

API SERIES NO. 271

RICE PADDY POLICY ANALYSIS FOR 2019-20 CROP



**AGRICULTURE POLICY INSTITUTE
MINISTRY OF NATIONAL FOOD SECURITY AND
RESEARCH
GOVERNMENT OF PAKISTAN
ISLAMABAD**

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Acronyms and Abbreviations

API	Agriculture Policy Institute
COP	Cost of production
CPI	Consumer Price Index
DRC	Domestic Resource Cost
E&M	Economics and marketing
ECC	Economic Coordination Committee
EPC	Effective Protection Coefficient
FAO	Food and Agriculture Organization
FAQ	Fair and average quality
FCA	Federal Committee on Agriculture
FO	Free on Board
FMI	Farm machinery Institute
FSC&RD	Federal Seed Certification and Registration Department
FYM	Farm Yard Manure
GST	General Sale Tax
IPM	Integrated Pest Management
IRRI	International Rice research Institute
KS	Kala Shah Kaku
MNFS&R	Ministry of National Food Security & Research
NARC	National Agriculture Research Center
NIAB	Nuclear Institute for Agriculture and Biology
NPC	Nominal protection Coefficient
PARC	Pakistan Agriculture Research Council
PASSCO	Pakistan Agriculture Storage and Services Corporation

RICE POLICY ANALYSIS FOR 2019-20 CROP**SUMMARY OF FINDINGS
AND
RECOMMENDATIONS****Findings****1. Area and production**

- During the decade ending 2018-19, production of rice at country level has increased @ 1.8 per cent per annum as a cumulative effect of increase in yield @ 1.3 per cent and expansion in area @ 0.5 per cent.
- Rice production at the country level is estimated at 7.202 million Tonne from 2018-19 crop which is 3.3% less than the last year production of 7.450 million Tonne. Thus production has decreased by 3.3% due to 3.1% decrease in area and 0.2% decrease in yield (Table-4).
- Punjab is best suited to production of basmati rice. On an average during previous three years Punjab, Sindh, and Balochistan have contributed to coarse rice production at the country level by 22.3%, 51.1% and 26.6%, respectively. 'Other varieties' share of Punjab, Sindh and Khyber Pakhtun Khwa in the country production is found 35.3%, 56.5% and 8.2% respectively (Table-27).

2. Domestic prices

- During post-harvest season (Oct.-Dec, 2018) average wholesale market price of Basmati remained at Rs 1855.9/40 Kg (Table-6).
- Average wholesale market price of Kainat paddy from Oct.-Dec stood at Rs 2076.5/40 kg (Table-7).
- Wholesale price of IRRI paddy during post-harvest period (Oct.-Jan; 2019) in different markets of Sindh averaged at Rs 1120.9/40 kg (Table-8).

3. Cost of production

- During 2018-19 prices of fertilizer, pesticides, petrol and land rent increased considerably. Accordingly, cost of production of paddy is also likely to increase. It is estimated in this Report that net cost of production of 2019-20 Basmati crop in Punjab would be Rs. 55,658/acre whereas in 2018-19 it was at Rs. 46,928, showing 18.6% increase (Annex-III).

- Similarly net cost of production per acre of IRRI paddy during 2019-20 estimates to Rs. 44750 against Rs. 37711 during 2018-19 showing 18.7% increase (Annex-IV).
- Market level cost of production of Basmati paddy for 2019-20 crop in Punjab turns out to be Rs 1683/40 kg (Annex-III).
- Market level cost of production of coarse paddy for 2019-20 crop in Sindh estimates at Rs 945/40 kg (Annex-IV).

4. Real market prices

- During the 2007/08 to 2018/19 real market price of Basmati in Punjab remained above the base year (2007/08) price only thrice i.e during 2008-09, 2012-13 and 2013-14 (Table-12).
- In real terms, price of IRRI paddy remained below the base year (2007/08) price throughout the period under review (2007/08 to 2018/19) except in 2009-10 and 2010-11 (Table-12).

5. World situation

- Rice production in 2019-20 is projected to increase to 505 Mill. Tonne which is 5 Mill. Tonne higher than 2018-19 forecast (Table-14). With addition of opening stocks of 157 Mill.Tonne, total supply would be 662 Mill. Tonne (an increase of 11 Mill. Tonne over 2018-19).
- World rice trade in 2019-20 is forecast at 48 Mill. Tones higher by 1 Mill. Tonne over the last year.

6. Export Parity Price

- On the basis of FOB Karachi price of Basmati during June 2019 export parity price of Basmati paddy at the mill gate is estimated at Rs 2588/40 kg and for IRRI-6 paddy at Rs 1474/ 40 Kg (Table-15).

7. Economic efficiency

- Nominal Protection Coefficient (NPC) are found less than one throughout the period of analysis for Punjab which indicates that paddy growers in Punjab are implicitly taxed (Table-19).
- Effective Protection Coefficients (EPC) are also less than one for Punjab which means that net effect of various input/ output policies is encouraging to rice growers for development of the crop
- Coarse paddy growers in Sindh have been fluctuation during the period of analysis which shows that Pakistan's international competitiveness in rice is sensitive to domestic policies (Table-20).

- Cost of resources used in producing Basmati rice domestically is less than the corresponding import cost but this does not hold true for domestic production of coarse rice (Table-19).

8. World comparison

- According to 2017 data, India allocates maximum area to rice in the world with 43.8 Mill. Hec. followed by China with 30.75 Mill. Hec. and Indonesia with 15.79 Mill. Hec. (Annex-V). Pakistan lies at 11th number in this regard.
- In production, China is on the top with total production of 141.78 Mill. Tonne followed by India with 112.33 Mill. Tonne and Indonesia with 54.26 Mill. Tonne. In production Pakistan lies at 10th position in the world (7.45 Mill. Tonne).
- In terms of rice **yield**, Australia is at the top with 6547 Kg/Hect. followed by Egypt with 6201, Uruguay 5667 Kg/Hect. and USA 5610 Kg/Hect. In the world **Pakistan** ranks 53rd in yield of rice which calls for yield improvement in the country.

9. Economics of Rice and Competing Crops

- Resource allocation among competing enterprises is primarily guided by economic considerations as reflected in their gross cost, gross income, gross margin, net income, output-input ratio, etc. Rice, a major ‘kharif’ crop, competes with cotton for land, water and other farm resources in the areas where cultivation of both crops is technically feasible.
- In Punjab, Basmati’s performance is observed lower than seed cotton in terms of all the economic criteria, except Crop duration. IRRI paddy also could not perform against seed cotton in any of the economic indicators analyzed and cotton out-competed the earlier comprehensively. IRRI even couldn’t gain break-even and its returns to overall investment i.e output-input ratio, was below than 1, which indicates that farmer’s cost could not be met in cultivating IRRI paddy. In case of indirect competition, the Basmati combinations with Wheat and Sunflower though show better returns however still lag far behind sugarcane in terms of output-input ratio.
- In Sindh, IRRI paddy farming could not gain better results in any of the economic criteria and remained below cotton crop. In terms of entire criteria, IRRI could not match or compete with the Cotton. Economic position of IRRI+ wheat rotation is healthier than sugarcane in terms of returns to crop duration. However, the performance of IRRI + sunflower combination has been considerably lower to the sugarcane in terms of overall investment and the remaining indicators.

Recommendations

In view of analysis of different factors bearing on price of Basmati and IRRI rice paddy, comments of the participants of API committee on rice paddy held at API, farmers' feedback assembled through the field survey held for paddy 2019-20 crop policy by the API staff following suggestions are advanced:

a. Indicative price of rice paddy for 2019-20 crop

- In view of increase in cost of production of paddy it is suggested the government to consider announcement of indicative price of Basmati and IRRI paddy with a reasonable profit margin to sustain the crop.
- To minimize prices of pesticides by withdrawing GST on pesticides.
- API suggests to give subsidy on fertilizer @ Rs. 1450/bag of Urea and Rs. 2500/bag of DAP to subside inflationary effect on rice crop.
- In view of importance of free market and involvement of private sector, actual incentive to paddy growers should come through free play of market forces.
- Government policy for promoting role of 'service providers' may be strengthened for wide spread of advance production technology in rice cultivation.

b. Improving productivity

- For promoting use of certified seed of rice, Provincial Seed Councils should be taken on board.
- Laser land levelers may be subsidized to promote its use. This may significantly reduce cost of production of the crop.
- Concerted efforts are required to develop rice varieties suitable for dry cultivation.
- Monitoring role of Provincial Department of Agriculture (Extension) for curbing adulteration in pesticides needs to be invigorated.
- Portable dryers may be subsidized to ensure supply of quality rice in the market.
- Price of certified seed both local and imported must be closely monitored and controlled.
- Role of Department of Agriculture (Extension) may be strengthened for promoting balanced use of fertilizer.

c. Improving quality and marketing

- Par boiled steaming technology of rice may be encouraged under supervision of qualified technician for standardizing quality of rice.
- Performance of Provincial Crop Reporting Service (CRS) needs to be enhanced by providing mini threshers (portable) for measuring yield of rice paddy.
- Under WTO Rules considerable subsidy is permissible for undertaking research. It is suggested to advance more funds for evolving new hybrid varieties of rice.

