RELATIONSHIP BETWEEN WHOLESALE PRICES, RETAIL PRICES, EXPORT PRICES (FOB), PRICES REALIZED BY FARMERS

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Preface

The present study is undertaken for the Ministry of Agriculture, mainly motivated by the frequent gyrations in prices of perishable commodities in the country. The study attempts to analyze the spread between wholesale, retail and export prices of onion, grapes and basmati rice. The study also analyzed the economics of cultivation, marketing channels, profitability of various market players and the major problems faced. The study uses secondary data (from 2001 to 2014), supplemented by primary data.

The study has undertaken an analysis of secondary data (from 2001 to 2014) at the national and state level, supplemented by in-depth primary data surveys in two or three major states growing each of the study crops, to understand the situation at the ground level and farmers' perspective. The Institute of Economic Growth has carried out the analysis based on secondary data and coordinated the primary data surveys carried out by the various Agricultural Economic Research Centres (AERC s). This report presents an integrated analysis based on the primary data surveys conducted by the AERC s and the analysis based on the secondary data from published sources. The studies by the following AERC / AERU s (in alphabetical order) have been used in this report, with the states covered in parentheses – Delhi (Haryana), ISEC (Karnataka), Ludhiana (Punjab), Pune (Maharashtra) and Vallabh Vidya Nagar (Gujarat).

We wish to thank Dr Sangeeta Verma, Dr P. C. Bodh and other officials of the Directorate of Economics & Statistics for their cooperation and support. We thank the entire study teams in the various AERC s for their inputs through their primary data-based reports. In particular, we wish to thank Professors Usha Tuteja, Parmod Kumar, D.K. Grover, Sangeeta Shroff and S.S. Kalamkar at these respective AERC s/ AERU s for leading their study teams and giving valuable inputs from time to time. Last but not the least, we would like to place on record our appreciation of our colleagues in the Agricultural Economics Research Unit at IEG for their support.

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List of Acronyms

WSP	Wholesale Prices
RP	Retail Prices
EXP	Export Prices
STM	Storage, transportation and marketing costs
AVG	Average
SD	Standard Deviation
CV	Coefficient of Variation
AP	Andhra Pradesh
ASM	Assam
BH	Bihar
CHD	Chandigarh
CHH	Chhattisgarh
DL	Delhi
GJ	Gujarat
HP	Himachal Pradesh
J&K	Jammu & Kashmir
JKD	Jharkhand
HR	Haryana
KR	Karnataka
KRL	Kerala
MP	Madhya Pradesh
MH	Maharashtra
OR	Orissa
PB	Punjab
RJ	Rajasthan
SKM	Sikkim
TN	Tamil Nadu
UP	Uttar Pradesh
UK	Uttarakhand
WB	West Bengal

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EXECUTIVE SUMMARY

Abstract: The study is an attempt to analyze the spread between wholesale, retail and export prices of onion, grapes and basmati rice. The study also analyzed the economics of cultivation, marketing channels, profitability of various market players and the major problems faced. The study uses secondary data (from 2001 t0 2014), supplemented by primary data through in-depth surveys in two or three major states growing each of the study crops.

Results of our secondary data analysis show that retailers' profit margins (of onions and grapes) are much higher than wholesalers and exporters, including Maharashtra which is an important state, indicating super-normal profits being earned by the retailers. Econometric analysis confirms the significant negative effect of market arrivals on prices at most markets. There is also a significant positive effect of wholesale prices on the retail prices.

Results of the primary data analysis show that about 95% of the produce of all three study crops is sold in the market. More than three-fourths of the total costs are on account of inputs and the major component of input costs is labour (manual + bullock). There is some evidence of imperfection in vertical integration of onion markets in Gujarat and Karnataka**.** For all the study crops, regulated market and commission agents are the main channels of marketing. Farmers have mostly cited lack of remunerative price and lack of MSP & procurement as major problems in cultivating the study crops.

The main policy implications that emerge from the study are addressing onion market imperfections in Maharashtra; smoothening supply through production, storage or processing;

appropriate policies to address labour scarcity; strengthening the existing marketing system as well as developing alternative channels, such as farmers' collectives and streamlining and strengthening the current initiatives such as NAM (National Agricultural Market).

Introduction: The present system of agricultural marketing in India involves a multiplicity of players from the producer to the final consumer – commission agents, wholesalers, processors, retailers, exporters etc. The constellation of prices at various levels depends on the cost structure of agriculture, supply-demand dynamics, weather patterns, infrastructure, trade shocks, and government policy and last but not the least, the structure of the product and factor markets. In recent years there have been frequent gyrations of prices of several commodities of perishable nature. Therefore the present study attempts to analyze the price spread of different commodities at different levels of marketing chain and also explore reasons for the same. The commodities selected for the study are onion, grapes and basmati rice.

Objectives

1) To analyze the price behaviour at the farm, wholesale, retail and export levels
2) To analyze the price spread at various levels
3) To analyze the economics and marketing channels of the study crops to understand the price behaviour

Methodology

The study focussed on three crops, namely, onion, grapes and basmati rice, as suggested by the Trade Division, Ministry of Agriculture, GoI. Two or three major states growing each of these crops were selected for an in-depth primary survey. Gujarat, Maharashtra and Karnataka were selected for onion; Maharashtra and Karnataka for grapes and, Punjab, Haryana for basmati rice.

The study used both secondary and primary data to study the price behaviour at various levels. Secondary data was collected from various publications of Government of India and states, such

as Agricultural prices in India, Agricultural Situation in India, Agricultural Statistics at a Glance, Economic Survey, Statistical Abstracts (of various states) etc.

For primary survey, a multi-stage sampling procedure was adopted. In the first stage, two/three major districts growing the study crops were selected in each state. In the next stage, villages were selected using the same criterion. The third stage involved selecting the households. At this stage, a total of 150 households were selected for each crop from the selected villages. Within each village, based on a complete listing of the village households, households belonging to four categories, marginal (< 1 ha), small (1 to 2 ha), medium (2 to 4 ha) and large (> 4 ha) were selected randomly using the PPS sampling method (probability proportional to size).

In addition to the farming households, few wholesalers, retailers and exporters were also interviewed to understand the issues and problems along the supply chain. The number of wholesalers, retailers and exporters interviewed varied across states though, depending upon the number of these participants available in the study regions.

The primary survey has been conducted by the various Agricultural Economics Research Centres and Units in the respective states. The districts selected for onions are Chikballapur, Chitradurga and Gadag from Karnataka; Rajkot, Junagarh and Bhavnagar from Gujarat; and Pune, Ahmednagar and Nasik from Maharashtra. For grapes the districts selected are Bangalore, Bijapur and Chickballapur from Karnataka and Nasik, Sangli and Solapur from Maharashtra.

Secondary data on prices and market arrivals across all the major states have been used to analyze price spread between wholesale, retail and export markets at monthly, annual and five-yearly intervals to understand the intra-year (seasonal) and long-term (inter-year) trends. This is followed by a detailed econometric analysis, using monthly data, to explore the effect of market arrivals on wholesale prices and of wholesale prices on the retail prices.

Primary data, collected through in-depth primary data surveys in the sample regions, has been used to study economics of crop production including cost structure and profitability; major marketing

channels used, profitability at various levels of marketing chain; major problems facing the various stakeholders etc. Descriptive analysis using tabular and graphical analysis has been employed.

Major Findings

Findings from the secondary data analysis

1) There was a sharp price rise of onions in 2013 and 2014. However, this rise has been somewhat uneven. Retail prices were higher than the export prices during this period. The exporters' margins declined during 2011-14 while the retailers' margins have slightly increased during the corresponding period!

2) Grapes also show similar patterns. There has been an increase in wholesale and retail prices of grapes since 2011 and of export prices since 2012. However, the percentage mark-ups are a lot higher for retailers. The percentage mark-ups have increased for retailers while the same have decreased for exporters.

3) Among states, Maharashtra, the major supplier of onion in the country reported extremely high price spread between wholesale and retail prices, reporting 9 out of 14 years with above 100% variation. **This is a cause for concern and shows some market imperfections.** Our findings have been supported other by other important studies too (Chengappa et al. 2012), which even conclude that the onion market structure in Maharashtra is oligopolistic.

4) The econometric analysis shows that there is a significant negative effect of market arrivals on wholesale price and significant positive effect of wholesale price on retail price. This relationship holds true for onions and grapes and is robust across markets and states. In case of onion, Nasik district price in general and Lasalgaon price in particular show a significant effect on wholesale prices of most of the markets in the country

Findings from the primary data analysis

I Cropping Pattern and area under the study crop

1) **Onions:** In the sample regions of Gujarat, Maharashtra and Karnataka the area under onion cultivation is about 26%, 34% and 25% respectively of the total cropped area. The major varieties of onion cultivated in Gujarat are Nashik Red / Nashik 53 (36% out of a total area of 172 ha), red patti (32%), local (13%) and Nashik white (12%). In Maharashtra, out of a total onion area of 150 ha, 48% of the area is under fursungi, 27% under Nashik lal and 15% under panchganga varieties. In Karnataka, the major varieties grown are red onion, rose onion and chincholi. Red onion is the predominant variety occupying about 80% of the total onion area in the sample region

2) **Grapes:** In Maharashtra, grape is the major rabi crop in the sample region, occupying 50% of the total area. In Karnataka, grape occupies about 25% of the total area. In Maharashtra, 68% of the grapes area is under Thomson, 15% is under Sonaka, 6% under Manik chaman and 5% under Sharad varieties. In Karnataka, the major varieties grown are Bangalore blue, Dilkush and Thomson seedless, with shares of 29%, 28% and 23% respectively,

3) **Basmati**: In Punjab and Haryana, basmati occupies about 32% and 38% of the total area respectively. The major share of area belongs to large farmers - 68% in Punjab and 79% in Haryana. In both the states, small and marginal farmers together command a share of less than 10%, showing that basmati cultivation is mainly practiced by the larger size-groups. The major varieties grown in Punjab are Pusa 1121, Pusa Punjab 1509 and traditional Basmati. The major varieties grown in the Haryana are Pusa 1121 and Pusa Punjab 1509. About 91% of the area in Haryana is under Pusa 1121and the rest (9%) is under Pusa Punjab 1509.

II Production, Consumption and Sale

1) **Onions:** In Gujarat, the total onion production is 41396 quintals with following shares of major varieties - Nashik Red/ N-53 (30%), Red Patti (30%), Local (15%), Nashik White (15%), Pilli Patti/ Yellow (5%) and NHRDF/ NAFED (1%). In Maharashtra, the total production in kharif and rabi seasons is 5823 and 20678 quintals respectively. Fursungi variety has a share of about 53%, followed by Nashik Lal (23%) and Pachganga (8%) and

others (16%). In Karnataka, the total production is 21816 quintals, of which nearly 77% is of Red variety and rest, nearly 23% is of Rose variety. In all the three states, onions are mainly sold in the market and home consumption is very minimal. About 96% to 98% of the production is sold and only 1-2 percent is retained for consumption or wasted. These patterns are roughly similar across size groups.

2) **Grapes:** In Maharashtra, the total grapes production is 21576 quintals with shares of 71% and 14% of Thomson and Sonaka respectively. Nearly 97% of grape production is sold in the market and 1% is used for consumption In Karnataka, the total grapes production is 24412 quintals with following shares of the main varieties - Thomson (31%), Sonaka (10%), Bangalore blue (25%), Bangalore black (6%), Dilkhush (21%), Sharath (5%) and Manik chaman (2%). Nearly 96% of the production is sold, 3.5% is wasted. None of the farmers reported consumption of grapes. The highest percentage of wastage is reported for Bangalore black and Bangalore blue varieties - about 8 % and 5 %, respectively.

3) **Basmati:** The total basmati production in Punjab from all the varieties together was 18532 quintals in the study regions of state, of which nearly 91% is from Pusa 1121. The other major varieties grown in the state are Pusa Punjab 1509 and traditional Basmati. About 84% of the production is sold in the market and about 14% is stored for future use. In Haryana, the total production is 18598 quintals, out of which about 91% is of Pusa 1121. The percentage of production sold in the market is much higher than in Punjab – 97% as compared to 84% in Punjab. About 2% of the production is consumed. These proportions are similar and there is very little variation across varieties of basmati or size-groups of farmers.

III Cost of Cultivation

1) **Onions:** The total cost of onion cultivation in Gujarat, Maharashtra and Karnataka is 138291Rs/ha, 100982 Rs/ha and 106398 Rs / ha respectively. The share of input cost in the total cost is about 86%, 77% and 95% respectively in these states. The rest is incurred on the storage, transportation and marketing costs (STM). Broadly similar patterns are

observed across all size groups. In the total input costs, major share is accounted for by hired labour, manure & fertilizer and machinery hiring charges.

2) **Grapes:** In Maharashtra and Karnataka, the cost of cultivation is Rs.251505 Rs/ha and Rs.253839 Rs/ha respectively, out of which nearly 97% is on account of the input costs and rest is incurred on storage, transportation and marketing. Out of the input costs, manure & fertilizer and pesticides/weedicides account for bulk of the expenditure.

3) **Basmati:** The total cost of onion cultivation in Punjab is nearly 30208Rs/ha, of which nearly 96% is the input cost and rest is incurred on STM. Out of the total input costs, nearly half (about 48%) is incurred on labour (bullock+manual), followed by machinery hiring (nearly 18%), pesticides / weedicides (13%) and manure & fertilizer (12%). All the categories of farmers show similar cost pattern. The total cost of basmati cultivation in Haryana is nearly 39488 Rs/ha. About 93% of the total cost is incurred on inputs and the rest on STM. Out of the total costs, about 47% is incurred on labour (bullock+manual), followed by manure & fertilizer (15%), pesticides / weedicides (13%) and machinery hiring (nearly 11%)

IV Profitability

1) **Onions:** The net returns per hectare from onion cultivation in Gujarat, Maharashtra and Karnataka are 72033 Rs/ha, 68030 Rs/ha and Rs 82677 Rs/ha respectively. One major difference between Karnataka and the other two study states is that per hectare returns for the marginal farmer group are the lowest in Karnataka, progressively increasing over the size-groups. In Gujarat and Maharashtra, the returns are highest for marginal and small farmers

2) **Grapes:** The net returns per hectare from grape farming in Maharashtra and Karnataka are 272611 Rs/ha and Rs 213120Rs/ha respectively. In Maharashtra, there are no marginal farmers growing the crop and the returns per hectare are lowest for the small farmers. In

Karnataka, The gross & net returns as well as marketed surplus of large farmers are substantially higher than of other groups, and are almost double the average returns.

3) **Basmati:** The net returns per hectare in Punjab and Haryana are Rs. 134449 Rs/ha and 105109 Rs/ha respectively. In Punjab the returns are lowest for marginal farmers at 122945 Rs/ha. However, in Haryana, the returns are highest for marginal farmers. Pusa 1121 variety yielded the highest returns of Rs 136157 in Punjab. In Haryana, the returns for both the varieties are similar.

V Marketing

1) Onions:

a. Marketing Channels: In Gujarat nearly 93% of onion is marketed through the regulated markets (APMC), only about 5% is marketed through private traders and the rest (1%) through village markets. In Maharashtra regulated market is the only channel of marketing used in both seasons. In Karnataka nearly two-thirds of farmers (67%) sell in the regulated market and rest (33 %) to the commission agents

b. **Quantity marketed through various channels**: In Gujarat, about 94 % of the total quantity sold is marketed through the regulated markets (APMC) and only 5% through private traders and less than 1% through village markets. In Maharashtra all the produce is marketed through regulated market as this is the only channel of marketing used. In Karnataka, 78% is marketed through regulated markets and the rest (22%) is sold through commission agents.

c. **Marketing period:** The period during October to June is the main marketing period, mainly through the regulated markets, in Gujarat. In Maharashtra, October to April period is the preferred time during kharif and January to June in rabi. In Karnataka, October to December are the main months of marketing onions.

d. **Sources of supply of wholesalers:** In Gujarat 80% of the wholesalers sourced their supply from the farmers while 20% sourced from commission agents. In Maharashtra,

the predominant source was commission agent (90%) followed by 'other wholesalers' (10%). In Karnataka 100% of the supply was sourced from the farmers.

e. Sources of supply of retailers: in Gujarat, 85% of the retailers sourced their supply from commission agents and the rest from wholesalers. In Maharashtra, 100% of the supply is sourced from commission agents, whereas in Karnataka, 56% sourced from commission agents, 32% from farmers and the rest 12 % from wholesalers

f. Sources of supply of exporters: In Gujarat 57% of the exporters sourced their supply from commission agents while 43% sourced from farmers. The corresponding numbers in Maharashtra are 70% and 30% respectively. It is notable that wholesalers do not form a source of supply for exporters, indicating that the channels for domestic and export markets are different and also indicative of a probable product differentiation.

g. Margins of profit

i. **Wholesalers:** In Gujarat, the percentage margins of wholesalers are on the lower side from July to November. They begin to rise from December (25%) upto May and June (78% and 66% respectively). The annual average margin is about 44%. In Maharashtra, the average wholesalers' margin is 26%. In Karnataka, the wholesalers' margins vary widely across varieties with an average percentage margin of 11%.

ii. **Retailers:** In Gujarat, the retailers' margins are much higher than wholesalers. One interesting feature is that the retailers' margins begin to show a reverse trend to that of wholesale prices – rising from 201% in July 2013 to 297% in December 2013, and decline thereafter to about 164 in June 2014. The average percentage margin of retailers is 202%. In Maharashtra, the retailers' margins are comparable to that of wholesalers, with an annual average margin of 27%. In Karnataka, the average mark-up percentage is about 57% - five times that of the wholesalers' margin. This is indicative of some imperfections in the vertical market in Karnataka, as was in the case of Gujarat.

iii. **Exporters:** The percentage margins in Gujarat are much higher than those in Maharashtra, as in the case of retailers. The percentage margins of exporters ranged from 77% to 447% in Gujarat, while in Maharashtra the range is from 48% to 58%. This wide difference in the two states indicates again that the vertical markets in Gujarat are probably not as well-integrated as in Maharashtra and there are super-normal profits for retailers and exporters in the state.

2) Grapes:

a. Marketing Channels: In Maharashtra, the entire grape marketing is done through on-farm sale. In Karnataka, the predominant marketing channel is the commission agent (94%), followed by the regulated market (6%).

b. Quantity marketed through various channels: In Maharashtra, about 20932 quintals of grapes were disposed through on-farm sale at an average price of 3415 Rs/qtl. In Karnataka, the total quantity sold during the reference period was about 9515 quintals at an average price of Rs. 4008 per quintal. Sonaka fetched the maximum price of Rs 8731 Rs/qtl, followed by Thompson (7050 Rs/qtl) and Sharath (5133 Rs/qtl).

c. Marketing period: There is no major variation in the monthly disposals or prices in Maharashtra. In Karnataka, sales start around April. Maximum sales are observed in the months of April (4515) and September (4858). However, the price is substantially higher in September – Rs 6658 per quintal - as compared to Rs 2467 per quintal in April.

d. Sources of supply of wholesalers: In Maharashtra, the predominant source for wholesalers was farmers (60%), followed by commission agent (30%) and other wholesalers (10%). In Karnataka 100% of the supply was sourced from the farmers.

e. **Sources of supply of retailers:** in Maharashtra, 50% of the supply is sourced from farmers, 40% from commission agents and 10% from wholesalers. In Karnataka, the preferred sources are wholesalers for (61%) and farmers (39%).

f. **Sources of supply of exporters:** All the exporters in Maharashtra preferred farmers (100%) as the first choice of supply. Wholesalers (60%) and commission agents (40%) were rated as second choice.

It is notable that all the three types of traders – wholesalers, retailers and exporters - preferred fresh produce from farmers as the first choice of supply. This is probably due to preference for fresh grapes as well as absence of proper cold storage and processing facilities at the wholesale, retail and export levels.

g. **Margins of profit**

i. **Wholesalers:** In Maharashtra, the average wholesalers' margins is 23%, which do not show a temporal pattern. The margins are similar for both the varieties – Thompson and Sonaka. In Karnataka, the average margin is about 16% and this margin varies across varieties –from 7% for Dilkush to 112% for Sonaka. This may be due to the large quantum of Dilkush procured - about 21560 tons as against 1730 tons of Sonaka. Manik Chaman, Sharath and Sonaka are the premium varieties, yielding a sale price almost double that of the remaining varieties.

ii. **Retailers:** In Maharashtra, The retailers' margins are slightly higher than the wholesalers, ranging from 27% in December to 32% in May, with an average of 30% for the whole year. The margins are broadly similar across the two varieties. In Karnataka, margins are higher, with an average of 70% and ranging from 39% for Sonaka to 190% for black variety. The relative order of percentage margins of different varieties at the retail level is quite different from that at the wholesale level.

iii. **Exporters:** In Maharashtra, the exporters' margins are much higher compared to wholesalers or retailers. The percentage mark-up for exporters ranges from 153% to 193%, with an average of 169%. The mark-ups are roughly the same for the two varieties.

3) Basmati:

a. Marketing Channels: In Punjab, nearly 96 per cent of the households are marketing through regulated market. In Haryana, 63% of the households are marketing through commission agents while the rest are marketing through the village market.

b. Quantity marketed through various channels: In Punjab, 96 percent of the output is sold through regulated market. The marketed surplus varies directly with the size of landholding. Quantity sold per household is also highest (229 quintals) for large farmers, which is way above the average (121 quintals). The price received differs substantially across varieties but for a given variety, there is very little variation in price received across farmer categories. In Haryana, commission agents (52% of the output sold) and village market (48%) are the main channels. But there is a large difference between the two varieties in the quantity sold but there is very little difference in the price received. Large farmers possess a share of more than 80% in total quantity sold and quantity sold per household is also highest for this class (about 167 quintals).

c. Marketing period: In Punjab, October and November are the months during which maximum sale of basmati rice takes place in the sample region, mainly through the regulated markets. Price is much higher in the months of lean supply i.e. from December onwards. In Haryana, November is the month of maximum sales activity. However, it is to be noted that there is little variation in price across months in the two channels. Therefore, farmers' averseness or inability to store is perhaps the reason for high sales during November.

d. Margins of profit

i. **Wholesalers:** Overall percentage margin of wholesalers is about 4.4%. There is no discernible trend over the months though. In Haryana, the average wholesalers' margin works out to 4.5%. The margins are similar for both the varieties.

ii. **Retailers:** The retailer's margin in Punjab is about 12%. In Haryana, the retailers' margins are slightly higher than the wholesalers. The average retailers' margin is 6.7% and the margins are similar for both the varieties.

iii. **Exporters:** In Punjab, the exporters' margin is higher than that of wholesalers but slightly lower than that of retailers. The average exporters' margin worked out to 10.8%. In Haryana, the exporters' margins, unlike in Punjab, are much higher than those of wholesalers and retailers. The average margin of the exporters is 11.3%

VI Stakeholder Perceptions

1) Onions:

a. Reasons for growing: In Gujarat and Maharashtra, crop's higher profitability (69% and 85% respectively) and land suitability (29% and 35%) are the major reasons cited. In Karnataka along with the major factors of profitability (64%) and land suitability (71%), home consumption (61%) and crop rotation (30%) are also reported as important reasons.

b. **Major Problems faced by farmers:** In Gujarat lower yield (46% of the households), yield instability (42%), lack of remunerative price (41%), price fluctuations (31%) and lack of MSP & procurement (16%) are the major problems. In Maharashtra price fluctuations (38%), labour scarcity (36%), lack of MSP & procurement (35%), erratic power supply (28%) and poor refrigeration problem (22%) are the major problems. In Karnataka, distant market (67%), poor quality of underground water (65%) and price fluctuations (59%) were reported as major problems in onion cultivation.

c. **Major Problems faced by wholesalers:** In Gujarat, poor quality of supply (70%) is reported to be the biggest problem, followed by lower supply (30%). In Maharashtra, high marketing charges/taxes (40%) and other infrastructure problems (30%) are the severe problems. Other major problems, although not ranked severe, are lower price & demand (80%), mixing of different varieties (60%), other infrastructure problems (40%) and erratic supply from farmers (30%). In Karnataka, competition from other wholesalers (61%), competition from imports (29%), poor road network (29%), erratic supply (14%) and high marketing charges/taxes (11%) are rated as severe.

d. Major Problems faced by retailers: In Gujarat, 65% have reported poor infrastructure as the most severe problem, followed by competition from imports (55%), labour problems (40%), lower price due to lower demand (35%) and competition from other retailers (40%). In Maharashtra, poor infrastructure (40%) is the most severe problem. Competition from other retailers (80%), competition from organized retail chains (30%), lower price due to lower demand and lack of government intervention to support price (20% each) are reported as less severe problems. In Karnataka, competition from other retailers (85%), lack of government intervention to support price (30%), competition from imports (25%) and lower price due to lower demand (20%) are the major problems. **Thus, in all the three states competition from other retailers, imports and infrastructure have been reported as the major problems facing retailers.**

e. **Major Problems faced by exporters:** In Gujarat, lengthy government procedures (71%), export policy uncertainty (57%), lower price due to lower world demand (57%) and chemical residues (57%) are reported as severe problems. In Maharashtra, competition from other exporters (60%) and poor refrigeration facilities (50%) rank as the most severe problems.

2) Grapes:

a. Reasons for growing: In Maharashtra, profitability (94%), land suitability (40%) and high value (27%) are the predominant reasons for growing grapes. In Karnataka, land suitability (85%) and profitability (64%) are the main reasons for growing grapes.

b. **Major Problems faced by farmers:** In Maharashtra, lack of price support (about 27%), labour problem (22%), lack of extension services (19%), erratic power supply (18%) and poor refrigeration facilities (14%) are the other major problems. In Karnataka, an overwhelming 78% of the respondents rated distance of the market as the most severe problem, followed by price fluctuations (50%), poor quality of groundwater (47%), lack of market information (38%), labour problem (33%) and lack of price support (27%).

c. **Major Problems faced by wholesalers:** In Maharashtra, mixing of different varieties (60%), poor refrigeration facilities (20%), erratic supply (10%) and high marketing charges (10%) are the major problems. In Karnataka, an overwhelming 81% of the respondents rated competition from other wholesalers as the most severe problem. This is followed by competition from imports (43%), poor road network and poor refrigeration facilities (10% each) and other infrastructure problems (30%).

d. **Major Problems faced by retailers:** In Maharashtra, lack of price support (20%) and poor quality of the product (20%) are reported to be the most severe problem by the retailers. In Karnataka, 84% rated competition from fellow retailers as the most severe problem. This is followed by competition from organized retail chains (20%) and competition from imports (20%) and poor infrastructure (28%).

e. **Major Problems faced by exporters:** In Maharashtra, poor road network (70%), lengthy government procedures (20%), export policy uncertainty (20%) and high port charges & taxes (20%) are severe problems facing exporters. Poor refrigeration facilities and other infrastructure problems have also been reported as major problems by 10% of the respondents.

3) Basmati:

a. Reasons for growing: In Punjab and Haryana, a majority of the households 95% and 99% respectively, are growing basmati for profitability. Land suitability is the other major reason for growing basmati, cited by 13% and 11% of the respondents in the two states respectively.

b. **Major Problems faced by farmers:** In Punjab, lack of MSP & procurement (8%), lower yield (6%), lack of remunerative price (5%) and yield instability (4%) are the major problems. In Haryana lack of MSP & procurement (18%), labour problem (11%), lack of market information (9%), lack of remunerative price (7%) and non-availability of credit and pests (6% each) are the major problems.

c. **Major Problems faced by wholesalers:** In Punjab, the wholesalers reported only two problems as severe – competition from other wholesalers (10%) and high market fees / charges (10%). In Haryana, there are no problems listed as of 'severe' intensity. The problems ranked in the 'high' category are competition from other wholesalers (20%); high market fees / charges (20%), lower supply, poor quality of supply and erratic supply (10% each).

d. **Major Problems faced by retailers:** In Punjab 'competition from large organized retail chains' has been ranked as the only problem in 'severe' category by about 20% of the respondents and another 40% of the respondents have categorized this as 'high'. Competition from other retailers (20%) is the other problem listed as of high intensity. In Haryana, the problems ranked 'high' include competition from imports (10%) government intervention in price through MSP and lower supply (10% each).

e. **Major Problems faced by exporters:** In Punjab, infrastructure problems topped the list of severe problems with 2 out of 5 exporters reporting them as the most severe (Table 5.32). Other problems reported as severe are poor quality of the product, competition from other wholesalers, poor road network, poor port facilities, export policy uncertainty and problem of chemical residue – each by 20% of the respondents.

In Haryana, poor quality of product, competition from other wholesalers, infrastructure problems and high port charges/taxes have all been ranked by about 14% of the respondents as 'severe'

Policy Implications

1) Much higher mark-ups for retailers vis-à-vis wholesalers and exporters, over the period of 2001 to 2014, suggest imperfections in the domestic supply chain that may need to be addressed

2) The very high spread between retail and wholesale prices in Maharashtra in 9 out of 14 years during 2001 to 2014, is a cause for concern. Maharashtra is an important state for onions in the country and price behaviour in this state has major implications for rest of the country. Our results, together with previous literature (Chengappa et al. 2012), suggests that addressing market imperfections in Maharashtra is very important for the onion sector in the country.

3) Our econometric analysis confirms the significant effect of market arrivals on prices. Therefore, smoothening supply - either through production, storage or processing – is crucial to address frequent price spikes in onions and grapes.

4) Labour cost is a major component in the total cost of production, of both onions and basmati. This is true for other crops as well, as can be discerned from recent cost of cultivation statistics. Therefore, appropriate policies to address labour scarcity and to promote appropriate mechanization need to be devised.

5) For all the study crops, regulated market and commission agents are the main channels of marketing. Also, farmers and commission agents are the main sources of supply for wholesalers, retailers and exporters. Therefore, strengthening the existing marketing system as well as developing alternative channels, such as farmers' collectives to reap scale economies, needs to be undertaken.

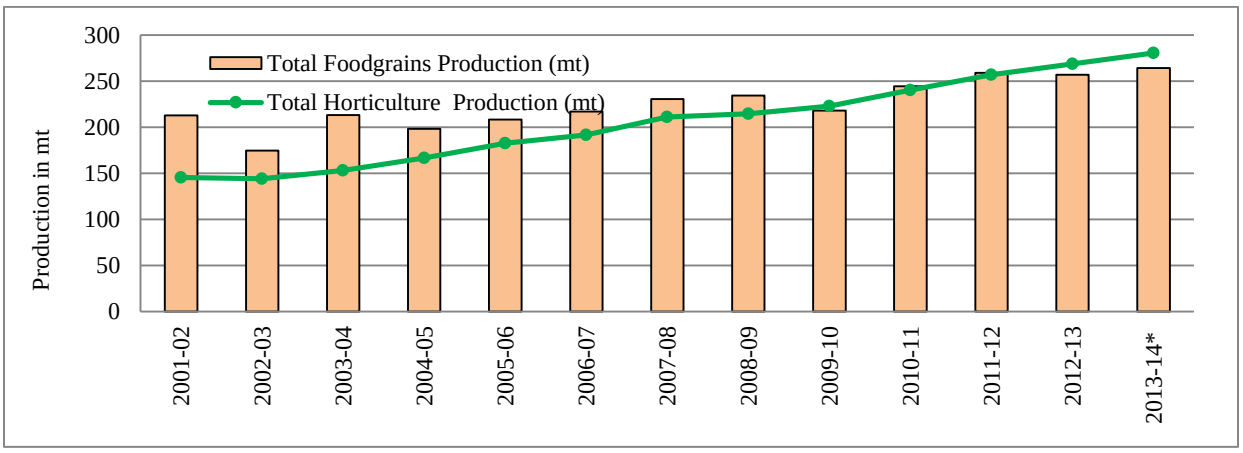
6) Farmers have mostly cited lack of remunerative price and lack of MSP & procurement as major problems in cultivating the study crops. Therefore, streamlining and strengthening the current initiatives such as NAM (National Agricultural Market) may help in better price discovery.

Chapter 1

Introduction

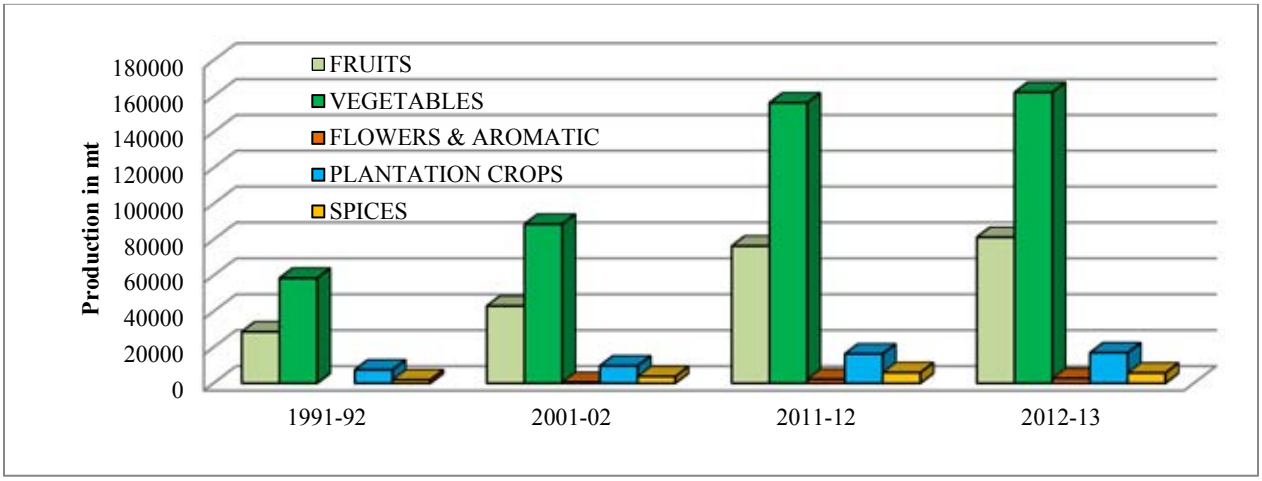
Agriculture is a prerequisite for faster economic growth of the country. This is particularly true for a country like India where agriculture is a predominant occupation, with about 50 per cent of the people employed in the sector. India has made impressive strides in agriculture during the last four decades. Food grains production increased more than five times from 51 million tonnes (mt) in 1950-51 to about 265 mt in 2013-14. After achieving self sufficiency in food grains, the changing consumption patterns and the need for diversification necessitated a shift in focus to dairy, horticulture, poultry and other allied sectors. Public as well as private investment in horticulture sector increased over time and resulted in significant increase in production of horticultural crops (Figure 1.1 and Figure 1.2). India now ranks second in fruits and vegetables (GOI, 2015). The estimates relating to value of agricultural products and horticultural products at different points of time encompassing the period between 1970-71 and 2010-11 are provided in Table 1.1. These estimates are based on National Accounts Statistics at current prices.

Figure 1.1: Production of Horticulture vis-à-vis Foodgrains



Source: *Agricultural Statistics at a Glance, DES, Ministry of Agriculture, GoI and Database of National Horticulture Board*

Figure 1.2: Production of Horticultural Crops in India



Source: *Agricultural Statistics at a Glance, DES, Ministry of Agriculture, GoI and Database of National Horticulture Board*

Table 1.1: Value of Agricultural and Horticultural Products in India: Current Prices

(Rs. in crores)

Items	At current prices						
	1970-71	1980-81	1990-91	1995-96	2003-04	2005-06	2010-11
(i) Total agricultural products (Net)	17,531	46,278	1,28,657	2,62,302	494,245	523,389	1,051,894
(ii) Total horticultural products	2,280	6,254	19,621	68,077	147,024	167,428	333,974
(iii) Fruits and vegetables	1,791	5,202	15,773	59,454	131,896	132,895	251,014
(iv) Share of (iii) in (ii)	78.55	83.18	80.39	87.33	89.71	79.37	75.16
(v) Share of (ii) in (I)	13.01	13.51	15.25	25.95	29.75	31.99	31.75
(vi) Percentage increase of (ii) over							
- 1970-71	-	174.30	760.57	2,885.83	6,348.42	7,243.33	14,547.98
- 1980-81	-	-	213.74	988.54	2,250.88	2,577.13	5,240.17
- 1990-91	-	-	-	246.96	649.32	753.31	1,602.13
- 1995-96	-	-	-	-	115.97	145.94	390.58
- 2003-04	-	-	-	-	-	13.88	127.16
- 2005-06	-	-	-	-	-	-	99.47

Source: Report AERC, Maharashtra, National Accounts Statistics, CSO, 2012

Increase in food production brought in its wake new challenges on the marketing front. High inflation of food commodities, although mainly caused by mismatch of demand and supply and sometimes by exogenous shocks, can also be traced to market inefficiencies, weak supply chains and monopolies in the market (Chengappa, et al., 2012). Particularly, the frequent price spikes in onion cannot be fully explained by the fundamentals of demand-supply. Thus, building an efficient

marketing system with physical infrastructure and institutional framework is the prime focus of Indian policymakers now.

The present system of agricultural marketing in India involves both public and private sectors, According to some estimates, about 10 percent of the total value of marketed surplus is handled by the government agencies, 10 percent by the cooperatives and the remaining 80 percent by the private trade. Marketing of most of the commodities is carried out by the private sector, barring direct intervention by the government in some commodities. Bulk of the trade takes place in the wholesale markets, which are managed by the Agricultural Produce Market Committees (APMC). There is a multiplicity of players from the producer to the final consumer – commission agents, wholesalers, processors, retailers, exporters etc. Commission agents organize auctions on behalf of the farmers in these wholesale markets. Further, the commission agents also work towards ensuring timely and accurate payment to farmers.

Given such complex system, the issues of market structure and price formation assume importance. The constellation of prices at various levels depends to a large extent on the cost structure of agriculture, supply-demand dynamics, weather patterns, infrastructure, trade shocks, the government policy and last but not the least, the structure of the product and factor markets. In recent years there have been frequent gyrations of food prices in general, and large differences between retail and wholesale prices in particular, of several commodities of perishable nature. Therefore the present study attempts to analyze the price spread of different commodities at different levels of marketing chain and also explore reasons for the same. The commodities selected for the study are onion, grapes and basmati rice.

The specific objectives of the study are

1) To analyze the price behaviour at the farm, wholesale, retail and export levels
2) To analyze the price spread at various levels
3) To analyze the economics and marketing channels of the study crops to understand the price behaviour

The study uses secondary as well as primary data. Two / three states have been selected for in-depth primary survey. Detailed methodology and data sources are given in Section ----. The various aspects analyzed in the study include the patterns in price spread across states, movement of wholesale and retail prices, effect of market arrivals on prices, profitability of farmers and other plays in the supply chain, sources of supply for various players in the marketing chain etc.

The report is organized as follows. After a brief introduction, a brief overview of agriculture in the study states and details of study crops are presented in the following sections. This is followed by a section on the details of methodology and database. The chapter is wrapped with a brief review of the relevant literature.

The second chapter provides a detailed analysis of the price trends at various levels (wholesale, retail and export); price spread between various levels; effect of wholesale prices on retail markets; effect of market arrivals on prices in wholesale markets. This chapter is totally based on the secondary data.

The third, fourth and fifth chapters are devoted to a detailed analysis of each of the three study crops – onion, grape and basmati rice. The aspects explored in these chapters include economics of farming (cost structure, gross and net returns from farming etc); various marketing channels used by farmers; price spread and profitability at each level of the marketing chain; sources of supply and profitability of various players (wholesalers, retailers and exporters); the problems faced by farmers, wholesalers, retailers and exporters etc.

The sixth chapter presents the summary and conclusions of the study

1.2 Agriculture in the Study States - An Overview

Karnataka

Agriculture is an important sector of Karnataka's economy. Karnataka is known for its rich biodiversity in India. The State has been identified as one of the 10 agro-climatic zones, suited for the majority of agricultural and horticultural crops (GoK, 2011). About 12 million hectares of land

(65% of the total area) is under agriculture in the state. The agriculture and allied sector's contribution to Karnataka's GSDP came down from a high of 43 percent in 1980-81 to 26 per cent in 2001-02, further down to 17 percent 2007-08 and to 12-14 per cent during the latest period for which data is available. Despite the declining share of primary sector in GSDP, agriculture remains the primary activity and main livelihood source for the rural population in the state. As per 2011 Population Census, about 13.74 million workers depended on agriculture, which constituted about 49 per cent of the total workforce in the state. In rural areas, dependence of on agriculture is even higher at 71 per cent.

Agriculture in Karnataka is mainly dryland agriculture and rainfed. The extent of arid land in Karnataka is second only to Rajasthan in the country. Agriculture is highly dependent on the vagaries of the southwest monsoon. The state has one of the lowest levels of area under irrigation. The gross irrigated area to gross cropped area was only 32 per cent against the national average of 45 per cent in 2009-10. In the light of this adverse scenario, the major challenges for agriculture in the state are providing food security and livelihood security. Karnataka attained self sufficiency in food grains, particularly of coarse cereals and pulses, but still continues to be deficit in rice and oilseeds.

The three main agricultural seasons in the state are Kharif (June to September); Rabi (October to February) and Summer (March to May). Some of the important crops grown in the state are rice, jowar, maize, pulses, oilseeds, cashew-nuts, coconut, arecanut, cardamom, chillies, cotton, sugarcane, coffee, tobacco etc. Karnataka is the largest producer of coffee, coarse cereals and raw silk among all states in India. Horticulture also plays a vital role in the economy of Karnataka. The state is a major producer of horticultural commodities and occupies the second position in terms of the horticultural production in India. **About 40 percent of the total Income of the state is generated from horticulture**.

Gujarat

Agriculture in Gujarat has been transforming over time from traditional to high value added commercial crops with a shift in its cropping pattern from food grains crops to high value cash crops such as oilseeds, fruits, vegetables and spices. The trend in shifting of cropping pattern paved

ways for many ancillary industries in the areas of processing, packing, storage, transformation, etc.

Maharashtra

Maharashtra's topography is diverse. It is classified into five broad regional groups such as Greater Mumbai, Western Maharashtra, Marathwada, Konkan and Vidarbha, and six revenue divisions for administrative purposes like Navi Mumbai, Nashik, Pune, Aurangabad, Nagpur and Amravati. All the 35 districts of Maharashtra are divided amongst these six divisions.

Konkan division consists of Mumbai, Thane, Raigad, Ratnagiri and Sindhudurg districts on the coast where landholdings are small but evenly distributed with no irrigation facilities. Nashik, Dhule, Nandurbar, Jalgaon and Ahmednagar districts with characteristics like large tribal population, large landholdings, high level of landlessness, forests, a few fertile tracts and good rainfall comprise the Nashik division. Pune division is comprised of Pune, Sangli, Satara, Kolhapur and Solapur districts and witnesses relatively lower rainfall with its smaller landholding being served by canal and wells. The districts belonging to Marathwada region like Aurangabad, Jalna, Parbhani, Hingoli, Nanded, Osmanabad, Beed and Latur constitute the Aurangabad division and are culturally well tied as all of them represent the erstwhile State of Hyderabad. The region is rocky and dry with low and uncertain rainfall, large landholdings and some landlessness. One part of Vidarbha region comprising Buldhana, Akola, Amravati, Washim and Yavatmal districts is administered by Amravati division and rest of this region comprising Nagpur, Wardha, Bhandara, Gondia, Chandrapur and Gadchiroli districts stands governed by Nagpur division. The two divisions of Vidarbha cover part of a plateau characterized by deep block soil, assured rainfall, medium and large landholdings, and high levels of landlessness. The districts like Bhandara, Gondia, Chandrapur and Gadchiroli have a large tribal population and forest cover.

Maharashtra's net sown area stands at around 1,77,44,000 hectares, of which 18.5 per cent is irrigated. Well irrigation accounts for around 55 per cent of the total irrigated area of Maharashtra. The lower proportion of area under irrigation renders agriculture vulnerable to draughts, resulting in periodic fluctuation in farm output, which in a normal year is only 90 per cent of the State's

total foodgrain requirement. The cropping intensity of Maharashtra is relatively higher than irrigation intensity.

Although India has become self sufficient in foodgrains production, Maharashtra accorded higher priority to assuring remunerative income to the farmers. The state has been implementing various schemes not only to increase agricultural production and exports but also to encourage agro-processing industries to reap the benefits of global trade. The innovative horticulture plantation scheme under employment guarantee scheme implemented by the state is a part of this policy**.** Recognizing the significance of horticultural crops in generating substantial income, employment and exports, Maharashtra is among the several states that have diversified their cropping pattern in favour of these high value crops.

Punjab

Punjab state lies between the 29º33'-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. Three districts have been selected for the present study from the state, namely, Gurdaspur, Amritsar and Ferozpur. Gurdaspur is the northern most district of Punjab state. It falls in the Jalandhar division and is situated between river Ravi and Beas and shares common boundaries with Pathankot district in the north, Kapurthala district in the south, Amritsar district in the south west, Pakistan in the north-west, Beas River in the north-east and Hoshiarpur district in the south-east. Amritsar, the second study district, is located in the northern part of Punjab and shares common boundaries 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 located in the 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.

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.

Haryana

Diverse agro-climatic conditions in Haryana are conducive for cultivation of alternate rabi and kharif crops including horticultural crops such as vegetables. Since, one third of the state falls within the geographical coverage of the National Capital Region, there is tremendous scope for commercial cultivation of vegetable crops, fruits, flowers, etc. In addition, establishment of agro-processing industries has a good potential. Especially, owing to its proximity to Delhi, there is vast potential for processing of fruits and vegetables. Table 1.2 indicates percentage of gross cropped area devoted to different crops in Haryana during 1980-81, 1990-91, 2000-01 and 2011-12. The agro-climatic variations in Haryana are large and hence, the state is bestowed with a variety of crops.

Table 1.2: Percentage of Gross Cropped Area under Important Crops in Haryana

Year	GCA* ('000 ha.)	Rice	Wheat	Bajra	Maize	Gram	Total Pulses	Other Food Grains	Total Food Grains	Mustard	Cotton	Other Crops
1980-81	5462	8.9	27.1	15.9	1.3	12.2	14.55	4.8	72.5	5.5	5.8	16.2
1990-91	5919	11.2	31.3	10.3	0.6	11.0	12.53	3.1	68.9	8.0	8.3	14.8
2000-01	6115	17.2	38.5	9.9	0.3	2.03	2.6	2.5	71.0	9.1	9.1	13.2
2011-12	6489	19.0	39.0	8.9	0.2	1.22	1.9	1.6	70.6	8.3	9.3	11.9

**Gross Cropped Area, Source: Director of Land Records, Haryana*

1.3 Study Crops – An Overview

Onion

Onion is a cool season vegetable and grows well under mild climate without extreme heat or cold or excessive rainfall. It does not thrive when the average rainfall exceeds 75-100cm during monsoon period. Poona Red, Nasik Red, Bellary Red, Patna Red and Patna White are common in onion trade.

India is the second largest producer of onion in the world, next to China with over 15 million tonnes produced in 2010-11. Onions are grown across the country in India and also consumed in all parts of the country. There is a steady demand for onions not only in India but also the entire Asian continent, where Indian onions have found wide acceptance. Maharashtra is the leading onion producing state in India followed by Karnataka and Gujarat (Table 1.3). The states of Maharashtra, Karnataka and Gujarat contribute over 50 percent of all India production with Maharashtra alone accounting for over 30 percent of country's total production. The other significant contributors are Madhya Pradesh, Bihar, Andhra Pradesh and Rajasthan.

India is the third biggest exporter of onion in the world, next to Netherlands and Spain. Major export is to Gulf countries, Malaysia, Singapore, Sri Lanka and Bangladesh. Export of onion is channelized through NAFED.

