Kharif-
2016

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

Report Volume - 6

Submitted to

Basmati Export Development Foundation (APEDA), New Delhi

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EXECUTIVE SUMMARY

Scope of the Report

The present report being the sixth cycle of report for Kharif - 2016 covers the results of field survey based (a) Acreage estimation of all rice, Basmati (all varieties) and other non-notified selected varieties (b) Field Survey based crop health monitoring and (c) Field survey and crop Cutting Experiment based production estimate of Basmati and other Non-notified, Non-basmati long grain varieties in the different districts of Punjab, Haryana, Delhi, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Jammu & Kashmir.

Study districts

The study area covers 81 districts, which includes 22 districts of Punjab, 21 districts of Haryana, 30 districts of Uttar Pradesh, 4 districts of Uttarakhand, 1 district of Himachal Pradesh and 3 districts of Jammu & Kashmir.

Rice Acreage

Total Basmati area in study districts has been 16,88,480 ha. this year in comparison to 21,18,550 ha in the year 2015. There has been a 20.3% decrease in Basmati area and resulting in 23.6% reduction in production estimates this year. Area under Pusa Basmati-1509 reduced from 1.72 million ha. to 1.22 lakh ha. (93%) and most of the area was transplanted under permal varieties as the farmers got same price on permal varieties and a higher return due to higher yield in comparison to Basmati varieties.

In Punjab, the total basmati area has been 6,15,630 ha. Out of which, Pusa Basmati-1121 has 5,55,780 ha, Pusa Basmati-1509, 1,22,760 ha, Pusa Basmati-1, 24,280 ha, Basmati-386, 370 ha. The area under Pusa Basmati-1121 has decreased by 17%. Whereas, Pusa Basmati-1509 has decreased by 80.7% this year. Northern districts Gurdaspur, Tarantaran, Amritsar & Fazilka have maximum area under Pusa Basmati – 1121. The Production of Pusa Basmati-1121 and Pusa Basmati-1509 is likely 20,47,570 and 1,71,920 Metric tons respectively in the state this year. The area & production under Basmati-386 is likely 370 ha and 920 metric tons. The area under Sharbati has increased marginally to 5,390 ha. this year. And the production is likely 20,420 metric tons. The varieties like CSR-30 and Punjab Basmati-3 were not transplanted this year. The yield has been at higher side this year by 3-4 quintals in many

varieties and even 1 ton/ha too in a few districts.

In Haryana, the total basmati area has been 6,15,630 ha. Out of which, Pusa Basmati - 1121 has 5,04,860 ha, Pusa Basmati-1, 44,280 ha, Pusa Basmati-1509, 26,160 ha, CSR-30, 97,920 ha, Pusa Basmati-1401, 46,420 ha. The area under Pusa Basmati-1121 has increased again by 6%. Whereas, CSR-30 area has reduced by 26% this year. Much of the area under Pusa Basmati-1 has gone under Pusa Basmati-1401. Karnal, Jind, Kaithal, Sonepat and Panipat have maximum area under Pusa Basmati – 1121. The Production of Pusa Basmati-1121 and Pusa Basmati-1509 is likely 18,42,120 and 1,30,110 Metric tons respectively in the state this year. The production under Pusa Basmati – 1401 and CSR-30 is likely 2,89,740 and 2,94,090 metric tons respectively. While the area & production under Pusa Basmati-1 is estimated 44,280 ha. and 2,39,560 metric tons. The yield has been lower by 5-6 quintals/ha in all the varieties due to pest & disease attack in many of the districts of the state.

In Western Uttar Pradesh, the total basmati area has been 2,66,150 ha. Out of which, Pusa Basmati-1121 has 1,56,260 ha, Pusa Basmati-1509, 53,650 ha, Type-3 & others, 12,950 ha. The area under Pusa Basmati-1121 has reduced by 10.9%. Bulandshahr, Aligarh, Saharanpur and Badaun have maximum area under Pusa Basmati – 1121. The Production of Pusa Basmati-1121 and Pusa Basmati-1 is likely 4,50,000 and 1,39,260 Metric tons respectively in the state this year. The area under Sharbati has increased significantly to 1,63,920 ha. this year. And the production is likely 5,09,750 metric tons.

In Uttarakhand, the total basmati area has been 15,810 ha. Out of which, Pusa Basmati-1121 has 4,200 ha, Pusa Basmati-1, 2,310 ha, Type-3 & others, 6,800 ha. Hardwar has maximum area under Pusa Basmati – 1121 (1,600 ha). The Production of Pusa Basmati-1121 and Type-3 is likely 11,070 and 6,800 Metric tons respectively in the state this year. The area under Sharbati has been again 14,570 ha. this year. And the production is likely 49,180 metric tons.

In Jammu & Kashmir, the total basmati area has been 62,250 ha. Out of which, Pusa Basmati-1121 has been 8,400 ha and Basmati-370 has been 53,600 ha. The estimated production of Pusa Basmati-1121 and Basmati-370 are likely 25,710 metric

tons and 1,03,300 metric tons respectively. Pusa Basmati-1509 has been grown in 250 ha only this year and the production is likely 1,100 Metric tons. Non-basmati long Grain variety Sharbati is grown in 9,950 ha. with a likely production 35,550 metric tons. In Jammu, the farmers are still preferring traditional basmati variety Basmati-370 as its straw has a good demand as fodder having more carbohydrate and is liked by the cattle.

In Himachal Pradesh, this year Pusa Basmati-1121 has been sown in 2,000 ha. area only with a likely production 7,600 metric tons and Kasturi Basmati in 1,000 ha with the estimated production 2,660 metric tons. Pusa Basmati-1509 is introduced in Mandi district of the state. Almost 5,000 ha. area was transplanted under the variety with a likely production 22,100 metric tons. Non-Basmati Sharbati in 500 ha. with an estimated production 1,780 metric tons.

