other crops. Inadequate market infrastructure for these crops and prevalence of too many intermediaries between producer and consumer result in higher marketing costs thus lowering the share of producer in the consumer's rupee. Price relationships in agricultural commodities had significant influence on decisions relating to the type and volume of agricultural production. Prices of high value crops have always been subjected to price volatility disadvantage to producers and final consumers but benefitted to the large number of intermediaries. The nature of markets of agricultural commodities and imperfections in these markets also influence the price transmission and the final consumer prices. Risk attitude of farmers is varying across regions and across socio-economic categories. Intensity of their attitude to take risk influences the cropping and marketing decisions. Therefore, market intelligence on aspects such as potential markets, the quantum of

market arrivals and prices in different markets in different months of a year is essential in helping the growers to adjust their production activities/cropping pattern.

Apart from these microeconomic considerations there are macroeconomic effects of changes in agricultural prices. While positive price incentives to farmers help the government to achieve self-sufficiency, fluctuations in agricultural prices spill over to other sectors of the economy leading to increase in the overall rate of inflation. Sometimes, a steep increase in the prices of agricultural commodities creates serious problems as happened in the case of wheat during 1996 and onions and other vegetables during 1998. Large variations in prices have serious consequences. Firstly, they provide enough room for speculators to take advantage of the situation especially in cases where there are restrictions on the movement of commodities and external trade is not permitted. Secondly, they lead to the formulation of flawed policy measures, which can be very costly (Sharma and Promod, 2011).

It has been noted in the past that wholesale and retail prices do not necessarily move in tandem. In fact, many a times, though it is observed that wholesale price either declined or remained stable, retail prices still increased, implying that the benefit of reduction in wholesale prices is not passed on to the consumers in retail prices. Alternatively, many a times wholesale prices increase but retail prices do not increase immediately, either due to communication gap between wholesale and retail markets that involve some time lag, or the retailers bear the burden of increased prices for not losing the customer especially if the nature of the commodity is highly elastic. This needs to be constantly monitored by analyzing the trend in the magnitude of gap between the retail and wholesale prices and analyzing the causes of such gap to identify the direct and indirect measures that could be used for market interventions. Commodity specific analysis needs to be undertaken to study the supply side factors and to analyze their impact on prices of essential commodities. Factors affecting price movements may be different at the regional, national and global levels at any given point and period of time. It is necessary to constantly keep a track of the international prices and the factors affecting their movements to be able to diagnose in advance the probable impact of international factors on domestic prices and supply of commodities (Anonymous, 2011).

Considering the above observations, it is necessary to study the farm level crop profitability and the relationship between movements in market prices of important agricultural

commodities along with the analysis of price relationships in movement of these commodities from farm gate to the retail level. In current study this inquest was applied to the basmati rice in Punjab state.

1.2 Basmati Rice: Profile

Basmati is long grain aromatic rice grown for many centuries in the specific geographical area at the Himalayan foot hills of Indian sub-continent. India being the world's largest producer, contributes more than 70 per cent of the total world basmati rice production and the rest is produced by Pakistan mainly from Punjab and Sindh states. Annual production of basmati rice in India hovers around 4 million tonnes and it was estimated to be 4.7 million tonnes in 2012.

Table 1.1: Exports of Basmati Rice from India, 2000-01 to 2013-14

Year	Quantity (lakh Tonnes)	Value (Rs Lakhs)
2000 - 2001	8.51	216599
2001 - 2002	6.67	184277
2002 - 2003	7.09	205847
2003 - 2004	7.71	199305
2004 - 2005	11.63	282390
2005 - 2006	11.67	304310
2006 - 2007	10.46	279281
2007 - 2008	11.83	434458
2008 - 2009	15.56	947703
2009 - 2010	20.17	1088960
2010 - 2011	23.71	1135477
2011 - 2012	31.78	1544959
2012 - 2013	34.59	1940939
2013 - 2014	37.57	2929996

Source: - Agricultural Statistics at a Glance, Ministry of Agriculture, GOI and APEDA

Basmati rice is a good source of export among the agricultural commodities. Export of basmati rice from India has increased from about 8.51 lakh tonnes during 2000-01 to 37.57 lakh tonnes during year 2013-14 (Table 1.1). During 2012-13, the country earned crucial foreign exchange worth of Rs 19.40 thousand crores contributing about 8.4 per cent towards the total earnings from the export of agricultural commodities (Adhikari and Sekhon, 2014). Basmati exports from India are highly concentrated to few countries. During 2007-08, the share of Saudi Arabia in the total export from India was about 47 per cent followed by U.A.E. (15.87%), Kuwait (9.24%), UK (6.69%) and U.S.A (3.27%). Since 2008, after the Pusa Basmati 1121 variety of rice notified as basmati, Iran became the important buyer of this rice variety (Sidhu et

al, 2014). The share of Iran in the total exports of Indian basmati increased from 0.46 per cent in 2007-08 to about 31.28 per cent in 2012-13. The corresponding share of Saudi Arabia during 2012-13 was 19.69 per cent. These two countries along with UAE, Kuwait, Iraq and UK were the major export destinations of Indian basmati rice accounting for nearly 75 per cent total basmati exports during 2012-13.

Haryana, Punjab, U.P, Uttarakhand, and J&K are the basmati growing states in India. The share of Haryana in total Indian basmati production during 2011-13 was about 37.18 per cent followed by Punjab with 36.47 per cent and U.P. with 23.65 per cent (www.airea.net). During 2000-01, area under basmati rice in Punjab was 1.04 lakh hectares and production 1.61 lakh tonnes which increased to 5.50 lakh hectares with production of 13.29 lakh tonnes in 2010-11. During 2013-14, area and production of basmati rice in Punjab was estimated at 5.59 lakh hectares and 14.73 lakh tonnes respectively (Table 1.2). There are many notified varieties of Basmati rice in India but the major area in Punjab is under Pusa Basmati1121.

Table 1.2: Area, Yield and Production of Basmati and Non-Basmati Rice, Punjab State
(Area in lakh ha, Production in lakh tonnes, Yield in Kg/ha)

Year	Basmati			Non-basmati			Total Rice		
	Area	Yield	Production	Area	Yield	Production	Area	Yield	Production
2000-01	1.04	1552	1.61	25.07	3587	89.93	26.11	3506	91.54
2001-02	1.02	1601	1.63	23.85	3628	86.53	24.87	3545	88.16
2002-03	1.57	1662	2.61	23.73	3632	86.19	25.30	3510	88.80
2003-04	2.12	1810	3.84	24.02	3860	92.72	26.14	3694	96.56
2004-05	1.30	1570	2.04	25.17	4066	102.33	26.47	3943	104.37
2005-06	1.00	1766	1.77	25.47	3938	100.30	26.47	3856	102.07
2006-07	1.22	2019	2.46	24.99	3958	98.92	26.21	3868	101.38
2007-08	1.44	2199	3.17	24.65	4125	101.69	26.09	4019	104.86
2008-09	3.40	2718	9.24	23.94	4207	100.72	27.34	4022	109.96
2009-10	5.13	2659	13.64	22.89	4313	98.72	28.02	4010	112.36
2010-11	5.50	2417	13.29	22.81	4168	95.08	28.31	3828	108.37
2011-12	5.58	2416	13.48	22.60	4068	91.94	28.18	3741	105.42
2012-13	4.58	2690	12.31	23.87	4249	101.43	28.45	3998	113.74
2013-14	5.59	2636	14.73	22.92	4272	97.94	28.51	3952	112.67

Source: Department of Agriculture, Government of Punjab, Chandigarh.

Note: Area under Basmati is as per field reports where as yield based on Crop Cutting Experiments. During kharif 2008 Govt. of India declared Pusa Basmati 1121 as Basmati.

As more than eighty per cent of Indian population consume non-basmati rice, major portion of the total Indian basmati production is being exported; hence the prices in the domestic market are largely determined by the movement of international prices of basmati. The jump in the prices of basmati paddy in the domestic market due to sudden increase in international basmati rice prices in 2008-09 induced the farmers to continuously shift the area from non-basmati paddy to basmati paddy, particularly Pusa 1121 variety which is a high yielding and short duration. As a result the production of basmati rice doubled against this increase in demand during 2008-09. The demand of basmati rice stabilized during 2009-12 but the production continued to increase more than the demand which widened the gap between supply and demand due to accumulated carryover stocks.

The present study is an attempt to analyze the behaviour of prices of basmati rice, both over years as well as across the selected markets along with enquiry into the relationship among farm harvest prices, wholesale prices, retail prices and export prices.

1.3 Objectives:

The specific objectives of the study are:

1. To study the cost structure and profitability of basmati cultivation in state.
2. To study the relationship between movements in market prices at important markets.
3. To study the divergence among farm harvest prices, wholesale prices, retail prices and export prices and the relationship between these movements.

1.4 Sampling Design, Data Sources and Methodology

The present study has been conducted in Punjab, the major basmati producing state of country. The study has been based on both primary as well as secondary data. The primary information for the purpose has been collected through primary surveys and informant interviews with basmati growers, wholesalers, retailers, and exporters. Secondary data pertaining to area, production, productivity, market arrivals and prices of basmati rice have been collected from various secondary sources.

Amongst different districts of the state, major proportion of area under basmati is concentrated in its traditional belt comprising Gurdaspur, Amritsar and Tarn Tarn districts. However, recently area under basmati cultivation in non-traditional districts of state like Ferozepur, Sangrur, Patiala, Mukatsar, etc has also been increased in a major way. The information on district-wise production of basmati in Punjab revealed that during 2012-13, four

districts viz. Gurdaspur, Amritsar, Tarn Tarn and Ferozepur contributed about 60 per cent of the total basmati production in state (Table 1.3).

Table 1.3: District-Wise Share in Area and Production of Basmati Paddy in Punjab, 2012-13

District	2012-13			
	Area (‘000 ha)	Per cent share in total area of the State	Production (‘000 tonnes)	Per cent share in total production of the State
Amritsar	86	18.78	274.5	14.87
Barnala	2	0.44	6	0.32
Bathinda	3	0.66	16.5	0.89
Faridkot	5	1.09	25.5	1.38
Fatehgarh Sahib	8	1.75	39	2.11
Ferozepur	66	14.41	304.5	16.49
Gurdaspur	70	15.28	262.5	14.22
Hoshiarpur	12	2.62	37.5	2.03
Jalandhar	19	4.15	72	3.90
Kapurthala	13	2.84	52.5	2.84
Ludhiana	11	2.40	52.5	2.84
Mansa	3	0.66	15	0.81
Moga	8	1.75	39	2.11
Mohali	8	1.75	37.5	2.03
Muktsar	20	4.37	100.5	5.44
Patiala	22	4.80	112.5	6.09
Ropar	3	0.66	12	0.65
Sangrur	24	5.24	118.5	6.42
SBS Nagar	4	0.87	12	0.65
Tarn Taran	71	15.50	256.5	13.89
Grand total (State)	458	100.00	1846.5	100.00

Multistage sampling procedure was adopted for selection of sample basmati growers. At first stage of sampling three major basmati growing districts (14 per cent of the total number of districts) viz. Gurdaspur, Amritsar and Ferozepur (erstwhile) accounting for nearly 46 percent of total basmati production of state during 2012-13 were selected. While Gurdaspur and Amritsar represents the traditional basmati growing region, the district of Ferozepur represents the non-traditional basmati rice growing region of the state. Further, from each of the selected districts, two blocks with highest area under basmati were selected. Thus overall six blocks from the sample districts were selected. At next stage of sampling a cluster of two to three villages with

concentration of basmati was chosen randomly from each of the selected block for the farm household survey. Finally from each of the selected village cluster, 25 basmati growers, in proportion to their respective proportionate share in different categories of operational holdings in state viz., marginal (< 1 ha), small (1 to 2 ha), medium (2 to 4 ha) and large (> 4 ha) were selected randomly. Thus, overall from state, total sample of 150 households growing basmati, comprising 18 marginal, 30 small, 48 medium and 54 large farmers forms the basis for the present enquiry. The detail of sampled districts, blocks and villages is provided in Table 1.4.

Table 1.4: List of Selected Districts, Blocks and Villages in Punjab, 2013-14.

District	Name of Blocks	Name of Villages	Number of Sample Farmers
Gurdaspur	Batala	Missarpura, Ammonangal and Natt	25
	Fatehgarh Churian	Khokhar, Ghanike Bandar and Dult	25
Amritsar	Chogawan	Ranike, Sahoora and Kotli Aulkh	25
	Harsha Chhina	Bhittewad, Dhariwal, Harsha Chhinna and Lal Afgana	25
Ferozepur	Fazilika	Banwal, Jandwal and Karnikhera	25
	Jalalabad	Ghubhaia and Chak Lamochar	25
Total sample of farmers			150

To study the market channels and price spread, the information was collected from ten wholesalers and ten retailers selected randomly from the Amritsar city which is major basmati markets in state as well as in country. Similarly five basmati exporters/millers were randomly selected to collect the data. The comprehensive survey was conducted in the sample villages at end of crop year 2013-14 (Reference year).

The data needed for the study were collected from the farmer respondents by personal interview method using pre-tested schedule. As farmers do not maintain records of expenditure and income from crop cultivation, hence, data collected was based on the memory of the respondents. Information on all the cultural operations in basmati rice cultivation and the consequent use of inputs, output received in physical as well as in monetary terms along with

other important socio-economic aspects like size of operational holdings, farm inventory, irrigation source, cropping pattern etc. were collected from the respondent farmers. Various problems faced by farmers in the cultivation and marketing of basmati were also recorded. Similarly trade related data from intermediaries like wholesalers, retailers and exporters/millers along with problems being faced by them were also recorded on the interview schedules.

Secondary data on monthly market arrivals and prices of basmati were collected from the offices of Agricultural Produce Market Committees (APMC) of the four major basmati markets viz. Amritsar, Tarntarn, Jallalabad and Fazilika. These markets were selected on the basis of market arrivals of basmati in the state as well as the availability of record with concerned APMC. However, overtime secondary data on basmati arrivals and prices is not being maintained variety-wise and available data pertains to the average of different varieties of basmati. While this type of secondary data is available and collected from Amritsar and Tarntarn markets for years 2000-01 to 2013-14, the data in Jallabad and Fazilika markets were available from year 2008 onwards only. Secondary data on area, production and yield of basmati was collected from the Department of Agriculture, Punjab Chandigarh where as data on exports has been taken from various published sources.

1.5 Statistical Analysis: Tabular presentation is adopted to compile the general characteristics of the sample farmers, determine the resource structure, cost structure, returns, profits and opinion of farmers regarding the problems in production and marketing. Simple statistical tools like averages and percentages were used to compare and interpret results properly.

Time series analysis was conducted to examine the patterns in basmati paddy prices. Seasonal behaviour was studied by constructing the seasonal indices. The seasonal indices were worked out by using ratio to moving average decomposition method as following:

- (i) For monthly price data, the successive averages of groups of 13 (Thirteen month moving average) were worked out.
- (ii) The price of each month was expressed as percentage of corresponding moving average.
- (iii) The average (over years) of percentages was worked out for each month.
- (iv) The sum of 12 monthly averages was computed and multiplied by the average for each month by correction factor ($k=1200/\text{Total of indices}$) to make the total 1200 or

average 100.

Time series is very likely to show a tendency to increase or decrease. This illustrates the trend which usually predominant in time series. To separate out the trend factor, straight line trend was fitted on the moving average data of the type: $Y_t = a + bT + U_t$, which gives us the trend values (T). To calculate cyclical and irregular movements the residual method was used. This method consists of eliminating seasonal variation and trend from the original series as following:

$$T \times C \times I = (T \times S \times C \times I) / S$$

$$C \times I = (T \times C \times I) / T$$

Where, T=Trend component; S=Seasonal component; C=Cyclical element, and I=Irregular fluctuations

The trend cycle components were plotted against the time to examine the cyclical behaviour of prices. To check inter-year and intra-year instability of prices, the coefficients of variation (CV) were worked out for de-sasonalized price data. Market integration among spatially separated markets of state was evaluated by constructing the correlation coefficients (r). The methodologically correct way of using correlation coefficients in spatial price analysis is to calculate the correlation coefficient of the *residuals* (Croxtan and Cowden, 1955). Trend and seasonal components reflect generally pervasive influences throughout an agricultural region. The trend due to rising demand occasioned by population increase, for instance apt to affect all the regions; change in supply during the year reflects in part a common climatic pattern (Blyn, 1973). Thus, in present study, market integration among state markets was examined through calculating the correlation coefficients of the residuals. For this, trend and seasonal components from the raw price data of the study markets were eliminated through decomposition analysis (as discussed above). The significance of 'r' was tested using t test. A higher degree of the correlation coefficient indicates a greater degree of integration.

Chapter 2

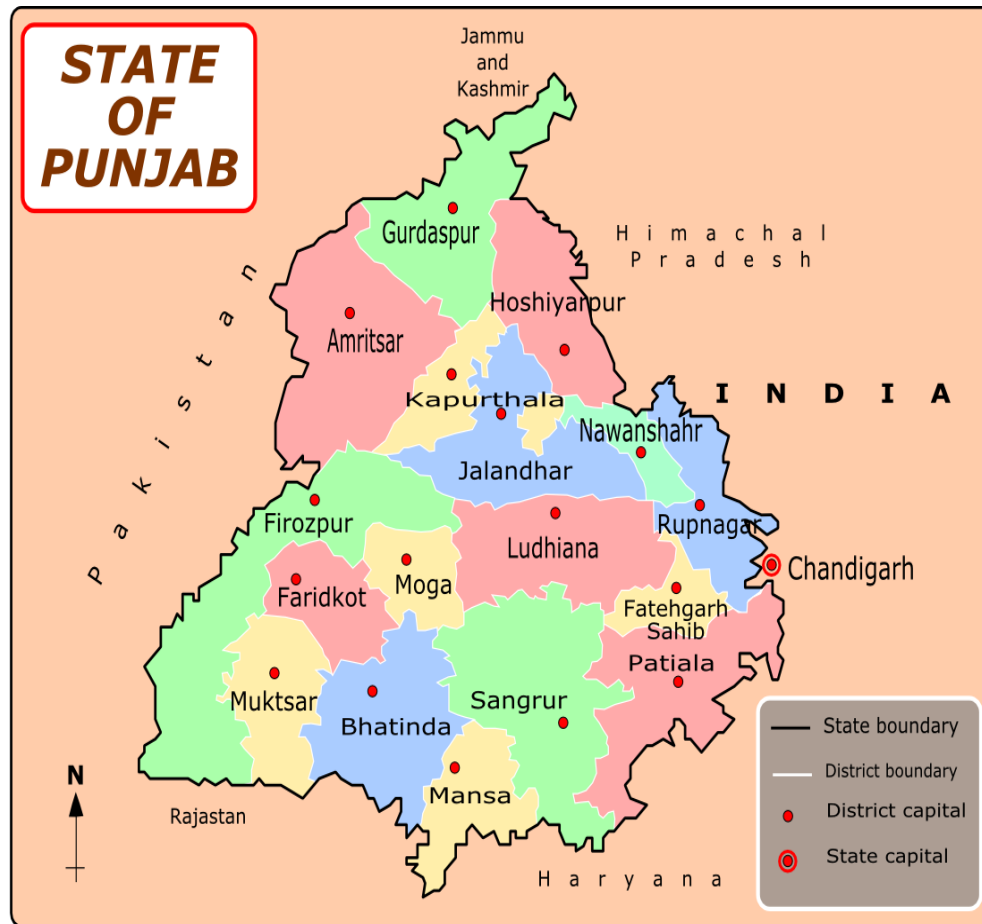
Demographic Profile and Cropping Pattern of the Study Region

The Punjab state lies between the 29°33'-32°3'N latitude and 73°53'- 76°55'E longitude and is bounded on the west by Pakistan, on the north by Jammu and Kashmir, on the north-east by Himachal Pradesh and on the south by Haryana and Rajasthan. Study district Gurdaspur is the northern most district of Punjab state. It falls in the Jalandhar division and is sandwiched between river Ravi and Beas and shares common boundaries with Pathankot district in the north, Beas River in the north-east, Hoshiarpur district in the south-east, Kapurthala district in the south, Amritsar district in the south west and Pakistan in the north-west.

Amritsar, the second study district, is located in northern part of Punjab state and shares common boundries with Tarntarn district in south, Gurdaspur district in north, Kapurthala district in eastern side and Pakistan on western side. This district falls between Ravi river and Beas river. Ravi river flows in north west of the district and forms international border with Pakistan. Beas river flows in the eastern part of the district. Erstwhile Ferozepur district, the third study district is situated in south-western region of state along the India Pakistan border. Ganganagar district of state Rajasthan touches the boundaries on the south-west side of this district and the united stream of the Sutlej and Beas generally separates it from the Tarntaran district in the north-west.

Gurdaspur district consists of 3 tehsils/subdivisions, 11 development blocks and 1157 inhabited villages. Amritsar district consists of 4 tehsils, 5 sub tehsils and 8 development blocks. Ferozepur district consists of 5 tehsils/subdivisions, 10 development blocks with number of inhabited villages at 954. The geographical area of Gurdaspur, Amritsar and Ferozepur districts is 2610, 5056 and 5850 square km covering 5 per cent, 7 per cent and 11.61 per cent of the total geographical area of the state, respectively.

The topography of the selected districts is generally plain of alluvial formation. However, the landscape of the Gurdaspur comprises undulating plain too, the flood plains of the Ravi and the Beas and the up plain land. The south east side of Ferozepur district which is dominated by the light soils has brackish underground water.



The climate of all the three selected districts is on the whole, dry and is characterized by hot summer, a short rainy season and a bracing with winter. The cold season is from November to March, followed by the summer season which lasts up to about end of the June. January happens to be the coldest month when the minimum temperature occasionally drops to about the freezing point of water. June is generally the hottest month and on individual days, the maximum temperature may be above 45°C. The period from July to the middle of September constitutes the monsoon season. The latter half of September and October may be termed as the post-monsoon or the transition period. About 70 percent of the annual rainfall in all these sampled districts is received during the period from July to September. Some rainfall occurs during the pre-monsoon months, mostly in the form of thunder showers. In the winter season, some rainfall occurs under the influence of westerly disturbances.

2.1 Demographic Profile of Sample Farmers

2.1.1 Family composition

The family composition of the sample farm households have been presented in Table 2.1.1a and Table 2.1.1b. The number of total persons on sample farms was 953 which comprised 367, 345 and 241 male, female and children respectively (Table 2.1.1a). The average size of family on sample farm households in state was 6.36 consisting of 2.45 males, 2.30 females and 1.61 children (Table 2.1.1b). Largest average family size of 7.38 members was recorded on large category farm households and the least i.e. 5.13 in case of small category. Average family size of marginal and medium category of sample households was of 5.39 and 6.34 members. Average number of adult members on sample households was observed to be 4.75. Category-wise marginal, small, medium and large households consisted 4.11, 3.90, 4.57 and 5.60 adult members.

Table 2.1.1a: Family Composition of Sample Households, Punjab, 2013-14

(Number of persons)

Farm category	Adults			Children	Total
	Males	Females	Total		
Marginal	35	39	74	23	97
Small	60	57	117	37	154
Medium	115	104	219	85	304
Large	157	145	302	96	398
Total	367	345	712	241	953

Table 2.1.1b: Family Composition of Sample Households, Punjab, 2013-14

(Number of persons per household)

Farm category	Adults			Children	Total
	Males	Females	Total		
Marginal	1.94	2.17	4.11	1.28	5.39
Small	2.00	1.90	3.90	1.23	5.13
Medium	2.40	2.17	4.57	1.77	6.34
Large	2.91	2.69	5.60	1.78	7.38
Total	2.45	2.30	4.75	1.61	6.36

2.1.2 Education profile

The education of the family members particularly the household head gives impetus to the adoption of new farm initiatives. Education profile of the heads of the sample households is presented in Table 2.1.2a. Proportionate (per cent) distribution of sample farmers with respect to the level of education is also presented in Table 2.1.2b. Out of the total sample of 150, 26 viz. about 17 per cent of total were found to be illiterate. The number of farmers who had primary, middle, high school and higher education were 16, 20, 47 and 41 respectively. Thus 10.67, 13.33, 31.33 and 27.33 per cent of the household heads were educated up to primary, middle, high school and higher level of the education respectively.

Table 2.1.2a: Education Profile of Sample Household Heads, Punjab, 2013-14
(No. of household heads)

Farm category	Illiterates	Primary	Middle	High school	Higher	Total
Marginal	8	0	4	3	3	18
Small	6	7	3	9	5	30
Medium	9	4	7	16	12	48
Large	3	5	6	19	21	54
Total	26	16	20	47	41	150

Table 2.1.2b: Proportionate Distribution of Sample Household Heads w.r.t. Education Level, Punjab, 2013-14

Farm category	Illiterates	Primary	Middle	High school	Higher	Total
Marginal	44.44	0.00	22.22	16.67	16.67	100
Small	20.00	23.33	10.00	30.00	16.67	100
Medium	18.75	8.33	14.58	33.33	25.00	100
Large	5.56	9.26	11.11	35.19	38.89	100
Total	17.33	10.67	13.33	31.33	27.33	100

Category-wise, while highest proportion of the small farmers (44.44%) was illiterate, the proportion of large farmers who were illiterate was at the lowest (5.56%). Among small and medium farmers, 20 per cent and 18.75 per cent were found to be illiterate respectively. Proportion of marginal, small, medium and large farmers with matriculation was observed to be

16.67, 30.00, 33.33 and 35.19 per cent respectively. Respective proportion of farmers of these categories with higher level of education was 16.67, 16.67, 25.00 and 38.89 per cent, respectively. Thus study revealed that there was positive relationship between the farm size and level of the education of the farmers.

2.1.3 Caste composition

The information on caste composition is very important socio-economic factor. While the landless castes gained little from the green revolution, it strengthened their immediate adversary, the landowning dominant castes. It was not only at the village level that the new agrarian technology made them stronger, the jats belonging to the general category emerged as the most powerful community at the regional level too. Punjab, over the years, came to be identified with agriculture, which was not just an occupation of the dominating community (Jats) but also came to be seen as a way of life (Jodka, 2001). Caste composition of the sample farmers have been presented in Table 2.1.3a and Table 2.1.3b.

Out of the total sample of 150 farm households, 146 viz. 97.33 per cent belonged to the general category. Only 4 farmers, 2 each belonged to the schedule caste (SC) and other backward caste (OBC). Thus only 2.66 per cent of the sample farmers were of the castes other than the general category. Category-wise, 5.56 per cent each of marginal farm households belonged to SC and OBC categories, respectively. Similarly, 3.33 per cent each of small farmers belonged to SC and OBC categories, respectively. However 100 per cent of medium and large category farmers belonged to the general category. Thus study sample was dominated with the traditional general category involved in Punjab agriculture.