Grape

Grape cultivation is one of the most remunerative farming enterprises in India. The major varieties of grapes grown in India are, Thomson Seedless, Sonaka, Anab-e-Shahi, Perlette, Banglore blue, Pusa seedless, Beauty seedless etc. Maharashtra occupies the first position in production of grapes followed by Karnataka (Table 1.3). The other states growing grapes are Punjab, Andhra Pradesh and Tamil Nadu. Approximately 85 percent of the total production, irrespective of the variety, is consumed fresh.

Grape is grown under a variety of soil and climatic conditions in three distinct agro-climatic zones, namely, sub-tropical, hot tropical and mild tropical climatic regions in India. The sub-tropical

region covers the north-western plains. The hot tropical region covers Nashik, Sangli, Solapur, Pune, Satara, Latur and Osmanabad districts of Maharashtra; Hyderabad, Ranga Reddy, Mahbubnagar, Anantapur and Medak districts of Andhra Pradesh; and Bijapur, Bagalkot, Belgaum, Gulberga districts of northern Karnataka. This is the major viticulture region accounting for 70 percent of the area under grapes in the country. Vines in this region do not undergo dormancy and double pruning and a single harvest is the general practice in this region. Thompson Seedless and its clones (Tas-A-Ganesh, Sonaka), Anab-e-Shahi, Sharad Seedless and Flame Seedless are the varieties grown in this region. Mild tropical region includes Bangalore and Kolar districts of Karnataka; Chittoor district of Andhra Pradesh and Coimbatore; and Madurai and Theni districts of Tamil Nadu. Principal varieties are Bangalore Blue (Syn. Isabella), Anab-e-Shahi, Gulabi (Syn. Muscat Hamburg), and Bhokri. Thompson Seedless is grown only with limited success. Except for Thompson Seedless, two crops are harvested in a year.

Table 1.3: State-wise Area Production, Productivity of Onion and Grapes in India

(Area in '000' Ha; Production in '000' MT; Productivity in MT/Ha)

State	2008-09			2012-13			Share			
	Area	Production	Productivity	Area	Production	Productivity	2008-09		2012-13	
							Area	Prod.	Area	Prod.
Onion										
Maharashtra	250.0	3952.5	15.7	260.0	4660.0	17.9	30.0	29.1	24.7	27.7
Karnataka	165.1	3031.8	18.4	159.6	2395.9	15.0	19.8	22.4	15.2	14.3
Gujarat	57.6	1409.6	24.5	28.9	704.4	24.4	6.9	10.4	2.7	4.2
Bihar	51.6	946.6	18.3	53.0	1107.8	20.9	6.2	7.0	5.0	6.6
M.P.	53.0	881.8	16.6	111.73	2691.0	24.1	6.4	6.5	10.6	16.0
A.P.	39.0	662.6	17.0	86.7	1560.1	18.0	4.7	4.9	8.2	9.3
Rajasthan	41.0	369.1	9.0	139.1	476.2	3.4	4.9	2.7	13.2	2.8
Haryana	18.8	347.9	18.5	27.8	604.5	21.7	2.3	2.6	2.6	3.6
T.N.	35.0	305.5	8.7	37.7	429.7	11.4	4.2	2.3	3.6	2.6
Orissa	Included in Others			34.9	419.1	12.0	-	-	3.3	2.5
U.P.	22.3	308.0	13.8	26.6	474.0	17.8	2.7	2.3	2.5	2.8
Others	100.7	1369.1	13.6	85.6	1290.3	15.1	12.1	10.1	8.1	7.7
Total	834.2	13564.5	16.3	1051.5	16813.0	16.0	100.0	100.0	100.0	100.0
Grapes										
Maharashtra	55.7	1415.0	25.4	90.0	2050.0	22.8	70.0	75.3	76.5	82.6
Karnataka	14.9	269.0	18.0	19.7	320.9	16.3	18.7	14.3	16.8	12.9
T.N.	3.1	91.0	29.8	2.7	43.4	16.2	3.9	4.8	2.3	1.7
A.P.	3.0	62.2	21.0	1.6	31.5	20.0	3.8	3.3	1.4	1.3
Mizoram	Included in Others			2.4	20.8	8.7	-	-	2.0	0.8
Others	3.0	41.1	13.8	1.3	16.5	12.7	2.2	1.1	0.7	2.2
Total	79.6	1878.3	23.6	117.6	2483.1	21.1	100.0	100.0	100.0	100.0

Source: Table reproduced from AERC Report, Maharashtra. Computations based on figures from 'Indian Horticulture Database – 2011 and 2013'

Basmati Rice

Basmati is a long grain aromatic rice variety grown in the Himalayan foot hills of Indian sub-continent. This area is endowed with suitable conditions for producing extra long slender aromatic grain. Also, basmati uses less water and fertilizer, has high export potential and its straw is used for livestock feed.

India is the world's largest producer and 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. During the past two decades, area, production, productivity, availability and exports of basmati rice from India increased manifolds which provided ample opportunities to producers and exporters in major basmati growing states such as Haryana and Punjab. Annual production of basmati rice in India hovers around 4 million tonnes and it was estimated to be 4.7 million tonnes in 2012. However, this increased quite rapidly in the last two years for which the data is available, as can be seen from the table below (Table 1.4).

Table 1.4: Area, Production and Yield of Basmati Rice in Major Growing States of India (2013 & 2014)

Area : 000 ha., Production: '000 Tonnes, Yield: Kgs/ Ha

Sl. No.	State	2013			2014		
		Area	Production	yield	Area	Production	yield
1.	Punjab	590.01 (35.17)*	2292.75 (34.65)	3885	857.68 (40.18)	3498.88 (39.88)	4079
2.	Haryana	711.11 (42.39)	2898.98 (43.82)	4077	832.54 (39.00)	3701.88 (42.19)	4446
3.	Uttar Pradesh	318.75 (19.00)	1270.09 (19.20)	3985	354.39 (16.60)	1260.69 (14.37)	3557
4.	Uttrakhand	18.30 (1.09)	54.16 (0.82)	2960	20.34 (0.95)	66.41 (0.76)	3265
5.	Jammu & Kashmir	37.28 (2.22)	92.66 (1.40)	2486	68.45 (3.21)	240.77 (2.74)	3517
6.	Himachal Pradesh	1.00 (0.06)	3.40 (0.05)	3400	0.45 (0.03)	2.15 (0.03)	4777
7.	Delhi	1.00 (0.07)	4.09 (0.06)	4090	0.70 (0.03)	3.00 (0.03)	4286
	Total	1677.45 (100.00)	6616.13 (100.00)	3944	2134.55 (100.00)	8773.78 (100.00)	4110

**Percentage of total, Source: Rice Exporters Association, New Delhi*

Exports of Basmati Rice:

The steady increase in production and growing demand for basmati in the world market has made India an important exporting country in the world. The quantum of basmati exports from India was around 267 thousand tonnes in 1991-92 which rose to 851 thousand tonnes in 2000-01 and increased phenomenally to a record scale of 3757 thousand tonnes in 2013-14. Similarly, the value too rose from around Rs. 499 crore in 1991-92 to Rs. 2165 crore in 2000-01 and further to Rs. 29299 crore in 2013-14 (Table 1.5)

Currently, India is one of the leading exporters of basmati rice in the world. Several factors have been responsible for this achievement. Some of these include research efforts in developing suitable varieties, adoption of suitable farm management practices and liberalization of trade policy by the government and the zeal of exporters to establish themselves as reliable and dependable suppliers of basmati and non-basmati rice in the global market. Basmati rice fetches higher price in international market than non-basmati rice.

Table 1.5: 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 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 has been 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. Currently, Haryana and Punjab are the leading producers of basmati in India, together constituting about 75 per cent of basmati rice produced 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.

As more than eighty per cent of Indian population consumes non-basmati rice, major portion of the Indian basmati production is 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 stocks.

1.4 Study Crops in the Sample States

Karnataka

Onion: Karnataka is the second leading onion producing state in India after Maharashtra. Karnataka is followed by Gujarat. These three states contribute over 50 percent of all India production, with Maharashtra alone accounting for over 30 percent of country's total production. The other significant contributors are Madhya Pradesh, Bihar, Andhra Pradesh and Rajasthan.

Grape: Bijapur, Bagalkot, Belgaum, Gulberga districts of northern Karnataka grow mainly Thompson Seedless and its clones (Tas-A-Ganesh, Sonaka), Anab-e-Shahi, Sharad Seedless and Flame Seedless varieties. Mild tropical region includes Bangalore and Kolar districts of Karnataka, which is suitable for varieties such as Bangalore Blue (Syn. Isabella), Anab-e-Shahi, Gulabi (Syn.

Muscat Hamburg), and Bhokri. Thompson Seedless is grown only with limited success. Except for Thompson Seedless, two crops are harvested in a year.

Maharashtra

In terms of fruits and vegetable production, Maharashtra is considered to be the most important state of the country. During the last 20 years period, there has been significant increase in the area and production of horticultural crops in the state. The area under fruits and vegetables in Maharashtra grew from 4.97 lakh hectares during 1991-92 to 20.29 lakh hectares in 2012-13 registering more than four folds increase in the area. It is to be noted that this state leads the country in the production of grapes, bananas, oranges and onions. Apart from these horticultural crops, wide range of other fruits and vegetables are also grown in the state. While grapes are cultivated in Nasik, Pune, Solapur, Sangli and Satara districts, bananas predominate in Jalgaon and Vasai; Chikoos' in Dahanu and Gholvad; Cashews' in Konkan; Oranges in Nagpur and Amravati; Mangos in Ratnagiri; and Onions in Nasik, Pune and Ahmednagar districts.

Among various horticulture crops, onion is a very important vegetable crop grown in Maharashtra. Although onion is cultivated in many states, most of the onion produced in India still comes from the state of Maharashtra. However, there has been fall in share of Maharashtra in total area as well output of onion in India. The share of Maharashtra in total area under onion crop in India has fallen from 30 per cent in 2008-09 to 25 per cent in 2012-13. Similarly, the share of Maharashtra in total onion production of India has fallen from 29 per cent in 2008-09 to 28 per cent in 2012-13 (Table 1.2). The district of Nasik in Maharashtra accounts for the largest share in the production of onions in India. Lasalgaon near Nasik is the biggest onion *mandi* in the whole of Asia. Onion is also grown in Pimpalgaon, Manmad, Yeola, Saikheda, Chandwad and Satana- all located around Nasik. All these places have marketing centres set up by NAFED. The onion produced in Nasik district is transported and distributed throughout the country. Nasik onion is not only consumed in the farthest corners of India, it is also exported to many countries. Bulk of the onions' exported from India originate from Nasik.

Another most important fruit crop cultivated in Maharashtra is grape. At present, almost entire grape production in India comes from the state of Maharashtra, though Karnataka also has significant presence in area as well as production of grapes in India. At present, Maharashtra

accounts for 77 per cent of the area and 83 per cent of the total output of grapes in India (Table 1.3). Grape is already established as an important commercial crop in Maharashtra. Although the cultivation is mainly concentrated in the three districts of Nasik, Sangli, and Solapur, a large number of farmers in the neighboring districts such as Pune, Ahmednagar and Satara are switching over to grape cultivation. In fact, grape cultivation is chiefly confined to Deccan Plateau in Western Maharashtra because of the congenial agro-climatic conditions prevailing in this region. Nasik district of Maharashtra is largest producer of grape in the country. The foregoing discussion clearly underscores the vast potential of Maharashtra in cultivation of various horticultural crops, particularly grapes among fruits and onion among vegetables.

Punjab

The crop under study in this state is basmati rice. 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 1.6). There are many notified varieties of Basmati rice in India but the major area in Punjab is under Pusa Basmati 1121.

Table 1.6: 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.

Haryana

The crop under study in this state is basmati rice. Jind, Kaithal and Sonipat are the leading districts in terms of area allocated to basmati rice (Table 1.7). These districts together contributed more than 40 per cent in total acreage of the state. The next ranking district with around 11 per cent share in area was Karnal. Panipat, Sirsa, Fatehabad and Hissar also recorded significant area under basmati rice. Further, Kaithal, Jind and Sonipat are the leading districts in production. Their contribution was 14.81, 14.71 and 11.17 per cent respectively. However, these districts were not front runners in terms of productivity. Sirsa followed by Fatehabad indicated much higher yield rate of basmati rice in comparison to other producing districts of the state.

The popular basmati varieties grown in Haryana are Pusa Basmati-1121, Pusa Basmati-1509, Pusa Basmati-1, CSR-30, Pusa Basmati-1401, Super, etc. The total basmati area in Haryana was 741 thousand hectares in 2013-14. Out of which more than 50 per cent of area was devoted to Pusa basmati-1121. The next was Pusa Basmati-1509 covering more than 15 per cent of area. The remaining varieties covered rest of the area. Considering the importance of Pusa basmati-1121 and Pusa basmati-1509, we have carried out in-depth analysis for these varieties. The reason for higher proportion of area under Pusa-1121 is better crop output and popularity in the export market. It has superior grain length and excellent elongation upon cooking and therefore, it has caught the fancy of the Iranian and other International markets.

Table 1.7: Area, production and Yield of Basmati Rice in Haryana during 2013-14

Area: ‘000 ha, Production: ‘000 tonnes, Yield:kg/ha.

S.N.	Districts	Area	%	Production	%	Yield
1.	Hissar	39	5.26	103	5.21	2641
2.	Fatehabad	43	5.80	140	7.08	3256
3.	Sirsa	51	6.87	198	10.01	3882
4.	Bhiwani	16	2.16	28	1.42	1750
5.	Rohtak	47	6.33	80	4.04	1702
6.	Jhajjar	21	2.83	44	2.22	2095
7.	**Sonipat**	**90**	**12.13**	**221**	**11.17**	**2456**
8.	Gurgaon	0	0.00	0	0.00	0.00
9.	Mewat	0	0.00	0	0.00	0.00
10.	Faridabad	10	1.35	26	1.31	2600
11.	Karnal	79	10.65	207	10.47	2620
12.	Panipat	57	7.68	146	7.38	2561
13.	Kurukshetra	30	4.04	83	4.20	2767
14.	**Kaithal**	**105**	**14.15**	**293**	**14.81**	**2790**
15.	Ambala	5	0.67	11	0.56	2200
16.	Panchkula	0	0.00	0	0.00	0.00
17.	Yamuna Nagar	17	2.29	51	2.58	3000
18.	**Jind**	**109**	**14.69**	**291**	**14.71**	**2670**
19.	Mahendragarh	0	0.00	0	0.00	0.00
20.	Rewari	0	0.00	0	0.00	0.00
21.	Palwal	23	3.10	56	2.83	2435
	State	742	100.00	1978	100.00	2666

Source: Government of Haryana.

1.5 Data base and Methodology

The study focussed on three major crops of interest - onion, grapes and basmati rice - suggested by the Trade Division, Ministry of Agriculture, GoI. Two or three major states growing each of these crops were selected for an in-depth primary survey. Gujarat, Maharashtra and Karnataka were selected for onion; Maharashtra and Karnataka for grapes and, Punjab, Haryana for basmati rice.

The study used both secondary and primary data to study the price behaviour at various levels. Secondary data was collected from various publications of the Government of India and the states, such as Agricultural prices in India, Agricultural Situation in India, Agricultural Statistics at a Glance, Economic Survey, Statistical Abstracts (of various states) etc.

For primary survey, a multi-stage sampling procedure was adopted. In the first stage, two/three major districts growing the study crops were selected in each state. In the next stage, villages were selected using the same criterion. The third stage involved selecting the households. At this stage, a total of 150 households were selected for each crop from the selected villages. Within each

village, based on a complete listing of the village households, households belonging to four categories, marginal (< 1 ha), small (1 to 2 ha), medium (2 to 4 ha) and large (> 4 ha) were selected randomly using the PPS sampling method (probability proportional to size).

In addition to the farming households, few wholesalers, retailers and exporters were also interviewed to understand the issues and problems along the entire supply chain. The number of wholesalers, retailers and exporters interviewed varied across states though, depending upon the number of these participants available in the study regions.

The primary survey has been conducted by the various Agricultural Economics Research Centres and Units in the respective states. Detailed methodology adopted by the respective Centres / Units in each of the states is given below.

Methodology

Secondary data

Secondary data on prices and market arrivals across all the major states have been collected for the study crops. Price spread between wholesale, retail and export markets has been analyzed at the monthly, annual and five-yearly intervals to understand the intra-year (seasonal) and long-term (inter-year) trends in the prices at various levels of the supply chain. This is followed by an econometric analysis using monthly data to explore the effect of essentially two aspects – effect of market arrival on wholesale price and of wholesale price on the retail price. The detailed methodology has been discussed in Chapter 2 where the secondary data analysis is presented.

Primary data

Primary data has been collected through in-depth primary data surveys in the sample regions. Economics of crop production including cost structure and profitability; marketing aspects; major problems facing the various stakeholders are some of the issues analyzed. Descriptive analysis using tabular and graphical analysis has been employed.

Sample selection in the states

Karnataka: Three major producing districts in the state were selected in the first stage. From each selected district 50 farm households growing grapes and onion each were selected for the detailed household survey. Thus, 150 households each for grape and onion were selected from three districts in Karnataka each. In addition to 300 farmers, few wholesalers, retailers and exporters from the nearest town to the study region were also selected for the detailed survey. To maintain the symmetry across vertical channels, information on the same varieties was collected in all the four questionnaires, i.e., farmers, wholesalers, retailers and exporters.

Table 1.8 (i): Name of districts and block/tehsils from where sample was selected – onion (households)

Districts	Bagepalli	Chinth Ama	Sidlagatt	Challaker	Chitra Durga	Hiriyur	Gadag	Rona	Shirahat	Total
Chikkablla pura	16	15	19	-	-	-	-	-	-	50
Chitradurga	-	-	-	12	22	16	-	-	-	50
Gadag	-	-	-	-	-	-	20	21	9	50
Total	16	15	19	12	22	16	20	21	9	150

Table 1.8 (ii): Details of wholesalers and retailers selected for onion (Nos.)

Commodity	District	Wholesalers interviewed	Retailers interviewed
Onion	Bangalore	10	-
	Chikkabalapur	9	-
	Gadag	9	10
	Chitradurga	-	10
Aggregate		28	20

Table 1.9 (i): Name of districts and block/tehsils from where sample was selected - grapes (households)

Districts	Devanahali	Doddaballpur	Basavana	Bijapura	Indi	Chickabalapur	Gowribidn	Sidalagat	Total
Bangalore	34	17	-	-	-	-	-	-	51
Bijapura	-	-	6	31	14	-	-	-	51
Chickaballapura	-	-	-	-	-	42	1	7	50
Total	34	17	6	31	14	42	1	7	152

Table 1.9 (ii): Details of wholesalers and retailers selected for grapes (Nos.)

Commodity	District	Wholesalers interviewed	Retailers interviewed
Grapes	Banagalore	7	8
	Chikkabalapur	5	10
	Bijapur	9	9
Aggregate		21	27

Gujarat: The primary survey was carried out in three largest onion producing districts of Gujarat, i.e. Bhavnagar, Rajkot and Junagadh (Table 1.10). Primary survey was carried out for farmers and

market intermediaries for the year 2013-2014. Data were collected from 50 sample farmer households from each district; this makes a total of 150 farmers households. Beside data were also collected from other stakeholders such as exporters[1] (07), wholesalers (10) and retailers (13).

Table 1.10: District wise Selected Taluka and Sample Villages in Gujarat

Sr.No.	Districts	Taluka/Blocks	Selected sample village/s
1	Rajkot	Gondal	Movia
		Rajkot	Madhapar
2	Junagadh	Una	Vadli
		Junagadh	Vadal, Goladhar, Bamrangram,Chokli
3	Bhavnagar	Talaja	Timana, Talavadiya, Dihore
		Mahuva	Kumbhan

A focus group discussion with the committee members of APMC, and with market functionaries was also held in order to get a clear picture of market charges, market practices, etc.

Maharashtra: The study is mainly based on farm level data collected from onion and grape cultivating farmers. However, since the study attempts to assess relationship between wholesale prices, retail prices, export prices and prices realized by the farmers, it also uses data collected from wholesalers, retailers and exporters of onions and grapes belonging to the State.

For collection of the primary data, a sample survey was conducted in six districts of Maharashtra, belonging to the Western Maharashtra region, which account for bulk of the onion and grape cultivation of the State. The districts have been selected based on the area allocation of the study crop. Pune, Ahmednagar and Nasik were selected for the onion crop and Nasik, Sangli and Solapur were selected for grapes. One Taluka was selected from each of the selected sample districts based on area allocation. Two villages from each Taluka/ district were selected for canvassing the questionnaire. A complete enumeration of the twelve selected villages was done. A total sample of 25 farmers from each village was selected and the number of farmers from each size-group (marginal, small, medium and large) was based on the probability proportional to size (PPS) method. The distribution of sample farmers in various categories is provided in Table 1.11.

Table 1.11: Sampled farmers and selected districts for onion and grape crops in Maharashtra

[1]Information on the exporters was obtained from http://agriexchange.apeda.gov.in

District	Selected Crop	Selected Taluka	Name of the Selected Villages	Sampled Farmers			
				Small	Medium	Large	Total
Pune	Onion	Shirur	Warude	17	4	4	25
			Takli Haji	18	5	2	25
Ahmednagar	Onion	Parner	Panoli	17	5	3	25
			Kalkup	21	3	1	25
Nasik	Onion	Satana	Parner	19	5	1	25
			Tarsali	21	3	1	25
			Total	113	25	12	150
Nasik	Grape	Dindori	Tisgaon	20	3	2	25
			Jawulkewani	22	3	-	25
Sangli	Grape	Miraj	Narwad	22	3	-	25
			Earndoli	23	2	-	25
Solapur	Grape	Pandharpur	Karkamb	7	16	2	25
			Bhose	20	3	2	25
			Total	114	30	6	150
			Grand Total	227	55	18	300

The study also covered wholesalers, retailers and exporters of onion and grape crops. In case of onion, 10 wholesalers and 10 retailers were selected from Pune. Similarly, for grape 10 wholesalers and 10 retailers were selected from Nasik. Apart from wholesalers and retailers, 10 exporters of grapes and 10 exporters of onions were also selected from Pune and Mumbai. Separate questionnaires were used for the collection of data from farmers, wholesalers, retailers and exporters.

Punjab: Punjab is a major basmati producing state of country. The primary data for the purpose has been collected through primary surveys and interviews with basmati farmers, 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 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 1.12).

Table 1.12: 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 represent 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 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. The detail of sampled districts, blocks and villages is provided in Table 1.13.

Table 1.13: 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 a major basmati market in the state as well as the country. Similarly five basmati exporters/millers were randomly selected to collect the data. The Reference year for the study is crop year 2013-14.

The data needed for the study were collected from the farmers, wholesalers, retailers and exporters by personal interview method using pre-tested schedule. 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.

Haryana: Three districts namely, Kaithal, Jind and Sonipat with highest share of area under basmati rice in Haryana were selected for in-depth study. The selection of respondents is based on multistage sampling design. At the first and second stages, basmati rice producing districts and blocks in these districts were selected. At the third stage, villages were selected on the same criterion. A questionnaire was canvassed to the farmers growing basmati rice. All farm size categories i.e. marginal, small, medium and large were covered in the sample. The number of farm households in each category was decided according to their proportion at the district level. The primary data pertaining to the year 2013-14 were collected from 150 farmers (Table 1.14).

In addition, ten wholesalers, ten retailers and seven exporters of basmati rice from the selected districts were surveyed to analyse prices and problems of stakeholders dealing with basmati rice.

Table 1.14: Farm households in each category for Haryana

Farm Size	No. of Farm Households
Marginal	14
Small	25
Medium	29
Large	82
Total	150

1.6 Literature Review

This section reviews some of the basic concepts in agricultural price margins and some select previous literature on the subject. Price spread is the difference between the price received by the producer and price paid by the consumer for a given commodity in market at a given point of time. The markets which involve lower margins are generally considered to be the efficient markets. The studies on marketing can be broadly categorized as the following

a) Studies on spatial integration, which study the spatial spread of prices in different geographical regions. The underlying assumption is that the prices in two regions differ by no more than the cost of transportation from one point to another.
b) Studies on temporal variation in prices, which study the price movements over time. The underlying assumption is that the prices over two points of time differ only by the cost of storage.
c) Studies on vertical spread in prices, which analyse the price behaviour at various points of the marketing chain. The underlying assumption is that the vertical prices of different forms of products differ by no more than the difference in marketing or the cost of processing.

In a competitive market price tends to follow the abovementioned patterns. Any deviation from perfect competition is expected to immediately induce players seeking profits to equalise prices by buying low and selling high.

A brief review of literature on studies related to production, cost, prices, marketing and margins of onion are discussed below.

Kulkarni and Basargekar (1997) attempted to quantify the effect of factors influencing onion prices by using secondary data for a period of 15 years (1978-79 to 1992-93). They conclude that onion prices witness a good seasonality, which is larger in producing markets than in overall onion prices. Elenchezhian and Kombairaju (2003) compared the marketing efficiency of farmers' market (channel I) with central vegetable market (channel II) by collecting data from 90 farmers from three farmers' markets in Madurai on selected vegetables, viz. brinjal, bhendi, tomato and small onion. The findings show that the farmer's share in consumer rupee was 95 percent in channel I for small onion and 55 percent in Channel II. The marketing efficiency was also higher in channel I with 16.02 percent for onion as compared to 2.44 percent in channel II. Authors conclude that farmers market helped in increased farmer's share in consumer's rupee and providing fresh vegetables to consumers at relatively low prices. Kumar and Arora (2003) studied the marketed surplus and marketing cost of vegetables in Uttaranchal. Their findings suggest that there was 93 percent marketed surplus in case of onion. The major components of marketing cost of vegetables were packing costs, transportation and commission charges. The commission was a major factor for almost all the vegetables. Improper weighing practices, lack of market information, delay in sale process, delay in payment and lack of effective market regulations were important problems noticed in the selected area. Murthy and Subrahmanyam (2003), in their study on the impact of arrivals on prices of onions, conclude that there is a negative and significant relationship between them, indicating that an increase in supply of onion to the market would reduce the prices of onion and vice versa. Indra and Velan (2004) studed the marketing of onion in Dindigul district of Tamil Nadu. Their results show that the major share of marketing expenses is of commission of the commission agents, which forms about 10 percent of the value of auction.

Shroff (2004) analyzed the price spread and marketing costs of onions in the important markets of Lasalgaon and Pune of Maharashtra state. In Maharashtra marketing of onions takes place in regulated markets through auction method and the farmers sell to the wholesalers through the commission agent. The marketing channel observed in the selected market was Farmer, Commission Agent, Wholesaler, Retailer and Consumer. The findings of the study suggest that

the producer's share in consumer rupee was 45 percent in Lasalgaon and 41 percent in Pune market. Thus, the share of the farmer in the retail price was less than half the retail price, the balance being accounted by marketing costs and margins. All farmers responded that although transport to APMC was easily available and loading and unloading is done timely, the transport charges were very high. The study suggests reduction in the length of the marketing channel and also encouragement of cooperative marketing so that farmers can benefit from scale economies. The price spread, marketing efficiency and constraints in marketing of onion in indore district of Madhya Pradesh was studied by Verma, et al. (2004). The study finds that the producer received the maximum share of consumer's rupee, of about 97 percent, in channel I (Producer- Consumer). This is followed by channel II (Producer- Retailer-Consumer) with 72 percent, and channel III (Producer- Wholesaler-Retailer-Consumer) with 58 percent. These findings clearly indicate that the number of intermediaries reduces the share of producer in the consumer's rupee. The highest share is obtained in channel I because of the absence of intermediaries. Similar findings are reported in Malaisamy, *et al.*, (2008), which analysed the supply chain management and marketing efficiency of fruits and vegetables in Tamil Nadu. The study finds that in case of onion, two marketing channels prevailed in Dindigul, Oddanchatram and Trichy markets. In the first channel, producer, commission agents, wholesalers, retailers and consumers participated in the process of marketing. Producer, commission agent, retailers and consumers participated in the second channel. They find that the farmer's share in consumer's rupee varied between 60 to 76 percent. It was found to be higher in Channel II in all the three markets compared to Channel I. This is because of the fact that there is direct purchase of onion by the retailers from the commission agents. They also noted that this type of marketing channel was not common and more than 70 percent of onion is marketed through wholesaler to retailer facilitated by commission agent. Thus, commission agent plays a major role in marketing of onion in three selected markets. Authors suggested that as stored onion fetches better prices, storage facilities should be provided to the farmers.

Goyal (2008) studied the growth and instability in export marketing of onion during 1985 to 2004 and concluded that the ratio of revealed comparative advantage (RCA) in export of onion was above unity in all the years during study period, which implies that India has comparative advantage in onion export. However these computations do not include the transportation costs, and hence may overestimate RCA.

Rasheed *et a*l., (2010) studied organized retailing of fresh fruits and vegetables in a vegetable growing cluster in Hyderabad and observed that producers benefit in terms of better price realization in case of sales to organized retail as compared to *mandi.* The farmers also saved on marketing costs, especially commission charges. Further in case of sales to organized retail there was digital weighing system, which did not exist in the *mandi*. The *mandi* also lacked basic infrastructure such as storage facilities, parking and clean drinking water. However, the study noted that while the *mandi* purchased all the produce brought by the farmers, the purchases by retailers was very limited and hence all farmers could not benefit from the better marketing operations of organized retailers, in spite of the fact that some organized retailers also provided inputs and technical advice to farmers.

Shorff, *et. al* (2011) studied the impact of emerging marketing channel in agricultural Marketing in Maharashtra and observed that although the farmers in the sample received Rs 711/- per quintal, they had to incur marketing costs of Rs 75/- per quintal and hence their net price after deducting marketing costs was Rs 636/- per quintal. It was observed that the share of the farmer in the retailer's price under traditional marketing channel was 44 percent, while marketing costs as a percentage of retailer's price was 44 and marketing margins as percentage of retailer's price was 11 percent.

Chengappa, et al, (2012) examined competitiveness in the onion markets in Central India. Secondary and primary data were collected from all the actors involved in the onion supply chain located in five major onion markets in Karnataka and six major onion markets in Maharashtra. Primary survey was carried out in these 11 markets, from farmers, retailers and wholesale traders and other market functionaries. The results indicate clear imperfections in the onion markets and presence of cartels. It was noticed that almost 66 percent of the sample farmers in Karnataka were affected by interlocked markets. About 55 per cent sample farmers experienced problems related to weighment and more than one fourth noticed unreasonable grading and anomalies in price fixation. Though these problems were not so prominent in Maharashtra, some farmers reported problems like anomalies in price fixation, barrier to entry and interlocked markets. Collusion amongst traders was reported in Ahmednagar market. About 95 per cent of the sample farmers in Maharashtra and 86 per cent in Karnataka were not aware about marketing channels in APMC and

were also not aware of other options to sell their produce. The figures on the extent of awareness about Minimum Support Price (MSP) are close to the figures of NSS Situation Assessment Survey (59^{th} round, 2003), indicating that despite knowledge of the officials about lack of awareness of farmers, the problem persists and very little has been done to improve dissemination of market information.

Kalamkar, et al (2012) analysed the structure of onion markets and conduct of major players in onion markets in Maharashtra by collecting primary survey data from six largest AMPC markets (mandis) in Maharashtra, i.e. Lasalgaon/Pimpalgaon Basant, Yeola, Sangamner, Ahmednagar, Pune and Mumbai (Vashi). The study clearly reveals that there are both intra-seasonal as well as inter-seasonal fluctuations in prices of onions. Traders revealed that it is mostly the retailers who charge higher from the consumers. There is no regulation on prices charged by retailers and at times their prices are exorbitant, especially when the produce is in short supply.

NIAM (2013) studied the trends in marketing and export of onion in India by collecting data from stakeholders in two markets of Maharashtra and three markets of Karnataka. The findings revealed that the astronomical increase in the prices of onion was a result of hoarding of stocks in anticipation of a rise in the price and a higher retailer mark-up. Moreover, the crop situations were not predicted timely and thus, the information on loss in production was not anticipated by market intelligence. Proper staggered planting of onions with suitable varieties can address supply gap during the slack period, there by stabilizing the prices across the year uniformly. As part of market reforms, implementing market intelligence systems can help in discovering the right prices for producers as well as consumers.

We review some of the important literature on economics of basmati cultivation in India and Pakistan below.

Brar et al. (2011) estimated the economics of basmati rice based on a field experiment. Results show that the productivity of basmati rice-wheat sequence was significantly higher with TPBR (Transplanted Basmati Rice) than direct seeded basmati rice (DSBR) irrespective of seeding technique of succeeding wheat. Thus, transplanting basmati rice followed by zero tillage or

conventional sowing of succeeding wheat was more profitable than direct seeding of basmati rice in basmati rice- wheat sequence.

Grover (2012) in his paper studied resource use pattern and economic viability and various biotic and abiotic constraints of basmati rice and non-basmati rice cultivation in Punjab. The study is based on the sample of 200 basmati rice growers spread over five districts of the state during 2008-09. Basmati cultivation saved around 18, 81, 70 and 39 per cent irrigation water, urea, DAP and zinc fertilizers respectively as compared to non-basmati rice crop. Basmati rice promised more returns over variable costs to the tune of Rs. 4562 per hectare over the non-basmati rice. It implies that basmati rice cultivation was both resource conserving as well as remunerative. The regression analysis has brought out that there existed scope to further increase use of human labour, plant population and insecticides/pesticides for improving the yield of basmati rice in the state. The price variability and difficulty to access price related information were the most important marketing problems for basmati rice. Sample farmers wanted the scientists to evolve new dwarf varieties to minimize the water logging losses. Basmati rice yield needs to be enhanced through genetically improved varieties. To encourage the farmers to increase area under basmati rice, the government needs to formulate a policy to ensure adequate support price for basmati rice on the pattern of non-basmati rice.

Sidhu and Kumar (2014) show the efficacy of the market intelligence system in the state of Punjab for Basmati cultivation. Dwivedi et al. (2011) carried out an economic analysis of Basmati rice production in Jammu and concludes that it is possible to increase production of Basmati Rice in the state and generate more potential for export of the scented crop. The study by Mukesh et al. (2013) focused on the effects of different transplanting dates on yield and quality of basmati rice. The findings show that tall varieties did not show decline in the yield because of transplanting dates, whereas, dwarf rice varieties showed a decline with a delay in transplantation.

Khatkar et al. (2014) tested the extent of market co- integration of prices of Paddy among major markets in Haryana, Amritsar and markets of Punjab by using Johansen Granger Causality Test. It also captures speed of adjustment to deviations in long run equilibrium in Paddy markets by using Vector Error Correction Model.

Ghani et al. (1993) analyzed growth of rice and agricultural production over the last two decades. The results show that policy restrictions and cumbersome administrative impediments to rice exports should be eliminated in order to encourage exporters and to avoid losing export opportunities to competitors. Mulik and Crespi (2011) examined the interesting issue of granting patent rights to three new strains of Basmati rice in the U.S. The study indicated that, residual demand elasticity (demand after the competitors' supply is netted out) for Indian Basmati rice in the UK and Kuwait fell after the entry of a competitor in the four markets.

There are few important studies that analyzed the economics of basmati in Pakistan. Since Pakistan is a major competitor to Indian basmati, it is instructive to review few of the important studies relating to Pakistan here. One of the early studies is by Ali and Flinn (1989). In this study farm-specific profit inefficiency was estimated among Basmati rice producers in Pakistan from a variable-coefficient profit frontier. Authors conclude that better use of existing technology provides substantial opportunity to improve the profitability of Basmati rice in Gujranwala district. The authors explain the benefits of promoting increased efficiency in Basmati rice production.

Farooq (2001) looks into supply response of basmati rice in Pakistan, in particular, the scope of price support policy to achieve growth targets. The results indicate that higher support prices, which are non-feasible, are required to achieve higher production.

Zulfiqar et al. (2009) assessed various protection policies and interventions in the Basmati rice economy of Pakistan. The study concludes that trade liberalization would entail in much larger gains to the economy.

Ali (1995) in his article investigates constraints in the second-generation Green Revolution by quantifying the causes of resource-use inefficiency and variation in input use in basmati farming. The author concludes that Basmati rice production could be improved by 30 per cent at the existing level of input use. The resource-use inefficiency in Basmati rice production was significantly explained by the institutional and socioeconomic factors that determined farmers' production-related characteristics and farm management practices. However, input use could be enhanced by improving marketing efficiency by removing unnecessary government interventions in input and output markets, providing the necessary physical infrastructure and technical and market information and streamlining the credit procedure.

Chapter 2

Secondary data analysis

2.1 National and state-level production patterns

2.1.1 Price Spread at the All-India Level

In this section the spread between the wholesale, retail and export prices have been analysed. Percentage mark-ups have been calculated using monthly prices and averaged over the year to yield annual percentage mark-up. Five yearly averages have been calculated from the annual averages.

Onions

Table 2.1 shows the average annual prices of onions at the three levels for the period 2001 to 2014. The Table shows that the there has been a sharp price rise in 2013 and 2014. However, this rise has been somewhat uneven, as can be seen from the percentage mark-ups (Table 2.2). The annual margins have hardly changed for retailers, while for exporters there is a slight decline. This is further clear from Table 2.3 (also Figure 2.2), where the last two columns show the five-yearly exporter price mark-ups, over wholesalers and retail price respectively. There is a sharp decrease in these mark-ups, from the 2001-05 to 2011-14 (Table 2.3). There is actually a decline (or negative mar-up) of export price over the retail price, showing that the retail prices were higher than the export prices during this period (Figure 2.2). The retailers' margins have slightly increased during the corresponding period!

Table 2.1: Average Price (in Rs/Quintal) at All-India level: Onion

Average annual price: Onion			
Year	Wholesale Prices (WSP)	Retail Prices (RP)	Export Prices (EXP)
2001	441	700	952
2002	380	617	773
2003	455	775	837
2004	495	844	955
2005	565	900	931
2006	389	710	861
2007	860	1322	1430
2008	593	1008	1077
2009	959	1474	1496
2010	1116	1749	1913
2011	987	1530	1854
2012	705	1252	1096
2013	2072	3228	3124
2014	1303	2144	1558
Average 2001-2014	809	1304	1347

Table 2.2: Price spread (Mark up) (in percentage) at All-India level: Onion

Percentage Mark-ups: Onion			
Year	Price spread (%) - WSP and RP	Price spread (%) - WSP and EXP	Price spread (%) - RP and EXP
2001	66.4	137.2	39.4
2002	63.5	114.2	30.6
2003	72.9	95.4	13.0
2004	75.2	99.8	14.3
2005	67.9	92.8	12.9
2006	86.6	128.2	22.8
2007	55.6	71.0	10.2
2008	77.2	91.2	7.6
2009	56.9	58.7	1.5
2010	59.8	83.9	15.8
2011	68.2	100.4	20.5
2012	83.9	62.0	-12.1
2013	60.9	45.9	-6.9
2014	68.3	21.0	-27.6
2001-2014 (AVG)	68.8	85.8	10.1

Figure 2.1: Average Price (in Rs/Quintal) at All-India level: Onion

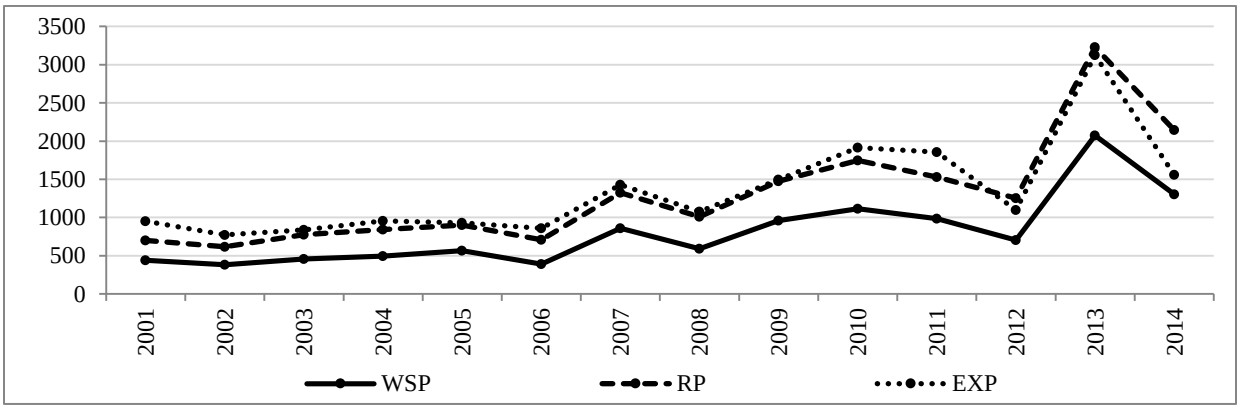
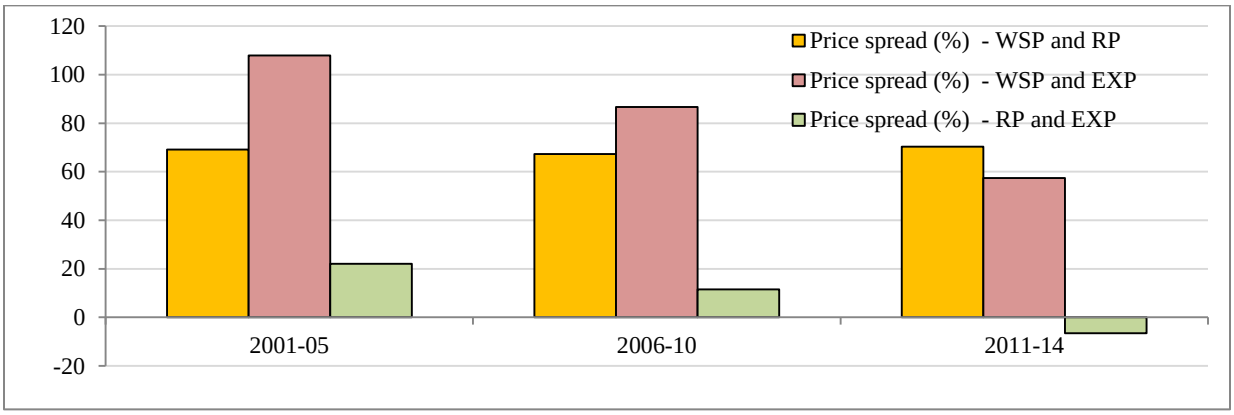


Table 2.3: Price spread (in %) for three time periods at All-India level: Onion

Period	Price spread (%) - WSP and RP	Price spread (%) - WSP and EXP	Price spread (%) - RP and EXP
2001-05	69.2	107.9	22.0
2006-10	67.2	86.6	11.6
2011-14	70.3	57.3	-6.5

Figure 2.2: Price spread (in %) for three time periods at All-India level: Onion



Grapes

Table 2.4 shows the average annual prices of onions at the three levels for the period 2001 to 2014. The Table shows that there has been an increase in wholesale and retail since 2011 and of export prices since 2012. However, the percentage mark-ups (Table 2.5) are a lot higher for retailers. The export prices have actually been lower than the retail prices, as can be seen from the negative mark-ups for export prices vis-à-vis retail prices (Table 2.5). When we examine the five-yearly averages, it can be seen clearly that the percentage mark-ups have increased for retailers while the same have decreased for exporters (Table 2.6 & Figure 2.4).

Table 2.4: Average Price (in Rs/Quintal) at All-India level: Grapes

Average annual price: Grapes			
Year	Wholesale Prices (WSP)	Retail Prices (RP)	Export Prices (EXP)
2001	2732		3809
2002	2373	3530	3400
2003	2402	3072	4496
2004	2618	3964	3187
2005	2550	4585	3139
2006	2717	4426	2683
2007	2970	4862	2139
2008	3260	4732	3565
2009	3772	5531	5354
2010	4405	6851	4318
2011	5252	8515	4808
2012	5057	7736	7542
2013	5245	8619	6857
2014	5441	8454	9514
Average 2001-2014	3628	5760	4629

Table 2.5: Price spread (Mark up) (in percentage) at All-India level: Grapes

Percentage Mark-ups: Grapes			
Year	Price spread (%) - WSP and RP	Price spread (%) - WSP and EXP	Price spread (%) - RP and EXP
2001		33.7	
2002	47.0	46.6	9.1
2003	27.9	86.6	88.8
2004	46.3	24.9	1.1
2005	73.1	24.1	-17.0
2006	75.1	4.8	-31.2
2007	66.5	-24.2	-51.1
2008	46.5	12.6	-23.0
2009	48.0	53.1	2.3
2010	56.6	1.1	-34.6
2011	66.0	-1.6	-40.8
2012	53.5	49.9	-2.2
2013	65.8	35.9	-17.0
2014	56.9	82.7	19.1
2001-2014 (AVG)	56.1	30.7	-7.4

Figure 2.3: Average Price (in Rs/Quintal) (in %) at All-India level: Grapes

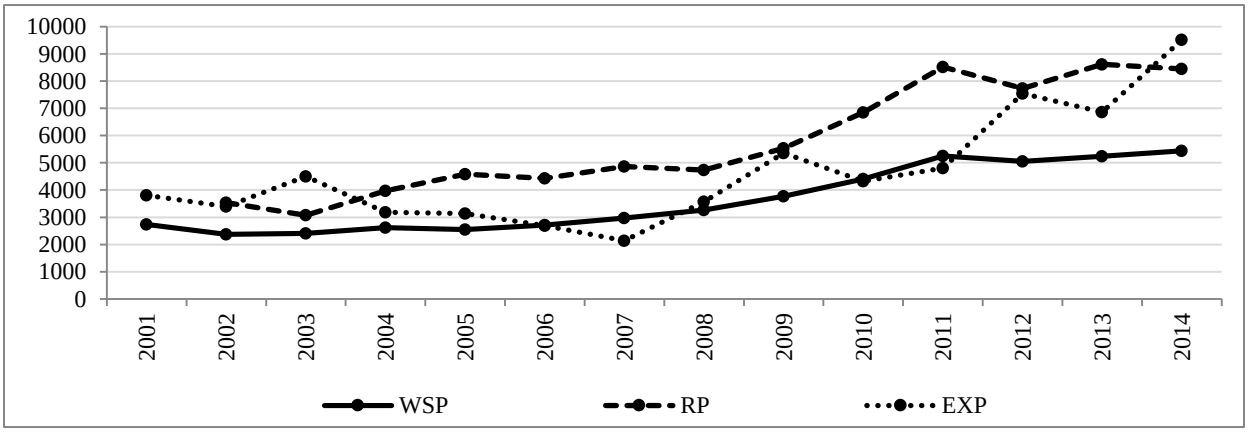
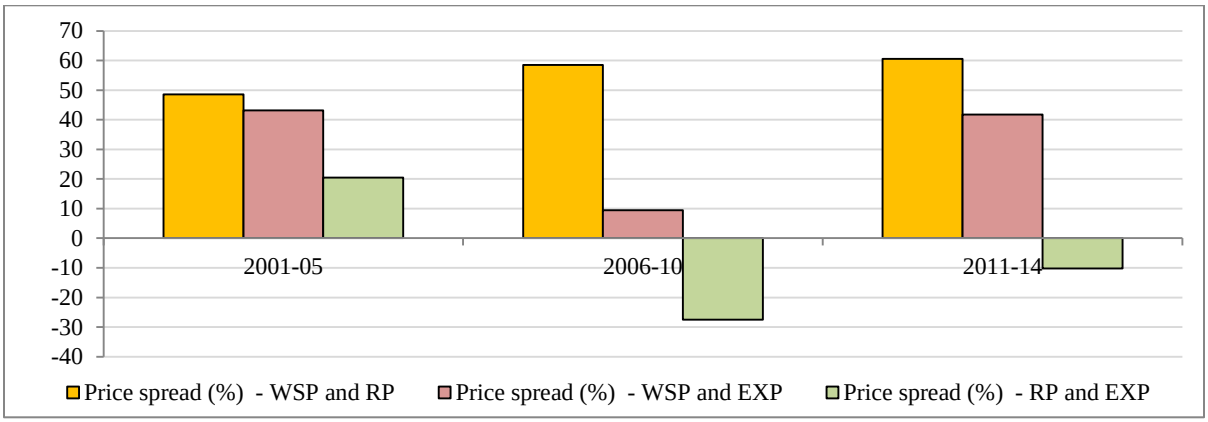


Table 2.6: Price spread (in %) for three time periods at All-India level: Grapes

Period	Spread - WSP and RP (%)	Spread – WSP and EXP (%)	Spread – RP and EXP (%)
2001-05	48.6	43.2	20.5
2006-10	58.5	9.5	-27.5
2011-14	60.5	41.7	-10.3

Figure 2.4: Price spread (in %) for three time periods at All-India level: Grapes



2.1.2 Wholesale and retail price spread: State level

Onion

Market wise data has been collected for retail and wholesale prices of onion in major states from 2001 to 2014.Market wise data has been aggregated using simple average to derive the state level retail and wholesale prices. Major states included in the analysis are Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh.