State wise total rice, Basmati varieties area has been given in table below:

Table 1A: State-wise Basmati Area during Kharif 2016

Area '000 ha

S. No.	State	Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati -1401	Pusa Basmati-1509	CSR-30	Type-3, Basmati-370/386
1	Haryana	504.86	44.28	46.42	26.16	97.92	
2	Punjab	555.78	24.28		35.20		0.37
3	W. Uttar Pradesh	156.26	43.29		53.65		12.95
4	Uttarakhand	4.20	2.31		2.50		6.80
5	Himachal Pradesh	2.00			5.00		1.00
6	Jammu & Kashmir	8.40			0.25		53.60
7	Delhi	1.00					
Total		1232.50	114.16	46.42	122.76	97.92	74.72

Table 1B: State-wise Basmati Production Estimates During Kharif 2016

Production '000 tons

S. No.	State	Pusa Basmati - 1121	Pusa Basmati- 1	Pusa Basmati - 1401	Pusa Basmati - 1509	CSR-30	Type-3 & Others
1	Haryana	1842.12	239.56	289.74	130.11	294.09	
2	Punjab	2047.57	116.10		171.92		0.92
3	W. Uttar Pradesh	450.00	139.26		204.05		21.69
4	Uttarakhand	11.07	7.19		10.15		12.83
5	Himachal Pradesh	7.60			22.10		2.66
6	Jammu & Kashmir	25.71			1.10		103.33
7	Delhi	3.80					
Total		4387.87	502.11	289.74	539.43	294.09	141.43

Table 2: State-wise Non Basmati Long Grain Rice Area & Production during Kharif 2016

Area in '000 ha, Production ('000 tons)

S. No.	State	Sharbati		Sugandha	
		Area	Production	Area	Production
1	Haryana	2.59	10.23		
2	Punjab	5.39	20.42		
3	Uttar Pradesh	163.92	509.75	90.86	310.40
4	Uttarakhand	14.57	49.18	0.49	1.95
5	Jammu & Kashmir	9.95	35.55		
6	Himachal Pradesh	0.50	1.78		
Total		196.92	626.91	91.35	312.35
	Yield (Tons/Ha)		3.18		3.42

Table : State-wise Transplanted Area during Kharif 2016

Area in '000 ha

S. No.	State	Rice
1	Haryana	1296.18
2	Punjab	3010.00
3	W.Uttar Pradesh	1272.46
4	Uttarakhand	120.09
5	Himachal Pradesh	60.00
6	Jammu & Kashmir	137.00
7	Delhi	1.00
Total		5896.73

Table-3 State-wise Area and Paddy production of Basmati in Kharif 2016 and Comparison with Kharif 2015

Area in '000 ha; Production in '000 t

Sl. No.	State	2015		2016	
		Area	Production	Area	Production
1	Punjab	863.74	3540.50	615.63	2795.62
2	Haryana	833.19	3242.67	719.64	2336.51
3	Uttar Pradesh	339.85	1066.47	266.15	816.54
4	Uttarakhand	15.80	45.58	15.81	41.24
5	Jammu & Kashmir	62.92	152.15	62.25	129.60
6	Himachal Pradesh	2.20	7.34	8.00	32.36
7	Delhi	0.85	3.35	1.00	3.80
Total		2118.55	8058.05	1688.48	6155.67

Table-4 State-wise Area and Paddy production of Non notified Non-Basmati in Kharif 2016 and Comparison with Kharif 2015

Area in '000 ha; Production in '000 tons

State	2015				2016			
	Sharbati		Sugandha		Sharbati		Sugandha	
	Area	Production	Area	Production	Area	Production	Area	Production
Punjab	5.03	20.61			2.59	10.23		
Haryana	2.74	9.98			5.75	20.42		
Uttar Pradesh	151.17	472.22	92.78	354.42	163.92	509.75	90.86	310.40
Uttarakhand	15.20	53.14	0.92	3.17	14.57	49.18	0.49	1.95
Jammu & Kashmir	9.41	33.70			9.95	35.55		
Himachal Pradesh	0.70	2.45			0.50	1.78		
Total	184.25	592.09	93.70	357.59	197.28	626.91	91.35	312.35

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Project 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 being the sixth cycle of report for Kharif-2016 covers the results of field survey based Basmati acreage and production estimates of all the Basmati varieties including Pusa Basmati-1121, Pusa Basmati-1, Pusa Basmati-1509, CSR-30, Basmati-386, Basmati-370, Type-3 and Non-

Basmati long grain varieties Sharbati & Sugandha.

Study Area Details

The study is confined to 81 districts, which includes 22 districts of Punjab (Amritsar, Barnala, Bathinda, Faridkot, Fatehgarh Sahib, Firozpur, Fazilka, Gurdaspur, Pathankot, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana, Mansa, Moga, Mohali, Muktsar, Nawanshahar, Patiala, Ropar, Sangrur and Tarantaran), 21 districts of Haryana (Ambala, Faridabad, Bhiwani, Fatehabad, Gurgoan, Hissar, Jhajjar, Jind, Kaithal, Karnal, Kurukshetra, Mahendragarh, Mewat, Palwal, Panchkula, Panipat, Rewari, Rohtak, Sirsa, Sonepat, Yamunanagar), 3 Districts of Jammu & Kashmir (Jammu, Samba and Kathua), 30 districts of Uttar Pradesh (Agra, Aligarh, Auraiya, Baghpat, Bareilly, Bijnore, Budaun, Bulandshahr, Etah, Kasganj, Etawah, Ferozabad, Gautam Buddha Nagar, Ghaziabad, Hapur, Hathras, J. P. Nagar, Kannauj, Mainpuri, Mathura, Meerut, Moradabad, Sambhal, Muzaffarnagar, Shamli, Pilibhit, Rampur, Saharanpur, Shahjehanpur), 4 districts of Uttarakhand, 1 district of Himachal Pradesh and one of Delhi.

The map of the study districts is given as Fig. 1. The complete list of districts is given in Annexure I. The study districts form a part of the Himalayas and the Indo-Gangetic Plains.

Rainfall during Kharif 2016

The Basmati growing belt has witnessed normal to deficient rainfall in the months of June and July this year in the states of Punjab, Haryana and Western U.P. And the transplanting has been timely due to good distribution of rainfall in the districts. A cumulative rainfall has been deficient in most of the area due to lesser rainfall in the month of September. The new variety Pusa Basmati-1509 has reduced to very less area due to very low returns last year.

The rainfall during 1 June to 28 Sept., 2016 in meteorological divisions under study area is given in table-1 and the rainfall in prominent districts in table-2.

Brief Profile of Organizations involved in the study

Agricultural and Processed Food Products Export Development Authority (APEDA):

APEDA came into existence in 1986 as an autonomous organization under Ministry of Commerce, Govt. of India, to develop India's agricultural commodities and processed foods, and to promote their exports. Its goals are to maximize foreign exchange earnings through increased agro exports, to provide better income to the farmers through higher unit value realization and to create employment opportunities in rural areas by encouraging value added exports of farm produce. APEDA has been achieving these objectives by identifying new markets, providing better support systems to our exporters and manufacturers, and introducing new products to the international market.