Table 2.1.3a: Caste Composition of Sample Household, Punjab, 2013-14
(No. of households)

Farm category	SC	ST	OBC	Others (General)	Total
Marginal	1	0	1	16	18
Small	1	0	1	28	30
Medium	0	0	0	48	48
Large	0	0	0	54	54
Total	2	0	2	146	150

Table 2.1.3b: Proportionate Distribution of Sample Households w.r.t. Caste, Punjab, 2013-14

Farm category	(Per cent)				
	SC	ST	OBC	Others (General)	Total
Marginal	5.56	0.00	5.56	88.89	100
Small	3.33	0.00	3.33	93.33	100
Medium	0.00	0.00	0.00	100.00	100
Large	0.00	0.00	0.00	100.00	100
Total	1.33	0.00	1.33	97.33	100

2.2 Land, Irrigation and Cropping Pattern

2.2.1 Operational holdings and irrigation status

The information on operational area and irrigation status of sample farmers is depicted in Table 2.2.1a to Table 2.2.1c. Total operational area on sample farms was 723.40 ha out of which 355.10 ha was irrigated by tubewell where as 368.30 ha had tubewell as well as the canal as source of irrigation (Table 2.2.1a). Table 2.2.1b reveals that overall average operational farm size on sample farms in state was 4.82 ha. The average operational area on marginal, small, medium and large category farms was 0.78, 1.61, 3.29 and 9.31 ha, respectively. The major factor for productivity enhancement in almost all the crops is timely and adequate application of irrigation water along with other requisite inputs. There was adequate availability of irrigation water as entire (100 per cent) operational area on the sample farms was under assured irrigation (Table 2.2.1c).

Table 2.2.1a: Operational Area and Irrigation Status of Sample Farms, Punjab, 2013-14
(ha)

Farm category	Irrigated					Un-irrigated	Total
	Canal	Tubewell	Tank	Others (Tubewell+ Canal)	Total		
Marginal	0.00	10.00	0.00	4.00	14.00	0.00	14.00
Small	0.00	32.70	0.00	15.70	48.40	0.00	48.40
Medium	0.00	93.20	0.00	64.80	158.00	0.00	158.00
Large	0.00	219.20	0.00	283.80	503.00	0.00	503.00
Total	0.00	355.10	0.00	368.30	723.40	0.00	723.40

Table 2.2.1b: Operational Area and Irrigation Status of Sample Farms, Punjab, 2013-14
(ha/farm)

Farm category	Irrigated					Un-irrigated	Total
	Canal	Tubewell	Tank	Others (Tubewell+ Canal)	Total		
Marginal	0.00	0.56	0.00	0.22	0.78	0.00	0.78
Small	0.00	1.09	0.00	0.52	1.61	0.00	1.61
Medium	0.00	1.94	0.00	1.35	3.29	0.00	3.29
Large	0.00	4.06	0.00	5.26	9.31	0.00	9.31
Total	0.00	2.37	0.00	2.46	4.82	0.00	4.82

Table 2.2.1c: Source-wise Distribution of Irrigated Area on Sample Farms, Punjab, 2013-14
(Per cent)

Farm category	Irrigated					Un-irrigated	Total
	Only Canal	Only Tubewell	Only Tank	Others (Tubewell+ Canal)	Total		
Marginal	0.00	71.43	0.00	28.57	100.00	0.00	100.00
Small	0.00	67.56	0.00	32.44	100.00	0.00	100.00
Medium	0.00	58.99	0.00	41.01	100.00	0.00	100.00
Large	0.00	43.58	0.00	56.42	100.00	0.00	100.00
Total	0.00	49.09	0.00	50.91	100.00	0.00	100.00

Overall, while 49 per cent of the operational area on sample farms was having only tube well as the source of irrigation, about 51 per cent area of the total operational area on sample farms was having canal water in addition to the tube wells as source of irrigation. Category wise it can be seen that relative proportion of only tube well irrigated area was larger on smaller size farm categories which declined with the increase in farm size. On the other hand, proportion of area under two sources of irrigation i.e tube well plus canal was the lowest on smaller categories which increased with the increase in farm size and was found to be highest on large size category farms.

2.2.2 Cropping pattern

The cropping pattern on a farm depends upon the resource availability and gives an idea about the area covered under various crops in different seasons during the year. The area sown under different crops is presented in Table 2.2.2a. The cropping pattern and cropping intensity have been depicted in Table 2.2.2b

Table 2.2.2a: Area Sown under Different Crops on Sample Farms, Punjab, 2013-14**(ha)**

Farm category	Rice	Wheat	Sugarcane	Basmati	Other major crops	Total
Marginal	0.70 (0.04)	11.96 (0.66)	0.00 (0.00)	10.86 (0.60)	4.48 (0.25)	28.00 (1.56)
Small	8.30 (0.28)	41.10 (1.37)	0.00 (0.00)	32.50 (1.08)	16.10 (0.54)	98.00 (3.27)
Medium	33.70 (0.70)	138.50 (2.89)	1.40 (0.03)	100.60 (2.10)	32.60 (0.68)	306.80 (6.39)
Large	106.90 (1.98)	438.00 (8.11)	35.80 (0.66)	306.00 (5.67)	86.70 (1.61)	973.40 (18.03)
Total	149.60 (1.00)	629.56 (4.20)	37.20 (0.25)	449.96 (3.00)	139.88 (0.93)	1406.20 (9.37)

Note: Figures in the parentheses represent the per farm area (in ha) sown under different crops

The perusal of Table 2.2.2b reveals that on marginal farms wheat and basmati were the major crops comprising 42.71 and 38.79 per cent of the gross cropped area followed by other crops mainly comprising the fodder crops (16.00 %) and rice (2.50 %). On small farms also, wheat and basmati comprised 41.94 and 33.16 per cent of the gross cropped area followed by other crops (16.43 %) and rice (8.47 %). As far as medium farms are concerned, wheat and basmati shared 45.14 and 32.79 per cent of the gross cropped area on the sample farms followed by rice (10.98 %) and other crops (10.63 %). Similarly, on large farms wheat and basmati accounted for 45.00 and 31.44 per cent of the gross cropped area followed by rice (10.98 %), other crops (8.91 %) and sugarcane (3.68 %). Hence wheat and basmati were major crops on all the farm size categories and on average accounted for 44.77 and 32.00 per cent of the gross cropped area on the sample farms in state followed by rice, other major crops (primarily fodder) and sugarcane.

The overall cropping intensity on sample farms was recorded at 194 per cent. Category-wise cropping intensity was observed to be high on smaller size categories as compared to their larger size counterparts.

Table 2.2.2b: Cropping Pattern and Cropping Intensity of Sample Farms, Punjab, 2013-14
(%)

Farm category	Rice	Wheat	Sugarcane	Basmati	Other major crops	Total	Cropping Intensity (%)
Marginal	2.50	42.71	0.00	38.79	16.00	100.00	200
Small	8.47	41.94	0.00	33.16	16.43	100.00	203
Medium	10.98	45.14	0.46	32.79	10.63	100.00	194
Large	10.98	45.00	3.68	31.44	8.91	100.00	194
Total	10.64	44.77	2.65	32.00	9.95	100.00	194

2.2.3 Area under basmati cultivation

Status of basmati area on different categories of farmers revealed that total area under basmati cultivation on sample farms was 449.96 ha which constituted 32 per cent of the gross cropped area and on average per farm area under basmati was 3.00 ha (Table 2.2.2a and Table 2.2.2b). Category-wise the average per farm area on marginal, small, medium and large category farms was 0.60, 1.08, 2.10 and 5.67 ha respectively (Table 2.2.3a). The respective proportions of these size categories in total basmati area on sample farms were observed to be 2.41, 7.22, 22.36 and 68.01 per cent respectively. Thus, largest two categories of farms viz. medium and large contributed nearly 90 per cent area towards the total area under basmati cultivation on the sample farms and marginal and small farms together contributed only about 10 per cent of the total basmati area.

Table 2.2.3a: Area Sown under Basmati Crop (All Varieties) on Sample Farms, Punjab, 2013-14

Farm category	Total area under the study crop (in ha)	% Share to total
Marginal	10.86 (0.60)	2.41
Small	32.50 (1.08)	7.22
Medium	100.60 (2.10)	22.36
Large	306.00 (5.67)	68.01
Total	449.96 (3.00)	100.00

Note: Figures in the parentheses represent the per farm area sown under basmati crop

Area sown and proportionate area under different varieties of basmati crop on the sample farms is presented in Table 2.2.3b and Table 2.2.3c respectively. The perusal of Table 2.2.3c reveals that on overall sample farms Pusa Basmati 1121 was the most dominating variety of basmati and accounted for nearly 90 per cent of the total area under basmati crop. This was

followed by Traditional Basmati variety and Pusa Punjab Basmati 1509 varieties accounting for 6.96 and 3.42 per cent of the total area under basmati, respectively.

Table 2.2.3b: Variety-wise Area Sown under Basmati Crop on Sample Farms, Punjab, 2013-14

Farm category	Variety (ha)			
	Pusa Basmati 1121	Pusa Punjab Basmati 1509	Traditional Basmati	Total
Marginal	10.86 (0.60)	0.00 (0.00)	0.00 (0.00)	10.86 (0.60)
Small	30.50 (1.02)	0.00 (0.00)	2.00 (0.07)	32.50 (1.08)
Medium	92.90 (1.94)	2.80 (0.06)	4.90 (0.10)	100.60 (2.10)
Large	269.00 (4.98)	12.60 (0.23)	24.40 (0.45)	306.00 (5.67)
Total	403.26 (2.69)	15.40 (0.10)	31.30 (0.21)	449.96 (3.00)

Note: Figures in the parentheses represent the per farm area sown under different varieties of basmati crop

Category-wise, while marginal farmers had sown only Pusa Basmati 1121 variety, the small farmers had put about 94 per cent area under this variety and rest about 6 per cent under the Traditional Basmati variety. Medium category farms had planted Pusa Basmati 1121, Traditional Basmati and Pusa Punjab Basmati 1509 varieties on 92.35, 4.87 and 2.78 per cent of the total area under basmati crop on this category of farms. Similarly large category farms had planted Pusa Basmati 1121, Traditional Basmati and Pusa Punjab Basmati 1509 varieties constituting 83.91, 7.97 and 4.12 per cent of the total area under basmati crop on this category of farms. Thus, in Punjab category-wise Pusa Basmati 1121 was dominating variety and on sample farms basmati varietal diversification showed a positive relationship with the farm size means larger size categories of farms had sown other varieties also.

Table 2.2.3c: Variety-wise Proportionate Area Sown under Basmati Crop on Sample Farms, Punjab, 2013-14

Farm category	Variety (%)			
	Pusa Basmati 1121	Pusa Punjab Basmati 1509	Traditional Basmati	Total
Marginal	100.00	0.00	0.00	100.00
Small	93.85	0.00	6.15	100.00
Medium	92.35	2.78	4.87	100.00
Large	87.91	4.12	7.97	100.00
Total	89.62	3.42	6.96	100.00

Chapter 3

Economics of Cultivation of Basmati Rice

The cost structure as reflected by share of various inputs in total variable costs is determined by the level of technology and use of modern inputs. Variations in use of various inputs on different size groups of farms show the difference in level of technology adopted on the respective farms. The knowledge of cost and returns structure is important for assessing the need for steps to fill the gaps to raise the overall economic viability of farming. Thus, it is very important to evaluate the economics of crop enterprise on respective farm groups in the study area. In this chapter, the variety-wise as well as overall structure of cost of cultivation and returns received by farmers from cultivation of basmati rice are evaluated.

3.1 Production, Consumption and Marketed Surplus

To estimate the marketable and marketed surplus of basmati, it is important to work out the total production of this crop as well as the on farm requirement for various purposes. These aspects are discussed variety-wise as following:

3.1.1 *Pusa Basmati 1121*

The total production, consumption and other details of Pusa Basmati 1121 on the respondent farms is provided in Table 3.1.1. Overall, average per farm production of Pusa basmati 1121 on sample farms was 112.64 quintals, from an average per farm area under this crop at 2.69 ha. The production on marginal, small, medium and large farms was 24.28, 40.34, 82.15 and 209.36 quintal/farm respectively.

On farm and family requirements of agricultural output for different purposes viz. home consumption, requirements for seed, kind payments etc. determine the total quantity to be retained by the farmers. Overall on average per farm consumption of Pusa Basmati 1121 was 1.22 quintal which accounted for 1.08 per cent of the total production. Proportionate share of retention of this variety for other uses and wastage turned out to be 0.78 (0.88 qtl/farm) and 0.49 (0.55 qtl/farm) per cent of production respectively. On marginal, small, medium and large farms the quantity of basmati consumed was worked out to be 0.60, 0.80, 1.38 and 1.51 qtl/farm, which accounted for 2.47, 1.98, 1.67 and 0.72 per cent of the total production on the respective farm size categories. Thus proportionate share of consumption in total production was inversely

related to the farm size. The proportionate share of wastage to total production directly varied with the farm size categories from nil on marginal farms to 0.57 per cent on large farms. The per farm marketed surplus or the total quantity of this variety sold by marginal, small, medium and large farmers was worked out to be 23.44, 39.01, 79.69 and 205.23 quintals, constituting 96.56, 96.69, 97.01 and 98.03 per cent of the production on the respective categories of farms. Thus marketed surplus of Pusa Basmati 1121 increased both in absolute as well as proportionate terms with the increase in farm size. Overall per farm marketed surplus was 110 quintals constituting 97.65 per cent of total production which was sold at an average price of Rs 3897/ql. While the small and medium farmers received almost same average and the highest price (Rs 3928 and Rs 3914/ql) of this variety, the price received by the marginal farmers was observed to be the lowest (Rs 3605/q). Large category of farmers fetched Rs 3899/ql for their marketed surplus.

Table 3.1.1: Area, Production, Consumption and Marketed Surplus of Pusa Basmati 1121 on Sample Farms, Punjab, 2013-14

(Per farm)							
Farm category	Area (ha)	Production (qtls)	Consumed (qtls)	Retained / stocked for future use(qtls)	Wastage	Sold (qtls)	Price (Rs/ql)
Marginal	0.60	24.28 (100.00)	0.60 (2.47)	0.24 (0.97)	0.00 (0.00)	23.44 (96.56)	3605
Small	1.02	40.34 (100.00)	0.80 (1.98)	0.43 (1.07)	0.10 (0.25)	39.01 (96.69)	3928
Medium	1.94	82.15 (100.00)	1.38 (1.67)	0.78 (0.94)	0.31 (0.38)	79.69 (97.01)	3914
Large	4.98	209.36 (100.00)	1.51 (0.72)	1.43 (0.68)	1.19 (0.57)	205.23 (98.03)	3899
Average	2.69	112.64 (100.00)	1.22 (1.08)	0.88 (0.78)	0.55 (0.49)	110.00 (97.65)	3897

Note: Figures in the brackets indicate the percent share in production

3.1.2 Pusa Punjab Basmati 1509

Overall, average per farm production of Pusa Punjab Basmati 1509 on sample farms was 5.21 quintals from an average per farm area under this crop at 0.10 ha (Table 3.1.2). The two farm size categories viz. marginal and small farmers had not sown this variety and its production on medium and large farms was 2.73 and 12.06 qtl/farm respectively. This variety of basmati was neither consumed nor retained or stocked for future use by its producers. Thus entire production of this variety on medium and large farms except negligible wastage was sold at respective price of Rs 2954 and Rs 2933/ql. The overall average price received by farmers was

Rs 2936/ql. Thus this variety fetched significant low prices as compared to the Pusa Basmati 1121 variety.

Table 3.1.2: Area, Production, Consumption and Marketed Surplus of Pusa Punjab basmati 1509 on Sample Farms, Punjab, 2013-14

(Per farm)

Farm category	Area (ha)	Production (qtls)	Consumed (qtls)	Retained / stocked for future use (qtls)	Wastage	Sold (qtls)	Price (Rs/qlt)
Marginal	0.00	0.00	0.00	0.00	0.00	0.00	0
Small	0.00	0.00	0.00	0.00	0.00	0.00	0
Medium	0.06	2.73 (100.00)	0.00	0.00	0.00	2.73 (100.00)	2954
Large	0.23	12.06 (100.00)	0.00	0.00	0.06 (0.46)	12.00 (99.54)	2933
Average	0.10	5.21 (100.00)	0.00	0.00	0.02 (0.38)	5.19 (99.62)	2936

Note: Figures in the brackets indicate the percent share in production

3.1.3 Traditional Basmati

For traditional aromatic variety of basmati, overall average per farm production on sample farms was 5.69 quintals from an average per farm area under this crop at 0.21 ha (Table 3.1.3). Marginal farmers had not sown this variety and the production on small, medium and large farms was 1.80, 2.62 and 12.48 qtl/farm respectively.

Table 3.1.3: Area, Production, Consumption and Marketed Surplus of Traditional Basmati on Sample Farms, Punjab, 2013-14

(Per farm)

Farm category	Area (ha)	Production (qtls)	Consumed (qtls)	Retained / stocked for future use (qtls)	Wastage	Sold (qtls)	Price (Rs/qlt)
Marginal	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small	0.07	1.80 (100.00)	0.03 (1.85)	0.01 (0.46)	0.00	1.76 (97.69)	5210
Medium	0.10	2.62 (100.00)	0.073 (2.78)	0.002 (0.08)	0.00	2.54 (97.14)	5215
Large	0.45	12.48 (100.00)	0.25 (2.00)	0.06 (0.48)	0.01 (0.07)	12.16 (97.44)	5195
Average	0.21	5.69 (100.00)	0.12 (2.11)	0.02 (0.42)	0.003 (0.06)	5.54 (97.41)	5199

Note: Figures in the brackets indicate the percent share in production

Overall average per farm consumption of this variety was only 0.12 quintals which accounted for 2.11 per cent of the total production and other about 0.42 per cent was retained for future use with negligible wastage. The per farm marketed surplus or the total quantity of this variety sold by small, medium and large farmers was worked out to be 1.76, 2.54 and 12.16 quintals constituting 97.69, 97.14 and 97.44 per cent of the production on the respective categories of farms. Overall per farm marketed surplus was 5.54 quintals constituting 97.41 per cent of total production which was sold at an average price of Rs 5199/ql.

3.1.4 Overall Basmati: All varieties

The information on total production, consumption and other details for overall basmati on the respondent farms is provided in Table 3.1.4. Per farm average area under all varieties of basmati and average per farm basmati production on overall farms was 3 ha and 123.54 quintals respectively. Category-wise, per farm production of total basmati on marginal, small, medium and large farms was 24.28, 42.14, 87.49 and 233.90 quintals respectively. Average per farm and family requirements/consumption of basmati was 1.34 quintals which accounted for 1.01 per cent of the total production on overall farms. Proportionate share of per farm retention of total basmati for other uses and wastage was 0.90 quintal (0.73%) and 0.57 quintal (0.46%) respectively. On marginal, small, medium and large farms the quantity of basmati consumed was 0.60, 0.83, 1.45 and 1.76 qtl/farm, which accounted for 2.47, 1.98, 1.65 and 0.75 per cent of the total production on the respective farm size categories. Thus proportionate share of consumption in total production was inversely related to the farm size. The proportionate share of wastage to total production directly varied with the farm size categories from nil on marginal farms to 0.54 per cent on large farms. The per farm marketed surplus sold by marginal, small, medium and large farmers was 23.44, 40.77, 84.96 and 229.39 quintal, constituting 96.56, 96.73, 97.10 and 98.07 per cent of the production on the respective categories of farms. Thus, marketed surplus of basmati collectively for all varieties on the overall sample farms increased both in absolute as well as proportionate terms with the increase in farm size. Overall per farm marketed surplus was 120.73 quintals which accounted for 97.73 per cent of total production. The average price received by farmers for their marketed surplus was Rs 3915 per quintal. For overall basmati the prices received by farmers varied from the lowest by small farmers (Rs 3605/ql) to the highest prices received by the small farmers (Rs 3983/ql).

Table 3.1.4: Area, Production, Consumption and Marketed Surplus of Basmati (All Varieties) on Sample Farms, Punjab, 2013-14

							(Per farm)
Farm category	Area (ha)	Production (qtls)	Consumed (qtls)	Retained / stocked for future use(qtls)	Wastage	Sold (qtls)	Price (Rs/qlt)
Marginal	0.60	24.28 (100.00)	0.60 (2.47)	0.24 (0.97)	0.00 (0.00)	23.44 (96.56)	3605
Small	1.08	42.14 (100.00)	0.83 (1.98)	0.44 (1.05)	0.10 (0.24)	40.77 (96.73)	3983
Medium	2.10	87.49 (100.00)	1.45 (1.65)	0.78 (0.89)	0.31 (0.35)	84.96 (97.10)	3922
Large	5.67	233.90 (100.00)	1.76 (0.75)	1.49 (0.64)	1.26 (0.54)	229.39 (98.07)	3917
Average	3.00	123.54 (100.00)	1.34 (1.08)	0.90 (0.73)	0.57 (0.46)	120.73 (97.73)	3915

Note: Figures in the brackets indicate the percent share in production

3.2 Cost of Cultivation of Basmati

Besides returns the cost of cultivation is important in determining the level of profitability of crop enterprise at farm level. In this section variety-wise as well as overall cost of cultivation of the respondent basmati growers has been discussed as following:

3.2.1 *Pusa basmati 1121*

The various components of per hectare cost of cultivation of Pusa Basmati 1121 variety of basmati is presented in Table 3.2.1. The overall total variable cost of sample farms including cost involving the post harvest operations of this variety of basmati paddy was Rs. 30691 per ha. Out of this variable input cost accounted for about 96 per cent where as the rest about 4 per cent constituted the post harvest/marketing costs. Category-wise, the lowest cost i.e. Rs 25752 per ha was observed to be at the marginal category farms and the highest i.e. Rs 31856 per ha on the large category farms. Proportionate share of variable input cost in total cost on all the category farms was more or less about the same at 95-96 per cent. On all the groups of farms, the major share of total variable input cost was contributed by labour cost to the tune of about 50 per cent (varying from 45.73 % on marginal to 51.97 % on small farms) followed by the machine cost at about 19 per cent (varying from 17.93 % on large to 24.79 % on marginal farms), expenses on pesticides/weedicides at about 14 per cent (varying from 12.58 % on small to 14.01 % on large farms) and expenditure on fertilizers and manures at about 13 per cent (varying from 9.79 % on marginal to 13.62 % on large farms).

Table 3.2.1: Cost of Cultivation of Pusa Basmati 1121 on Sample Farms, Punjab, 2013-14
(Rs per ha)

Particulars	Farm category				
	Marginal	Small	Medium	Large	Total
I) Input costs					
Seed	660 (2.69)	705 (2.65)	695 (2.48)	753 (2.48)	733 (2.50)
Irrigation	978 (3.99)	450 (1.69)	730 (2.61)	475 (1.57)	545 (1.86)
Manure and fertilizer	2400 (9.79)	2970 (11.18)	3328 (11.89)	4128 (13.62)	3809 (12.98)
Labour (bullock + human)	11210 (45.73)	13808 (51.97)	13608 (48.61)	15273 (50.39)	14669 (50.00)
Machinery hire charges	6078 (24.79)	5295 (19.93)	5725 (20.45)	5435 (17.93)	5509 (18.78)
Pesticides/weedicides	3188 (13.00)	3343 (12.58)	3908 (13.96)	4248 (14.01)	4072 (13.88)
I) Total input cost	24513 (100.00)	26570 (100.00)	27993 (100.00)	30310 (100.00)	29337 (100.00)
II) Storage, transportation and marketing cost					
Storage	0 (0.00)	18 (1.24)	69 (5.25)	81 (6.32)	71 (5.26)
Transportation cost	535 (43.19)	500 (34.31)	275 (20.75)	285 (22.36)	360 (26.61)
Marketing losses	148 (11.93)	201 (13.81)	183 (13.84)	125 (9.77)	145 (10.68)
Marketing (unloading, cleaning, etc)	523 (42.33)	516 (35.40)	552 (41.69)	546 (42.81)	545 (40.22)
Kind payment	33 (2.65)	217 (14.90)	213 (16.09)	179 (14.06)	186 (13.74)
Misc.	0 (0.00)	5 (0.34)	32 (2.39)	60 (4.68)	48 (3.51)
II) Total storage, transportation and marketing cost	1239 (100.00)	1457 (100.00)	1324 (100.00)	1276 (100.00)	1354 (100.00)
Percent share to the total cost (I+II)					
Total input cost (I)	95.19	94.80	95.49	95.96	95.59
Total storage, transportation and marketing cost (II)	4.81	5.20	4.51	4.04	4.41
Productivity (qtl/ha)	40.24	39.68	42.44	42.03	41.90
TOTAL COST (I+II)	25752 (100.00)	28027 (100.00)	29316 (100.00)	31586 (100.00)	30691 (100.00)

Figures in parentheses indicate per cent to the respective total cost

On account of free electricity supply to irrigation pumps, the expenditure on irrigation component accounted for only 1.86 per cent of variable input cost on overall farms and it varied from 1.57 per cent on large farms to 3.99 per cent on marginal farms. This higher expenditure on small size category of farms on irrigation was due to their relative higher dependence on costly source of irrigation i.e. diesel engines. Total cost on post harvest/marketing operations on overall sample farms was Rs 1354 per ha which varied from Rs 1239 per ha on marginal farms to Rs 1457 per ha on the small farms. Among different post harvest/marketing costs the unloading and cleaning charges accounted for about 40 per cent of total costs on this account on overall sample farms followed by transportation cost (26.61 %), kind payments (13.74 %), marketing losses (10.68 %), storage cost (5.26 %) and miscellaneous expenses (3.51%).