Annual price spread: Onion

Price spread has been calculated for every month, for the whole year and for three sub periods: i.e. 2001 to 2005, 2006 to 2010 and 2011 to 2014. The Annual price spread is the simple annual average of monthly price spread over the 12 month period. The results suggest that the overall spread for different states for the whole period January 2001 to December 2014 is in the range of 34% to 127% (Table 2.7). The highest spread is noted for Gujarat (127%), followed by

Maharashtra (107%), Rajasthan (95%), Madhya Pradesh (94%), Karnataka (85%), Andhra Pradesh (76%), Haryana (73%), Uttar Pradesh (64%), Bihar (42%), Tamil Nadu (35%) and lowest for Orissa (34%).

Table 2.7: Price spread for major states for the period 2001 to 2014 (in percentages): Onion

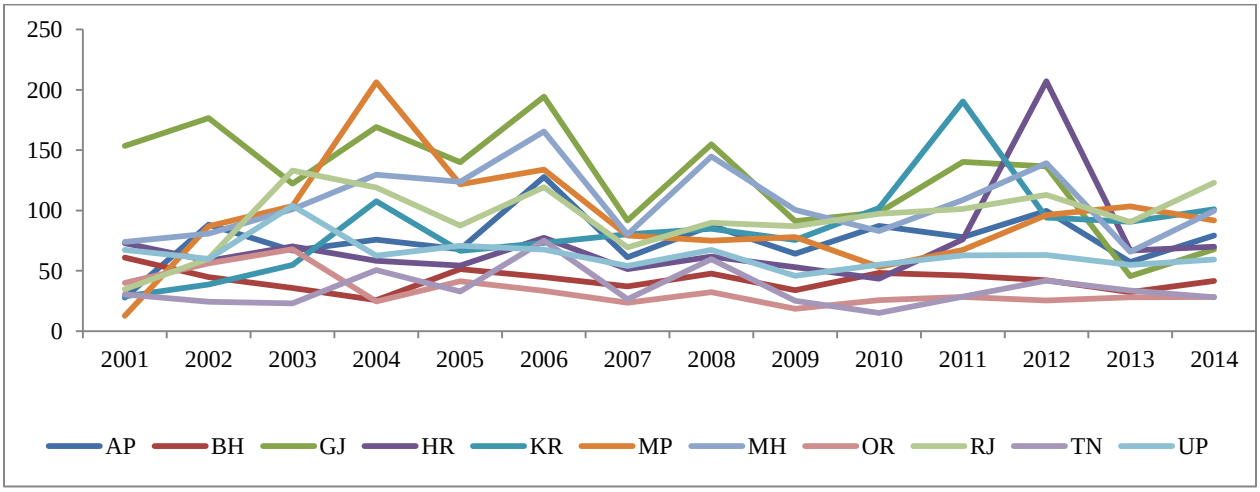
Years	Andhra Pradesh	Bihar	Gujarat	Haryana	Karnataka	Madhya Pradesh	Maharashtra	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh
2001	28	61	154	73	29	13	74	40	35	31	67
2002	88	45	177	58	39	87	81	56	60	24	60
2003	67	36	122	70	55	104	101	68	133	23	104
2004	76	26	169	58	108	206	130	25	119	51	63
2005	68	51	140	54	66	122	124	41	87	33	71
2006	128	45	194	77	73	134	165	34	119	75	68
2007	61	37	92	52	80	79	80	24	69	26	54
2008	88	48	155	62	85	75	145	32	90	60	67
2009	64	34	91	53	75	78	100	19	87	25	46
2010	87	48	98	43	102	53	83	26	97	15	55
2011	78	46	140	76	190	67	109	28	101	29	63
2012	100	42	137	207	94	96	139	25	113	42	63
2013	57	32	46	67	91	103	66	28	90	34	55
2014	79	42	68	70	101	92	100	28	123	28	59
Average	76	42	127	73	85	94	107	34	95	35	64

The annual price spread varies greatly across the states. For Andhra Pradesh, price spread is usually in range of 60% to 90%, but in 2006 (128%) and in 2012 (100 %) it suddenly jumped to much higher levels, showing some tightness in the markets (Table 2.7 & Figure 2.5). Bihar has continuously shown a stable spread, ranging from a low of 26 % (in 2004) to a high of 61 % (in 2001).For Gujarat, initial period of 2001 to 2006 was very volatile and price spread was continuously high - above 120 % and sometimes surging to 200 %. It has somewhat stabilized thereafter, with overall spread dropping to almost one-third, especially in recent two years[2]. Haryana reported just one extreme year (2012) when the spread went above 200%, otherwise it remained at moderate levels from 50 % to 80 %.In Karnataka, the later half time period, especially after 2010 was on higher spread side (90 % and higher). During 2001 to 2009 the spread increased steadily over time- from 29 % to nearly 80 %.For Madhya Pradesh, 2001 was the year with extremely low spread (just near 10 %) but then onwards till 2006, it was near or above 100 % except 2002. The period from 2007 recorded moderate spread with some upwards trend, especially

[2]However, there were three spikes during period 2007 to 2014, when spread crossed 135 %.

in the last three years. Maharashtra being a major supplier of onion in the country reported extremely high price spread between wholesale and retail prices, reporting 9 out of 14 years with above 100 % variation and also in the remaining years it was usually above 70 % except 2013 (66 %). **This is a cause for concern and shows some market imperfections.** This has been highlighted in other studies too, which even conclude that the onion market structure in Maharashtra is oligopolistic (Chengappa et al. 2012). Rajasthan also showed high price spread throughout the period – with six years showing a spread above 100%.Orissa and Tamil Nadu have generally shown lower price spread as compared to other states. The spread in these states ranged from below 40% to 75%. Uttar Pradesh also has comparatively lower or moderate price spread below 70% except year 2003 (104%).

Figure 2.5: Price spread for major states for the period 2001 to 2014 (in percentages): Onion



Sub period wise price spread: Onion

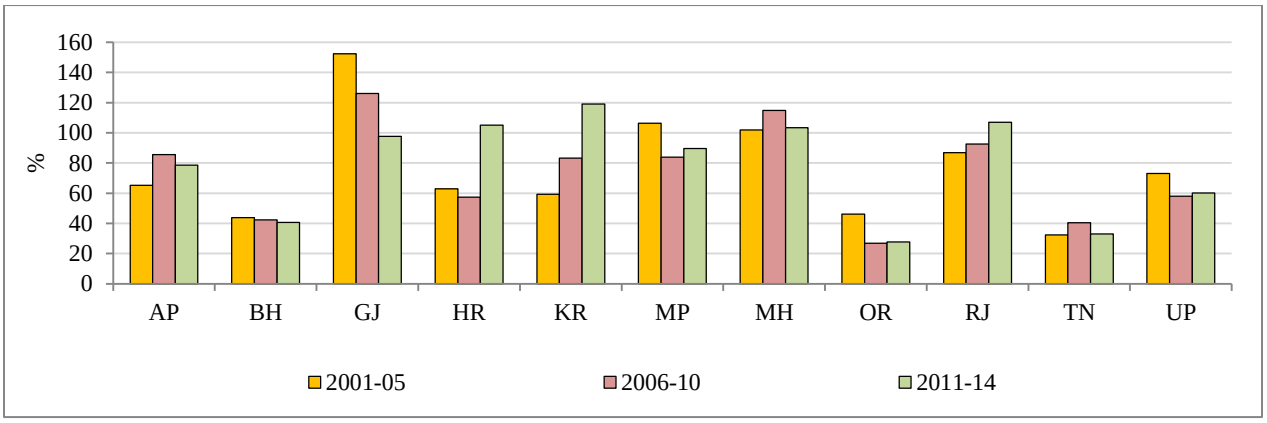
For the first sub period (2001 to 2005) the price spread was high for Gujarat (152 %), Madhya Pradesh (106 %) and Maharashtra (102 %) (Table 2.8 & Figure 2.6). During second sub period (2006 to 2010) the price spread decreased moderately for Gujarat from 152% to 126%, Madhya Pradesh from 106% to 84% but for Maharashtra it increased from 102%to 115%. It also increased for Andhra Pradesh, Karnataka and Rajasthan during this period. During third sub period (2011 to 2014) the price spread was high for Haryana (105%), which is almost the doubled of previous sub-period. Karnataka and Rajasthan were the other states that showed a significant increase in the

spread. It was high for Maharashtra and Gujarat too. In Bihar, Tamil Nadu and Orissa the price spread remained generally low as compared to other states during all the three sub periods of time, which ranged from 27 % to 46 %. Orissa even reported decreasing trend in price spread from 46% in first sub period to nearly stable spread in later two sub periods at a low of about 28%.It of some concern that in all the three major producer states, Maharashtra, Karnataka and Gujarat, price spread is at a higher level.

Table 2.8: Price spread for major states for three sub-periods (in percentages): Onion

Time Period	Andhra Pradesh	Bihar	Gujarat	Haryana	Karnataka	Madhya Pradesh	Maharashtra	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh
2001-05	65	44	152	63	59	106	102	46	87	32	73
2005-10	86	42	126	57	83	84	115	27	93	40	58
2011-14	79	41	98	105	119	90	103	28	107	33	60

Figure 2.6: Price spread for major states for three sub-periods (in percentages): Onion



Average monthly price spread (2001 to 2014): Onion

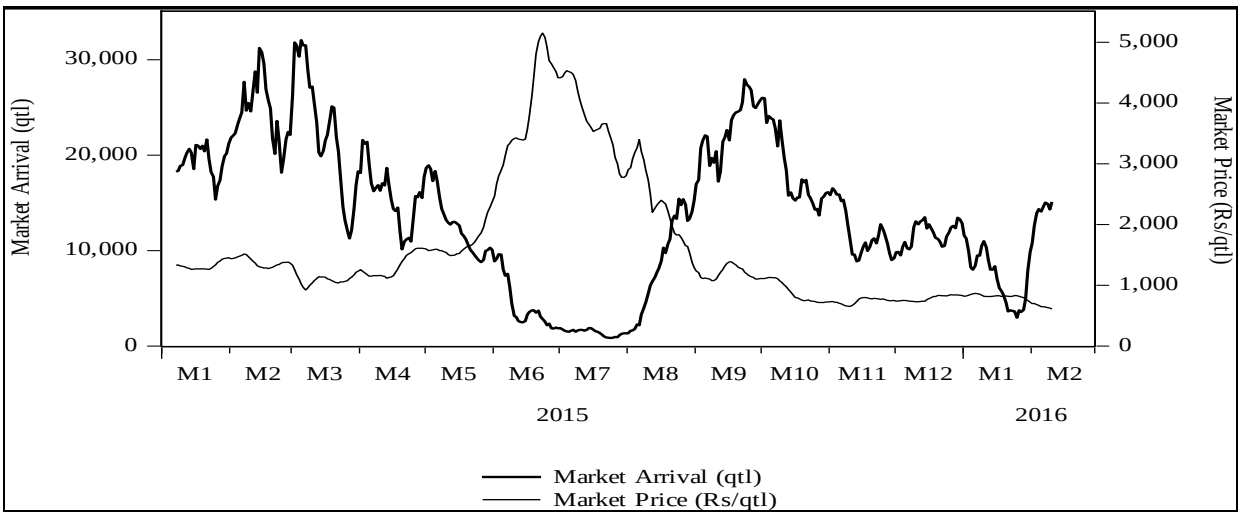
Year-on-year averages of spread were calculated for each month to see the seasonality pattern, if any, in the spread. The results show that broadly the spread is above median value during the months of February to July, and in some states until September (Table 2.9). However, there are state-level variations though. In Andhra Pradesh, it is the period from March to June and again November-December when price spread is high. In Bihar March to June& August and October; in Gujarat February to July; in Haryana February-March and May to August; in Karnataka March to

June and October and December; in Madhya Pradesh April to June and August-December, in Maharashtra January to June; in Orissa February, April, June and August; in Rajasthan May to October; in Tamil Nadu April-July and September-October; and finally in Uttar Pradesh February, and April to August months are when the price spread is higher.

Table 2.9: Average monthly price spread for the period 2001 to 2014 (in percentages): Onion

Months	Andhra Pradesh	Bihar	Gujarat	Haryana	Karnataka	Madhya Pradesh	Maharashtra	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	Average
January	65	42	121	57	64	77	99	32	83	10	53	64
February	71	40	135	79	81	85	127	43	90	26	61	76
March	85	50	143	80	94	86	148	34	90	32	57	82
April	103	53	150	77	111	113	142	37	89	54	77	92
May	99	57	162	101	112	105	146	29	94	60	80	95
June	83	45	142	90	89	107	128	45	115	51	89	89
July	65	39	124	79	79	82	84	30	103	35	67	71
August	57	48	118	85	67	110	78	40	109	24	79	74
September	63	40	104	66	71	97	79	31	98	41	54	68
October	67	43	101	49	90	84	71	34	95	36	60	66
November	79	21	115	62	78	87	88	28	88	30	49	66
December	79	30	111	50	84	89	93	24	85	25	41	65
Median	75	43	123	78	82	88	96	33	92	33	60	73

Figure 2.7: Market arrival and price movements in Lasalgaon Market – 2015 and 2016: Onion



Source: NHRDF Data, Note: data upto 8th September, 2016

Grapes

Market wise data has been collected for retail and wholesale prices of onion in major states from 2001 to 2014. State level retail and wholesale prices have been derived as averages of individual market prices at the wholesale and retail level respectively. Major states included in the analysis are Andhra Pradesh, Assam, Bihar, Chattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Price spread has been calculated for each month (for which data is available), for the whole year and for three sub periods: i.e. 2001 to 2005, 2006 to 2010 and 2011 to 2014. The Annual price spread is computed as average of the monthly price spreads.

Annual price spread: Grapes

The results suggest that the overall spread for different states for the whole period January 2001 to December 2014 is in the range of 21% in Orissa to 118% in Maharashtra (Table 2.10). The highest spread in Maharashtra is followed by Punjab (88%), Rajasthan (85%), and Bihar (73%). Rest of the states recorded much lower spreads.

The annual price spread varies greatly across the states (Table 2.10). Orissa, despite the lowest price spread of only 21%, shows the highest coefficient of variation in spread (133%) over the study period – the annual spread ranging from -45% in 2002 to 50% in 2007. UP also shows high CV despite a relatively lower average spread of 32%. On the other hand, Maharashtra, which recorded the highest price spread of 118%, also shows a reasonably high level o coefficient of variation of the same at 45%. The price spread in this state ranged from a low of 36% in 2003 to a high of 215% in 2010. Another major state for grape production, Karnataka, showed a lower CV though (36%).

Sub period wise price spread: Grapes

Turning to the price spreads over a 5-year period, it appears that unlike in case of onions, there is no noticeable increase during the last sub-period i.e. 2010-14 (Table 2.12). Maharashtra, Punjab and Rajasthan have, generally recorded higher spreads compared to other states.

Average monthly price spread (2001 to 2014): Grapes

Year-on-year averages of spread were calculated for each month to see the seasonality pattern, if any, in the spread. There is no discernible seasonal pattern in movements of price spread over months, although Maharashtra shows a clear increase around May, which continues until December (Table 2.11). Surprisingly, this pattern is not followed by other states, despite Maharashtra being the largest producer of grapes in the country.

Table 2.10: Price spread for major states for the period 2001 to 2014 (in percentages): Grapes

	AP	ASM	BH	CHD	CHH	DL	GJ	HP	J&K	JKD	KRL	KR	MH	MP	OR	PB	RJ	SKM	TN	UK	UP	WB
2001																						
2002		33		76				45			13			28	-45	209	115		93			45
2003		63						41			22	22	36	25	-9		103		99			
2004		69						40			30			25			101	-99	85	229		
2005		71		-19	42			39			-28	15		42			90	71	54		-10	81
2006		58						43			33			30			69	48	37			
2007		82		46			79	48		63			59	19	50	51	68	47	50			52
2008	39	50	45	52		44	34	53		50	48	30	117	16	35	64	75	64	99	112	-8	42
2009	51	45	78	40		23	21	49		78	32	49	128	23	42	91	84	42	56	63	41	28
2010	70	26	117	64	9	19	32	42	48	86	18	47	215	20	37	60	85	30	41	60	40	50
2011	80	60	58	66	68	39	42	38	39	70	25	50	168	23	26	55	81	49	30	34	39	48
2012	41	35	86	46	76	57	66	43	30	61	29	50	108	25	30	55	79	27	34	48	46	54
2013	54	38	76	54	67	65	52	67	26	51	36	56	129	21	23	80	84	25	38	66	59	58
2014	44	28	52	57	42	65	45	30	29	55	31	52	102	19	22	122	66	25	29	62	47	49
AVG	54	51	73	48	51	45	46	44	34	64	24	41	118	24	21	88	85	30	57	84	32	51
SD	15	18	24	26	25	19	19	9	9	13	19	15	53	7	28	51	14	45	27	62	26	13
CV	28	35	33	54	49	43	40	20	26	20	77	36	45	27	133	58	17	152	47	74	82	26

Note: State names are explained in acronyms list

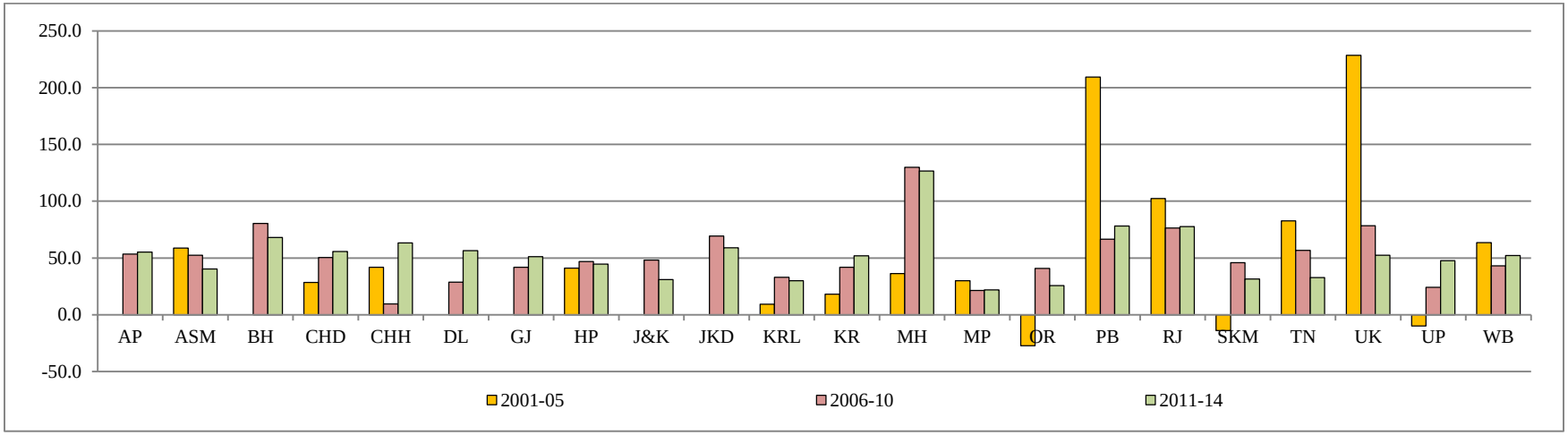
Table 2.11: Average monthly price spread for the period 2001 to 2014 (in percentages): Grapes

	AP	ASM	BH	CHD	CHH	DL	GJ	HP	J&K	JKD	KRL	KR	MH	MP	OR	PB	RJ	SKM	TN	UK	UP	WB
Jan	51	56	93	54	33	39	40	46	32	58	26	41	60	29	28	84	78	50	62	38	41	51
Feb	47	42	88	45	37	48	47	48	29	65	31	54	50	23	37	69	85	36	56	65	36	54
Mar	57	50	74	43	71	36	49	47	29	67	20	55	53	26	30	86	86	50	62	86	29	55
Apr	53	52	58	52	63	24	35	42	34	68	30	39	51	22	28	73	81	36	51	69	47	58
May	47	58	41	64	52	34	45	42	39	70	25	47	114	23	30	54	81	39	59	56	50	43
Jun	46	42		83		58	51	50	37		20		222	15	18	113		57		82	8	19
Jul						41		28			14		227		34	46					2	
Aug	156					43					21		226		42	67			64			
Sep	62					49			28		20		219	17	46	64						
Oct	68					47			54	51	21		162	18	49	74		-21	82			80
Nov	39	51				57			58	75	23	39	156		44	81	74		30		45	35
Dec	35	54	62	65		56	8		34	45	29	40	100	29	35	56	82	30	75	55		44
AVG	60	51	69	58	51	44	39	43	37	62	23	45	137	22	35	72	81	35	60	64	32	49
SD	33	6	20	14	16	10	15	7	10	10	5	7	74	5	9	18	4	24	15	16	18	17
CV	55	12	28	24	32	23	38	17	28	16	21	16	54	23	26	25	5	69	24	26	57	35

Table 2.12: Price spread for major states for three sub-periods (in percentages): Grapes

	AP	ASM	BH	CHD	CHH	DL	GJ	HP	J&K	JKD	KRL	KR	MH	MP	OR	PB	RJ	SKM	TN	UK	UP	WB
2001-05		58.8		28.4	41.8			41.1			9.3	18.2	36.3	29.9	-27.2	209.4	102.3	-14.0	82.7	228.5	-9.9	63.4
2006-10	53.5	52.3	80.4	50.5	9.4	28.6	41.7	46.8	48.2	69.2	32.9	41.8	129.8	21.5	40.8	66.5	76.5	46.0	56.6	78.4	24.2	43.1
2011-14	55.1	40.3	68.1	55.7	63.2	56.4	51.1	44.6	30.9	59.1	29.9	51.8	126.7	22.0	25.6	78.2	77.7	31.5	32.8	52.4	47.6	52.2

Figure 2.8: Price spread for major states for three sub-periods (in percentages): Grapes



2.2 Econometric Analysis

Two important issues relating to prices of the selected commodities have been analysed in this section – i) what is the relationship between wholesale prices and retail prices, or more precisely, what is the effect of wholesale price on retail price ii) what is the precise effect of market arrivals on price (wholesale)?

The crucial question in analysis of price formation mechanism is where along the marketing network, from the time commodity originates to the time it is consumed finally, is the price level determined? From the time an agricultural commodity originates from the producer until the time it is purchased by the final consumer, it undergoes a variety of transformations in space, time and form. Many of these transformations involve a change of ownership and, hence, imply a price for the transaction (Sarris and Schmitz, 1981). Suppose there are m such transactions in the marketing network, each at a price p_i, i=0,1, …..,m, where p_0 is the producer price and p_m is the price the final consumer pays for the product. Then each marketing channel in the network can be viewed from pricing viewpoint as a transformation of the input price (the price at the previous channel) into an output price (the price of next transaction).

$p_i = f_i(p_{i-1}, z_i)$ ……..(1) i=1,……..,m

The way equation (1) is written implies that the level of prices is determined at the zero channel i.e. producer. If the main price-determining channel is assumed to be the consumer, then the producer price and all other prices in between the producer and consumer must be viewed as being derived in a backward fashion from the m th channel.

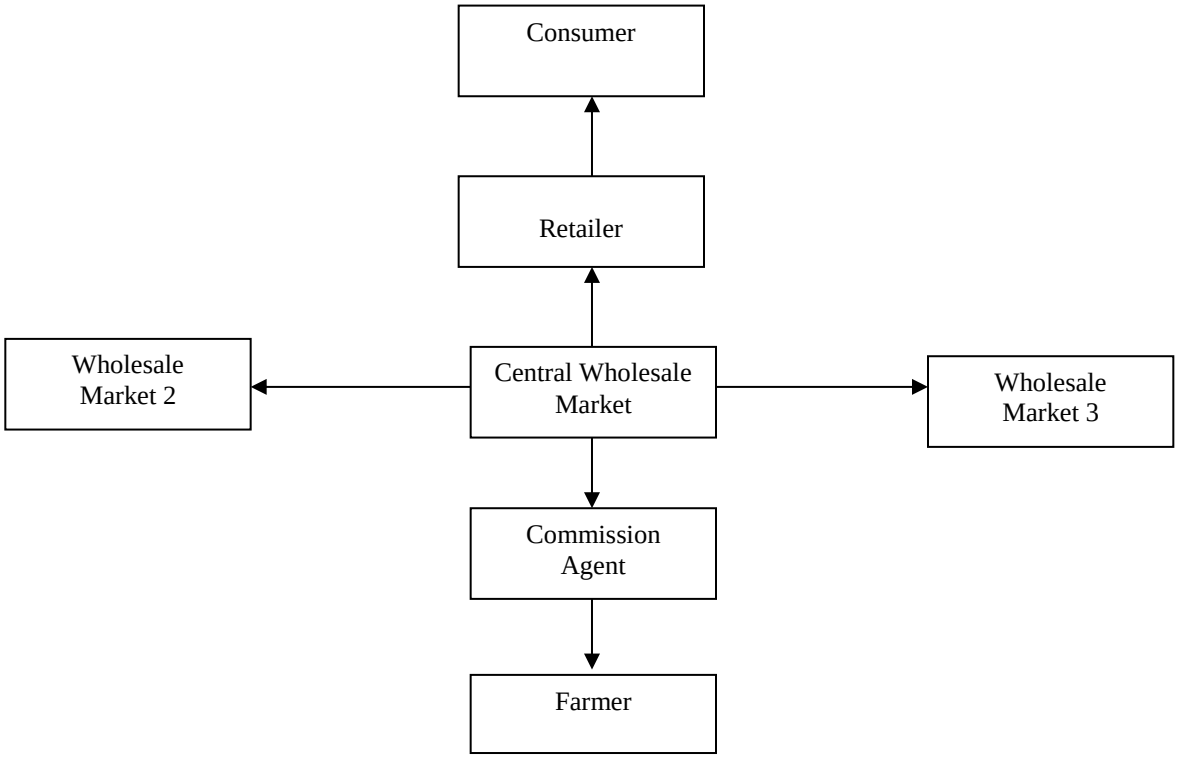
$p_i = g_i(p_{i+1}, z_i)$ ……..(2) i=0,……,m-1

Equations 1 and 2 are extreme examples of most real world situations. In reality the major price determining channel is somewhere between the producer and the consumer, say the k th level. Then the producer price is determined in a backward induction such as (2) - starting at k th level - while the consumer price is determined by a forward induction such as (1)- starting again at the k th level.

In this framework, the following questions arise

1) What is the structure of the crucial k th marketing stage that governs the whole constellation of prices in the network? How does the structure impinge on the price differential generated by the k th level. (i.e. p_k-p_{k-1}) and how do fluctuations get transmitted through it?
2) Could there be more than one crucial price determining level?

In India, majority of the farmers are small and lack the ability to affect market prices to any significant extent. Farming in India involves incurring production costs and accepting equilibrium prices from the markets. In the years when market prices cover the variable costs, farmers manage to stay afloat. Regulated markets are the major marketing channel and majority of the agricultural produce is marketed through this channel. Therefore, we hypothesize that the wholesale market is the crucial marketing stage at which the price formation occurs, which influences forward and backward transmission of prices. Given the geographical concentration of production and trade of different commodities (wheat in Punjab, Haryana and Western U.P., rice in southern states, onion in Maharashtra), certain markets play a relatively larger role in spatial price formation. Given these aspects we hypothesize the following **marketing structure**, for vertical and horizontal price transmission.



In this framework, there is a central wholesale market, which vertically influences the prices is that geographical region and also affects spatially the prices in other wholesale markets. In case of onions, Nasik district in Maharashtra is assumed to be such a central market. This district accounts for the largest share in the production of onions in India. Lasalgaon near Nasik is the biggest onion *mandi* in the whole of Asia. Onion is also grown in Pimpalgaon, Manmad, Yeola, Saikheda, Chandwad and Satana- all located around Nasik. All these places have marketing centres set up by NAFED. The onion produced in Nasik district is transported and distributed throughout the country. Nasik onion is not only consumed in the farthest corners of India, it is also exported to many countries. Bulk of the onions' exported from India originate from Nasik.

Given this structure, we estimate the following two equations to examine the effect of wholesale price on retail price and, the effect of market arrivals on wholesale price

$$\Delta \ln(rp_t)=\beta_0+\beta_1\Delta \ln(wp_t)+\beta_2\Delta \ln(wp_{t-1})+\beta_3\Delta \ln(wpnasik_t)+\beta_4\Delta \ln(x_t)+\varepsilon_t \text{.....(3)}$$

$$\Delta \ln(rp_t)=\beta_0+\beta_1\Delta \ln(wp_t)+\beta_2\Delta \ln(aq_t)+\beta_3\Delta \ln(wpnasik_t)+\beta_4\Delta \ln(x_t)+\varepsilon_t \text{.....(4)}$$

where $\Delta \ln(rp_t)$ and $\Delta \ln(wp_t)$ are the growth rates of retail and wholesale prices respectively. $\Delta \ln(wpnasik_t)$, $\Delta \ln(aq_t)$ and $\Delta \ln(x_t)$ denote the growth rates of Nasik market price, of market arrivals and of other explanatory variables respectively.

Effect of wholesale price on retail price

The effect of wholesale price on the retail price has been examined by using data for 21 markets, for which data for wholesale and retail prices was available. We have also included the wholesale price of Nasik as Nasik is a major nodal market for onions in the country. The data series are plotted to identify any time trend in the data. Then the series are tested for unit roots, including a time trend if observed in the plots. All the price series are found to be stationary or I(0), after including trend wherever appropriate. Therefore OLS is an inappropriate method of estimation. In the present case however, we are more interested in the relationship between the *changes* in prices rather than their levels. In other words we are interested in the first differences of the two price series (retail and wholesale). Thus, we tested Δrp_t and Δwp_t for unit roots, where Δrp_t and Δwp_t

denote retail price and wholesale price respectively. Both the series have been found to be I(0). Therefore, we used OLS on these variables. Since the original variables are in logarithmic form, the first differences denote their respective growth rates. Therefore, the final estimated equation is of the form given by equation (3).

The results are presented in Table 2.13. Considering that the regressions are of growth rates, the adjusted R^2 is quite high for most of the states. In only three states, the Adjusted R^2 falls below 0.3 showing the satisfactory performance of the model. The results show that the changes in wholesale price have a significant effect on the change in retail price. The elasticity is also quite high in about two-thirds of the markets. In only six markets the elasticity falls below 0.30. The Nasik market price shows a significant positive effect on retail prices of markets all over the country. The elasticity of the Nasik market price is also quite high – ranging from 0.24 to 0.66[3].

Effect of market arrivals on wholesale prices

A similar procedure of testing for unit roots, as in the previous sub-section, was applied. All the variables and their first differences were found to be stationary (I(0)). Therefore, a OLS in first differences has been preferred. Price at Lasalgaon market have been included as the nodal market price. All the equations show satisfactory Adjusted R^2 . The effect of Lasalgaon price is overwhelming with elasticity ranging from 0.50 (Jaipur) to 0.85 (Gondal, Gujarat) (Table 2.14). The Lasalgaon price elasticity is highly statistically significant in almost all the markets. The variable of interest, market arrivals, also shows the expected negative effect and is also statistically significant. However, the elasticity is small – ranging from -0.01 to -0.29. In 90% of the markets, the elasticity is below -0.05. The lagged dependent variable also showed significant positive effect in all the markets. Exports showed a significant positive effect in three markets – Lasalgaon, Pimplagaon and Nasik – showing that exports play a role in price formation in these nodal markets. The prices in these nodal markets, in turn, play a major role in price formation in other markets in the country.

[3] Only in one market (Surat), the Nasik price showed a negative effect, which needs further research.

Grapes

Unlike in the case of onions, we do not assume a central market for grapes. Although grapes are predominantly produced in Maharashtra and Karnataka, no market has emerged as a nodal market for grapes in the country. Therefore, the equations for grapes do not include the price in the central market. The rest of the explanatory variables are similar.

Effect of wholesale price on retail price

The wholesale price has a significant positive effect on retail price in all the markets. The Adjusted R^2 is also quite high, ranging from 0.61 (Patna) to 0.99 (Raipur) (Table 2.15). The elasticity is also high, ranging from 0.73 (Bangalore) to 1.22 (Gangtok). This shows that the retail markets for grapes closely followed the wholesale markets and the retailers' margins are not very high.

Effect of market arrivals on wholesale prices: Grapes

A similar equation, as in case of onions, has been used for grapes. All the states show decent Adjusted R^2, except Uttarakhand (Table 2.16). The market arrivals variable shows a significant positive effect on wholesale price. Although the elasticity is small, it is slightly higher than in case of onions – ranging from -0.01 to -0.15. There are quite a few states showing elasticity higher than -0.10.

Table 2.13: Effect of Wholesale Price on Retail Price: Onions

Dependent Variable: D(l_RP)

S.No	State	Market	RP(-1)	WSP	WSP(-1)	WSP_Nasik	Year Dummies	Other Variables	Adj R^2
1	AP	Hyderabad		0.25		0.35			0.50
2		Kurnool	-0.28	0.49		0.29			0.58
3	Bihar	Patna		0.30		0.37		0.25	0.62
4	Gujarat	Rajkot		0.23		0.31	1.44		0.59
5		Surat		0.87		-0.17			0.80
6	Haryana	Karnal		0.47		0.24			0.37
7	Karnarataka	Bangalore		0.62	-0.16	0.21			0.44
8		Hubli	-0.24	0.70		0.26	0.90		0.49
9	Maharashtra	Mumbai	-0.19	0.71					0.49
10		Nagpur		0.17		0.37			0.38
11		Nasik		0.52			0.48		0.39
12		Pune	-0.17	0.63			0.56		0.49
13	Madhya Pradesh	Bhopal		0.20		0.66			0.49
14	Orissa	Bhubaneshwar	-0.12	0.38		0.45			0.66
15	Rajasthan	Jaipur	-0.11	0.63			0.97		0.46
16		Jodhpur	-0.38	0.58		0.36	0.64		0.57
17	Tamilnadu	Chennai	-0.36	0.48		0.37	0.54		0.48
18	Uttar Pradesh	Lucknow		0.23		0.56	-0.74		0.65

Table 2.14: Effect of Market Arrivals on Wholesale Price: Onions

Dependent Variable: D(l_WSP)

S.No	State	Market	WSP(-1)	WSP(-2)	Lasalgaon Price	Arrival Quantity at the market	Year Dummies	Exports	Adj R^2
1	AP	Hyderabad	0.13		0.56	-0.03			0.58
2		Kurnool	0.22		0.75	-0.03	-0.73		0.70
3	Bihar	Patna	0.18		0.62	-0.02			0.67
4	Gujarat	Ahmedabad	0.13		0.67	-0.02		-0.07	0.80
5		Gondal	0.06		0.85	-0.01			0.67
6		Rajkot	-0.09	0.17	0.84	-0.06			0.59
7		Surat	0.13		0.70	0.01			0.80
9	Haryana	Karnal	0.13		0.58	-0.03			0.48
10	Karnarataka	Bangalore	0.12		0.62	-0.06	0.71		0.73
11	Maharashtra	Devala	0.40			-0.03	-0.87		0.28
12		Dhulia	0.38			-0.05	-1.01		0.27
13		Jalgaon	0.46			-0.11	-0.94		0.32
14		Kolhapur	0.11		0.64	-0.09			0.78
15		Lasalgaon	0.07			-0.19		0.6	0.34
16		Malegaon	0.40			-0.08	-0.89		0.23
17		Manmad	0.34			-0.23			0.27
18		Nasik	0.12			0.00		0.66	0.25
19		Niphad	0.28			0.00	-1.25		0.27
20		Pimplagaon	0.11			-0.18		0.54	0.34
21		Pune	0.51			-0.29			0.35
22		Rahuri	0.35			-0.08	-0.93		0.31
23		Shrirampur	0.39			0.05	-0.99		0.34
24		Sinnar	0.31			-0.04	-0.75		0.18
25		Solapur	0.42			-0.06	-0.64		0.30
26		Yeola	0.36			-0.10	-0.93		0.25
27	Madhya Pradesh	Indore	0.08		0.77	-0.03	-0.46		0.73
28	Orissa	Bhubaneshwar	0.19		0.53	0.02	-0.40		0.70
29	Rajasthan	Jaipur	0.21		0.60	-0.01	0.23		0.61
30	Tamilnadu	Chennai	0.19		0.50	0.01	-0.44		0.72
31	Uttar Pradesh	Kanpur	0.25		0.49	-0.05			0.56
32		Lucknow	0.20		0.57	0.00			0.53

Table 2.15: Effect of Wholesale Price on Retail Price: Grapes

Dependent Variable: D(l_RP)

S.No	State	Market	WSP	Year Dummy1	Year Dummy2	Adj R^2
1	AP	Hyderabad	0.98			0.88
2	Assam	Gauhati	0.81	4.43		0.96
3	Bihar	Patna	0.68			0.61
4	Punjab	Chandigarh	0.81			0.94
5	Chattisgarh	Raipur	0.67	4.77		0.99
6	Delhi	Delhi	0.75			0.68
7	Gujarat	State	0.84			0.71
8	HP	Shimla	0.87			0.91
9	Jharkand	Ranchi	0.79			0.94
10	J&K	State	0.90	0.21		0.89
11	Kerala	Trivandrum	0.92	-1.50		0.92
12	Karnataka	Bangalore	0.73	0.47	-0.29	0.95
13	Maharashtra	State	0.35	-0.11	0.60	0.47
14	Madhya Pradesh	Bhopal	0.93			0.96
15	Orissa	Bhubaneshwar	0.92			0.84
16	Rajasthan	Jaipur	0.89			0.90
17	Sikkim	Gangtok	1.22			0.85
18	Tamilnadu	Chennai	0.68			0.63
19	Uttarakhand	Dehradun	0.80			0.79
20	UP	State	1.11	-3.56	3.38	0.97
21	West Bengal	Kolkata	0.82	-0.82	0.72	0.94

Table 2.16: Effect of Market Arrivals on Wholesale Price: Grapes

Dependent Variable: D(l_WSP)

S.No	State	Market	Arrival Quantity	Year Dummy1	Year Dummy2	Adj R^2
1	AP	Hyderabad	-0.01	-1.25	1.63	0.44
2	Assam	Gauhati	-0.08	-1.14	1.33	0.43
3	Bihar	Patna	-0.15	-0.71		0.62
4	Punjab	Chandigarh	0.04	-1.50		0.31
5	Chattisgarh	Raipur	-0.09	-1.34	1.75	0.57
6	Delhi	Delhi	-0.01	-1.63	1.38	0.31
7	Gujarat	State	-0.04	-1.90		0.39
8	HP	Shimla	0.00	-1.36		0.40
9	Jharkand	Ranchi	-0.12	-1.93	1.62	0.53
10	J&K	State	-0.01	-1.00		0.34
11	Kerala	Trivandrum	-0.02	1.87	-1.69	0.56
12	Karnataka	Bangalore	-0.16			0.40
13	Maharashtra	State	0.03	1.70	-1.65	0.33
14	Madhya Pradesh	Bhopal	-0.06	-2.53	2.10	0.56
15	Orissa	Bhubaneshwar	-0.07	-2.14	2.53	0.73
16	Rajasthan	Jaipur	-0.11			0.37
17	Sikkim	Gangtok	-0.06	-1.07	1.28	0.44
18	Tamilnadu	Chennai	-0.04	-1.19	1.18	0.51
19	Uttarakhand	Dehradun	-0.02			0.02
20	UP	State	-0.01	-1.07		0.19
21	West Bengal	Kolkata	-0.11	-1.81	1.82	0.65

Chapter 3

ONION

In this chapter we present the demographic features of onion-cultivating households, economics of onion cultivation, the various channels of marketing and perceptions of various stakeholders in the onion sector. The analysis is based on primary data collected from three states – Maharashtra, Gujarat and Karnataka.

3.1 Demographic Profile and Cropping Pattern of the Study Region

3.1.1 Demographic profile of sample households

Gujarat

The total number of sample households in the state is 150 (Table 3.1(a)). The maximum number of the sample households fall in the small and medium categories. The total sample population is about 957 out of which the adult population is about 78% - adult males constitute about 40% and adult females about 38% (Table 3.1). Majority of the sample households have a literate head (89%) and in about 35% of the sample households the head of the household has completed 'high school' and in 21% of the households they have attained even higher level of education (Table 3.2). Therefore, the level of education in Gujarat can be said to be satisfactory. Majority of the households belong to the general category (79%) and about 20% of the households belong to OBC category (Table 3.3). The percentage of SC and ST households is only 1% in the sample.

Maharashtra

The total number of sample households in the state is 150 (Table 3.1(a)). An overwhelming proportion of sample households (75%) belong to the small farmer category. The total sample population in the state is about 979 out of which adult population is about 70% - adult males and adult females constituting about 35% each (Table 3.1). 85% of the sample households have a literate head and about 50% have educational attainments higher than 'high school' (Table 3.2). Majority of the households belong to the general category (63%) and the percentage of OBC households is slightly higher than Gujarat - about 34% (Table 3.3). The percentage of SC and ST households is about 1% and 3%, respectively.

Karnataka

The total number of sample households in the state is 302 for onions and grapes combined. About 35% of the sample households belong to the small farmer category, followed by marginal and large farmers – about 23% each. The adult population is about 76% - adult males and adult females constituting about 40% and 36% respectively (Table 3.1). In Karnataka also the education profile of the sample households is quite satisfactory, with 83% of the sample households having a literate head and about 58% having educational attainment of high school or above (Table 3.2). As in the other two states, majority of the households belong to the general category (70%) but the percentage of OBC households is much lower than Maharashtra- about 19% (Table 3.3). The percentage of SC and ST households is slightly higher in this state - about 5% and 7% respectively.

Table 3.1(a): No of sample households in various land-holding categories: Onion

Size of the Landholding	Gujarat		Maharashtra		Karnataka	
	Sample households	% to Total	Sample households	% to Total	Sample households	% to Total
Marginal	16	11			19	13
Small	77	51	113	75	52	35
Medium	39	26	25	17	29	19
Large	18	12	12	8	50	33
Total	150	100	150	100	150	100

Table 3.1: Demographic profile of the sample households

Farmer class	Total Population	Percentage Distribution (%)				
		Adults			Children	Total
		Males	Females	Total		
Gujarat						
Marginal	95	40.0	33.7	73.7	26.3	100
Small	433	41.8	37.4	79.2	20.8	100
Medium	239	38.5	39.7	78.2	21.8	100
Large	190	40.0	37.4	77.4	22.6	100
Total	957	40.4	37.6	78.1	21.9	100
Maharashtra						
Marginal						
Small	703	34.7	35.0	69.7	30.3	100
Medium	170	34.1	36.5	70.6	29.4	100
Large	106	34.9	33.0	67.9	32.1	100
Total	979	34.6	35.0	69.7	30.3	100
Karnataka						
Marginal		41.4	36.7	78.1	21.9	100
Small		41.4	36.5	77.9	22.1	100
Medium		38.8	34.5	73.3	26.7	100
Large		38.0	34.6	72.6	27.4	100
Total		39.9	35.7	75.6	24.4	100

Table 3.2: Education level of the Head of the sample households

Farmer class	Total No. of Households	Percentage Distribution (%)					
		Illiterates	Primary	Secondary	High School	Higher	Total
Gujarat							
Marginal	16	12.5	18.8	18.8	25.0	25.0	100
Small	77	11.7	13.0	14.3	35.1	26.0	100
Medium	39	10.3	20.5	17.9	35.9	15.4	100
Large	18	5.6	22.2	33.3	16.7	22.2	100
Total	150	10.7	16.7	17.3	34.7	20.7	100
Maharashtra							
Marginal							
Small	113	14.2	16.8	22.1	31.9	15.0	100
Medium	25	16.0	8.0	12.0	36.0	28.0	100
Large	12	16.7	8.3	25.0	33.3	16.7	100
Total	150	14.7	14.7	20.7	32.7	17.3	100
Karnataka*							
Marginal	70	15.7	21.4	15.7	25.7	21.4	100
Small	107	21.5	11.2	16.8	28.0	22.4	100
Medium	54	20.4	5.6	11.1	31.5	31.5	100
Large	71	7.0	8.5	11.3	35.2	38.0	100
Total	302	16.6	11.9	14.2	29.8	27.5	100
*Note: *For Karnataka, numbers of households are for both – onion and grapes, together.*							

Table 3.3: Caste profile of the sample households

Farmer class	Total No. of Households	Percentage Distribution (%)				
		Scheduled Caste	Scheduled Tribe	Other Backward Classes	Others	Total
Gujarat						
Marginal	16			25.0	75.0	100
Small	77	1.3		20.8	77.9	100
Medium	39			20.5	79.5	100
Large	18			11.1	88.9	100
Total	150	0.7		20.0	79.3	100
Maharashtra						
Marginal						
Small	113	0.9	1.8	36.3	61.1	100
Medium	25		8.0	24.0	68.0	100
Large	12			33.3	66.7	100
Total	150	0.7	2.7	34.0	62.7	100
Karnataka*						
Marginal	70	10.0	8.6	12.9	68.6	100
Small	107	3.7	8.4	20.6	67.3	100
Medium	54	3.7	1.9	27.8	66.7	100
Large	71	1.4	5.6	16.9	76.1	100
Total	302	4.6	6.6	19.2	69.5	100
*Note: *For Karnataka, numbers of households are for both – onion and grapes, together.*						

3.1.2 Area and Irrigation Pattern of the sample households

In Gujarat, the total area under cultivation, among the onion-growing households of the sample, is about 417 ha, of which 99% is irrigated (Table 3.4). The major source of irrigation is tubewell, providing irrigation to about 95% of the area. Canals provide irrigation only to about 5% of the area. The total area under cultivation in Maharashtra is 282 ha. About 91% of the area is irrigated and 9% is un-irrigated. Wells and other source is the only form of irrigation in the state. In Karnataka, the total area under cultivation is about 1009 ha. Only 46% of this area is irrigated and 53% is un-irrigated. Tubewell is the only source of irrigation in the state.

