

**Kharif-  
2016**

**Basmati Acreage & Yield Estimation in  
Punjab, Haryana, Delhi, Uttarakhand,  
Himachal Pradesh, Western Uttar Pradesh  
and Parts of Jammu & Kashmir**

**Report Volume - 7**

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### *Background*

Basmati rice is an important export commodity among the food grains exported from India. During the past few years, the Basmati export has been growing steadily, from 7.71 lakh metric tonnes in 2003 to an estimated 4.05 million metric tonnes in 2015-16 on robust demand from the traditional markets in West Asia.

Almost 132 countries have been importing Basmati from India every year. Out of which, Iran, Saudi Arabia, UAE and Iraq are the major importers. Apart from India second is Pakistan from where Basmati is exported to many countries.

Timely information on the area and likely production of the crop before the harvest helps exporters and other decision makers involved in Basmati trade to take decisions about the quantum and time of export. Realizing this potential, the Basmati Export Development Foundation (BEDF), New Delhi contracted M/s. Agri Net Solutions (A division of BPPL – a UPL Group Company) the work of field survey validation based acreage estimation for all rice, for Basmati crop for selected other non-notified varieties), crop health monitoring and yield

estimation and production for Basmati rice and non-notified varieties and questionnaire based sample survey of farmers, for 81 districts in the selected seven states i.e. Punjab, Haryana, Uttar Pradesh, Uttarakhand, Himachal Pradesh, and Jammu & Kashmir apart from Delhi. The field survey based approach has been being applied to collect the information at block level to improve the accuracy further to a desired level.

The Basmati varieties for which information is required include Basmati-370, Basmati-386, Type-3 (Dehraduni), Taraori, Ranbir), Pusa-1509, Pusa Basmati-1, CSR-30 and Pusa Basmati-1121 and non-notified, non-Basmati (Sharbati, and Permal).

### *Scope of the Current Report*

The present report presents the questionnaire based farmer's survey report on Basmati. It includes information on the current farming practices, marketing practices, and future planning / strategy and suggestions of Basmati growing farmers in the study states, based on primary data collected during November-December 2016.



### *Methodology*

#### Questionnaire Development

For the purpose of the study, a questionnaire was developed, which sought answers to different parameters for assessment of farming and marketing practices and future planning / strategy. A sample questionnaire is given in Annexure-I. The main parameters considered were as follows:

- i) Farmer's background: Name, area owned, soil type, source of irrigation.
- ii) Cropping Pattern: Crops grown, Basmati varieties grown and their area (during last and current year), adoption of contract farming or not.
- iii) Input use:
- iv) Seeds: Source and Quantity (variety-wise)
- v) Manures & Fertilizers: Source type and Quantity used
- vi) Herbicides: Source and Quantity used
- vii) Insecticide / Pesticide: Source and Quantity used
- viii) Planting and Harvesting: Time of nursery sowing and transplanting, plant spacing, harvesting schedule

- ix) Production: Per ha. yield of different varieties and production
- x) Marketing Practices: Marketing method, market rates obtained of different varieties
- xi) Economics of cultivation: Cost of cultivation and net profit
- xii) New Technology: Any new technology / practices adopted
- xiii) Future Plan: Next year plan for growing Basmati
- xiv) Farmers' suggestions

#### Sample Size

In each of the three major states viz. Punjab, Haryana and Uttar Pradesh, a large number of Basmati growing farmers were interviewed from all prominent blocks. In Uttarakhand, Jammu & Kashmir and Himachal Pradesh 125 farmers each were interviewed. The farmers were randomly selected from Basmati growing blocks of prominent districts. The states of Uttarakhand, Jammu & Kashmir and Himachal Pradesh are having very less area, and hence the no. of farmers from these states was small. Moreover, in Jammu, there is no variability in Basmati farming practices and the farmers grow preferably Basmati-370 and the variability in input use is also not

significant. But in Kathua, the farmers started growing Pusa Basmati-1121 as they get their produce sold in Punjab markets and get higher returns. And during the last 5 years the acreage under Pusa Basmati-1121 has increased in the area. Since the % Basmati rice area in different districts is variable, the no. of farmers in each district was also variable.

## PUNJAB

### Soil type and Irrigation:

Rice in Punjab occupies more than 80-82% of total cropped area during kharif. Basmati Rice is cultivated under assured irrigation and puddled, low land rice ecosystem. Soils are generally loam to clay loam with pH 7.5-8.9. Irrigation is mainly through Tube-wells (78 - 80%) and Canals (20 - 22%).

### Cropping Pattern:

Rice-wheat is the major cropping pattern. However, in some areas of high productivity as observed near cities, three crops per year is also being followed; i.e. Rice-Potato-

## RESULTS

The yield was collected from 1092 Crop Cutting Experiments selected during the initial survey. In UP the yield of almost all the varieties was at lower side. While In Haryana, the yield has been at higher side.

Brief summary of the questionnaire based farmers responses from different states are given below:

Potato; Rice-Potato-Sathi Maize/Summer Moong/Sunflower/Celery; Rice-Toria-Wheat; Rice-Barseem fodder.

Out of the 30.10 lakh ha transplanted rice, 6.16 lakh ha. was under basmati varieties in this year. As per the information collected from the farmers and other sources, 32.6% area under rice was sown under basmati varieties. Area under Basmati-386 minimised to hundreds ha. only. Out of the total basmati 90.28% area was under Pusa Basmati-1121 and only 3.64% area was under Pusa Basmati-1509. Area under Pusa Basmati-1 has been. CSR-30 area has also reduced.