3.2.2 Pusa Punjab Basmati 1509

The components of per hectare cost of cultivation of Pusa Punjab Basmati 1509 are presented in Table 3.2.2. This variety has been sown by only two categories of sample farmers viz. medium and large ones and their overall total variable cost including the post harvest operations was Rs. 24213 per ha. Out of this variable input cost accounted for about 94 per cent where as the rest about 6 per cent constituted the post harvest/marketing costs. Category-wise, the total cost on medium farms was Rs 24308 per ha which was marginally higher as compared to their large size counterparts at Rs 24199 per ha. Proportionate share of total variable input cost in total cost on medium and large farms was 95.21 and 93.76 per cent respectively. On overall farms, the major share of total variable input cost was contributed by labour cost to the tune of about 38 per cent (31.00 % on medium and 39.39 % on large farms) followed by the machine cost at about 28 per cent (31.33 % on medium and 27.27 % on large farms), expenses on pesticides/weedicides at about 17 per cent (16.06 % on medium and 17.08 % on large farms) and expenditure on fertilizers and manures at about 13 per cent (13.30 % on medium and 12.80 % large farms). On account of free electricity supply to irrigation pumps the expenditure on irrigation component accounted for only 0.93 per cent of total variable input cost on overall farms and category-wise it was observed to be nil on large farms. Due to relatively higher dependence on costly source of irrigation i.e. diesel engines, the irrigation component on medium farms was significant part (5.03%) of total input cost. Total cost on post harvest/marketing operations on overall sample farms was Rs 1441 per ha and category-wise it was Rs 1166 and Rs 1509 per ha on medium farms and large farms respectively.

Table 3.2.2: Cost of Cultivation of Pusa Punjab Basmati 1509 on Sample Farms, Punjab, 2013-14

(Rs per ha)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total
I) Input costs					
Seed	-	-	758 (3.27)	785 (3.46)	780 (3.42)
Irrigation	-	-	1165 (5.03)	0	212 (0.93)
Manure and fertilizer	-	-	3078 (13.30)	2905 (12.80)	2936 (12.89)
Labour (bullock + human)	-	-	7175 (31.00)	8938 (39.39)	8617 (37.84)
Machinery hire charges	-	-	7250 (31.33)	6188 (27.27)	6381 (28.02)
Pesticides/weedicides	-	-	3718 (16.06)	3875 (17.08)	3846 (16.89)
I) Total input cost	-	-	23143 (100.00)	22690 (100.00)	22772 (100.00)
II) Storage, transportation and marketing cost					
Storage	-	-	0 (0.00)	119 (7.89)	97 (6.76)
Transportation	-	-	102 (8.75)	169 (11.23)	151 (10.50)
Marketing losses	-	-	253 (21.70)	266 (17.61)	263 (18.29)
Marketing (unloading, cleaning, etc)	-	-	608 (51.18)	672 (44.51)	660 (45.82)
Kind payments	-	-	202 (17.36)	243 (16.12)	236 (16.37)
Misc.	-	-	0 (0.00)	40 (2.63)	32 (2.25)
II) Total storage, transportation and marketing cost	-	-	1166 (100.00)	1509 (100.00)	1441 (100.00)
Percent share to the total cost (I+II)					
Total input cost (I)	-	-	95.21	93.76	94.05
Total storage, transportation and marketing cost (II)	-	-	4.79	6.24	5.95
Productivity (qtl/ha)	-	-	46.79	51.67	50.78
TOTAL COST (I+II)	-	-	24308 (100.00)	24199 (100.00)	24213 (100.00)

Figures in parentheses indicate per cent to the respective total cost

Among different post harvest/marketing costs the marketing (unloading and cleaning) accounted for the major part to the tune of about 46 per cent of total costs on this account on overall sample farms followed by transportation cost (18.29 %), kind payments (16.37 %), marketing losses (18.29 %), storage cost (6.76 %) and miscellaneous expenses (2.25%).

3.2.3 Traditional basmati

Among sample farmers no marginal farmer had sown this high value variety and thus was sown by small, medium and large farmers only. The various components of per hectare cost of cultivation of Traditional Basmati are presented in Table 3.2.3. The overall total variable cost of sample farms including cost involving the post harvest operations of this variety of basmati paddy was Rs. 27625 per ha. Out of this, variable input cost accounted for about 97 per cent where as the rest about 3 per cent constituted the post harvest/marketing costs. Category-wise the lowest cost i.e. Rs 26749 per ha was observed to be at medium category farms and the highest i.e. Rs 27824 per ha on the large category farms. Share of total variable input cost in total cost on overall farms was more or less about the same at 96-97 per cent. On all the groups of farms, the major share of total variable input cost was contributed by labour cost to the tune of about 60 per cent (varying from 59.65 % on large to 62.77 % on medium farms) followed by the machine cost at about 17 per cent (varying from 16.43 % on large to 17.46 % on medium farms), expenses on pesticides/weedicides at about 13 per cent (varying from 11.62 % on small to 13.03 % on medium farms) and expenditure on fertilizers and manures at about 6 per cent (varying from 3.25 % on medium to 6.59 % on large farms). On account of free electricity supply to irrigation pumps, the expenditure on irrigation component accounted for only 1.02 per cent of total variable input cost on overall farms. Total cost on post harvest/marketing operations on overall sample farms was Rs 893 per ha which varied from Rs 786 per ha on medium farms to Rs 970 per ha on the small farms. Among different post harvest/marketing costs the unloading and cleaning accounted for about 40 per cent of total costs on this account on overall sample farms followed by transportation cost (27.04 %), marketing losses (17.92 %) and kind payments (14.74 %) with negligible storage costs.

Table 3.2.3: Cost of Cultivation of Traditional Basmati on Sample Farms, Punjab, 2013-14
(Rs per ha)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total
I) Input costs					
Seed	-	825 (3.13)	906 (3.49)	848 (3.15)	856 (3.20)
Irrigation	-	0 (0.00)	0 (0.00)	350 (1.30)	273 (1.02)
Manure and fertilizer	-	1670 (6.33)	845 (3.25)	1775 (6.59)	1623 (6.07)
Labour (bullock + human)	-	16245 (61.62)	16298 (62.77)	16055 (59.65)	16105 (60.25)
Machinery hire charges	-	4563 (17.31)	4533 (17.46)	4423 (16.43)	4449 (16.64)
Pesticides/weedicides	-	3063 (11.62)	3383 (13.03)	3465 (12.87)	3426 (12.82)
I) Total input cost	-	26365 (100.00)	25964 (100.00)	26916 (100.00)	26731 (100.00)
II) Storage, transportation and marketing cost					
Storage	-	0 (0.00)	0 (0.00)	1 (0.09)	1 (0.07)
Transportation	-	277 (28.54)	200 (25.45)	247 (27.18)	241 (27.04)
Marketing losses	-	285 (29.39)	204 (25.98)	141 (15.52)	160 (17.92)
Marketing (unloading, cleaning, etc)	-	351 (36.19)	334 (42.47)	359 (39.52)	355 (39.70)
Kind payments	-	57 (5.88)	48 (6.11)	155 (17.01)	132 (14.74)
Misc.	-	0 (0.00)	0 (0.00)	6 (0.68)	5 (0.54)
II) Total storage, transportation and marketing cost	-	970 (100.00)	786 (100.00)	909 (100.00)	893 (100.00)
Percent share to the total cost (I+II)					
Total input cost (I)	-	96.45	97.06	96.73	96.77
Total storage, transportation and marketing cost (II)	-	3.55	2.94	3.27	3.23
Productivity (qtl/ha)	-	27.00	25.66	27.62	27.28
TOTAL COST (I+II)	-	27335 (100.00)	26749 (100.00)	27824 (100.00)	27625 (100.00)

Figures in parentheses indicate per cent to the respective total cost

3.2.4 Overall Basmati (all varieties)

For overall basmati, weighted average cost of cultivation was worked by giving weights to area under each variety and is provided in Table 3.2.4. The weighted average variable cost of cultivation of overall basmati (all varieties) on the sample farms including cost involving the post harvest operations of basmati paddy was Rs. 30256 per ha. Out of this, variable input cost accounted for about 96 per cent where as the rest about 4 per cent constituted the post harvest/marketing costs. Category-wise, the lowest cost i.e. Rs 25752 per ha was observed to be on the marginal category farms and the highest i.e. Rs 30982 per ha on the large category farms. Proportionate share of total variable input cost in total cost on all the category farms was more or less about the same at 95-96 per cent. On all the groups of farms, the major share of total variable input cost was contributed by labour cost to the tune of about 50 per cent (varying from 45.73 % on marginal to 52.56 % on small farms) followed by the machine cost at about 19 per cent (varying from 18.12 % on large to 24.79 % on marginal farms). The other cost components like expenses on pesticides/weedicides accounted for about 14 per cent (varying from 12.52 % on small to 14.03 % on large farms) and expenditure on fertilizers and manures at about 13 per cent (varying from 9.79 % on marginal to 13.08 % on large farms) of the total variable input cost. On account of free electricity supply to irrigation pumps the expenditure on irrigation component accounted for only 1.78 per cent of total variable input cost on overall farms and it varied from 1.50 per cent on large farms to 3.99 per cent on marginal farms. Total cost on post harvest/marketing operations on overall sample farms was Rs 1325 per ha which varied from Rs 1239 per ha on marginal farms to Rs 1427 per ha on the small farms. Among different post harvest/marketing costs the unloading and cleaning accounted for the major part viz. about 40 per cent of total costs on this account on overall sample farms followed by transportation cost at 26.03 per cent. Among other marketing related costs kind payments, marketing losses, storage cost and miscellaneous expenses respectively accounted for 13.88, 11.30, 5.07 and 3.32 per cent of the total post harvest/marketing cost.

Table 3.2.4: Cost of Cultivation of Overall Basmati (All Varieties) on Sample Farms, Punjab, 2013-14

(Rs per ha)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total
I) Input costs					
Seed	660 (2.69)	712 (2.68)	707 (2.55)	761 (2.56)	743 (2.57)
Irrigation	978 (3.99)	422 (1.59)	707 (2.55)	445 (1.50)	515 (1.78)
Manure and fertilizer	2400 (9.79)	2890 (10.88)	3200 (11.53)	3890 (13.08)	3627 (12.54)
Labour (bullock + human)	11210 (45.73)	13958 (52.56)	13559 (48.85)	15074 (50.71)	14562 (50.33)
Machinery hire charges	6078 (24.79)	5250 (19.77)	5709 (20.57)	5385 (18.12)	5465 (18.89)
Pesticides/weedicides	3188 (13.00)	3325 (12.52)	3877 (13.97)	4170 (14.03)	4020 (13.89)
I) Total input cost	24513 (100.00)	26557 (100.00)	27759 (100.00)	29726 (100.00)	28931 (100.00)
II) Storage, transportation and marketing cost					
Storage	0 (0.00)	17 (1.19)	64 (4.96)	76 (6.04)	67 (5.07)
Transportation	535 (43.19)	486 (34.07)	266 (20.58)	278 (22.09)	345 (26.03)
Marketing losses	148 (11.93)	206 (14.47)	186 (14.40)	132 (10.49)	150 (11.30)
Marketing (unloading, cleaning, etc)	523 (42.22)	506 (35.43)	543 (41.97)	537 (42.71)	535 (40.40)
Kind payments	33 (2.65)	207 (14.52)	205 (15.83)	180 (14.33)	184 (13.88)
Misc.	0 (0.00)	5 (0.32)	29 (2.26)	55 (4.35)	44 (3.32)
II) Total storage, transportation and marketing cost	1239 (100.00)	1427 (100.00)	1293 (100.00)	1256 (100.00)	1325 (100.00)
Percent share to the total cost (I+II)					
Total input cost (I)	95.19	94.90	95.55	95.94	95.62
Total storage, transportation and marketing cost (II)	4.81	5.10	4.45	4.06	4.38
Productivity (qtl/ha)	40.24	38.90	41.75	41.28	41.18
TOTAL COST (I+II)	25752 (100.00)	27985 (100.00)	29052 (100.00)	30982 (100.00)	30256 (100.00)

Figures in parentheses indicate per cent to the respective total cost. Cost of cultivation for overall basmati is the weighted average with weights to area under each variety.

3.3 Profitability of Basmati Cultivation

It is imperative for the farmers to judiciously use the resources at their command to derive maximum possible per hectare economic benefits, thereby raising the living standard of the farm households. In this section variety-wise and overall profitability of basmati cultivation has been discussed as following:

3.3.1 Pusa Basmati 1121

Gross as well as the returns over variable costs (ROVC) from Pusa Basmati 1121 variety of basmati paddy cultivation are shown in Table 3.3.1. The average price received by overall farms for this variety was turned out to be Rs 3897 per qtl. The gross returns and returns over variable cost on overall farms were Rs 166796 and Rs 136104 per ha respectively. Per quintal gross returns and return over variable cost on these farms were Rs 3981 and Rs 3248 respectively. Amongst categories, the price received varied from highest on small farms (Rs 3928/ctl) to the lowest on marginal farms (Rs 3605/ctl). On marginal farms due to low price received and relatively low productivity, per ha gross as well as ROVC (Rs 148697/ha and Rs 122945/ha) were observed to be the lowest amongst all the categories. Although gross returns per quintal were the highest on small category of farms, still on account of relatively low productivity level the gross return (Rs 159178/ha) as well as ROVC (Rs 131151/ha) on this category of farms were significantly lower as compared to two larger categories. The gross returns on medium and large farms were Rs 169527 and Rs 167444 per ha respectively. The ROVC on these category of farms were recorded at Rs 140211 and Rs 135858 per ha respectively.

3.3.2 Pusa Punjab Basmati 1509

Information on economic viability of cultivation of Pusa Punjab Basmati 1509 on the sample farms is provided in Table 3.3.2. This variety was cultivated by only two categories of farms viz. medium and large ones. Price of this variety received by overall sample farms was Rs 2936 per qtl with negligible inter category difference in this regard. Similarly on overall sample farms per quintal ROVC were Rs 2459, and were almost same on both the category of farms. However, on account of low productivity on medium farms (46.79ctl/ha), per ha gross returns as well as ROVC at Rs 138205 and Rs 113897 were observed to be significantly lower than those on the large size farms with Rs 151538 and Rs 127339 respectively.

Table 3.3.1: Profitability of Pusa Basmati 1121 on Sample Farms, Punjab, 2013-14
(Rs on total sample farms)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total/Overall
Area (ha)	10.86	30.50	92.90	269.00	403.26
Production (qtl)	437.05	1210.25	3943.00	11305.50	16895.80
Price received on sale (Rs/qtl)	3605	3928	3914	3899	3897
Returns (Rs)					
Main product	1575482	4753294	15431585	44078125	65839199
By product	39368	101641	317486	964365	1422860
Gross Returns	1614850	4854935	15749070	45042490	67262058
Cost (Rs)					
Input cost	266206	810385	2600503	8153390	11830484
Marketing cost	13457	44443	122964	343298	546130
Total variable costs	279663	854828	2723468	8496688	12376614
ROVC	1335187	4000107	13025603	36545802	54885445
Total variable cost (Rs/ha)	25752	28027	29316	31586	30691
Gross returns (Rs/ha)	148697	159178	169527	167444	166796
ROVC (Rs/ha)	122945	131151	140211	135858	136104
Total variable cost (Rs/qtl)	640	706	691	752	733
Gross returns (Rs/qtl)	3695	4012	3994	3984	3981
ROVC (Rs/qtl)	3055	3305	3303	3233	3248
Quantity sold (Qtls)	422.00	1170.20	3824.95	11082.30	16499.45
Value of marketed surplus	1521230	4595996	14969576	43207908	64294710

(Note: Gross Returns = Value of Main Product (equal to Production*Price) +Value of by-product; Returns over Variable Cost (ROVC) = Gross Returns-Total Variable Costs; Value of Marketed Surplus=Quantity sold*price; Gross Returns/ha=Gross Returns/area sown under the crop; Gross Returns/qtl=Gross Returns/production of the crop)

Table 3.3.2: Profitability of Pusa Punjab Basmati 1509 on Sample Farms, Punjab, 2013-14
(Rs on total sample farms)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total/Overall
Area (ha)	-	-	2.80	12.60	15.40
Production (qtl)	-	-	131.00	651.00	782.00
Price received on sale (Rs/qtl)	-	-	2954	2933	2936
Returns (Rs)					
Main product	-	-	386974	1909383	2295952
By product	-	-	0	0	0
Gross Returns	-	-	386974	1909383	2295952
Cost (Rs)					
Input cost	-	-	64799	285894	350693
Marketing cost	-	-	3263	19012	22185
Total variable costs	-	-	68062	304906	372878
ROVC	-	-	318912	1604477	1923074
Total variable cost (Rs/ha)	-	-	24308	24199	24213
Gross returns (Rs/ha)	-	-	138205	151538	149088
ROVC (Rs/ha)	-	-	113897	127339	124875
Total variable cost (Rs/qtl)	-	-	520	468	477
Gross returns (Rs/qtl)	-	-	2954	2933	2936
ROVC (Rs/qtl)	-	-	2434	2465	2459
Quantity sold (Qtls)	-	-	131.00	648.00	779.00
Value of marketed surplus	-	-	386974	1900584	2287144

(Note: Gross Returns = Value of Main Product (equal to Production*Price) +Value of by-product; Returns over Variable Cost (ROVC) = Gross Returns-Total Variable Costs; Value of Marketed Surplus=Quantity sold*price; Gross Returns/ha=Gross Returns/area sown under the crop; Gross Returns/qtl=Gross Returns/production of the crop)

3.3.3 Traditional Basmati

Traditional aromatic variety of basmati was cultivated by all the categories of farms except marginal ones; however area under this variety was hardly 6 per cent of the total area under basmati on the sample farms. Category-wise as well on overall returns received by farmers farms on cultivation of this variety are presented in Table 3.3.3.

On overall sample farms cultivation of this variety yielded gross returns and ROVC to the tune of Rs 144777 and Rs 117152 per ha respectively. Category-wise, per ha gross returns and ROVC were observed on the large farms were Rs 146434 and Rs 118610 respectively which were significantly higher as compared to that received by small and medium farms. Average

price and ROVC per quintal from this variety on overall farms observed to be Rs 5199 per qtl and Rs 4295 per qtl respectively, and these were quite higher as compared to that received from the other two varieties. As there was very little variation in price received for traditional variety by different category of farmers, the category-wise difference in per ha gross returns and ROVC were mainly on account of the yield differences among the farm categories.

Table 3.3.3: Profitability of Traditional Basmati on Sample Farms, Punjab, 2013-14
(Rs on total sample farms)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total/Overall
Area (ha)	-	2.00	4.90	24.40	31.30
Production (qtl)	-	54.00	125.75	674.00	853.75
Price received on sale (Rs/qtl)	-	5210	5215	5195	5199
Returns (Rs)					
Main product	-	281340	655786	3501430	4438646
By product	-	7200	14112	71553	92865
Gross Returns	-	288540	669898	3572983	4531511
Cost (Rs)					
Input cost	-	52730	127222	656738	836691
Marketing cost	-	1940	3850	22169	27958
Total variable costs	-	54670	131072	678908	864649
ROVC	-	233871	538826	2894075	3666862
Total variable costs (Rs/ha)	-	27335	26749	27824	27625
Gross returns (Rs/ha)	-	144270	136714	146434	144777
ROVC (Rs/ha)	-	116935	109965	118610	117152
Total variable costs (Rs/qtl)	-	1012	1042	1007	1013
Gross returns (Rs/qtl)	-	5343	5327	5301	5308
ROVC (Rs/qtl)	-	4331	4285	4294	4295
Quantity sold (Qtls)	-	52.75	122.15	656.75	831.65
Value of marketed surplus	-	274828	637012	3411816	4323748

(Note: Gross Returns = Value of Main Product (equal to Production*Price) +Value of by-product; Returns over Variable Cost (ROVC) = Gross Returns-Total Variable Costs; Value of Marketed Surplus=Quantity sold*price; Gross Returns/ha=Gross Returns/area sown under the crop; Gross Returns/qtl=Gross Returns/production of the crop)

3.3.4 Overall Basmati (All varieties)

The weighted average returns from cultivation of overall basmati (all varieties) have been presented in Table 3.3.4. Among different varieties grown by the sample farms, cost and returns of Pusa Basmati 1121 variety accounting for more than 90 per cent of total area under basmati cultivation determined the profitability for the overall profitability of basmati cultivation. Per ha

gross returns and ROVC on overall sample farms were Rs 164658 and Rs 134402 respectively. Among different categories the gross returns were found to be highest on medium size farms (Rs 167057/ha) and lowest on the marginal farms (Rs 148697/ha). ROVC were also observed to be highest on medium size farms (Rs 138005/ha) and lowest on the marginal farms (Rs 122945/ha). Lowest returns on marginal farms were particularly due to the relatively low price received by them for their produce (particularly for Pusa Basmati 1121) which was significantly lower at Rs 3605 per quintal against overall average price received by the sample farms at Rs 3915 per quintal.

Table 3.3.4: Profitability of Overall Basmati Cultivation (All Varieties) on Sample Farms, Punjab, 2013-14

(Rs on total sample farms)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total/Overall
Area (ha)	10.86	32.50	100.60	306.00	449.96
Production (qtl)	437.05	1264.25	4199.75	12630.50	18532
Price received on sale (Rs/qtl)	3605	3983	3922	3917	3915
Returns (Rs)					
Main product	1575482	5034634	16474345	49488938	72573797
By product	39368	108841	331598	1035918	1515725
Gross Returns	1614850	5143475	16805943	50524856	74089522
Cost (Rs)					
Input cost	266206	863115	2792525	9096022	13017868
Marketing cost	13457	46383	130077	384480	596273
Total variable costs	279663	909498	2922602	9480502	13614141
ROVC	1335187	4233977	13883341	41044354	60475381
Total variable costs (Rs/ha)	25752	27985	29052	30982	30256
Gross returns (Rs/ha)	148697	158261	167057	165114	164658
ROVC (Rs/ha)	122945	130276	138005	134132	134402
Total variable costs (Rs/qtl)	640	719	696	751	735
Gross returns (Rs/qtl)	3695	4068	4002	4000	3998
ROVC (Rs/qtl)	3055	3349	3306	3250	3263
Quantity sold (Qtls)	422.00	1222.95	4078.10	12387.05	18110.10
Value of marketed surplus	1521230	4870824	15993589	48520197	70905839

(Note: Gross Returns = Value of Main Product (equal to Production*Price) +Value of by-product; Returns over Variable Cost (ROVC) = Gross Returns-Total Variable Costs; Value of Marketed Surplus=Quantity sold*price; Gross Returns/ha=Gross Returns/area sown under the crop; Gross Returns/qtl=Gross Returns/production of the crop)

Chapter 4

Marketing of Basmati Rice

Consequent to the severe food grain crisis of the mid-1960s as well as earlier experiences, the Government of India has developed a system of institutions with the objective of supporting, controlling and stabilizing food grain prices in India, and seeking to assure basic food availability at reasonable prices to the people. The government is involved in both direct market operations/interventions, as well as in the development of infrastructure, and a legal framework for the private marketing system. The private system includes regulated and unregulated wholesale markets and sub-markets totalling to about 6800 - both rural (primary) and urban, over 26,930 rural periodic markets, and a huge number of private retail shops. Recently, in the early 2000s, three national multi-commodity exchanges have been added to this system and have introduced electronic trading and futures markets. Over the last decade, the more active MSP (Minimum Support Price) and procurement policies of the Government of India (GOI) may have significantly reduced the role and activities of private traders in case of wheat and non-basmati rice (Gandhi and Koshy, 2006). The uncertainties regarding the price and volume of sales from large GOI stocks often make it difficult for private traders to play their role in the marketing of non-basmati in a significant way. In contrast, the private traders play major role in the marketing of basmati rice in state, national and international level. The large numbers of intermediaries involved in market transactions, bagged handling and storage, lack of grades, standards and inspections, etc. effects India's grain markets efficiency. Given the major role of basmati rice in both, farm income in Punjab as well as in earning the much needed foreign exchange, inefficiencies in marketing would impose significant costs on producers, consumers, and the economy as a whole. This section deals with the marketing channels/trade involved in the basmati rice in state.

4.1 Farmer's Disposal Pattern of Basmati Paddy

The Variety-wise disposal pattern of marketed surplus of basmati paddy according to type of market by the respondent farmers is presented in Table 4.1.1 to Table 4.1.3 and for overall basmati in Table 4.1.4.

As revealed by data, about 96 per cent of the sample farmers had disposed of their basmati crop through regulated markets (Table 4.1.4). Category-wise all of the small and medium farmers have disposed of their basmati produce of different varieties through regulated markets only. About 90 per cent marginal farmers and 93 per cent of the large farmers also had disposed of their marketed surplus through this channel. While 3.23 per cent of overall farmers sold in the village market there were only of about half per cent of the total farmers who sold their produce through other channel (particularly directly to processor). Category-wise, 11.11 per cent marginal farmers and 5.33 per cent large farmers disposed of their marketed surplus in the village market.

Table 4.1.1: Disposal Pattern of Marketed Surplus of Pusa Basmati 1121, Punjab, 2013-14.

Farm Category	Village market	Commission agent	Regulated market	Govt agencies	Others	Total
Number of households marketing through various channels						
Marginal	2	0	16	0	0	18
Small	0	0	30	0	0	30
Medium	0	0	48	0	0	48
Large	3	0	50	0	1	54
Total	5	0	144	0	1	150
% of total households in the size group marketing through various channels						
Marginal	11.11	0.00	88.89	0.00	0.00	100.00
Small	0.00	0.00	100.00	0.00	0.00	100.00
Medium	0.00	0.00	100.00	0.00	0.00	100.00
Large	5.56	0.00	92.59	0.00	1.85	100.00
Total	3.33	0.00	96.00	0.00	0.67	100.00

Variety-wise, Pusa basmati 1121 was the dominant variety as all the farmers had sown this variety which accounted for nearly 90 per cent of total area under basmati on sample farms; its disposal pattern was same as discussed above for the overall basmati (Table 4.1.1). Among medium and large farmers who had sown the Pusa Punjab 1509 variety, all of the medium farmers and 87.50 per cent of the large farmers had disposed of their marketed surplus of this variety through the regulated markets (Table 4.1.2). In addition 12.50 per cent of large farmers had sold this variety in the village market. In case of traditional basmati which was sown by small, medium and large farmers all of the farmers had sold their output through regulated markets only (Table 4.1.3).

Table 4.1.2: Disposal Pattern of Marketed Surplus of Pusa Punjab Basmati 1509, Punjab, 2013-14.

Farm Category	Village market	Commission agent	Regulated market	Govt agencies	Others	Total
Number of households marketing through various channels						
Marginal	0	0	0	0	0	0
Small	0	0	0	0	0	0
Medium	0	0	3	0	0	3
Large	1	0	7	0	0	8
Total	1	0	10	0	0	11
% of total households in the size group marketing through various channels						
Marginal	0.00	0.00	0.00	0.00	0.00	0.00
Small	0.00	0.00	0.00	0.00	0.00	0.00
Medium	0.00	0.00	100.00	0.00	0.00	100.00
Large	12.50	0.00	87.50	0.00	0.00	100.00
Total	9.09	0.00	90.91	0.00	0.00	100.00

Table 4.1.3: Disposal Pattern of Marketed Surplus of Traditional Basmati, Punjab, 2013-14.