Table 3.4: Irrigation Details of the sample households

Farmer class	Irrigated Area (in ha.)			Percentage Distribution by Source (%)						
	Irrigated	Un-Irrigated	Total	Canal	Tubewell	Tank	Others	Irrigated	Un-Irrigated	Total
Gujarat										
Marginal	12.3	0.0	12.3	0.0	100.0	0.0	0.0	100.0	0.0	100
Small	124.2	0.0	124.2	2.2	97.8	0.0	0.0	100.0	0.0	100
Medium	117.0	0.8	117.8	6.0	94.0	0.0	0.0	99.3	0.7	100
Large	159.8	2.4	162.2	7.3	92.7	0.0	0.0	98.5	1.5	100
Total	413.3	3.2	416.5	5.2	94.8	0.0	0.0	99.2	0.8	100
Maharashtra										
Marginal										
Small	144.2	5.5	149.8				96.3	96.3	3.7	100
Medium	60.4	6.6	67.0				90.1	90.1	9.9	100
Large	53.3	12.4	65.7				81.2	81.2	18.8	100
Total	257.9	24.5	282.4				91.3	91.3	8.7	100
Karnataka										
Marginal	43.5	10.1	53.6	0.0	81.2	0.0	0.0	81.2	18.8	100
Small	122.6	48.1	170.6	0.0	71.8	0.0	0.0	71.8	28.2	100
Medium	97.8	68.2	166.0	0.0	58.9	0.0	0.0	58.9	41.1	100
Large	207.5	411.3	618.8	0.2	33.3	0.0	0.0	33.5	66.5	100
Total	471.3	537.7	1009.0	0.1	46.6	0.0	0.0	46.7	53.3	100

3.1.3 Cropping Pattern of the sample households

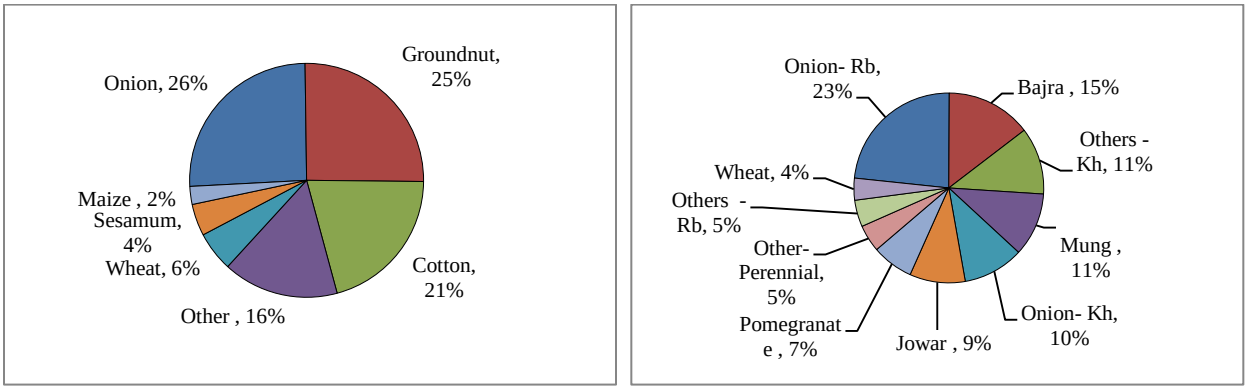
The sample districts in all the three states are predominantly onion growing districts. In Gujarat, about 26% of the area in the sample region is under onion cultivation (Figure 3.1(i) & Table 3.5(i)). About 25% is under groundnut, 20% is under cotton and the remaining area under other crops. In Maharashtra, onion is the major crop in the sample region, occupying 34% of the total area (in both seasons combined) (Figure 3.1(ii) & Table 3.5(ii)). In Karnataka again, onion and grapes are the major crops in the sample region, occupying about 50% of the total area (25% each crop) (Figure 3.1(iii) & Table 3.5(iii)).

In Gujarat, major share of area under onion crop is with the small, medium and large farmers - 37%, 27% and 31% respectively (Table 3.6 & Figure 3.2). Marginal farmers have a very minimal

share of 5% in the onion area. In Maharashtra too, the situation is similar. There are no marginal farmers in our sample cultivating onion. Major share belongs to the small farmers (67%). In Karnataka, the situation is very different. Here, the share of area under onions increases with the landholding size. Marginal farmers have the least share (5%), followed by small (18%), medium (17%) and large (60%).

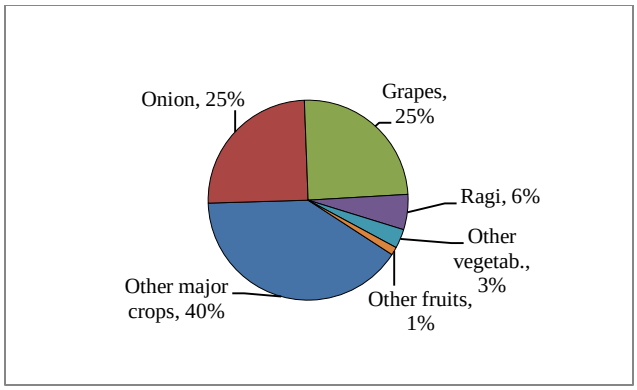
The major varieties of onion cultivated in Gujarat are Nashik Red - 36% out of a total area of 172 ha, red patti (32%), local (13%) and Nashik white (12%) (Table 3.7(i)). In Maharashtra, out of a total onion area of 150 ha, 48% of the area is under fursungi, 27% under Nashik lal and 15% under panchganga varieties (Table 3.8(i)). Nashik lal and panchganga varieties are mainly grown in the kharif season whereas fursungi and Nashik lal are grown in rabi season. In Karnataka, the major varieties grown are red onion, rose onion and chincholi. Red onion is the predominant variety occupying about 80% of the total onion area in the sample region (Table 3.9(i)). This is followed by rose onion, which occupies about 19% of the area. Chincholi occupies only 1% of the total onion area in the sample region but is mainly grown by the marginal farmers - occupying about 18% of the area cultivated by this size group. Table 3.7(ii), Table 3.8(ii) and Table 3.9(ii) indicate the season-wise area under the study crop and the percentage distribution under different farmer classes for Gujarat, Maharashtra and Karnataka, respectively.

Figure 3.1: Cropping pattern of the sample households



(i): Gujarat

(ii): Maharashtra



(iii): Karnataka

Table 3.5 (i): Cropping pattern of the sample households: Gujarat

Farmer class	Total Area (in ha)	Percentage Distribution (%)							
		Cotton	Groundnut	Maize	Wheat	Sesamum	Onion	Other	Total
Marginal	25.8	17.7	15.2	9.3	2.5	2.5	30.7	22.3	100
Small	218.4	15.8	24.0	3.6	5.8	3.5	29.0	18.3	100
Medium	184.0	26.5	23.7	2.3	4.3	2.9	26.0	14.4	100
Large	245.7	20.8	28.9	1.0	6.4	6.6	21.8	14.6	100
Total	673.9	20.6	25.4	2.5	5.5	4.4	25.6	16.0	100

Table 3.5 (ii): Cropping pattern of the sample households: Maharashtra

Farmer class	Total Area (in ha)	Percentage Distribution (%)													
		Kharif Season					Rabi Season					Perennial Crops			Total
		Onion	Bajra	Mung	Others	Total	Onion	Jowar	Wheat	Others	Total	Pomegranate	Others	Total	
Marginal															
Small	268.4	12.3	15.7	10.8	8.4	47.2	27.7	7.6	3.3	5.0	43.6	6.7	2.6	9.2	100
Medium	104.6	9.9	12.2	11.1	13.3	46.5	17.2	10.5	4.2	4.6	36.5	10.5	6.5	17.0	100
Large	103.2	5.7	13.9	10.6	17.4	47.6	18.6	13.3	4.5	3.3	39.7	4.7	8.0	12.7	100
Total	476.2	10.4	14.5	10.8	11.4	47.1	23.4	9.5	3.7	4.6	41.2	7.1	4.6	11.7	100

Table 3.5 (iii): Cropping pattern of the sample households: Karnataka

Farmer class	Total Area (in ha)	Percentage Distribution (%)						
		Onion	Grapes	Ragi	Other major crops	Other vegetables	Other fruits	Total
Marginal	143.1	9.1	52.9	16.9	9.4	4.9	6.8	100
Small	231.9	23.1	39.4	12.0	20.8	4.5	0.3	100
Medium	181.9	27.0	32.0	5.5	32.3	3.1	0.0	100
Large	616.6	28.6	10.4	0.8	57.3	2.1	0.9	100
Total	1173.6	24.9	24.7	5.7	40.4	3.1	1.3	100

Table 3.6: Percentage Distribution of Area under Onions among the sample households

Farmer class	Gujarat	Maharashtra	Karnataka
Marginal	4.6		4.5
Small	36.7	66.8	18.1
Medium	27.7	17.6	16.8
Large	31.0	15.6	60.0
Total	100.0	100.0	100.0

Figure 3.2: Area under Onions: Percentage share of different size-groups

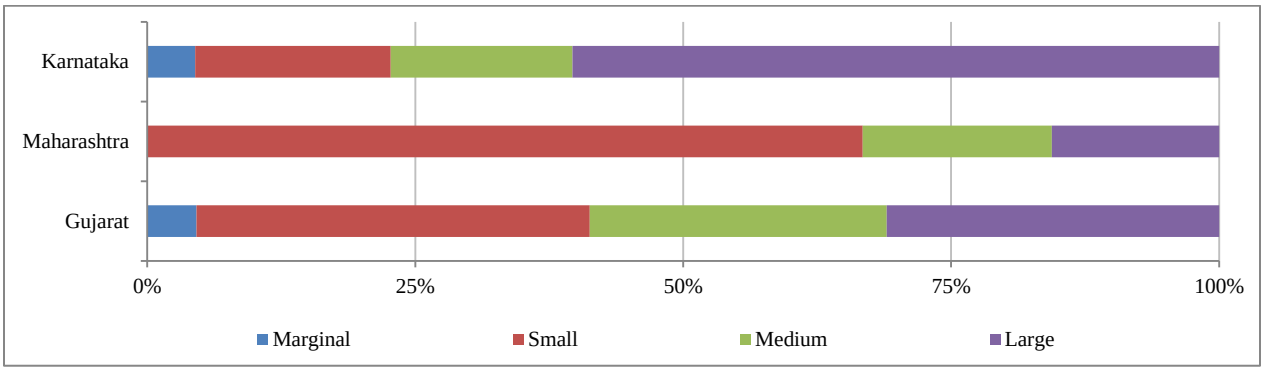


Table 3.7 (i): Variety-wise area under onions: Gujarat

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)						
		Nashik Red	Pillipatti/Yellow	Red Patti	Local	NHRDF	NashikWhite	Total Area
Marginal	7.9	38.4	24.2	20.2	17.2			100
Small	63.4	29.8	3.8	39.8	23.1		3.5	100
Medium	47.8	24.4	5.4	45.8	11.4		13.0	100
Large	53.5	53.1	2.4	13.2	2.7	5.4	23.3	100
Total	172.6	35.9	4.7	32.3	13.3	1.7	12.1	100

Table 3.7 (ii): Season-wise area under onions: Gujarat

Farmer class	Area (in Ha.)				Percentage Distribution by Season (%)			
	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
Marginal	3.8	3.3	0.8	7.9	48.5	41.4	10.1	100
Small	21.7	41.7		63.4	34.2	65.8		100
Medium	10.0	37.8		47.8	20.9	79.1		100
Large	7.6	45.9		53.5	14.2	85.8		100
Total	43.1	128.7	0.8	172.6	25.0	74.6	0.5	100

Table 3.8 (i): Variety-wise area under onions: Maharashtra

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)				
		Fursungi	Nashik Lal	Panchganga	Other Varieties	Total
Marginal						
Small	107.4	44.4	32.7	9.7	13.3	100
Medium	28.3	51.4	23.6	16.4	8.5	100
Large	25.1	57.3	3.2	33.1	6.5	100
Total	160.8	47.6	26.5	14.5	11.4	100

Note: Other varieties include - N.53, Sinnor Ghavti, Mahabij, Halwa, Lasalgaon, Malav, Chandwad, Prema, Bhagwa, Double Pati, Baju 258 and Lonand.

Table 3.8 (ii): Season-wise area under onions: Maharashtra

Farmer class	Area (in Ha.)			Percentage Distribution by Season (%)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
Marginal						
Small	33.1	74.2	107.4	30.8	69.2	100
Medium	10.3	18.0	28.3	36.4	63.6	100
Large	5.9	19.2	25.1	23.4	76.6	100
Total	49.3	111.5	160.8	30.7	69.3	100

Table 3.9 (i): Variety-wise area under onions: Karnataka

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)			
		Red onion	Rose onion	Chincholi	Total
Marginal	13.0	50.5	30.8	18.7	100
Small	53.0	50.8	49.2		100
Medium	49.2	76.5	23.5		100
Large	176.9	92.4	8.5		100
Total	292.1	79.8	19.4	0.8	100

Table 3.9 (ii): Season-wise area under onions: Karnataka

Farmer class	Area (in Ha.)				Percentage Distribution by Season (%)			
	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
Marginal	11.1		1.9	13.0	85.4		14.6	100
Small	39.8	1.6	11.6	53.0	75.1	3.0	21.9	100
Medium	40.5	3.6	5.1	49.2	82.3	7.3	10.4	100
Large	164.0	2.8	10.1	176.9	92.7	1.6	5.7	100
Total	255.3	8.1	28.7	292.1	87.4	2.8	9.8	100

3.2 Economics of the Study Crop

3.2.1 Production, Consumption and Other Details

Gujarat

The major varieties grown in the state are local, Nashik Red/ N-53, Pilli Patti/ Yellow, Red Patti, Nashik White and NHRDF/ NAFED. The total onion production from all the varieties together was 41396 quintals in the sample region of state, of which nearly 30% is from Nashik Red/ N-53 and Red Patti varieties each and nearly 15% is from Local and Nashik White variety each. Pilli Patti/ Yellow has a share of 5% in overall onion production and NHRDF/ NAFED has about 1% (Table 3.10).

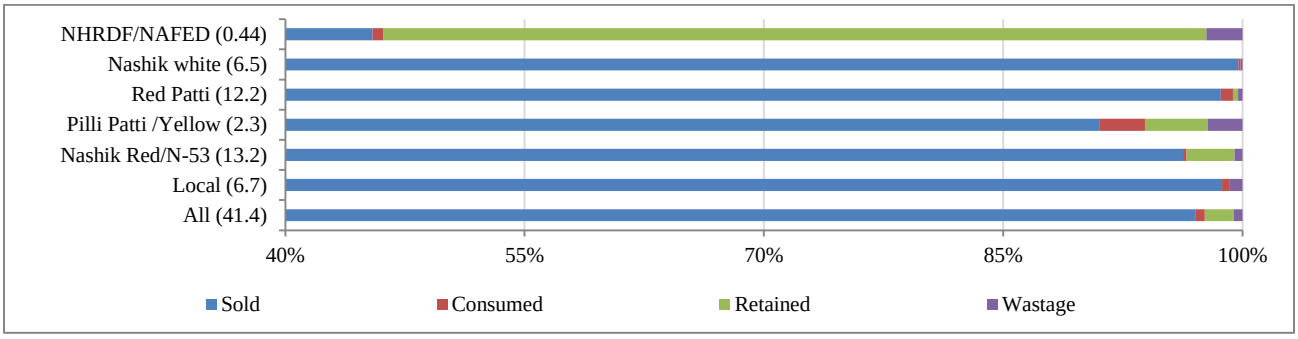
Red Patti and Pilli Patti/ Yellow are the varieties that are most consumed whereas Nashik Red/ N-53 variety is mostly stocked for future use (Table 3.11). The marginal farmer class consumes most of onion production and large farmer class stocks it most (both, nearly 3 %).This pattern is evident

across all the varieties of onion produced in the study region, except marginally produced NHRDF/ NAFED variety by large farmer class and of which nearly half is stocked and half is sold to the market. Overall, home consumption is very minimal (less than 1 %) and nearly 97 % is sold to the market, and about 2 % of total production is retained for future use (Figure 3.3). The average selling price received, over all varieties, is Rs. 871 per quintal, which varies from Rs. 784 per quintal for medium class farmers to Rs. 935 per quintal for large class farmers.

Table 3.10: Variety wise production and % share -Onion

Gujarat			Maharashtra			Karnataka		
Variety	Production	% Share	Variety	Production	% Share	Variety	Production	% Share
Local	6686	16.2	Nasik Lal	5992	22.6	Red	16707	76.6
Nashik Red/ N-53	13241	32.0	Panchganga Kharif	2187	8.3	Rose	5039	23.1
Pilli Patti/ Yellow	2285	5.5	Fursungi Rabi	13963	52.7	Chincholi	70	0.3
Red Patti	12213	29.5						
Nashik White	6530	15.8						
NHRDF/ NAFED	440	1.1						
Overall	41396	100.0	Overall	26501	100.0	Overall	21816	100.0

Figure 3.3: Production, Consumption and Other Details: % shares in production: Gujarat



Note: Figure in parenthesis indicates total production in 100 tones.

Table 3.11: Production, consumption and other details – Onion - Gujarat

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal	7.9	1791	60		3	1727	914
	Small	63.4	15097	99	251	166	14581	852
	Medium	47.8	12002	59	90	32	11821	784
	Large	53.5	12506	11	417	21	12057	935
	Total	172.6	41396	229	758	223	40187	871
Variety wise								
Local	Marginal	1.4	191.0				191	1117
	Small	14.6	4303.4	29	0.2	55	4219	718
	Medium	5.4	1752			2	1750	700
	Large	1.4	440				440	1063
	Total	22.9	6686	29		57	6600	775
Nashik Red /N-53	Marginal	3.0	675	0.4		0	674	1125
	Small	18.9	4249	20	210	41	3978	1002
	Medium	11.7	2771	2		13	2756	925
	Large	28.4	5546	7	190	11	5339	1012
	Total	62.0	13241	29	400	65	12747	994
Pilli Patti /Yellow	Marginal	1.9	605	60			545	933
	Small	2.4	533	0.4		42	491	866
	Medium	2.6	847	4	90	8	745	895
	Large	1.3	300	1			299	613
	Total	8.2	2285	66	90	50	2080	860
Red Patti	Marginal	1.6	320			3	317	481
	Small	25.2	5401	41	40	25	5295	799
	Medium	21.9	5312	53		5	5254	752
	Large	7.0	1180				1180	1050
	Total	55.8	12213	94	40	33	12046	777
Nashik white	Marginal							
	Small	2.2	610	8		4	598	875
	Medium	6.2	1320			4	1316	648
	Large	12.5	4600				4600	1000
	Total	21.0	6530	8		8	6514	777
NHRDF/NAFED	Marginal							
	Small							
	Medium							
	Large	2.9	440	3	227	10	200	875
	Total	2.9	440	3	227	10	200	875

Maharashtra

Nasik Lal is the major variety of onion grown in study region in both seasons while among other major varieties Panchganga is grown mainly during the kharif season and Fursungi in the rabi season. Some other varieties of onion are also grown in the study region. The total onion production from all the varieties together in kharif season was 5823 quintals and in rabi season was 20678 quintals in the study regions of state (Table 3.12). Nearly 2% of the total onion production is used for consumption and for future stock, nearly 96% is sold and about 2 % is wasted (Figure 3.4). Fursungi variety has a share of about 53% in the total production while Nashil

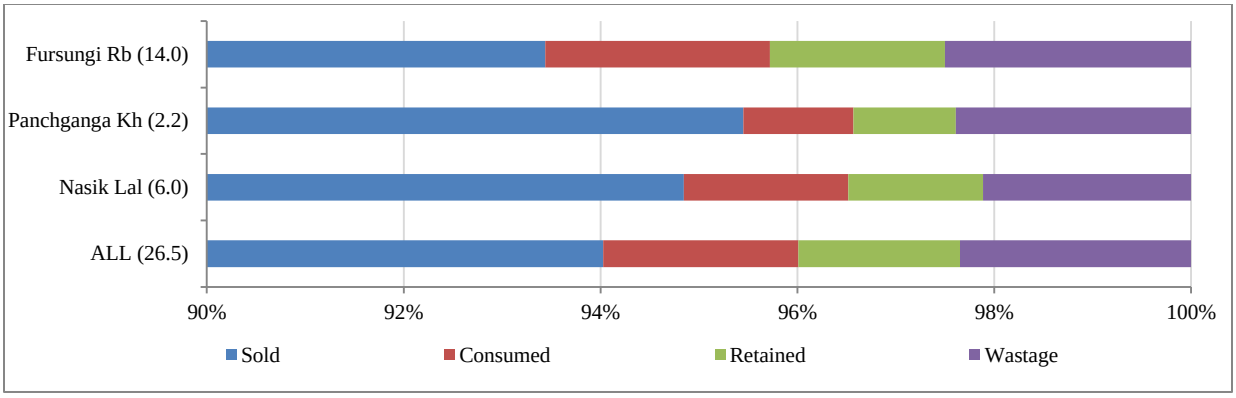
Lal and Pachganga varieties have shares of 23% and 8% respectively (Table 3.10). The remaining 16% of the production comes from various other varieties. The average selling price is comparatively higher in rabi season. Farmer's receive Rs. 1051 per quintal in rabi season whereas in kharif it is about Rs. 924 per quintal. The quantity sold in the rabi season is also almost four times that sold in the kharif season.

Table 3.12: Production, consumption and other details – Onion -Maharashtra

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal							
	Small	107.3	17368	350	265	452	16302	984
	Medium	28.3	4649	83	73	89	4404	1010
	Large	25.1	4484	94	98	81	4211	965
	Total	160.8	26501	526	435	622	24917	987
Overall Kharif	Marginal							
	Small	33.1	3835	48	40	94	3652	925
	Medium	10.3	1268	16	14	17	1221	945
	Large	5.9	720	9	8	18	685	850
	Total	49.3	5823	73	62	129	5558	924
Overall Rabi	Marginal							
	Small	74.2	13533	301	224	357	12650	1043
	Medium	18.0	3381	66	60	72	3183	1075
	Large	19.2	3764	85	90	63	3526	1080
	Total	111.5	20678	452	374	493	19359	1051
Variety -wise								
Nasik Lal	Marginal							
	Small	35.1	4879	83	67	102	4627	997
	Medium	6.7	973	15	11	21	926	1052
	Large	0.8	140	3	3	4	130	1268
	Total	42.6	5992	100	82	127	5683	1007
Panchganga Kh	Marginal							
	Small	8.7	1064	12	11	26	1016	908
	Medium	4.7	579	6	6	11	556	953
	Large	4.3	544	7	6	16	516	842
	Total	17.6	2187	25	23	52	2087	907
Fursungi Rb	Marginal							
	Small	44.7	8364	201	128	246	7789	1024
	Medium	14.6	2755	56	51	58	2591	1063
	Large	14.4	2844	62	70	45	2667	1048
	Total	73.6	13963	319	249	349	13047	1034

Note: Sum of variety is less than overall sum as some minor varieties are also added in overall category

Figure 3.4: Production, Consumption and Other Details: % shares in production: Maharashtra



Note: Figure in parenthesis indicates total production in 100 tones. All variety production also includes some other minor variety's production

Karnataka

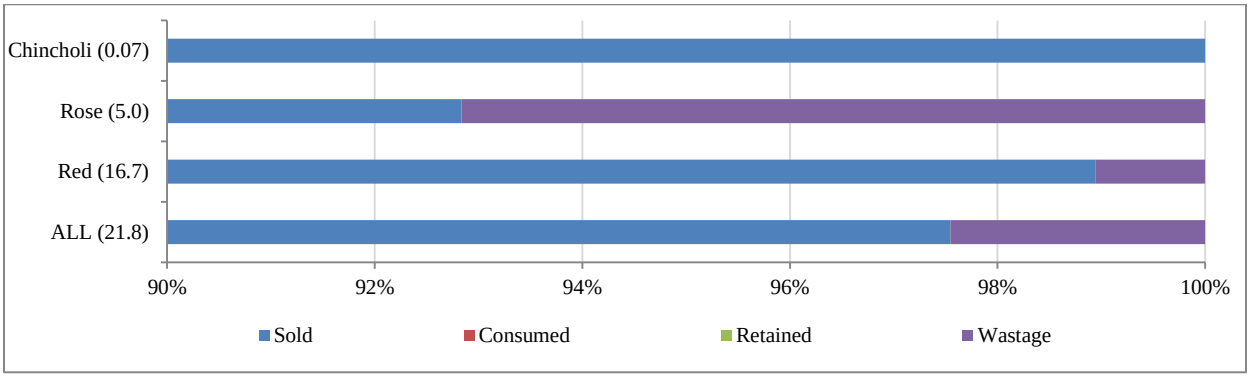
Red, Rose and Chincholi are the major varieties of onion grown in Karnataka. The total onion production from all the varieties together was 21816 quintals, of which a major share (nearly 77%) is of Red variety and rest, nearly 23% is of Rose variety (Table 3.10). Production under Chincholi variety is minimal as the area under the variety is less than 1%. About 98% of the production is sold and the rest gets wasted (Figure 3.5). None of the farmers in any category in the study regions stores onion for consumption and future stock purpose.

Nearly 58% of the production is by large farmers followed by small and medium farmers. Out of the total quantity sold (21377 quintals), red variety onion constitutes about 78 % and the average price received for this variety is Rs. 2681 per quintal (Table 3.13)). The share and the price of this variety is quite high compared to Rose variety, which constitutes about 22% of the production and the farmer receives just about Rs. 1080 per quintal on selling. However, the Productivity of Rose variety is higher compared to Red and Chincholi varieties. Overall the average selling price is Rs. 1941 per quintal. Chincholi variety is produced in very little quantity, only by marginal farmers, for sale in the market.

Table 3.13: Production, consumption and other details – Onion - Karnataka

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal	12.5	951			16	936	1919
	Small	44.7	4732			151	4581	1796
	Medium	43.7	3557			158	3399	1996
	Large	166.4	12575			213	12362	2052
	Total	267.3	21816			538	21377	1941
Variety -wise								
Red	Marginal	6.6	563			1	562	2342
	Small	27.7	2674			23	2651	2448
	Medium	34.8	2295			45	2250	3009
	Large	158.3	11175			108	11067	2924
	Total	227.4	16707			177	16629	2681
Rose	Marginal	3.5	318			15	304	1014
	Small	17.0	2058			128	1930	1144
	Medium	8.9	1262			113	1149	982
	Large	8.1	1400			105	1295	1180
	Total	37.5	5039			361	4678	1080
Chincholi	Marginal	2.4	70				70	2400
	Small							
	Medium							
	Large							
	Total	2.4	70				70	2400

Figure 3.5: Production, Consumption and Other Details: % shares in production: Karnataka



Note: Figure in parenthesis indicates total production in 100 tones.

3.2.2 Cost of cultivation

Gujarat

The total cost of onion cultivation in the state is nearly 138291Rs/ha, of which nearly 86% is the input cost and rest is incurred on storage, transportation and marketing or STM (Figure 3.6 (i) & Figure 3.6 (ii)). Out of the total costs, majority is incurred on labour - about 45% is incurred on labour (manual). This is followed by seeds (12%); manure and fertilizer (10%); irrigation,

machinery hiring, cost of pesticides & weedicides, transportation and other costs (nearly 6 % each) (Figure 3.6(iii)). All the categories of farmers, in both the seasons, show similar cost pattern except that storage costs are lower for large farmers.

Maharashtra

The total cost of onion cultivation in the state is nearly 100982 Rs/ha. About 77% of the total cost is incurred on the inputs and rest on storage, transportation and marketing (STM) (Figure 3.7 (i) & Figure 3.7 (ii)). Out of the total costs, labour - human plus bullock labour (21%); manure and fertilizer (19%); machinery hiring (13%) and seeds (9%) account for nearly 62%. Irrigation and pesticides/weedicides, each account for about 7% in the overall input cost (Figure 3.7 (iii)). Marketing and transportation account for another 8% and 6% respectively. The cost structure is more or less similar across varieties and farmer categories in both the seasons. The difference between Gujarat and Maharashtra is mainly is in terms of labour cost. In Gujarat the share of the labour cost (45%) was more than double than that in Maharashtra (21%).

Karnataka

In Karnataka the total cost of onion cultivation is nearly 106398 Rs / ha, of which nearly 95% is the input cost and the rest is incurred for storage, transportation and marketing costs (STM) (Figure 3.8 (i) & Figure 3.8 (ii)). Out of the total input cost, hired labour (bullock and manual, together) accounts for about 33% and manure and fertilizer cost for about 28%, followed by seed (9%), pesticides/weedicides (6%) and irrigation charges (4%) (Figure 3.8 (iii). Out of the total STM cost, other miscellaneous cost has maximum share (nearly 5%), followed by transportation, marketing and other charges such as market fees, cess, etc. (1%). It is interesting that no expenses are reported on storage by farmers in the study region. All farmer categories share similar cost structure except medium farmers, who show slightly higher share of 11% on STM expenses.

Figure 3.6 (i): Per hectare cost of cultivation of all varieties: Gujarat

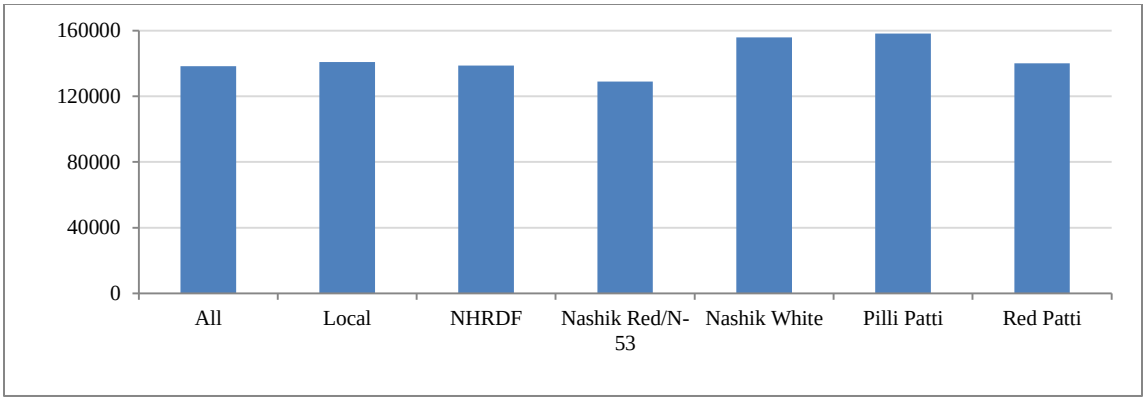


Figure 3.6 (ii): Share of input and STM costs: Gujarat

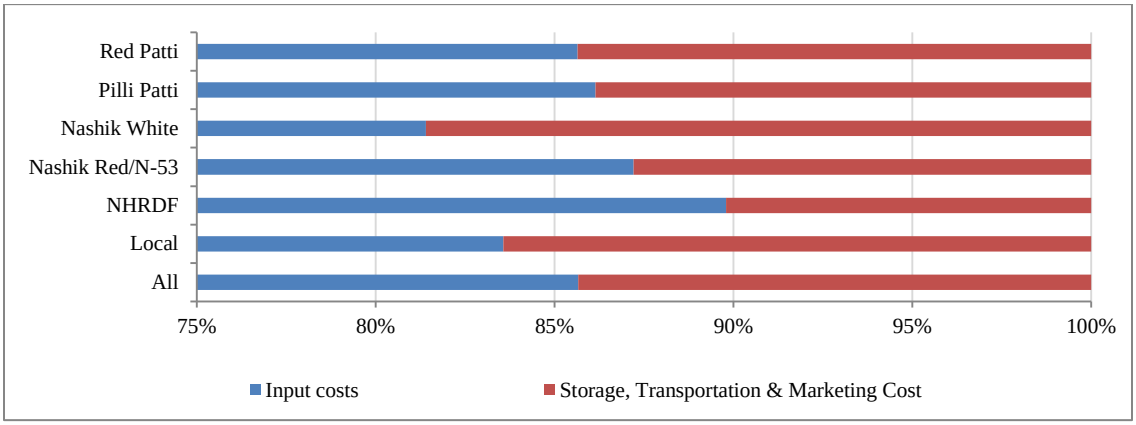


Figure 3.6 (iii): Share of different costs in total cost: Gujarat

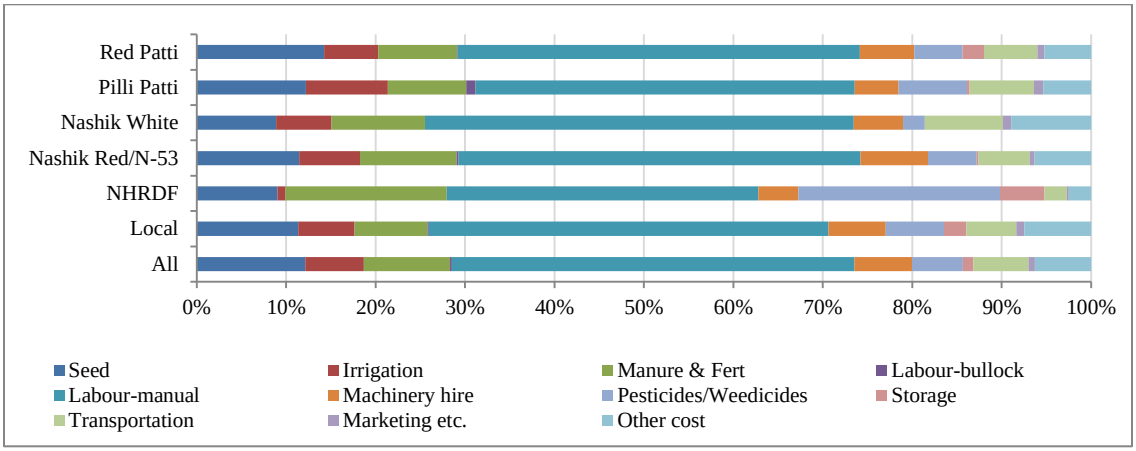


Figure 3.7 (i): Per hectare cost of cultivation of all varieties: Maharashtra

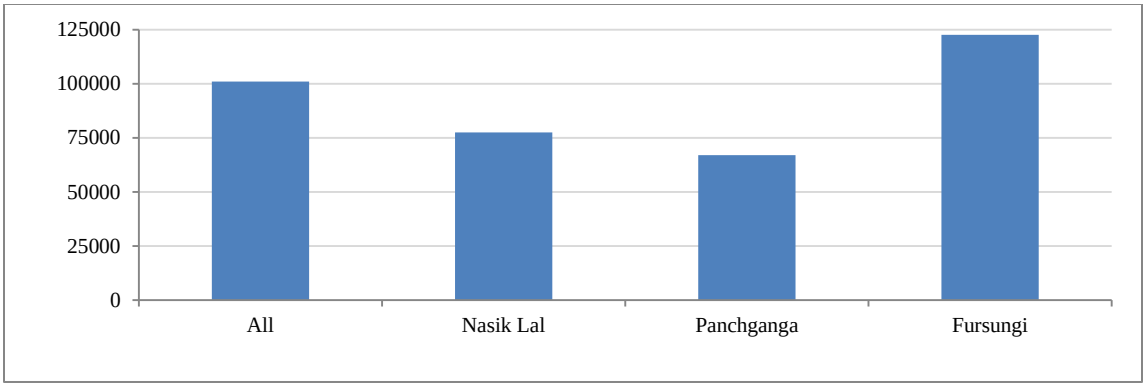


Figure 3.7 (ii): Share of input and STM costs: Maharashtra

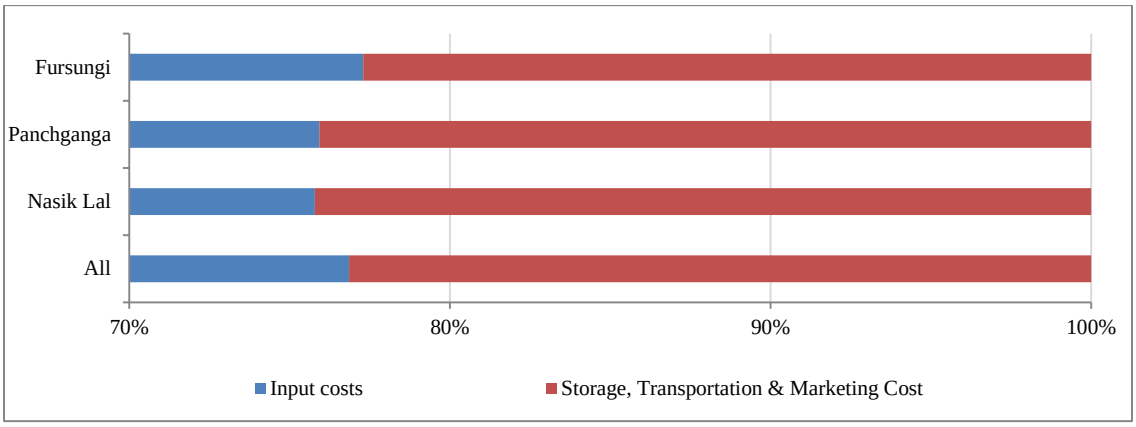


Figure 3.7 (iii): Share of different costs in total cost: Maharashtra

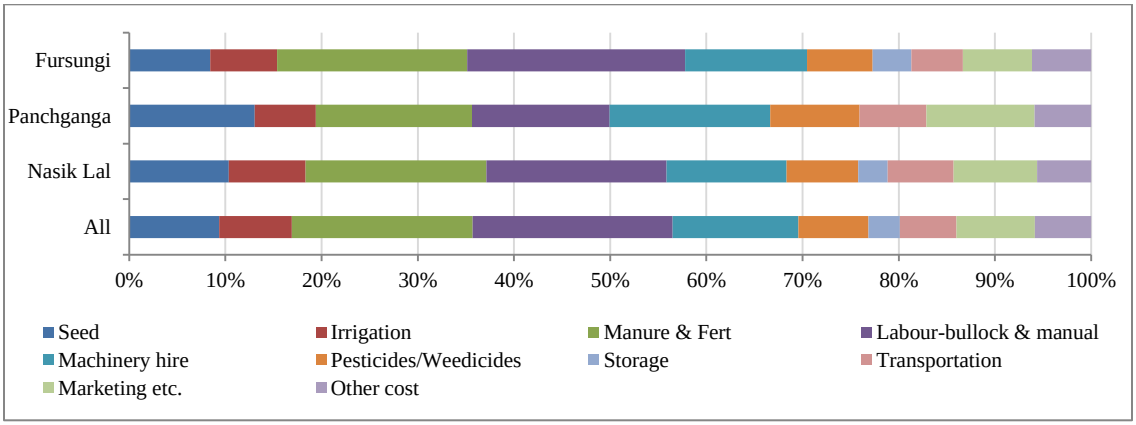


Figure 3.8 (i): Per hectare cost of cultivation of all varieties: Karnataka

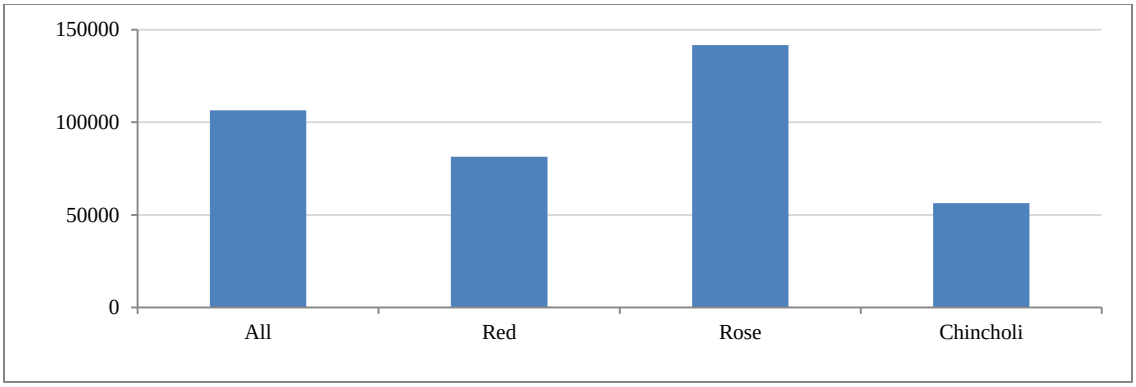


Figure 3.8 (ii): Share of input and STM costs: Karnataka

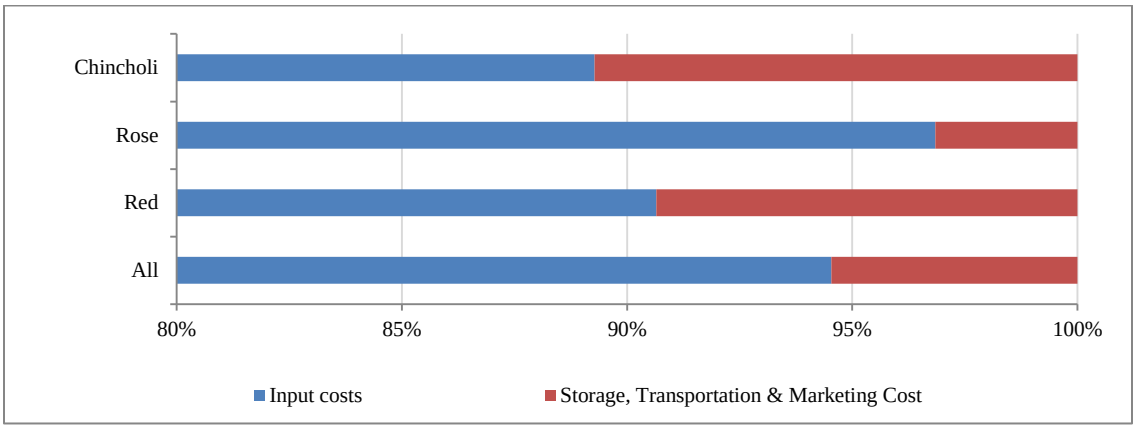
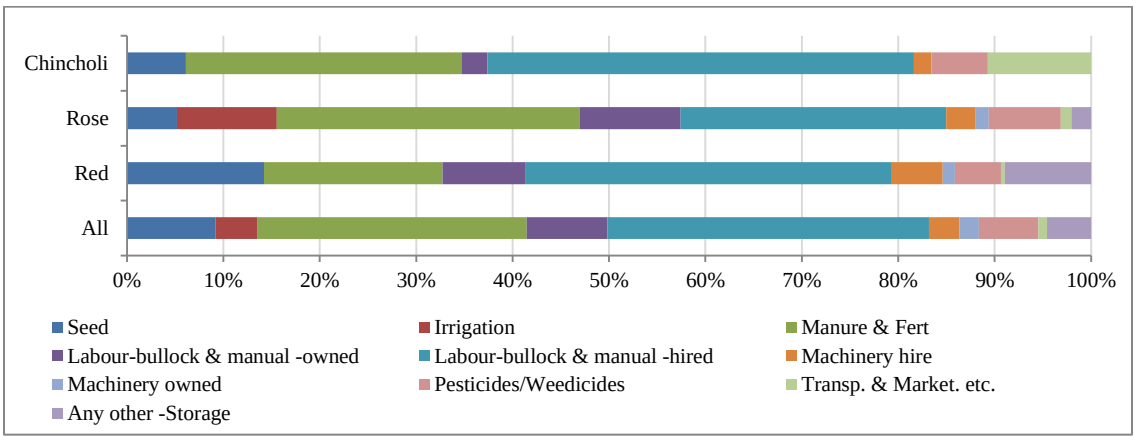


Figure 3.8 (iii): Share of different costs in total cost: Karnataka



3.2.3 Profitability

Gujarat

The gross and net returns per hectare are 218898 Rs/ha and 72033 Rs/ha respectively (Table 3.14 (i)). The corresponding figures per quintal are 912 and 300 respectively. One noticeable fact is that the gross and net returns per hectare are highest for marginal farmers - 241393 Rs/ha and 96647 Rs/ha respectively. The returns per quintal are also highest for marginal farmers - 1066 Rs/qtl and 427 Rs/qtl respectively, showing that even after taking the productivity aspect into consideration, the relative position of marginal farmers is much better as compared to other size-groups. The quantum of marketed surplus also supports this inference. The value of the marketed surplus (per hectare) of the marginal farmers is Rs 225253, which is way above the other size groups.

The gross and net returns per hectare across different varieties are highest for Nashik White variety (Rs 312231 and Rs 136088 respectively), followed by Pilli Patti, Local variety and Nasik Red/N-53 and lowest for NHRDF variety, which is yielding negative returns (Table 3.14 (ii)). Marketed surplus per hectare is also following similar pattern across varieties. The gross returns per quintal are also highest for Nasik Red/N-53 and Nasik White varieties followed by Pilli patti and Red patti varieties.

Maharashtra

The gross and net returns are slightly lower than Gujarat. The gross returns are 169011 Rs/ha and the net returns are 68030 Rs/ha (Table 3.15 (i)). The net returns per hectare and per quintal are the highest for small farmers. This is mainly because of the relatively lower costs incurred by this size-group. Therefore, despite lower gross returns, the net returns are highest for this size-group of farmers. However, the value of marketed surplus is lower than other size-groups, as can be expected.

The gross and net returns per hectare are highest for Fursungi variety grown in rabi season (196628 Rs/ha and 74024 Rs/ha, respectively), followed by Nasik lal and Panchganga varieties (Table 3.15 (ii)). The gross and net returns per quintal and marketed surplus per hectare also follow a similar pattern across varieties.

Karnataka

The returns from onion cultivation in Karnataka are slightly higher than Maharashtra but lower than Gujarat. The gross and net returns per hectare are Rs 198908 and Rs 82677, respectively (Table 3.16 (i)). One major difference between Karnataka and the other two study states is that per hectare returns for the marginal farmer group are the lowest, progressively increasing over the size-groups.

The gross and net returns per hectare are highest for Red variety (208617 Rs/ha and 125229 Rs/ha, respectively), followed by Rose and Chincholi varieties, however the net returns of Chincholi variety are higher than that of Rose variety (Table 3.16 (ii)). The net returns per hectare and per quintal from Rose variety are negative (loss). This indicates that the cost of cultivation of Rose variety is much higher than the other two varieties.

Table 3.14 (i): Returns per hectare (Rs.) – All Varieties: Gujarat

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
Marginal	241393	96647	1066	427	225253
Small	210923	61684	871	255	189857
Medium	211205	62268	826	244	199408
Large	231701	89137	1026	395	205861
Total	218898	72033	912	300	199148

Table 3.14 (ii): Returns per hectare (Rs.) –Variety wise: Gujarat

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	218898	72033	912	300	199148
Local	231259	90291	791	309	214500
Nashik Red/N-53	213340	72790	1027	350	195874
Pilli Patti	267733	37276	882	123	230652
Red Patti	177869	37694	812	172	174881
Nashik White	312231	136088	939	409	275136
NHRDF	133681	-5140	875	-34	60764

Table 3.15 (i): Returns per hectare (Rs.) – All Varieties: Maharashtra

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
Marginal					
Small	164558	68113	1017	421	154082
Medium	170527	67789	1040	413	161497
Large	186341	67945	1043	380	174863
Total	169011	68030	1025	413	158634

Table 3.15 (ii): Returns per hectare (Rs.) –Variety wise: Maharashtra

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	169011	68030	1025	413	158634
Nasik Lal	143504	66017	1021	470	136041
Kh -Panchganga	112079	45068	903	363	106962
Rb -Fursungi	196628	74024	1037	390	183731
Note: Prices for 'all' variety is weighted average of individual prices with production as weight. Gross returns are computed as product of production and prices					

Table 3.16 (i): Returns per hectare (Rs.) – All Varieties: Karnataka

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
Marginal	144434	31579	1903	416	142155
Small	198992	31710	1881	300	192642
Medium	186269	46655	2290	574	183179
Large	206309	109692	2730	1452	202814
Total	198908	82677	2438	1013	195059

Table 3.16 (ii): Returns per hectare (Rs.) –Variety wise: Karnataka

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	198908	82677	2438	1013	195059
Red	208617	125229	2840	1705	207685
Rose	148364	-65396	1105	-487	137826
Chincholi	69136	13373	2400	464	69136

3.3 Marketing

3.3.1 Marketing Channels

In Gujarat nearly 93% of marketing of onion is marketed through the regulated markets (APMC) (Table 3.17). Only about 5% is marketed through private traders and the rest (1%) through village markets. Marginal farmers and large farmers sell nearly 10% to the private traders. It is interesting that even the large farmers sell nearly 6% through village markets. Some varieties, such as local, pilli patti, Nashik White and Nashik Red are fully marketed through the regulated markets (APMC) (Figure 3.9 & Table 3.18). Nashik Red/N-53 variety is the only variety sold through private traders. Large farmers growing Red patti variety sell nearly 33% through village markets. Results show that the government agencies are not a preferred channel of marketing in the study region.