Table 2: Variety wise % Area & Production in year 2015 and 2016.

Sl. No.	Variety	% Basmati Area		% Basmati Production	
		2015	2016	2015	2016
1	Pusa Basmati-1121	77.52	90.28	75.87	87.63

2	Pusa Basmati-1509	21.1	5.72	23.06	7.36
3	CSR-30	0.21	0.0	0.14	0.0
4	Pusa Basmati-1	0.24	3.94	0.28	4.97
5	Basmati-370/386	0.93	0.06	0.63	0.04

**Prominent varieties grown in different districts:**

Important districts where Traditional Basmati varieties are grown include Amritsar, Ferozpur, Gurdaspur, Fatehgarh Sahib, Kapurthala, Patiala, Tarantaran and Sangrur. Pusa Basmati-1121 is dominant in Amritsar, Gurdaspur, Ferozabad, Faridkot, Fatehgarh Sahib, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana, Patiala, Sangrur and Taran Taran. Pusa Basmati-1 area has reduced drastically and is grown in Barnala, Ferozpur, Patiala and Sangrur. Almost 147 blocks in 22 districts were surveyed. Efforts were made to cover 10-15 farmers in each village and 5-8 villages in each prominent block. More than 15,000 farmers were interviewed and an area covered 1,50,000 acres and 1500 villages. Questionnaire based survey was conducted covering 2,200 farmers.

**Seed supply and Seed rate:**

i) Farmers generally sow their own seed or procure from private seed agencies, Govt.

agencies (Punjab Agricultural University / Punjab State Seed Corporation / NSC) and from other farmers. The percent break up of different seed sources is as follows:

ii) It has been assessed that all of the farmers use less seed than recommended, which is 20 kg seed for sowing nursery for transplanting one ha field. Almost 85% farmers use 12 – 14 kg and 15% use 8 – 10Kg/ha seed rate.

**Sowing and transplanting:**

i) Almost 90.3 % area under Basmati varieties has been under Pusa Basmati-1121 and 5.7% under Pusa Basmati-1509, 3.94% under Pusa Basmati-1.

ii) Only 62% farmers follow normal timings for nursery and transplanting. 19% follow very early and 14% go late.

iii) Nursery sowing of Pusa Basmati-1509 starts in the end of month of May, of Pusa Basmati-1 and Pusa Basmati-1121 in the first week of June and Basmati-386 and CSR-30 in the second fortnight of June.

- iv) Pusa Basmati-1509 transplanting starts in the first fortnight of June and that of Pusa Basmati-1, Pusa Basmati-1121 and Super in the first fortnight of July and of Basmati-386 in the second fortnight of July. In the case of late transplanting, yield is reduced and sowing of next crop of wheat is delayed; however, quality of Basmati improves due to low temperature during maturity. Transplanting of traditional Basmati varieties continues up to 1<sup>st</sup> week of August depending on availability of labor and irrigation water.
- v) Transplanting in lines is not done and instead random transplanting is followed.
- vi) It has been noticed that a plant population of 15 – 18 hills / m<sup>2</sup> is followed by 30-40% farmers and 20 – 25 hills / m<sup>2</sup> by 60-70% farmers.
- vii) Only 65% farmers go for seed treatment. Remaining 35% farmers don't go for seed treatment.

#### Weed Control:

Weeds are entirely (100%) controlled by herbicide application. Most used (80-85% farmers) herbicides are -Butachlor 50EC, Anilofos 30EC, and Pretilachlor 50 EC.

Farmers make rational use of herbicide for better efficacy for weed control.

#### Manures & Fertilizers:

- i) Organic manures: Green manures are highly beneficial to rice crop. However, due to shortage of irrigation water, during hot summer costly seed and short time gap between the harvesting of wheat and sowing of rice, 5.6% farmers have been following the practice of green manuring. Now in Punjab 33.4% farmers have been using FYM.
- ii) Inorganic fertilizers: Urea is the major source of Nitrogen. For short-statured Basmati varieties such as Pusa Basmati-1, Pusa Basmati-1121 and Sharbati, 192-277 kg / ha urea in three equal splits and for Basmati-386, 75-125 kg urea in two split per ha is used. Most of the farmers use 62 kg of DAP for Phosphorus per ha as basal dose. Very few farmers (3-4%) use potash fertilizers. Muriate of Potash for Potassium at the rate of 60 kg. per ha. is being applied. Almost all farmers (80-90% in different districts) use 17.5-30 kg. / ha of Zinc Sulphate to all paddy crops for supply of Zinc.

#### Pests and Disease Control:

- i) Major insect pests are Leaf Folder. Leaf Folder attacked in the month of Sept. Farmers generally used 1-2 spray of Monocrotophos/ Chlorpyriphos or 1-2 applications of granular Cartap Hydrochloride, Fipronil, etc.
- ii) Due to dry season, the disease incidence was very less this year. For Blast and Sheath Blight, farmers use Tilt 25EC @ 500 ml / ha. in one or two spraying. Seed treatment with Bavistin and Streptocycline is used for control of Foot-Rot. However, this year the use of pesticide was much less.