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RICE POLICY ANALYSIS FOR 2019-20 CROP

INTRODUCTION

Rice is an important food item of Pakistan's population. It is also consumed as dessert in Pakistan. Pakistan's Basmati rice maintains dominant position in the world market. Besides its food importance, it provides employment to vast majority at the grass roots level, in addition to its employment share in the shelling industry.

2. For foreign exchange earning, Pakistan economy is heavily dependent on cotton and rice. After cotton, rice is second largest export item from Pakistan. It has maintained consistent performance overtime. Due to its aromatic features, Pakistani rice is very much liked the world around.

3. Due to its importance in Pakistan and the world around government of Pakistan has ever been vigilant to domestic production of rice paddy. Towards this end agricultural authorities have taken for development of the crop. Consequently the crop has ever been on the rise (natural damages exception).

4. It has been estimated by the Agriculture Policy Institute (API) that the rice production has grown @ 1.8% in Pakistan during the decade ending 2018-19. Primarily this has been due to improvement in yield of the crop which increased @1.3% during the above referred period, because corresponding area of rice expanded only @ 0.5%. So far, as different varieties of rice are concerned, maximum increase happened in 'other varieties' category which are non-basmati varieties and are mostly cultivated in Sindh. Production of non-basmati varieties in Pakistan increased @ 9.3%. Major contributor to this growth is Hybrid rice cultivated in Sindh, mostly imported from China.

5. It is already mentioned in the foregoing paragraphs that rice has much importance in Pakistan due to its export contribution to the economy. It is encouraging that during 2018-19 Pakistan rice exports were composed of Basmati rice, which relatively fetch higher price in the international market. From July to April, 2018-19, Basmati rice export from Pakistan increased from 422.802 thousand tonne in 2018 to 515.02 thousand tonnes in 2019, showing an increase of around 18%.

6. Though the crop has performed well in the previous years but still it faces a number of issues that undermines its performance.

7. Agriculture Policy Institute (API), every year produces a comprehensive report on rice paddy, analyzing all of its dimensions ranging from production to export. Objective of this report is to suggest indicative price of Basmati and coarse paddy. Though indicative price fixation has been devolved to the provinces since devolution but API still plays its neutral role by conducting this analysis and submitting its indicative price proposal to the federal government which are seriously considered by the Provinces.

8. This report is developed on the pattern of its previous version. Analysis is based on (2018-19) data collected by API team from main rice producing districts of Punjab and Sindh.

9. The Report extends to 14 sections. First Section brings forth summary of findings and suggestions for indicative price for 2019-20 crop. Subsequently, sections 3-13 are primarily meant for describing performance of 2018-19 crop and presenting projection for 2019-20 rice paddy crop. Section 14 is dedicated to acknowledge work of the contributors of the Report.

2. SOWING & TRANSPLANTING TIME OF RICE PADDY

10. Rice crop in Pakistan is mostly sown through transplanting of nursery. Sowing time of nurseries and transplanting differ by variety and region. Sowing time of nursery and their transplanting in various regions are given in **Table-1**.

Table-1: Sowing times of rice crop

Province	Variety	Time for	
		Sowing nursery	Transplanting
Punjab	Super Basmati	20 May to 7 June	20 June to 7 July
	Other Basmati	1 June to 20 June	1 July to 31 July
	IRRI	20 May to 7 June	20 June to 7 July
Sindh			
Upper Sindh	IRRI-6, Sada Hayat	8 May to 15 June	8 June to 15 July
	DR-82/92	23 May to 30 June	23 June to 31 July
	Dr-83	16 June to 15 July	16 July to 15 August
Lower Sindh	IRRI-6, Sada Hayat	16 April to 15 May	16 May to 15 June
	DR-82/92	8 May to 22 June	8 June to 22 July
	Dr-83	1 June to 7 July	1 July to 8 August
KPK			
Plains	All varieties	1 May to 31 May	1 June to end of June
Hilly areas	All varieties	1 May to 20 May	3 rd week of May to end of June
Balochistan	All varieties	20 May to 30 June	20 June to 30 July

Source:

- i) For Punjab: Director, Rice Research Institute, Kala Shah Kaku
- ii) For Sindh: Rice Research Institute, Dokri, Sindh
- iii) For Khyber Pakhtukhwa and Balochistan: Rice Coordinator, NARC, Islamabad

3. REVIEW OF 2018-19 CROP

3.1 Provincial shares in area and production: 2016-17 to 2018-19

3.1.1 Area

11. At the country level Provincial shares of Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan in area under rice crop are 65.0, 26.9, 2.3 and 5.8 per cent, respectively. Basmati accounts for 50.3 per cent of the total area, IRRI and 'Other' varieties are grown on 22.0 and 27.7 per cent of area under paddy. Province-wise and variety-wise shares in production are also given in Fig-1 and 2.

3.1.2 Production

12. Average provincial share in area and production rice are estimated on the basis of three year averages. For the period between 2016-17 to 2018-19. These are produced in Table-2. Data in this table indicate that annual average production of rice works out at 7.167 million tonnes from average area of 2.812 million hectares (6.948 million acres). Varietal break-up of rice production (**Table-2**) shows that Punjab having best suited agro climate conditions in production of basmati rice is the sole producer of basmati rice in the country. In the total production of IRRI rice; Punjab, Sindh, and Balochistan contribute 22.3, 51.1 and 26.6 per cent, respectively. 'Other varieties' share of Punjab, Sindh and Khyber Pakhtunkhwa in production is 35.3, 56.5 and 8.2 per cent respectively.

Table-2: Provincial share in area and production of rice: average (2016-17 to 2018-19)

Variety	Pakistan		Punjab	Sindh	KPK	Balochistan
Area (000 hectares)		%%.....			
Total	2811.5 (6947.5)	100.0	65.0	26.9	2.3	5.8
Basmati	1414.1 (3494.4)	50.3	100.0	-	-	-
IRRI	618.0 (1527.1)	22.0	22.3	51.1	-	26.6
Other	779.5 (1926.2)	27.7	35.3	56.5	8.2	-
Production (000 tonnes)		%%.....			
Total	7167.0	100.0	52.8	37.6	2.1	7.5
Basmati	2763.4	38.6	100.0	-	-	-
IRRI	1760.4	24.6	20.9	48.7	-	30.4
Other	2643.2	36.9	24.7	69.5	5.8	-

Note:

Figures in parenthesis are thousand acres.

Source:

Worked out from data in Annex-I

3.2 **Overtime change in area, yield and production**

13. Area under rice crop during 2008-09 to 2018-19 has ranged between 2.308 and 2.962 million hectares and production oscillated between 4.823 and 7.450 million tonnes (Annex-I and Annex-IA). The yield during this period fluctuated between 2039 to 2568 kgs per hectare (825 to 1039 kgs per acre). Long and short terms changes in area, yield and production of rice are discussed below:

3.2.1 Long term changes: 2008-09 to 2018-19

14. During the decade ending 2018-19, production of rice at country level is estimated to have increased @ 1.8 per cent per annum as a cumulative effect of increase in yield @ 1.3 per cent and expansion in area @ 0.5 per cent.