In Maharashtra regulated market is the only channel of marketing used in both the growing seasons (Table 3.17, Figure 3.10 & Table 3.19). In both seasons, small farmer's category is the largest group that is selling through the regulated markets.

In Karnataka, Onion marketing is mainly through the regulated market and commission agents. Nearly two-thirds of farmers (67%) in the study region sell in the regulated market and rest (33 %) to the commission agents (Table 3.17). Majority of the large farmers (90%) prefer regulated markets. About 60% of the marginal and medium farmers prefer regulated markets and 50% of the small farmers also prefer this channel. It is interesting to note that the sample farmers growing Red variety, constituting about two-thirds of the sample farmers (67%), prefer regulated market while the rest (33%), growing mainly Rose variety, prefer to sell to the commission agents (Figure 3.11 & Table 3.20).

Table 3.17: Marketing Channels – All Varieties

Farmer class	Total responses	Percentage distribution by marketing channel used (%)				
		Regulated Market	Commission Agent	Village	Private traders	Total
Gujarat						
Marginal	16	88			13	100
Small	77	96		1	3	100
Medium	39	95			5	100
Large	18	83		6	11	100
Total	150	93		1	5	100
Maharashtra -Kharif						
Marginal						
Small	51	100				100
Medium	12	100				100
Large	4	100				100
Total	67	100				100
Maharashtra -Rabi						
Marginal						
Small	98	100				100
Medium	20	100				100
Large	10	100				100
Total	128	100				100
Karnataka						
Marginal	19	63	37			100
Small	52	48	52			100
Medium	29	62	38			100
Large	50	90	10			100
Total	150	67	33			100

Figure 3.9: Marketing Channels - Variety wise details (for total farmer class): Gujarat

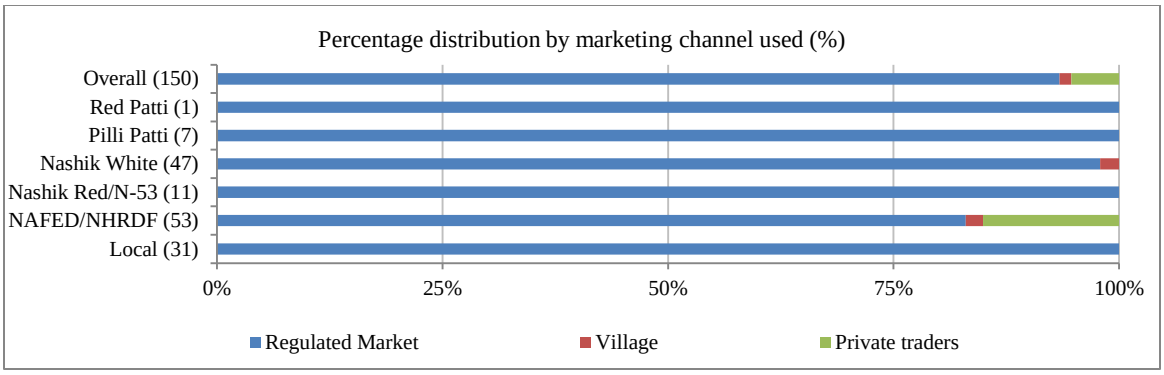


Table 3.18: Marketing Channels - Variety wise details (for total farmer class): Gujarat

Variety	Total responses	Percentage distribution by marketing channel used (%)			
		Regulated Market	Village	Private traders	Total
Local	31	100			100
NAFED/NHRDF	53	100			100
Nashik Red/N-53	11	83	2	15	100
Nashik White	47	98	2		100
Pilli Patti	7	100			100
Red Patti	1	100			100
Overall	150	93	1	5	100

Figure 3.10: Marketing Channels - Variety wise details (for total farmer class): Maharashtra

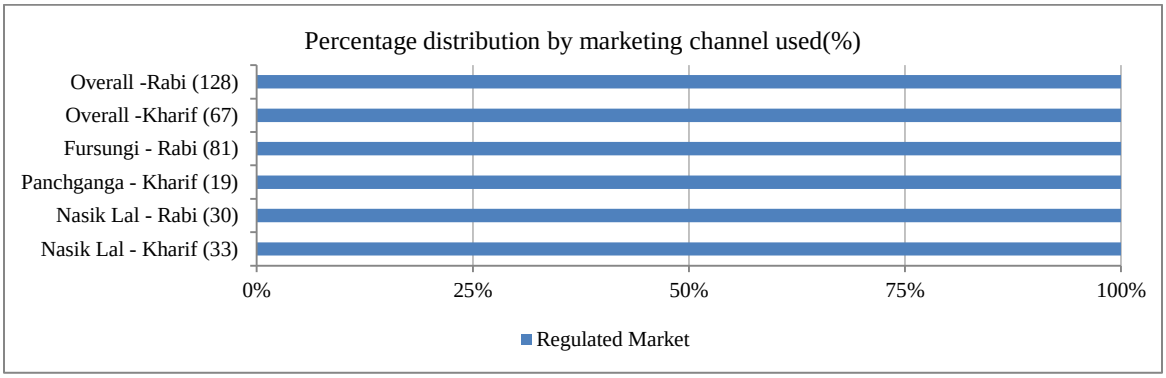


Table 3.19: Marketing Channels - Variety wise details (for total farmer class): Maharashtra

Variety	Total responses	Percentage distribution by marketing channel used (%)	
		Regulated Market	Total
Nasik Lal - Kharif	33	100	100
Nasik Lal - Rabi	30	100	100
Panchganga - Kharif	19	100	100
Fursungi - Rabi	81	100	100
Overall -Kharif	67	100	100
Overall -Rabi	128	100	100

Figure 3.11: Marketing Channels - Variety wise details (for total farmer class): Karnataka

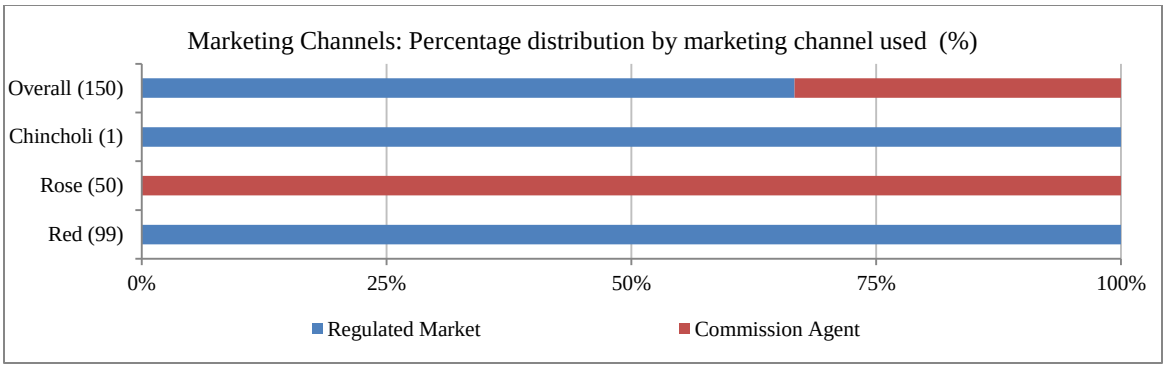


Table 3.20: Marketing Channels - Variety wise details (for total farmer class): Karnataka

Variety	Total response	Percentage distribution by marketing channel used (%)		
		Regulated Market	Commission Agent	Total
Red	99	100		100
Rose	50		100	100
Chincholi	1	100		100
Overall	150	67	33	100

3.3.2 Quantity sold and average price received

Gujarat

About 38270 quintals of onion is reported to have been marketed through various marketing channels at an average selling price of Rs. 899 per quintal (Table 3.21(i)). About 94 % of the total quantity sold is marketed through the regulated markets (APMC) and only 5% through private traders and less than 1% through village markets (Table A 3.1). It is observed that small and medium farmers prefer regulated market in larger proportion (almost 99 %). Marginal farmers (21%) and large farmers (8%) prefer mainly the private traders. It appears that price is not the sole criterion for preferring a particular marketing channel. For example, marginal and large farmer classes are receiving much higher prices (above Rs.1025 per quintal) in the regulated markets, as compared to small and medium farmers, who are receiving only about Rs. 850 per quintal (Table 3.21(i)). In the same way, small farmers who are selling just near 1-2 % to private traders, are getting a much higher price (Rs.1410 per quintal) as compared to marginal and large farmers (Rs. 750 per quintal), who are the major classes selling to the private trader. Quantity of onions sold per household is reported in Table 3.21(ii).

Maharashtra

About 5556 quintals of onion in kharif season and 19360 quintals in rabi season is marketed through regulated markets, at an average price of Rs.924 per quintal and Rs.1051 per quintal, respectively (Table 3.22). There is no other marketing channel reported in the study region. Out of the total quantity sold, small farmers have a major share of about 65%. Medium and large farmers have a share of about 12% to 22% during both the seasons. The average selling price in rabi season is almost equal across all the classes of farmers– ranging from from Rs. 1043 to Rs. 1080. However, in the kharif season, it ranges from Rs. 850 for large farmers to Rs. 945 for medium farmers. The information about farmers' preferred place of sale is reported in Table A 3.2.

Karnataka

In Karnataka, overall 8654 quintals of onion is marketed, of which about 78% is marketed through regulated markets at an average price of Rs. 2541 per quintal, and the rest (22%) is sold through commission agents, at an average selling price of Rs.1080 per quintal (Table 3.23). Nearly 58 % of the total quantity is sold by large class farmers, followed by small farmers (21%) and medium farmers (16%). Marginal farmers' share is less than 5 % of the total onions marketed. As can be seen, the difference in prices between two markets channels is quite large, and may be due to the commissions that marketing agents might be receiving. The large farmers are more inclined towards selling through the regulated market (about 90%), followed by marginal and medium class farmers (nearly 63%, each) (Table A 3.3). The small farmers reported only 48% of the sale through regulated markets and rest 52% is through commission agents.

Table 3.21 (i): Details of quantity of onions marketed through various channels- Gujarat

Variety	Farmer class	Village market				Regulated market				Others - Pvt traders				Total				Total of all channels	% distn
		Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)		
Overall	Marginal					1308	14	1111	78.9	349	2	750	21.1	1657	16	1066	100	1657	4.3
	Small	12	1	2500	0.1	13849	74	835	98.5	204	2	1410	1.5	14065	77	871	100	14065	36.8
	Medium					11212	37	836	98.7	148	2	638	1.3	11360	39	826	100	11360	29.7
	Large	200	1	1500	1.8	10117	15	1031	90.4	870	2	750	7.8	11187	18	1026	100	11187	29.2
	Total	212	2	2000	0.6	36487	140	884	95.3	1571	8	887	4.1	38270	150	899	100	38270	100

Table 3.21 (ii): Quantity of onions sold per household- Gujarat

Variety	Farmer class	Village market	Regulated market	Others - Pvt traders	Total
Overall	Marginal		93	175	104
	Small	12	187	102	183
	Medium		303	74	291
	Large	200	674	435	622
	Total	106	261	196	255

Table 3.22: Details of quantity of onions marketed through various channels- Maharashtra

Variety	Farmer class	Regulated market					Total					Total of all channels	% distribution
		Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)		
Overall Kharif	Marginal												
	Small	3652	51	72	925	100	3652	51	72	925	100	3652	66
	Medium	1221	12	102	945	100	1221	12	102	945	100	1221	22
	Large	685	4	171	850	100	685	4	171	850	100	685	12
	Total	5556	67	83	924	100	5556	67	83	924	100	5556	100
Overall Rabi	Marginal												
	Small	12650	98	129	1043	100	12650	98	129	1043	100	12650	65
	Medium	3183	20	159	1075	100	3183	20	159	1075	100	3183	16
	Large	3527	10	353	1080	100	3527	10	353	1080	100	3527	18
	Total	19360	128	151	1051	100	19360	128	151	1051	100	19360	100
Nasik Lal Kharif	Marginal												
	Small	1843	28	66	953	100	1843	28	66	953	100	1843	81
	Medium	441	5	88	971	100	441	5	88	971	100	441	19
	Large												
	Total	2284	33	69	955	100	2284	33	69	955	100	2284	100
Nasik Lal Rabi	Marginal												
	Small	2784	26	107	1042	100	2784	26	107	1042	100	2784	82
	Medium	485	3	162	1133	100	485	3	162	1133	100	485	14
	Large	130	1	130	1268	100	130	1	130	1268	100	130	4
	Total	3399	30	113	1058	100	3399	30	113	1058	100	3399	100
Panchganga Kharif	Marginal												
	Small	1016	12	85	908	100	1016	12	85	908	100	1016	49
	Medium	558	4	140	953	100	558	4	140	953	100	558	27
	Large	514	3	171	842	100	514	3	171	842	100	514	25
	Total	2089	19	110	907	100	2089	19	110	907	100	2089	100
Fursungi Rabi	Marginal												
	Small	7789	57	137	1024	100	7789	57	137	1024	100	7789	60
	Medium	2591	16	162	1063	100	2591	16	162	1063	100	2591	20
	Large	2666	8	333	1048	100	2666	8	333	1048	100	2666	20
	Total	13047	81	161	1034	100	13047	81	161	1034	100	13047	100

Table 3.23: Details of quantity of onions marketed through various channels- Karnataka

Variety	Farmer class	Regulated market					Commission agent					Total					Total of all channels	% distn
		Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)		
Overall	Marginal	256	12	21	2371	68	123	7	18	1014	32	379	19	20	1919	100	379	4
	Small	1073	25	43	2448	58	781	27	29	1144	42	1854	52	36	1796	100	1854	21
	Medium	951	18	53	3009	67	465	11	42	982	33	1416	29	49	1996	100	1416	16
	Large	4481	45	100	2924	90	524	5	105	1180	10	5005	50	100	2052	100	5005	58
	Total	6760	100	68	2541	78	1894	50	38	1080	22	8654	150	58	2054	100	8654	100
Red	Marginal	228	11	21	2342	100						228	11	21	2342	100	228	3
	Small	1073	25	43	2448	100						1073	25	43	2448	100	1073	16
	Medium	951	18	53	3009	100						951	18	53	3009	100	951	14
	Large	4481	45	100	2924	100						4481	45	100	2924	100	4481	67
	Total	6732	99	68	2681	100						6732	99	68	2681	100	6732	100
Rose	Marginal						123	7	18	1014	100	123	7	18	1014	100	123	6
	Small						781	27	29	1144	100	781	27	29	1144	100	781	41
	Medium						465	11	42	982	100	465	11	42	982	100	465	25
	Large						524	5	105	1180	100	524	5	105	1180	100	524	28
	Total						1894	50	38	1080	100	1894	50	38	1080	100	1894	100
Chincholi	Marginal	28	1	28	2400	100						28	1	28	2400	100	28	100
	Small																	
	Medium																	
	Large																	
	Total	28	1	28	2400	100						28	1	28	2400	100	28	100

3.3.3 Chanel-wise Month-wise Variety-wise Quantity Sold

Gujarat

The period during October to June is the main marketing period, mainly through the regulated markets, in Gujarat. Farmers prefer to sell in the village markets at the beginning (October) and end months (May) of this period and get relatively higher price. Private trader is another channel but only for few months and not on a regular basis, mainly because of the lower prices.

Marketing period starts in the month of October, with an average price of Rs.1232 per quintal (Table A 3.4). March is the month when the maximum quantity of onion (14409 quintals) arrives in the regulated markets, fetching an average price of Rs.955 per quintal. This is followed by February and January.

Local I and Nashik White varieties are marketed only through regulated markets from October to April months. Red Patti is marketed through regulated markets during October to March, and Pilli Patti is marketed through regulated markets usually during January to June. Nashik Red/N- 53 is also sold through private traders, along with regulated market, during October to June period.

Maharashtra

Regulated market is the only preferred channel for marketing onions in the state. October to April period is the preferred time during the kharif season (Table A 3.5). Large quantity of onion arrives in the market during October and November months. In rabi season it is basically January to June months, with the highest arrival in February month. During kharif season, Nashik Lal variety is sold during October to January period but Panchganga variety is also sold until April. Small farmers also sell during July month in smaller quantity.

Karnataka

Farmers growing Red variety, mainly sell through regulated market during October to December months (Table A 3.6). The major arrivals occur during the first two months. Only marginal farmers sell in December month in small quantities. Farmers growing Rose variety sell only through commission agents mainly during April to May, and again in September. The first and the last months are the months of major arrivals. Only medium class farmers sell in May in small quantities

to the commission agents. Chincholi variety is sold only by the marginal farmers in small quantities through the regulated market during November.

3.4 Sources of Supply and Percentage Margins

3.4.1 Sources of Supply

In this section the sources of supply for wholesalers, retailers and exporters have been analysed. In all 10, 10 and 28 wholesalers have been interviewed in Gujarat, Maharashtra and Karnataka respectively. The corresponding numbers for retailers are 13,10 and 20 respectively. The number of exporters in Gujarat and Maharashtra are 7 and 10 respectively. No exporters from Karnataka were included in the sample. Responses were elicited from these various stakeholders on their sources of supply.

In Gujarat 80% of the wholesalers sourced their supply from the farmers while 20% sourced from commission agents (Figure 3.12 (i)). However, in Maharashtra, the predominant source was commission agent (90%) followed by 'other wholesalers' (10%) (Figure 3.12 (ii)). In Karnataka 100% of the supply was sourced from the farmers (Figure 3.12 (iii)).

Turning to the retailers' sources of supply, in Gujarat, 85% of the retailers sourced their supply from commission agents and the rest from wholesalers (Figure 3.13(i)). In Maharashtra, 100% of the supply is sourced from commission agents (Figure 3.13(ii)), whereas in Karnataka, 56% sourced from commission agents, 32% from farmers and rest 12 % from wholesalers (Figure 3.13(iii)).

Exporters mainly sourced from commission agents and farmers. In Gujarat 57% of the exporters sourced their supply from commission agents while 43% sourced from farmers (Figure 3.14(i)). The corresponding numbers in Maharashtra are 70% and 30% respectively (Figure 3.14(ii)). It is notable that wholesalers do not form a source of supply for exporters, indicating that the channels for domestic and export markets are different and also indicative of a probable product differentiation.

Figure 3.12: Source of Supply for the Wholesalers

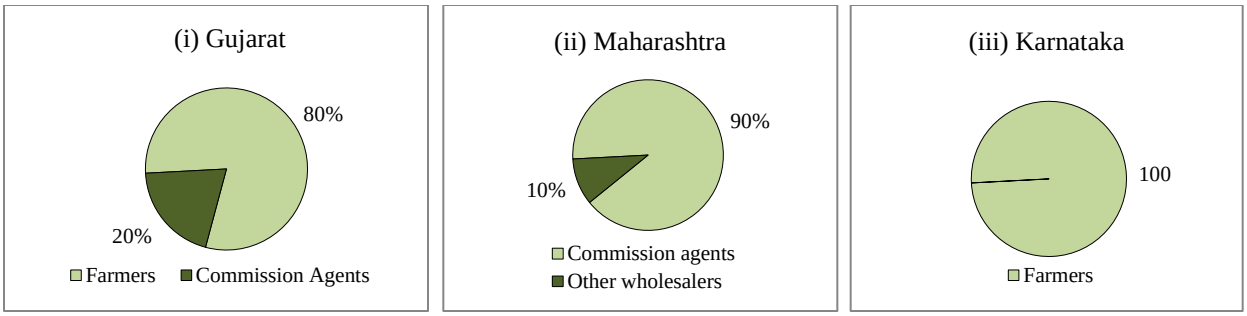


Figure 3.13: Source of Supply for the Retailers

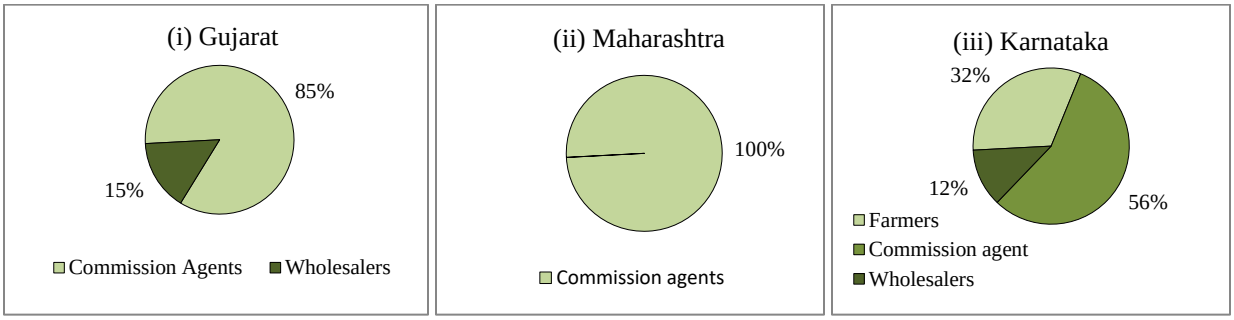
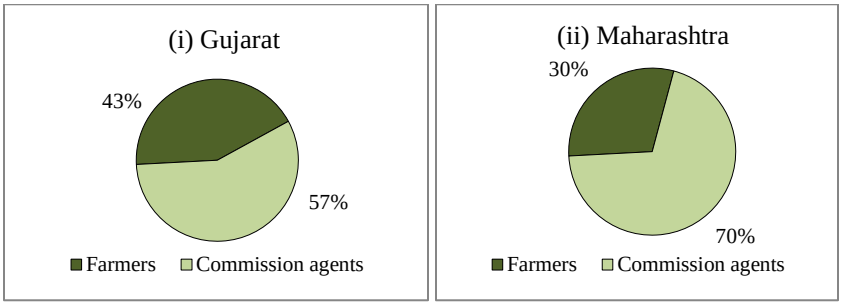


Figure 3.14: Source of Supply for the Exporters



3.4.2 Percentage Margins

In this section the purchase price, sale price and percentage margins at various stages of supply chain have been analysed. The idea is to discern the differences in margins at various stages and also changes in margins over time, if any.

In Gujarat, the percentage margins of wholesalers during 2013-14 (July-June) appear to be on the lower side from July to November. They begin to rise from December (25%) upto May and June (78% and 66% respectively). The annual average spread is about 44%. (Table 3.24). One interesting feature is that the retailers' margins begin to show a reverse trend – rising from 201 in July 2013 to 297 in December 2013, and decline thereafter to about 164 in June 2014 (Table 3.25). The reasons for this have not been explored in the present study and can form an interesting area for future research. The average percentage margin of retailers is 202% - more than 4 times the margins of wholesalers (44%). This is suggestive of some underlying imperfection in the vertical integration of onion markets in Gujarat.

In Maharashtra, the wholesalers' margins do not show a temporal pattern – ranging from 21% in July to 30 % in December, with an average of 26% (Table 3.27(i) & Table 3.27(ii)). The retailers' margins are comparable ranging from 25% in March to 30% in January-February – with an annual average margin of 27% (Table 3.28 (i) & Table 3.28 (ii)).

In Karnataka, the wholesalers' margins vary widely across varieties with an average percentage margin of 11% (Table 3.30). For retailers, the average mark-up percentage is about 57% - five times that of the wholesalers' margin (Table 3.31). This is indicative of some imperfections in the vertical market in Karnataka, as was in the case of Gujarat.

Turning to exports from Gujarat and Maharashtra, the percentage margins in Gujarat are much higher than those in Maharashtra. This pattern is similar to what has been observed in retail trade. The percentage margins of exporters ranged from 77% to 447% in Gujarat (Table 3.26), while in Maharashtra the range is from 48% to 58% (Table 3.29 (i) & Table 3.29 (ii)). This wide difference in the two states indicates again that the vertical markets in Gujarat are probably not as well-integrated as in Maharashtra and there are super-normal profits for retailers and exporters in the state.

Table 3.24: Overall trade detail of wholesalers (2013-14): Gujarat

Month	Average Price paid for purchase Rs./Qtl. (PP)	Quantity sold (Qtl.)	Average Price got for sale to wholesalers Rs./Qtl.(SP)	Markup (SP-PP)	Percentage markup [(sp-pp)/pp] *100
July	1750	14934	2030	280	16
August	2957	4877	3108	151	5
September	3276	12392	3593	317	10
October	2211	25459	2716	505	23
November	1839	22017	2127	288	16
December	1044	30709	1306	262	25
January	858	72718	1280	422	49
February	665	90026	1161	496	75
March	752	80052	1220	468	62
April	735	66022	1182	447	61
May	750	43879	1333	582	78
June	996	30517	1658	662	66
Average	1022	493602	1476	454	44

Table 3.25: Overall trade detail of retailers (2013-14): Gujarat

Month	Average Price paid for purchase Rs./Qtl. (PP)	Quantity sold (Qtl.)	Average Price got for sale to retailers Rs./Qtl.(SP)	Markup (SP-PP)	Percentage markup [(sp-pp)/pp]*100
July	905	18	2725	1820	201
August	939	7	3375	2436	259
September	1036	8	3640	2604	251
October	860	7	3125	2265	263
November	771	20	3000	2229	289
December	771	25	3066	2295	297
January	778	6	2453	1675	215
February	886	6	2250	1364	154
March	850	14	2500	1650	194
April	1215	22	2377	1161	96
May	873	18	2369	1496	171
June	938	20	2475	1538	164
Average	905	172	2735	1830	202

Table 3.26: Overall trade detail of exporters: Gujarat

Month	Average Price paid for purchase Rs./Qtl. (PP)	Quantity sold (Qtl.)	Average Price got for sale to retailers Rs./Qtl.(SP)	Markup (SP-PP)	Percentage markup [(sp-pp)/pp]*100
Aug, 2012	1000	3	4250	3250	325
Feb, 2013	1300	400	2300	1000	77
Mar, 2013	1138	390	5624	4487	394
Apr, 2013	1250	200	5236	3986	319
Jan, 2014	542	780	1484	942	174
Mar, 2014	800	200	4379	3579	447
Apr, 2014	825	200	4379	3554	431
May, 2014	676	6350	2932	2256	334
Average	734	8523	3015	2281	311

Table 3.27 (i): Overall trade detail of wholesalers (2013-14): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Wholesaler	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	1069	892	1372	303	28
February	900	2446	1144	244	27
March	1244	1298	1595	351	28
April	1100	3579	1366	266	24
May	1108	1426	1377	269	24
June	1100	1384	1334	234	21
July	1155	1967	1392	237	21
August	1260	1737	1567	307	24
September	1178	2074	1495	317	27
October	1320	2914	1619	299	23
November	1323	3684	1710	387	29
December	1292	5083	1682	390	30
Average	1183	4278	1487	304	26

Table 3.27 (ii): Variety-wise trade detail of wholesalers (Month averages): Maharashtra

Variety	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Wholesaler	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Nasik Lal Variety	1277	1130	1608	331	26
Panchganga Variety	1167	1905	1475	309	26
Fursungi Variety	1207	719	1518	310	26
Overall	1183	4278	1487	304	26

Table 3.28 (i): Overall trade detail of retailers (2013-14): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Retailer	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	1260	32	1633	373	30
February	1220	28	1585	365	30
March	1195	32	1497	302	25
April	1355	24	1694	339	25
May	1268	35	1680	412	33
June	1335	27	1688	353	26
July	1510	27	1983	473	31
August	2613	37	3347	735	28
September	2510	41	3207	697	28
October	2525	38	3232	707	28
November	2290	38	2839	549	24
December	1585	35	1974	389	25
Average	1707	50	2167	460	27

Table 3.28 (ii): Variety-wise trade detail of retailers (Month averages): Maharashtra

Variety	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Retailer	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Nasik Lal Variety	1555	9	1980	426	27
Panchganga Variety	1440	4	1839	399	28
Fursungi Variety	1568	5	1983	415	26
Overall	1707	50	2167	460	27

Table 3.29 (i): Overall trade detail of exporters: Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) Per Exporter	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	1261	1898	1987	726	58
February	1906	2820	2914	1009	53
March	1658	2669	2541	883	53
April	1395	2176	2120	725	52
May	1700	2290	2539	839	49
June	1585	1993	2414	829	52
July	2100	1866	3211	1111	53
August	3161	2410	4668	1506	48
September	2700	1773	4143	1443	53
October	3117	3163	4768	1651	53
November	2208	2324	3411	1203	54
December	1858	1679	2812	953	51
Average	2038	4000	3102	1065	52

Table 3.29 (ii): Variety-wise trade detail of exporters (Month averages): Maharashtra

Variety	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) Per Exporter	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Nasik Lal Variety	1991	790	3097	1106	56
Panchganga Variety	1933	642	3072	1138	59
Fursungi Variety	1980	408	2951	971	49
Overall	2038	4000	3102	1065	52

Table 3.30: Overall trade detail of wholesalers: Karnataka

Variety	Quantity procured (tons)	Purchase price (Rs/ton)	Net price received (Rs per ton)	Margin	Margin %
Red Onion from Bangalore	14295	44000	48555	4555	10
Rose onion	408	11778	16699	4921	42
Summer Rose onion	422	11556	14608	3052	26
Red Onion from Gadag	883	14444	16538	2094	14
Overall	16008	40693	45082	4389	11

Table 3.31: Overall trade detail of retailers: Karnataka

Variety	Quantity procured (tons)	Purchase price (Rs/ton)	Net price received (Rs per ton)	Margin	Margin %
Chitradurga retailers Kharif variety	16	5980	17243	11263	188
Chitradurga retailers Rabi variety	9	11333	15800	4467	39
Chitradurga retailers Summer variety	9	14333	21133	6800	47
Gadag retailers all varieties	107	8700	12692	3992	46
Overall	141	8896	13935	5039	57

3.5 Stakeholder Perceptions

3.5.1 Farmers' reasons for growing onions

In Gujarat, a majority of the households (69%) are growing onions because of the crop's higher profitability (Table 3.32). Land suitability is also an influencing factor, as reported by 29% of the households. In Maharashtra also a similar pattern can be observed. About 85% of the households reported higher profitability as the major reason behind their onion cultivation while 35% have reported land suitability as a major factor (Table 3.33). However, in Karnataka the scenario is slightly different. Here, alongwith the major factors of profitability (64%) and land suitability (71%), home consumption (61%) and crop rotation (30%) are also reported as important reasons, (Table 3.34).

Table 3.32: Reasons for Growing Crop by Households: Gujarat

Reasons for Growing Crop by Households	Gujarat					
	Total responses	Percentage to Total Number of Households (150)				
		Marginal	Small	Medium	Large	Total
Home Consumption	2				11	1
Profitability	104	88	68	59	83	69
Land Suitability	44	13	32	41	6	29
Government Subsidies						
Fits well with Crop Rotation						
Short duration, weather suitability, etc.						
Any other						
Total	150	100	100	100	100	100

Table 3.33: Reasons for Growing Crop by Households: Maharashtra

Reasons for Growing Crop by Households	Maharashtra					
	Number of responses	Percentage to Total Number of Households (150)				
		Marginal	Small	Medium	Large	Total
Home Consumption	2			1		1
Profitability	127		63	15	6	85
Land Suitability	53		29	5	2	35
Government Subsidies	2		1	1		1
Fits well with Crop Rotation	18		9	3	1	12
Short duration, weather suitability, etc.	22		11	3	1	15
Any other						

Table 3.34: Reasons for Growing Crop by Households: Karnataka

Reasons for Growing Crop by Households	Karnataka					
	Total responses	Percentage to Total Number of Households (150)				
		Marginal	Small	Medium	Large	Total
Home Consumption	92 (61%)	9	17	10	25	61
Profitability	96 (64%)	7	17	11	29	64
Land Suitability	107 (71%)	10	25	15	21	71
Government Subsidies	1 (1%)		1			1
Fits well with Crop Rotation	45 (30%)	4	11	5	9	30
Short duration, weather suitability, etc.						
Any other						

3.5.2 Major problems faced by farmers in cultivation of onions

In Gujarat reported lower yield (46% of the households) and yield instability (42%) of onions as major problems. These are followed by lack of remunerative price (41%), price fluctuations (31%) and lack of MSP & procurement (16%) (Table 3.35).

In Maharashtra price fluctuations ranked first as the major problem in onion cultivation, as reported by 38% of the households (Table 3.35). The next major problem in severity is reported to be labour scarcity (36%), followed by lack of MSP & procurement (35%), erratic power supply (28%), poor refrigeration problem (22%), poor extension services (15%) and yield instability (12%).

In Karnataka, distant market, poor quality of underground water and price fluctuations emerged as the major problems in onion cultivation, as reported by 67%, 65% and 59% of the households, respectively (Table 3.35). Other problems such as labour problems (41%), poor refrigeration (35%), lack of MSP & procurement (34%), erratic electricity supply (29%) and lack of market information (23%) are some of the other major problems reported by the onion farmers in the state.

Table 3.35: Problems faced by Households

Problems faced by Households	Gujarat		Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower Yield	150	46	150	7	150	5
Unstable yield	150	42	150	12	150	21
Lack of remunerative price	150	41	150	5	150	14
Poor road network for transportation	150	8	150	3	150	1
Poor refrigeration facilities	150	11	150	22	150	35
Other infrastructure problems	150	4	150	4	150	35
Erratic electricity supply	150	13	150	28	150	29
Labour problem	150	26	150	36	150	41
Poor quality of underground water	150	3	150	8	150	65
Non-availability of good quality of seed	150	7	150	3	150	11
Lack of/poor extension services lack of technical know-how	150	9	150	15	150	13
Price fluctuations	150	31	150	38	150	59
Lack of MSP/government procurement	150	16	150	35	150	34
Lack of market information	150	5	150	3	150	23
Collusion among traders/trade malpractices	150	9	150	10	150	12
Distant market	150	12	150	2	150	67

3.5.3 Major problems faced by Wholesalers

In Gujarat, 7 out the 10 wholesalers (70%) reported that poor quality of supply is the biggest problem while 30% rated lower supply as a major problem (Table 3.36). In Maharashtra, high marketing charges/taxes and other infrastructure problems have been reported to be severe problems by 40% and 30% of the respondents respectively (Table 3.36). Other major problems, although not ranked severe, are lower price & demand (80%), mixing of different varieties (60%), other infrastructure problems (40%) and erratic supply from farmers (30%). In Karnataka, most of the problems are market and infrastructure related. 17 out of 28 wholesalers (61%), reported competition from other wholesalers as the most severe problem (Table 3.36). This is followed by competition from imports (29%), poor road network (29%), erratic supply (14%) and high marketing charges/taxes (11%).

Table 3.36: Problems faced by Wholesalers

Problems faced by Wholesalers	Gujarat		Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower supply	10	30				
Poor quality supply	10	70	10		28	
Lower price due to lower demand			10		28	4
Competition from other wholesalers	10	10	10		28	4
Competition from imports	10		10	10	28	61
Poor road network			10		28	29
Poor facilities of drier			10	10	28	29
Other Infrastructure problems			10	30	28	7
Erratic Supply/ Production			10		28	14
High Marketing Charges / taxes			10	20	28	11
Mixing of different Varieties			10	40	28	
Non-remunerative price due to lower demand	10	20	10		28	
Competition from large organized retail chains	10					
Government intervention in price (MSP/MIP)	7	14				
Poor infrastructure	10	10				
Other problems (e.g. ECA)	2					

3.5.4 Major problems faced by Retailers

In Gujarat, 13 out of 20 retailers (65%) have reported poor infrastructure as the most severe problem. This is followed by competition from imports (55%), labour problems (40%), lower price due to lower demand (35%) and competition from other retailers (40%) (Table 3.37). In Maharashtra, poor infrastructure has been reported by 4 retailers (40%) as the most severe problem (Table 3.37). The other major problems, although not rated as severe, are competition from other retailers (80%), competition from organized retail chains (30%), lower price due to lower demand and lack of government intervention to support price (20% each). In Karnataka, an overwhelming 85% of the retailers have reported competition from other retailers as the most severe problem (Table 3.37). This is followed by lack of government intervention to support price (30%), competition from imports (25%) and lower price due to lower demand (20%).

Therefore, in all the three states competition from other retailers, imports and infrastructure have been reported as the major problems facing retailers.

Table 3.37: Problems faced by Retailers

Problems faced by Retailers	Gujarat		Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower supply	20	20	10		20	10
Poor quality of product	20	10	10		20	5
Non-remunerative price due to lower demand	20	35	10	10	20	20
Competition from other retailers	20	40	10	10	20	85
Competition from large organized retail chains	20	15	10	10	20	10
Competition from imports	20	55	10		20	25
Government intervention in price (MSP.MIP)	20	35	10	10	20	30
Labour problem	20	40				
Poor infrastructure	20	65	10	40	20	15
Other problems	20	10	10		20	35

3.5.5 Major problems faced by exporters

In Gujarat, five out seven exporters (71%) rated the lengthy government procedures as the most severe problem faced by the exporters (Table 3.38). This is followed by the export policy uncertainty, lower price due to lower world demand and chemical residues – reported by 57% of the respondents as severe problems. Lower production, poor quality of the product, erratic supply, competition from wholesalers, poor port facilities and poor refrigeration have been reported to be severe problems by more than 40% of the exporters.

In Maharashtra, competition from other exporters (60%) and poor refrigeration facilities (50%) rank as the most severe problems faced by the exporters (Table 3.38). These are followed by the lower domestic demand (40%), lower price due to lower world demand (30%), competition from wholesalers (30%), mixing of different varieties (30%) and high port charges / taxes (30%).

Table 3.38: Problems faced by Exporters

Problems faced by Exporters	Gujarat		Maharashtra	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower domestic production	7	43	10	
Poor quality of product	7	43	10	10
Lower price due to lower world demand	7	57	10	30
Competition from other wholesalers	7	43	10	30
Competition from other exporters	7	29	10	60
Poor road network	7	14	10	20
Poor port facilities	7	43	10	20
Poor refrigeration facilities/facilities of drier	7	43	10	50
Other infrastructure problems	7	14	10	10
Lengthy government procedures	7	71	10	20
Export policy uncertainty	7	57	10	20
Erratic supply/production	7	43	10	10
Low domestic demand	7	14	10	40
Mixing of different varieties	7	29	10	30
Problem of chemical residue	7	57	10	10
High port charges/taxes	7	29	10	30

Appendix Tables: Onion

Table A 3.1: Marketing Channels: variety wise details - Gujarat

Variety	Farmer class	Place of Sale				Percentage distribution of place of Sale (%)			
		Regulated Market	Village	Private traders	Total response	Regulated Market	Village	Private traders	Total
Local	Marginal	3			3	100			100
	Small	20			20	100			100
	Medium	6			6	100			100
	Large	2			2	100			100
	Total	31			31	100			100
Nashik Red/N-53	Marginal	3		2	5	60		40	100
	Small	20	1	2	23	87	4	9	100
	Medium	14		2	16	88		13	100
	Large	7		2	9	78		22	100
	Total	44	1	8	53	83	2	15	100
Pilli Patti	Marginal	4			4	100			100
	Small	3			3	100			100
	Medium	3			3	100			100
	Large	1			1	100			100
	Total	11			11	100			100
Red Patti	Marginal	4			4	100			100
	Small	29			29	100			100
	Medium	11			11	100			100
	Large	2	1		3	67	33		100
	Total	46	1		47	98	2		100
Nashik White	Marginal								
	Small	2			2	100			100
	Medium	3			3	100			100
	Large	2			2	100			100
	Total	7			7	100			100
NAFED/NHRDF	Marginal								
	Small								
	Medium								
	Large	1			1	100			100
	Total	1			1	100			100
Overall	Marginal	14		2	16	88		13	100
	Small	74	1	2	77	96	1	3	100
	Medium	37		2	39	95		5	100
	Large	15	1	2	18	83	6	11	100
	Total	140	2	8	150	93	1	5	100

Table A 3.2: Marketing Channels: variety wise details - Maharashtra

Variety	Farmer class	Place of Sale		Percentage distribution of place of Sale (%)	
		Regulated market	Total response	Regulated market	Total
Nasik Lal - Kharif	Marginal				
	Small	28	28	100	100
	Medium	5	5	100	100
	Large				
	Total	33	33	100	100
Nasik Lal - Rabi	Marginal				
	Small	26	26	100	100
	Medium	3	3	100	100
	Large	1	1	100	100
	Total	30	30	100	100
Panchganga - Kharif	Marginal				
	Small	12	12	100	100
	Medium	4	4	100	100
	Large	3	3	100	100
	Total	19	19	100	100
Fursungi - Rabi	Marginal				
	Small	57	57	100	100
	Medium	16	16	100	100
	Large	8	8	100	100
	Total	81	81	100	100
Overall -Kharif	Marginal				
	Small	51	51	100	100
	Medium	12	12	100	100
	Large	4	4	100	100
	Total	67	67	100	100
Overall -Rabi	Marginal				
	Small	98	98	100	100
	Medium	20	20	100	100
	Large	10	10	100	100
	Total	128	128	100	100

Table A 3.3: Marketing Channels: variety wise details - Karnataka

Variety	Farmer class	Place of Sale			Percentage distribution of place of Sale (%)		
		Regulated Market	Commission Agent	Total	Regulated Market	Commission Agent	Total
Red	Marginal	11		11	100		100
	Small	25		25	100		100
	Medium	18		18	100		100
	Large	45		45	100		100
	Total	99		99	100		100
Rose	Marginal		7	7		100	100
	Small		27	27		100	100
	Medium		11	11		100	100
	Large		5	5		100	100
	Total		50	50		100	100
Chincholi	Marginal	1		1	100		100
	Small						
	Medium						
	Large						
	Total	1		1	100		100
Overall	Marginal	12	7	19	63	37	100
	Small	25	27	52	48	52	100
	Medium	18	11	29	62	38	100
	Large	45	5	50	90	10	100
	Total	100	50	150	67	33	100

Table A 3.4: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Gujarat

Variety	Farm Category	October		November		December		January		February		March		April		May		June	
		Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price
	Regulated Market																		
Local I	Marginal	96	1625							55	900	40	1325						
	Small	63	1200			332	730	438	831	3192	632	58	1113	136	1250				
	Medium	110	750	200	550	120	1000			720	575			600	750				
	Large	40	1000			400	1125												
	Total	309	1144	200	550	852	952	438	831	3967	702	98	1219	736	1000				
	Regulated Market																		
Nashik Red/N- 53	Marginal	135	3000									120	1200						
	Small	1394	806	305	750	420	1025	530	1000			944	800	150	1000				
	Medium	693	1300	160	600	250	588	72	325	60	1000	1303	950						
	Large	1150	1296					1000	750			999	1375	499	575				
	Total	3372	1624	465	675	670	806	1602	692	60	1000	3366	1081	649	838				
	Village market																		
Nashik Red/N- 53	Marginal																		
	Small	12	2500																
	Medium																		
	Large																		
	Total	12	2500																
	Others - Private traders																		
Nashik Red/N- 53	Marginal	349	750																
	Small			140	850					64	1970								
	Medium									48	625							100	650
	Large	400	1000	400	1000									70	500				
	Total	749	875	540	925					112	1298			70	500			100	650
	Regulated Market																		
Pilli Patti	Marginal	130	650									90	750			105	1050	220	930
	Small							110	1500	21	875			120	875				
	Medium							48	1000	100	750			200	750	102	1050		
	Large											249	630						
	Total	130	650					158	1250	121	803	339	690	320	813	207	1050	220	930
	Regulated Market																		
Red Patti	Marginal	63	875							254	683								
	Small	272	1033	150	925	290	633	1317	895	1191	714	2076	883						
	Medium							1597	892	607	663	3050	738						
	Large									500	750	480	900						
	Total	335	954	150	925	290	633	2914	893	2552	702	5606	840						
	Village market																		
Red Patti	Marginal																		
	Small																		
	Medium																		
	Large															200	1500		
	Total															200	1500		
	Regulated Market																		
Nashik White	Marginal																		
	Small	250	950					92	950										
	Medium					320	850			200	750	400	650	300	750				
	Large											4600	1000						
	Total	250	650			320	850	92	950	200	750	5000	825	300	750				
	Regulated Market																		
NHRDF	Marginal																		
	Small																		
	Medium																		
	Large					200	875												
	Total					200	875												
	Regulated Market																		
Overall	Marginal	424	1538							309	738	250	1119			105	1050	220	930
	Small	1978	884	455	808	1042	773	2487	956	4404	678	3078	899	406	1075				
	Medium	803	1208	360	575	690	756	1717	800	1687	700	4753	822	1100	750	102	1050		

	Large	1190	1297			600	1000	1000	750	500	750	6328	981	499	575				
	Total	4396	1232	815	692	2332	843	5204	835	6900	716	14409	955	2005	800	207	1050	220	930
	Village market																		
Overall	Marginal																		
	Small	12	2500																
	Medium																		
	Large															200	1500		
	Total	12	2500													200	1500		
	Others - Private traders																		
Overall	Marginal	349	750																
	Small			140	875					64	1970								
	Medium									48	625							100	650
	Large	400	1000	400	1000									70	500				
	Total	749	875	540	925					112	1298			70	500			100	650

Table A 3.5: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Maharashtra

Variety (Regulated Market)	Farm Category	April		May		June		July		October		November		December		January		February		March		Total	
		Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price
Nasik Lal-Kharif	Marginal																						
	Small							10	480	429	1039	584	1065	452	711	369	922					1843	953
	Medium											388	989			53	900					441	971
	Large																						
	Total							10	480	429	1039	972	1042	452	711	422	918					2284	955
Nasik Lal-Rabi	Marginal																						
	Small	473	793	584	930	762	1127	461	1352							219	1040	62	975	223	943	2784	1042
	Medium	130	1175	158	1100															197	1125	485	1133
	Large			60	1000	70	1535															130	1268
	Total	603	869	802	960	832	1185	461	1352							219	1040	62	975	420	979	3399	1058
Panchganga-Kharif	Marginal																						
	Small									208	888	579	926	48	895	25	865			156	875	1016	908
	Medium											277	1030					279	875			556	952
	Large	210	750									183	925					123	850			516	842
	Total	210	750							208	888	1039	945	48	895	25	865	402	867	156	875	2087	907
Fursungi-Rabi	Marginal																						
	Small	1580	995	731	1139	753	1129	286	1183			81	715			1134	969	2158	998	1067	998	7790	1024
	Medium	544	1087	120	993	344	980									436	1027	468	1037	679	1128	2591	1063
	Large	146	1100													632	1137	1293	903	596	1040	2667	1048
	Total	2270	1014	851	1107	1097	1092	286	1183			81	715			2202	1017	3919	989	2342	1038	13047	1034
Overall-Kharif	Marginal																						
	Small							10	480	832	964	1515	981	576	775	474	842	96	900	156	875	3652	924
	Medium											878	966			57	900	279	875			1221	945
	Large	210	750							168	875	183	925					123	850			685	850
	Total	210	750					10	480	1000	957	2576	976	576	775	531	849	498	875	156	875	5558	924
Overall-Rabi	Marginal																						
	Small	2307	969	1951	1057	1794	1178	747	1304			81	715			1931	994	257	1004	1264	981	12651	1043
	Medium	674	1109	385	1046	344	980									436	1027	465	1037	880	1127	3183	1075
	Large	146	1100	60	1000	70	1535									632	1137	1793	952	826	1077	3527	1080
	Total	3127	994	2396	1053	2208	1176	747	1304			81	715			2999	1022	4833	1000	2970	1029	19360	1051

Table A 3.6: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Karnataka

Variety	Farm Category	April		May		September		October		November		December	
		Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price
Regulated Market													
Red	Marginal									59	2267	169	2370
	Small							865	2425	209	2540		
	Medium							283	3917	668	2600		
	Large							2248	2521	2233	3219		
	Total							3396	2954	3168	2656	169	2370
Commission Agent													
Rose	Marginal	19	1000			104	1020						
	Small	205	1214			577	1115						
	Medium	162	733	45	1200	259	1057						
	Large	267	1250			257	1133						
	Total	653	1049	45	1200	1196	1081						
Regulated Market													
Chincholi	Marginal									28	2400		
	Small												
	Medium												
	Large												
	Total									28	2400		
Regulated Market													
Overall	Marginal									87	2310	169	2370
	Small							865	2425	209	2540		
	Medium							283	3917	668	2600		
	Large							2248	2521	2233	3219		
	Total							3396	2954	3168	2656	169	2370
Commission Agent													
Overall	Marginal	19	1000			104	1020						
	Small	205	1214			577	1115						
	Medium	162	733	45	1200	259	1057						
	Large	267	1250			257	1133						
	Total	653	1049	45	1200	1196	1081						

Chapter 4

GRAPES

4.1 Demographic Profile and Cropping Pattern of the Study Region

4.1.1 Demographic profile of the sample households

Maharashtra

The total number of sample households is 150 for grapes (Table 4.1(a)). About114 sample households (76%) belong to the small farmer category, followed by medium farmers (20%) and large farmers (4%). There are no marginal farmers cultivating grapes in the sample. The total sample population of the grape cultivating households is about 1018 out of which adult population is about 68% - adult males and adult females constituting about 35% and 33% respectively (Table 4.1). 91% of the sample households have a literate head and about 68% have educational attainments higher than 'high school' (Table 4.2). Majority of the households belong to the general category (84%) and the percentage of OBC households about 11% (Table 4.3). The percentage of SC and ST households is about 3% and 1% respectively.