#### Harvesting time and method:

- i) Harvesting of Sharbati and Pusa Basmati-1509 starts in September and of other Basmati varieties in late October to mid-November.
- ii) Major area under rice is harvested by Combine Harvester, and transported directly to the grain market on the same day or the next day. It saves the farmer from unloading, loading and storage expenses. However, most of the Traditional Basmati and Pusa Basmati-1121 farmers (20-25%) do manual harvesting due to higher market price of manually harvested produce. Under shortage of labour or other field problems like lodging

etc., 70-75% farmers go for mechanical harvesting. 5-10% farmers follow both.

#### Marketing:

Marketing system is well established in Punjab and harvested produce is taken on the same day or the next day of threshing to the market for the sale. 5-10% farmers store their produce for a month or more, speculating the increase in price. Paddy is cleaned in the market yard and open auctioned on same day through Commission Agent, who charge commission fee from farmers as well as from traders. Price offered varies due to the percentage of moisture in the grain and other quality parameters. During the current year, the market price of Pusa Basmati-1121 Rs. 2100-2500/- per quintal. The price for Pusa Basmati-1509 has been ranged from Rs. 1700-1850/-.

Average rent value for one hectare land has been Rs. 75,000-1,00,000/- per year i.e., for Basmati growing season the rent is Rs. 37,500-50,000/- per hectare. As the prices have been very less this year, many of the farmers have met huge losses and suggest the Govt. to fix MSP for Basmati varieties too.

Table 4: Variety wise Cost of Cultivation & profitability in Punjab

Variety	Average Yield (Qtl/ha)	Average Market Price (Rs./qtl)	Gross Income (Rs/ha)	Cost of Cultivation (Rs/ha)	Net Returns (Rs/ha)
Basmati-386	25	2800.00	70,000.00	40,000.00	30,000.00
Pusa Basmati-1121	37.5	2250.00	84,375.00	45,500.00	38,875.00
Pusa Basmati-1509	49.6	1750.00	86,800.00	45,500.00	41,300.00
Pusa Basmati-1	48	1650.00	79,200.00	45,000.00	34,200.00
Sharbati	41	1550.00	63,550.00	40,000.00	23,550.00

**Expected change in the next year:**

Pusa Basmati-1509 being an early maturing and high yielding variety may become the farmer's preference. The yield has been higher this year for all the varieties.

**HARYANA**

**Soil type and Irrigation:**

Basmati Rice is cultivated under assured irrigation. Irrigation is mainly through Tube-wells (70%) and Canals (30%). Soils are generally loam to clay loam.

**Cropping Pattern:**

Rice-wheat is the major cropping pattern. However, in some areas of high productivity, three crops per year is also being followed; i.e. Rice-Potato-Potato; Rice-Toria-Wheat. Short duration varieties like Sharbati are cultivated in association with vegetable pea/potato barseem.

The contract farming in Basmati rice is not popular, (except for some organic rice area of Kaithal district), in any district of the

study. However, farmers are willing to enter contract farming under Tripartite Model (Trade-Govt.-Farmers).

**Prominent varieties grown in different districts:**

Important districts where Basmati varieties grown are- Jind, Karnal, Kaithal, Kurukshetra, Sonapat and Ambala districts for Traditional Basmati varieties and Jind, Panipat, Sirsa, Fatehabad, Yamunanagar, Kaithal, Karnal and Sonapat districts for Pusa Basmati-1. Pusa Basmati-1121 is grown largely in Sonapat, Panipat, Jind, Hisar, Kaithal districts and some areas in Yamunanagar, Rohtak, Jajjhar and Faridabad districts. Sharbati is prominent in Karnal, Kaithal, Kurukshetra, Jind, Faridabad and Ambala districts. Out of 12.96 lakh ha. rice transplanted this year Basmati varieties were sown in 7.2 lakh ha area. Which is around 55.5%. Almost 110 blocks in 20 districts were

surveyed. Efforts were made to cover 10-15 farmers in each village and 8-10 villages in each prominent block. More than 3,622 farmers were interviewed and an area covered 61,285 acres.

Table 5: Variety wise % Area & Production in year 2015 and 2016 in Haryana.

Sl. No.	Variety	% Basmati Area		% Basmati Production	
		2015	2016	2015	2016
1	Pusa Basmati-1121	57.15	70.16	56.04	65.89
2	Pusa Basmati-1509	13.52	3.64	16.47	4.65
3	CSR-30	15.9	13.61	13.09	10.52
4	Punjab Basmati-3	0.64	0.00	0.71	0.00
5	Pusa Basmati-1	4.69	6.15	3.5	4.97
6	Pusa Basmati-1401	7.74	6.45	9.93	10.36
7	Super	0.29	0.00	0.23	0.00

**Seed supply and Seed rate:**

- i) Farmers generally sow their own seed (45-50 %) or procure from private seed agencies (40%). The procurement from Govt. agencies i.e. Agricultural University / State Seed Corporation / NSC is only 5-10%.
- i) Farmers use less seed than recommended, which is 20 kg seed for sowing nursery for transplanting one ha field. In general, 10 kg seed is used by farmers per ha.

**Sowing and transplanting:**

- i) Nursery sowing of Sharbati and Pusa Basmati-1509 starts by the end of May, and of Pusa Basmati-1, Pusa Basmati-1121, and CSR-30 in the 1<sup>st</sup> week of June.