Basmati Export Development Foundation (BEDF)

BEDF is a registered society promoted by APEDA and Basmati Development Fund (BDF). It came into existence in the year 2003. The main objective of BEDF is to undertake and promote programs relating to application technology, research and development, including evaluation of region-specific agronomic practices. Evaluation trials of new promising varieties, seed multiplication projects, development and execution of contract farming and field-execution projects, and development of other relationship patterns between various stakeholders involved in development, growing, milling, processing, trading and exporting of Basmati rice are the other objectives of BEDF. The laboratory recently been developed at Meerut has state of the art research facilities including DNA finger printing technique for basmati which has started working this year.

All India Rice Exporters' Association (AIREA)

All India Rice Exporters' Association (AIREA) born in October 1989 is presently recognized as the only Apex Body of Indian Rice exporters both in India and abroad. Apart from major rice exporters, its members include Multinationals, Co-operative bodies and Public Sector Undertakings, etc. It has been representing the trade within the states / country as well as abroad and has established a proven track record in grappling and solving the

problems of the rice exporters. The Association offers numerous services to its members and it deals with various ministries/ government agencies, APEDA/ EIC/ EIA, FCI, etc., for projecting the problems of its members and finding solutions for the same. It also arranges meetings with State/ Central Government Officials/ Ministries, Organizes National/ International Conferences and circulating Daily Rice news etc. The Association's monthly publication, Rice India, gives comprehensive coverage regarding complete rice situation and it is widely circulated and respected amongst exporters and traders both nationally and internationally.

Agri Net Solutions / United Phosphorus Ltd. (UPL)

AgriNet Solutions, a subsidiary of United Phosphorus Ltd., is a spatial technology company which pioneered the remote sensing and GIS applications to agriculture and natural resource management among the private sector companies in India. The company, established in the year 2000, adheres to good corporate governance practices with emphasis on business ethics and values. AgriNet Solutions has one of the best infrastructures with several ERDAS Imagine image processing soft wares, ARC Info GIS and state-of-art hard wares. Crop acreage and yield estimation, soil suitability for crop area expansion, impact evaluation of irrigation projects, water resources development planning, farm forestry development are the major areas in which AgriNet has provided value added products to central and state governments, public and private sector organizations in India. The main strength of AgriNet is its strong team of long experienced domain experts and its origin from UPL.

United Phosphorus Ltd. (UPL) an ISO 9002 & 14001 Indian multinational is a leading global producer of generic crop protection products, intermediates, specialty agro-chemicals and other industrial chemicals. UPL is the largest producer of crop protection products with a wide range of products that include insecticides, fungicides, herbicides, fumigants and rodenticides. The company ranks fourth amongst the generic agrochemical companies in the world, and has a commitment to provide cost effective quality solutions in crop protection for farmers globally. The group of companies

includes seed multinational 'ADVANTA', which is committed for high quality seeds to farmers across the country. Jai Research Foundation, a numero-uno Contract Research Organization contributes in Mammalian Toxicology and Eco-Toxicology conducts studies with the latest international GLP guidelines.

Project Team

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Table 1: Rainfall (mm) in the Meteorological Divisions in different states (1.6.2016 to 28.9.2016)			
Met. Division	1 June to 28 Sept. '16		Remarks
	Normal	Actual	
Punjab	489.4	351.4 (-28)	Deficient
Haryana, Delhi	464.3	338.3 (-27)	Deficient
Western UP	764.6	640.0 (-16)	Normal
Himachal Pradesh	822.1	624.4 (-24)	Deficient
Uttarakhand	1223.4	1103.2 (-10)	Normal
Jammu & Kashmir	532.5	478.5 (-10)	Normal

Figures in parantheses show percent deviation from normal. Source: IMD

Table 2: Rainfall in the monsoon season at important locations (1 June to 28 Sept. 2016)				
Location / District	Total Rainfall (mm)	Normal Rainfall	% Departure from normal	Status
Ambala	434.4	914.0	-52	Deficient
Hissar	240.0	323.9	-26	Deficient
Karnal	372.1	575.2	-35	Deficient
Jammu	1110.0	859.1	29	Excess
Kathua	883.4	979.2	-10	Normal
Amritsar	463.0	532.3	-13	Normal
Sangrur	294.8	435.0	-32	Deficient
Patiala	240.7	611.8	-61	Scanty
Nainital	1556.4	1432.6	9	Normal
Dehradun	1194.8	1795.1	-33	Deficient
Udham Singh Nagar	643.0	1111.8	-42	Deficient
Kangra	1338.7	1577.9	-15	Normal
Meerut	472.8	773.5	-39	Deficient
Saharanpur	535.2	798.0	-33	Deficient
Bulandshaher	541.0	664.5	-19	Normal
Delhi	524.6	633	-17	Normal

Source: IMD

Fig. 1: Map Showing Districts of The Study Area

Crop Health Monitoring and Analysis

The scope of the present study included only ground survey based crop health monitoring. A state-wise summary on crop health is being presented here.

Punjab:

Crop Vigor: Crop vigor throughout the season was satisfactory.

Disease and insects / pests: Brown Spot, Neck blast and Brown Plant Hopper were noticed in some of the districts. However, it was below Economic Threshold Level (ETL).

Nutritional Deficiency: No nutritional deficiency was observed in this cropping season.

The yield has been slightly lesser in comparison to last year in case of all the varieties.

Haryana

Crop Vigor: Crop vigor throughout the season was satisfactory.

Disease and insects / pests: Neck Blast, Stem Rot and Brown Plant Hopper affected the crop badly under all the varieties resulting significant reduction in yield. In Karnal, Neck Blast and Stem Rot; In Jind, BPH and in Rohtak, Stem Rot badly affected the crop.

Nutritional Deficiency: No nutritional deficiency has been observed in the cropping season.

Crop Health and Yield Loss

In general, the crop has been good in the state. The yield has been at lower side due to pest & disease outbreak in many prominent districts.

Uttar Pradesh and Uttarakhand:

Crop Vigor: Crop vigor throughout the season was satisfactory.

Disease and insects / pests: Brown plant hopper has badly affected the crop in several districts. Bakanae outbreak was observed in Pusa Basmati-1121 and Pusa Basmati-1509 in a few districts. Neck Blast was observed in Pusa Basmati-1 and Pusa Basmati-1401.

Nutritional Deficiency: Zinc deficiency has been observed in most of the area during the cropping season.

Himachal Pradesh

Crop Vigor: Crop vigor throughout the season was satisfactory though the transplanting was delayed due to delayed monsoon.

Disease and insects/pests: The damage to crop was non-significant below ETL.

Nutritional Deficiency: No nutritional deficiency has been observed in the cropping season.

Jammu and Kashmir

Crop Vigor: Crop vigor throughout the season was satisfactory.