Karnataka

The total number of sample households in the state is 152 (Table 4.1(a)). The majority belong to marginal and small categories – 34% and 36% of the total households belong to these categories respectively. The combined demographic profile (population, caste structure, education profile of the head etc) for onion and grape cultivating sample households for the state is already provided in the section on onions (see Chapter 3, Table 3.1, Table 3.2 and Table 3.3).

Table 4.1(a): No of sample households in various land-holding categories: Grapes

Size of the Landholding	Maharashtra		Karnataka	
	Number of sample hhlds	% to Total	Number of sample hhlds	% to Total
Marginal		0	51	34
Small	114	76	55	36
Medium	30	20	25	16
Large	6	4	21	14
Total	150	100	152	100

Table 4.1: Demographic profile of households: Maharashtra

Farmer class	Total members in Family	Percentage Distribution (%)				
		Adults			Children	Total
		Males	Females	Total		
Marginal						
Small	796	36.4	32.9	69.4	30.7	100
Medium	182	30.8	33.0	63.7	36.3	100
Large	40	35.0	25.0	60.0	40.0	100
Total	1018	35.4	32.6	68.0	32.0	100

Table 4.2: Education level of households: Maharashtra

Farmer class	Total No. of Households	Percentage Distribution (%)					
		Illiterates	Primary	Secondary	High School	Higher	Total
Marginal							
Small	114	6.1	11.4	12.3	31.6	38.6	100.0
Medium	30	16.7	3.3	23.3	20.0	36.7	100.0
Large	6	16.7			16.7	66.7	100.0
Total	150	8.7	9.3	14.0	28.7	39.3	100.0

Table 4.3: Caste of households: Maharashtra

Farmer class	Total No. of Households	Percentage Distribution (%)				
		Scheduled Caste	Scheduled Tribe	Other Backward Classes	Others	Total
Marginal						
Small	114	4.4	1.8	11.4	82.5	100
Medium	30			10.0	90.0	100
Large	6			16.7	83.3	100
Total	150	3.3	1.3	11.3	84.0	100

4.1.2 Area and Irrigation Pattern of the sample households

The total area under cultivation in Maharashtra is 241 ha. About 95% of the area is irrigated and 5% is un-irrigated (Table 4.4). Wells and other sources is the predominant form of irrigation in the state, providing irrigation to 75% of the area. Tube-wells is the source of irrigation for 14% of the area and tanks for 3% of the area. In Karnataka, the total area under cultivation of onion and grape households is about 1009 ha. Only 46% of this area is irrigated and 53% is un-irrigated. Tube-well is the only source of irrigation in the state.

Table 4.4: Irrigation Details: Maharashtra

Farmer class	Irrigated Area (in ha.)			Percentage Distribution of Source (%)						
	Irrigated	Un-Irrigated	Total	Canal	Tubewell	Tank	Others	Irrigated	Un-Irrigated	Total
Marginal										
Small	147.6	6.8	154.4		16.7	0.3	78.6	95.6	4.4	100
Medium	63.1	4.1	67.1	1.2	12.3	1.8	78.6	94.0	6.0	100
Large	30.8	1.2	32.0	31.0	3.8	17.1	44.3	96.2	3.8	100
Total	241.4	12.0	253.5	4.2	13.9	2.8	74.3	95.3	4.8	100

4.1.3 Cropping Pattern of the sample households

The sample districts in both the states have been chosen from predominantly grape-growing districts. In Maharashtra, grape is the major rabi crop in the sample region, occupying 50% of the total area (Figure 4.1). In Karnataka again, grapes is a major crop in the sample region, occupying about 25% of the total area. In Maharashtra there are no marginal farmers in the sample cultivating grapes. Major share belongs to the small farmers (64%), followed by medium farmers (24%) and the rest by the large farmers (Figure 4.2 & Table 4.5). In Karnataka, the share of area under grapes is highest for small farmers (32%) but the marginal farmers also command a reasonable share of the area (26%) (Figure 4.2).

Out of a total grapes area of 141 ha in Maharashtra, 68% of the area is under Thomson, 15% is under Sonaka, 6% under Manik chaman and 5% under Sharad varieties (Table 4.6). All the varieties are mainly grown in the rabi season. In Karnataka, the major varieties grown are Bangalore blue, Dilkush and Thomson seedless, with shares of 29%, 28% and 23% respectively, in a total area of 289 ha under grapes in the sample districts (Table 4.7 (i) &Table 4.7 (ii)).

Figure 4.1: Cropping pattern Details: Maharashtra

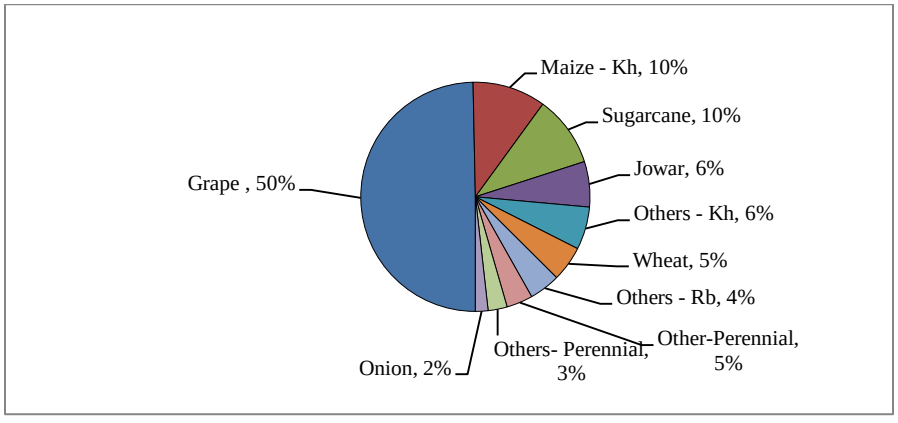


Table 4.5: Cropping pattern Details: Maharashtra

Farmer class	Total Area (in ha)	Percentage Distribution (%)													
		Kharif Season					Rabi Season				Perennial Crops				Total
		Maize	Vegetable	Onion	Others	Total	Jowar	Wheat	Others	Total	Grape	Sugarcane	Others	Total	
Marginal															
Small	268.4	7.0	4.1	1.1	7.8	20.0	7.1	3.6	5.1	15.8	51.7	10.2	2.3	64.3	100
Medium	104.6	17.4	3.4	4.2	3.4	28.5	6.9	8.2	3.2	18.3	43.1	6.1	4.0	53.2	100
Large	103.2	11.3	2.4	-	3.0	16.6	1.8	4.7	3.5	10.1	53.8	17.7	1.8	73.4	100
Total	476.2	10.3	3.7	1.8	6.0	21.9	6.4	5.0	4.4	15.8	49.7	10.0	2.7	62.4	100

Figure 4.2: Area under study crop: % share of farmer classes

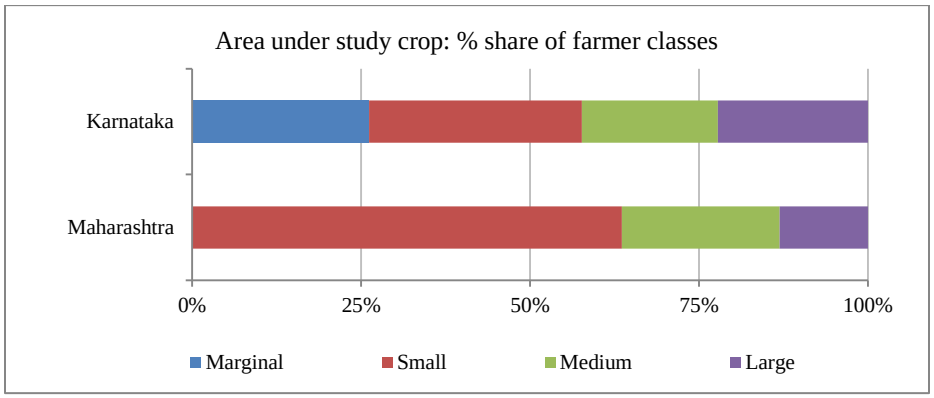


Table 4.6: Variety-wise crop area details: Maharashtra

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)								
		Thomson	Sonaka	Ganesh	Jumbo	Sharad	Nanasaheb Purple	Clone 2	Manik chaman	Total Area
Marginal										
Small	89.7	69.2	18.3	1.4	0.9	4.0	0.7	3.0	2.5	100
Medium	33.0	67.2	14.1	2.5		2.5		6.8	7.1	100
Large	18.4	65.9				16.5			17.6	100
Total	141.1	68.3	15.0	1.4	0.6	5.3	0.4	3.5	5.6	100

Table 4.7 (i): Variety-wise crop area details: Karnataka

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)							
		Thompson seedless	Sonaka	Bangalore blue	black	Dilkush	Sharath	Manik chaman	Total Area
Marginal	75.7	17.1	2.7	24.8	19.8	28.1	7.5		100
Small	91.1	20.5		35.3	12.2	27.5	2.7	1.8	100
Medium	58.3	25.7	3.5	29.2	1.4	36.1		4.2	100
Large	64.2	28.7	10.7	26.5	15.1	18.9			100
Total	289.3	22.5	3.8	29.4	12.7	27.5	2.8	1.4	100

Table 4.7 (ii): Season-wise crop area details: Karnataka

Farmer class	Area (in Ha.)			Percentage Distribution by Season (%)		
	Kharif	Summer	Total	Kharif	Summer	Total
Marginal	27.3	48.4	75.7	36.1	63.9	100
Small	34.5	56.6	91.1	37.9	62.1	100
Medium	19.0	39.3	58.3	32.6	67.4	100
Large	19.0	45.1	64.1	29.6	70.4	100
Total	99.9	189.4	289.3	34.5	65.5	100

4.2 Economics of the Study Crop

4.2.1 Production, Consumption and Other Details

Maharashtra

There are about eight major varieties of grapes grown in the state. They are Thomson, Sonaka, Ganesh, Jumbo, Sharad, Nanasaheb Purple, Clone 2 and Manik chaman. Thomson (71%) and Sonaka (14%) are the varieties covered in this study because these are the major varieties together covering nearly 83% of total area under grapes and 85% of the total production in the state (Table 4.8). Sharad and Manik chaman, have a share of about 5% each. The total grapes production from all the varieties, together, was 21576 quintals whereas the combined production of two varieties majorly grown, Thomson and Sonaka, was nearly 18420 quintals with 71 % and 14 % shares in overall production, respectively (Table 4.8). Small farmers are the major producers of grapes among the farmer classes (Table 4.9). Nearly 97% of grape production is sold in the markets, with 1% used for consumption & retained for future use, and the rest (2%) is wasted (Figure 4.3). This trend is similar across different varieties. No marginal farmer in our sample is cultivating grapes in the study region and also, large farmers are generally not found to grow Sonaka variety. The average selling price received by the farmers is Rs.3415 per quintal. There are variations across the size-groups though[4].

[4]Highest selling price is received by medium farmer class, about Rs. 3789 per quintal, and lowest by large farmers, Rs. 3290 per quintal.

Table 4.8: Variety wise production and % share - Grapes

Maharashtra			Karnataka		
Variety	Production	% Share	Variety	Production	% Share
Thomson	15357	71.2	Thomson	7683	31.5
Sonaka	3063	14.2	Sonaka	2456	10.1
			Bangalore blue	6220	25.5
			Bangalore black	1403	5.7
			Dilkhush	5150	21.1
			Sharath	1130	4.6
			Manik Chaman	370	1.5
Overall	21576	100.0	Overall	24412	100.0

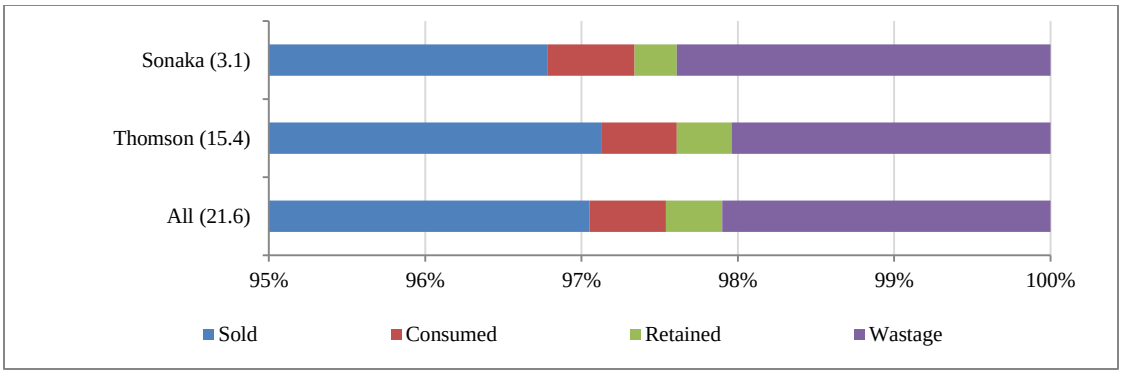
Note: Other minor varieties are also included in Overall sum.

Table 4.9: Production, consumption and other details – Grapes - Maharashtra

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal							
	Small	89.7	13990	67	49	291	13583	3337
	Medium	33.0	4640	28	17	101	4494	3789
	Large	18.4	2946	11	12	68	2855	3290
	Total	141.1	21576	105	79	460	20932	3415
Variety -wise								
Thomson	Marginal							
	Small	62.1	9925	48	36	189	9651	3245
	Medium	22.2	3349	19	11	77	3242	3699
	Large	12.2	2083	7	7	48	2021	3370
	Total	96.4	15357	74	54	314	14914	3313
Sonaka	Marginal							
	Small	16.5	2522	13	7	62	2441	3427
	Medium	4.7	541	4	1	12	524	4205
	Large							
	Total	21.1	3063	17	8	73	2965	3595

Note: Other minor varieties are also included in Overall sum.

Figure 4.3: Production, Consumption and Other Details: % shares in production: Maharashtra



Karnataka

The total grapes production from all the varieties together was 24412 quintals in the study regions of state which is shared by the following varieties (Table 4.8) - Thomson (31%), Sonaka (10%), Bangalore blue (25%), Bangalore black (6%), Dilkhush (21%), Sharath (5%) and Manik chaman (2%). Out of the total production of grapes in the study region approximately 96% is sold, 3.5% is wasted and the rest is retained as future stock (Figure 4.4). None of the farmers in any category in the study regions reported consumption of grapes (Table 4.10). The highest percentage of wastage is reported for Bangalore black and Bangalore blue varieties - about 8 % and 5 %, respectively.

For the total quantity sold (23501 quintals), farmers get an average price of Rs.3455 per quintal. The highest selling price is received by large class farmers (Rs. 3866 per quintal) and lowest by small farmers (Rs. 3237 per quintal). Thomson fetches the highest price, at an average price Rs.6464 per quintal, followed by sonaka (Rs.5767 per quintal) and Sharath (Rs.5133 per quintal). Large farmers selling Thomson variety manage to get much higher price (Rs.9256 per quintal) than the average.

Figure 4.4: Production, Consumption and Other Details: % shares in production: Karnataka

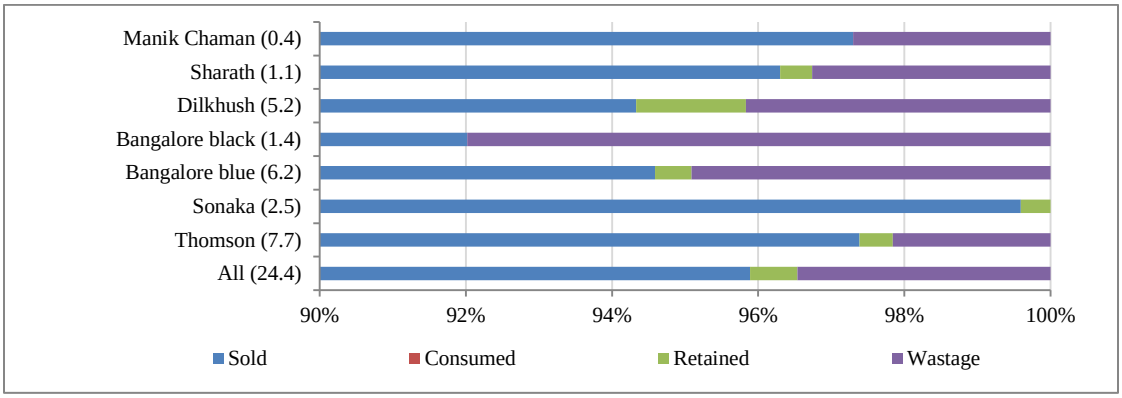


Table 4.10: Production, consumption and other details – Grapes - Karnataka

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal	30.8	4548		53	178	4363	3456
	Small	53.1	7163		53	334	6808	3237
	Medium	36.0	5453		37	163	5268	3261
	Large	45.6	7248		16	174	7062	3866
	Total	165.5	24412		159	849	23501	3455
Variety -wise								
Thomson	Marginal	5.7	625			10	620	4788
	Small	18.7	1573		5	36	1537	6083
	Medium	15.0	2483		20	20	2443	5730
	Large	19.6	3002		10	100	2892	9256
	Total	59.0	7683		35	166	7492	6464
Sonaka	Marginal	2.0	330		10		320	4333
	Small							
	Medium	1.2	60				60	2800
	Large	6.9	2066				2066	10167
	Total	10.1	2456		10		2446	5767
Bangalore blue	Marginal	6.2	1190		13	42	1147	2180
	Small	13.2	2610		14	150	2459	1493
	Medium	7.3	1220			75	1145	1775
	Large	7.7	1200		4	40	1158	1875
	Total	34.3	6220		31	307	5909	1831
Bangalore black	Marginal	5.7	393			52	341	1290
	Small	4.7	610			40	570	2400
	Medium							
	Large	4.9	400			20	380	400
	Total	15.3	1403			112	1291	1363
Dilkhush	Marginal	10.4	1580		25	67	1512	3244
	Small	13.7	1570		34	83	1467	2247
	Medium	10.9	1420		17	53	1365	1763
	Large	6.5	580		2	14	566	1500
	Total	41.6	5150		78	217	4910	2188
Sharath	Marginal	0.8	430		5	7	423	4900
	Small	2.0	550			25	525	5000
	Medium	0.4	150			5	145	5500
	Large							
	Total	3.2	1130		5	37	1093	5133
Manik Chaman	Marginal							
	Small	0.8	250				250	2200
	Medium	1.2	120			10	110	2000
	Large							
	Total	2.0	370			10	360	2100

4.2.2 Cost of cultivation

Maharashtra

The cost of cultivation of grapes in the study region is nearly Rs.251505 Rs/ha, of which nearly 97 % is the input cost and rest is incurred on storage, transportation and marketing (Figure 4.5 (i) & Figure 4.5 (ii)).Out of the total input costs, labour, cost of pesticides & weedicides and manure & fertilizer – with 21% each, account for bulk of the expenditure. Machinery hiring charges and irrigation account for 15% and 10%, respectively (Figure 4.5 (iii)). Both the varieties and all the size groups show approximately the similar cost structure, except that the machinery hire charges and transportation costs are lower for large farmers growing Thompson variety.

Karnataka

The cost of cultivation (CoC) of grapes in the study region is nearly Rs.253839 Rs/ha, out of which nearly 98% is the input cost and rest is incurred on storage, transportation and marketing (Figure 4.6 (i) & Figure 4.6 (ii)). The cost of cultivation is highest for Sonaka variety – about 356993 Rs/ha and lowest for Black variety - 156197 Rs/ha (Figure 4.6(i)). Out of the input costs, manure & fertilizer and pesticides/weedicides account for bulk of the expenditure with a share of 30% and 29%, respectively (Figure 4.6 (iii)). These are followed by seed & establishment costs (22%) and hired labour costs (11%).

Figure 4.5 (i): Per hectare cost of cultivation of all varieties: Maharashtra

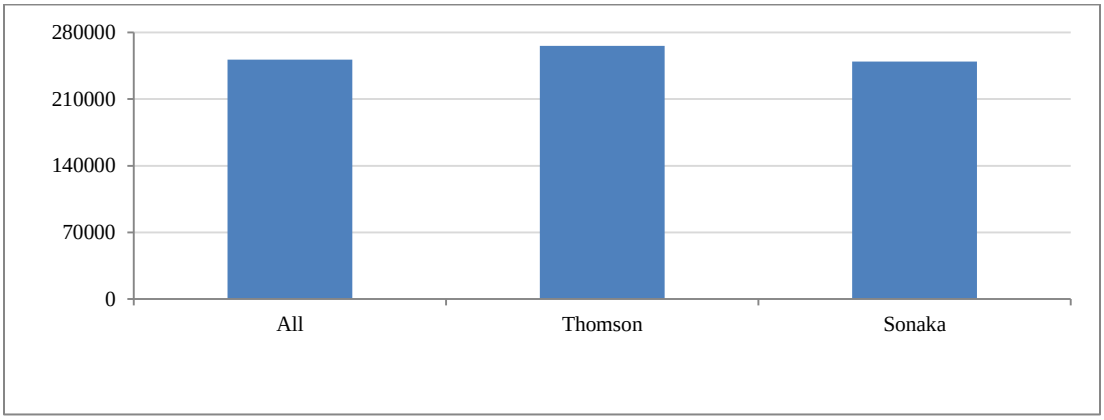


Figure 4.5 (ii): Share of input and STM costs: Maharashtra

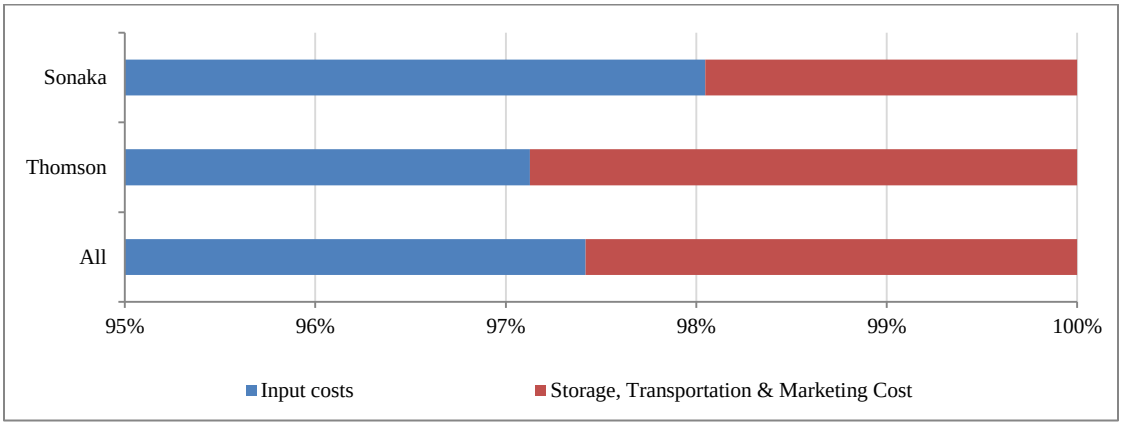


Figure 4.5 (iii): Share of different costs in total cost of cultivation: Maharashtra

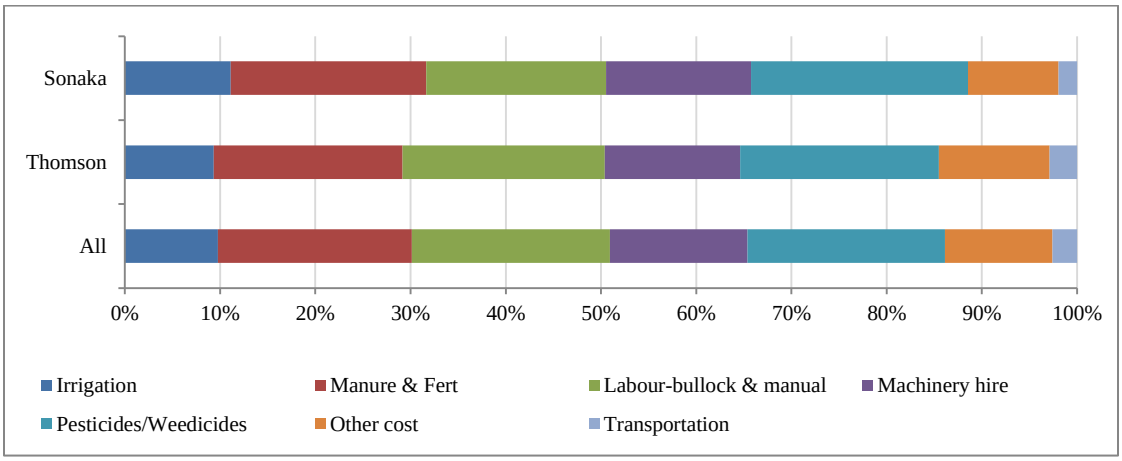


Figure 4.6 (i): Per hectare cost of cultivation of all varieties: Karnataka

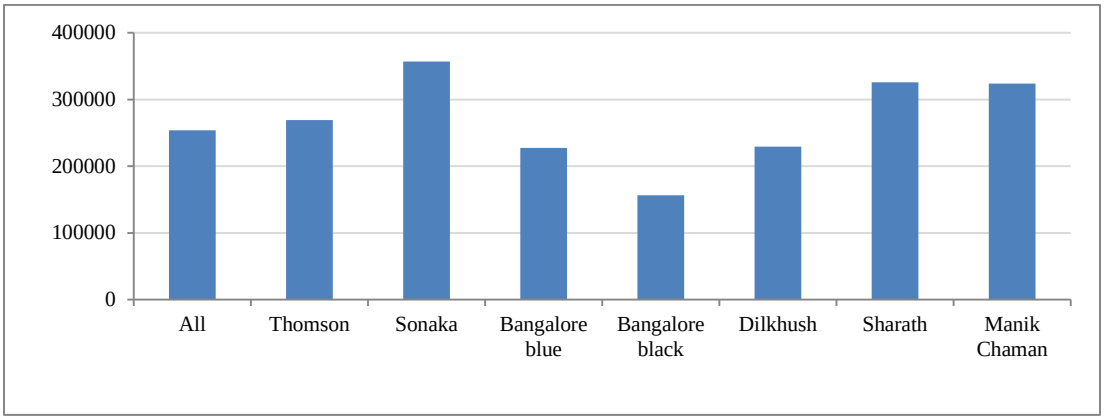


Figure 4.6 (ii): Share of input and STM costs: Karnataka

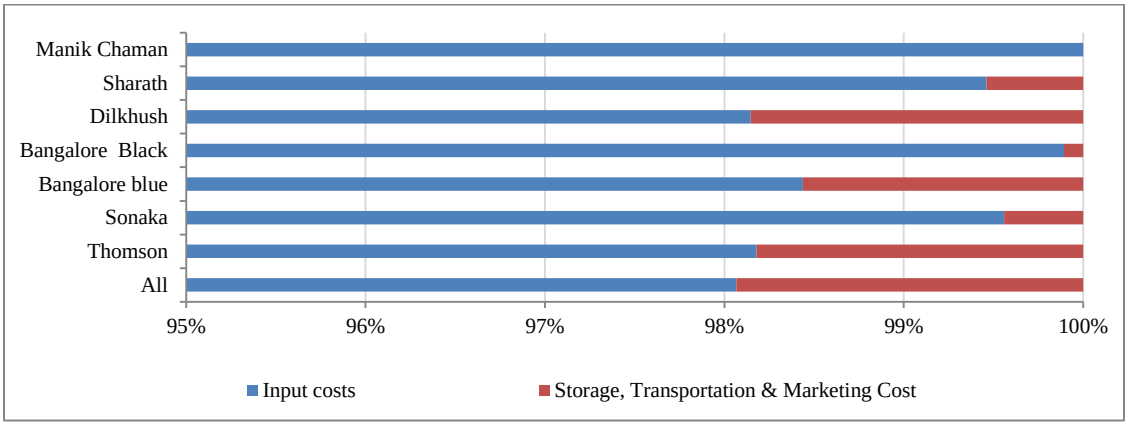
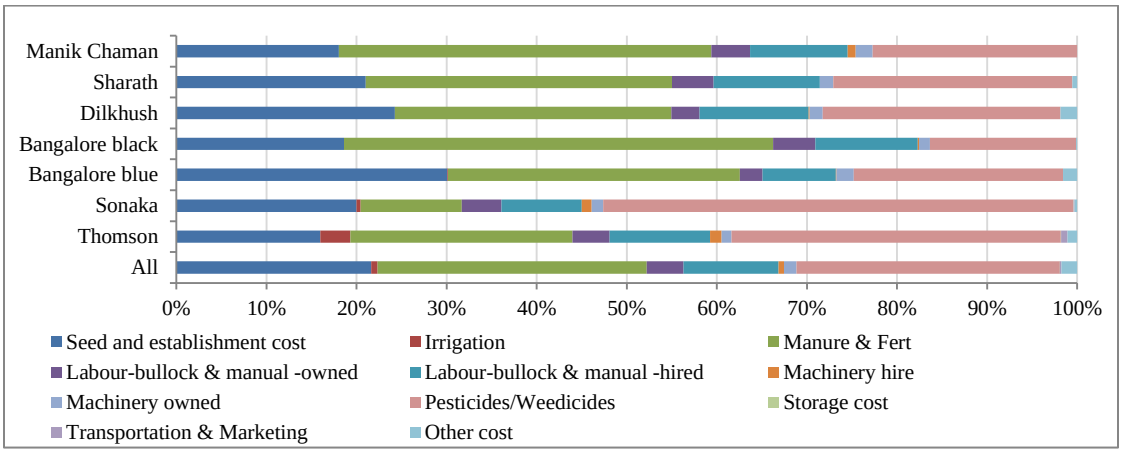


Figure 4.6 (iii): Share of different costs in total cost of cultivation: Karnataka



4.2.3 Profitability

Maharashtra

The average gross returns across all size-groups are 524116 Rs/ha and the net returns are 272611 Rs/ha (Table 4.11 (i)). The corresponding figures per quintal are 3428 Rs/qtl and 1783 Rs/qtl respectively. There are no marginal farmers growing the crop and the returns per hectare and per quintal are the lowest for small farmers. This is also confirmed from the marketed surplus, which is lowest for the small farmer group.

The per-hectare returns from Thompson variety are slightly higher than Sonaka but lower in per quintal terms (Table 4.11 (ii)). This is because of the higher productivity of Thompson vis-à-vis the Sonaka variety. The marketed surplus is also higher for Thompson variety.

Karnataka

The average gross and net returns per hectare across all size-groups from grapes cultivation in Karnataka worked out to 656812 Rs/ha and 213120 Rs/ha respectively (Table 4.12 (i)). The corresponding numbers per quintal are 4453 Rs/qtl and 1445 Rs/qtl respectively. The marketed surplus of grapes is 549143 Rs/ha. The gross & net returns as well as marketed surplus of large farmers are substantially higher than of other groups, and are almost double the average returns.

Both the gross and net returns are the highest for Sonaka - 2235699 Rs/Ha and 1850810 Rs/ha respectively (Table 4.12 (ii)). This is followed by Sharath (1759133 Rs/ha and 879742 Rs/ha) and Thompson (925160 Rs/ha and 628249 Rs/ha). The returns from other varieties are much lower by approximately 2.5 times that of Thompson variety. In fact, there is net lossfrom cultivation ofBangalore Blue, Bangalore Black, Dilkush and Manik Chaman varieties. The production of Thompson is the highest (7683 quintals), followed by Bangalore Blue (6220), Dilkhush (5150), Sonaka (2456), Bangalore Black (1403), Sharath (1130) and Manik Chaman (370). Therefore, Thompson and Sonaka appear to be the favoured varieties in terms of returns and production.

Table 4.11 (i): Returns per hectare (Rs.) – All Varieties: Maharashtra

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
Marginal					
Small	520463	264355	3337	1695	505316
Medium	532885	285583	3789	2031	516100
Large	526202	289582	3290	1811	509982
Total	524116	272611	3428	1783	508446

Table 4.11 (ii): Returns per hectare (Rs.) – Variety wise: Maharashtra

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	524116	272611	3428	1783	508446
Thomson	535457	269550	3361	1692	519980
Sonaka	517186	267836	3564	1846	500584

Table 4.12 (i): Returns per hectare (Rs.) – All Varieties: Karnataka

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
Marginal	479631	-261001	3245	-1766	388092
Small	409141	7585	3037	56	305299
Medium	558774	113798	3691	752	470034
Large	1143131	851858	7184	5353	1005129
Total	656812	213120	4453	1445	549143

Table 4.12 (ii): Returns per hectare (Rs.) – Variety wise: Karnataka

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	656812	213120	4453	1445	549143
Thomson	925160	628249	7103	4824	899896
Sonaka	2235699	1850810	9203	7619	2231413
Bangalore blue	318064	-245399	1753	-1353	122529
Bangalore black	139553	-234828	1519	-2556	128349
Dilkhush	289105	-149456	2335	-1207	275403
Sharath	1759133	879742	5028	2515	1701300
Manik Chaman	391089	-250012	2135	-1365	381188

4.3 Marketing

4.3.1 Marketing Channels and Month-wise Variety-wise Quantity Sold

Maharashtra

In Maharashtra, the entire grape marketing is done through 'on-farm sale' (Table 4.13, Figure 4.7 and Table 4.14). No other channels are being used by the sample households. About 20932 quintals of grapes are disposed through on-farm sale during the reference period of the study at an average

price of 3415 Rs/qtl (Table 4.16). There is no major variation in the monthly disposals or prices in Maharashtra (Table A 4.3).

Karnataka

The predominant marketing channel is the commission agent. 94% of the households are marketing through this channel (Table 4.13, Figure 4.8 and Table 4.15). About 6% of the households are marketing through the regulated market. The regulated market is being used mainly for the sale of Thompson and Sonaka varieties.

The total quantity sold during the reference period is about 9515 quintals at an average price of Rs. 4008 per quintal (Table 4.17). Sonaka fetched the maximum price of Rs 8731 Rs/qtl, followed by Thompson (7050 Rs/qtl) and Sharath (5133 Rs/qtl). The maximum quantity sold during the reference period belonged to the Thompson variety (3033 qtls), Bangalore Blue (2392) and Dilkush (1988). The sales start around April in Karnataka (Table A 4.4). Maximum sales are observed in the months of April (4515) and September (4858). However, the price is substantially higher in September – Rs 6658 per quintal - as compared to Rs 2467 per quintal in April.

Table 4.13: Marketing Channels - All varieties: Maharashtra

Farmer class	Total response	Percentage distribution of place of Sale (%)			
		Regulated Market	Commission Agent	On farm sale	Total
Maharashtra					
Marginal					
Small	149			100	100
Medium	34			100	100
Large	8			100	100
Total	191			100	100
Karnataka					
Marginal	51		100		100
Small	55	7	93		100
Medium	25	8	92		100
Large	21	14	86		100
Total	152	6	94		100

Figure 4.7: Marketing Channels - Variety wise: Maharashtra

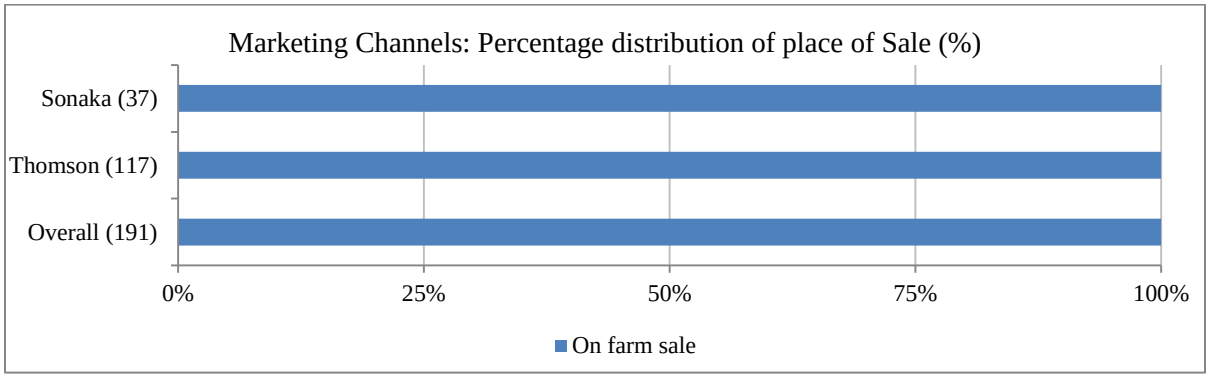


Table 4.14: Marketing Channels - Variety wise: Maharashtra

Variety	Total response	Percentage distribution of place of Sale (%)	
		On farm sale	Total
Thomson	117	100	100
Sonaka	37	100	100
Overall	191	100	100

Figure 4.8: Marketing Channels - Variety wise: Karnataka

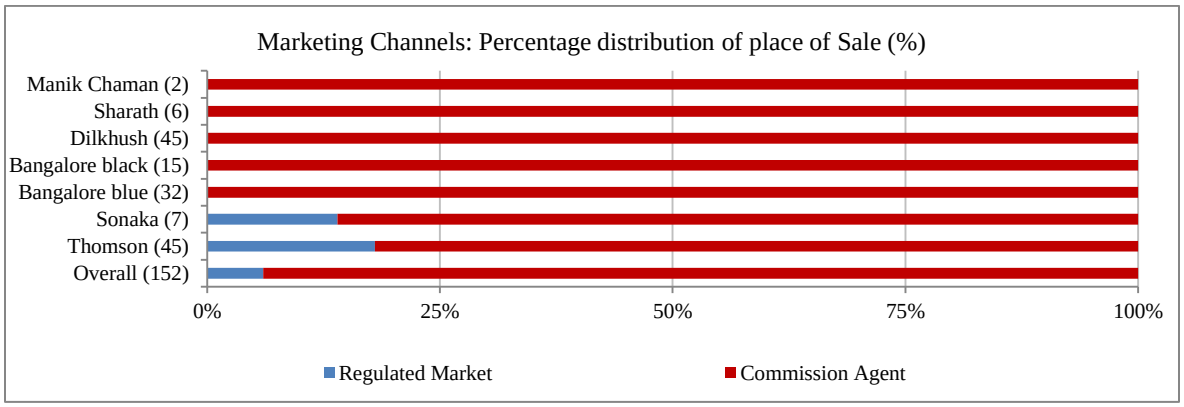


Table 4.15: Marketing Channels – All Varieties: Karnataka

Variety	Total response	Percentage distribution of place of Sale (%)		
		Regulated Market	Commission Agent	Total
Thomson	45	18	82	100
Sonaka	7	14	86	100
Bangalore blue	32		100	100
Bangalore black	15		100	100
Dilkhush	45		100	100
Sharath	6		100	100
Manik Chaman	2		100	100

Overall	152	6	94	100

Table 4.16: Details of quantity of grapes marketed through various channels - Maharashtra

Variety	Farm Category	On farm sale					Total					Total of all channels	% distn
		Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)		
Overall	Marginal												
	Small	13583	149	91	3337	100	13583	149	91	3337	100	13583	65
	Medium	4494	34	132	3789	100	4494	34	132	3789	100	4494	21
	Large	2855	8	357	3290	100	2855	8	357	3290	100	2855	14
	Total	20932	191	110	3415	100	20932	191	110	3415	100	20932	100
Thomson	Marginal												
	Small	9651	96	101	3245	100	9651	96	101	3245	100	9651	65
	Medium	3242	16	203	3699	100	3242	16	203	3699	100	3242	22
	Large	2021	5	404	3370	100	2021	5	404	3370	100	2021	14
	Total	14914	117	127	3313	100	14914	117	127	3313	100	14914	100
Sonaka	Marginal												
	Small	2441	29	84	3427	100	2441	29	84	3427	100	2441	82
	Medium	524	8	65	4205	100	524	8	65	4205	100	524	18
	Large												
	Total	2965	37	80	3595	100	2965	37	80	3595	100	2965	100

Table 4.17: Details of quantity of grapes marketed through various channels - Karnataka

Variety	Farm Category	Commission agent					Regulated market					Total					Total of all channels	% distn
		Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)		
Overall	Marginal	1766	51	35	3456	100						1766	51	35	3456	100	1766	19
	Small	2607	51	51	3170	95	150	4	38	7500	5	2757	55	50	3322	100	2757	29
	Medium	1778	23	77	2718	83	356	2	178	7900	17	2134	25	85	2912	100	2134	22
	Large	2685	18	149	3095	94	174	3	58	11500	6	2859	21	136	3779	100	2859	30
	Total	8835	143	62	3291	93	680	9	76	10400	7	9515	152	63	4008	100	9515	100
Thomson	Marginal	251	8	31	4788	100						251	8	31	4788	100	251	8
	Small	472	14	34	5679	76	150	4	38	7500	24	622	18	35	6589	100	622	21
	Medium	633	8	79	5188	64	356	2	178	7900	36	989	10	99	6544	100	989	33
	Large	1017	7	145	5543	87	154	2	77	11000	13	1171	9	130	8271	100	1171	39
	Total	2373	37	64	5299	78	660	8	83	8800	22	3033	45	67	7050	100	3033	100
Sonaka	Marginal	130	3	43	4333	100						130	3	43	4333	100	130	13
	Small																	
	Medium	24	1	24	2800	100						24	1	24	2800	100	24	2
	Large	816	2	408	9250	98	20	1	20	12000	2	836	3	279	10625	100	836	84
	Total	970	6	162	5461	98	20	1	20	12000	2	990	7	141	8731	100	990	100
Bangalore blue	Marginal	464	10	46	2180	100						464	10	46	2180	100	464	19
	Small	996	14	71	1493	100						996	14	71	1493	100	996	42
	Medium	464	4	116	1775	100						464	4	116	1775	100	464	19
	Large	469	4	117	1875	100						469	4	117	1875	100	469	20
	Total	2392	32	75	1831	100						2392	32	75	1831	100	2392	100
Bangalore black	Marginal	138	10	14	1290	100						138	10	14	1290	100	138	26
	Small	231	4	58	2400	100						231	4	58	2400	100	231	44
	Medium																	
	Large	154	1	154	400	100						154	1	154	400	100	154	29
	Total	523	15	35	1023	100						523	15	35	1023	100	523	100
Dilkhush	Marginal	612	18	34	3244	100						612	18	34	3244	100	612	31
	Small	594	15	40	2247	100						594	15	40	2247	100	594	30
	Medium	553	8	69	1763	100						553	8	69	1763	100	553	28
	Large	229	4	57	1500	100						229	4	57	1500	100	229	12
	Total	1988	45	44	2188	100						1988	45	44	2188	100	1988	100
Sharath	Marginal	171	2	86	4900	100						171	2	86	4900	100	171	39
	Small	213	3	71	5000	100						213	3	71	5000	100	213	48
	Medium	59	1	59	5500	100						59	1	59	5500	100	59	13
	Large																	
	Total	443	6	74	5133	100						443	6	74	5133	100	443	100
Manik Chaman	Marginal																	
	Small	101	1	101	2200	100						101	1	101	2200	100	101	69
	Medium	45	1	45	2000	100						45	1	45	2000	100	45	31
	Large																	
	Total	146	2	73	2100	100						146	2	73	2100	100	146	100

4.4 Sources of Supply and Percentage Margins

4.4.1 Sources of Supply

In this section the sources of supply for wholesalers, retailers and exporters have been analysed. In all 10 and 21 wholesalers have been interviewed in Maharashtra and Karnataka respectively. The corresponding numbers for retailers are10 and 27 respectively. The numbers of exporters in Maharashtra are 10. No exporters from Karnataka were included in the sample. Responses were elicited from these various stakeholders on their sources of supply.

In Maharashtra, the predominant source for wholesalers was farmers (60%), followed by commission agent (30%) and other wholesalers (10%) (Figure 4.9(i)). In Karnataka 100% of the supply was sourced from the farmers (Figure 4.9(ii)). Turning to the retailers' sources of supply, in Maharashtra, 50% of the supply is sourced from farmers, 40% from commission agents and 10% from wholesalers (Figure 4.10(i)). In Karnataka, the preferred source is wholesalers for 61% of the respondents and for 39%, it is farmers ((Figure 4.10(ii)).