- ii) Sharbati and Pusa Basmati-1509 transplanting starts in June, and of Pusa Basmati-1, Pusa Basmati-1121 and CSR-30 in July.
- iii) Very few farmers maintain recommended plant stand per unit area, which is 33 hills / m<sup>2</sup>, plant population of 16 – 20 hills / m<sup>2</sup> and 20 – 25 hills / m<sup>2</sup> is generally being maintained at farmers' field.

**Weed Control:**

Weeds are controlled by herbicide application and also by manual weeding. Mostly used herbicides are Butachlor 50EC, Anilofos 30EC, and Pretilachlor 50 EC.

Farmers make rational use of herbicide for better efficacy for weed control.

#### Manures & Fertilizers:

- i) Organic manures: Green manures are highly beneficial to rice crop. However, due to shortage of irrigation water, costly seed and short time gap between the harvesting of wheat and sowing of rice, very few farmers follow the practice of green manuring. FYM is being used by some farmers.
- ii) Inorganic fertilizers: Farmers use excessive nitrogen and ignore phosphate and potash. They mostly use urea for Nitrogen application. For short-statured Basmati varieties such as Pusa Basmati-1, Pusa 1121 and Sharbati, 185 kg. urea in three equal splits and for HBC 19, 125 kg urea in two split per ha is used. Most of the farmers use 65 kg of DAP for Phosphorus per ha as basal dose. Very few farmers use Muriate of Potash for Potassium at the rate of 50 to 60 kg. per ha. Almost all farmers use 25 kg. / ha of Zinc Sulphate to all paddy crops for supply of Zinc.

#### Pests and Disease Control:

- i) Major insect pests are Rice Stem Borer, Leaf Folder, White Plant Hopper and Brown plant hopper in Jind, Ambala, Assandh and

Nilokheri blocks of Karnal. Sharbati variety of rice is transplanted early and hence escapes the attack of insect pest; thus requiring very less pesticide. For Basmati, farmers have to use pesticide. For spray, farmers generally use Buprofezin, Monocrotophos, Chlorpyrifos or granular Cartap Hydrochloride, Fipronil, etc. The most of the farmers apply Carbofuran to give green color to the crop irrespective of presence of Stem rot disease for which to control it is sprayed.

- ii) Major diseases are Stem rot, Bacterial Leaf Blight (BLB), Sheath Blight, Blast and Foot-Rot. Pusa Basmati-1121 is susceptible to Foot Rot (bakanae) disease. BLB is controlled by the weather conditions (i.e. temperature) in Basmati. In the current year Leaf Blast disease appeared in Tohana block resulting in Yield loss.
- iii) Due to Zinc deficiency the issue of less tillering was reported in Kaithal and Panipat districts

#### Harvesting time and method:

- i) Harvesting of Pusa Basmati-1509 and Sharbati starts in mid-September and of Basmati in end October to mid-November.

ii) Rice is harvested by Combine Harvester and also manually, and transported directly to the market. The combine harvested Pusa Basmati -1121 crop fetch lesser price in comparison to manually harvested crop.

**Yield Losses:**

Crop of Pusa Basmati-1121, Pusa Basmati-1, Pusa Basmati-1401 and CSR-30 were attacked by Brown Plant Hopper and Stem Rot in many areas which caused yield losses. The reduction of yield in Ambala ranged from 3-6 quintals per ha. in case of Pusa Basmati-1121. In case of CSR-30, the yield loss ranged from 4-14 quintals per ha. In most areas it was 10 quintal per ha.

**Marketing:**

Price of paddy varies due to the percentage of moisture in the grain and other quality parameters. During the current year, price of Pusa Basmati-1121 in the year was Rs.1860-2300/- per quintal. The price of Pusa Basmati-1509 ranged between Rs.1746/- 1985/-. The price of CSR-30 Basmati varied

between Rs. 2870/- to Rs.3200/- per quintal. Price of Pusa Basmati-1 during the current year it is Rs.1880 to Rs.2310/- per quintal. The price of Pusa Basmati-6 ranged from Rs.2050/- to Rs.2510/- per quintal. The net profit has been worked out in Table-7. Which does not include the land lease cost ranging Rs. 43,225-Rs. 49,400/- per hectare.

i) Haryana is a high productivity area and farmers are highly adaptive to new technology. Cost of cultivation is very high due to input cost and farmers use all means to get higher productivity. Cost of cultivation in case of CSR-30 Basmati is up to Rs. 31,800/- per ha, depending upon the usage of fertilizers and pesticides. For Pusa Basmati-1509 it has been Rs. 28,050/- per ha. For Pusa Basmati-1, the cost of cultivation is Rs. 33,150/- per ha. The cost of cultivation of Pusa Basmati-1121 is also Rs. 35,200/- per ha.

ii) A total 1143 plots from various blocks in all the prominent districts were selected as Crop Cutting Experiments.