Table-3: Average annual growth rate of area, yield and production of rice in Pakistan: 2008-09 through 2018-19

Country/Province	Variety	Area	Yield	Production
		-----% per annum-----		
Pakistan	All varieties	0.5	1.3	1.8
	Basmati	0.3	1.6	1.8
	IRRI	-3.5	-0.6	-4.1
	Others	6.1	3.1	9.4
Punjab	All varieties	-0.2	1.1	0.8
	Basmati	0.3	1.6	1.8
	IRRI	-4.2	0.8	-3.5
	Others	0.4	0.1	0.5
Sindh	All varieties	2.9	0.4	3.4
	IRRI	-4.3	-2.9	-7.0
	Others	14.1	2.2	16.7
KP	All varieties	2.2	3.1	5.4
Balochistan	All varieties	-0.3	4.1	3.9

Note:

-Growth rates are worked out by estimating the equation $Y=a(1+r)^x$ through Ordinary Least Squares (OLS) method from data given in Annex-I

15. Annual growth of rice production in Punjab during the period 2008-09 to 2018-19 remained 0.8 per cent as a result of 1.1 per cent per annum increase in yield and 0.2 per cent per annum decrease in area. Area, yield and production of basmati rice have increased by 0.3, 1.6 and 1.8 per cent per annum. Production of IRRI rice has primarily decreased by 3.5 per cent annually due to 4.2 percent decrease in area as yield increased by 0.8 per cent per annum. Production of 'Other' varieties has increased by 0.5 per cent per annum due to 0.4 per cent expansion in area and 0.1 per cent rise in yield.

16. In Sindh, where only coarse varieties are cultivated, rice production during the reference period is estimated to have increased @ 3.4 per cent annually due to 2.9 per cent expansion in area and 0.4 per cent rise in yield.

17. In Khyber Pakhtunkhwa, production of rice has increased by 5.4 per cent annually due to 2.2 and 3.1 per cent respective increase in area and yield.

18. In Balochistan, rice production during the period under reference has recorded average annual reduction of 3.9 per cent due to increase in yield by 4.1 per cent despite 0.3 per cent per annum decrease in area.

3.2.2 Short-term changes: 2017-18 vs 2018-19

19. According to Final estimates, rice production at the country level estimated at 7.202 million tonnes in 2018-19 is 3.3% less than the last year production of 7.450 million tonnes (Table-4). Thus production has decreased by 3.3% primarily due to 3.1% decrease in area and 0.2% decrease in yield. Change in area, yield and production by province and by variety during 2018-19 over 2017-18 are given in **Table-4**.

Table-4: Area, yield and production of rice by variety: 2018-19 over 2017-18 crop

Country/ Pakistan	Area		Change	Yield		Change	Production		Change
	2017-18	2018-19		2017-18	2018-19		2017-18	2018-19	
	(000 Hect.)		%	(Kgs/ Hect.)		%	(000 Tonnes)		%
Pakistan	2900.6	2810.0	-3.1	2568.4	2563.0	-0.2	7449.8	7201.9	-3.3
Basmati	1416.4	1473.0	4.0	1988.6	2002.2	0.7	2816.6	2949.2	4.7
IRRI	656.2	549.1	-16.3	2734.8	2933.0	7.2	1794.6	1610.5	-10.3
Others	828.0	787.9	-4.8	3428.2	3353.5	-2.2	2838.6	2642.2	-6.9
Punjab	1840.9	1904.0	3.4	2117.4	2089.8	-1.3	3898.0	3979.0	2.1
Basmati	1416.4	1473.0	4.0	1988.6	2002.2	0.7	2816.6	2949.2	4.7
IRRI	134.8	133.6	-0.9	2689.2	2627.2	-2.3	362.5	351.0	-3.2
Others	289.7	297.4	2.7	2481.5	2282.4	-8.0	718.9	678.8	-5.6
Sindh	828.3	690.2	-16.7	3441.3	3725.0	8.2	2850.5	2571.0	-9.8
IRRI	351.6	262.0	-25.5	2498.0	2906.1	16.3	878.3	761.4	-13.3
Others	476.7	428.2	-10.2	4137.0	4226.1	2.2	1972.2	1809.6	-8.2
KPK (other varieties)	61.6	62.3	1.1	2394.5	2468.7	3.1	147.5	153.8	4.3
Balochistan (IRRI)	169.8	153.5	-9.6	3261.5	3245.0	-0.5	553.8	498.1	-10.1

Source:

- Annex-I

20. In Punjab, overall production of rice has shown an increase of 2.1 per cent during 2018-19 against 2017-18. This increase in production is net effect of 3.4% increase in area and 1.3% decline in yield. Production of basmati in Punjab increased by 4.7% resulting from 4% expansion in area and 0.7% improvement in yield. During the same period, IRRI production in Punjab decreased by 3.2% resulting from area decline by 0.9% and 2.3% decline in yield. It is indicated by the data in the referred table that 'Other' varieties of rice decreased by 5.6% which happened due to 8.0% decline in yield.

21. In Sindh, overall production of rice during 2018-19 decreased by 9.8% mainly due to 16.7% decrease in area despite 8.2% increase in yield to the last year. Production of IRRI in Sindh also decreased by 13.3% mainly due to area decrease of 25.5% otherwise yield had increased by 16.3% against the last year. Production of varieties other than IRRI rice also decreased by 8.2%. This decrease is primarily attributed to 10.2% decrease in area.

22. In Khyber Pakhtunkhwa province, increase in rice production during the above referred period is cumulative effect of marginal expansion in area and 3.1% improvement in yield.

23. Balochistan shows decrease in area, yield and production during 2018-19 where rice cultivation is dominated by IRRI varieties. In this province area, yield and production all decreased by 9.6%, 0.5% and 10.1% respectively.

3.3 Targets and achievements: 2018-19 crop

24. According to final estimates provided by the provincial Agriculture Departments, total area cultivated with paddy is 2.805 million hectares and production 6.931 million tonnes. These achievements are higher than the respective targets by 0.2% and 3.9%.

Table-5: Targets and estimated achievements of area, yield and production of rice: 2018-19 crop

Country/ Province	Area		Devi- ation from Target	Yield		Devi- ation from Target	Production		Devi- ation from Target
	Target	Achieve- -vement		Target	Achiev ement		Target	Achiev ement	
	000 hectares		%	kgs per hectare		%	000 tonnes		%
Pakistan (Basmati/IRRI/ Others)	2805	2810.0	0.18	2470.9	2563.0	3.73	6931.0	7201.9	3.91
Punjab (Basmati/IRRI/ Others)	1800	1904.0	5.78	1944.4	2089.8	7.48	3500.0	3979.0	13.69
Sindh (IRRI/Others)	770	690.2	-10.36	3519.5	3725.0	5.84	2710.0	2571.0	-5.13
KPK (Others)	60	62.3	3.83	2450.0	2468.7	0.60	147.0	153.8	4.62
Balochistan (IRRI)	175	153.5	-12.29	3280.0	3245.0	-1.07	574.0	498.1	-13.22

Source:

-For targets, concerned Provincial Departments of Agriculture

-For targets, Annex-1

25. It may be seen from the data produced in table-5 that area, yield and production targets fixed for 2018-19 rice crop were successfully achieved. At the country level, area of the crop remained in excess of the target by 0.2% while production performance was 3.9% higher than the target. Yield of the crop was higher by 3.7% against the target.

26. So far as provincial performances are concerned, achievements were much more than the specified targets for Punjab and KP. In Punjab it was very encouraging because production in Punjab remained higher by 13.7%. It mainly happened due to considerable improvement in yield of the crop.

27. In KP production remained higher than the target by 4.6% mainly due to 3.8% more cultivation than the target. Both in Sindh and Balochistan, targets could not be achieved. In Sindh

production remained about 5% less than the fixed target whereas in Balochistan production fell by 13% against the target.