Disease and insects/pests: The damage to crop was non-significant and below ETL.

Nutritional Deficiency: No nutritional deficiency has been observed in the cropping season.

Crop Maturity Survey

AgriNet field survey team collected information on crop growth stages of different varieties of interest in different districts and the compiled information was included in every report volume, so that the trade can plan the procurement of paddy accordingly.

In Crop Maturity Survey, primarily four crop stages were considered viz., Vegetative, Reproductive, Maturity and Harvesting. Percent area under different crop stages in each district for Basmati and other non-Basmati varieties were provided at a regular periodicity.

Table 5: District-wise Acreage & Production Estimates of Basmati Varieties Varieties in Haryana during Kharif 2016

Area in '000 ha, Production ('000 tons)

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1509		Pusa Basmati - 1401		Pusa Basmati - 1		CSR-30	
		Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
1	Ambala	7.20	20.11	0.12	0.56			0.26	1.15	9.30	20.96
2	Bhiwani	22.05	70.23								
3	Faridabad	8.10	31.75					0.30	1.32		
4	Gurgaon	2.40	7.06					0.20	0.78		
5	Fatehabad	27.41	110.78	1.30	6.88	7.37	50.56	12.58	84.76	1.05	3.09
7	Hisar	42.40	166.21	0.45	2.54			0.85	4.17	1.10	2.96
8	Jajjhar	42.41	138.19	0.92	3.83					0.27	0.65
9	Jind	65.03	302.71	1.87	8.22			8.26	40.45	6.04	17.74
10	Kaithal	37.30	138.89	2.80	14.41			0.10	0.56	24.38	71.68
11	Karnal	39.71	163.43	8.85	43.58			0.26	1.21	29.77	89.33
12	Kurukshetra	11.04	43.28	2.70	13.23			2.55	13.12	14.48	45.04
13	Mewat	7.50	25.73								
14	Palwal	16.99	41.63	0.20	0.83			3.19	14.07		
15	Panipat	56.01	171.53	2.15	10.51			2.10	8.23	7.85	30.75
16	Rewari	1.20	4.41								
17	Rohtak	36.16	124.03	0.05						0.06	0.15
18	Sirsa	11.87	58.16	2.97	17.43	39.05	239.18	6.41	32.17	0.30	0.81
19	Sonepat	69.33	220.82	1.21	5.04					2.94	9.67
20	Yamunanagar	0.77	3.19	0.59	3.04			7.24	37.58	0.41	1.26
Total		504.86	1842.12	26.16	130.11	46.42	289.74	44.28	239.56	97.92	294.09

Table 5A: District-wise Acreage & Production Estimates under Long Grain Non- Basmati Sharbati in Haryana during Kharif 2016			
Area in '000 ha, Production ('000 tons)			
S. No.	District	Sharbati	
		Area	Production
1	Ambala	0.08	0.34
2	Bhiwani		
3	Faridabad		
4	Gurgaon		
5	Fatehabad	0.07	0.27
7	Hisar		
8	Jajjhar		
9	Jind		
10	Kaithal		
11	Karnal	0.13	0.39
12	Kurukshetra	0.29	0.94
13	Mewat		
14	Palwal	0.25	1.05
15	Panipat	0.29	1.23
16	Rewari		
17	Rohtak	1.00	4.00
18	Sirsa	0.49	2.01
19	Sonepat		
20	Yamunanagar		
Total		2.59	10.23

Table 6: District-wise Acreage & Production Estimates under Basmati Varieties in Punjab during Kharif 2016

Area in '000 ha, Production ('000 tons)

S. No.	District	Basmati-386		Pusa Basmati 1121		Pusa Basmati-1509		Pusa Basmati -1	
		Area	Production	Area	Production	Area	Production	Area	Production
1	Amritsar	0.37	0.92	85.46	313.85	28.11	138.63		
2	Barnala			2.01	7.89			0.54	2.65
3	Bhatinda			11.29	37.92				
4	Faridkot			22.80	92.87				
5	Fatehgarh Sahib			8.40	33.45			2.04	9.69
6	Fazilka			70.33	287.60				
7	Firozepur			50.87	182.78				
8	Gurdaspur			44.06	160.06	0.09	0.41		
9	Pathankot			3.01	8.39				
10	Hoshiarpur			7.31	27.54				
11	Jalandhar			10.73	40.31	0.70	0.35		
12	Kapurthala			8.54	30.20				
13	Ludhiana			19.30	71.57	1.96	10.15	3.27	14.79
14	Mansa			1.00	3.81				
15	Moga			19.93	49.76			0.13	0.62
16	Mohali			4.30	13.25				
17	Muktsar			49.89	176.92			9.04	43.32
18	Nawanshahar			5.21	18.32	0.20	0.96		
19	Patiala			17.88	70.44	1.00	5.00	2.71	13.28
20	Roopnagar			3.21	10.90	0.01	0.04		
21	Sangrur			30.08	113.91			6.55	31.74
22	Tarantaran			80.17	295.83	3.13	16.38		
Total		0.37	0.92	555.78	2047.57	35.20	171.92	24.28	116.10

Table 6A: District-wise Acreage & Production Estimates under Sharbati (Non-Basmati) in Punjab during Kharif 2016			
Area in '000 ha, Production ('000 tons)			
S. No.	District	Sharbati	
		Area	Production
1	Amritsar	0.36	1.40
2	Barnala		
3	Bhatinda		
4	Faridkot		
5	Fatehgarh Sahib		
6	Fazilka		
7	Firozepur		
8	Gurdaspur	3.49	13.48
9	Pathankot	1.90	6.94
10	Hoshiarpur		
11	Jalandhar		
12	Kapurthala		
13	Ludhiana		
14	Mansa		
15	Moga		
16	Mohali		
17	Muktsar		
18	Nawanshahar		
19	Patiala		
20	Roopnagar		
21	Sangrur		
22	Tarantaran		
Total		5.75	21.82

Table 7: District-wise Acreage & Production Estimates under Basmati Varieties in Uttar Pradesh during Kharif 2016

Area in '000 ha, Production ('000 tons)