Farm Category	Village market	Commission agent	Regulated market	Govt agencies	Others	Total
Number of households marketing through various channels						
Marginal	0	0	0	0	0	0
Small	0	0	4	0	0	4
Medium	0	0	8	0	0	8
Large	0	0	13	0	0	13
Total	0	0	25	0	0	25
% of total households in the size group marketing through various channels						
Marginal	0.00	0.00	0.00	0.00	0.00	0.00
Small	0.00	0.00	100.00	0.00	0.00	100.00
Medium	0.00	0.00	100.00	0.00	0.00	100.00
Large	0.00	0.00	100.00	0.00	0.00	100.00
Total	0.00	0.00	100.00	0.00	0.00	100.00

Table 4.1.4: Disposal Pattern of Marketed Surplus of Overall Basmati (All Varieties), Punjab, 2013-14.

Farm Category	Village market	Commission agent	Regulated market	Govt agencies	Others	Total
Number of households marketing through various channels						
Marginal	2	0	16	0	0	18
Small	0	0	30	0	0	30
Medium	0	0	48	0	0	48
Large	3	0	50	0	1	54
Total	5	0	144	0	1	150
% of total households in the size group marketing through various channels						
Marginal	11.11	0.00	88.89	0.00	0.00	100.00
Small	0.00	0.00	100.00	0.00	0.00	100.00
Medium	0.00	0.00	100.00	0.00	0.00	100.00
Large	5.56	0.00	92.59	0.00	1.85	100.00
Total	3.33	0.00	96.00	0.00	0.67	100.00

4.2 Market-wise Disposal pattern of Marketed Surplus

The disposal of quantities of marketed surplus in different types of markets in absolute physical terms as well as in proportionate terms along with the prices received are presented in Table 4.2.1 to Table 4.2.4.

4.2.1 Pusa Basmati 1121

Quantity and share in total marketed surplus of Pusa 1121 variety disposed off by farmers in different markets and price received is presented in Table 4.2.1a and 4.2.1b respectively. It has been found that total per farm quantity sold by sample respondents was 110 quintals which fetched an average price of Rs 3897/ql. Out of this the major proportion viz. 96.95 per cent (106.64 qtl/farm) was sold in regulated markets at price Rs 3906/ql. Per farm proportionate share of marketed surplus sold in other channels like village market and to others (directly to processors) was only 2.14 per cent (2.35 qtl/farm) and 0.92 per cent (1.01 qtl/farm) respectively. The average price received in these respective markets was Rs 3225/ql and Rs 4500/ql. Category-wise, marginal farmers sold their 91.94 per cent marketed surplus in regulated markets at price of Rs 3636/ql and 8.06 per cent in the village market at price of Rs 3247/ql. The large farmers had sold their 95.76 per cent proportion of total marketed surplus in the regulated market at price of Rs 3911/ql followed by 2.88 per cent in village market at price of Rs 3223/ql and

other 1.36 per cent to others at price of Rs 4500/qtl. Small and medium farmers had sold their entire marketed surplus in regulated market at price of Rs 3928/qtl and Rs 3914/qtl respectively.

Table 4.2.1a: Quantity Sold through Various Channels and Price Received - Pusa Basmati 1121, Punjab, 2013-14.

Farm Category	Village market		Commission Agent		Regulated market		Govt agencies		Others (Miller)		Total	
	Qty Sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price*
Marginal	34.00 (1.89)	3247	-	-	388.00 (21.56)	3636	-	-	-	-	422.00 (23.44)	3605
Small	-	-	-	-	1170.20 (39.01)	3928	-	-	-	-	1170.20 (39.01)	3928
Medium	-	-	-	-	3824.95 (79.69)	3914	-	-	-	-	3824.95 (79.69)	3914
Large	319.00 (5.91)	3223	-	-	10612.30 (196.52)	3911	-	-	151.0 (2.80)	4500	11082.30 (205.23)	3899
Total	353.00 (2.35)	3225	-	-	15995.45 (106.64)	3906	-	-	151.0 (1.01)	4500	16499.45 (110.0)	3897

Note: Figures in parentheses denote quantity sold per farm; *Weighted average price

Table 4.2.1b: Percentage of Quantity Sold through Various Channels - Pusa Basmati 1121, Punjab, 2013-14.

Farm category	Village market	Commission Agent	Regulated market	Govt agencies	Others (Miller)	Total
Marginal	8.06	-	91.94	-	-	100.00
Small	-	-	100.00	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	2.88	-	95.76	-	1.36	100.00
Total	2.14	-	96.95	-	0.92	100.00

4.2.2 Pusa Punjab basmati 1509

The per farm marketed surplus of this variety on overall sample farms was 5.19 quintal and on average it was sold at price of Rs 2936/qtl (Table 4.2.2a). Out of this 79.46 per cent (4.13 qtl/farm) was disposed of in the regulated market at Rs 2997/qtl and the rest 20.54 per cent (1.07 qtl/farm) was sold in the village market at price of Rs 2700/qtl (Table 4.2.2a and Table 4.2.2b). Category-wise, while the medium farmers had sold their entire marketed surplus in the regulated market at Rs 2954/qtl, the large farmers sold their 75.31 per cent and 24.69 per cent of the

marketed surplus in regulated market and village market at price of Rs 3009/ql and 2700/ql respectively. Medium and small farmers had not sown this newly released variety of basmati.

Table 4.2.2a: Quantity Sold through Various Channels and Price Received - Pusa Punjab Basmati 1509, Punjab, 2013-14.

Farm category	Village market		Commission Agent		Regulated market		Govt agencies		Others (specify)		Total	
	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price*
Marginal	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	131.00 (2.73)	2954	-	-	-	-	131 (2.73)	2954
Large	160 (2.96)	2700	-	-	488.00 (9.04)	3009	-	-	-	-	648 (12.0)	2933
Total	160 (1.07)	2700	-	-	619.00 (4.13)	2997	-	-	-	-	779 (5.19)	2936

Note: Figures in parentheses denote quantity sold per farm; *Weighted average price

Table 4.2.2b: Percentage of Quantity Sold through Various Channels – Pusa Punjab Basmati 1509, Punjab, 2013-14.

Farm category	Village market	Commission Agent	Regulated market	Govt agencies	Others (specify)	Total
Marginal	-	-	-	-	-	-
Small	-	-	-	-	-	-
Medium	-	-	100.00	-	-	100.00
Large	24.69	-	75.31	-	-	100.00
Total	20.54	-	79.46	-	-	100.00

4.2.3 Traditional basmati

Information on disposal of traditional variety of basmati presented in Table 4.2.3a and 4.2.3b revealed that marketed surplus of this variety on overall sample farms was 5.54 quintals per farm which on average fetched price of Rs 5199/ql. Category-wise, all the categories of farmers who had sown this variety viz. small, medium and large farmer had sold their entire marketed surplus in the regulated markets only and fetched price of Rs 5210, Rs 5215 and Rs 5195 per quintal respectively. Marginal farmers had not sown this variety.

Table 4.2.3a: Quantity Sold through Various Channels and Price Received - Traditional Basmati, Punjab, 2013-14.

(Quantity in qtls; Price in Rs/ctl)

Farm category	Village market		Commission Agent		Regulated market		Govt agencies		Others (specify)		Total	
	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price*
Marginal	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	52.75 (1.76)	5210	-	-	-	-	52.75 (1.76)	5210
Medium	-	-	-	-	122.15 (2.54)	5215	-	-	-	-	122.15 (2.54)	5215
Large	-	-	-	-	656.75 (12.16)	5195	-	-	-	-	656.75 (12.16)	5195
Total	-	-	-	-	831.65 (5.54)	5199	-	-	-	-	831.65 (5.54)	5199

Note: Figures in parentheses denote quantity sold per farm; *Weighted average price

Table 4.2.3b: Percentage of Quantity Sold through Various Channels - Traditional Basmati, Punjab, 2013-14.

Farm category	Village market	Commission Agent	Regulated market	Govt agencies	Others (specify)	Total
Marginal	-	-	100.00	-	-	100.00
Small	-	-	100.00	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
Total	-	-	100.00	-	-	100.00

4.2.4 Overall Basmati (All varieties)

Quantity and share in total marketed surplus of overall basmati (all varieties) disposed of by farmers in different markets and price received is presented in Table 4.2.4a and 4.2.4b. On overall sample farms, per farm marketed surplus of all varieties of basmati collectively was recorded at 120.73 quintals which was sold on an average price of Rs 3915/ctl. Out of this 116.31 q/farm accounting for 96.33 per cent of marketed surplus was sold in the regulated market at price of Rs 3935/ctl. Per farm quantity of marketed surplus sold in other channels like village market and to others was only 3.42 quintal (2.83 %) and 1.01 quintal (0.83 %). The average price received in the respective markets was Rs 3062/ctl and Rs 4500/ctl. Category-wise, marginal farmers sold their 91.94 per cent marketed surplus in regulated markets at price of

Rs 3636/ql and 8.06 per cent in the village market at price of Rs 3247/ql. The large farmers had sold their 94.91 per cent proportion of total marketed surplus in the regulated market at price of Rs 3945/ql followed by 3.87 per cent in village market at price of Rs 3048/ql and other 1.22 per cent to others at price of Rs 4500/ql. Small and medium farmers had sold their entire marketed surplus in regulated market at price of Rs 3983/ql and Rs 3922/ql respectively. Category-wise, for overall marketed surplus the average price received by small, medium and large farmers had very small difference and it varied from Rs 3917/ql to Rs 3983/ql received by the large and small farmers respectively. However, the lowest price was received by the marginal farmers (Rs 3605/ql). Lack of bargaining power as well as selling relatively largest proportion (60.19%) of marketed surplus during October, month in which the prices remained significantly low as compared to other months of marketing year seems to be the reason for relative overall low price received by marginal farmers for their marketed surplus.

Table 4.2.4a: Quantity Sold through Various Channels and Price Received – Overall Basmati (All Varieties), Punjab, 2013-14.

Farm category	Village market		Commission Agent		Regulated market		Govt agencies		Others (Miller)		Total	
	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price	Qty sold	Price*
Marginal	34.00 (1.89)	3247	-	-	388.00 (21.56)	3636	-	-	-	-	422.00 (23.44)	3605
Small	-	-	-	-	1222.95 (40.77)	3983	-	-	-	-	1222.95 (40.77)	3983
Medium	-	-	-	-	4078.10 (84.96)	3922	-	-	-	-	4078.10 (84.96)	3922
Large	479.0 (8.87)	3048	-	-	11757.05 (217.72)	3945	-	-	151.0 (2.80)	4500	12387.05 (229.39)	3917
Total	513.0 (3.42)	3062	-	-	17446.10 (116.31)	3935	-	-	151.0 (1.01)	4500	18110.10 (120.73)	3915

Note: Figures in parentheses denote quantity sold per farm; *Weighted average price

Table 4.2.4b: Percentage of Quantity Sold through Various Channels - Overall Basmati (All Varieties), Punjab, 2013-14.

Farm category	Village market	Commission Agent	Regulated market	Govt agencies	Others (specify)	Total
Marginal	8.06	-	91.94	-	-	100.00
Small	0.00	-	100.00	-	-	100.00
Medium	0.00	-	100.00	-	-	100.00
Large	3.87	-	94.91	-	1.22	100.00
Total	2.83	-	96.33	-	0.83	100.00

4.3 Month-wise Disposal of Basmati Paddy and Prices Received

Variety-wise pattern of disposal of basmati rice with respect to time of sale and price received are presented in Table 4.3.1 to 4.3.3 and for overall basmati in Table 4.3.4.

4.3.1 Pusa Basmati 1121

Monthly disposal pattern of Pusa Basmati 1121 by the farmers along with prices received during different months is presented in Table 4.3.1. The data revealed that sample farmers had sold about 85 per cent of their marketed surplus during the crop harvesting months of October and November. During October, the month during which harvesting season starts about 36 per cent of the total marketed surplus was sold, however the average price received during this month was Rs 3498/ql which was 10.18 per cent lower than the average annual prices received by the farmers. This may be due to the high moisture content of output during October month. The proportion of marketed surplus sold during month of November was nearly 49 per cent which on average fetched price of Rs 4033/ql which was 3.60 per cent higher relative to the annual average price of Rs 3897/ql. During December, January, February, and March onwards months of the marketing year 2013-14, the overall quantity sold constituted 3.36, 3.92, 3.20 and 4.21 per cent of the marketed surplus respectively. Respective prices received during these months were Rs 4354, Rs 4378, Rs 4396 and Rs 4461/ql which were 11.73, 12.34, 12.81 and 14.48 per cent higher as compared to the annual average price received by the farmers. Category-wise it was found that marginal farmers had sold their entire marketed surplus during harvesting months, small farmers besides selling their major proportion (93.29%) of marketed surplus in harvesting months also sold a small proportion (6.70%) during the month of December. Medium farmers besides selling major proportion in months of October and November also sold during

the months of December (5.15%) and January (5.52%). It was the large farmers who on account of their output holding capacity had sold their marketed surplus even after month of January. Besides selling major proportions of marketed surplus during October and November months, the large farmers had also sold 2.51, 3.93, 4.76 and 6.27 per cent of their marketed surplus during the months of December, January, February and March onwards respectively.

Market-wise, monthly information on disposal and prices had shown that sales in village market took place only during harvesting months of October and November and monthly price received in comparison to overall average price in this (village) market was 4.15 per cent lower and 4.95 per cent higher during October and November respectively. In regulated market, almost 86 per cent marketed surplus of Pusa 1121 was sold during the months of October and November. While the price received during month of October in comparison to annual average price of regulated market was 10.8 per cent lower, the price received during November was observed to be 3.70 per cent higher. In all other months the prices received by farmers for Pusa 1121 remained above the annual average price of regulated market by about 11 to 14 percent. Apart from this, some large farmers had sold their produce out of market in months of March onwards and received the higher prices of Rs 4500/ql against overall average price of Rs 3897/ql.

4.3.2 Pusa Punjab Basmati 1509

Month-wise disposal pattern of Pusa Punjab Basmati 1509 by the farmers along with prices received during different months is presented in Table 4.3.2. This variety was sown by only medium and large farmers and 38.77 per cent proportion of the marketed surplus was sold by the overall respondents in the month of October at a price (2762/ql) which was lower by 5.92 per cent as compared to the overall annual average price received by the farmers. Major proportion of marketed surplus of this variety (50.32%) was sold during the month of November at a price of Rs 2948/ql which was almost equivalent to the overall annual average price of Rs 2936/ql. Another 10.91 per cent share of overall marketed surplus was sold during the months March onward at significantly higher price of Rs 3500/ql.

Category-wise, the medium farmers had sold their 70.23 per cent and 29.77 per cent of marketed surplus during the months of October and November. During these months the large farmers had disposed off 32.41 per cent and 54.48 per cent of their marketed surplus respectively while rest 13.12 percent was sold in months of March onwards. Market-wise, while the output in

village market was sold only during the month of October, in regulated market the proportion of sales accounted for 22.94, 63.33, and 13.73 per cent share of total quantity sold in this market during months of October, November and March onwards respectively.

4.3.3 Traditional Basmati

Information on monthly disposals of this long duration traditional basmati presented in Table 4.3.3 reveals that this variety was sold through the regulated market only. Further, the major proportion of overall farmers' marketed surplus of this variety viz. 78.24 per cent was sold during the month of December at a price of Rs 5217/qtl which was almost equivalent to the overall annual average price (Rs 5199/q) received by the farmers. Harvesting of this variety starts in the month of November and about 18.82 per cent of total marketed surplus was sold during this month at a little low price of Rs 5110/qtl when compared to the overall annual average price. A small proportion accounting for 2.95 per cent of the marketed surplus of this variety was sold during the month of February which fetched 1.94 per cent relatively higher price than the annual average price. Category-wise the entire marketed surplus on small and medium farmers was sold during the month of December only at price of Rs 5210/qtl and Rs 5215/qtl respectively. The large farmers had sold their major proportion to the tune of 72.44 per cent during December and the rest 23.83 per cent and 3.73 per cent during the months of November and February respectively.

4.3.4 Overall Basmati (all varieties)

Data on monthly disposal pattern of overall basmati marketed surplus by the sample farmers along with prices received during different months is presented in Table 4.3.4. It was observed that sample farmers had sold 82.43 per cent of their marketed surplus during the crop harvesting period consisting months of October and November of marketing year 2013-14. During October, 34.44 per cent of the total marketed surplus was sold, however the price received during this month was Rs 3463/qtl which on an average was 11.55 per cent lower than the average annual prices (Rs 3915/qtl) received by the farmers. As harvesting season starts in October, the high moisture content of output during this month results in the low prices. The proportion of marketed surplus sold during month of November was 47.99 per cent which on average fetched price of Rs 4007/qtl which was 2.35 per cent higher relative to the annual average price. During December, January, February and others months (March onwards) of the marketing year 2013-14, the overall quantity sold constituted 6.65, 3.57, 3.05 and 4.31 per cent

of the marketed surplus respectively. Respective prices received during these months were Rs 4820, Rs 4378, Rs 4436 and Rs 4356/ql which were 23.10, 11.81, 13.30 and 11.26 per cent higher as compared to the annual average price received by the farmers. During December month nearly 78 per cent of total marketed surplus of the traditional aromatic basmati fetching significant higher price was sold, which is reflected in the price received for overall basmati during this month. Category-wise it was found that marginal farmers had sold their entire marketed surplus during harvesting months. The small farmers besides selling 89.27 per cent of their marketed surplus in harvesting months had also sold 10.73 per cent of it during the month of December. Medium farmers besides selling major proportion (86.99%) of marketed surplus in months of October and November had also sold during the months of December (7.82%) and January (5.18%). It was the large farmers who on account of their output holding capacity had sold their marketed surplus even after month of January. Besides selling major proportions (79.64%) of marketed surplus during October and November months, farmers of this category had also sold significant proportions viz. 6.09, 3.51, 4.46 and 6.30 per cent during the months of December, January, February and March onwards respectively.

Market-wise monthly information on disposal and prices had shown that sales in village market took place only during harvesting months of October and November and monthly price received in comparison to overall annual average price in this (village) market was 4.34 per cent lower and 10.57 per cent higher during October and November respectively. In regulated market, 82.62 per cent marketed surplus of total basmati crop was sold during the months of October and November. While the price received during month of October in comparison to annual average price of regulated market was 11.17 per cent lower, the price received during November was observed to be 2.13 per cent higher. In all other months (except December when more than three-fourth output of highly priced traditional basmati was sold), the prices received by farmers for overall basmati crop remained above the annual average price in regulated market by about 9 to 13 percent. Apart from this, a few large farmers with their holding capacity fetched higher price to the tune of Rs 4500/ql by selling their produce during the lean period consisting months of March onward.

Table 4.3.1: Month-wise and Market-wise Sales of Pusa Basmati 1121, Sample Farmers, Punjab, 2013-14

Farm category	October		November		December		January		February		Other months		Total	
	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price*
VILLAGE MARKET														
Marginal	4 (11.76)	2700 (-16.85)	30 (88.24)	3320 (2.25)	-	-	-	-	-	-	-	-	34.00 (100.00)	3247 (100.00)
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	188 (58.93)	3100 (-3.82)	131 (41.07)	3400 (5.49)	-	-	-	-	-	-	-	-	319.00 (100.00)	3223 (100.00)
Total	192 (54.39)	3092 (-4.15)	161 (45.61)	3385 (4.95)	-	-	-	-	-	-	-	-	353.00 (100.00)	3225 (100.00)
REGULATED MARKET														
Marginal	250 (64.43)	3623 (-0.36)	138 (35.57)	3660 (0.66)	-	-	-	-	-	-	-	-	388.00 (100.00)	3636 (100.00)
Small	317.5 (27.13)	3544 (-9.77)	774.25 (66.16)	4042 (2.91)	78.45 (6.70)	4350 (10.76)	-	-	-	-	-	-	1170.20 (100.00)	3928 (100.00)
Medium	1468.75 (38.40)	3621 (-7.48)	1948 (50.93)	4040 (3.23)	196.9 (5.15)	4325 (10.51)	211.3 (5.52)	4400 (12.43)	-	-	-	-	3824.95 (100.00)	3914 (100.00)
Large	3706 (34.92)	3459 (-11.55)	5120.75 (48.25)	4066 (3.97)	278.7 (2.63)	4375 (11.88)	435.05 (4.10)	4367 (11.67)	527.8 (4.97)	4396 (12.41)	544 (5.13)	4450 (13.79)	10612.30 (100.00)	3911 (100.00)
Total	5742.25 (35.90)	3512 (-10.08)	7981 (49.90)	4050 (3.70)	554.05 (3.46)	4354 (11.46)	646.35 (4.04)	4378 (12.08)	527.8 (3.30)	4396 (12.55)	544 (3.40)	4450 (13.93)	15995.45 (100.00)	3906 (100.00)
OTHERS														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-	-	151 (100.00)	4500 (0.00)	151.00 (100.00)	4500 (100.00)
Total	-	-	-	-	-	-	-	-	-	-	151 (100.00)	4500 (0.00)	151.00 (100.00)	4500 (100.00)
OVERALL														
Marginal	254 (60.19)	3608 (0.10)	168 (39.81)	3599 (-0.15)	-	-	-	-	-	-	-	-	422.00 (100.00)	3605 (100.00)
Small	317.5 (27.13)	3544 (-9.77)	774.25 (66.16)	4042 (2.91)	78.45 (6.70)	4350 (10.76)	-	-	-	-	-	-	1170.20 (100.00)	3928 (100.00)
Medium	1468.75 (38.40)	3621 (-7.48)	1948 (50.93)	4040 (3.23)	196.9 (5.15)	4325 (10.51)	211.3 (5.52)	4400 (12.43)	-	-	-	-	3824.95 (100.00)	3914 (100.00)
Large	3894 (35.14)	3442 (-11.73)	5251.75 (47.39)	4049 (3.86)	278.7 (2.51)	4375 (12.21)	435.05 (3.93)	4367 (12.01)	527.8 (4.76)	4396 (12.75)	695 (6.27)	4461 (14.42)	11082.30 (100.00)	3899 (100.00)
Total	5934.25 (35.97)	3499 (-10.22)	8142 (49.35)	4033 (3.60)	554.05 (3.36)	4354 (11.73)	646.35 (3.92)	4378 (12.34)	527.8 (3.20)	4396 (12.81)	695 (4.21)	4461 (14.48)	16499.45 (100.00)	3897 (100.00)

Figures in the brackets indicate the per cent share to the total quantity sold and percent change (increase or decrease) over average annual price of respective market; *Weighted average price

Table 4.3.2: Month-wise and Market-wise Sales of Pusa Punjab Basmati 1509, Sample Farmers, Punjab, 2013-14

(Quantity in qtls; Price in Rs/qty)

Farm category	October		November		December		January		February		Other months		Total	
	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price*
VILLAGE MARKET														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	160 (100.00)	2700 (0.00)	-	-	-	-	-	-	-	-	-	-	160.00 (100.00)	2700 (100.00)
Total	160 (100.00)	2700 (0.00)	-	-	-	-	-	-	-	-	-	-	160.00 (100.00)	2700 (100.00)
REGULATED MARKET														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	92 (70.23)	2850 (-3.53)	39 (29.77)	3200 (8.32)	-	-	-	-	-	-	-	-	131.00 (100.00)	2954 (100.00)
Large	50 (10.25)	2800 (-6.94)	353 (72.34)	2920 (-2.95)	-	-	-	-	-	-	85 (17.42)	3500 (16.33)	488.00 (100.00)	3009 (100.00)
Total	142 (22.94)	2832 (-5.50)	392 (63.33)	2948 (-1.65)	-	-	-	-	-	-	85 (13.73)	3500 (16.78)	619.00 (100.00)	2997 (100.00)
OTHERS														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OVERALL														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	92 (70.23)	2850 (-3.53)	39 (29.77)	3200 (8.32)	-	-	-	-	-	-	-	-	131.00 (100.00)	2954 (100.00)
Large	210 (32.41)	2724 (-7.12)	353 (54.48)	2920 (-0.43)	-	-	-	-	-	-	85 (13.12)	3500 (19.35)	648.00 (100.00)	2933 (100.00)
Total	302 (38.77)	2762 (-5.92)	392 (50.32)	2948 (0.40)	-	-	-	-	-	-	85 (10.91)	3500 (19.20)	779.00 (100.00)	2936 (100.00)

Figures in the brackets indicate the per cent share to the total quantity sold and percent change (increase or decrease) over average annual price of the respective market; *Weighted average price

Table 4.3.3: Month-wise and Market-wise Sales of Traditional Basmati, Sample Farmers, Punjab, 2013-14

(Quantity in qtls; Price in Rs/ctl)

Farm category	October		November		December		January		February		Other months		Total	
	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price*
VILLAGE MARKET														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REGULATED MARKET														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	52.75 (100.00)	5210 (0.00)	-	-	-	-	-	-	52.75 (100.00)	5210 (100.00)
Medium	-	-	-	-	122.15 (100.00)	5215 (0.00)	-	-	-	-	-	-	122.15 (100.00)	5215 (100.00)
Large	-	-	156.50 (23.83)	5110 (-1.64)	475.75 (72.44)	5218 (0.44)	-	-	24.50 (3.73)	5300 (2.01)	-	-	656.75 (100.00)	5195 (100.00)
Total	-	-	156.50 (18.82)	5110 (-1.71)	650.65 (78.24)	5217 (0.34)	-	-	24.50 (2.95)	5300 (1.94)	-	-	831.65 (100.00)	5199 (100.00)
OTHERS														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OVERALL														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	52.75 (100.00)	5210 (0.00)	-	-	-	-	-	-	52.75 (100.00)	5210 (100.00)
Medium	-	-	-	-	122.15 (100.00)	5215 (0.00)	-	-	-	-	-	-	122.15 (100.00)	5215 (100.00)
Large	-	-	156.50 (23.83)	5110 (-1.64)	475.75 (72.44)	5218 (0.44)	-	-	24.50 (3.73)	5300 (2.01)	-	-	656.75 (100.00)	5195 (100.00)
Total	-	-	156.50 (18.82)	5110 (-1.71)	650.65 (78.24)	5217 (0.34)	-	-	24.50 (2.95)	5300 (1.94)	-	-	831.65 (100.00)	5199 (100.00)

Figures in the brackets indicate the per cent share to the total quantity sold and percent change (increase or decrease) over average annual price of the respective market; *Weighted average price