4. IMPORTANT RICE PRODUCING DISTRICTS

28. Districts producing more than 50 thousand tonnes of rice include Gujranwala, Okara, Sheikhpura, Hafizabad, Sialkot, Nankana Sahib, Bahawalnagar, Pakpattan, Kasur, Jhang, Narowal, M.B. Din, T.T. Singh, D.G. Khan, Chiniot, Vehari, Muzafarabad, Lahore, Khanewal, Sahiwal, Multan, Sargodha, Gujrat, Lahore, and Faisalabad from Punjab; Badin, Larkana, Shikarpur, Jacobabad, Qamber, Kashmore, Thatta, Dadu and Tando Muhammad Khan from Sindh; and Jafarabad and Nasirabad from Balochistan. These 35 districts collectively produced 95.3 per cent of total production of rice. Main basmati producer districts which contribute about 75.5 per cent of the total basmati are Gujranwala, Okara, Sheikhpura, Hafizabad, Sialkot, Nankana Sahib, Bahawalnagar, Pakpattan, Kasur, Jhang, Narowal, M.B. Din, and T.T. Singh. While 69.3 per cent of the total IRRI rice is contributed by Badin, Larkana, Shikarpur, Qamber, Nasirabad and Jafarabad. Districts, based on 2016-17 to 2018-19 average, are arranged in descending order of rice production, with varieties break-up in Annex-II.

5. DOMESTIC DEMAND, SUPPLY OF RICE AND PRICES OF RICE PADDY

5.1 Domestic demand and supply of rice

29. Domestic demand for rice for the year 2018-19 is calculated on the basis of per capita availability of rice and population of Pakistan. Per capita availability during the period 2015-16 to 2017-18 estimates to 13.46 Kgs. Thus domestic consumption requirement in 2018-19 for population of 219.37 Million is estimated at 2816 thousand tonnes. Against this requirement total production of rice in the country from 2018-19 crop has been reported at 7215 thousand tonnes. Deducted seed and wastage allowance @ 6% of the production (433 thousand tonnes), net available rice for consumption and trade comes to 6782 thousand tonnes. Thus Pakistan has an export surplus of 3966 thousand tonnes during 2018-19.

5.2 Domestic price of basmati rice paddy

30. During 2018-19, farmers of Basmati paddy fetched very good price for their paddy produce. Wholesale market prices of basmati paddy in major markets of collar belt of Punjab (area designated/suitable for aromatic basmati rice) are presented in **Table-6**. These prices are for three months i.e Oct.-Dec., 2018. During the referred post-harvest season (Oct.-Dec, 2018) price stretch remained between Rs 1472 and Rs 2040 per 40 kg. Average price of basmati (paddy) during this period estimates to Rs 1855.9/40 Kg.

5.3 Domestic price of Kainat paddy

31. Data regarding wholesale price of extra-long and pearl white 'kainat' paddy in main producing area markets of Punjab are depicted in **Table-7**.

Table-6: Monthly average wholesale price of basmati (paddy) in major producer area markets of Punjab: Oct.-Dec. 2018

S.No	Markets	Oct	Nov	Dec	Average
		-----Rs per 40kgs-----			
1	Hafizabad	1525	1595	-	1560
2	Gujranwala	-	1956	2028	1992
3	Sheikhupura	-	1805	2000	1902.5
4	Nankana Sahib	-	1729	1901	1815
5	Narowal	-	1944	2040	1992
6	Sialkot	1472	1734	2014	1874
	Average	1499	1794	1997	1855.9

Source:

-Directorate of Agriculture (E&M) Punjab, Lahore.

Table-7 Monthly average wholesale prices of Kainat (paddy) in major producer area markets of the Punjab: Oct-Dec 2018

S.No	Market	Oct	Nov	Dec	Average
		-----Rs per 40kgs-----			
1	Arifwala	-	2040	2231	2135.5
2	Bahawalnagar	1939	2164	2208	2103.7
3	M.B.Din	-	2218	2000	2109.0
4	Nankana Sahib	1818	2073	2016	1969.0
5	Okara	-	2159	2197	2178.0
6	Pakpattan	1939	2072	2320	2110.3
7	Sahiwal	-	1960	2191	2075.5
8	Sargodha	-	2070	2080	2075.0
9	Sheikhupura	1875	2084	2174	2044.3
10	Sialkot	1472	2084	2063	1873.0
	Average	1809	2092	2148	2076.5

Source:

-Directorate of Agriculture (E&M) Punjab, Lahore

32. Price of kainat paddy has also followed the prices of basmati paddy. Farmers have received the highest price ever since last five years. Price of kainat paddy ranged between Rs 1472 per 40 kgs in Sialkot market during October 2018 and Rs 2040 per 40 kgs in Narowal market during December 2018. The season average prices of basmati (paddy) in the Punjab have ranged between Rs 1560 and Rs1992 per 40 kgs.

33. According to the data in the above table average wholesale market price of IRRI paddy in Sindh (Table-7) have ranged between Rs 1873 and Rs 2178/40 Kg while seasonal average remained Rs 2076.5/40 kg.

Table-8: Monthly average wholesale prices of IRRI-6 paddy in major producer area markets of Sindh during Oct. 2018 to Jan. 2019

S.No	Market	Oct	Nov	Dec	Jan	Average
		-----Rs per 40kgs-----				
1	Badin	1140	1175	1185	1150	1162.5
2	Tando Mohammad Khan	1190	1040	1160	1150	1135.0
3	Thatta	1175	1110	1085	1085	1113.8
4	Dadu	1113	975	1108	1100	1074.0
5	Larkano	-	900	1170	1175	1081.7
6	Shikarpur	-	875	1105	1135	1038.3
7	Jacobabad	1225	1200	1110	1175	1177.5
8	Kashmore-Kandh Kot	1125	1200	1125	1160	1152.5
9	Qambar-Shahdad Kot	-	1120	1163	1175	1152.7
	Average	1161	1066	1135	1145	1120.9

Source:

-Market Committees, Sindh.

34. Table-8 provides data on average wholesale price of IRRI paddy during the post-harvest period (Oct.-Jan; 2019) in different markets of Sindh. Average price across different markets show considerable range i.e Rs 1038.3 to 1177.5/40 Kg. Seasonal average of these data calculates to rs 1120.9/40 kg.

6. COST OF PRODUCTION OF RICE (PADDY)

35. Cost of production is basic parameter of economic viability of a crop. Its composition provides suitable structure to analyze different inputs and cultural operations to assess their importance in production of the concerned crop. Thus structure of production cost of a crop helps policy makers to assess need for interventions in the inputs market for promotion. For 2019-20 paddy crop is separately produced for basmati and coarse rice paddy for Punjab and Sindh provinces respectively. These estimates are tentative estimates based on the field data about input usage, rates of mechanical (tractor run) operations and prices of traded inputs, collected at the time of sowing of paddy during 2019. These estimates were also shared with different stakeholders of rice for counter check in Agriculture Policy Institute (API) Committee meeting on Rice. The Meeting was held at API Islamabad, summary of cost of production is produced in **Table-9** below.

36. It is visible from the above referred table that net cost of production of paddy in Punjab during crop year 2019-20 estimates at Rs 55658. Net cost of production is obtained by subtracting Rs 6000 from the gross cost of production which estimates at Rs 61658 per acre.

37. Net cost of cultivation divided by the yield/acre, cost of production/turns out to be Rs 1683/40 kg in Punjab. This includes marketing cost @ Rs 50/40 kg. Thus Rs 1683/40 kg is cost of production at the market level. Similarly cost of production of coarse rice in Sindh estimates at Rs 945/40 kg. Needless to reiterate that basmati paddy is mainly grown in Punjab. Therefore, cost of production for Basmati represents Punjab and for coarse rice it represents Sindh.

38. It may be deduced from above tables that cost of production is high for basmati and relatively less for coarse rice. It's main reason is yield difference between basmati and coarse rice (Hybrid). It may also be noted that during 2019-20 COP is likely to considerably increase in 2019-20 against the last year.

39. Following paragraphs cast detail of cost of production of both type of above mentioned rice paddy.

6.1 Composition of Cost of Production

40. It seems pertinent here to explain difference between inputs and operations made in growing paddy. By inputs we mean seed, fertilizer, pesticides, tube-well water etc. while an 'operation' made in cultivation and production of a crop means an activity either made with tractor or with manual labor for example, ploughing, planking, nursery sowing, uprooting and transplanting, pesticide and fertilizer application, harvesting/threshing etc are different operations.

41. Third category of costs consists of manual weeding, mark-up on capital, land tax, land rent, and shifting of the crop from farm to the market etc. Detail of all of these inputs/operations cost estimates is presented in **Table-11** and **Table-12**.