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1 & 6		Pusa Basmati-1509		Type-3 & others	
		Area	Production	Area	Production	Area	Production	Area	Production
1	Agra	0.38	1.00	0.08	0.26	0.46	1.80		
2	Aligarh	18.58	53.03	4.88	14.20	4.17	18.34		
3	Auraiya	1.12	2.82	0.05	0.16	0.16	0.51	0.67	1.20
4	Baghpat	2.13	6.20	1.19	3.55	0.51	2.00	0.03	0.05
5	Bareilly	1.31	3.45	0.47	1.41	0.64	2.24	0.68	1.41
6	Bijnore	1.62	4.00	3.15	9.50	2.16	7.78		
7	Budaun	2.02	5.24	0.75	2.30	1.99	5.97	9.48	15.13
8	Bulandshahr	20.74	60.23	5.76	19.86	4.22	17.90	0.02	0.03
9	Etah+Kasganj	5.19	12.80	0.49	1.56	2.93	9.58		
10	Farukhabad	1.84	4.88	0.06	0.18	0.83	2.49		
11	Firozabad	2.33	6.34	0.24	0.75	1.28	4.86		
12	Etawah	6.33	18.56	0.16	0.53	2.54	8.89		
13	Gautam Buddha Nagar	18.86	56.81	1.78	6.11	0.76	3.27	0.01	0.02
14	Ghaziabad+Hapur	5.84	19.48	1.40	4.75	2.75	12.41		
15	Hathras	4.21	12.50	0.80	2.65	2.32	7.91		
16	Mathura	25.09	77.12	1.06	3.50	3.27	12.43		
17	Mainpuri	16.12	43.89	0.20	0.71	2.37	7.54		
18	Meerut	2.55	6.88	2.38	7.88	2.38	9.80	0.03	0.06
19	Moradabad	0.97	3.00	0.30	1.00	2.12	7.85		
20	J. P. Nagar	1.20	3.18	0.97	3.01	1.94	7.00		
21	Kannauj	0.65	1.65	0.16	0.45	1.38	4.21		
22	Muzaffarnagar+Shamli	4.62	12.80	3.98	13.40	2.42	10.16	0.11	0.25
23	Pilibhit	0.88	2.68	0.16	0.48	3.33	12.95		
24	Rampur	0.68	2.02	0.14	0.48	1.18	4.52		
25	Saharanpur	7.80	22.30	12.01	38.23	3.07	12.03	0.21	0.50
26	Shahjehanpur	1.63	4.76	0.27	0.85	0.80	3.10	1.71	3.00
27	Sambhal	1.57	4.09	0.40	1.33	1.67	6.51	0.02	0.04
Total		156.26	451.71	43.29	139.09	53.65	204.05	12.95	21.69

Table 7A: District-wise Acreage & Production Estimates under long grained non-Basmati varieties in Uttar Pradesh during Kharif 2016

Area in '000 ha, Production ('000 tons)

S. No.	District	Sharbati		Sugandha	
		Area	Production	Area	Production
1	Agra	0.00	0.00	2.16	6.45
2	Aligarh	2.38	8.33	8.97	28.32
3	Auraiya	1.72	4.91	0.19	0.60
4	Baghpat	0.22	0.80	0.85	2.35
5	Bareilly	43.75	129.45	0.49	1.63
6	Bijnore	16.89	54.20	1.34	4.99
7	Budaun	19.86	61.52	1.95	6.82
8	Bulandshahr	4.23	14.80	14.63	52.34
9	Etah+Kasganj	0.84	2.44	7.34	23.50
10	Farukhabad	0.13	0.35	2.35	6.89
11	Firozabad	0.12	0.31	5.27	17.20
12	Etawah	0.06	0.18	4.54	13.66
13	Gautam Buddha Nagar	1.31	4.60	0.87	3.01
14	Ghaziabad+Hapur	2.89	8.56	4.95	18.67
15	Hathras	0.65	2.01	5.84	19.32
16	Mathura	0.26	0.91	3.39	13.62
17	Mainpuri	0.15	0.52	5.97	19.96
18	Meerut	0.59	1.95	3.13	12.08
19	Moradabad	8.61	29.27	2.34	7.95
20	J. P. Nagar	6.76	22.31	2.73	9.00
21	Kannauj	0.13	0.37	1.41	4.31
22	Muzaffarnagar+Shamli	1.17	3.35	1.97	8.01
23	Pilibhit	5.10	16.00	0.37	1.45
24	Rampur	22.83	69.32	0.19	0.78
25	Saharanpur	7.10	21.56	2.85	10.57
26	Shahjehanpur	8.12	27.43	0.42	1.39
27	Sambhal	8.05	24.30	4.35	15.53
Total		163.92	509.75	90.86	310.40

Table 8: District-wise Acreage & Production under Basmati Varieties in Uttarakhand during Kharif 2016

Area in '000 ha, Production '000 tons

S. No.	District	Pusa Basmati- 1121		Pusa Basmati-1		Pusa Basmati-1509		Type-3 & others	
		Area	Production	Area	Production	Area	Production	Area	Production
1	Dehradun	0.4	1.0	0.0	0.0	0.2	0.71	2.7	4.90
2	Haridwar	1.6	4.4	2.2	6.8	0.5	2.30	2.4	4.68
3	Nainital	0.3	0.8	0	0	0.3	0.92	0.9	1.75
4	Udham Singh Nagar	1.9	4.9	0.12	0.38	1.5	6.22	0.8	1.50
Total		4.20	11.07	2.31	7.19	2.50	10.15	6.80	12.83

Table 8A: District-wise Acreage & Production under Non-Basmati Long grain Varieties in Uttarakhand during Kharif 2016

Area in '000 ha, Production '000 tons

S. No.	District	Sharbati		Sugandha	
		Area	Production	Area	Production
1	Dehradun	2.45	7.5	0.06	0.24
2	Haridwar	3.59	13.6	0.26	1.07
3	Nainital	1.40	4.7	0	0
4	Udham Singh Nagar	7.13	23.4	0.17	0.64
Total		14.57	49.18	0.49	1.95

Table 9: District-wise Acreage and Production Estimates under Basmati rice in Jammu & Kashmir during Kharif 2016

Area '000 ha, Production ('000 tons)

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1509		Basmati-370	
		Area	Production	Area	Production	Area	Production
1	Jammu	1.40	3.98	0.00	0.00	47.68	92.33
2	Kathua	6.40	19.45	0.20	0.80	3.80	7.20
3	Samba	0.60	1.74	0.05	0.30	2.12	3.80
Total		8.40	25.17	0.25	1.10	53.60	103.33

Table 10: District-wise Acreage & Production Estimates under Basmati in Himachal Pradesh during Kharif 2016

Area '000 ha, Production ('000 tons)

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1509		Kasturi Basmati	
		Area	Production	Area	Production	Area	Production
1	Kangra	2.00	7.60	1.00	4.50	1.00	2.66
2	Mandi			4.00	17.60		
Total		2.00	7.60	5.00	22.10	1.00	2.66

Crop Cutting Experiments (CCE) for Validation

Crop Cutting Experiments have been conducted using standard procedures in all the states for assessment of yield. All-important Basmati varieties in all the important districts have been taken up for CCE. The CCE derived yield was averaged for the district and a conversion factor used for offsetting the moisture content of the grain for estimation of district level production.