**Table 7: Variety wise Cost of Cultivation and Net Profit in Haryana**

Sl. No.	Variety	Average Yield (tons/ha)	Cost of Cultivation (Rs./ha)	Average Price (Rs./Qtl.)	Net Returns (Rs./ha)	Profit (Rs./ha)
1	Pusa Basmati-1121	3.85	35,200/-	2150/-	82,775/-	47,575/-

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2	CSR-30	3.10	31,800/-	3000/-	93,000/-	61,200/-
3	Pusa Basmati-1	4.86	33,150/-	2075/-	1,00,845/-	67,695/-
4	Pusa Basmati-1509	4.85	28,050/-	1850/-	89,725/-	61,675/-
5	Pusa Basmati-6	5.96	33,700/-	2234/-	1,33,146/-	99,446/-

### Expected change in the next year:

- i) Farmers tend to take decision on selection of a variety to be sown in the next coming season generally on the basis of total return from an acre calculated simply by multiplying production (yield/acre) and prevailing rates of paddy produce.
- ii) The market price of all the rice varieties were corrected during the current year kharif-2016. Pusa Basmati-1509 is an early maturing and High yielding variety but due to very less returns last year, the farmers didn't opt for this variety. Next year too, the farmers are not in a mood to transplant this variety much.

## UTTAR PRADESH AND UTTARAKHAND

### Soil Type and Irrigation:

- i) Dominant soil types identified in both the states are loam and clay loam. Rice is mostly cultivated in clay dominated soil. Sodic soils are also used for Basmati cultivation in Ghaziabad, Bulandshahr and some pockets of Meerut and Badaun. Basmati is cultivated under assured irrigated conditions in both the

states and more than 95% of Basmati growers have independent source of irrigation. Sources of irrigation are private tube-wells, pumping sets and canal.

### Cropping Pattern:

The major cropping pattern in Uttar Pradesh and Uttarakhand with Basmati rice as a prominent crop includes Rice-Wheat. However, other crops like Sugarcane-Vegetables-Fodder-Pulses are also included in the cropping pattern. The short duration varieties (Sharbati) are followed by vegetable pea and short duration spices in the cropping sequence.

### Prominent varieties grown in different districts:

Prominent varieties of Basmati rice grown in Uttar Pradesh and Uttarakhand are Basmati-370, Type-3 and Basmati CSR-30, Pusa Basmati-1, Pusa Basmati-6, Pusa Basmati-1509 and Pusa Basmati-1121. Sharbati and Sugandha are other scented varieties. Traditional varieties are localized mostly in

Badaun, Sahajahanpur, Saharanpur, Bareilly and Auraiya districts in U.P. Much of the area has gone back again under Pusa Basmati-1121 this year. Pusa Basmati-6 (1401) has replaced much of the area under Pusa

Basmati-1. Pusa Basmati 1509 is continue in potato growing belt.

The productivity has been lesser this year due to the blast and BPH attack at maturity satage in most of the districts.

Table 8: Variety wise % Area & Production in year 2015 and 2016 in Uttar Pradesh & Uttarakhand

Sl. No.	Variety	% Basmati Area		% Basmati Production	
		2015	2016	2015	2016
1	Pusa Basmati-1121	58.63	56.91	55.21	53.85
2	Pusa Basmati-1509	20.13	19.91	25.03	25.02
3	Pusa Basmati-1 & 6	16.24	16.17	17.1	17.1
4	Type-3 & others	4.86	7.00	2.66	4.03

#### Seed supply and Seed rate:

- i) >45% Farmers use Basmati seeds purchased from private seed dealers and reliable progressive farmers. Govt. agencies do not contribute significantly in the distribution of seeds of Basmati. Whereas >40-45% farmers use own seed for cultivation. Seeds of Sharbati are procured from private agencies of farmers own sources. The quality seed distributed by various organizations cover 40% of the acreage sown. Remaining 60% is considered to be from farmer's own source.
- ii) Seed rate used by most of the farmers is 15-25 kg / ha for all the varieties, as against the

recommended dose of 20 Kg/ha depending on seed quality and method of nursery raising.

#### Sowing and Transplanting

- i) Nursery sowing of Pusa Basmati-1509, Sugandha, Sharbati and some areas Pusa Basmati-1 from 2<sup>nd</sup> week of May and transplanting starts June onwards, up to first week of August. This year the transplanting was done up to 15<sup>th</sup> August due to delayed monsoon. Farmers used 25-35 days old seedlings. Some of the farmers uprooted their fields due to delayed rains and water stress.

- ii) Generally, plant spacing 20 x 15 cm is kept. However, in late transplanting, spacing is reduced to 20X20 cm.

#### Yield Frequency:

A total 440 CCE were selected from the farmers interviewed. The yield frequency under different varieties is given below:

#### Manures and Fertilizers:

- i) Green manures and Organic manures are used only by few progressive farmers.
- ii) The fertilizer dose does not vary much from one district to the other. General application of fertilizer per ha is 25 kg Zinc Sulphate, 125-150 kg. DAP and 100-200 kg Urea in Basmati, which varies field to field depending on variety. The application of potash is generally ignored.

#### Pests and Disease Control:

- i) Major insect pests are Rice Stem Borer, Leaf Folder, Brown Plant Hopper and Gundhi bug. In general the farmers use insecticide whenever the crop suffers severely. But the trend is that many of the farmers use pesticides as recommended by the pesticide dealer.
- ii) Major diseases are Bacterial Leaf Blight (BLB), Sheath Blight and Blast. There was major

incidence of disease in Basmati rice this year. Untimely rains in the first fortnight of October and Brown Plant Hopper attack affected rice productivity this year, resulting in 6-8% lower yields than expected.

#### Harvesting time and method:

Harvesting of Pusa Basmati-1509, Sugandha and Sharbati starts in September and is completed in the first fortnight of October. In potato growing areas harvesting of Pusa Basmati-1 starts in last week of September. Pusa Basmati-1121 and Traditional Basmati varieties are harvested in late November to 1<sup>st</sup> week of December. The harvesting is mostly done manually. However, in some Western U. P. districts and Udham Singh Nagar districts, harvesting is also done by Combine Harvester.