6.1.1 Basmati Paddy in Punjab

42. It may be seen from data in the above mentioned tables that major part of cost of production in both Basmati and coarse rice is land rent. In case of basmati it carried 24.3% of the gross cost of production while in case of coarse paddy (hybrid) it was 31% of the gross cost of production for coarse paddy. Second major cost item during 2019-20 is likely to be irrigation. Its weight in gross cost of production may be about 19%. This may be ascribed to shrinking canal irrigation water in Punjab as India has curtailed flow of Chenab river water into Pakistan. Consequently tube-well irrigation has increased in Pakistan. As electricity tariff has considerably increased since last year which has lead to increase in tube-well water cost. After irrigation, fertilizer and land preparation costs make bigger share of COP. These tend to be around 15% of the gross cost of production. Its main reason is withdrawal of fertilizer subsidy during 2017. Since then fertilizer prices are gradually increasing. Remaining costs cumulatively make about 40% of the gross cost. In this, about 10% is cost of nursery, its uprooting and transplanting in the field, of nursery accounts for 9.7% of gross cost and 'other costs' i.e. mark-up on capital, management charges, land tax and land revenue make 7.5% while harvesting and threshing costs 4.6% of the gross cost of production of basmati in Punjab province.

6.1.2 Coarse Rice (Paddy) in Sindh

43. Paddy cultivation cost in Sindh indicates somewhat different type of cost structure. It is already mentioned that land rent is maximum of all costs for Sindh as well (**Table-12**). It makes 31% of the gross cost of production. Though like cost of production of basmati in Punjab fertilizer and land preparation carry significant weight but unlike Punjab, for Sindh fertilizer (17.8%) and land preparation (14.1%) of the gross cost of production are higher than respective irrigation water cost.

44. Third level of analysis is determination of respective share of different cost items in net increase in cost of production during 2019-20 over 2018-19.

45. Data in last column of **Table-13** indicate that for Punjab, land rent (27.4%) and fertilizer (26%) would carry maximum share of the increased cost of production. While for Sindh maximum part of the net increase in COP of coarse rice (paddy) will go to land rent and land preparation.

46. Concluding it may be forecasted that net cost of production of paddy during 2019-20 may increase by 17% in Punjab and by 19% in Sindh (estimated for **Table-11 & Table-12**). Reasons underlying the said increase consist of increase in power tariff and price of fertilizer during 2019. Partly, price of 2018-19 paddy remained better in the open market which speculatively raised land rent as well.

Table-9 Average farmer cost of production of Basmati (paddy) in Punjab: 2018/19 and 2019/20 crop comparison

S. No	Cost item	Unit	Cost estimate		Increase in 2019-20 over 2018-19
			2018-19 crop	2019-20 crop	
1	Net cost of cultivation	Rs./ acre	46928	55658	8731
2	Yield	Kg/acre	1325	1363	38
3	Cost of production at farm level	Rs./40 kg	1417	1633	217
4	Marketing cost	“	50	50	0
5	Cost of production at market level	“	1467	1683	217

Table-10 Average farmer cost of production of coarse (paddy) in Sindh: 2018/19 and 2019/20 crop comparison

S. No	Cost item	Unit	Cost estimate		Increase in 2019-20 over 2018-19
			2018/19 crop	2019/20 crop	
1	Net cost of cultivation	Rs./ acre	37711	44750	7040
2	Yield	Kg/acre	2000	2000	0
3	Cost of production at farm level	Rs./40 kg	754	895	141
4	Marketing cost	“	50	50	0
5	Cost of production at market level	“	804	945	141

Table-11 Share of different inputs/ operations in gross cost of production of Basmati paddy in Punjab during 2019-20 crop year

(Rs./ acre)

S. No	Input/ operation	2018/19	2019/20	Share in gross cost of production of 2019-20 %
1	Land rent	15000	15000	24.3
2	Irrigation	10036	11896	19.3
3	Fertilizer including FYM and transport and application	7569	9938	16.1
4	Land preparation	6634	9132	14.8
5	Cost of nursery, uprooting and transplanting nursery	5063	6000	9.7
6	Other costs	3905	4633	7.5
7	Harvesting & threshing etc	2300	2816	4.6
8	Plant protection	1562	1669	2.7
9	Weeding	460	575	0.9
10	Gross cost	52528	61658	100.0

Table -12 Share of different inputs/ operations in gross cost of production of coarse rice paddy in Sindh during 2019-20 crop year

Rs./ acre

S. No	Input/ operation	2018/19	2019/20	Share in gross cost of production of 2019-20
1	Land rent	12500	1500	31.0
2	Fertilizer including FYM and transport and application	7736	8611	17.8
3	Land preparation	5675	6850	14.1
4	Cost of nursery, uprooting and transplanting nursery	5700	6700	13.8
5	Other costs	3347	3800	7.8
6	Irrigation	2767	3346	6.9
7	Harvesting & threshing etc	2000	2000	4.1
8	Weeding	960	1200	2.5
9	Plant protection	726	944	1.9
10	Gross cost	41411	48450	100.0

Table -13 Item-wise share in changed cost of production of Basmati (paddy) in Punjab during 2019-20

(Rs./ acre)				
S. No	Input/ operation	2018-19	2019-20	Share in changed cost of production %
1	Land preparation	6634	9132	27.4
2	Fertilizer including FYM and transport and application	7569	9938	26.0
3	Irrigation	10036	11896	20.4
4	Cost of nursery, uprooting and transplanting nursery	5063	6000	10.3
5	Other costs	3905	4633	8.0
6	Harvesting & threshing etc	2300	2816	5.7
7	Weeding	460	575	1.3
8	Plant protection	1562	1669	1.2
9	Land rent	15000	15000	0
10	Gross cost	52528	61658	100.0

Table-14 Item-wise share in changed cost of production of coarse rice (paddy) in Sindh during 2019-20

(Rs./acre)				
S. No	Input/ operation	2018/19 crop	2019/20 Crop	Share in changed cost of production %
1	Land rent	12500	1500	35.5
2	Land preparation	5675	6850	16.7
3	Cost of nursery, uprooting and transplanting nursery	5700	6700	14.2
4	Fertilizer including FYM and transport and application	7736	8611	12.4
5	Irrigation	2767	3346	8.2
6	Other costs	3347	3800	6.4
7	Weeding	960	1200	3.4
8	Plant protection	726	944	3.1
9	Harvesting & threshing etc	2000	2000	0
10	Gross cost	41411	48450	100.0

7. NOMINAL AND REAL MARKET PRICES OF BASMATI AND IRRI PADDY: 2007-08 to 2018-19

47. To analyze overtime change in purchasing power of basmati and IRRI paddy nominal and real market prices of paddy for the period 2007-08 to 2018-19 were deflated by the Consumer Price Index (CPI), the most common measure of inflation in the economy. The results are given in Table-15 and depicted in Fig-1 and Fig-2.

48. It may be noted from the referred analysis that due to increasing trend of general inflation in the economy, gap between nominal and real prices both for Basmati and IRRI paddy has widened every year. It shows deterioration of purchasing power of paddy overtime. Variety-wise detail of basmati and IRRI paddy is discussed in the following paragraphs.

7.1 Basmati Paddy (Punjab)

49. Data in **Table-15** expose that nominal market price of Basmati paddy increased by 99% against the base year during the period under review while its real value decreased by 14% (estimated from the corresponding data from first and the last rows of column-2 and column-5). Its main reason is gradually declining trend in real purchasing power of the crop. This may be ascribed to ever increasing inflation in the economy i.e 132% rise in inflation during the period under study.

50. It is evident from the data produced in Table-15 that real price of Basmati paddy occasionally remained below the base year price. It was only in 2008-09, 2012-13 and 2013-14 when real market prices exceeded the base year real price. During the last year of analysis (2018-19) real market price of Basmati paddy fell by 14% (estimate from data contained in (Table-15).