Table 4.3.4: Month-wise and Market-wise Sales of Overall Basmati (All Varieties), Sample Farmers, Punjab, 2013-14

Farm category	October		November		December		January		February		Other months		Total	
	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price*
VILLAGE MARKET														
Marginal	4 (11.76)	2700 (-16.85)	30 (88.24)	3320 (2.25)	-	-	-	-	-	-	-	-	34.00 (100.00)	3247 (100.00)
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	348 (72.65)	2916 (-4.34)	131 (27.35)	3400 (11.53)	-	-	-	-	-	-	-	-	479.00 (100.00)	3048 (100.00)
Total	352 (68.62)	2914 (-4.83)	161 (31.38)	3385 (10.57)	-	-	-	-	-	-	-	-	513.00 (100.00)	3062 (100.00)
REGULATED MARKET														
Marginal	250 (64.43)	3623 (-0.36)	138 (35.57)	3660 (0.66)	-	-	-	-	-	-	-	-	388.00 (100.00)	3636 (100.00)
Small	317.5 (25.96)	3544 (-11.02)	774.25 (63.31)	4042 (1.49)	131.2 (10.73)	4696 (17.90)	-	-	-	-	-	-	1222.95 (100.00)	3983 (100.00)
Medium	1560.75 (38.27)	3576 (-8.83)	1987 (48.72)	4024 (2.59)	319.05 (7.82)	4666 (18.97)	211.30 (5.18)	4400 (12.19)	-	-	-	-	4078.10 (100.00)	3922 (100.00)
Large	3756 (31.95)	3450 (-12.54)	5630.25 (47.89)	4023 (1.98)	754.45 (6.42)	4907 (24.38)	435.05 (3.70)	4367 (10.70)	552.3 (4.70)	4436 (12.45)	629 (5.35)	4322 (9.55)	11757.05 (100.00)	3945 (100.00)
Total	5884.25 (33.73)	3496 (-11.17)	8529.5 (48.89)	4019 (2.13)	1204.7 (6.91)	4820 (22.48)	646.35 (3.70)	4378 (11.24)	552.3 (3.17)	4436 (12.73)	629 (3.61)	4322 (9.82)	17446.10 (100.00)	3935 (100.00)
OTHERS														
Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-	-	151 (100.00)	4500 (0.00)	151.00 (100.00)	4500 (100.00)
TOTAL	-	-	-	-	-	-	-	-	-	-	151 (100.00)	4500 (0.00)	151.00 (100.00)	4500 (100.00)
OVERALL														
Marginal	254 (60.19)	3608 (0.10)	168 (39.81)	3599 (-0.15)	-	-	-	-	-	-	-	-	422.00 (100.00)	3605 (100.00)
Small	317.5 (25.96)	3544 (-11.02)	774.25 (63.31)	4042 (1.49)	131.2 (10.73)	4696 (17.90)	-	-	-	-	-	-	1222.95 (100.00)	3983 (100.00)
Medium	1560.75 (38.27)	3576 (-8.83)	1987 (48.72)	4024 (2.59)	319.05 (7.82)	4666 (18.97)	211.3 (5.18)	4400 (12.19)	-	-	-	-	4078.10 (100.00)	3922 (100.00)
Large	4104 (33.13)	3405 (-13.07)	5761.25 (46.51)	4009 (2.35)	754.45 (6.09)	4907 (25.26)	435.05 (3.51)	4367 (11.49)	552.3 (4.46)	4436 (13.25)	780 (6.30)	4356 (11.21)	12387.05 (100.00)	3917 (100.00)
Total	6236.25 (34.44)	3463 (-11.55)	8690.5 (47.99)	4007 (2.35)	1204.7 (6.65)	4820 (23.10)	646.35 (3.57)	4378 (11.81)	552.3 (3.05)	4436 (13.30)	780 (4.31)	4356 (11.26)	18110.10 (100.00)	3915 (100.00)

Figures in the brackets indicate the per cent share to the total quantity sold and percent change (increase or decrease) over average annual price of the respective market;*Weighted average price

4.4 Government Support

The promotion of basmati paddy cultivation is part of the State Government's diversification plan aimed at reduction of area under water consuming common paddy crop in Punjab. Basmati paddy is relatively short duration crop and need less water for irrigation as compared to the common paddy. Although government had not provided any direct benefit to the basmati farmers, but major relief provided to basmati millers in the form of market tax exemptions on basmati purchase from Punjab markets is primarily aimed at ensuring remunerative prices to basmati farmers. This measure had been taken to encourage the farmers to grow more basmati as well as encourage rice milling industry for more investments.

During 2013-14 marketing year, Government had waived market fee (2%), rural development fee (2%) and infrastructure development fee (3%) on purchase of basmati paddy for milling in Punjab. Besides, Value Added Tax (VAT) is zero on all basmati exports which are sourced from Punjab. Exporters can avail the refund for VAT on basmati paddy purchases through documentation or 'H' form. VAT for purchases made other than exports is 5 per cent. Thus, during 2013-14, Punjab Government had given 12 per cent relief to basmati millers/exporters in a hope that a significant proportion of it will be passed over to the farmers in the form of higher prices of basmati paddy.

4.5 Source of Supply for Intermediaries

Various intermediaries source their supplies from different sources. Sources of supplies for wholesalers, retailers and exporters/millers of basmati rice are presented in Table 4.5.1 to Table 4.5.3 respectively.

4.5.1 Source of supply for wholesalers

Wholesalers of basmati rice form an important part of supply chain who purchases quantities in bulk and sell in relatively small quantities to the retailers. As revealed by information provided in Table 4.5.1, all of the respondent wholesalers procured their major part of supplies from the rice millers. Second important source of supply for wholesalers was observed to be the other wholesalers as reported by 50 per cent of the respondents. Another 20 per cent wholesalers ranked the commission agents as their second important supply source. These agents basically source the supply from rice millers on behalf of the wholesalers and normally do not take title of the commodity.

Table 4.5.1: Source of Supply for the Wholesalers of Basmati Rice, Punjab, 2013-14
(Wholesalers: N=10)

Source	Rank 1	Rank 2
Number sourcing from		
Farmers	0	0
Commission Agents	0	2
Other wholesalers	0	5
Miller	10	0
Others (No response)	0	3
Total	10	10
Percentage		
Farmers	0.00	00.00
Commission Agents	0.00	20.00
Other wholesalers	0.00	50.00
Miller	100.00	0.00
Others (No response)	0.00	30.00
Total	100.00	100.00

4.5.2 Source of supply for retailers

As per information provided in Table 4.5.2, major source of supply of basmati for the retailers is the wholesalers. All 10 respondent retailers procured their major supplies of basmati rice from the wholesalers. Besides, according to 20 per cent retailers their second most important source of supply is either processors or other retailers in the market.

Table 4.5.2: Source of Supply for the Retailers of Basmati Rice, Punjab, 2013-14
(Retailers: N=10)

Source	Rank 1	Rank 2
Number sourcing from		
Farmers	0	0
Commission Agents	0	0
Wholesalers	10	0
Other retailers	0	2
Millers	0	2
Others (No response)	0	6
Total	10	10
Percentage		
Farmers	0.00	0.00
Commission Agents	0.00	0.00
Wholesalers	100.00	0.00
Other retailers	0.00	20.00
Millers	0.00	20.00
Others (No response)	0.00	0.00
Total	100.00	100.00

4.5.3 Source of supply for the exporters/millers

It has been found that most of the exporters dealing with basmati rice had their own rice milling units established in producing areas of state. About 80 per cent; 4 out of 5 respondent exporters were having their own rice mills and their major source of supply was the farmers from whom they purchase large quantities of basmati paddy (Table 4.5.3). Almost entire supply from farmers was purchased through commission agents in the regulated markets of state. For one respondent exporter who does not have the milling facility, the main source of supply was the rice millers. Besides, 40 per cent exporters termed other rice millers as their second important source of supply where as for another 20 per cent the other exporters was the second source of supply of basmati rice.

Table 4.5.3: Source of Supply for the Exporters/Millers of Basmati Rice, Punjab, 2013-14

(Exporters: N=5)		
Source	Rank 1	Rank 2
Number sourcing from		
Farmers	4	0
Commission Agents	0	0
Wholesalers	0	0
Retailers	0	-
Other exporters	0	1
Other millers	1	2
Others (No response)	0	2
Total	5	5
Percentage		
Farmers	80.00	0.00
Commission Agents	0.00	0.00
Wholesalers	0.00	0.00
Retailers	0.00	0.00
Other exporters	0.00	20.00
Other millers	20.00	40.00
Others (No response)	0.00	40.00
Total	100.00	100.00

Chapter 5

Price Patterns over Time and Space

The huge geographical area and divergent agro-climatic regions in the country exert a strong influence on the supply of most of the agricultural commodities. The variations in the output of crops lead to wild fluctuations in their prices, exposing the producers to market risk. Inadequate market infrastructure and too many intermediaries between the producers and consumers lead to high marketing costs, resulting in lower share of producer in the consumer's rupee. The lack of market intelligence about the potential markets and the pattern of market arrivals and prices in important regional and national markets further add to the woes of the farmers. Therefore, the need for proper marketing intelligence system has been felt and raised from time to time by many scholars (Kalloo and Pandey, 2002; Singh et al., 2004). The availability of market intelligence on aspects like the potential markets, the quantum of market arrivals and prevailing and expected prices in different regional, national and international markets during different months of the year shall go a long way in mitigating many of these problems. Not only that, it shall help the farmers in adjusting their cropping pattern in a way so that they could sell their produce at a time when the prices are reasonably high in the market (Kumar et al 2005). This section gives insights into the behaviour of market prices at different levels and time. Time series data on basmati paddy prices have been decomposed to examine the seasonal as well cyclic patterns. Market margin analysis has also been attempted using the primary data.

5.1 Variation in basmati paddy prices

Seasonal variation in basmati paddy prices in major markets was analyzed through seasonal indices, the details of which are given Table 5.1.1 and also depicted through Figure 5.1.1. Seasonality around moving average of basmati paddy prices has also been presented in Figure 5.1.2. The monthly modal prices of basmati were used for this purpose. The information provided in Table 5.1.1 and Figure 5.1.1 reveals that in study markets, prices of basmati paddy remained above the annual average prices during the lean period consisting months of April to July and highest prices prevailed during the month of May. As the harvesting season starts in October, the basmati paddy prices in the state markets remained relatively low from October to January. The lowest monthly prices prevailed during October month which were about 8 per cent below the annual average prices.

Table 5.1.1: Seasonal Index of Basmati Paddy Prices in State Markets

Month	Jallalabad	Fazilika	Tarntaran	Amritsar	Overall
January	100.16	96.34	99.89	97.72	98.69
February	94.57	96.83	101.95	99.04	98.56
March	98.47	99.96	101.00	99.14	99.45
April	100.89	105.39	103.03	100.81	101.41
May	108.02	106.62	107.69	107.53	106.12
June	106.18	108.37	104.19	106.78	105.78
July	108.52	105.48	103.15	105.05	104.26
August	103.32	101.65	95.29	100.78	99.36
September	95.50	97.73	93.31	93.59	96.12
October	90.97	89.10	92.01	92.20	92.62
November	94.67	94.51	97.71	99.54	98.15
December	98.73	98.03	100.80	97.82	99.47

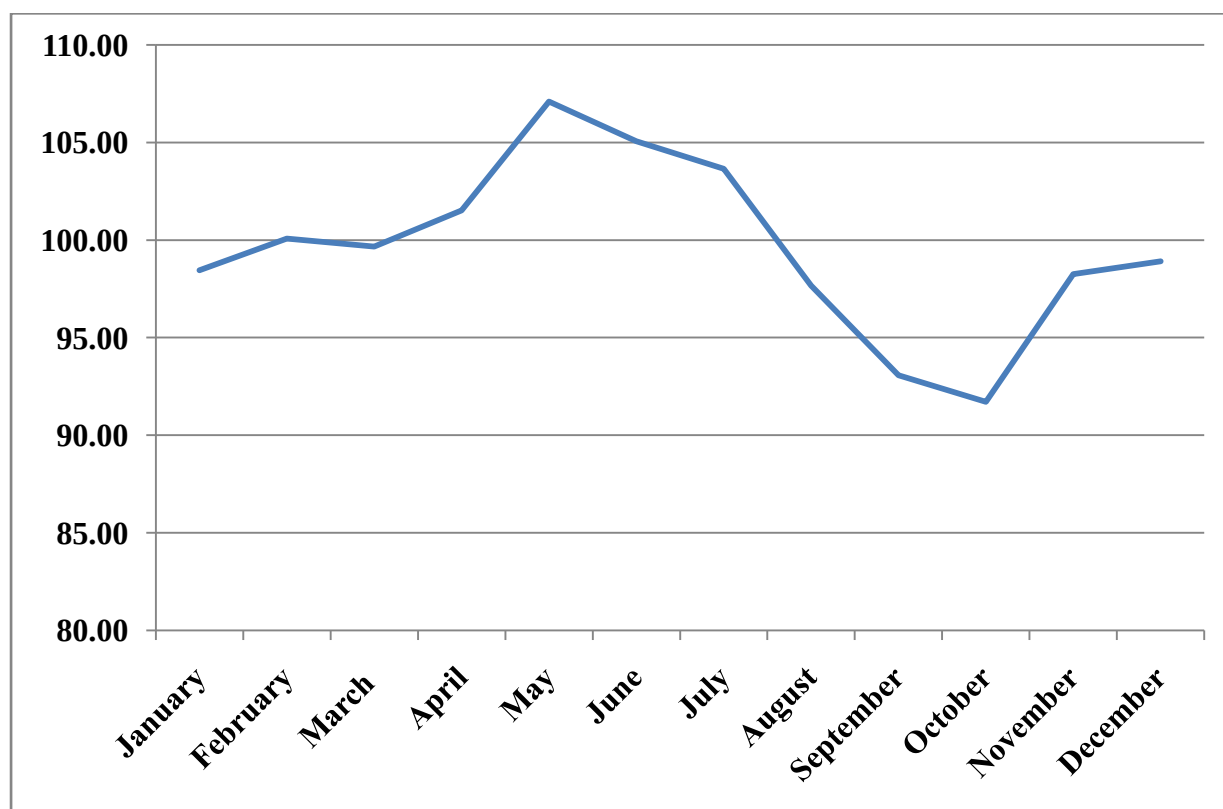


Figure 5.1.1: Seasonality in basmati paddy prices in Punjab

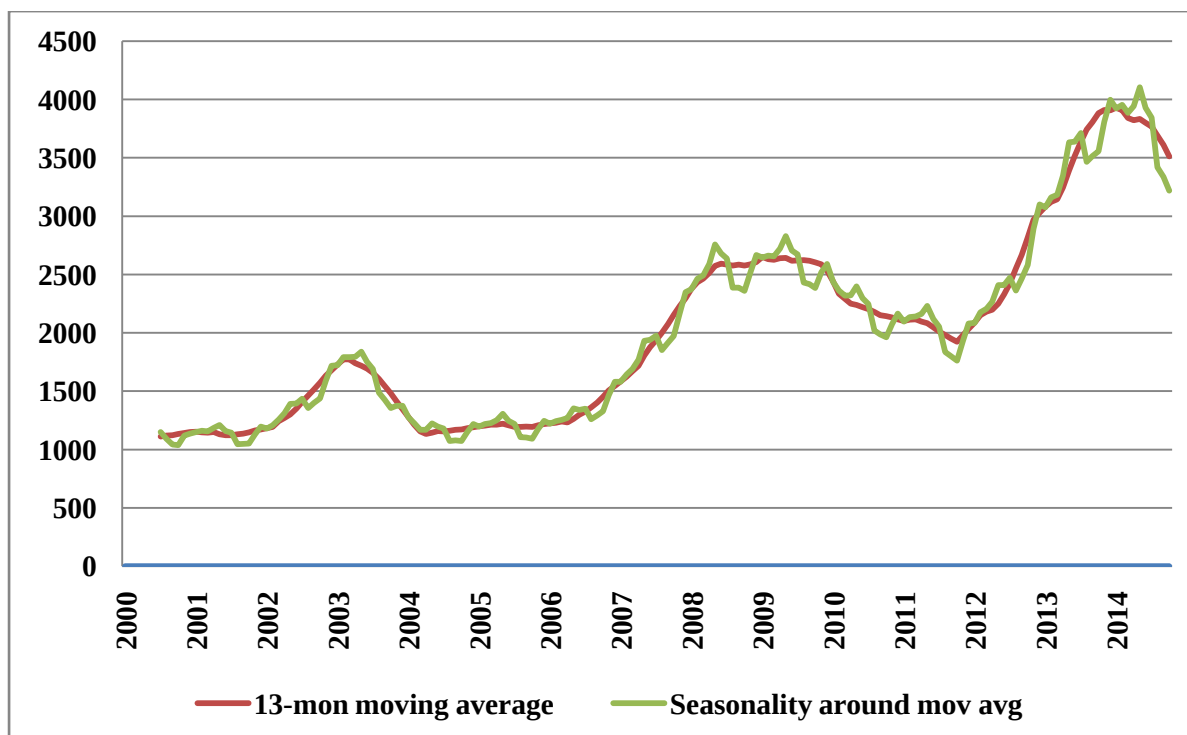


Figure 5.1.2: Seasonality of basmati paddy prices around moving averages

The behaviour of de-seasonalised basmati paddy prices in state markets is depicted in Fig. 5.1.3. The de-seasonalised prices of basmati paddy in different state markets and overall in Punjab were plotted around the trend line and the same is depicted in Figure 5.1.4 to Figure 5.1.8. Movement of de-seasonalised prices around trend line exhibits the presence of oscillatory movements pointing towards existence of the cyclical patterns in basmati paddy prices during the past years. Graphical analysis reveals that basmati prices remained low from 2003-04 to 2006-07 and went up for two years 2007-08 and 2008-09, and then remained low from 2009-10 to 2012-13. Again during 2012-13 prices increased significantly and peaked during year 2013-14 and had shown decline during the initial period of marketing year 2014-15. Clearly the data strongly reveals the presence of cyclical pattern in basmati paddy prices. However, as the data was available for only 13 years from two markets, the periodicity of cyclical pattern is not likely to be estimated accurately. Exact cyclical nature of basmati paddy could have been ascertained with help of 25 to 30 years data.

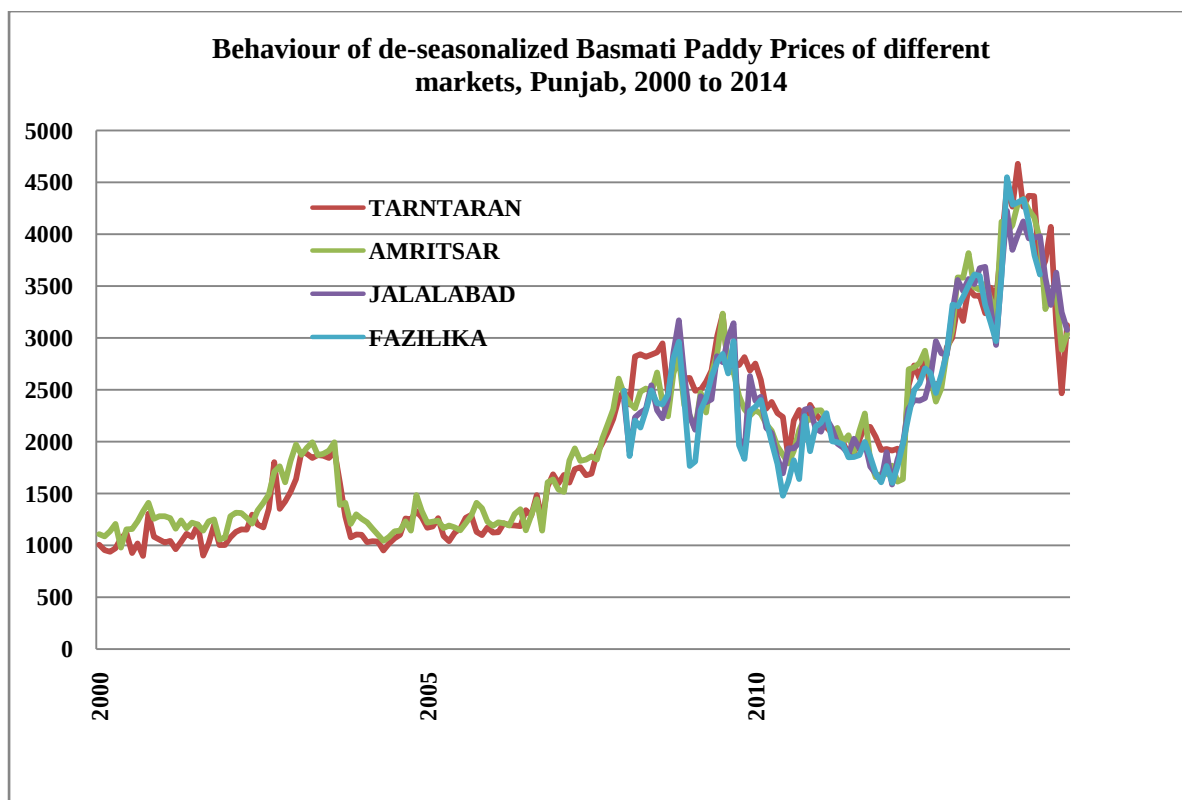


Figure 5.1.3: Movement of basmati paddy prices in Punjab market

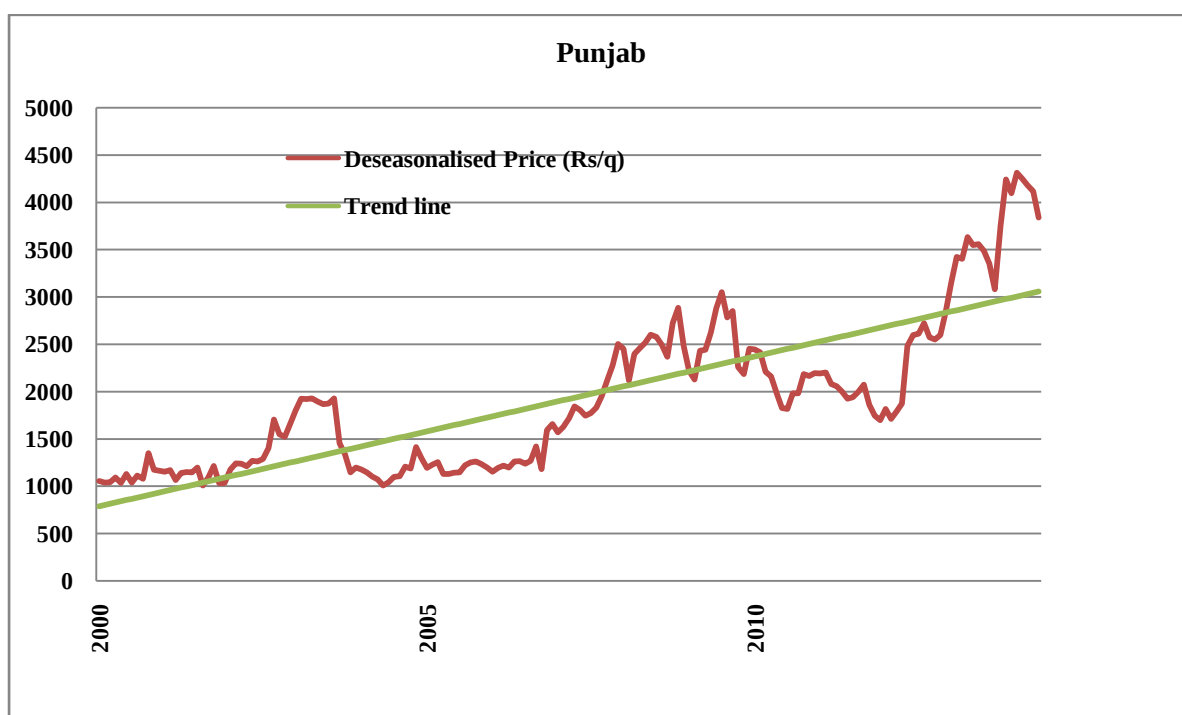


Figure 5.1.4: Movement of de-sasonalised prices of basmati paddy around trend line in Punjab

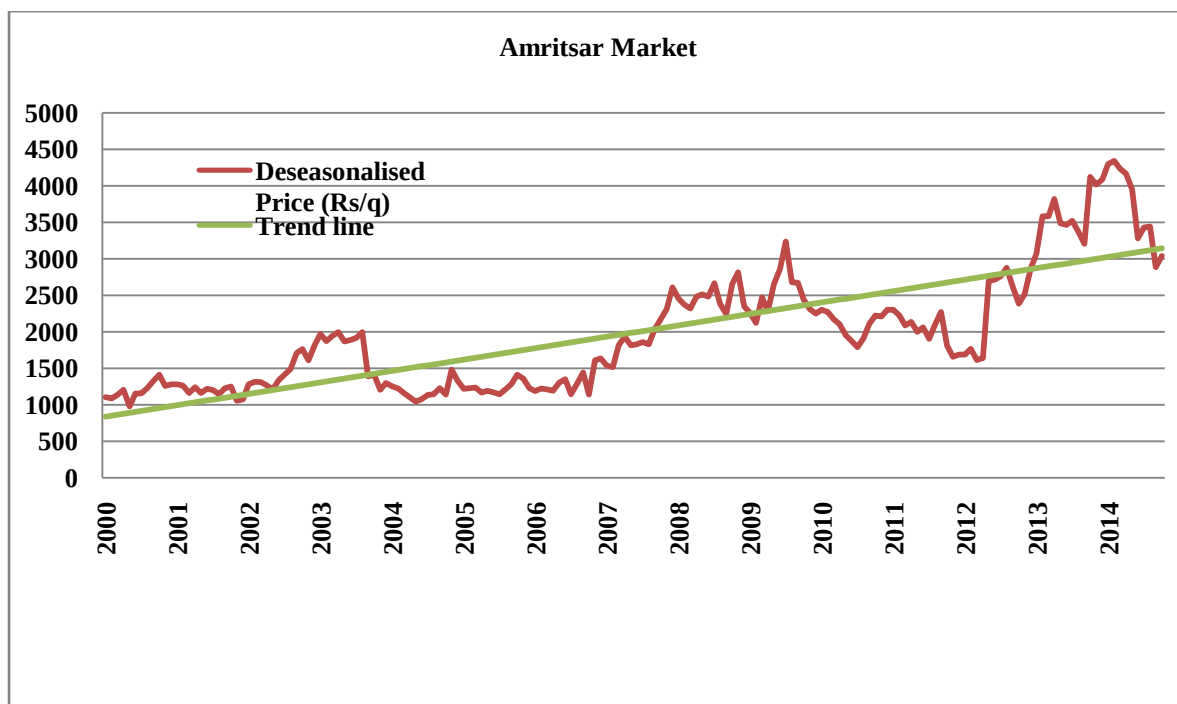


Figure 5.1.5: Movement of de-sasonalised prices of basmati paddy around trend line in Amritsar market