Exporters in Maharashtra mainly preferred farmers (100%) as the first choice of supply (Figure 4.11). As a second choice, wholesalers were preferred by 60% of the respondents while commission agents were preferred by 40%. It is notable that all the three types of grape traders preferred fresh produce from farmers as the first choice of supply. **This is probably due to the absence proper cold storage and processing facilities at the wholesale, retail and export levels.**

Figure 4.9: Source of supply for the Wholesalers

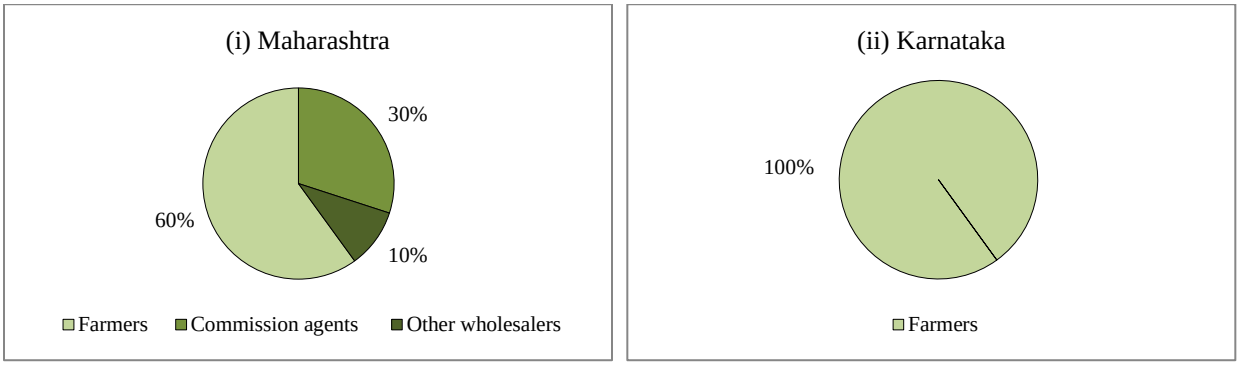
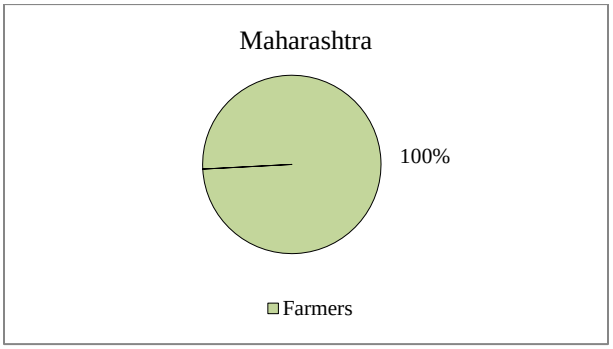


Figure 4.10: Source of supply for the Retailers

Figure 4.11: Source of supply for the Exporters



4.4.2 Percentage Margins

In this section the purchase price, sale price and percentage margins in the supply chain have been analysed. The idea is to discern the differences in margins at various stages and also changes in margins over time, if any.

In Maharashtra, the wholesalers' margins do not show a temporal pattern – ranging from 22% in March to 29% in November, **with an average of 23% (**Table 4.18**)**. The margins are similar for both the varieties – Thompson and Sonaka (Table 4.19). **The retailers' margins are slightly higher ranging from 27% in December to 32% in May, with an average of 30% for the whole year** (Table 4.21). The margins are broadly similar across the two varieties (Table 4.22). The exporters' profit margins are much higher compared to wholesalers or retailers. The percentage

mark-up for exporters ranges from 153% to 193%, with an average of 169% (Table 4.24). The percentage mark-ups are roughly the same for the two varieties (Table 4.25).

In Karnataka, the average wholesalers' margin (weighted with quantity marketed) is about 16% and this margin varies substantially across varieties – ranging from a low 7% for Dilkush variety to 112% for Sonaka (Table 4.20). Part of the reason could be the large quantum of Dilkush variety that is procured - about 21560 tons as against 1730 tons of Sonaka. Manik Chaman, Sharath and Sonaka appear to be premium varieties, yielding a sale price almost double that of the remaining varieties. The retailers' margins are much higher, with an average of 70% and ranging from 39% for Sonaka to 190% for black variety (Table 4.23). Although the percentage mark-up for Manik Chaman is the highest, the quantity procured is very low (1 ton). It is interesting that the relative order of percentage margins of different varieties at the retail level is quite different from that at the wholesale level.

Table 4.18: Trading Patterns of wholesalers (all varieties): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Wholesaler	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	3858	257	4801	944	24.5
February	3920	324	4870	950	24.2
March	3875	213	4710	835	21.5
April	3990	325	4921	931	23.3
May	3943	208	4878	935	23.7
November	3625	240	4686	1061	29.3
December	3700	400	4492	792	21.4
Average	3885	305	4796	911	23.5

Table 4.19: Trading Patterns of wholesalers (variety wise): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Wholesaler	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Thomson	3956	100.4	4876	920	23.3
Sonaka	4018	96.9	4984	966	24.0
Overall	3885	304.6	4796	911	23.5

Table 4.20: Trading Patterns of wholesalers (all varieties): Karnataka

Variety	Quantity procured (tons)	Purchase price (Rs/ton)	Turnover (Rs crore)	Sale price (Rs/ton)	Mark-up	Marke-up (%)
Bangalore blue	8900	19573	19	21663	2090	10.7
Black	9930	20330	22	22443	2113	10.4
Dilkhush	21560	20814	48	22289	1475	7.1
Manik chaman	1280	31109	6	46875	15766	50.7
Sharath	2210	43050	11	51072	8023	18.6
Sonaka	1730	23549	9	50029	26480	112.4
Thomson seedless	4140	26184	15	32208	6024	23.0
Average		22290		25909		16.2

Table 4.21: Trading Patterns of retailers (all varieties): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Retailer	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	5065	8.1	6640	1575	31.1
February	5646	6.1	7332	1686	29.9
March	5456	6.8	7135	1679	30.8
April	5731	6.8	7518	1787	31.2
May	5133	0.6	6785	1652	32.2
November	6117	2.6	7878	1762	28.8
December	5866	7.4	7466	1601	27.3
Average	5558	6.9	7237	1679	30.2

Table 4.22: Trading Patterns of retailers (variety wise): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) per Retailer	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Thomson	5963	3.9	7730	1767	29.6
Sonaka	6035	2.6	7863	1827	30.3
Overall	5558	6.9	7237	1679	30.2

Table 4.23: Trading Patterns of retailers (all varieties): Karnataka

Variety	Quantity procured (tons)	Purchase price (Rs/ton)	Turnover (Rs crore)	Sale price (Rs/ton)	Mark-up	Marke-up (%)
Bangalore blue	11	22315	4	40472	18157	81.4
Black	73	16668	35	48388	31720	190.3
Dilkhush	53	22954	28	51019	28064	122.3
Manik chaman	1	20000	0	72900	52900	264.5
Sharath	2	46667	1	85067	38400	82.3
Sonaka	35	33526	17	46695	13169	39.3
Thomson seedless	124	30689	47	37489	6800	22.2
Average		25965		44053		69.7

Table 4.24: Trading Patterns of exporters (all varieties): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) Per Exporter	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
January	3750	231.7	10994	7244	193.2
February	4210	632.8	11661	7451	177.0
March	4985	1385	12620	7635	153.2
November	4200	50	11130	6930	165
December	3750	540	10863	7113	189.7
Average	4394	1288.5	11839	7444	169.4

Table 4.25: Trading Patterns of exporters (variety wise): Maharashtra

Month	Average price (Rs/qtl) at which Purchased (PP)	Average Qty Sold (Qtl.) Per Exporter	Average Sale Price (Rs/qtl) (SP)	Mark - up (Rs/qtl) (SP-PP)	Percentage Mark-up [SP-PP)/PP*100
Thomson	4007	343.1	11394	7387	184.4
Sonaka	4138	36.3	12045	7908	191.1
Overall	4394	1288.6	11839	7444	169.4

4.5 Stakeholder Perceptions

4.5.1 Farmers' reasons for growing grapes

In Maharashtra, profitability (94%), land suitability (40%) and high value (27%) are the predominant reasons for growing grapes (Table 4.26). In Karnataka, land suitability (85%), profitability (64%), home consumption (44%), suitable for crop rotation (27%) and government subsidies (21%) have been reported to be the main reasons for growing grapes (Table 4.27).

Table 4.26: Reasons for Growing Grapes by Cultivating Households: Maharashtra

Reasons for Growing Crop by Households	Maharashtra					
	Total responses	Percentage to Total Number of Households (150)				
		Marginal	Small	Medium	Large	Total
Home Consumption	2		1			1
Profitability	141		77	14	3	94
Land suitability	60		33	6	1	40
Government subsidies	1		1			1
Fits well with crop rotation	1		1			1
Whether suitability, high value crop, etc.	40		23	3	1	27
Total	150		100	100	100	100

Table 4.27: Reasons for Growing Grapes by Cultivating Households: Karnataka

Reasons for Growing Crop by Households	Karnataka					
	Total responses	Percentage to Total Number of Households (152)				
		Marginal	Small	Medium	Large	Total
Home Consumption	67	15	17	6	7	44
Profitability	96	23	21	10	9	64
Land suitability	129	28	32	15	11	85
Government subsidies	31	7	5	4	4	21
Fits well with crop rotation	41	7	12	6	2	27
Whether suitability, high value crop, etc.						
Total	150	100	100	100	100	100

4.5.2 Major problems faced by farmers in cultivation of grapes

In Maharashtra, lack of price support has been reported to be the most severe problem by the maximum number grape-cultivating households (about 27%) (Table 4.28). This is followed by labour problem (22%), lack of extension services (19%), erratic power supply (18%) and poor refrigeration facilities (14%) as the other major problems in order of severity.

In Karnataka, an overwhelming 78% of the respondents rated distance of the market as the most severe problem (Table 4.28). Price fluctuations (50%), Poor quality of groundwater (47%), lack of market information (38%), labour problem (33%) and lack of price support (27%) are the other major problems reported by the farmers.

Table 4.28: Problems faced by Households in Grapes Cultivation

Problems faced by Households	Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower Yield	150	1	152	3
Unstable yield	150	3	152	12
Lack of remunerative price	150	5	152	6
Poor road network for transportation	150	4	152	1
Poor refrigeration facilities	150	14	152	14
Other infrastructure problems	150	5	152	8
Erratic electricity supply	150	18	151	23
Labour problem	150	22	152	33
Poor quality of underground water	150	7	152	47
Non-availability of good quality of seed	150	2	152	
Lack of/poor extension services lack of technical know-how	150	19	152	11
Price fluctuations	150	7	152	50
Lack of MSP/government procurement	150	27	152	27
Lack of market information	150		152	38
Collusion among traders/trade malpractices	150	1	152	17
Distant market			152	78
Diseases	150	1		

4.5.3 Major problems faced by Wholesalers

In Maharashtra, mixing of different varieties has been rated as the most severe problem by 60% of the wholesalers (Table 4.29). Poor refrigeration facilities (20%), erratic supply (10%) and high marketing charges (10%) are the other problems reported by the respondents as severe. Although not rated as severe problems, competition from other wholesalers (30%) and poor quality of supply (30%) have also been rated as major problems by the respondents.

In Karnataka, an overwhelming 81% of the respondents rated competition from other respondents as the most severe problem facing them (Table 4.29). This is followed by competition from imports (43%), poor road network and poor refrigeration facilities (10% each) and other infrastructure problems (30%) as severe problems faced by the wholesalers.

Table 4.29: Problems faced by Wholesalers

Problems faced by Wholesalers	Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower supply	10		21	
Poor quality supply	10		21	5
Lower price due to lower demand	10		21	5
Competition from other wholesalers	10		21	81
Competition from imports	10		21	43
Poor road network	10		21	10
Poor refrigeration facilities	10	20	20	10
Other Infrastructure problems	10		20	30
Erratic Supply/ Production	10	10	20	5
High Marketing Charges / taxes	10	10	20	
Mixing of different Varieties	10	60	19	11
Non-availability of cold storages	10			

4.5.4 Major problems faced by Retailers

In Maharashtra, lack of price support (20%) and poor quality of the product (20%) are reported to be the most severe problem by the retailers (Table 4.30). Poor infrastructure (10%) and lower price due to inadequate demand (10%) are the other major problems reported by the respondents.

In Karnataka, competition in the market place is reported to be the biggest problem faced by the retailers. A huge percentage of 84% of the respondents rated competition from fellow retailers as the most severe problem (Table 4.30). This is followed by competition from organized retail chains

and competition from imports as major problems by 20% of the respondents. Poor infrastructure has also been reported as a major problem by 28% of the respondents.

Table 4.30: Problems faced by Retailers

Problems faced by Retailers	Maharashtra		Karnataka	
	Total responses	'Most severe' (%)	Total responses	'Most severe' (%)
Lower supply	10	0	25	0
Poor quality of product	10	20	25	0
Non-remunerative price due to lower demand	10	10	25	0
Competition from other retailers	10	0	25	84
Competition from large organized retail chains	10	0	25	20
Competition from imports	10	0	25	20
Government intervention in price (MSP.MIP)	10	20	25	20
Labour problem				
Poor infrastructure	10	10	25	28
Other problems			16	50

4.5.5 Major problems faced by exporters

In Maharashtra, poor road network is rated as the most severe problem by 70% of the exporters (Table 4.31). This is followed by lengthy government procedures (20%), export policy uncertainty (20%) and high port charges & taxes (20%) as the other severe problems facing exporters. Poor refrigeration facilities and other infrastructure problems have also been reported as major problems by 10% of the respondents.

Table 4.31: Problems faced by Exporters

Problems faced by Exporters	Maharashtra	
	Total responses	'Most severe' (%)
Lower domestic production	10	
Poor quality of product	10	
Lower price due to lower world demand	10	
Competition from other wholesalers	10	
Competition from other exporters	10	
Poor road network	10	70
Poor port facilities	10	
Poor refrigeration facilities/facilities of drier	10	10
Other infrastructure problems	10	10
Lengthy government procedures	10	20
Export policy uncertainty	10	20
Erratic supply/production	10	
Low domestic demand	10	10
Mixing of different varieties	10	
Problem of chemical residue	10	
High port charges/taxes	10	20

Appendix Tables - Grapes

Table A 4.1: Marketing Channels: variety wise details - Maharashtra

Variety	Farmer class	Place of Sale		Percentage distribution of place of Sale (%)	
		On farm sale	Total	On farm sale	Total
Thomson	Marginal				
	Small	96	96	100	100
	Medium	16	16	100	100
	Large	5	5	100	100
	Total	117	117	100	100
Sonaka	Marginal				
	Small	29	29	100	100
	Medium	8	8	100	100
	Large				
	Total	37	37	100	100
Overall	Marginal				
	Small	149	149	100	100
	Medium	34	34	100	100
	Large	8	8	100	100
	Total	191	191	100	100

Table A 4.2: Marketing Channels: variety wise details - Karnataka

Variety	Farmer class	Place of Sale			Percentage distribution of place of Sale (%)		
		Regulated Market	Commission Agent	Total	Regulated Market	Commission Agent	Total
Thomson	Marginal		8	8		100	100
	Small	4	14	18	22	78	100
	Medium	2	8	10	20	80	100
	Large	2	7	9	22	78	100
	Total	8	37	45	18	82	100
Sonaka	Marginal		3	3		38	100
	Small						
	Medium		1	1		10	100
	Large	1	2	3	33	67	100
	Total	1	6	7	14	86	100
Bangalore blue	Marginal		10	10		100	100
	Small		14	14		100	100
	Medium		4	4		100	100
	Large		4	4		100	100
	Total		32	32		100	100
Bangalore black	Marginal		10	10		100	100
	Small		4	4		100	100
	Medium						
	Large		1	1		100	100
	Total		15	15		100	100
Dilkhush	Marginal		18	18		100	100
	Small		15	15		100	100
	Medium		8	8		100	100
	Large		4	4		100	100
	Total		45	45		100	100
Sharath	Marginal		2	2		100	100
	Small		3	3		100	100
	Medium		1	1		100	100
	Large						
	Total		6	6		100	100
Manik Chaman	Marginal						
	Small		1	1		100	100
	Medium		1	1		100	100
	Large						
	Total		2	2		100	100
Overall	Marginal		51	51		100	100
	Small	4	51	55	7	93	100
	Medium	2	23	25	8	92	100
	Large	3	18	21	14	86	100
	Total	9	143	152	6	94	100

Table A 4.3: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Maharashtra

Variety	Farm Category	January		February		March		April		May		Total	
		Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
Thomson	Marginal												
	Small	2303	3226	2149	3433	1702	3273	1503	2950	1995	3189	9651	3245
	Medium	725	3717	1165	3568	593	4357			759	3230	3242	3699
	Large			1282	2800	100	4950	164	3300	474	2900	2021	3370
	Total	3028	3311	4597	3434	2394	3470	1667	2980	3228	3169	14914	3313
Sonaka	Marginal												
	Small	408	3277	661	3798	382	3690	705	2930	285	2760	2441	3427
	Medium	149	3475	138	3990	160	4290	78	5065			524	4205
	Large												
	Total	557	3326	799	3836	541	3810	783	3784	285	2760	2965	3595
Overall	Marginal												
	Small	2951	3413	3262	3550	2760	3337	2233	2871	2376	3204	13583	3337
	Medium	1131	3864	1417	3515	1034	3914	78	5065	834	3223	4494	3789
	Large			1282	2800	293	4075	806	3190	474	2900	2855	3290
	Total	4082	3525	5961	3527	4087	3461	3117	3138	3684	3186	21016	3415
Note: On farm sale only, Quantity in Quintals and Price in Rs./Quintal													

Table A 4.4: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Karnataka

Variety	Farm Category	April		May		September		November	
		Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
Regulated Market									
Thomson	Marginal								
	Small	150	7500						
	Medium	356	7900						
	Large	154	11000						
	Total	660	8800						
Commission Agent									
Thomson	Marginal	251	4788						
	Small	472	5679						
	Medium	633	5188						
	Large	394	5633			623	5000		
	Total	1750	5322			623	5000		
Regulated Market									
Sonaka	Marginal								
	Small								
	Medium								
	Large	20	12000						
	Total	20	12000						
Commission Agent									
Sonaka	Marginal	130	4333						
	Small								
	Medium	24	2800						
	Large	816	9250						
	Total	970	5461						
Commission Agent									
Bangalore blue	Marginal	23	1800	20	8000	421	1500		
	Small	219	1325			776	1560		
	Medium	65	1800			399	1767		
	Large	57	1800			412	1900		
	Total	364	1681	20	8000	2008	1682		
Commission Agent									
Bangalore black	Marginal					138	1290		
	Small					231	2400		
	Medium								
	Large					154	400		
	Total					523	1363		
Commission Agent									
Dilkhush	Marginal					606	2056	6	8250
	Small			77	2500	517	2229		
	Medium					553	1763		
	Large	161	2500	40	1000	28	1250		
	Total	161	2500	117	1750	1704	1824	6	8250
Commission Agent									
Sharath	Marginal	172	4900						
	Small	213	5000						
	Medium	59	5500						
	Large								
	Total	444	15400						
Commission Agent									
Manik Chaman	Marginal								
	Small	101	2200						
	Medium	45	2000						
	Large								
	Total	146	2100						

Note: Quantity in Quintals and Price in Rs./Quintal

Chapter 5

BASMATI

5.1 Demographic Profile and Cropping Pattern of the Study Region

5.1.1 Demographic profile of the sample households

Punjab

The total number of sample households is 150 for Basmati (Table 5.1(a)). About 18 sample households (12%) belong to the marginal farmer category, followed by small farmers (20%), medium farmers (32%) and large farmers (36%). Basmati cultivation appears increase with size of the landholding. The total sample population of the basmati-cultivating households is about 953 out of which adult population is about 75% - adult males and adult females constituting about 39% and 36% respectively (Table 5.1). 83% of the sample households have a literate head and about 58% have educational attainments of high school or above (Table 5.2). Majority of the households belong to the general category (97%) and the percentage of OBC and SC households is about 1% each (Table 5.3). There are no households belonging to the ST category.

Haryana

The total number of sample households is 150 for Basmati (Table 5.1(a)). About 14 sample households (9%) belong to the marginal farmer category, followed by small farmers (16%), medium farmers (19%) and large farmers (56%). Basmati cultivation appears to be predominant among the large size-group. The total sample population of the basmati-cultivating households is about 1219 out of which adult population is about 65% - adult males and adult females constituting about 34% and 31%, respectively (Table 5.1). 87% of the sample households have a literate head and about 69% have educational attainments of high school or above (Table 5.2). Majority of the households belong to the general category (73%) and the percentage of OBC households about 22% (Table 5.3). The percentage of SC households is about 5%. There are no households belonging to the ST category.

Table 5.1(a): No of sample households in various land-holding categories: Basmati

Size of the Landholding	Punjab		Haryana	
	Number of sample households	% to Total	Number of sample households	% to Total
Marginal	18	12	14	9
Small	30	20	25	16
Medium	48	32	30	19
Large	54	36	87	56
Total	150	100	156	100

Table 5.1: Demographic profile of the sample households

Farmer class	Total members in Family	Percentage Distribution (%)				
		Adults			Children	Total
		Males	Females	Total		
Punjab						
Marginal	97	36	40	76	24	100
Small	154	39	37	76	24	100
Medium	304	38	34	72	28	100
Large	398	39	36	76	24	100
Total	953	39	36	75	25	100
Haryana						
Marginal	121	37	30	67	33	100
Small	152	34	30	64	36	100
Medium	187	36	33	69	31	100
Large	759	33	31	63	37	100
Total	1219	34	31	65	35	100

Table 5.2: Education level of the Head of the sample households

Farmer class	Total No. of Households	Percentage Distribution (%)					
		Illiterates	Primary	Secondary	High School	Higher	Total
Punjab							
Marginal	18	44		22	17	17	100
Small	30	20	23	10	30	17	100
Medium	48	19	8	15	33	25	100
Large	54	6	9	11	35	39	100
Total	150	17	11	13	31	27	100
Haryana							
Marginal	14	7	14	7	21	50	100
Small	25	16		12	36	36	100
Medium	29	3		24	31	42	100
Large	82	16	7	11	28	38	100
Total	150	13	5	13	29	40	100

Table 5.3: Caste profile of the sample households

Farmer class	Total No. of Households	Percentage Distribution (%)				
		Scheduled Caste	Scheduled Tribe	Other Backward Classes	Others	Total
Punjab						
Marginal	18	6		6	89	100
Small	30	3		3	93	100
Medium	48				100	100
Large	54				100	100
Total	150	1		1	97	100
Haryana						
Marginal	14	7		7	86	100
Small	25	8		24	68	100
Medium	29	3		10	86	100
Large	82	5		28	67	100
Total	150	5		22	73	100

5.1.2 Area and Irrigation Pattern of the sample households

The total area under cultivation in the sample region of Punjab is 723 ha. The entire area (100%) is irrigated (Table 5.4). Tubewell plus canal is the predominant form of irrigation in the state, providing irrigation to 51% of the area. This is followed by tubewells (only), which provide irrigation to 49% of the area. In Haryana, the total area under cultivation of basmati households is about 749 ha. The entire area (100%) is irrigated. Tubewell is the predominant source of irrigation in the state, providing irrigation to 82% of the area. About 13% of the area is irrigated by both canals and tubewells. Only canals provide irrigation to just about 4% of the area.

Table 5.4: Irrigation Details of the sample households

Farmer class	Irrigated Area (in ha.)			Percentage Distribution by Source (%)						
	Irrigated	Un-Irrigated	Total	Canal	Tube well	Tube well&Canal	Others	Irrigated	Un-Irrigated	Total
Punjab										
Marginal	14		14		71	29		100		100
Small	48		48		68	32		100		100
Medium	158		158		59	41		100		100
Large	503		503		44	56		100		100
Total	723		723		49	51		100		100
Haryana										
Marginal	8		8		100			100		100
Small	35		35	1	88	11		100		100
Medium	83		83	3	79	17	2	100		100
Large	623		623	4	82	13	1	100		100
Total	749		749	4	82	13	1	100		100

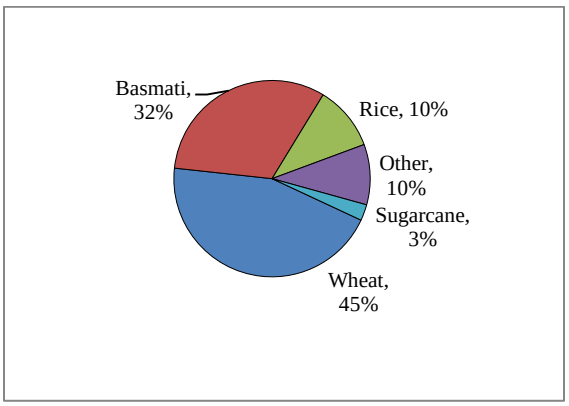
5.1.3 Cropping Pattern of the sample households

The sample districts in both the states have been chosen to be basmati-growing districts. In Punjab, basmati occupies about32% of the total area (Figure 5.1 (i) & Table 5.5 (i)). In Punjab, the major share under basmati belongs to large farmers (68%), followed by medium farmers (22%) (Table 5.6 & Figure 5.2). Small and marginal farmers together command a share of less than 10%, showing that basmati cultivation is mainly practiced by the larger size-groups.

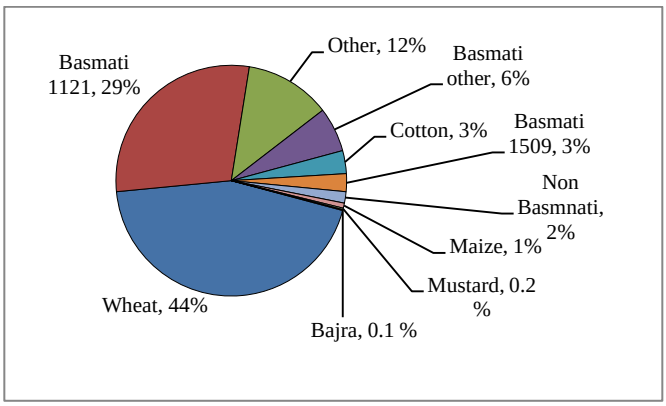
In Haryana again, basmati is a major crop in the sample region, occupying about 38% of the total area (Figure 5.1 (ii) & Table 5.5 (ii)). In Haryana, the situation is very similar. Here too, the share of area under basmati is highest for large farmers (79%) followed by the medium size-group (13%) (Table 5.6 & Figure 5.2). Here also basmati cultivation is mainly practiced by the larger size-groups as shown by the cumulative share of small and marginal farmers which is less than 10%.

Out of a total basmati area of 450 ha in Punjab, 90% of the area is under Pusa Basmati 1121, 7% is under Traditional Basmati and only 3% is under Pusa Basmati 1509 (Table 5.7). In Haryana, the major varieties grown are Pusa Basmati 1121, Pusa Basmati 1509 and other Basmati varieties. Pusa Basmati 1121 is the predominant variety occupying about 77% of the total basmati area of 549 ha (Table 5.8). This is followed by 'other' basmati varieties, occupying about 15% of the area. About 7% of the area is under Pusa Basmati 1509.

Figure 5.1: Cropping pattern of the sample households



(i): Punjab



(ii): Haryana

Table 5.5 (i): Cropping pattern of the sample households: Punjab

Farmer class	Total Area (in ha)	Percentage Distribution (%)					
		Rice	Wheat	Sugarcane	Basmati	Other	Total
Marginal	28	3	43		39	16	100
Small	98	8	42		33	16	100
Medium	307	11	45	0.5	33	11	100
Large	973	11	45	4	31	9	100
Total	1406	11	45	3	32	10	100

Table 5.5 (ii): Cropping pattern of the sample households: Haryana

Farmer class	Total Area (in ha)	Percentage Distribution (%)										
		Pusa Basmati 1121	Pusa Basmati 1509	Basmati other	Non Basmati	Wheat	Bajra	Mustard	Cotton	Maize	Other	Total
Marginal	15	40	3	1		46		1	1		8	100
Small	67	41	2	2		48			2	1	4	100
Medium	163	34	2	5	3	45			1	0.4	9	100
Large	1207	28	3	7	2	44	0.2	0.2	4	1	13	100
Total	1453	29	3	6	2	44	0.1	0.2	3	1	12	100

Table 5.6: Percentage Distribution of Area under Basmati among the sample households

Farmer class	Punjab	Haryana
Marginal	2.4	1.4
Small	7.2	6.3
Medium	22.4	13.0
Large	68.0	79.3
Total	100.0	100.0

Figure 5.2: Area under Basmati: Percentage share of different size-groups

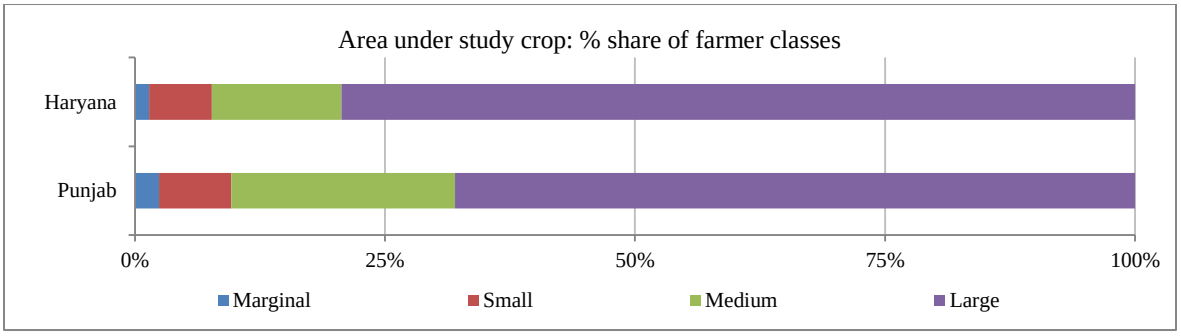


Table 5.7: Variety-wise area under basmati: Punjab

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)			
		Pusa Basmati 1121	Pusa Basmati 1509	Traditional Basmati	Total
Marginal	11	100			100
Small	33	94		6	100
Medium	101	92	3	5	100
Large	306	88	4	8	100
Total	450	90	3	7	100

Table 5.8: Variety-wise area under basmati: Haryana

Farmer class	Total Area (Ha.)	Percentage Distribution by variety (%)				
		Pusa Basmati 1121	Pusa Basmati 1509	Basmati Muchad	Basmati Other	Total
Marginal	7	91	6		3	100
Small	30	92	4	2	3	100
Medium	68	82	5		13	100
Large	445	75	7	2	16	100
Total	549	77	7	2	15	100

5.2 Economics of the Study Crop

5.2.1 Production, Consumption and Other Details

Punjab

The major varieties grown in the state are Pusa 1121, Pusa Punjab 1509 and traditional Basmati. The total basmati production from all the varieties together was 18532 quintals in the study regions of state, of which nearly 91% is from Pusa 1121 (Tables 5.9). About 5% and 4% of the production is from traditional Basmati and Pusa Punjab 1509, respectively. About 84% of the production is sold in the market and about 14% is stores for future use (Tables 5.10 & Figure 5.3). Only 2% of the production is consumed by the cultivating households. This indicates that basmati is cultivated in Punjab mainly for its profitability. Traditional basmati variety is mainly sold (95%) or consumed (3%) and very little is stored for future use (2%). This is because the average price received for traditional basmati is about 5199 Rs/qtl, which is way above the overall average price of 3915 Rs/qtl (Table 5.10). There is no variation in the price received by farmers across size-groups, indicating no inherent advantage to large farmers.

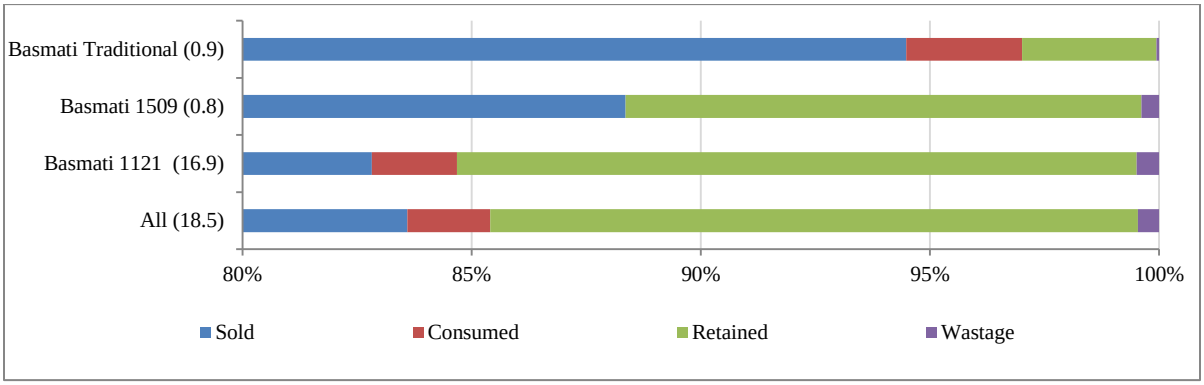
Table 5.9: Variety wise production and % share -Basmati

Punjab			Haryana		
Variety	Production	% Share	Variety	Production	% Share
Basmati 1121	16896	91.2	Basmati 1121	17018	91.5
Basmati 1509	782	4.2	Basmati 1509	1582	8.5
Basmati Traditional	854	4.6			
Overall	18532	100.0	Overall	18600	100.0

Table 5.10: Production, consumption and other details – Basmati - Punjab

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal	10.9	437	15			422	3605
	Small	32.5	1264	38	82	3	1141	3983
	Medium	100.6	4200	107	423	15	3655	3922
	Large	306.0	12631	176	2114	68	10273	3917
	Total	450.0	18532	336	2619	86	15492	3915
Variety -wise								
Pusa 1121	Marginal	10.9	437	15			422	3605
	Small	30.5	1210	37	82	3	1089	3928
	Medium	92.9	3943	103	423	15	3402	3914
	Large	269.0	11306	159	2001	64	9081	3899
	Total	403.3	16896	314	2506	82	13994	3897
Pusa Punjab 1509	Marginal							
	Small							
	Medium	2.8	131		0	0	131	2954
	Large	12.6	651		88	3	560	2933
	Total	15.4	782		88	3	691	2936
Traditional	Marginal							
	Small	2.0	54	1			53	5210
	Medium	4.9	126	4			122	5215
	Large	24.4	674	17	25	1	632	5195
	Total	31.3	854	22	25	1	807	5199

Figure 5.3: Production, Consumption and Other Details: % shares in production: Punjab



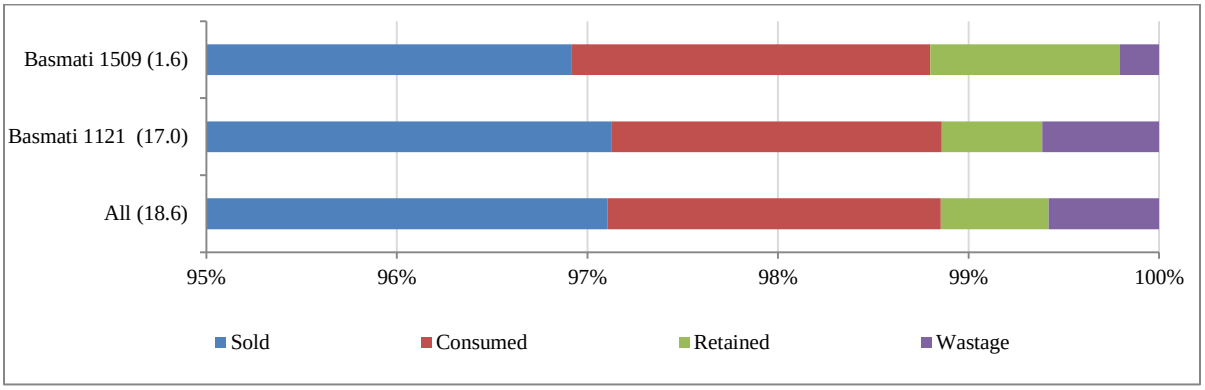
Haryana

Tha major varieties grown in the state are Pusa 1121 and Pusa Punjab 1509. There are no traditional varieties of basmati in the sample region. About 91% of the area is under Pusa 1121and the rest (9%) is under Pusa Punjab 1509 (Table 5.9). In Haryana, the total production is 18598 quintals, out of which about 91% is of Pusa 1121. The percentage of production sold in the market is much higher than in Punjab – 97% as compared to 84% in Punjab (Tables 5.11 & Figure 5.4). About 2% of the production is consumed. These proportions are similar and there is very little variation across varieties of basmati or size-groups of farmers (Table 5.11).

Table 5.11: Production, consumption and other details – Basmati - Haryana

Varieties	Farmer class	Area (Ha)	Production (Qtls)	Consumed (Qtls)	Retained/stocked for future use(Qtls)	Wastage (Qtls)	Sold (Qtls)	Price (Rs./Qtl)
Overall								
Overall	Marginal	6.4	269	19	2	1	247	3785
	Small	28.9	1094	32	7	2	1053	3474
	Medium	59.4	2291	55	7	20	2210	3624
	Large	363.7	14944	219	90	85	14552	3585
	Total	458.4	18598	325	106	108	18062	3586
Variety -wise								
Pusa Basmati 1121	Marginal	6.0	254	19	2	1	232	3824
	Small	27.6	1028	31	7	2	988	3511
	Medium	55.9	2157	52	5	20	2081	3627
	Large	332.5	13579	193	77	82	13228	3608
	Total	422.0	17018	295	90	104	16529	3607
Pusa Basmati 1509	Marginal	0.4	16	0.3	0.3		15	3200
	Small	1.2	67	1	1		65	2900
	Medium	3.6	134	3	2		129	3567
	Large	31.3	1366	26	13	3	1324	3357
	Total	36.4	1582	30	16	3	1533	3354

Figure 5.4: Production, Consumption and Other Details: % shares in production: Haryana



5.2.2 Cost of cultivation

Punjab

The total cost of onion cultivation in the state is nearly 30208Rs/ha, of which nearly 96% is the input cost and rest is incurred on storage, transportation and marketing (Figure 5.5 (i) & Figure 5.5 (ii)). Out of the total input costs, nearly half (about 48%) is incurred on labour (bullock+manual), followed by machinery hiring (nearly 18%), pesticides / weedicides (13%) and manure & fertilizer (12%) (Figure 5.5 (iii)). All the categories of farmers show similar cost pattern.

Haryana

The total cost of basmati cultivation in the state is nearly 39488 Rs/ha. About 93% of the total cost is incurred on the inputs and the rest on storage, transportation and marketing (STM) (Figure 5.6 (i) & Figure 5.6 (ii)). Out of the total costs, about 47% is incurred on labour (bullock + manual), followed by manure & fertilizer (15%), pesticides/weedicides (13%) and machinery hiring (nearly 11%) (Figure 5.6 (iii)). Marketing & other costs and transportation accounted for 4% and 3% of the total costs respectively. The proportion of labour costs is slightly lower for Basmati 1509 (41%) as compared to Basmati 1121 (47%). The corresponding machinery hire charges are higher for Basmati 1509 (12%) as compared to Basmati 1121 (11%). This shows that the two varieties perhaps differ in their machine use.

Figure 5.5 (i): Per hectare costs of cultivation of all varieties: Punjab

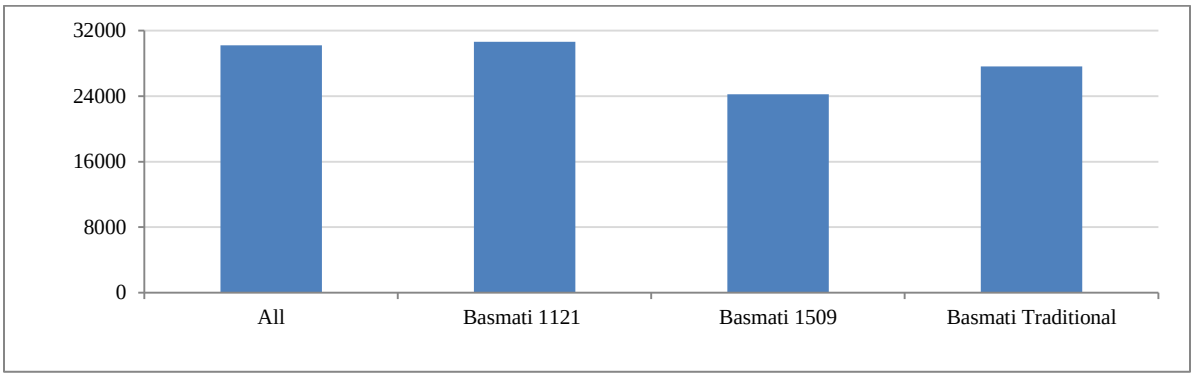


Figure 5.5 (ii): Share of input and STM costs: Punjab

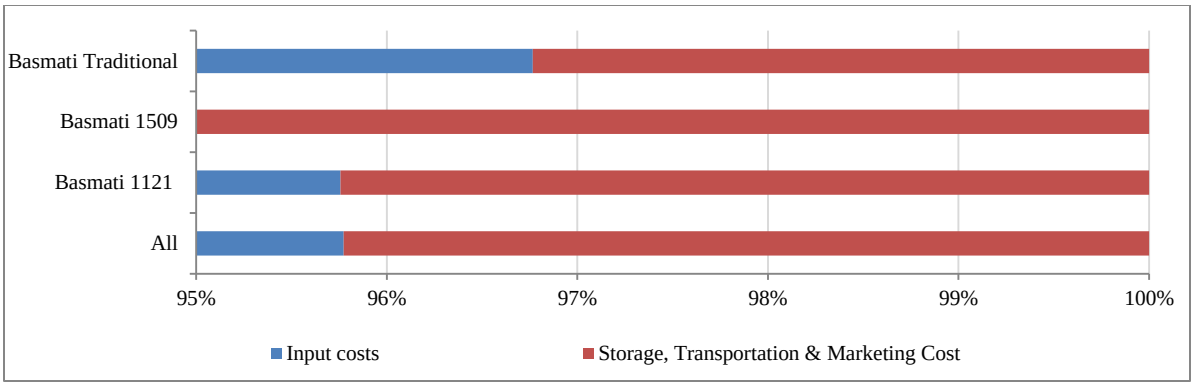


Figure 5.5 (iii): Share of different costs in total cost: Punjab

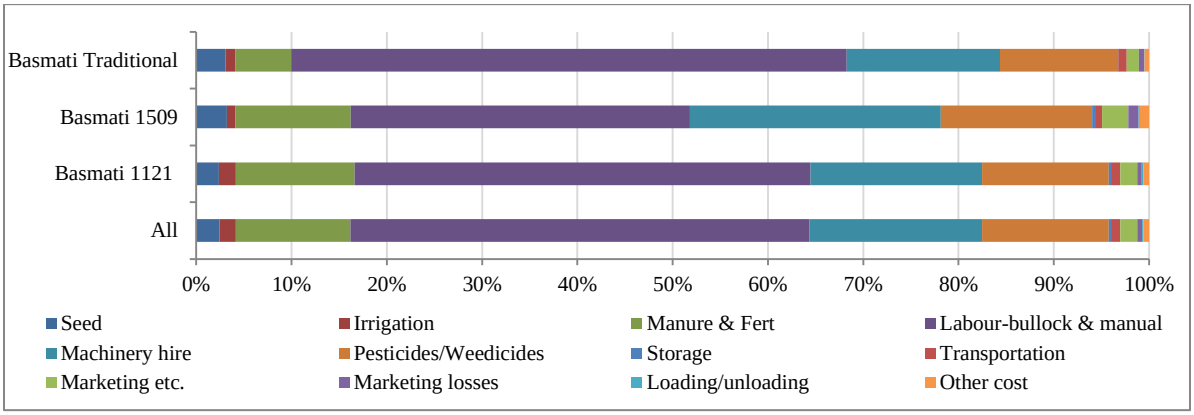


Figure 5.6 (i): Per hectare costs of cultivation of all varieties: Haryana

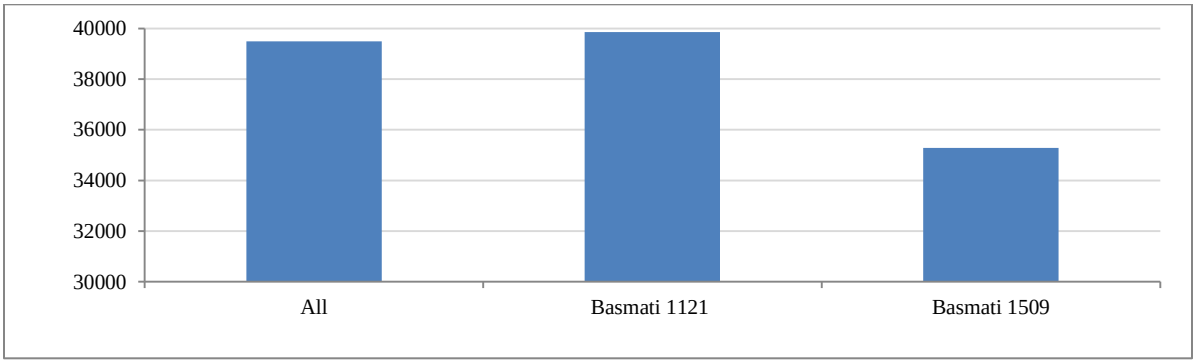


Figure 5.6 (ii): Share of input and STM costs: Haryana

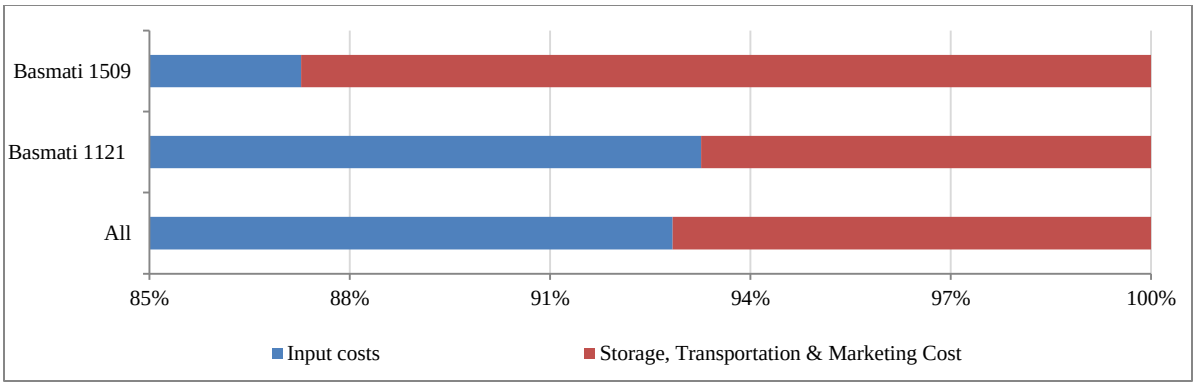
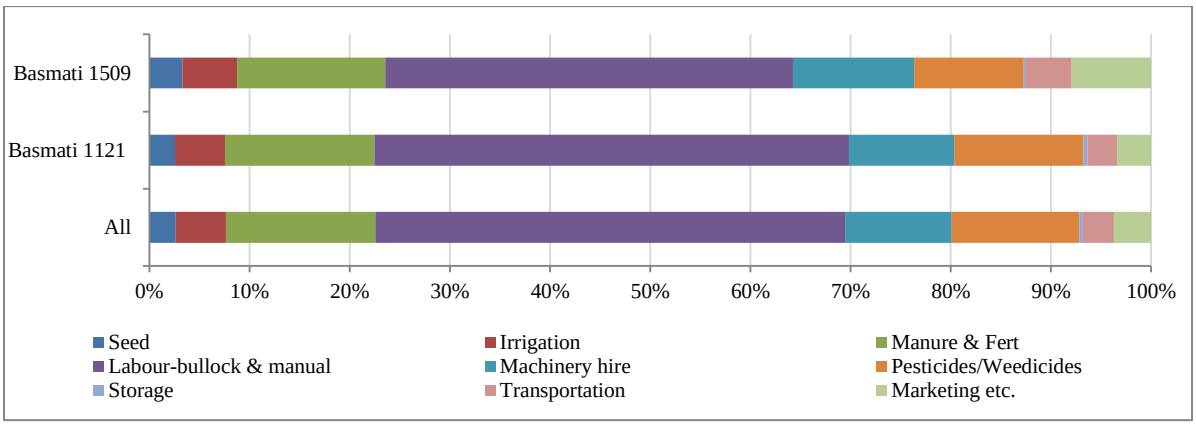


Figure 5.6 (iii): Share of different costs in total cost: Haryana



5.2.3 Profitability

Punjab

The gross returns from basmati cultivation (all varieties) are about Rs.74089123, with a total cost of Rs. 13592265 (about 18% of the gross returns), yielding a net return of Rs.60496859. The gross and net returns per hectare are 164657 Rs/ha and 134449 Rs/ha respectively (Table 5.12 (i)). The corresponding figures per quintal are 3998 and 3265 respectively. The gross and net returns per hectare are lowest for the marginal farmers - 148697 Rs/ha and 122945 Rs/ha respectively. The returns per quintal are also lowest for marginal farmers - 3695 Rs/qtl and 3055 Rs/qtl respectively, showing that even after taking the productivity aspect into consideration, the relative position of marginal farmers is worse as compared to other size-groups. Pusa Basmati 1121 variety yielded

the highest returns – with per hectare gross and net returns of Rs 166794 and Rs 136157, respectively (Table 5.12 (ii)).