Table-15: Nominal and Real Market Prices of Basmati and IRRI-6 paddy: 2007-08 to 2018-19

Crop year	Nominal Market Price		Consumer Price Index (CPI)	Real Market Price	
	Basmati (Punjab)	IRRI-6 (Sindh)		Basmati (Punjab)	IRRI-6 (Sindh)
	2	3		4	5=(2/4)*100	6=(3/4)*100
1	Rs/40 Kg		2000-01=100	Rs/40 Kg	
2007-08	920	509	100.00	920	509
2008-09	1183	585	117.03	1,010	499
2009-10	1097	666	128.85	851	516
2010-11	1325	935	146.45	904	638
2011-12	1424	798	162.57	875	490
2012-13	1653	875	174.53	947	501
2013-14	2260	890	189.58	1,192	469
2014-15	1444	828	198.69	727	417
2015-16	1320	713	203.25	649	351
2016-17	1557	832	212.16	734	392
2017-18	1604	898	219.01	732	410
2018-19	1834	1121	232.00	790	483

Note:

-Market prices are average wholesale prices that prevailed during post-harvest season in the main producer area markets of Punjab for basmati and in Sindh for IRRI paddy.

Source:

-Economic Survey of Pakistan, 2017-18

-Directorate of Agriculture, (E&M), Lahore, Punjab

-Directorate of Agriculture Farms and Major Crops Development, Hyderabad, Sindh.

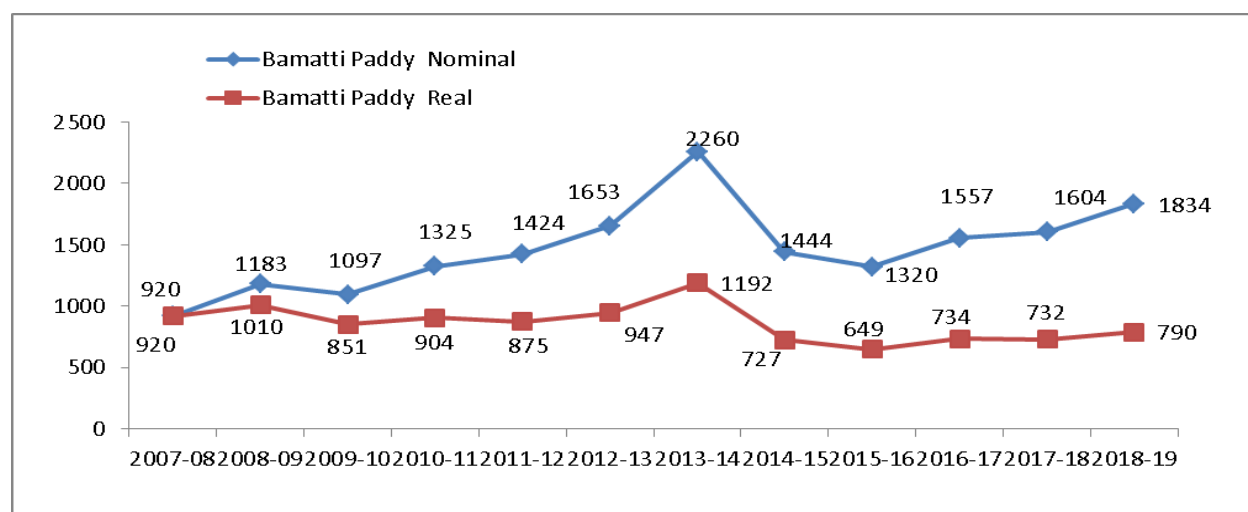


Fig-1: Nominal and Real Market price of Basmati Paddy in the Punjab: 2007-08 to 2018-19

7.2 IRRI Paddy (Sindh)

51. It may be seen from data in Table-15 that nominal market price of IRRI paddy in

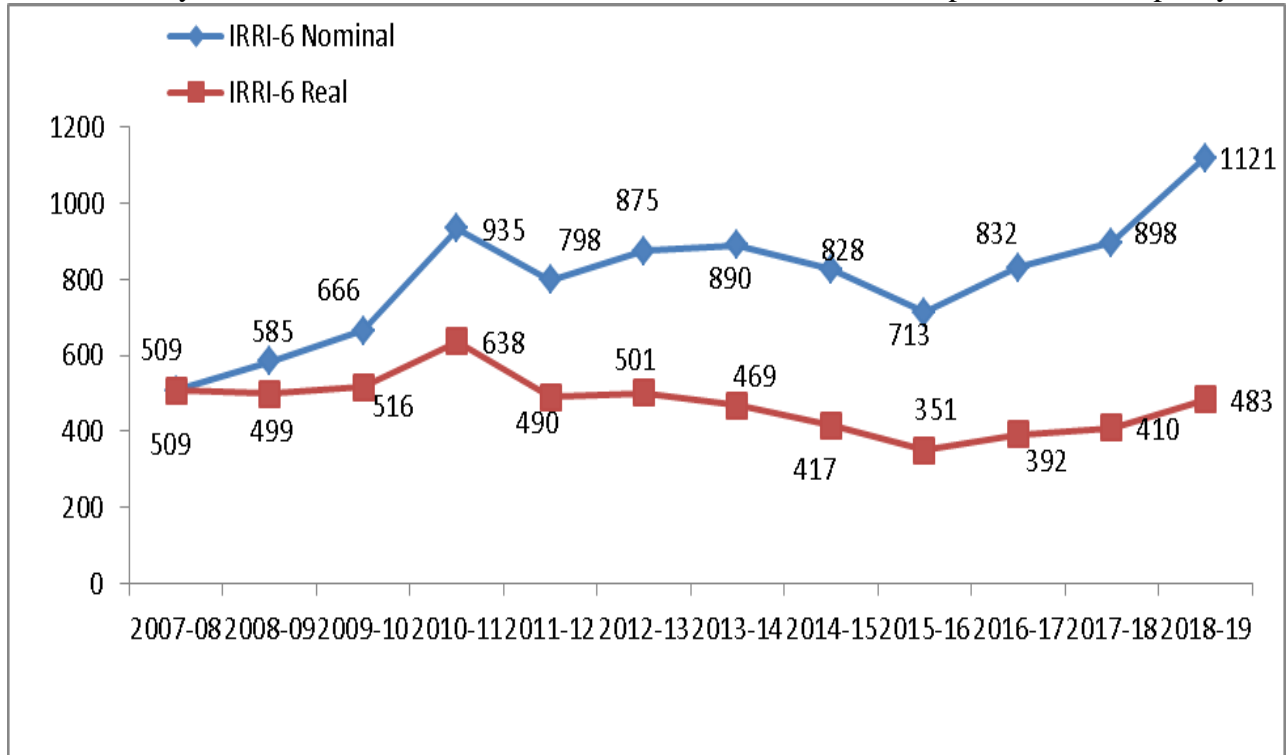


Fig-2 Nominal and Real Market price of IRRI-6 Paddy in the Sindh: 2007-08 to 2018-19

Sindh averaged at Rs 509/40 Kg during post-harvest season of 2007-08 which increased to Rs 1121/40 Kg in 2018-19 (almost 120% increase). But its effect on real price of IRRI paddy was mitigated by 132% increase in inflation during the same period. Consequently real price fell by 5% against the 2007-08 (base year) price. Nominal and real prices of IRRI paddy are graphed in Figure-2.

52. Above referred diagram shows that real market price of IRRI paddy did not move consistently rather it fluctuated at times. However, 2010-11 was the best crop year for rice growers as they received the highest real price of Rs 638/40 Kg. Though in 2018-19 real price slightly increased over the last year but even then it remained below the base year level.

8. WORLD SUPPLY, DEMAND, STOCKS, TRADE AND PRICE SITUATION OF MILLED RICE

8.1 World supply, demand, stocks and trade

53. Estimated and projected statistics of production, consumption, stocks and trade of rice from 2017-18 to 2019-20 is presented in **Table-16**.

54. World production of rice in 2018-19 is forecast at 500 Mill. Tonne, 6 Million less than the 2017-18 estimate. Accounting for the opening stock of 151 Mill. Tonne total supply works out at 651 Mill. Tonne (15 Mill. Tonne higher than the previous year).

55. Rice production in 2019-20 is projected further to increase to 505 Mill. Tonne (5 Mill. Tonne higher than the 2018-19 forecast). With addition of opening stock of 157 Mill. Tonne, total supply during 2019-20 would be 662 Mill. Tonne (an increase of 11 Mill. Tonne) against 2018-19. For 2019-20 global consumption is projected to increase from 493 Mill. Tonne during 2018-19 to 499 Mill. Tonne in 2019-20. Resultantly the end year stock is projected to increase further from 157 in 2018-19 to 162 during 2019-20.