In *Punjab*, Crop Cutting Experiments has been conducted in 80 plots covering 12 districts. Based on CCE data, the range of productivity of different Basmati and non-Basmati varieties has been found to be as follows:

Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties in Punjab During Kharif 2016					
S. No.	District	Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati-1509	Basmati-386
1	Amritsar	4.35		5.19	2.45
2	TarnTaran	4.22		5.11	
3	Gurdaspur	3.60		4.59	
4	Pathankot	2.80			
5	Fatehgarh Sahib	4.10	4.75		
6	Kapurthala	3.63			
7	Patiala	4.33	4.99	4.50	
8	Fazilka	4.46			
9	Sangrur	3.89			
10	Ferozepur	3.57			
11	Ludhiana	3.61			
12	Muktsar	4.09	4.92		

In *Haryana*, Crop Cutting Experiments has been conducted in 486 plots covering 13 districts. Based on CCE data, the range of productivity of different Basmati varieties has been found to be as follows:

Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties in Haryana During Kharif 2016						
S. No.	District	Pusa Basmati-1121	Pusa Basmati-1	CSR-30	Pusa Basmati-1509	Pusa Basmati-1401
1	Ambala	3.16		2.35	4.90	
2	Kaithal	3.76		3.06		
3	Karnal	4.06		3.16	5.06	
4	Jind	4.01		2.96	5.10	6.21
5	Sonepat	3.90		3.23	5.27	
6	Hisar	3.80	4.90			
7	Kurukshetra	3.63	4.33	3.16	4.48	
8	Panipat	3.95	3.92			5.88
9	Rohtak	3.41			5.64	
10	Jhajjar	3.38				
11	Yamunanagar	3.82	5.20			
12	Fatehabad	4.69	5.10		5.54	6.10
13	Sirsa	4.68	5.29		5.64	6.05

In *Uttar Pradesh*, Crop Cutting Experiments have been conducted in 400 farmers' fields distributed over 18 districts. The average productivity of crop has been estimated on the basis of 5 crop cuttings of one sq. m. each in the field with 14% moisture content. Based on the data of crop cutting experiments, the range of productivity of different basmati and non-basmati varieties has been found to be as shown below:

Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties in Uttar Pradesh During Kharif 2016							
S. No.	District	Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati-1509	Basmati-370, Type-3	Sharbati	Sugandha
1	Agra			3.60			4.00
2	Aligarh	3.00	3.70			4.00	4.10
3	Auraiya			3.00		3.40	
4	Bareilly		3.20		2.00		3.50
5	Budaun			3.20		3.00	3.60
6	Bulandshahr	3.10	3.50				4.30
7	Etah+Kasganj	2.40				3.10	
8	Firozabad	2.90		3.40		3.5	
10	Gautam Buddha Nagar	3.10		4.00	1.80		4.00
11	Ghaziabad + Hapur	3.50	3.90	3.90		3.20	
12	Hathras		3.00	3.80			
13	Mathura	2.90					3.60
14	Mainpuri	2.60				3.70	
15	Meerut	3.20	3.50	3.90			3.80
16	Muzaffarnagar + Shamli	3.10	4.00	3.60			3.80
17	Rampur	2.50				3.70	3.60
18	Saharanpur	2.90	3.80	3.60	1.80	3.40	

Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties in Uttarakhand During Kharif 2016							
S. No.	District	Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati-1509	Basmati-370, Type-3	Sharbati	Sugandha
1	Dehradun			3.80	2.00		
2	Haridwar	2.70	3.50	3.70		3.50	3.50
3	Nainital				1.80		3.60
4	Udham Singh Nagar	2.40	3.30			3.40	

In *Uttarakhand*, Crop Cutting Experiments has been conducted in 40 farmers' fields of 4 districts. Based on CCE data, the range of productivity of different Basmati and non-Basmati varieties has been found to be as follows:

Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties in Uttarakhand During Kharif 2016							
S. No.	District	Pusa Basmati-1121	Pusa Basmati-1	Pusa Basmati-1509	Basmati-370, Type-3	Sharbati	Sugandha
1	Dehradun			3.80	2.00		
2	Haridwar	2.70	3.50	3.70		3.50	3.50
3	Nainital				1.80		3.60
4	Udham Singh Nagar	2.40	3.30			3.40	

However, it has been observed that the yield has been less in Haryana in many districts due to pest & disease attack this year in comparison to last year (Table A). Particularly, in case of Pusa Basmati-1121, the Crop Cutting Experiments revealed that the yield has been lesser this year at least 2-3 quintals per hectare in all the states, the yield of all the Basmati varieties has been lower by 2-3 quintals except Pusa Basmati-1 and Pusa Basmati-1401. In a few cases even 4 quintals per hectare. In Kurukshetra, yield of Pusa Basmati-1121 has been lower even more than 8 quintals per hectare. The yield of CSR-30 also has been at lower by 3-4 quintals per ha. In case of Pusa Basmati-1509 being an early maturing short duration variety, the yield has been higher in comparison to last year by 1-5 quintals per ha. The area under Pusa Basmati-1401 in Fatehabad district, whereas Sirsa witnessed a lower yield this year by >4 quintals per ha.

A Comparison of Yield in Haryana in Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties During Kharif 2015 & 2016

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1		CSR-30		Pusa Basmati-1509		Pusa Basmati-1401	
		2016	2015	2016	2015	2016	2015	2016	2015	2016	2015
1	Ambala	3.16	*3.75*								
2	Kaithal	3.76	*3.99*								
3	Karnal	4.06	*4.21*			3.16	*3.59*	*5.06*	4.91		
4	Hisar	3.80	*3.90*								
5	Kurukshetra	3.63	*4.40*			3.16	*3.22*	*4.48*	4.68		
6	Panipat	3.95	*4.30*	3.92	*4.94*						
7	Yamunanagar	3.82	*4.32*								
8	Fatehabad							*5.54*	5.03	*6.10*	5.66
9	Sirsa	4.68	*4.45*							6.05	*6.42*

In Punjab the yield of Pusa Basmati-1121 has been lower this year in comparison to last year by 2-5 quintals per ha. In Sangrur, noticeably by >1 ton/ha. The yield of Pusa Basmati-1, which is mainly transplanted in Patiala, the yield has been low by 7.6 quintals/ha. The yield of variety Pusa Basmati-1509 also has given a lesser yield by more than 5 quintals/ha. The traditional variety Basmati-386 has also given a low yield by 2 quintals per hectare this year (Table B).