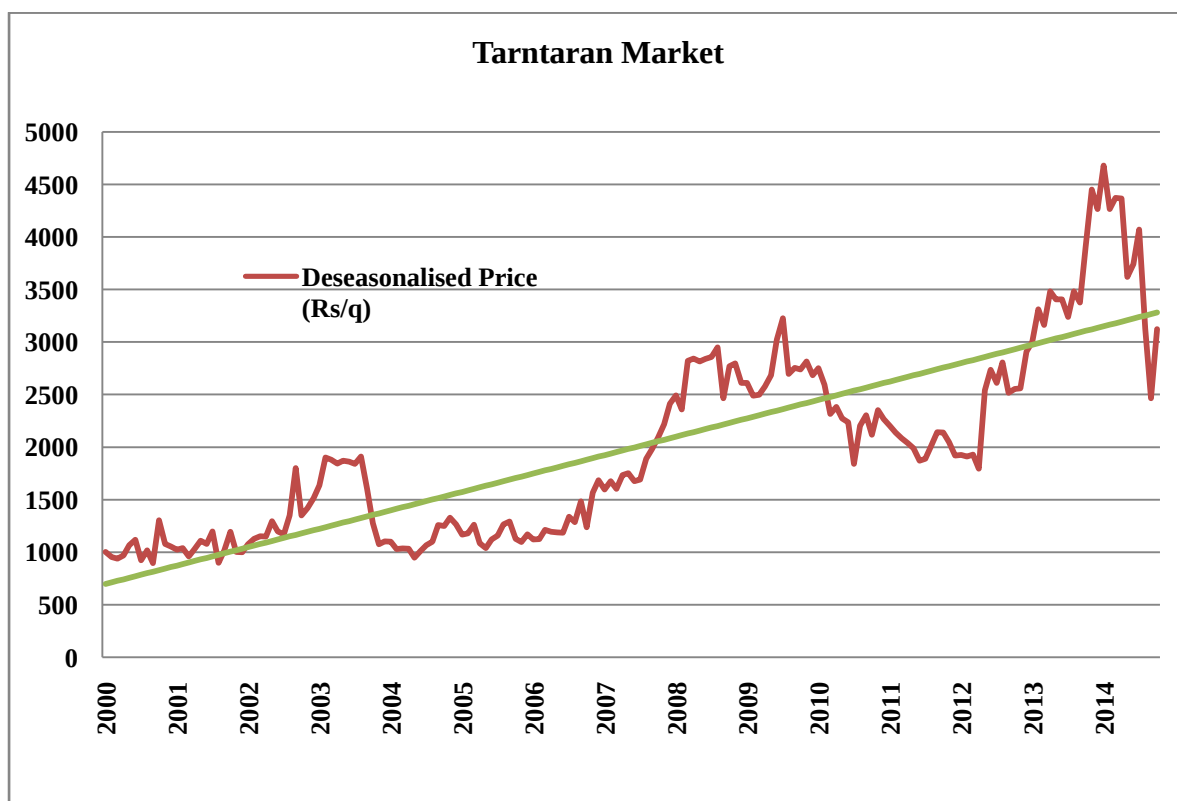


Figure 5.1.6: Movement of de-sasonalised prices of basmati paddy around trend line in Tarntarn market

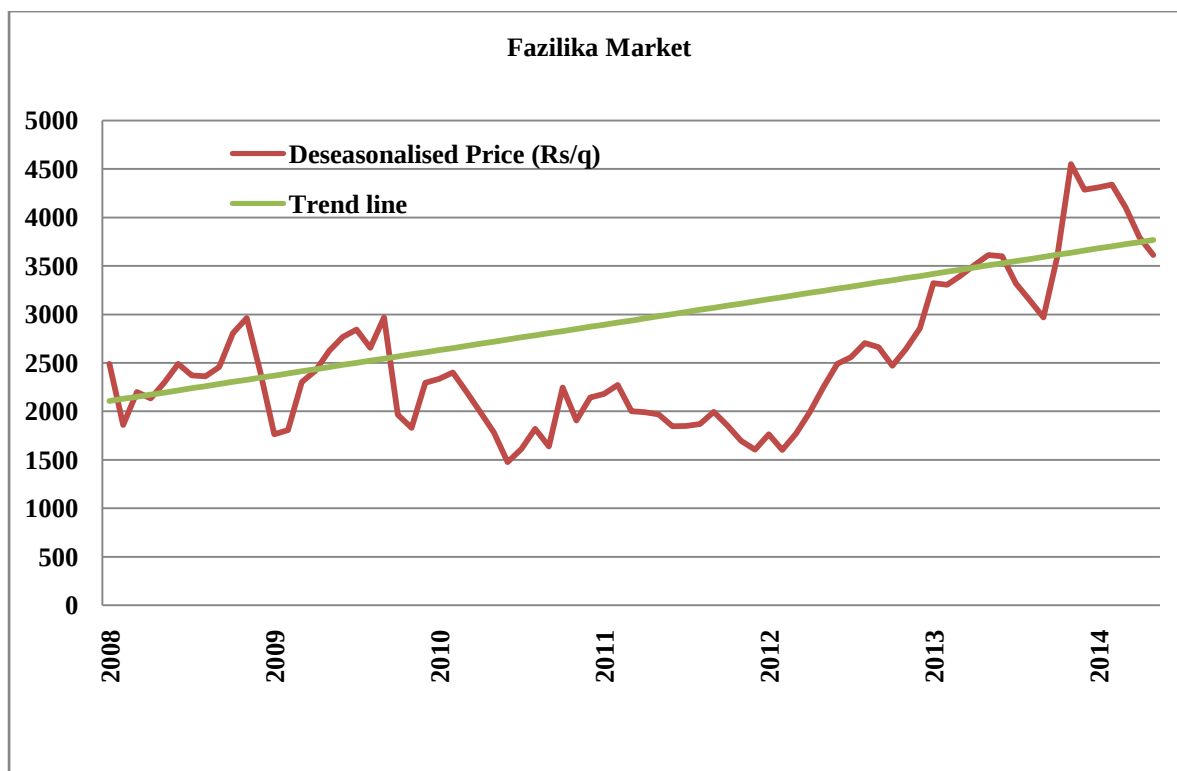


Figure 5.1.7: Movement of de-sasonalised prices of basmati paddy around trend line in Fazilika market

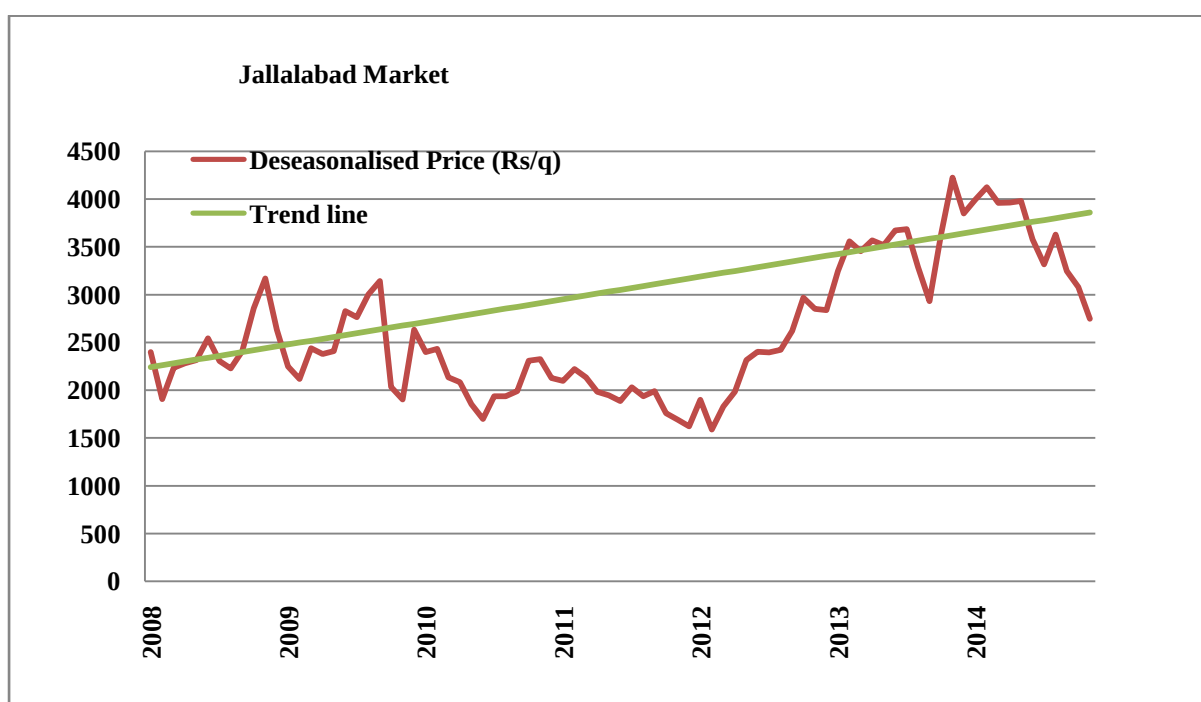


Figure 5.1.8: Movement of de-sasonalised prices of basmati paddy around trend line in Jallalabad market

5.2 Inter and intra-year variability in basmati paddy prices

The extent of inter-year monthly basmati paddy price variability in four major markets of state and overall has been depicted in Table 5.2.1. The value of coefficient of variation of price reveals that price variability was more pronounced during the months of January to April (47–48 %) and was lower during the months from August to October (35 to 40 %). Before arrival of Pusa basmati 1121 variety, most prominent traditional basmati was harvested during the November month. Thus period with low price variability coincides with the pre-harvesting lean period. On the other hand high variability is associated with immediate post-harvest period.

Table 5.2.1: Inter-Year Monthly Variability in the Prices of Basmati Paddy in Punjab, 2000 to 2014

Year	TarnTaran		Amritsar		Jallalabad		Fazilika		Overall	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV
January	1957.93	52.37	1902.00	45.17	2614.29	28.47	2500.00	35.50	1900.02	47.41
February	1978.53	49.32	1941.00	47.66	2423.57	36.16	2432.14	39.09	1893.83	47.40
March	1968.60	49.73	1946.33	46.90	2557.14	30.53	2567.14	33.13	1927.00	46.79
April	2028.87	51.24	1997.00	47.47	2628.57	31.27	2685.71	30.38	1985.43	47.37
May	2125.93	44.95	2137.33	45.96	2828.57	30.94	2764.29	28.71	2092.07	45.32
June	2091.67	46.46	2117.00	40.56	2821.43	28.79	2650.00	30.26	1964.68	42.16
July	2072.53	48.14	2119.00	43.75	2857.14	25.06	2558.33	26.00	1947.36	42.19
August	1906.13	42.31	2021.67	39.64	2721.43	25.67	2466.67	21.29	1860.57	39.41
September	1826.77	35.96	1849.33	33.50	2500.00	19.73	2391.67	21.98	1792.20	35.47
October	1852.33	42.78	1866.33	40.92	2421.43	24.60	2216.67	25.78	1755.38	39.91
November	1941.71	48.89	1948.21	41.06	2557.14	31.60	2455.00	41.58	1908.27	45.08
December	2006.93	46.82	1942.50	41.75	2583.33	28.59	2545.83	35.43	1952.98	43.69

CV: Coefficient of variation (%)

The information presented in Table 5.2.2 shows significant intra-year (within year) variability in prices of basmati paddy. During last thirteen years, there were seven years when the intra-year variability was about 10 per cent and above; and during three years it was about 15 per cent and more. Further over time intra-year variability in prices had not been reduced. Clearly there is need to identify and address the factors which result into such a high intra-year variability of prices.

Table 5.2.2: Intra-Year Variability in the Prices of Basmati Paddy in Punjab, 2000 to 2013

(Rs/ctl)

Year	TarnTaran		Amritsar		Jalalabad		Fazilika		Overall	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV
2000	1028.03	10.79	1192.87	9.78	-	-	-	-	1109.87	8.12
2001	1047.07	8.37	1188.83	6.06	-	-	-	-	1117.75	6.10
2002	1301.15	15.85	1458.54	14.59	-	-	-	-	1378.01	13.40
2003	1651.01	19.32	1728.40	17.61	-	-	-	-	1690.12	18.37
2004	1120.24	11.04	1192.27	10.21	-	-	-	-	1155.55	9.75
2005	1164.96	6.62	1236.23	6.36	-	-	-	-	1200.01	4.16
2006	1302.43	14.01	1309.72	12.99	-	-	-	-	1305.23	12.66
2007	1860.72	14.13	1936.49	15.97	-	-	-	-	1897.27	14.47
2008	2718.80	6.92	2477.78	6.63	2439.10	13.50	2402.34	12.02	2507.27	7.55
2009	2733.68	7.74	2518.17	12.59	2490.36	15.64	2353.72	18.28	2526.32	12.23
2010	2304.16	9.79	2101.30	8.47	2100.74	10.98	1962.41	15.53	2114.90	9.52
2011	2040.45	5.27	2019.83	10.65	1940.16	9.23	1927.09	9.62	1981.43	7.95
2012	2400.45	16.45	2344.57	21.86	2341.56	18.87	2313.96	18.46	2348.62	17.79
2013	3541.91	12.46	3611.42	9.36	3552.10	9.05	3550.65	12.70	3560.83	9.58

CV: Coefficient of variation (%)

5.3 Basmati Market Integration

Market integration describes the relationship between two different markets, and if prices in two markets are determined interdependently then those markets are said to be integrated. The integration in the markets influences the conduct of the firms and consequently the marketing efficiency. In an integrated market, prices of commodity are responsive to price changes of the same quality of products in the other markets. The extent to which prices in spatially separated markets move together reflects the degree of market integration.

Table 5.3.1: Pair-wise correlations among prices of different markets

Markets	Jalalabad	Fazilika	Tarntaran	Amritsar
Spearman's correlation coefficient				
Jalalabad	1	0.947**	0.867**	0.905**
Fazilika	0.947**	1	0.879**	0.906**
Tarntaran	0.867**	0.879**	1	0.901**
Amritsar	0.905**	0.906**	0.901**	1
Karlpearson's correlation coefficients				
Jalalabad	1	.956**	0.866**	0.891**
Fazilika	0.956**	1	0.887**	0.901**
Tarntaran	0.866**	0.887**	1	0.911**
Amritsar	0.891**	0.901**	0.911**	1

** Significant at one percent level of probability

Price linkages of different Punjab markets were evaluated through construction of Spearman's and Karl Pearson's coefficients of correlation of the residuals (Croxtton and Cowden 1955), after the trend and the seasonal components are removed from the raw price data and the same are presented in Table 5.3.1. The results show that all pair-wise correlation coefficients are highly significant. Therefore price behaviour of basmati paddy in different markets was similar and the markets of state were well integrated. High integration of rice markets was also reported by Pandit et al (2012).

5.4 Analysis of Profitability and Mark-Ups (From Primary Data)

There are many players in the food distribution system including producers, processors, commission agents, wholesalers, retailers, Government, exporters, etc. By the time a product is placed in final consumer hands, it has travelled countless miles and has been handled by many people.

With development, the role of marketing system becomes increasingly important. The marketing system includes storing products until they are required, processing into end products and moving products from the point of production to the point of consumption. This system is called by many names: marketing channel, distribution channel/chain, or supply chain. Most food items go through a distribution channel to reach the end consumer. Each market player evaluates and scrutinizes the product to assess its risk and opportunity. Each has to consider quality, price, packaging, labelling and marketing plans. By the time the product is purchased, the producer and all players involved its distribution have all determined it to be viable and profitable, and the end consumer has deemed it to be of significant value. When calculating profits, each market player consider all costs involved, not just the costs to produce the product or the purchase price. Additional costs include promotions, transportation, taxes, etc. The packaging is also a major consideration. Market agents, in common with any type of business, can only continue to operate if they receive a reasonable return for their efforts. For this we need to measure all of the various costs involved in the marketing activities and the returns or profits availed.

A marketing margin is the difference between the value of a product at one stage in the marketing process and the value of an equivalent product at another stage. Measuring this margin indicates how much has been paid for various processes and services applied to the product at a particular stage in the marketing process. Margin analysis is necessary for assessing the performance of the marketing system and it can also provide clues to significant weaknesses and inefficiencies in the system.

Basmati rice is the high value product having significant export market. In this section marketing margins of important market intermediaries involved in basmati trade are analysed and discussed along with their sources of supply. This section attempts to estimate the marketing cost/transaction cost across the whole marketing chain, based on the information collected in the survey. Basmati paddy goes through complex processing process of different types before reaching into consumer hands. However, processors after processing dispose of their product through wholesalers and exporters. Many processors are also major exporters of this commodity. This part deals with analysis of farmer's percentage profit and percentage mark-ups for wholesalers, retailers and exporters/millers through whom product reaches to final consumer in domestic and export market.

5.4.1 Farmer's percentage profit

Variety-wise farmer's percentage profitability of basmati paddy is provided in Table 5.4.1.

Table 5.4.1: Variety-wise Percentage Profit of Basmati Growers, Punjab, 2013-14
(Rs/qtl of basmati paddy)

Farm category	Value of Main product (Rs/qtl)	Variable Cost (Rs/qtl)	ROVC (Rs/qtl)	% profit* (ROVC/VC)*(100)
Pusa Basmati 1121				
Marginal	3605	640	2965	463.35
Small	3928	706	3221	456.05
Medium	3914	691	3223	466.62
Large	3899	752	3147	418.77
Average	3897	733	3164	431.96
Pusa Punjab Basmati 1509				
Marginal	-	-	-	-
Small	-	-	-	-
Medium	2954	520	2434	468.56
Large	2933	468	2465	526.22
Average	2936	477	2459	515.74
Traditional Basmati				
Marginal	-	-	-	-
Small	5210	1012	4198	414.62
Medium	5215	1042	4173	400.33
Large	5195	1007	4188	415.74
Average	5199	1013	4186	413.35
Overall				
Marginal	3605	640	2965	463.35
Small	3982	719	3263	453.56
Medium	3923	696	3227	463.69
Large	3918	751	3168	422.01
Average	3916	735	3182	433.08

VC - Variable cost; ROVC – Returns over variable cost; *To calculate farmer's percentage profit only variable costs has been considered which roughly account for about half of the total cost of production in Punjab.

The information shows that the overall average value of main product for Basmati paddy (all varieties) was Rs 3916/ql and it varied from Rs 3605/ql on marginal farms to Rs 3918/ql on small farms. The farmer's returns over variable cost (ROVC) per quintal of basmati on average farm was Rs 3182/ql which varied from Rs 2965/ql on small farms to Rs 3263/ql on medium farms. Overall farmer's percentage profitability in basmati production was about 433 per cent and it varied from 422 per cent on the large farms to 453-463 per cent on other category of farms. The farmer's ROVC per quintal of Pusa Bamsti 1121 on average farm was Rs 3164/ql which varied from Rs 2965/ql on marginal farms to Rs 3223/ql on medium farms. Overall percentage profitability for this variety was about 432 per cent and it varied from 419 per cent on the large farms to 467 per cent on the medium farms. The average ROVC per quintal of Pusa Punjab Basmati 1509 variety was Rs 2459/ql with very little difference between medium and large farmers who had sown this variety. The average percentage profit over variable cost of this variety was about 516 per cent. However, on account of relatively higher per quintal variable cost the same were about 469 per cent on medium category farms which were significantly lower as compared to that received by the large farmers (526%). In case of traditional basmati, the per quintal average value of output, variable cost and ROVC were Rs 5199, Rs 1013 and Rs 4186 respectively and category-wise there was no difference on account of these. The overall average percentage profit of farmer from traditional variety was about 413 per cent.

These profitability figures which seem considerably high do not reveal the real picture as only variable cost has been taken into account during the calculations. As per latest available estimates of cost of cultivation scheme the fixed costs constitute more than 50 per cent of the total cost of cultivation of paddy and wheat in Punjab agriculture, which is also true in case of basmati.

5.4.2 Wholesale trade details and mark-up percentage

Variety-wise and overall wholesale trade related information for October to February months of year 2013-14 is depicted in Table 5.4.2. It can be seen that an average wholesaler had monthly traded 28.65 quintal of total basmati rice comprising 27.54 quintal of Pusa Basmati 1121 and 1.11 quintal of traditional basmati. Thus, Pusa basmati 1121 and traditional basmati accounted for 96.12 and 3.88 per cent of the overall wholesale trade of basmati rice. Wholesale sales of basmati of both of these varieties were found to be highest in month of December. Average purchase price of Pusa basmati 1121 for wholesale trade was Rs 8127/ql and it was found to be highest during the month of February (Rs 8300/ql) and least during the month of October (Rs 7900/ql). Wholesaler's average sale price during the study period

turns out to be Rs 8489/qtl, which was found to be highest in January and the lowest in month of October. Per quintal mark-up and average percentage mark-up of rice for wholesaler during the study period on average was Rs 362/qtl and 4.46 per cent respectively. The average percentage mark-up for wholesale trade varied from the highest (5.01%) in month of January to the lowest (4.13%) in February.

Table 5.4.2: Variety-wise and Overall Wholesale Trade Details of Basmati Rice, October to February, 2013-14, Punjab

(Rs/qtl of basmati rice)					
Month	Average price (Rs/qtl) at which purchased (PP)	Average Qty sold (Qtl.)	Average Sale price (Rs/qtl) (SP)	Mark-up (Rs/qtl) (SP-PP)	Percentage Mark-up [(SP-PP)/PP]*100
Pusa Basmati 1121					
October	7900	24.75	8200	300	3.80
November	8000	27.80	8400	400	5.00
December	8150	34.50	8503	353	4.33
January	8285	25.60	8700	415	5.01
February	8300	25.05	8643	343	4.13
Average	8127	27.54	8489	362	4.46
Traditional Basmati					
October	10050	1.05	10450	400	3.98
November	10260	1.225	10520	260	2.53
December	10565	1.525	10880	315	2.98
January	10300	1.02	10750	450	4.37
February	10251	0.72	10730	479	4.67
Average	10285	1.11	10666	381	3.70
Overall					
October	7988	25.80	8292	304	3.81
November	8095	29.03	8489	394	4.87
December	8252	36.03	8604	351	4.26
January	8362	26.62	8779	416	4.98
February	8355	25.77	8701	347	4.15
Average	8210	28.65	8573	363	4.42

SP-Sale Price; PP-Purchase price

The average purchase price and sale price of traditional basmati rice for wholesale trade was Rs 10285/qtl and Rs 10666/qtl. The wholesaler's average purchase price as well as sale price was highest during the month of December and was at lowest during the month of October. The average absolute mark-up and percentage mark-up of wholesaler for this variety was Rs 381/qtl and 3.70 per cent respectively. Monthly average percentage mark-up for

wholesale trade of this variety varied from the highest (4.67%) in month of February to the lowest (2.53%) in November.

The study showed that due to relative higher prices of the traditional basmati, while the average absolute mark-up was more in traditional variety, the average percentage mark-up of wholesale was relatively more in trade of Pusa Basmati 1121. Overall for both varieties taken together the absolute mark up and percentage mark-up in wholesale trade turns out to be Rs 363/ql and 4.42 per cent respectively. The wholesaler's overall weighted average purchase price was Rs 8210/ql and the weighted sale price was 8573/ql. The overall absolute average mark up for basmati rice varied from Rs 304/ql in month of December to Rs 416/ql in month of January.

5.4.3 Retail trade details and mark-up percentage

The information on retail trade viz. quantity of trade, retailer's purchase price and sale price along with absolute and percentage mark-up for both basmati varieties separately and overall during October to February months of year 2013-14 is presented in Table 5.4.3. The monthly basmati trade of an average retailer in local market was 0.59 quintal comprising 0.46 quintal of Pusa Basmati 1121 and 0.13 quintal of traditional basmati.

The retailer's average purchase price of Pusa basmati 1121 was Rs 8489/ql and it was found to be highest during the month of January (Rs 8700/ql) and least during the month of December (Rs 8200/ql). The average sale price of retailer during the study period turns out to be Rs 9533/ql, and likewise purchase price, it was found to be highest in January and the lowest in month of October. The retailer's average per quintal absolute mark-up and average percentage mark-up of this variety during the study period was Rs 1044/ql and 12.30 per cent respectively. In case of traditional basmati the average purchase price and sale price of retailer was Rs 10666/ql and Rs 11798/ql. Retailer's average absolute mark-up and average percentage mark-up for this variety was Rs 1132/ql and 10.61 per cent respectively.

The respective share of these varieties in total head rice sold was about 78 and 22 per cent. The retail sales of both varieties were relatively more during October - December months and low during the January - February months. The retailer's overall weighted average purchase and sale price of basmati rice was Rs 9019/ql and Rs 10092/ql respectively. Retailer's overall absolute mark up and percentage mark-up in both varieties taken together turns out to be Rs 1073/ql and 11.90 per cent respectively.

Table 5.4.3: Variety-wise and Overall Retail Trade Details of Basmati Rice, October to February, 2013-14, Punjab

(Rs/qtl of basmati rice)

Month	Average price (Rs/qtl) at which purchased (PP)	Average Qty sold (Qtl.)	Average Sale price (Rs/qtl) (SP)	Mark-up (Rs/qtl) (SP-PP)	Percentage Mark-up [(SP-PP)/PP]*100
Pusa Basmati 1121					
October	8200	0.75	9400	1200	14.63
November	8400	0.45	9440	1040	12.38
December	8503	0.55	9580	1077	12.67
January	8700	0.275	9750	1050	12.07
February	8643	0.25	9495	852	9.86
Average	8489	0.46	9533	1044	12.30
Traditional Basmati					
October	10450	0.15	11550	1100	10.53
November	10520	0.14	11640	1120	10.65
December	10880	0.15	11900	1020	9.38
January	10750	0.12	12050	1300	12.09
February	10730	0.11	11850	1120	10.44
Average	10666	0.13	11798	1132	10.61
Overall					
October	8575	0.9	9758	1183	13.80
November	8903	0.59	9962	1059	11.90
December	9012	0.7	10077	1065	11.82
January	9323	0.4	10449	1126	12.07
February	9281	0.36	10215	934	10.06
Average	9019	0.59	10092	1073	11.90

SP-Sale Price; PP-Purchase price

5.4.4 Export trade details and mark-up percentage

Basmati rice constitutes a major share of agricultural exports from India. Nearly two-third of basmati rice produced in India is exported and being the leading fine quality rice of the world trade it fetches good export price in the international market. The export of basmati rice has experienced the annual compound growth rate of 4.32 per cent and 9.75 per cent in volume and value terms respectively over the period of 1991-92 to 2010-11(Khatkar et al, 2012).