Table-16: World supply, demand, stocks and trade in rice: 2017-18 to 2019-20

S.No	Item	2017-18	2018-19	2019-20
		Estimated	Forecast	Projected
-----Million tones-----				
1.	Opening stocks	142	151	157
2.	Production	494	500	505
3.	Total supply (Items 1+2)	636	651	662
4.	Consumption/disappearance	486	493	499
5.	Closing stocks	151	157	162
6.	Trade	47	47	48

Source:

-International Grain Council (IGC), GMR 497, March 28, 2019

56. Similarly global trade in rice reported at 47 Mill. Tonne in 2018-19 is projected to increase to 48 Mill. Tonne in 2019-20. It implies that constant increase in carryover stocks may lead to decrease in international price of rice.

8.2 Export parity prices of rice (paddy)

57. To ascertain export competitiveness of Pakistani rice in the international market export parity prices have been calculated on the basis of actual export prices of both fine and coarse rice. Details of these calculations are given in Annex-VII to Annex-IX. Summary of export parity prices is given in **Table-17**.

Table-17: Export parity price of Basmati and IRRI paddy for 2019-20

Items	June 2019	2018-19	Average 2016-17 To 2018-19
A) Export Parity Price of Basmati Paddy based on actual fob Karachi price of Pakistani Basmati			
- Price of paddy worked back at the mill gate (Rs/40 kg)	2588	2923	3048
B) Export Parity Price of IRRI-6 Paddy based on actual fob Karachi price of Pakistani IRRI-6 rice			
- Price of paddy worked back at the mill gate (Rs/40 Kg)	1474	1527	1485

9. RICE EXPORT FROM PAKISTAN

58. Pakistan is one of the largest exporters of rice with an average of 8.13% share in global rice market during 2016-18. A comparative account of export destinations of Pakistan rice is given in **Table-18**.

59. It may be seen from the data in this table that main destination of Pakistani fine rice has been Europe who imported 42.88% of total Pakistani exports in 2017-18. Second major destination is itself Asian who imported 39% of Pakistani export of fine rice. All other regions almost shared equally in importing Pakistani basmati rice (about 5%).

60. So for as coarse rice import destinations are concerned, maximum was imported by African countries (55.53%) followed by Asian countries (36.75%). CIS imported 6.47% of all export of coarse rice from Pakistan.

61. Export of rice has witnessed increase during 2017-18 over 2016-17.

Table-18 Change in export of basmati and coarse rice: 2017-18 over 2016-17

	Basmati rice		Coarse rice	
	2016-17	2017-18	2016-17	2017-18
Asia	60.76	39.09	36.75	35.19
Oceania	2.57	0.06	0.09	
Europe	15.73	42.88	3.48	0.96
Africa	9.95	5.33	53.55	53.79
America	5.87	4.78	1.74	3.50
CIS	8.36	5.35	4.42	6.47
Total	100.00	100.00	100.00	100.00

10. ECONOMIC EFFICIENCY OF RICE (PADDY) PRODUCTION IN PAKISTAN

62. Rice production, annually, involves extensive use of land, water and other resources. In view of its importance it is imperative to examine its competitiveness in paddy growers as well as in national context.

63. As during this year input prices have significantly increased, study of production efficiency in rice has assumed even more importance. Accordingly, different indicators of economic efficiency are examined and described in the following paragraphs.

10.1 Economic efficiency under import scenario

10.1.1 Nominal Protection Coefficient (NPC)

64. NPC is obtained by dividing price of the crop/ commodity prevailing in the private market by the corresponding social (economic) price. NPC measures the impact of output pricing policy without any consideration of the input pricing policy. As a rule of thumb, NPC value greater than one indicates that domestic producers are getting more than the economic price for their crop. When growers receive more than the economic price, they implicitly receive a subsidy or protection which encourages production in the country. Alternatively, if NPC coefficient is less than one, it implies that domestic producers are getting less than the corresponding economic price and thus they are implicitly taxed. Taxation to growers means resources transfer from the concerned crop to other sectors of the economy which acts as a disincentive to the promotion of the concerned crop.

10.1.2 Effective Protection Coefficient (EPC)

65. By definition, it is the ratio of the difference between crop revenue and summation of tradable inputs' costs incurred in producing the crop at private prices to that at social prices. Unlike NPC, which ignores distortion and policy interventions in the input prices, EPC takes into account policy interventions made by the government both for in input and output prices. Thus it is a preferred measure of estimating level of protection or implicit taxation to the producer of a crop/ commodity.

66. EPC is an indicator of the net incentive and disincentive effects of all policies affecting prices of tradeable outputs and inputs. Like NPC if EPC is greater than one, it means that private profit is higher than it would be without government intervention in the input/ output markets. Conversely EPC less than one indicates net effect of policy changes in prices of tradable input and outputs is to reduce private profits. In the former case, producers of a commodity receive subsidy and thus encouraged whereas in the latter situation domestic production is discouraged.

10.1.3 Domestic Resource Cost (DRC)

67. Domestic Resource Cost (DRC) coefficient indicates cost of non-tradable domestic resources employed in production of the commodity at social prices. In this calculation opportunity cost of non-tradable factors like family labor, proxy land rent for own land cultivated, cost of own farm yard manure, opportunity cost of self-management (un-paid), opportunity cost of capital invested in the crop (interest rate) etc, used in production of the crop is numerator while these costs calculated at social prices is denominator. Conclusively, in estimating social/ economic prices we subtract taxes levied on tradable inputs and add subsidies given on inputs. If DRC coefficient is greater than one it indicates ‘comparative disadvantage’ in domestic production of the concerned crop as the cost of this domestic production tends to be greater than the corresponding cost of imports while domestic resource cost coefficient (DRC) value less than one implies ‘comparative advantage’ because domestic production can save foreign exchange at cost less than the corresponding cost of importing this commodity.

68. For 2019-20 rice crop, NPC, EPC and DRCs have been estimated for Punjab and Sindh provinces on the basis of average category farmer cost of production and export price of Pakistani rice during 2018-19. These are summarized in **Table-19**. Data on private and social profitability of rice (paddy) for last five years are given in Annex-X to XIV.

10.2 Export situation analysis

10.2.1 Basmati in Punjab

69. Review of various parameters presented in Table-19 suggest that cultivation of rice paddy is an economic proposition for Punjab because NPC is significantly less than one which means that private market price of paddy is less than its social price.

70. Values of Effective Protection Coefficient (EPC) for last 5 years are also given in the same Table-19. Effective Protection Coefficients (EPC) are also found less than one throughout the period of analysis which indicates that paddy growers in Punjab are implicitly taxed.

71. As Effective Protection Coefficients are also less than one it may be deduced that net effect of various input/ output policies is encouraging to rice growers for development of the crop.

Table-19 Economic efficiency coefficients for Basmati paddy production in Punjab

Year	NPC	EPC	DRC	US \$ 1= Pak Rs	Domestic Resources Spent (Rs) to earn Forex worth US\$ 1
2014-15	0.61	0.56	0.68	101.00	69.16
2015-16	0.42	0.30	0.81	104.24	84.69
2016-17	0.59	0.52	0.52	104.68	54.30
2017-18	0.54	0.50	0.34	109.84	37.42
2018-19	0.64	0.54	0.44	156.70	68.86

Source: Annex-XI

10.2.2 Coarse rice in Sindh

72. The above analysis is repeated for Sindh Province as well. However, it is worth mentioning here that in Sindh major proportion of the crop comprises coarse rice whereas in Punjab maximum of the crop is Basmati. Thus the results may differ significantly.

73. It is observed from **Table-20** that NPC values for Sindh have been mostly above one all along 2014-15 through 2018-19. This reflects that coarse paddy growers in Sindh have some kind of policy protection. The same holds true for EPCs as well. However, a mixed trend is noted in DRC values. At times as in 2015-16 and 2016-17 values are less than one which supports comparative advantage for coarse rice in Sindh. For remaining years (2015-16 & 2016-17), DRC values are much higher than one which plead for not cultivating coarse rice due to its disadvantageous position in Pakistan. Entire of the preceding analysis on economic efficiency is based on export parity prices for the concerned years.