A Comparison of Yield in Punjab in Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties During Kharif 2015 & 2016

S. No.	District	Pusa Basmati-1121		Pusa Basmati-1		Pusa Basmati-1509		Basmati-386	
		2016	2015	2016	2015	2016	2015	2016	2015
1	Amritsar	*4.35*	4.38			*5.19*	5.05	*2.45*	2.69
2	TarnTaran	*4.22*	4.53			*5.11*	5.29		
3	Gurdaspur	*3.60*	4.26			*4.59*	5.09		
5	Sangrur	*3.89*	5.18						
6	Patiala	*4.33*	4.85	*4.99*	5.75	*4.50*	5.25		

In Western Uttar Pradesh, the yield of Pusa Basmati-1121 has been lower this year by 2-4 quintals per ha. in comparison to the last year. In case of Pusa Basmati-1 also the yield has been lower by 3-4 quintals per hectare.

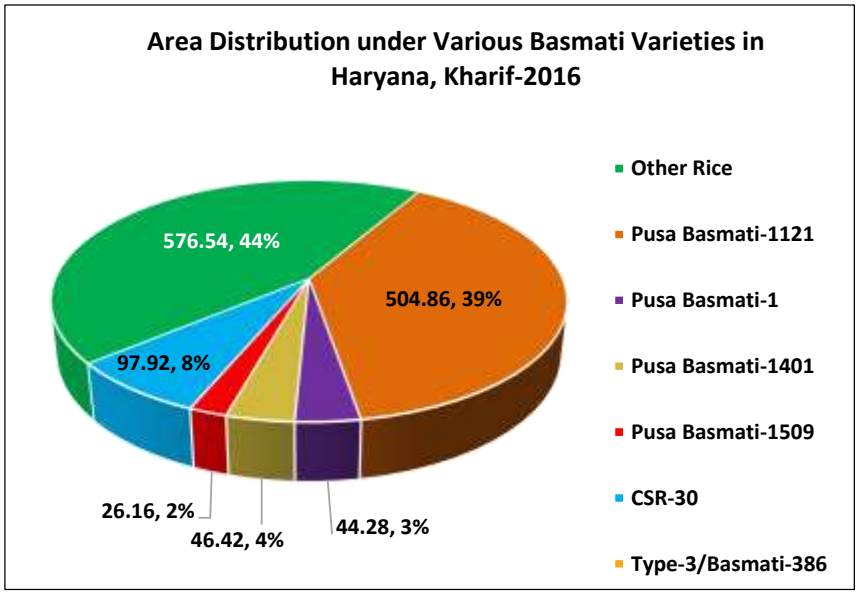
A Comparison of Yield in Western Uttar Pradesh in Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties During Kharif 2015 & 2016

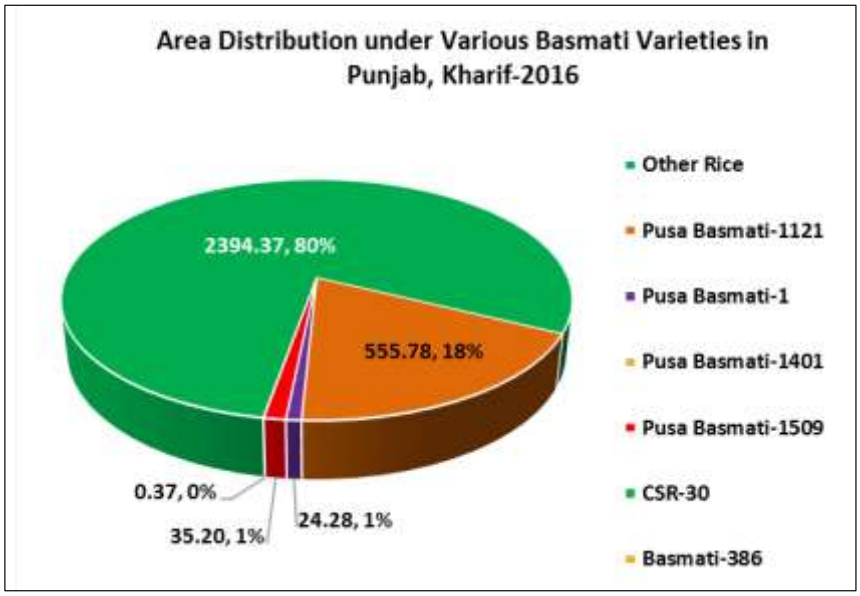
S. No.	District	Pusa Basmati-1121		Pusa Basmati-1		Pusa Basmati-1509		Basmati-370, Type-3	
		2016	2015	2016	2015	2016	2015	2016	2015
1	Agra					*3.60*	3.20		
2	Aligarh	3.00	3.00						
3	Auraiya					*3.00*	2.70		
4	Bareilly			3.20	*3.40*			2.00	*2.30*
5	Budaun					*3.20*	3.20		
6	Bulandshahr	*3.10*	3.00	*3.50*	3.44				
7	Firozabad	2.90	2.90						
8	Gautam Buddha Nagar					*4.00*	3.60		
9	Ghaziabad + Hapur	3.50	*3.70*	3.90	*3.91*	*3.90*	3.50		
10	Hathras			3.00	*3.49*	*3.80*	3.10		
11	Meerut			3.50	*3.80*	*3.90*	3.80		
12	Muzaffarnagar + Shamli	3.10	*3.67*	*4.00*	3.90	*3.60*	3.60		
13	Saharanpur			3.80	*4.00*				

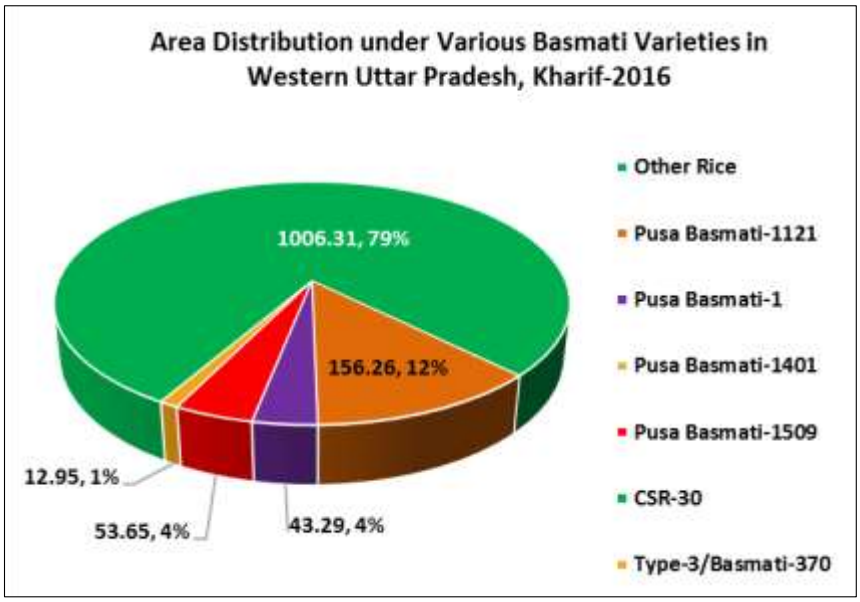
The yield of Pusa Basmati-1509 has increased up to 5-6 quintals per ha. While the potential yield has been claimed 70 quintals per hectare. A reduction of yield of Pusa Basmati-1121 and Pusa Basmati-1 by 3-4 quintals per ha. is due to pest attack and diseases has disappointed the farmers.