#### Marketing:

- i) Most of the farmers sell their produce after harvest in nearby primary or secondary markets and 'Mandis'. Most of the farmers market this produce after harvest in local markets (mandis) and since the paddy mandis are not available in most of the districts and the farmers carry their produce to other state mandis as well depending on rates.

- ii) The market rates of different varieties of Basmati, evolved varieties and Sharbati vary from market to market. However, on an average the market price of the varieties studied in the project during December 2015 as follows: Traditional Basmati Rs.2600-3500/- per quintal, Pusa Basmati-1 Rs.1500-2400/- per quintal, Pusa Basmati-1121 Rs.1700-3200/- per quintal, Pusa Basmati-1509 Rs. 1000-1950/- per quintal and Non-Basmati long grain varieties Sugandha and Sharbati ranged between Rs.900-1600/- and Rs.950-1700/- per quintal.

**Cost of cultivation and Net Profit:**

- i) The cost of cultivation of different varieties of Basmati including evolved and non-notified rice, as reported by farmers were as follows:

**Table 10: Variety wise Cost of Cultivation and Net Profit in Uttar Pradesh & Uttarakhand**

Sl. No.	Particulars	Varieties					
		Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati-1509	Traditional	Sugandha	Sharbati
1	Average (q/ha.)	32	37	37	20	35	34
2	Average Market Price (Rs./q.)	2000	1800	1600	3000	1300	1350
3	Total Income (Rs./ha.)	64,000	66,600	57,600	60,000	45,500	45,900
4	Total Expenditure (Rs./ha.)	52,000	52500	50000	50000	50000	45000
5	Net Income (Rs./ha.)	12000/-	14100/-	7600/-	10000/-	-4500/-	900/-

**Expected change in the next year:**

- i) Rainfall in the year 2015 has been deficient due to which the transplanting was delayed.
- ii) Incidence of Foot Rot (Bakanae), neck Blast and BPH has affected productivity in case of all the varieties. But the variety is likely to increase mainly in potato growing areas.
- iii) The rates are less this year in comparison to last year and the yield has not been good.
- iv) The new farmers from sugarcane took up Basmati on the basis of last year high returns and suffered due to bad quality seed and low returns this year.

**Farmers' suggestions:**

- i) The seed of Pusa Basmati-1509 was sold by many private companies due to high demand this year and adulteration was there. The farmers are expecting a good quality authentic seed next year.

### JAMMU & KASHMIR

#### Soil Type and Irrigation:

- i) Dominant soil type identified in the state is loam and silt loam.
- ii) Basmati is cultivated under assured irrigated condition. Main irrigation source is canal, which supplies water to 94% of Basmati growing areas. Wells irrigate the remaining portion.

#### Cropping Pattern:

The major cropping pattern in Jammu & Kashmir is Rice-Wheat/Barley. However, some areas are left fallow after rice due to high moisture.

#### Prominent varieties grown in different districts:

Exclusively Basmati-370 is grown in the state. Last year the price of Basmati-370 was high and the farmers got good returns. Sharbati is grown in some area (4-4.5%). In Kathua Pusa Basmati-1121 has been gaining

year by year due to good approachability to Punjab markets.

#### Seed supply and Seed rate:

- i) Farmers use either their own seed or seed purchased from private seed dealers. Govt. seed distribution of Basmati rice is also being facilitated to farmers.
- ii) Seed rate used by most of the farmers is 12 to 15 kg / ha.

#### Sowing and Transplanting:

- i) Nursery raising starts in mid-June and transplanting is done in mid-July.
- ii) Plant population is 2 – 3 seedlings per hill. Plant spacing during transplant is 20 x 20 cm.

#### Weed Control:

Weeds are mostly controlled mechanically by use of Khurpi. However, progressive farmers use 'Butachlor', a popular weedicide.

#### Manures and Fertilizers:

- i) Green manuring is not usually done. Organic manures are used only by few farmers.
- ii) Use of Nitrogen at 40 kg N / ha is generally given. Urea is the main source of Nitrogen.

#### Pests and Disease Control / Hailstorm:

- i) Major insect pests are Rice Stem Borer, Leaf Folder and Plant Hopper. Farmers use

insecticide whenever the crop suffers severely. During the current year, no impact incidence was observed above economic threshold limit and hence, no use of insecticide was required.

- ii) Major disease is Paddy Blast. Hinosan and Ziram are used for control of the disease.

#### Harvesting time and method:

Harvesting of Traditional Basmati is generally done manually. Harvesting starts during early November and is completed by mid-November.

#### Marketing:

- i) Most of the farmers sell their produce after harvest in nearby primary or secondary markets and 'Mandis'.
- ii) The market rate of Ranbir Basmati varies from market to market. During the current year Basmati-370 fetched Rs.2800 to Rs.3200 per quintal.

#### Cost of cultivation and Net Profit:

- i) The cost of cultivation of Basmati-370 as reported by farmers was Rs. 35,000/- to Rs.40,000/- per ha. The net profit during the current year has been lesser than the last year, due to reduction in yield and lower prices.

#### Expected change in the next year:

Basmati rice acreage in general has stabilized and hence no significant change in the area under Traditional Basmati is expected.