Haryana

In Haryana the gross and net returns are slightly lower than Punjab. The gross returns are 144596 Rs/ha and the net returns are 105109 Rs/ha (Table 5.13 (i)). The corresponding figures for returns per quintal are 3564 Rs/qtl and 2591 Rs/qtl, respectively. However, it is interesting that unlike in Punjab, the returns are highest for marginal farmers. The returns for both the varieties – Pusa Basmati 1121 and Pusa Basmati 1509 – are similar (Table 5.13 (ii)).

Table 5.12 (i): Returns per hectare (Rs.) – All Varieties: Punjab

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.
Marginal	148697	122945	3695	3055
Small	158261	130276	4068	3349
Medium	167057	138005	4002	3306
Large	165114	134132	4000	3250
Total	164657	134449	3998	3265

Table 5.12 (ii): Returns per hectare (Rs.) –Variety wise: Punjab

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	164657	134449	3998	3265	157583
Pusa Basmati 1121	166794	136157	3981	3250	159437
Pusa Basmati 1509	149114	124895	2937	2460	148543
Basmati Traditional	144774	117149	5308	4295	138136

Table 5.13 (i): Returns per hectare (Rs.) – All Varieties: Haryana

Farm Size	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.
Marginal	157423	113872	3749	2712
Small	129005	86013	3402	2268
Medium	139789	96945	3625	2514
Large	146391	107802	3563	2624
Total	144596	105109	3564	2591

Table 5.13 (ii): Returns per hectare (Rs.) –Variety wise: Haryana

Variety	Gross Returns/Ha.	Net Returns/Ha.	Gross Returns/Qtl.	Net Returns/Qtl.	Marketed Surplus/Ha.
All	144596	105109	3564	2591	140534
Pusa Basmati 1121	145498	105648	3608	2620	141359
Pusa Basmati 1509	145564	110274	3354	2541	141094

5.3 Marketing

5.3.1 Marketing Channels

Punjab

Nearly 96 per cent of the households are marketing through the regulated market (Table 5.14, Figure 5.7 & Table 5.15). Also, 96% of the total output sold is marketed through this channel. Traditional variety is fully marketed through regulated market. The price received differs substantially across varieties – from 2936 Rs/qtl of Pusa Basmati 1509 variety to 5199 Rs/qtl of traditional basmati variety (Table 5.17 (ii)). However, for a given variety, there is very little variation in price received across farmer categories. Large farmers sold 12387 quintal (68% of total quantity sold) and this proportion decreases as the land holding size decreases. Quantity sold per household is also highest (229 quintal) for large farmers and overall it is 121 quintal per household (Table 5.17 (i)).

Haryana

There is some variation across varieties as regards the channel of marketing. Overall, about 63% of the households are marketing through commission agents while the rest are marketing through the village market (Table 5.14). However, there is variation in the two varieties though. Pusa Basmati 1509 variety is almost entirely marketed (96 per cent of the households) through the commission agents, whereas in case of Pusa Basmati 1121 only about 63% of the households use commission agents as the main channel while the rest are marketing in the village market (Figure 5.8 & Table 5.16). About 52% of the total quantity is sold through the commission agents channel and about 48% is sold in the village market (Table 5.18). Again there is a large difference between the two varieties. In the case of Pusa Basmati 1509 variety, about 97% of the total quantity is sold through the commission agents channel. However, in case of Pusa Basmati 1121, only 48% is sold through this channel while the major portion (52%) is sold in the village market. Across varieties, despite the differences in marketing channels in terms of the number of households and quantity marketed, there is very little difference in the price received (Table 5.18). Large farmers constitute above 80 % share in total quantity sold and quantity sold per household is also highest for this class (about 167 quintals).

Table 5.14: Marketing Channels – All Varieties

Farmer class	Total response	Percentage distribution of place of Sale (%)				
		Regulated Market	Commission Agent	Village	Others	Total
Punjab						
Marginal	18	89		11		100
Small	30	100				100
Medium	48	100				100
Large	54	93		6	2	100
Total	150	96		3	1	100
Haryana						
Marginal	14		79	21		100
Small	25		72	28		100
Medium	30		47	53		100
Large	87		63	37		100
Total	156		63	37		100

Figure 5.7: Marketing Channels - Variety wise details (for total farmer class): Punjab

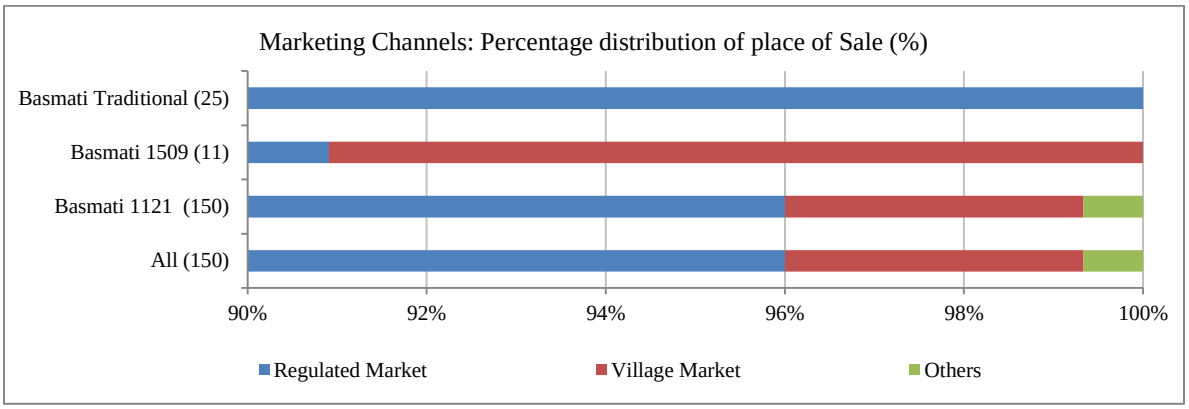


Table 5.15: Marketing Channels - Variety wise details (for total farmer class): Punjab

Variety	Total response	Percentage distribution of place of Sale (%)			
		Regulated Market	Village Market	Others	Total
All	150	96	3	1	100
Pusa Basmati 1121	150	96	3	1	100
Pusa Basmati 1509	11	91	9		100
Basmati Traditional	25	100			100

Figure 5.8: Marketing Channels - Variety wise details (for total farmer class): Haryana

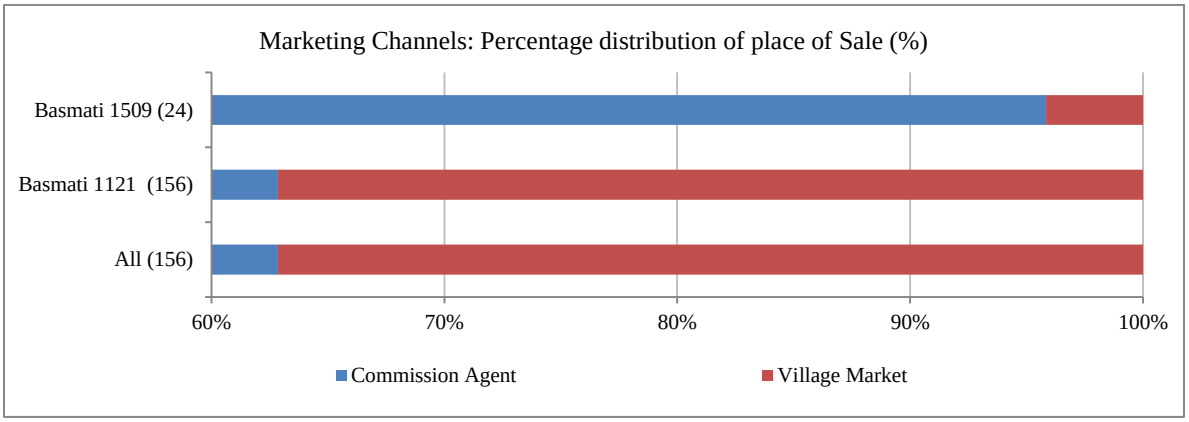


Table 5.16: Marketing Channels - Variety wise details (for total farmer class): Haryana

Variety	Total response	Percentage distribution of place of Sale (%)		
		Commission Agent	Village Market	Total
All	156	63	37	100
Pusa Basmati 1121	156	63	37	100
Pusa Basmati 1509	24	96	4	100

Table 5.17 (i): Quantity of onions sold per household - Punjab

Variety	Farmer class	Regulated market	Village market	Others	Total
Overall	Marginal	24	17		23
	Small	41			41
	Medium	85			85
	Large	235	160	151	229
	Total	121	103	151	121
Pusa Basmati 1121	Marginal	24	17		23
	Small	39			39
	Medium	80			80
	Large	212	106	151	205
	Total	111	71	151	110
Pusa Basmati 1509	Marginal				
	Small				
	Medium	44			44
	Large	70	160		81
	Total	62	160		71
Basmati Traditional	Marginal				
	Small	13			13
	Medium	15			15
	Large	51			51
	Total	33			33

Table 5.17 (ii): Details of quantity of Basmati rice marketed through various channels- Punjab

Variety	Farmer class	Regulated market				Village market				Others				Total				Total of all channels	% distn
		Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)	Qty sold	No (hhlds)	Price	% sold (channel)		
Overall	Marginal	388	16	3636	92	34	2	3247	8					422	18	3605	100	422	2
	Small	1223	30	3983	100				0					1223	30	3983	100	1223	7
	Medium	4078	48	3922	100				0					4078	48	3922	100	4078	23
	Large	11757	50	3945	95	479	3	3048	4	151	1	4500	1	12387	54	3917	100	12387	68
	Total	17446	144	3935	96	513	5	3062	3	151	1	4500	1	18110	150	3915	100	18110	100
Pusa Basmati 1121	Marginal	388	16	3636	92	34	2	3247	8					422	18	3605	100	422	3
	Small	1170	30	3928	100									1170	30	3928	100	1170	7
	Medium	3825	48	3914	100									3825	48	3914	100	3825	23
	Large	10612	50	3911	96	319	3	3223	3	151	1	4500	1	11082	54	3899	100	11082	67
	Total	15995	144	3906	97	353	5	3225	2	151	1	4500	1	16499	150	3897	100	16499	100
Pusa Basmati 1509	Marginal																		
	Small																		
	Medium	131	3	2954	100				0					131	3	2954	100	131	17
	Large	488	7	3009	75	160	1	2700	25					648	8	2933	100	648	83
	Total	619	10	2997	79	160	1	2700	21					779	11	2936	100	779	100
Basmati Traditional	Marginal																		
	Small	53	4	5210	100									53	4	5210	100	53	6
	Medium	122	8	5215	100									122	8	5215	100	122	15
	Large	657	13	5195	100									657	13	5195	100	657	79
	Total	832	25	5199	100									832	25	5199	100	832	100

Table 5.18: Details of quantity of Basmati rice marketed through various channels - Haryana

Variety	Farmer class	Village market					Commission agent					Total					Total of all channels	% distn
		Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)	Qty sold	No (hhlds)	Qty sold /Hhld	Price	% sold (channel)		
Overall	Marginal	27	3	9	3167	11	220	11	20	3821	89	247	14	18	3749	100	247	1
	Small	284	7	41	3758	27	769	18	43	3271	73	1053	25	42	3402	100	1053	6
	Medium	1176	16	74	3742	53	1034	14	74	3492	47	2210	30	74	3625	100	2210	12
	Large	7103	32	222	3757	49	7449	55	135	3378	51	14552	87	167	3563	100	14552	81
	Total	8590	58	148	3729	48	9472	98	97	3420	52	18062	156	116	3567	100	18062	100
Pusa Basmati 1121	Marginal	27	3	9	3181	12	205	11	19	3909	88	232	14	17	3824	100	232	1
	Small	284	7	41	3865	29	705	18	39	3369	71	988	25	40	3511	100	988	6
	Medium	1176	16	74	3757	57	905	14	65	3458	43	2081	30	69	3627	100	2081	13
	Large	7051	32	220	3814	53	6178	55	112	3372	47	13229	87	152	3608	100	13229	80
	Total	8537	58	147	3806	52	7992	98	82	3395	48	16529	156	106	3607	100	16529	100
Pusa Basmati 1509	Marginal					0	15	1	15	3200	100	15	1	15	3200	100	15	1
	Small					0	65	1	65	2900	100	65	1	65	2900	100	65	4
	Medium					0	129	3	43	3567	100	129	3	43	3567	100	129	8
	Large	52	1	52	3300	4	1271	18	71	3359	96	1323	19	70	3357	100	1323	86
	Total	52	1	52	3300	3	1480	23	64	3356	97	1532	24	64	3354	100	1532	100

5.3.2 Channel-wise Month-wise Variety-wise Quantity Sold

In Punjab, October and November are the months during which maximum sale of basmati rice takes place in the sample region, mainly through the regulated markets (Table A 5.3). The total quantity of all the varieties together marketed during these two months is 6236 qtls and 8691 qtls respectively. All the remaining months witnessed much lower volume of sale – about 1000 qtls or lower. This pattern is observed in all the varieties, with Pusa Basmati 1121 recording sales of 5934 qtls and 8142 qtls respectively during these two months. Pusa Basmati and traditional varieties recorded much lower volumes though. Price is much higher in the months of lean supply i.e. from December onwards.

In Haryana, November is the month of maximum sales activity (Table A 5.4). Out of the total quantity sold of 8590 quintals sold in the village market, about 6485 quintals were sold during November. Similarly out of a total quantity of 9472 quintals sold to the commission agents, 8050 quintals were sold during the November month. However, it is to be noted that there is little variation in price across months in the two channels. Therefore, it can be inferred that the farmers' averseness or inability to store is perhaps the reason for this pattern. In case of Pusa Basmati 1121, village market is the major channel whereas in case of Pusa Basmati 1509 the entire sales have taken place through the commission agents. The price variation across months and varieties is minimal. Details and percentage distribution of farmer's selling different varieties through various marketing channels are reported in Table A 5.1 and Table A 5.2 for Punjab and Haryana, respectively.

5.4 Sources of Supply and Percentage Margins

In this section the purchase price, sale price and percentage margins at various stages of supply chain have been analysed.

Punjab

Overall percentage margin of wholesalers is about 4.4%, ranging from a low of 3.8% in October to 5.0% in January (Table 5.19). There is no discernible trend over the months though. The average margin percentage is lower for traditional Basmati (3.5%) than Pusa Basmati 1121 (4.5%) (Table 5.20). The retailer's margin (overall) is about 12% and as is the case with wholesalers, the margin

is lower for traditional variety (10.6%) than Pusa Basmati 1121 (12.9%) (Table 5.23 & Table 5.24). The exporters' margin is higher than that of wholesalers but slightly lower than that of retailers. The average exporters' margin worked out to 10.8% - with 11% for Pusa Basmati 1121 and 9.9% for Traditional Basmati (Table 5.27 & Table 5.28).

Haryana

The average wholesalers' margin works out to 4.5% - ranging from 1.4% in March to 6.9% in November (Table 5.21). The margins are similar for both the varieties, with 4.9% for Pusa Basmati 1121 and 5.4% for Pusa Basmati 1509 (Table 5.22). The retailers' margins are slightly higher than the wholesalers. The average retailers' margin is 6.7% - ranging from 5.9% in November to 8.1% in March (Table 5.25). There is only a minor difference between the margins of the two varieties. The average margin for the Pusa Basmati 1121 is 6.1% and for Pusa Basmati 1509 it is 6.6% (Table 5.26). The exporters' margins are, unlike in Punjab, much higher than those of wholesalers and retailers. The average margin of the exporters is 11.3% - ranging from 10.4% in October to 12.6% in January (Table 5.29). There is no temporal pattern in the margins though. Unlike in the case of wholesalers and retailers, the percentage margin of Pusa Basmati 1509 is lower (10.5%) than that of Pusa Basmati 1121 (11.5%) (Table 5.30). There is no temporal pattern across the varieties too.

Table 5.19: Overall trade detail of wholesalers: Punjab

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	24.8	8200	300	3.8
November	8000	27.8	8400	400	5
December	8150	34.5	8503	353	4.3
January	8285	25.6	8700	415	5.0
February	8300	25.1	8643	343	4.1
Average	8127	138	8490	363	4.5
Basmati Traditional					
October	10050	1.1	10450	400	4.0
November	10260	1.2	10520	260	2.5
December	10565	1.5	10880	315	3.0
January	10300	1.0	10750	450	4.4
February	10251	0.7	10730	479	4.7
Average	10310	6.0	10675	365	3.5
Overall					
October	7988	25.8	8292	304	3.8
November	8095	29.0	8489	394	4.9
December	8252	36.0	8604	351	4.3
January	8362	26.6	8779	416	5.0
February	8355	25.8	8701	347	4.1
Average	8212	143.0	8574	363	4.4

Table 5.20: Variety-wise trade detail of wholesalers (Month averages): Punjab

Variety	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	8127	138	8490	363	4.5
Basmati Traditional	10310	6	10675	365	3.5
Overall	8212	143	8574	363	4.4

Table 5.21: Overall trade detail of wholesalers: Haryana

Month	Purchase Price	Qty sold	Sale price	Markup Rs/qtl	% markup
Pusa Basmati 1121					
October	7200	14.7	7500	300	4.2
November	7100	12.6	7600	500	7.0
December	7400	11.4	7700	300	4.1
January	7500	10.4	7900	400	5.3
February	7600	9.7	8000	400	5.3
March	7900	9.8	8200	300	3.8
Average	7417	69	7783	366	4.9
Pusa Basmati 1509					
October	6888	5.5	7280	392	5.7
November	7018	5.0	7400	382	5.4
December	7115	4.5	7490	375	5.3
January	7269	9.3	7650	381	5.2
February	7322	3.8	7710	388	5.3
March	7429	3.5	7820	391	5.3
Average	7165	32	7549	384	5.4
Overall					
October	7116	20.2	7421	305	4.3
November	7077	17.6	7563	486	6.9
December	7319	15.9	7651	332	4.5
January	7391	19.6	7715	323	4.4
February	7521	13.5	7885	364	4.8
March	7777	13.3	7885	109	1.4
Average	7338	100	7664	327	4.5

Table 5.22: Variety-wise trade detail of wholesalers (Month averages): Haryana

Variety	Purchase Price	Qty sold	Sale price	Markup Rs/qtl	% markup
Pusa Basmati 1121	7417	69	7783	366	4.9
Pusa Basmati 1509	7165	32	7549	384	5.4
Overall	7338	100	7664	327	4.5

Table 5.23: Overall trade detail of retailers: Punjab

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	0.8	9400	1200	14.6
November	8400	0.5	9440	1040	12.4
December	8503	0.6	9580	1077	12.7
January	8700	0.3	9750	1050	12.1
February	8643	0.3	9495	852	9.9
Average	8422	2.0	9504	1082	12.9
Basmati Traditional					
October	10450	0.2	11550	1100	10.5
November	10520	0.1	11640	1120	10.7
December	10880	0.2	11900	1020	9.4
January	10750	0.1	12050	1300	12.1
February	10730	0.1	11850	1120	10.4
Average	10661	1.0	11786	1125	10.6
Overall					
October	8575	0.9	9758	1183	13.8
November	8903	0.6	9962	1059	11.9
December	9012	0.7	10077	1065	11.8
January	9323	0.4	10449	1126	12.1
February	9281	0.4	10215	934	10.1
Average	8932	3.0	10024	1092	12.2

Table 5.24: Variety-wise trade detail of retailers (Month averages): Punjab

Variety	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	8422	2	9504	1082	12.9
Basmati Traditional	10661	1	11786	1125	10.6
Overall	8932	3	10024	1092	12.2

Table 5.25: Overall trade detail of retailers: Haryana

Month	Purchase Price	Qty sold	Sale price	Markup Rs/qtl	% markup
Pusa Basmati 1121					
October	7500	1.6	7993	493	6.6
November	7600	1.5	8058	458	6.0
December	7700	1.3	8186	486	6.3
January	7900	1.1	8362	462	5.9
February	8000	0.9	8486	486	6.1
March	8200	0.8	8637	437	5.3
Average	7756	7.0	8229	473	6.1
Pusa Basmati 1509					
October	7280	0.8	7793	513	7.0
November	7400	0.7	7901	501	6.8
December	7490	0.6	8013	523	7.0
January	7650	0.5	8139	489	6.4
February	7710	0.4	8172	462	6.0
March	7820	0.4	8295	475	6.1
Average	7507	4.0	8006	499	6.6
Overall					
October	7421	2.5	7925	504	6.8
November	7563	2.2	8006	443	5.9
December	7651	2.0	8130	479	6.3
January	7715	1.6	8289	575	7.5
February	7885	1.3	8385	500	6.3
March	7885	1.2	8525	640	8.1
Average	7644	11.0	8155	512	6.7

Table 5.26: Variety-wise trade detail of retailers (Month averages): Haryana

Variety	Purchase Price	Qty sold	Sale price	Markup Rs/qtl	% markup
Pusa Basmati 1121	7756	7	8229	473	6.1
Pusa Basmati 1509	7507	4	8006	499	6.6
Overall	7644	11	8155	512	6.7

Table 5.27: Overall trade detail of exporters: Punjab

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 Basmati 1121					
October	7000	3600	7900	900	12.9
November	7050	4310	7940	890	12.6
December	7610	4540	8250	640	8.4
January	7650	4615	8450	800	10.5
February	7700	4088	8500	800	10.4
Average	7418	21153	8219	801	10.8
Basmati Traditional					
October	9550	125	10350	800	8.4
November	9600	150	10500	900	9.4
December	9700	160	10850	1150	11.9
January	9880	162	10990	1110	11.2
February	10200	150	11060	860	8.4
Average	9794	747	10769	974	9.9
Overall					
October	7086	3725	7982	897	12.7
November	7136	4460	8026	890	12.5
December	7681	4700	8339	657	8.6
January	7726	4777	8536	811	10.5
February	7788	4238	8591	802	10.3
Average	7499	21900	8306	807	10.8

Table 5.28: Variety-wise trade detail of exporters (Month averages): Punjab

Variety	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 Basmati 1121	7418	21153	8219	801	10.8
Basmati Traditional	9794	747	10769	974	9.9
Overall	7499	21900	8306	807	10.8

Table 5.29: Overall trade detail of exporters: Haryana

Month	Purchase Price	Qty exported	Export price	Markup Rs/qtl	% markup
Pusa Basmati 1121					
October	6862	7457	7579	717	10.5
November	6960	8200	7689	729	10.5
December	7310	8271	8225	915	12.5
January	7410	7900	8369	960	13.0
February	7565	5457	8399	834	11.0
March	7650	4657	8502	853	11.2
Average	7252	41942	8086	834	11.5
Pusa Basmati 1509					
October	6340	1600	6994	654	10.3
November	6416	1900	7099	683	10.7
December	6745	2121	7461	716	10.6
January	6853	1371	7564	711	10.4
February	6943	1200	7680	737	10.6
March	7015	1114	7747	732	10.4
Average	6682	9306	7384	702	10.5
Overall					
October	6769	9057	7476	707	10.4
November	6858	10100	7578	720	10.5
December	7195	10393	8069	874	12.2
January	7327	9271	8250	923	12.6
February	7453	6657	8269	816	11.0
March	7527	5771	8356	829	11.01
Average	7148	51249	7958	810	11.3

Table 5.30:Variety-wise trade detail of exporters (Month averages): Haryana

Variety	Purchase Price	Qty exported	Export price	Markup Rs/qtl	% markup
Pusa Basmati 1121	7252	41942	8086	834	11.5
Pusa Basmati 1509	6682	9306	7384	702	10.5
Overall	7148	51249	7958	810	11.3

5.5 Stakeholder Perceptions

5.5.1 Farmers' reasons for growing basmati

In Punjab, a majority of the households (95%) are growing basmati for profitability (Table 5.31). Usefulness of the by-product (28%), fitting well into crop rotation (17%) and Land suitability (13%) have also been reported as the major reasons for growing the crop. In Haryana also profitability is the predominant reason for growing the crop (99%) (Table 5.32). About11% of the farmers reported Land suitability as the reason, followed by fitting well with crop rotation (9%).

Table 5.31: Reasons for Growing Crop by Households: Punjab

Reasons for Growing Crop by Households	Punjab					
	Total responses	Percentage Distribution (%)				
		Marginal	Small	Medium	Large	Total
Home Consumption	5	6	3	2	4	3
Profitability	142	78	87	100	100	95
Land suitability	19	33	10	6	13	13
Government subsidies						
Fits well with crop rotation	25	28	23	6	19	17
Whether suitability, high value crop, etc.						
Usefulness of crop by- product	42	6	40	29	28	28
Any other						
Total	150	100	100	100	100	100

Table 5.32: Reasons for Growing Crop by Households: Haryana

Reasons for Growing Crop by Households	Haryana					
	Total responses	Percentage Distribution (%)				
		Marginal	Small	Medium	Large	Total
Home Consumption						
Profitability	148	93	96	100	100	99
Land suitability	16	14	8	17	9	11
Government subsidies	2	7	4			1
Fits well with crop rotation	13		4	17	9	9
Whether suitability, high value crop, etc.						
Usefulness of crop by- product						
Any other	8	7	4	3	6	5
Total	150	100	100	100	100	100

5.5.2 Major problems faced by farmers in cultivation of basmati

In Punjab, 8% of the households reported lack of MSP & procurement as the major problem (Table 5.33). This is followed by lower yield (6%), lack of remunerative price (5%) and yield instability (4%). In Haryana also lack of MSP & procurement ranks as the major problem, reported as severe by 18% of the households (Table 5.33). This is followed by labour problem (11%), lack of market information (9%), lack of remunerative price (7%) and non-availability of credit and pests (6% each) as the major problems.

Table 5.33: Problems faced by Households

Problems faced by Households	Punjab		Haryana	
	Total responses	Most severe response (%)	Total responses	Most severe response (%)
Lower Yield	150	6	130	1
Unstable yield	150	4	141	1
Lack of remunerative price	150	5	148	7
Poor road network for transportation	150		125	4
Poor refrigeration facilities				
Other infrastructure problems				
Erratic electricity supply	150	1	130	
Labour problem	150	1	140	11
Poor quality of underground water	150		84	1
Non-availability of good quality of seed	150		73	
Lack of/poor extension services lack of technical know-how	150		118	
Price fluctuations	150	1	145	3
Lack of MSP/government procurement	150	8	147	18
Lack of market information	150	1	145	9
Collusion among traders/trade malpractices	150	1	148	
Distant market	150	1	118	2
Diseases	150	3	149	1
Insects/pests	150	1	150	6
Weeds	150	2	147	2
Any other (Non-availability of Inputs)				
Fertilizers			128	
Insecticides			94	
Credit			106	6
Adverse climate conditions			78	1
Any other			19	

5.5.3 Major problems faced by Wholesalers

In Punjab, the wholesalers reported only two problems as severe – competition from other wholesalers (10%) and high market fees / charges (10%) (Table 5.34). Some problems were reported to be of 'high' intensity, although not 'severe'. Poor road network (30%), competition from other wholesalers (20%), lower supply and high market fees/charges (10% each). In Haryana, there are no problems listed as of 'severe' intensity. The problems ranked in the 'high' category are competition from other wholesalers (20%); high market fees / charges (20%), lower supply, poor quality of supply and erratic supply (10% each) (Table 5.34).

Table 5.34: Problems faced by Wholesalers

Problems faced by Wholesalers	Punjab			Haryana	
	Total responses	Most severe response (%)	'High' response (%)	Total responses	'High' response (%)
Lower supply	10		10	10	10
Poor quality supply	10			10	10
Lower price due to lower demand	10			10	
Competition from other wholesalers	10	10	20	10	20
Competition from exports	10				
Competition from Importers				10	
Poor road network	10		30	10	
Poor refrigeration facilities					
Other Infrastructure problems	10			10	10
Erratic Supply/ Production	10			10	10
High Marketing Charges / taxes	10	10	10	10	20
Mixing of different Varieties	10			10	

**In Haryana, no problems have been rated as 'severe'. Therefore, we have presented distribution of problems rated as 'high' here. .*

5.5.4 Major problems faced by Retailers

In Punjab 'competition from large organized retail chains' has been ranked as the only problem in 'severe' category by about 20% of the respondents and another 40% of the respondents have categorized this as 'high' (Table 5.35). Competition from other retailers (20%) is the other problem listed as of high intensity. In Haryana, there are no problems listed as of 'severe' intensity. The problems ranked in the 'high' category are competition from imports (10%) and, government intervention in price through MSP and lower supply (10% each) (Table 5.35).

Table 5.35: Problems faced by Retailers

Problems faced by Retailers	Punjab			Haryana*	
	Total responses	Most severe response (%)	'High' response (%)	Total responses	'High' response (%)
Lower supply	10			10	10
Poor quality of product	10			10	
Non-remunerative price due to lower demand	10			10	
Competition from other retailers	10		20	10	
Competition from large organized retail chains	10	20	40	10	
Competition from exports	10				
Competition from Importers				10	10
Government intervention in price (MSP.MIP)	10			10	10
Labour problem					
Poor infrastructure	10			10	10

**for Haryana, 'second most severe' or 'high'.*

5.5.5 Major problems faced by exporters

In Punjab, infrastructure problems topped the list of severe problems with 2 out of 5 exporters reporting them as the most severe (Table 5.36). Other problems reported as severe are poor quality of the product, competition from other wholesalers, poor road network, poor port facilities, export policy uncertainty and problem of chemical residue – each by 20% of the respondents.

In Haryana, poor quality of product, competition from other wholesalers, infrastructure problems and high port charges/taxes have all been ranked by about 14% of the respondents as severe problems facing the exporters (Table 5.36). High port charges/taxes have been ranked as 'high' by another 71% of the respondents, followed by competition from other exporters and lengthy government procedures as major problems belonging to the 'high' category by 43% of the respondents.

Table 5.36: Problems faced by Exporters

Problems faced by Exporters	Punjab		Haryana		
	Total responses	Most severe response (%)	Total responses	Most severe response (%)	'High' response (%)
Lower domestic production	5		7		14
Poor quality of product	5	20	7	14	29
Lower price due to lower world demand	5		7		29
Competition from other wholesalers	5	20	7	14	29
Competition from other exporters	5		7		43
Poor road network	5	20	7		57
Poor port facilities	5	20	7		14
Poor refrigeration facilities/facilities of drier					
Other infrastructure problems	5	40	7	14	29
Lengthy government procedures	5		7		43
Export policy uncertainty	5	20	7		0
Erratic supply/production	5		7		14
Low domestic demand	5		7		14
Mixing of different varieties	5		7		0
Problem of chemical residue	5	20	7		0
High port charges/taxes	5		7	14	71

Appendix Tables - Basmati

Table A 5.1: Marketing Channels - variety wise details: Punjab

Variety	Farmer class	Place of Sale				Percentage distribution of place of Sale (%)			
		Regulated Market	Village Market	Others	Total	Regulated Market	Village Market	Others	Total
Pusa Basmati 1121	Marginal	16	2		18	89	11		100
	Small	30			30	100			100
	Medium	48			48	100			100
	Large	50	3	1	54	93	6	2	100
	Total	144	5	1	150	96	3	1	100
Pusa Basmati 1509	Marginal								
	Small								
	Medium	3			3	100			100
	Large	7	1		8	88	13		100
	Total	10	1		11	91	9		100
Basmati Traditional	Marginal								
	Small	4			4	100			100
	Medium	8			8	100			100
	Large	13			13	100			100
	Total	25			25	100			100
Overall	Marginal	16	2		18	89	11		100
	Small	30			30	100			100
	Medium	48			48	100			100
	Large	50	3	1	54	93	6	2	100
	Total	144	5	1	150	96	3	1	100

Table A 5.2: Marketing Channels - variety wise details: Haryana

Variety	Farmer class	Place of Sale			Percentage distribution of place of Sale (%)		
		Commission Agent	Village Market	Total	Commission Agent	Village Market	Total
Pusa Basmati 1121	Marginal	11	3	14	79	21	100
	Small	18	7	25	72	28	100
	Medium	14	16	30	47	53	100
	Large	55	32	87	63	37	100
	Total	98	58	156	63	37	100
Pusa Basmati 1509	Marginal	1		1	100		100
	Small	1		1	100		100
	Medium	3		3	100		100
	Large	18	1	19	95	5	100
	Total	23	1	24	96	4	100
Overall	Marginal	11	3	14	79	21	100
	Small	18	7	25	72	28	100
	Medium	14	16	30	47	53	100
	Large	55	32	87	63	37	100
	Total	98	58	156	63	37	100

Table A 5.3: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Punjab

Variety	Farm Category	October		November		December		January		February		Other month		All Months	
		Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
	Villege Market														
Pusa Basmati 1121	Marginal	4	2700	30	3320									34	3247
	Small														
	Medium														
	Large	188	3100	131	3400									319	3223
	Total	192	3092	161	3385									353	3225
	Regulated Market														
Pusa Basmati 1121	Marginal	250	3623	138	3660									388	3636
	Small	318	3544	774	4042	78	4350							1170	3928
	Medium	1469	3621	1948	4040	197	4325	211	4400					3825	3914
	Large	3706	3459	5121	4066	279	4375	435	4367	528	4396	544	4450	10612	3911
	Total	5742	3512	7981	4050	554	4354	646	4378	528	4396	544	4450	15995	3906
	Other														
Pusa Basmati 1121	Marginal														
	Small														
	Medium														
	Large											151	4500	151	4500
	Total											151	4500	151	4500
	Total														
Pusa Basmati 1121	Marginal	254	3608	168	3599									422	3605
	Small	318	3544	774	4042	78	4350							1170	3928
	Medium	1469	3621	1948	4040	197	4325	211	4400					3825	3914
	Large	3894	3442	5252	4049	279	4375	435	4367	528	4396	695	4461	11082	3899
	Total	5934	3499	8142	4037	554	4354	646	4378	528	4396	695	4461	16499	3897
	Villege Market														
Pusa Basmati 1509	Marginal														
	Small														
	Medium														
	Large	160	2700											160	2700
	Total	160	2700											160	2700
	Regulated Market														
Basmati 1509	Marginal														
	Small														
	Medium	92	2850	39	3200									131	2954
	Large	50	2800	353	2920							85	3500	488	3009
	Total	142	2832	392	2948							85	3500	619	2997
	Other														
Pusa Basmati 1509	Marginal														
	Small														
	Medium														
	Large											151	4500	151	4500
	Total											151	4500	151	4500
	Total														
Pusa Basmati 1509	Marginal														
	Small														
	Medium	92	2850	39	3200									131	2954
	Large	210	2724	353	2920							85	3500	648	2933
	Total	302	2762	392	2948							85	3500	779	2936
	Regulated Market														
Basmati Traditional	Marginal														
	Small					53	5210							53	5210
	Medium					122	5215							122	5215
	Large			157	5110	476	5218			25	5300			657	5195
	Total			157	5110	651	5217			25	5300			832	5199
	Total														
Basmati Traditional	Marginal														
	Small					53	5210							53	5210
	Medium					122	5215							122	5215

	Large			157	5110	476	5218			25	5300			657	5195
	Total			157	5110	651	5217			25	5300			832	5199
	Villege Market														
Overall	Marginal	4	2700	30	3320									34	3247
	Small														
	Medium														
	Large	348	2916	131	3400									479	3048
	Total	352	2914	161	3385									513	3062
	Regulated Market														
Overall	Marginal	250	3623	138	3660									388	3636
	Small	318	3544	774	4042	131	4696							1223	3983
	Medium	1561	3576	1987	4024	319	4666	211	4400					4078	3922
	Large	3756	3450	5630	4023	754	4907	435	4367	552	4436	629	4322	11757	3945
	Total	5884	3496	8530	4019	1205	4820	646	4378	552	4436	629	4322	17446	3935
	Other														
Overall	Marginal														
	Small														
	Medium														
	Large											151	4500	151	4500
	Total											151	4500	151	4500
	Total														
Overall	Marginal	254	3608	168	3599									422	3605
	Small	318	3544	774	4042	131	4696							1223	3983
	Medium	1561	3576	1987	4024	319	4666	211	4400					4078	3922
	Large	4104	3405	5761	4009	754	4907	435	4367	552	4436	780	4356	12387	3917
	Total	6236	3463	8691	4007	1205	4820	646	4378	552	4436	780	4356	18110	3915

Table A 5.4: Chanel-wise Month-wise Variety-wise Quantity Sold (quintals): Haryana

Variety	Farm Category	November 2013		December 2013		January 2014		February 2014		All Months	
		Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
	Villege Market										
Pusa Basmati 1121	Marginal	27	3167							27	3167
	Small	238	3750	46	3800					284	3758
	Medium	932	3773	210	3575			35	3900	1176	3741
	Large	5289	3731	1122	3783	459	4067	182	3700	7051	3760
	Total	6485	3711	1377	3709	459	4067	217	3767	8537	3731
	Commission agent										
Pusa Basmati 1121	Marginal	154	3873	51	3850					205	3867
	Small	559	3313	118	3383	28	2800			705	3304
	Medium	710	3369	50	3800	145	3950			905	3486
	Large	5254	3377	218	3667	706	3609			6178	3414
	Total	6676	3421	437	3628	879	3600			7992	3452
	Villege Market										
Pusa Basmati 1509	Marginal									0	
	Small									0	
	Medium									0	
	Large					52	3300			52	3300
	Total					52	3300			52	3300
	Commission agent										
Pusa Basmati 1509	Marginal	16	3200							16	3200
	Small	65	2900							65	2900
	Medium	87	3500	22	3600	20	3600			129	3533
	Large	1207	3182	10	3900	54	3600			1271	3205
	Total	1374	3212	32	3750	74	3600			1480	3243
	Villege Market										
Overall	Marginal	27	3167							27	3167
	Small	238	3750	46	3800					284	3758
	Medium	932	3773	210	3575			35	3900	1176	3741
	Large	5289	3731	1122	3783	511	3988	182	3700	7103	3757
	Total	6485	3711	1377	3709	511	3988	217	3767	8590	3729
	Commission agent										
Overall	Marginal	169	3812	51	3850					220	3821
	Small	623	3271	118	3383	28	2800			769	3271
	Medium	797	3383	72	3739	165	3908			1034	3492
	Large	6461	3341	228	3677	760	3608			7449	3379
	Total	8050	3386	469	3636	953	3600			9472	3420

Chapter 6

Summary and Conclusions

The study is an attempt to analyze the spread between wholesale, retail and export prices of onion, grapes and basmati rice. The study also analyzed the economics of cultivation, profitability, marketing channels, profitability of various market players and the major problems faced at each stage of the marketing channel. Two or three major states growing each of these crops were selected for an in-depth primary survey. Gujarat, Maharashtra and Karnataka were selected for onion; Maharashtra and Karnataka for grapes and; Punjab and Haryana for basmati rice. The study used both secondary and primary data. Primary data has been collected by the respective Agricultural Economics Research Centres / units (AERC / AERU). The period of analysis of secondary data is from 2001 to 2014 and the reference year for primary data is 2013-14.

Findings from secondary data analysis

1) There was a sharp rise in the price of onions in 2013 and 2014 and also a sharp increase in wholesale and retail prices of grapes since 2011 and of export prices since 2012. However, this rise has been somewhat uneven. The percentage mark-ups are a lot higher for retailers, as compared to wholesalers or exporters and retailers' mark-ups have increased while those of exporters have decreased.

2) Maharashtra, the major supplier of onion in the country, reported extremely high price spread of 100% between wholesale and retail prices in 9 out of 14 years. **This is a cause for concern and shows some market imperfections.** Our findings have been supported other by other important studies too (Chengappa et al. 2012), which conclude that the onion market structure in Maharashtra is oligopolistic.

3) Econometric analysis shows that **there is a significant negative effect of market arrivals on wholesale price and a significant positive effect of wholesale price on retail price**.

This relationship holds true for onions and grapes and is robust across most of the markets and states. In case of onion, Nasik district price in general and Lasalgaon price in particular show a significant effect on wholesale prices of most of the markets in the country

Findings from primary data analysis

1) Onions: In all the three states – Gujarat, Maharashtra and Karnataka, onions are mainly sold in the market and home consumption is very minimal. **More than 95% of the production is sold** in the market and only 1-2 percent is retained for consumption. These patterns are roughly similar across size groups. **More than three-fourths of the total cost of production is incurred on inputs** and the rest is incurred on account of storage, transportation and marketing costs (STM). **In the total input costs, major share is accounted for by hired labour, manure & fertilizer and machinery hiring charges.** The net returns per hectare for the marginal farmer group are the lowest in Karnataka, progressively increasing over the size-groups. In Gujarat and Maharashtra, the returns are highest for marginal and small farmers. **In all the three states, more than three-fourths of the produce is marketed through the regulated markets.** In Gujarat and Karnataka, farmers are the main source of supply for wholesalers. In Maharashtra, commission agent is the main source. For retailers in Gujarat and Maharashtra, commission agents are the main source. In Karnataka, 56% of retailers source from commission agents and 32% from farmers. For exporters in Maharashtra and Karnataka, both commission agents and farmers are the main sources. As for profitability, the retailers' margins in Gujarat and Karnata, at 202% and 57% respectively, are way above those of wholesalers, which are at 44% and 11% respectively. This is also true of the exporters' margins in Gujarat. **This is suggestive of some imperfection in the vertical integration of markets in these states.** There is no such discrepancy in the margins in Maharashtra. As for reasons for growing onions, profitability and land suitability have been cited as the major reasons in all the three states. The problems faced by onion farmers differed across the three states. However, **some of the common problems reported by farmers in all the three states relate to price, namely, price fluctuations and absence of MSP & procurement.** The problems faced by wholesalers also differed across the states. In Gujarat they are mainly supply-related, such as inadequate supply and unstable supply. In Maharashtra they are mainly related to

market infrastructure, mainly, high marketing charges/taxes, mixing of different varieties and other infrastructure problems. In Karnataka, the problems are mainly market competition-related and high market fees. Turning to problems faced by retailers, infrastructure and competition figured prominently in that order in Gujarat and Maharashtra. But in Karnataka, competition-related problems are relatively more important. Exporters in the two states of Gujarat and Maharashtra gave a different assessment of their problems. In Gujarat, lengthy procedures, policy uncertainty and world demand figured prominently while in Maharashtra they were mostly related to inadequate infrastructure and competition.

2) Grapes: Maharashtra and Karnataka are the states selected for grapes. Nearly 96% of the of grapes' production is sold. Out of the total cost of cultivation, about 97% is incurred on input costs and the rest on STM costs. Out of the input costs, manure & fertilizer and pesticides/weedicides account for bulk of the expenditure. In Maharashtra, there are no marginal farmers growing the crop and the returns per hectare are lowest for the small farmers. In Karnataka, The gross & net returns as well as marketed surplus of large farmers are substantially higher than of other groups, and are almost double the average returns. In Maharashtra all the marketing is through on-farm sale while in Karnataka, commission agent is the major source (94% of households). There are some differences in the intra-year marketing in the two states though. There is no major variation in Maharashtra in the monthly disposals or prices. However, in Karnataka maximum sales are observed both in the months of April and September, although the price is substantially higher in September. **All the three types of traders – wholesalers, retailers and exporters – sourced their supplies mainly from farmers. This is probably due to the absence proper cold storage and processing facilities at the wholesale, retail and export levels.** The average percentage mark-up of wholesalers in the two states works out to 23% and 16% respectively. The corresponding margins of retailers are 30% and 70% respectively, showing higher retailers' margins in Karnataka. The exporters' margin in Maharashtra is much higher at 169%. Profitability and land suitability have been reported as the main reasons for growing grapes by farmers of both the states. **As for problems in grapes cultivation, the farmers gave a host of reasons ranging from lack of price support to**

infrastructure problems to lack of extension facilities. However, an overwhelming 78% of the farmers in Karnataka rated distance to the market as the most severe problem. Wholesalers and retailers in Maharashtra reported issues related to infrastructure and supply as major problems while the wholesalers and retailers in Karnataka rated competition from other players as the main problem. As for the problems faced by exporters, poor infrastructure, export policy uncertainty and lengthy government procedures have been cited most.

3) Basmati: In case basmati, the percentage of sale is lower – ranging from 84% in Punjab to 97% in Haryana. **About 93%-96% of the total cost of cultivation is on account of input costs** and the rest is due to STM costs. Out of the total costs, **about 47% is incurred on labour (bullock+manual),** followed by manure & fertilizer (15%), pesticides / weedicides (13%) and machinery hiring (nearly 11%). In Punjab the returns are lowest for marginal farmers at 122945 Rs/ha. However, in Haryana, the returns are highest for marginal farmers. In Punjab, the predominant channel of marketing is the regulated market (96% of area and marketed surplus). In Haryana, commission agent and regulated market are the major channels. October and November are the main months of marketing. Unlike onions or grapes, the mark-ups in basmati trade are not much higher. The wholesalers' and exporters' margins in the two states are similar at 4.5% and 11% respectively. The retailers' margins differ slightly though (12% and 6.7% respectively). **More than 95% of the households reported profitability as the main reason for undertaking basmati cultivation, which is quite encouraging. As for problems with basmati farming absence of MSP & procurement and lack of remunerative price have been reported as the major problems.** Wholesalers in both the states reported competition from other wholesalers and high market fees / charges as major problems. Retailers of both the states have also rated competition from other players as a major problem. Exporters of basmati rated competition, poor quality of the product, export policy uncertainty, poor road network, poor port facilities and problem of chemical residue as major problems facing the exporters.

Policy Implications

7) Much higher mark-ups for retailers vis-à-vis wholesalers and exporters, over the period of 2001 to 2014, suggest imperfections in the domestic supply chain that may need to be addressed

8) The very high spread between retail and wholesale prices in Maharashtra in 9 out of 14 years during 2001 to 2014, is a cause for concern. Maharashtra is an important state for onions in the country and price behaviour in this state has major implications for rest of the country. Our results, together with previous literature (Chengappa et al. 2012), suggests that addressing market imperfections in Maharashtra is very important for the onion sector in the country.

9) Our econometric analysis confirms the significant effect of market arrivals on prices. Therefore, smoothening supply - either through production, storage or processing – is crucial to address frequent price spikes in onions and grapes.

10) Labour cost is a major component in the total cost of production, of both onions and basmati. This is true for other crops as well, as can be discerned from recent cost of cultivation statistics. Therefore, appropriate policies to address labour scarcity and to promote appropriate mechanization need to be devised.

11) For all the study crops, regulated market and commission agents are the main channels of marketing. Also, farmers and commission agents are the main sources of supply for wholesalers, retailers and exporters. Therefore, strengthening the existing marketing system as well as developing alternative channels, such as farmers' collectives to reap scale economies, needs to be undertaken.

12) Farmers have mostly cited lack of remunerative price and lack of MSP & procurement as major problems in cultivating the study crops. Therefore, streamlining and strengthening the current initiatives such as NAM (National Agricultural Market) may help in better price discovery.

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