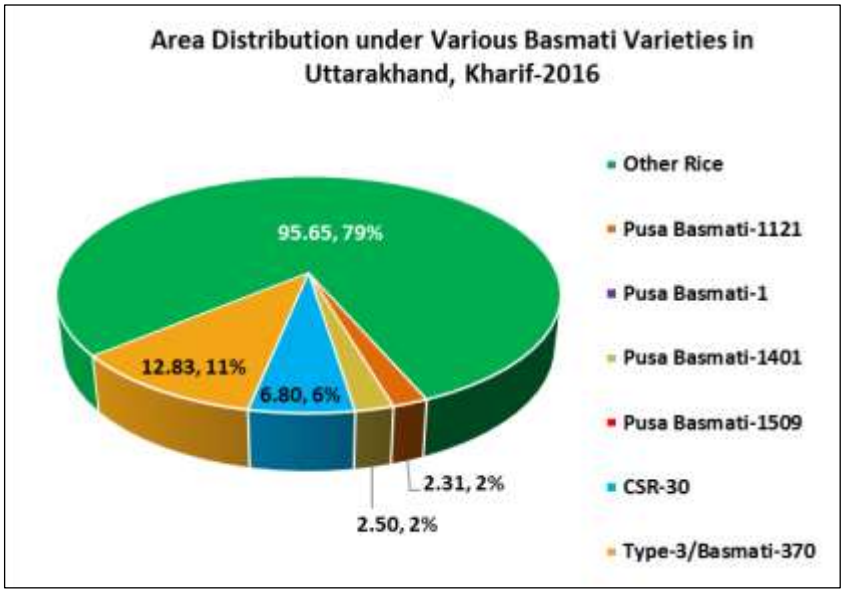
A Comparison of Yield in Western Uttarakhand in Mean of Crop Cutting Experiment Yield Data (T/Ha) of Basmati Varieties During Kharif 2015 & 2016

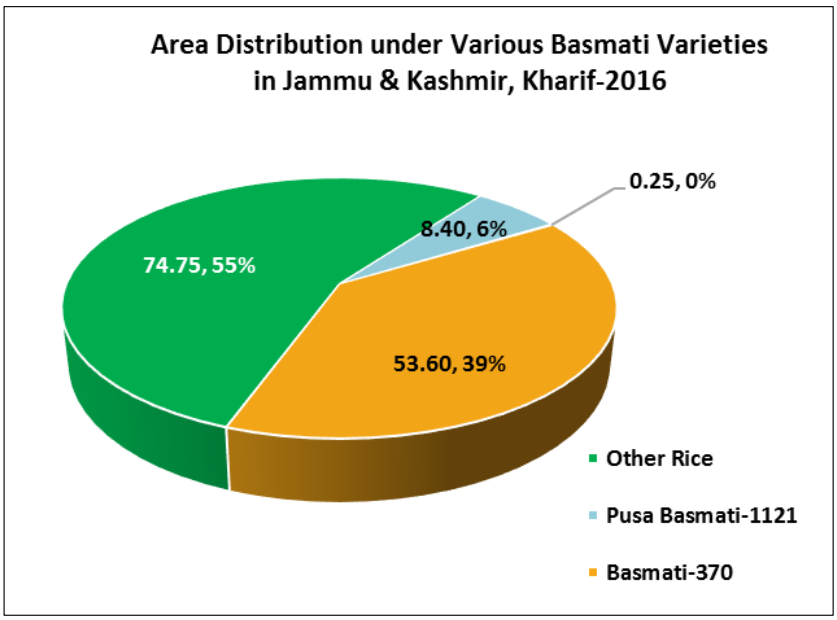
S. No.	District	Pusa Basmati-1121		Pusa Basmati-1		Pusa Basmati-1509		Basmati-370, Type-3	
		2016	2015	2016	2015	2016	2015	2016	2015
1	Dehradun					*3.80*	3.10	2.00	1.95
2	Haridwar	2.70	*3.10*			*3.70*	3.20		
3	Udham Singh Nagar	2.40	*2.80*	3.30	*3.90*				


Area Distribution under Various Basmati Varieties in Haryana, Kharif-2016
576.54, 44%
504.86, 39%
97.92, 8%
26.16, 2%
46.42, 4%
44.28, 3%
Other Rice
Pusa Basmati-1121
Pusa Basmati-1
Pusa Basmati-1401
Pusa Basmati-1509
CSR-30
Type-3/Basmati-386


Area Distribution under Various Basmati Varieties in Punjab, Kharif-2016
2394.37, 80%
555.78, 18%
0.37, 0%
35.20, 1%
24.28, 1%
Other Rice
Pusa Basmati-1121
Pusa Basmati-1
Pusa Basmati-1401
Pusa Basmati-1509
CSR-30
Basmati-386


Area Distribution under Various Basmati Varieties in Western Uttar Pradesh, Kharif-2016
1006.31, 79%
156.26, 12%
12.95, 1%
53.65, 4%
43.29, 4%
Other Rice
Pusa Basmati-1121
Pusa Basmati-1
Pusa Basmati-1401
Pusa Basmati-1509
CSR-30
Type-3/Basmati-370


Area Distribution under Various Basmati Varieties in Uttarakhand, Kharif-2016
95.65, 79%
12.83, 11%
6.80, 6%
2.31, 2%
2.50, 2%
Other Rice
Pusa Basmati-1121
Pusa Basmati-1
Pusa Basmati-1401
Pusa Basmati-1509
CSR-30
Type-3/Basmati-370


Area Distribution under Various Basmati Varieties in Jammu & Kashmir, Kharif-2016
0.25, 0%
8.40, 6%
74.75, 55%
53.60, 39%
Other Rice
Pusa Basmati-1121
Basmati-370