#### Farmers' suggestions:

Marketing of Basmati in Jammu & Kashmir is not done as in adjoining Punjab. Better marketing facilities should be introduced by the Government for profitability to farmers.

### HIMACHAL PRADESH

Rice is cultivated in 0.77 to 0.83 lakh hectares area in Himachal Pradesh. Two major districts, Mandi and Kangra have 70-75% of the total area. Basmati and Sharbati are grown in exclusively few blocks of Kangra.

Rice is cultivated as a rainfed irrigated crop in general. The majority of farmers (70-75%) use very less input of fertilizer and pesticide etc. and hence the yield is very less, hardly 20-25 qt/ha of rice.

#### Varieties:

Farmer prefers to grow the local traditional varieties due to incidence of pest and diseases. Sharbati is preferred.

#### Diseases & Pest:

Diseases like Brown spot, Leaf Blast are the major ones and all basmati varieties are very sensitive to these diseases.

### Marketing:

There is no established marketing system and mostly products are sold at the farm yard/house. Himachal Pradesh is self-consuming state and very small quantity is being put to market.

### Expected Change:

Pusa Basmati-1121 has been introduced very recently in the state. But farmers mostly prefer to grow Traditional Basmati varieties of their own choice. There is no significant change likely to occur in the Basmati varieties grown in the state during the next year.

## CONCLUSION

From the farmers' survey of the 6 states, the results of which has been given in the

previous pages, the following general conclusions with respect to Basmati can be drawn.

- i) The Basmati crop, (Traditional, Evolved and non-notified varieties) this year was affected much due to pests and disease incidence in Punjab, Haryana, U.P and Uttarakhand.
- ii) The price of all the varieties has been very low this year over last year disappointing the farmers.
- iii) Productivity has been high this year in Haryana. Whereas in Western Up the productivity has been at low due to deficient irrigation conditions.
- iv) From farmers' survey, it is observed that Pusa Basmati-1509 which is an early maturing and high yielding variety may take substantial area next year as the farmers get good returns and may take other crops.

**QUESTIONNAIRE FOR FIELD DATA COLLECTION FOR BASMATI & NON-NOTIFIED VARIETIES - KHARIF 2016**

**1. Personal Information**

Date: \_\_\_\_\_

Name of the Farmer: \_\_\_\_\_

Name of the Village / District / State: \_\_\_\_\_

- GPS Coordinates:
- Latitude \_\_\_\_\_ Longitude \_\_\_\_\_
- Total area owned by the farmer: \_\_\_\_\_ (Acres)
- Soil Type (Local Name) in farmer's fields \_\_\_\_\_
- Dominant soil type in the village \_\_\_\_\_
- What is the source of irrigation used by the farmer?
- I. For Basmati (Traditional / Evolved) \_\_\_\_\_
- II. For Sharbati \_\_\_\_\_

**2. Cropping Pattern**

- What all crops did the farmer grown last year? \_\_\_\_\_
- Did the farmer grow Rice / (Basmati-370/386) / Pusa Basmati-1509/ Punjab Basmati-3/Pusa Basmati-1121 / CSR-30 last year? If yes, which varieties and how much area variety-wise?  
\_\_\_\_\_
- How much yield was obtained per acre, variety-wise?  
\_\_\_\_\_
- What are the crops being grown by the farmer in the current year?  
\_\_\_\_\_
- The total area sown by the farmer in the current year with Rice is \_\_\_\_\_ acres. Basmati-370/386 \_\_\_\_\_ acres, Pusa Basmati-1509 \_\_\_\_\_ acres. Pusa 1121 \_\_\_\_\_ acres, Pusa Basmati-1, Punjab Basmati-3 and CSR-30 \_\_\_\_\_ acres.
- Has the farmer gone for contract farming in current year for Basmati (370-386) / Sharbati / Pusa Basmati-1121 / CSR-30?
- If 'Yes', which varieties and how much acreage \_\_\_\_\_

: 2:

### 3. Planting & Harvesting

Where from did the farmer procure seed in Kharif '16 for the following varieties?

Varieties	Seed Source			
	Own Seed	Private Seed Agency	Govt. Seed Agency	Any other Source
Basmati-370/386				
Pusa Basmati-1509				
Pusa Basmati-1121				
CSR 30				
Punjab Basmati-3				
Pusa Basmati-1401				

How many kilograms of seed were used per acre, variety-wise?

Varieties	Seed used per Acre (in Kilogram)			
Basmati-370/386				
Pusa Basmati-1509				
Pusa Basmati-1121				
CSR 30				
Punjab Basmati-3				
Pusa Basmati-1401				

When was nursery sown for Crop in the current year?

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When were seedlings transplanted during the current year?

---

When does the farmer plan to harvest Crop (variety-wise) in Kharif '16?

---

Crop would be harvested manually or mechanically?

---

### 4. Marketing

#### A. Last Year

- How much did the farmer produce & when did he sell the produce last year?

: 3:

Varieties	Crop Sold (in %)		
	Production (Quintals)	Immediately after Harvesting	After Storage
Basmati-370/386			
Pusa Basmati-1509			
Pusa Basmati-1121			
CSR 30			
Punjab Basmati-3			
Pusa Basmati-1401			

- Through which channel crop was sold?