The primary survey revealed that most of the basmati rice exporters have their own rice milling units. In addition these exporters arrange additional supplies from other millers

also. Primarily, the par-boiled head rice is being exported to other countries. The information generated by the primary survey on export trade has been depicted in Table 5.4.4.

Table 5.4.4: Exporter Trade Details of Basmati Rice, October to February, 2013-14, Punjab

(Rs/qtl of basmati rice)					
Month	Average price (Rs/qtl) at which purchased (PP)	Average Qty exported (Qtl.)	Average export price (Rs/qtl) (SP)	Mark-up (Rs/qtl) (SP-PP)	Percentage Mark-up [(SP-PP)/PP]*100
Pusa 1121					
October	7000	3600	7900	900	12.86
November	7050	4310	7940	890	12.62
December	7610	4540	8250	640	8.41
January	7650	4615	8450	800	10.46
February	7700	4088	8500	800	10.39
Average	7340	4231	8310	970	13.22
Traditional Basmati					
October	9550	125	10350	800	8.38
November	9600	150	10500	900	9.38
December	9700	160	10850	1150	11.86
January	9880	162	10990	1110	11.23
February	10200	150	11060	860	8.43
Average	9790	149	10810	1020	10.42
Overall					
October	7086	3725	7982	897	12.65
November	7136	4460	8026	890	12.48
December	7681	4700	8339	657	8.56
January	7726	4777	8536	811	10.49
February	7788	4238	8591	802	10.30
Average	7499	4380	8306	807	10.76

SP-Sale Price; PP-Purchase price

It was observed that average monthly export per respondent exporter was 4380 quintals which comprised of 4231 quintals of Pusa basmati 1121 and 149 quintals of traditional basmati. The share of respective varieties in total export was 96.59 and 3.41 per cent. Over the study period from October to February, monthly export was found to be the highest in month of February and least during the month of October. Average purchase price of exporter in case of Pusa basmati 1121 was Rs 7340/qtl and it was found to be highest during the month of February (Rs 7700/qtl) and least during the month of October (Rs 7000/qtl). Exporter's average sale price of Pusa basmati 1121 during the study period turns

out to be Rs 8310/qtl, which was found to be highest in February and the lowest in month of October. The exporter's average absolute mark-up and average percentage mark-up of Pusa basmati 1121 during the study period on average was Rs 970/qtl and 13.22 per cent respectively. The average percentage mark-up in export trade varied from the lowest (8.41%) in month of December to the highest (12.86%) in month of October.

Exporter's average purchase price and export price of traditional basmati rice was Rs 9790/qtl and Rs 10810/qtl. Highest purchase and export price of traditional basmati was observed in the month of February. The exporter's average absolute and percentage mark-up for this variety was Rs 1020/qtl and 10.42 per cent respectively. The average percentage mark-up of this variety varied from the lowest (8.38%) in month of October to the highest (11.86%) in December. The exporter's overall absolute weighted average absolute mark-up and percentage mark-up for both varieties taken together was Rs 807/qtl and 10.76 per cent respectively.

5.5 Vertical Price Spread in Basmati Rice

The sample farmers sold most of their basmati output to rice millers in the regulated markets of state. Two main marketing channels were prevalent in the study area. The vertical price spread in these channels has been worked out for the par-boiled head rice ((1 qtl of rice= 1.667 qtl of basmati paddy).

Channel I: Farmer- Rice miller (through commission agent) - Wholesaler (local/distant market) -Retailer-consumer

Channel II: Farmer- Rice miller (through commission agent) - Exporter

5.5.1 Price spread in domestic (local) market

The difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm produce is known as price spread. Variety-wise marketing and processing cost, price spread and producer's share in consumer's rupee in channel I for local market are given in Table 5.5.1. Rice millers sell significant quantities in the distant markets also, but due to competitive nature of trade price spread in distant market channels increase mainly on account of the transport costs involved. In this part price spread in local market is worked out. The farmer's sale price for Pusa Basmati 1121 and Traditional basmati (in rice form) were Rs 6492/qtl and Rs 8650/qtl respectively. Farmer's selling/marketing costs in case of respective varieties were Rs 53.37/qtl and Rs 54.58/qtl. The farmer's net price accounted for about 68 and 73 per cent of the retailer's sale price (consumer's purchase price) of Pusa basmati 1121 and traditional basmati respectively. The rice miller's net margin for Pusa basmati 1121 and traditional varieties was 8.06 per cent and

4.31 per cent respectively of the consumer's price. The wholesaler's purchase price and sale price/retailer's purchase price of Pusa basmati 1121 was Rs 8127/qtl and Rs 8489/qtl respectively. For traditional basmati the respective purchase price of wholesaler and retailer was Rs 10285/qtl and Rs 10666/qtl. The wholesaler and retailer's net margin in Pusa basmati 1121 was 3.40 and 9.47 per cent of the final price. The wholesaler and retailer's costs accounted for 0.39 and 1.48 per cent of price paid by consumer's for Pusa basmati 1121 and 0.32 and 1.20 percent for traditional basmati respectively. While the wholesaler's net margin as percentage to the final price remained more or less equal in both of the basmati varieties (3.40% and 3.43%), retailer's net margin in sale of traditional basmati was relatively low (8.40%) when compared to that in the Pusa basmati 1121 (9.47%).

Table 5.5.1: Price Spread for Basmati Rice, Punjab, 2013-14. (Channel: Farmer – Rice Miller (through commission agent) - Wholesaler (Local Market) – Retailers - Consumer)
(1 qtl of rice= 1.667 qtl of basmati paddy)

S. No.	Particulars	Pusa Basmati 1121		Traditional Basmati	
		Rs/qtl	% share in Consumer's rupee	Rs/qtl	% share in Consumer's rupee
A	Net price received by the farmer	6438	67.53	8595	72.85
	Expenses borne by the farmer	53.87	0.57	54.58	0.46
B	Miller's purchase price/Farmer's sale price	6492	68.10	8650	73.32
	Miller's expenses on processing and selling	878	9.21	1126.82	9.55
	Total cost to the miller	7370	77.31	9667	82.87
	Miller's net margin	757	7.94	508	4.31
C	Wholesaler's purchase price/miller's sale price	8127	85.25	10285	87.18
	Expenses borne by the wholesaler	37.62	0.39	37.62	0.32
	Wholesaler's net margin	324.58	3.40	405.18	3.43
D	Retailer's Purchase price/Wholesaler's sale price	8489.20	89.05	10666.00	90.41
	Expenses borne by the retailer	141.16	1.48	141.16	1.20
	Retailer's net margin	902.64	9.47	990.84	8.40
E	Consumer's purchase price/retailer's sale price	9533	100.00	11798	100.00

5.5.2 Price spread in export channel

This is the major channel for basmati marketing as nearly 85 per cent of the head rice of basmati is being exported, primarily to the gulf countries. The price spread and marketing costs in the export market channel based on the data collected for both of the study varieties by the field survey is indicated in Table 5.5.2.

Table 5.5.2: Price Spread for Basmati Rice, Punjab, 2013-14. (Export Channel: Farmer – Rice Miller (through commission agent) - Exporter)
(1 qtl of rice= 1.667 qtl of basmati paddy)

S.No	Particulars	Pusa Basmati 1121		Traditional Basmati	
		Rs/qtl	% to export price	Rs/qtl	% to export price
A	Net price received by the farmer	6438	77.47	8595	79.52
	Expenses borne by the farmer	53.87	0.65	54.58	0.50
B	Miller's purchase price/Farmer's sale price	6492	78.12	8650	80.02
	Miller's expenses	444	5.34	670.82	6.21
	Total cost to the miller	6936	83.47	9321	86.22
	Net margin of miller	404	4.86	469	4.34
C	Exporter's purchase price/Miller's sale price	7340	88.33	9790	90.56
	Expenses borne by the exporter	477.97	5.75	477.97	4.42
	Total cost of exporter	7817.97	94.08	10267.97	94.99
	Exporter's margin	492.03	5.92	542.03	5.01
XI	Export price	8310	100.00	10810	100.00

It can be seen from table that there was no difference with regard to the net sale price received by the farmers in export market channel as compared to local market channel for both of the varieties, however farmer's net margin in export price was significantly higher at 77.47 to 79.52 per cent of the export price as compared to that in the consumer price (66 to 73%) in domestic local market channel. But as in export channel we cannot track the price of ultimate consumer in importing countries, this high share in export price does not make any difference to the farmer. In absolute terms farmers returns per quintal remain same in both of the marketing channels. The rice miller's total cost in this channel was Rs 6936/qtl for Pusa basmati 1121 and Rs 9341/qtl for traditional basmati which was 83.47 per cent and 86.22 per cent to the export price. Relatively low total cost of miller in this channel as compared to the domestic market channels was on account of the exemption/refund of Value Added Tax (5%)

by state government under the basmati export promotion scheme. The net margin of miller accounted for 4.86 and 4.34 per cent of export price of Pusa basmati 1121 and traditional basmati respectively. The exporter had to bear Rs 478/qlt for export of basmati rice. The major costs of export include transportation cost to domestic sea port including insurance, terminal handling and clearance charges and packaging.

The exporter's margin was about 5.92 percent (Rs 492/qlt) and 5.01 per cent (Rs 542/qlt) for Pusa basmati 1121 and traditional basmati respectively. It may be mentioned that most of the exporters are millers also, therefore net margin in case of exporter-cum-miller constitute margins for export as well as for milling of the basmati rice. The rice millers who do not export directly had to sell their output through the established miller-cum-exporters. Although, margins for milling for supply of head rice in local market seems to relatively higher as compared to milling component for export market but local market is very limited one and mostly consumes the broken basmati rice where as bulk of the orders are received for exports, thus miller and exporters margins and earnings depends upon the international demand and price of basmati and the effect of same trickle down to the farmers in form of basmati paddy prices.

Chapter – 6

Stakeholders Perceptions on Production and Trade of Basmati

Problems in production and marketing have been associated with agriculture (and therefore human culture as such) since its beginning. Crop cultivation rose competition to other players in the agro-ecosystem, like micro-organisms, insects, animals etc. A number of actions against these undesired organisms were developed over time, such as crop-rotation, tillage, intercropping and selective breeding, etc. Even though these agricultural practices do offer numerous advantages to farmers, production problems are one of the factors that urge them to evolve better and more resistant crops, cultivation practices and, in more recent time, also a broad spectrum of agrochemicals designed to combat these biotic competitors for food. Equally important are the marketing/trade problems involving farmers as well as traders.

Dealing with crop production as well as marketing problems has always been an important issue. A wide range of different approaches exists and a huge debate going on with very different-thinking stakeholders, each offering different concepts of dealing with these problems. Most of literature on these topics is of more technical or natural sciences point of view and institutional background that often do not include the stakeholders' perceptions. Research on the perception of problems and management is a part of a process that aims to understand how different stakeholders perceive their economic environment. This highlights important knowledge for all stakeholders (farmers, traders, researchers, extension workers) involved.

Basmati rice is high value cereal and India is the principal exporter in the world with clear comparative advantage. In Punjab it is grown as commercial crop and is very important from economic and ecological point of view. However its prices depend primarily on the market situation particularly the international one on which the producers have no control at all. Traders/exporters also have to face international economic volatility along with domestic agricultural price and export policies. This section aims to address farmers' perception of various production and marketing problems because they are mostly undesired and causing economic damage. Similarly other stakeholders' (traders') perceptions of various trade related problems has also been analyzed.

6.1 Reasons for Growing Basmati

Farmers' multiple responses regarding motive of basmati cultivation are presented in Table 6.1.1. As revealed by data, profitability was the principal reason for growing basmati crop as reported by about 95 per cent of the respondent farmers. Category-wise, about 78 per

cent marginal, 87 per cent small, 100 per cent medium and large farmers reported that profitability was the major reason for their decision to cultivate the basmati rice. About 28 per cent farmer responses were pointing towards usefulness of basmati paddy by-product (straw) as animal fodder as one of the reasons for adopting the cultivation of this crop. Third most important reason for its cultivation reported by about 17 per cent overall sample farmers was the proper adjustment of this particular crop in the crop rotation. Land suitability to basmati was also reported by about 13 per cent of overall farmers as the reason for growing this crop. Only 3 per cent of the farmers had given need for home consumption also as the reason for basmati cultivation.

Overall it can be concluded that profitability along with usefulness of its by-product and the proper adjustment of basmati in the adopted crop rotation were the principal reasons for cultivation of basmati in Punjab.

Table 6.1.1: Reasons for Growing Basmati Crop, Sample Farmers, Punjab, 2013-14
(Multiple response)

Particulars	Farm Category				
	Marginal	Small	Medium	Large	Total
Home Consumption	1	1	1	2	5
Profitability	14	26	48	54	142
Land suitability	6	3	3	7	19
Government subsidies	0	0	0	0	0
Fits well with crop rotation	5	7	3	10	25
Usefulness of crop by- product	1	12	14	15	42
Total sample	18	30	48	54	150
Percentage to total farmers in the size group					
Home Consumption	5.55	3.33	2.08	3.70	3.30
Profitability	77.78	86.67	100	100	94.67
Land suitability	33.33	10.00	6.25	12.96	12.67
Government subsidies	0.00	0.00	0.00	0.00	0.00
Fits well with crop rotation	27.78	23.33	6.25	18.52	16.67
Usefulness of crop by- product	5.55	40.00	29.17	27.78	28.00
Total	100.00	100.00	100.00	100.00	100.00

6.2 Problems Faced by Basmati Growers

Various production and marketing related problems faced in basmati cultivation as per severity perceived by farmer respondents were ranked as low, moderate, high and severe problems. The intensity of problems considered or ranked moderate, high or severe are

discussed in this section. The responses of farmers in numbers and percentage terms are presented in Table 6.2.1 and Table 6.2.2 respectively.

The survey revealed that among the severe problems faced by the farmers, the most important constraint perceived by 24 per cent responses was the institutional factor in terms of lack of Minimum Support Price (MSP) and Government procurement of basmati. This problem was also 4th highest ranked problem among the problems of high nature. As government do not fix MSP for basmati and there is no state procurement, the farmers are left at the mercy of traders and have to face the volatility of international market resulting into year to year fluctuations in basmati prices. With about 18 per cent responses, lower yield was the 2nd most severe problem perceived by the farmers, reason being that most of the farmers compare the yield of basmati paddy in comparison of high yielding common paddy. Lack of remunerative price for their crop was ranked as the 3rd sever and 2nd highest problem as perceived by about 14 and 12 per cent responses under the category of severe and high problems. In contrast to farmers' observation, the prices received by them during the study year were fairly good as compared to previous years, still based on their overall past experience farmers were not satisfied with the prices. Especially, small and marginal farmers lack facility or money to sell when and where they want or keep their produce and sell when price is suitable/high. This problem also revealed the lack of proper organizations both collective and government organizations to ensure good price of farmer's produces.

The other main problems in order of their degree of severity were the problem of yield instability, diseases and weeds. Farmers of basmati rice in state were facing a lot of threats from weeds and diseases (foot root, leaf blight, etc.). The presence of weeds and decease infestation can cause colossal loss to the basmati crop in the form of reduction of yield. To keep the crop safe and to reduce the losses farmers have to rely on agro-chemicals. To handle these production related problems, proper technical knowhow and adequate extension services can provide guidance at different stages of crop but farmers were unable to utilize these services from public sector extension providers satisfactorily. For this purpose farmers visit the private fertilizer/pesticide dealers who were operating in the area with an aim of earning profit so their consultancy was usually based upon their motives of increasing sales of agro-chemicals.

High fluctuations of basmati price (price volatility) were a big challenge confronted by the basmati growers and had been perceived as top most high problem. The farmers were of the view that high fluctuations of the basmati price in market often led to uncertainty in profits of this crop. These days knowledge of market information or market intelligence is

equally important in decision making. However, most of basmati farmers rued the lack of market information and ranked this problem among high type of problems. As Government does not interfere in marketing of basmati, its marketing is primarily in the hands of private traders. Further being export commodity and presence of very low number of exporters often led to the trade malpractice in terms of collusion of traders. The collusion among traders and poor road network were also perceived as problems of high nature in marketing of basmati.

Table 6.2.1: Major Problems in Cultivating Basmati Crop, Sample Farmers, Punjab, 2013-14

(No of farmers: 150)

Problem	Severity of problem			
	Low	Moderate	High	Severe
1) Lower yield	48	72	21	9
2) Unstable yield	42	74	28	6
3) Lack of remunerative price	7	40	96	7
4) Poor road network for transportation	4	97	49	0
5) Poor refrigeration facilities	-	-	-	-
6) Other infrastructure problems	-	-	-	-
7) Erratic electricity supply	13	113	23	1
8) Labour problem (due to manual harvesting of basmati)	34	67	48	1
9) Poor quality of underground water	107	34	9	0
10) Non-availability of good quality of seed	47	86	17	0
11) Lack of/poor extension services /lack of technical knowhow	2	102	46	0
12) Price fluctuations	3	38	107	2
13) Lack of MSP/government procurement	3	50	85	12
14) Lack of market information	5	55	88	2
15) Collusion among traders/trade malpractices	6	72	71	1
16) Distant market	126	10	12	2
17) Diseases	7	104	35	4
18) Insects/pests	43	82	24	1
19) Weeds	8	95	44	3
Total responses	505	1191	803	51

Among moderate problems, the top most problem perceived by farmers was that of erratic electricity supply which is the main energy source for irrigation in state. Other moderate problems in order were the problem of deceases/weeds and regarding poor extension service/lack of technical knowhow.

Table 6.2.2: Major Problems in Cultivating of Basmati Crop, Sample Farmers, Punjab, 2013-14

Problem	Severity of problem (Per cent)			
	Low	Moderate	High	Severe
1) Lower yield	9.50	6.05	2.62	17.65
2) Unstable yield	8.32	6.21	3.49	11.76
3) Lack of remunerative price	1.39	3.36	11.96	13.73
4) Poor road network for transportation	0.79	8.14	6.10	0.00
5) Poor refrigeration facilities	-	-	-	-
6) Other infrastructure problems	-	-	-	-
7) Erratic electricity supply	2.57	9.49	2.86	1.96
8) Labour problem (due to manual harvesting of basmati)	6.73	5.63	5.98	1.96
9) Poor quality of underground water	21.19	2.85	1.12	0.00
10) Non-availability of good quality of seed	9.31	7.22	2.12	0.00
11) Lack of/poor extension services /lack of technical knowhow	0.40	8.56	5.73	0.00
12) Price fluctuations	0.59	3.19	13.33	3.92
13) Lack of MSP/government procurement	0.59	4.20	10.59	23.53
14) Lack of market information	0.99	4.62	10.96	3.92
15) Collusion among traders/trade malpractices	1.19	6.05	8.84	1.96
16) Distant market	24.95	0.84	1.49	3.92
17) Diseases	1.39	8.73	4.36	7.84
18) Insects/pests	8.51	6.88	2.99	1.96
19) Weeds	1.58	7.98	5.48	5.88
Total	100.00	100.00	100.00	100.00

Overall marketing related constraints/problems in basmati cultivation were of the most severe/high nature as perceived by growers followed by production related and the institutional problems.

6.3 Problems Faced by Wholesalers

As indicated in Table 6.3.1, the sever problems faced by basmati rice wholesalers were regarding the competition from other wholesalers as well as regarding the high marketing charges. These problems were also the main problems perceived of high as well as of moderate categories of problems. Besides, poor road net work was number one problem perceived by the wholesalers amongst the problems of high and moderate nature. Competition from exports, infrastructure related problems, erratic quality and mixing of varieties, etc were reported as very minor problems by majority of the wholesalers.

Table 6.3.1: Major Problems Faced by Wholesalers of Basmati Rice, Punjab, 2013-14
(No of wholesalers: 10)

Problems	Severity of problem			
	Low	Moderate	High	Severe
1) Lower supply	8	1	1	0
2) Poor quality supply	9	1	0	0
3) Lower price due to lower demand	9	1	0	0
4) Competition from other wholesalers	3	4	2	1
5) Competition from exports	10	0	0	0
6) Poor road network	2	5	3	0
7) Other infrastructure problems	10	0	0	0
8) Erratic supply/production	10	0	0	0
9) High marketing charges/taxes	6	2	1	1
10) Mixing of different varieties	10	0	0	0
Total responses	77	14	7	2
1) Lower supply	10.39	7.14	14.29	0.00
2) Poor quality supply	11.69	7.14	0.00	0.00
3) Lower price due to lower demand	11.69	7.14	0.00	0.00
4) Competition from other wholesalers	3.90	28.57	28.57	50.00
5) Competition from exports	12.99	0.00	0.00	0.00
6) Poor road network	2.60	35.71	42.86	0.00
7) Poor refrigeration facilities	0.00	0.00	0.00	0.00
8) Other infrastructure problems	12.99	0.00	0.00	0.00
9) Erratic supply/production	12.99	0.00	0.00	0.00
10) High marketing charges/taxes	7.79	14.29	14.29	50.00
11) Mixing of different varieties	12.99	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00

6.4 Major Problems Faced by Retailers

The major problems perceived by sample retailers in order of severity were competition from large organized retail chains, competition from other retailers and the poor infrastructure (Table 6.4.1).

Table 6.4.1: Major Problems Faced by Retailers of Basmati Rice, Punjab, 2013-14
(No of retailers: 10)

Problems	Severity of the Problem			
	Low	Moderate	High	Severe
1) Lower supply	8	2	0	0
2) Poor quality supply	9	1	0	0
3) Non-remunerative price due to lower demand	9	1	0	0
4) Competition from other retailers	2	6	2	0
5) Competition from large organized retail chains	0	4	4	2
6) Competition from exports	7	3	0	0
7) Government intervention in price	10	0	0	0
8) Poor infrastructure	6	4	0	0
Total responses	51	21	6	2
Per cent Distribution				
1) Lower supply	15.69	9.52	0.00	0.00
2) Poor quality supply	17.65	4.76	0.00	0.00
3) Non-remunerative price due to lower demand	17.65	4.76	0.00	0.00
4) Competition from other retailers	3.92	28.57	33.33	0.00
5) Competition from large organized retail chains	0.00	19.05	66.67	100.00
6) Competition from exports	13.73	14.29	0.00	0.00
7) Government intervention in price	19.61	0.00	0.00	0.00
8) Poor infrastructure	11.76	19.05	0.00	0.00
Total	100.00	100.00	100.00	100.00

Expansion of organized retail is perceived the biggest problem and perceived as severe and high problem by 100 and 67 per cent of retailer respondents respectively. The competition from other retailers was perceived as the second major problem ranked high and moderate by 33 and 29 per cent of retailers respectively. Problems of poor infrastructure and competition from exports were also among the moderate problems perceived by the sample retailers.

6.5 Major Problems Faced by Exporters

Basmati rice constitutes a major share of agricultural exports from India and nearly two-third of basmati rice produced in country is exported. The major problems perceived by sample exporters are presented in Table 6.5.1.

Table 6.5.1: Major Problems Faced by Exporters of Basmati Rice, Punjab, 2013-14
(No of exporters: 5)

Problems	Severity of the Problem			
	Low	Moderate	High	Severe
1) Lower domestic production	5	0	0	0
2) Poor quality supply	0	2	2	1
3) Lower price due to lower world demand	2	3	0	0
4) Competition from wholesalers	1	2	1	1
5) Competition from other exporters	1	2	2	0
6) Poor road network	0	2	2	1
7) Poor port facilities	0	2	2	1
8) Other infrastructure problems	0	1	2	2
9) Lengthy government procedures	1	3	1	0
10) Export policy uncertainty	0	3	1	1
11) Erratic supply/production	1	2	2	0
12) Low domestic demand	4	1	0	0
13) Mixing of different varieties	3	1	1	0
14) Problem of chemical residue	0	1	3	1
15) High port charges/taxes	1	3	1	0
Total responses	19	28	20	8
Per cent Distribution				
1) Lower domestic production	26.32	0.00	0.00	0.00
2) Poor quality supply	0.00	7.14	10.00	12.50
3) Lower price due to lower world demand	10.53	10.71	0.00	0.00
4) Competition from wholesalers	5.26	7.14	5.00	12.50
5) Competition from other exporters	5.26	7.14	10.00	0.00
6) Poor road network	0.00	7.14	10.00	12.50
7) Poor port facilities	0.00	7.14	10.00	12.50
8) Other infrastructure problems	0.00	3.57	10.00	25.00
9) Lengthy government procedures	5.26	10.71	5.00	0.00
10) Export policy uncertainty	0.00	10.71	5.00	12.50
11) Erratic supply/production	5.26	7.14	10.00	0.00
12) Low domestic demand	21.05	3.57	0.00	0.00
13) Mixing of different varieties	15.79	3.57	5.00	0.00
14) Problem of chemical residue	0.00	3.57	15.00	12.50
15) High port charges/taxes	5.26	10.71	5.00	0.00
Total	100.00	100.00	100.00	100.00

Infrastructure related problem was the most severe problem felt by the exporters. Problem of chemical residue in basmati rice, export policy uncertainty, poor quality supply, competition from wholesalers and poor road and port facilities were the other problems of severe and high nature perceived by the exporters. The problem of low price due to low world demand, lengthy government procedures, export policy uncertainty and high port charges were the main problems of moderate degree as perceived by the exporters.

Chapter 7

Summary, Conclusions and Policy Implications

Backdrop

Indian farmers are vulnerable to both production and market risk throughout their life. Vagaries of monsoon, occurrence of pest and diseases, etc., marked the risks associated with the production. The output variations in agricultural commodities lead to wide fluctuations in their prices exposing the growers to considerable marketing risk. Inadequate market infrastructure and prevalence of too many intermediaries between producer and consumer result in higher marketing costs thus lowering the share of producer in the consumer's rupee. Changes in domestic and global fundamentals, poor market intelligence, poor infrastructure facilities, large number of intermediaries, lack of awareness about quality standards etc. are the main causes for market related risks. Prices volatility led to disadvantage to producers and final consumers but benefitted to the large number of intermediaries. The nature of markets of agricultural commodities and imperfections in these markets also influence the price transmission and the final consumer prices. Considering the above observations, it is necessary to study the farm level crop profitability and the relationship between movements in market arrivals and market prices of important agricultural commodities along with the analysis of price relationships in movement of these commodities from farm gate to the retail level. In current study this inquest was applied to the basmati rice in Punjab state.