Varieties	Channel used for selling Crop			
	Mandi	Miller	Agent	At Farm Site
Basmati-370/386				
Pusa Basmati-1509				
Pusa Basmati-1121				
CSR 30				
Punjab Basmati-3				
Pusa Basmati-1401				

Market / Mandi / Agent (Details) \_\_\_\_\_

- What was the rate of selling?

Varieties	Rate of Selling (Rs. Per Quintal)	
	Immediately after harvesting	After Storage
Basmati-370/386		
Pusa Basmati-1509		
Pusa Basmati-1121		
CSR 30		
Punjab Basmati-3		
Pusa Basmati-1401		

## B. Current Year

- How much farmer is expecting to produce and what is his plan of selling?

: 4:

Varieties	Produce Expected	Plan of Selling (in %)	
		Immediately after harvesting	After Storage
Basmati-370/386			
Pusa Basmati-1509			
Pusa Basmati-1121			
CSR 30			
Punjab Basmati-3			
Pusa Basmati-1401			

- Through which channel the farmer wants to sell this year's produce of following varieties?

Varieties	Channel for selling produce			
	Mandi	Miller	Agent	At Farm Site
Basmati-370/386				
Pusa Basmati-1509				
Pusa Basmati-1121				
CSR 30				
Punjab Basmati-3				
Pusa Basmati-1401				

- Market / Mandi / Agent (Details) \_\_\_\_\_

- What is the expected rate of selling?

Varieties	Expected Rate of Selling (Rs. Per Quintal)
Basmati-370/386	
Pusa Basmati-1509	
Pusa Basmati-1121	
CSR 30	
Punjab Basmati-3	
Pusa Basmati-1401	

## 5. Weed Control

- How were weeds controlled last year?

- How are weeds being controlled this year?
- 

: 5:

## 6. Manure & Fertilizer application

### A. Inorganic

- Which inorganic fertilizers were applied last year and at which stages?

	ZnSO <sub>4</sub>			N <sub>2</sub>			P <sub>2</sub> O <sub>5</sub>			K <sub>2</sub> O		
	Application Stages											
	Basal	TD I	TD II	Basal	TD I	TD II	Basal	TD I	TD II	Basal	TD I	TD II
Doses (kg/Acre)												
Form (Urea etc.)												

- Which inorganic fertilizers are being applied this year and at which stages?

	ZnSO <sub>4</sub>			N <sub>2</sub>			P <sub>2</sub> O <sub>5</sub>			K <sub>2</sub> O		
	Application Stages											
	Basal	TD I	TD II	Basal	TD I	TD II	Basal	TD I	TD II	Basal	TD I	TD II
Doses (kg/Acre)												
Form (Urea etc.)												

### B. Organic

- Give details of any organic fertilizers (FYM, BIOCOMPOST etc.) used last year and being used this year by the farmer:
  - Last year
  - This year
- Give details of Green Manures, if used by the farmer:
  - Last year
  - This year

## 7. Pests and Diseases Management:

- Which types of Pests and Insects attacked Basmati (Traditional / Evolved) / Sharbati / Pusa 1121 / CSR 30 Crop Plants?

- Last year
- This year

: 6:

- What percentage of plant population was infested?

- Last year
- This year

- What control measures were / are adopted by the farmer?

- Last year
- This year

- What preventive measures, in advance, were / have been taken and with what results?

- Last year
- This year

**Diseases:**

- Which types of plant diseases occurred in Basmati (Traditional / Evolved) / Sharbati / Pusa 1121 / CSR 30 Crop?

- Last year
- This year

- At which stages the plant diseases occurred?

- Last year
- This year

- What was the extent of damage (in percentage) by crop diseases?

- Last year
- This year

- What control measures were / have been adopted by the farmer?

- Last year
- This year

- Did farmer take any preventive measures in advance and with what results?

- Last year
- This year

**8. General Information**

- What is the basis of selection of variety of Basmati (Traditional / Evolved) / Sharbati / Pusa 1121 / CSR 30 by the farmer for sowing during the current year?

- What technical advancements has the farmer adopted during the current year?

During transplantation \_\_\_\_\_

: 7:

In Weed Control \_\_\_\_\_

In Pest Control \_\_\_\_\_

In Harvesting \_\_\_\_\_

- What were the economics of Basmati (Traditional / Evolved) / Sharbati / Pusa 1121 / CSR 30 grown last year?

- The total cost of crop per acre, variety-wise \_\_\_\_\_

- The yield per acre, variety-wise \_\_\_\_\_

- The price realized per quintal and therefore, gross earning per acre \_\_\_\_\_

- Net Profit, per acre, variety-wise \_\_\_\_\_

- What is the total estimated cost per acre this year for Cultivation of the varieties of Basmati (Traditional / Evolved) / Sharbati / Pusa 1121 / CSR 30 being grown by the farmer?

\_\_\_\_\_

- What are the expected yields and market prices, variety-wise?

\_\_\_\_\_

- Which varieties will the farmer grow next year: (Basmati-370/386)/ Pusa-1509/ Punjab Basmati-3/ Pusa Basmati-1401/ Pusa Basmati-1121 / CSR-30

\_\_\_\_\_

Reasons for the above decision \_\_\_\_\_

### 9. Farmer's suggestions:

- What are the farmer's plans to increase yield?

\_\_\_\_\_

- What type of support does the farmer expect?

- From the Govt. \_\_\_\_\_

- From Private Parties \_\_\_\_\_

- Would the farmer like to change the crop next year?

If so, why? \_\_\_\_\_