Basmati is long grain aromatic rice grown for many centuries in the specific geographical area at the Himalayan foot hills of Indian sub-continent. India being the world's largest producer contributes more than 70 per cent of the total world basmati rice production. Annual production of basmati rice in India hovers around 4 million tones and it was estimated to be 4.7 million tones in 2012. Export of basmati rice from India has increased from about 8.51 lakh tonnes during 2000-01 to 37.57 lakh tones during year 2013-14. During 2012-13, the country earned crucial foreign exchange having worth of Rs 19.40 thousand crores contributing about 8.4 per cent towards the total earnings from the export of agricultural commodities. Iran, Soudi Arabia, UAE, Kuwait, Iraq and UK are the major export destinations of Indian basmati rice accounting for nearly 75 per cent total basmati exports during 2012-13.

Haryana, Punjab, U.P, Uttarakhand, and J&K are the basmati growing states in India. The share of Haryana in total Indian basmati production during 2011-13 was about 37.18 per cent followed by Punjab with 36.47 per cent and U.P. with 23.65 per cent. During 2013-14,

area and production of basmati rice in Punjab was estimated at 5.59 lakh hectares and 14.73 lakh tones respectively. There are many notified varieties of Basmati rice in India but the major area in Punjab is under Pusa Basmati 1121. The present study is an attempt to analyze the behaviour of prices of basmati rice, both over years as well as across the selected markets along with enquiry into the relationship among farm harvest prices, wholesale prices, retail prices and export prices.

Sampling and methodology

The study has been based on both primary as well as secondary data. Amongst different districts of the state, major proportion of area under basmati is concentrated in its traditional belt comprising Gurdaspur, Amritsar and Tarn Tarn districts. However, recently area under basmati cultivation in non-traditional districts of state like Ferozepur, Sangrur, Patiala, Mukatsar, etc has also been increased in a major way. The information on district-wise production of basmati in Punjab revealed that during 2012-13, four districts viz. Gurdaspur, Amritsar, Tarn Tarn and Ferozepur contributed about 60 per cent of the total basmati production in state. Multistage sampling procedure was adopted for selection of sample basmati growers from three major basmati growing districts (viz. Gurdaspur, Amritsar and Ferozepur (erstwhile) accounting for nearly 46 percent of total basmati production of state during 2012-13. To study the market channels and price spread, the information was collected from ten wholesalers and ten retailers selected randomly from the local markets. Similarly five basmati exporters/millers were randomly selected to collect the data. The comprehensive survey was conducted in the sample villages at end of crop year 2013-14 (Reference year). Secondary data on monthly market arrivals and prices of basmati were collected from the offices of Agricultural Produce Market Committees (APMC) of the four major basmati markets viz. Amritsar, Tarntarn, Jallalabad and Fazilika. Simple statistical tools like averages and percentages were used to compare and interpret results properly. Time series analysis was conducted to examine the patterns in basmati paddy prices. To measure inter and intra-year price variability coefficients of variation were also worked out. Correlation coefficients were worked out to examine the paddy price relationship of different sample markets.

Demographic profile of sample farmers

The average size of family on sample farm households in state was 6.36 consisting of 2.45 males, 2.30 females and 1.61 children. Category-wise marginal, small, medium and large households consisted 4.11, 3.90, 4.57 and 5.60 adult members. About 17 per cent of total sample farmers were found to be illiterate. The farmers who had primary, middle, high school and higher education comprised 10.67, 13.33, 31.33 and 27.33 per cent of the total sample

farmers respectively. The study revealed that there was positive relationship between the farm size and level of the education of the farmers. The study sample was dominated with the traditional general category involved in Punjab agriculture. Only 2.66 per cent of the sample farmers were of the casts other than the general category.

The overall average operational farm size on sample farms in state was 4.82 ha. The average operational area on marginal, small, medium and large category farms was 0.78, 1.61, 3.29 and 9.31 ha, respectively. There was adequate availability of irrigation water as entire (100 per cent) operational area on the sample farms was under assured irrigation. The proportion of area under two sources of irrigation i.e tube well plus canal was the lowest on smaller categories which increased with the increase in farm size and was found to be highest on large size category farms. Wheat and basmati were major crops on all the farm size categories and on average accounted for 44.77 and 32.00 per cent of the gross cropped area on the sample farms in state followed by rice, other major crops (primarily fodder) and sugarcane. Cropping intensity on overall farms was 194 per cent.

Status of basmati area on different categories of farmers revealed that total area under basmati cultivation on average farm under basmati was 3.00 ha. The respective proportions of marginal, small, medium and large category farms in total basmati area on sample farms were observed to be 2.41, 7.22, 22.36 and 68.01 per cent respectively. On overall sample farms Pusa Basmati 1121 was the most dominating variety of basmati which accounted for nearly 90 per cent of the total area under basmati crop. This was followed by Traditional Basmati variety and Pusa Punjab Basmati 1509 varieties accounting for 6.96 and 3.42 per cent of the total area under basmati, respectively. On sample farms basmati varietal diversification showed a positive relationship with the farm size means larger size categories of farms had sown more varieties.

Economics of basmati cultivation

The average per farm basmati production on overall farms was 123.54 quintals. Category-wise, per farm production of total basmati on marginal, small, medium and large farms was 24.28, 42.14, 87.49 and 233.90 quintals respectively. Average per farm and family requirements/consumption of basmati was 1.34 quintals which accounted for 1.01 per cent of the total production on overall farms. Proportionate share of per farm retention of total basmati for other uses and wastage was 0.90 quintal (0.73%) and 0.57 quintal (0.46%) respectively. While the proportionate share of consumption in total production was inversely related to the farm size, share of wastage to total production varied directly with the farm size. The marketed surplus of basmati collectively for all varieties on the overall sample farms increased both in

absolute as well as proportionate terms with the increase in farm size. The marketed surplus on overall farms accounted for 97.73 per cent of total basmati production. The average price received by farmers for their marketed surplus was Rs 3915 per quintal. Variety-wise, the average price received by farmers for Pusa Basmati 1121, Pusa Punjab Basmati 1509 and Traditional basmati were Rs 3897, Rs 2936 and Rs 5199/qlt respectively. For overall basmati the prices received by farmers varied from the lowest by small farmers (Rs 3605/qlt) to the highest prices received by the small farmers (Rs 3983/qlt).

The total variable cost of cultivation of overall basmati (all varieties) on the sample farms including cost involving the post harvest operations of basmati paddy was Rs. 30256 per ha. Variety-wise the total cost of cultivation was observed to be highest for Pusa basmati 1121 (Rs 30691/ha) followed by Traditional basmati (Rs 27625/ha) and Pusa Punjab Basmati 1509 (Rs 24213/ha). For overall basmati, variable input cost accounted for about 96 per cent where as the rest about 4 per cent constituted the post harvest/marketing costs. Category-wise, the lowest cost i.e. Rs 25752 per ha was observed to be on the marginal category farms and the highest i.e. Rs 30982 per ha on the large category farms. In overall variable input cost of basmati cultivation, the major share was contributed by labour cost to the tune of about 50 per cent (varying from 45.73 % on marginal to 52.56 % on small farms) followed by the machine cost at about 19 per cent (varying from 18.12 % on large to 24.79 % on marginal farms). The other cost components like expenses on pesticides/weedicides accounted for about 14 per cent (varying from 12.52 % on small to 14.03 % on large farms) and expenditure on fertilizers and manures at about 13 per cent (varying from 9.79 % on marginal to 13.08 % on large farms) of the total variable input cost. On account of free electricity supply to irrigation pumps the expenditure on irrigation component accounted for only 1.78 per cent of total variable input cost on overall farms and it varied from 1.50 per cent on large farms to 3.99 per cent on marginal farms. Total cost on post harvest/marketing operations on overall sample farms was Rs 1325 per ha which varied from Rs 1239 per ha on marginal farms to Rs 1427 per ha on the small farms. Among different post harvest/marketing costs the unloading and cleaning accounted for the major proportion followed by transportation, kind payments, marketing losses and storage cost.

Per ha gross returns and returns over variable cost (ROVC) on overall sample farms were Rs 164658 and Rs 134402 respectively. Among different categories the gross returns were found to be highest on medium size farms (Rs 167057/ha) and lowest on the marginal farms (Rs 148697/ha). ROVC were also observed to be highest on medium size farms (Rs 138005/ha) and lowest on the marginal farms (Rs 122945/ha). Lowest returns on marginal

farms were particularly due to the relatively low price received by them for their produce (particularly for Pusa Basmati 1121) which was significantly lower at Rs 3605 per quintal against overall average price received by the sample farms at Rs 3915 per quintal. Variety-wise, the highest per ha gross returns were received from Pusa Basmati 1121 (Rs 166796/ha) followed by from Pusa Punjab basmati 1509 (Rs 149088/ha) and Traditional Basmati (Rs 144777/ha). Likewise, the highest per ha ROVC were received from Pusa Basmati 1121 (Rs 136104/ha) followed by from Pusa Punjab basmati 1509 (Rs 124875/ha) and Traditional Basmati (Rs 117152/ha). However ROVC per quintal were observed to be the highest for traditional basmati (Rs 4295/ql) followed by Pusa Basmati 1121 (Rs 3248/ql) and Pusa Punjab basmati 1509 (Rs 2459/ql).

Marketing of basmati

About 96 per cent of the sample farmers had disposed of their basmati crop through regulated markets. While 3.23 per cent of overall farmers had sold in the village market there were only of about half per cent of the total farmers who sold their produce through other channel (particularly directly to processor). Category-wise all of the small and medium farmers, 90 per cent marginal farmers and 93 per cent of the large farmers disposed of their basmati produce of different varieties through regulated markets. About 11 per cent marginal farmers and 5 per cent large farmers had disposed of their marketed surplus in the village market.

On overall sample farms, per farm marketed surplus of basmati (all varieties) was recorded at 120.73 quintals which was sold on an average price of Rs 3915/ql. Market-wise, 96.33 per cent of marketed surplus was sold in the regulated market at price of Rs 3935/ql. The basmati sold in other channels like village market and to others was comprised only 2.83 0.83 per cent of total marketed surplus. The average price received in these markets was Rs 3062/ql and Rs 4500/ql respectively. Category-wise, marginal farmers sold their 91.94 per cent marketed surplus in regulated markets at price of Rs 3636/ql and 8.06 per cent in the village market at price of Rs 3247/ql. The large farmers had sold their 94.91 per cent proportion of total marketed surplus in the regulated market at price of Rs 3945/ql followed by 3.87 per cent in village market at price of Rs 3048/ql and other 1.22 per cent to others at price of Rs 4500/ql. Small and medium farmers had sold their entire marketed surplus in regulated market at price of Rs 3983/ql and Rs 3922/ql respectively. Category-wise, for overall marketed surplus the average price received by small, medium and large farmers had very small difference and it varied from Rs 3917/ql to Rs 3983/ql received by the large and small farmers respectively. Lack of bargaining power as well as selling relatively largest proportion

(60.19%) of marketed surplus during October, month in which the prices remained significantly low as compared to other months of marketing year seems to be the reason for relative overall low price (Rs 3605/ql) received by marginal farmers.

It was observed that sample farmers had sold 82.43 per cent of their marketed surplus during the crop harvesting period consisting months of October and November of marketing year 2013-14. During October, 34.44 per cent of the total marketed surplus was sold, however the price received during this month was Rs 3463/ql which on an average was 11.55 per cent lower than the average annual prices (Rs 3915/ql) received by the farmers. As harvesting season starts in October, the high moisture content of output during this month results in the low prices. The proportion of marketed surplus sold during month of November was 47.99 per cent which on average fetched price of Rs 4007/ql which was 2.35 per cent higher relative to the annual average price. During December, January, February and others months (March onwards) of the marketing year 2013-14, the overall quantity sold constituted 6.65, 3.57, 3.05 and 4.31 per cent of the marketed surplus respectively. Respective prices received during these months were Rs 4820, Rs 4378, Rs 4436 and Rs 4356/ql which were 23.10, 11.81, 13.30 and 11.26 per cent higher as compared to the annual average price received by the farmers. During December month nearly 78 per cent of total marketed surplus of the traditional aromatic basmati fetching significant higher price was sold, which is reflected in the price received for overall basmati during this month. Category-wise it was found that marginal farmers had sold their entire marketed surplus during harvesting months. The small farmers besides selling 89.27 per cent of their marketed surplus in harvesting months had also sold 10.73 per cent of it during the month of December. Medium farmers besides selling major proportion (86.99%) of marketed surplus in months of October and November had also sold during the months of December (7.82%) and January (5.18%). It was the large farmers who on account of their output holding capacity had sold their marketed surplus even after month of January. Besides selling major proportions (79.64%) of marketed surplus during October and November months, farmers of this category had also sold significant proportions viz. 6.09, 3.51, 4.46 and 6.30 per cent during the months of December, January, February and March onwards respectively. Market-wise monthly information on disposal and prices had shown that sales in village market took place only during harvesting months of October and November.

The promotion of basmati paddy cultivation is part of the State Government's diversification plan aimed at reduction of area under water consuming common paddy crop in Punjab. Although government had not provided any direct benefit to the basmati farmers, but major relief provided to basmati millers in the form of market tax exemptions on basmati

purchase from Punjab markets is primarily aimed at ensuring remunerative prices to basmati farmers. During 2013-14 marketing year, Government had waived market fee (2%), rural development fee (2%) and infrastructure development fee (3%) on purchase of basmati paddy for milling in Punjab. Besides, Value Added Tax (VAT) is zero on all basmati exports which are sourced from Punjab.

All of the respondent wholesalers procured their major part of supplies from the rice millers. Second important source of supply for wholesalers was observed to be the other wholesalers. The major source of supply of basmati for the retailers was the wholesalers. Besides, second most important source of supply for them was either processors or other retailers in the market. It has been found that most of the exporters dealing with basmati rice had their own rice milling units established in producing areas of state and their major source of supply was the farmers from whom they purchase large quantities of basmati paddy. Almost entire supply from farmers was purchased through commission agents in the regulated markets of state. Other rice millers were the second important source of supply for exporters.

Price patterns and price spread of basmati rice

The decomposition of time series data of basmati paddy prices revealed the presence of considerable seasonality in study markets and prices remained above the annual average prices during the lean period consisting months of April to July and highest prices prevailed during the month of May. As the harvesting season starts in October, the basmati paddy prices in the state markets remained relatively low from October to January. Movement of de-seasonalised prices around trend line exhibits the presence of oscillatory movements pointing towards existence of the cyclical patterns in basmati paddy prices during the past years. The value of coefficient of variation of inter-year price reveals that price variability was more pronounced during the months of January to April and was lower during the months from August to October. Thus period with low price variability coincides with the pre-harvesting lean period. On the other hand high variability is associated with immediate post-harvest period. The significant intra-year (within year) variability in prices of basmati paddy were also observed during the last thirteen years. Price linkages of different Punjab markets evaluated through correlation coefficients revealed that price behaviour of basmati paddy in different markets were similar and the markets of state were well integrated.

Farmer's overall percentage profitability (ROVC) in basmati paddy production was about 433 per cent and it varied from 422 per cent on the large farms to 453-463 per cent on other category of farms. Variety-wise, farmer's percentage profitability was 432, 516 and 413 per cent for Pusa Basmati 1121, Pusa Punjab Basmati 1509 and traditional basmati

respectively. However, while working out percentage profitability of farmers only variable costs were taken into account. As per latest available estimates of cost of cultivation scheme the variable costs constitute only about half of the total cost of cultivation of paddy and wheat in Punjab agriculture, which is also true in case of basmati.

An average wholesaler had monthly traded 28.65 quintal of total basmati rice comprising 96.12 and 3.88 per cent of Pusa basmati 1121 and traditional basmati respectively. Wholesale sales of basmati of both of these varieties were found to be highest in month of December. Wholesaler's average purchase price of Pusa basmati 1121 and traditional basmati was Rs 8127/ql and Rs 10285/ql respectively. The sale price of respective varieties was Rs 8489 and Rs 10666/ql. Average percentage mark-up of wholesaler during the study period for Pusa basmati 1121 and traditional basmati on average was 4.46 and 3.70 per cent respectively. The study showed that due to relative higher prices of the traditional basmati, while the average absolute mark-up was more in traditional variety, the average percentage mark-up of wholesale was relatively more in trade of Pusa Basmati 1121. Overall for both varieties taken together percentage mark-up in wholesale trade turns out to be 4.42 per cent respectively.

The monthly basmati trade of an average retailer in local market was 0.59 quintal comprising 78 per cent of Pusa Basmati 1121 and 22 per cent of traditional basmati. During the study period, retailer's sale price of Pusa basmati 1121 and traditional basmati was Rs 9533/ql, and Rs 11798/ql respectively. The retailer's average percentage mark-up of the respective varieties was 12.30 and 10.61 per cent. The retail sales of both varieties were relatively more during October - December months and low during the January - February months. The retailer's overall weighted average purchase and sale price of basmati rice was Rs 9019/ql and Rs 10092/ql respectively. Retailer's overall absolute mark up and percentage mark-up in both varieties taken together turns out to be Rs 1073/ql and 11.90 per cent respectively.

Pusa basmati 1121 and traditional basmati accounted for 96.59 and 3.41 per cent respectively of the total quantity exported by the respondent exporters. Over the study period from October to February, monthly export was found to be the highest in month of February and least during the month of October. The exporter's average percentage mark-up of Pusa basmati 1121 during the study period was 13.22 per cent. The same for export of traditional basmati was 10.42 per cent. The exporter's overall absolute weighted average absolute mark-up and percentage mark-up for both varieties taken together was Rs 807/ql and 10.76 per cent respectively.

In domestic market the farmer's net price accounted for about 68 and 73 per cent of the consumer's purchase price of Pusa basmati 1121 and traditional basmati respectively. The rice miller's net margin for Pusa basmati 1121 and traditional varieties was 8.06 per cent and 4.31 per cent of the consumer's price respectively. While the wholesaler's net margin as percentage to the final price remained more or less equal in both of the basmati varieties (3.40% and 3.43%), retailer's net margin in sale of traditional basmati was relatively low (8.40%) when compared to that in the Pusa basmati 1121 (9.47%).

Export is the major channel for basmati marketing as nearly 85 per cent of the head rice of basmati is being exported, primarily to the gulf countries. Although there was no difference with regard to the net sale price received by the farmers in export market channel as compared to local market channel for both of the varieties, however farmer's net margin in export price was significantly higher at 77.47 to 79.52 per cent of the export price as compared to that in the consumer price in domestic local market channel. Relatively low total cost of miller in this channel as compared to the domestic market channels was on account of the exemption/refund of Value Added Tax (5%) by state government under the basmati export promotion scheme. The net margin of miller accounted for 4.86 and 4.34 per cent of export price of Pusa basmati 1121 and traditional basmati respectively. The exporter's net margin was about 5.92 percent (Rs 492/q) and 5.01 per cent (Rs 542/q) for Pusa basmati 1121 and traditional basmati respectively.

Stakeholders' perceptions on basmati production and trade

Farmers' responses regarding motive of basmati cultivation revealed that profitability along with usefulness of its by-product and the proper adjustment of basmati in the adopted crop rotation were the principal reasons for cultivation of basmati in Punjab. According to farmer's perceptions, the marketing related constraints or problems in basmati cultivation viz. lack of Minimum Support Price (MSP) and Government procurement, lack of remunerative price, high fluctuations price, lack of market information and collusion among traders were the major problems being faced by them. The main production related problems in order of their degree of severity were the lower yield, yield instability, problem of diseases, problem of weeds and lack of technical knowhow or extension related problem.

Major problems of wholesalers were regarding the competition from other wholesalers, problem of high marketing charges/taxes and poor road network. The major problems perceived by sample retailers in order of severity were competition from large organized retail chains, competition from other retailers and the poor infrastructure. Infrastructure related problem was the most severe problem faced by the exporters. The

chemical residue on account of heavy use of insecticides and fungicides in basmati cultivation was a high and severe problem faced by them in basmati exports. The other problems of severe and high nature perceived by the exporters were the uncertainty of Government export policy, poor quality supply, competition from wholesalers and poor road network and port facilities.

Policy Implications

Recently, basmati replaced cotton as the third most important crop after wheat and non-basmati rice in Punjab state. During 2008, Government of India's notification declaring Pusa basmati 1121 variety as basmati played major role in this regard and the area under basmati in state increased in a major way. This particular variety with high demand in gulf countries had broken the long time genetic yield barrier of basmati varieties. Unlike non-basmati paddy, basmati does not get price support/procurement by the government, thus marketing related problems faced/perceived by basmati growers viz. high fluctuations in price, lack of remunerative price, lack of Minimum Support Price (MSP) and Government procurement, lack of market information and collusion among traders need to be addressed through various institutional and policy instruments. As basmati cultivation is important from ecological as well as farm incomes point of view; both State as well as Central Governments should frame a policy to save farmers from price fluctuations through ensuring some minimum income support to its cultivators. As significant proportion of farmers still depend upon the traders for basmati price information, there is need of providing wider coverage to collecting and dissemination of agricultural market intelligence/information so that prices prevailing in each and every market is available to them for making adequate marketing decisions. Study revealed that basmati paddy prices remained generally low during harvesting/peak period and high during the lean period. However, farmers had disposed of more than eighty per cent of marketed surplus immediately after harvesting at relatively low prices. Especially, small and marginal farmers lack facility or money to sell where they want or keep their produce and sell when price is suitable/high. Proper organizations, both collective and government organizations may tackle these issues in order to ensure good price of farmer's output. There is need to encourage the farmers to opt for farm level storage through creation of efficient storage structures at farm level.

The production related problems can be handled through improvement in the knowledge of farmers regarding new techniques and technologies. Even though the research and extension linkages in Punjab are fairly strong, the qualitative improvement by reaching low productivity farmers through involvement of crop scientists and extension personnel is very much needed. Improvement in road and other infrastructure in markets can solve the

problems being faced by different market intermediaries. The problem of chemical residue on account of heavy use of insecticides and fungicides in basmati cultivation needs immediate intension to address the exporter's quality concerns. To be credible supplier of basmati rice in world market, the country should formulate a long run export policy. Although, short-run benefits to basmati rice milling industry/exporters provided by State Government had helped the industry in competing in the world market, urgent steps should be taken to frame the long run policy in this regard.

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Appendix-I

Comments on draft report

Relationship between wholesale prices, retail prices, export prices (fob), prices realized by farmers and details of contributing factors for the price difference for basmati rice in Punjab

The report is well-written and most of the information needed for the study has been provided. The quality of work is appreciable and the draft write-up is engaging

Following are few suggestions to improve it further for the final report:

1. Page No. 12, Table No. 2.1.1, the family composition may be provided in number of persons (not as number of persons per household). Kindly do the needful.
2. Page No. 15, Table No. 2.2.1a, :It would be convenient if the irrigated area status for sample farmers is provided in hectares and not as ha/farm. Although the calculations are correct (as verified by us from other tables on cropping intensity and area under different crops) it would help if this table is provided in hectares.
3. Page No. 31, Table No. 3.2.4- It appears that this table is a weighted average of other three tables (3.2.1 to 3.2.3), with the weights being the area under each variety. Is this observation correct? Please clarify and include a line or two in the report on this.
4. Page No. 78 and 79, Table No. 6.2.1 and 6.2.2, - The percentages should sum to 100 *column-wise* and not row-wise as has been done in the draft report. The idea behind this table is to assess which of these problems are relatively more important. For example, suppose 5 problems are listed as severe by about 40 respondents (out of a total of 150). We need to assess the relative severity of these 5 problems. Therefore, the percentages should add to 100 *column-wise*. Other tables also need to be corrected likewise - problems of wholesaler, retailer and exporters on page no. 80, 81 and 83, respectively.

5. Chapter 5: Price Patterns over Time and Space

The analysis in this chapter is very good and quite interesting. The analysis in section 5.1 of deseasonalized prices is sound. However, the corresponding description of the methodology in section 1.5 (Introduction chapter) is not clear and needs to be made clearer. Some comments on this chapter are as follows

- i) Are the prices in table 5.2.1 and table 5.2.2 deseasonalized? The methodologically correct way is to use deseasonalized prices.
- ii) 5.3. Market Integration: Overall, this is a good attempt. I presume the prices series used here are raw prices. There are few important shortcomings of using correlation coefficients of raw prices to measure market integration (Mahendru 1937, Jasdanwalla 1966, Lele 1968 and Cummings 1967). Lele analyzed weekly wheat prices for five Punjab market towns and Delhi while Cummings analyzed the Indian wheat market. The price correlations are biased upwards when raw price series

are used (Hariss 1979). The raw price series are more likely to include the influences of other factors such as climate patterns, inflation or any other shocks that affect the markets. This is likely to conceal the true degree of integration among markets (Hariss 1979).

- iii) The methodologically correct way of using correlation coefficients in spatial price analysis is to calculate the correlation coefficient of the *residuals* (Croxtan and Cowden 1955), after the trend and the seasonal components are removed from the raw price data. **Blyn (1973)** is a good study in this direction. This study makes this correction and reworks the correlation coefficients after eliminating trend and seasonal influences using the same eight year monthly wheat price data for eight Punjab markets & Delhi **as used in Cummings (1967)**. The seasonal component is removed by arranging the data into twelve monthly series for each market. Then a linear trend line is fitted to each of these given-month (monthly) series and residuals are obtained. Then correlation coefficient is calculated among these residuals (detrended data) of each month for these nine markets. His calculations show that the average correlation coefficient is much lower than reported by Cummings.
- iv) For the purpose of journal publication of this analysis in future, the authors may like to use more advanced techniques of cointegration for assessing market integration,

Please provide a soft copy of the raw data and tables in the excel form, so that any additional calculations and analysis can be carried out at our end. Also necessary alterations in tables can be made to ensure uniformity across all reports.

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Appendix- II

Action Taken Report on the Comments

Date of rough draft of report submitted: January 15, 2015

Date of comments received on the rough draft of report: February 6, 2015

All the comments were taken into consideration while finalizing the report. These comments have been incorporated where ever found to be necessary.

1. The family composition has also been provided in number of persons as desired.
2. The irrigated area status for sample farmers has also been provided in hectares along with ha/farm as suggested.
3. Yes, this table (3.2.4) is a weighted average of other three tables (3.2.1 to 3.2.3), with the weights being the area under each variety.
4. The percentages have been summed to 100 column-wise for the tables as desired.
5. The methodology of deseasonlizing of prices has been made lucid as desired. The modified version of the methodology as suggested has been used for the analysis.

The soft copy of the report/ data/ tables in excel format as desired has been dispatched.

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