Table-20 Economic efficiency coefficients for coarse paddy production in Sindh

Year	NPC	EPC	DRC	US \$ 1= Pak Rs	Domestic Resources Spent to earn Forex worth US\$ 1
2014-15	1.20	1.19	0.96	101.00	96.73
2015-16	1.30	1.49	1.54	104.24	160.69
2016-17	1.64	1.91	1.25	104.68	130.48
2017-18	1.21	1.25	0.75	109.84	81.94
2018-19	1.34	1.44	0.86	156.70	134.38

Source:

- Derived from Annex-XIII AND Annex-XIV

10.3 Role of rice in saving Forex

74. Data in last column of Table-15 & Table-16 provides a snapshot whether domestic production of basmati or coarse rice helps us to earn foreign exchange or not? It is clear from Table-15 that cost of resources used in producing Basmati, domestically, is less than the corresponding cost in dollar terms. But this does not hold true for domestic production of coarse rice. In the former case this cost is found significantly less than one while for the later it has been higher than the US Dollar rate against Pak Rupee except in 2014-15 and 2017-18. This implies that promotion of basmati rice in Pakistan can save significant amount of foreign exchange while for coarse rice this may not be an economic proposition.

11. RICE YIELD AMONG COMPETING COUNTRIES

75. Global rice during **2018** occupied an area of 162.05 million hectares with a total production of 503.66 million tonnes. The world top 24 producing countries contribute 93.69 per cent of total area and 95.06 per cent of total production.

76. In terms of rice **area**, India is on the top with 44.5 million hectares followed by China, mainland with 30.19 million, Bangladesh with 11.91 and Indonesia, Thailand with 10.90,10.41 million hectares. Pakistan lies at 11th number in this regard (**Table-21**).

Table-21: AREA OF MAJOR RICE PRODUCING COUNTRIES IN THE WORLD: 2018 CROP

Area

S.No.	Country	Area (million hectare)	Per cent Share
1	India	44.500	27.46
2	China, mainland	30.189	18.63
3	Bangladesh	11.910	7.35
4	Indonesia	10.904	6.73
5	Thailand	10.407	6.42
6	Viet Nam	7.571	4.67
7	Myanmar	6.706	4.14
8	Philippines	4.800	2.96
9	Nigeria	3.346	2.06
10	Cambodia	2.982	1.84
11	Pakistan	2.810	1.73
12	Brazil	1.869	1.15
13	Guinea	1.860	1.15
14	Japan	1.470	0.91
15	Nepal	1.470	0.91
16	Democratic Republic of the Congo	1.303	0.80
17	United Republic of Tanzania	1.200	0.74
18	United States of America	1.180	0.73
19	Sri Lanka	1.041	0.64
20	Mali	0.970	0.60
21	Madagascar	0.928	0.57
22	Lao People's Democratic Republic	0.848	0.52
23	Sierra Leone	0.796	0.49
24	Cote d'Ivoire	0.775	0.48
	Total	151.835	93.70
	World Total 117 countries	162.05	100.000

77. In terms of rice **production**, China is on the top with 141.42 million tonnes followed by India with 115.05 million, Indonesia 37.69 and Bangladesh, Vietnam, Thailand with 37.61,29.36,21.46 million tonnes respectively. However, Pakistan lies at 10th position in rice production of the world (**Table-22**).

Table-22: PRODUCTION OF MAJOR RICE PRODUCING COUNTRIES IN THE WORLD: 2018 CROP

Production

S.No.	Country	Production million tonnes	Per cent share
1	China, mainland	141.419	28.08
2	India	115.053	22.84
3	Indonesia	37.693	7.48
4	Bangladesh	37.612	7.47
5	Viet Nam	29.364	5.83
6	Thailand	21.461	4.26
7	Myanmar	16.945	3.36
8	Philippines	12.711	2.52
9	Brazil	7.824	1.55
10	Pakistan	7.202	1.43
11	Cambodia	7.098	1.41
12	United States of America	6.780	1.35
13	Japan	6.485	1.29
14	Nigeria	4.540	0.90
15	Republic of Korea	3.464	0.69
16	Nepal	3.435	0.68
17	Egypt	3.267	0.65
18	Madagascar	2.687	0.53
19	Sri Lanka	2.620	0.52
20	Lao People's Democratic Republic	2.390	0.47
21	Peru	2.372	0.47
22	Colombia	2.215	0.44
23	Mali	2.112	0.42
24	United Republic of Tanzania	2.011	0.40
Total		478.759	95.06
World Total 117 Countries		503.66	100.00

Source:

FAOStat. World Statistics Year Book 2018.

Note: Rice production has worked out from paddy production assuming rice (paddy) ratio is 2/3

78. In terms of **yield** per hectare, Australia lies at the top with 6924 kgs per hectare followed by Egypt with 5884, USA with 5747 and Uruguay with 5667 kgs per hectare. It is very wonderful situation that **Pakistan** ranks at 57th in terms of yield while **India** falls at 56th position.(Annex-XV) It implies that there is a lot of potential to raise rice productivity per hectare in Pakistan.

12. IMPROVED SEED AVAILABILITY OF RICE PADDY

79. Seed is deemed as nucleus of plant and plays a vital role in increasing yield, thus it is necessary to use quality seed of recommended varieties. In the self-pollinated crop like rice, experts recommend that seed should be replaced at least every 5 years implying that at least 20% area of rice should be brought under fresh certified seed every year.

80. Seed is deemed as a nucleus of plant and plays a vital role in increasing yield, thus it is necessary to use quality seed of recommended varieties. In the self-pollinated crop like rice, the experts recommended seed should be replaced at least every 5 years, implying that at least 20 per cent area of rice should be brought under fresh certified seed every year.

81. In order to review the overtime progress regarding coverage of quality seed, the annual gross and replacement of certified seed of rice paddy and its availability during the period from 2013-14 to 2018-19 have been presented in **Annex-XVI**.

82. It is observable from the **Annex** mentioned above that the supply of certified seed has shown an asymmetrical trend. The availability of certified seed at the country level during the referred period augmented and remained approximately at 65.6 thousand tonnes in 2018-19, higher by 42.4 per cent than the available certified seed of 46.0 thousand during 2013-14.

83. The varietal breakup of the supply of certified seed of rice paddy in both public and private sector for the crop year **2018-19** is presented in **Table-23**.

Table-23: Variety wise Certified Seed of Paddy Supplied by Public and Private Sectors for 2018-19 Crop

Province/variety	Seed availability (Tons)			Area sown 000 ha.	Seed requirement tons	Seed enough for area %
	Public sect.	Pvt. sect.	Total tons			
Punjab	3840.0	55218.0	59058.0	1869.0	24929.0	236.9
Basmati (Fine)	2785.5	31477.0	34262.5	1495.0	18463.0	185.6
IRRI & others	1054.5	23741.0	24795.5	374.0	6466.0	383.5
Sindh (IRRI+ others)	233.7	6252.7	6486.4	770.0	13313.0	48.7
KPK.						
IRRI others	14.4	18.9	33.3	65.0	1124.0	3.0
Bol. IRRI	0.0	0.0	0.0	175.0	3026.0	0.0
All Pakistan	4088.1	61489.6	65577.7	2879.0	42392.0	154.7
Basmati	2785.5	31477.0	34262.5	1495.0	18463.0	185.6
IRRI +other	1302.6	30012.6	31315.2	1384.0	23929.0	130.9

Source: FSC&RD, Islamabad.

84. Provincial variety-wise data presented in the table above show that in all provinces the major source of supply of certified seed is private sector. The shares of private sectors in the

respective provincial total seed availability is as: Punjab (93 %), Sindh (96 %), KPK (57 %) and at country level (94 %). It is commendable to point out that keeping in view 20 % annual seed replacement, all provinces have surplus certified rice paddy seed with the exception of Balochistan.

13. ECONOMICS OF RICE PADDY AND COMPETING CROPS

85. Resource allocation among competing enterprises is primarily guided by economic considerations as reflected in their gross cost, gross income, gross margin, net income and output-input ratio etc. Rice, a major ‘kharif’ crop, competes with cotton for land, water and other farm resources in the areas where cultivation of both crops is agronomically feasible. Coarse and fine varieties of rice may also compete among themselves. Rice also faces indirect competition from sugarcane, an annual crop, which occupies land the whole year.

86. Economics of rice and competing crops has been analyzed in terms of input-output prices paid and received by the growers for the 2018-19 crops. A summary of the relevant economic indicators emerging from the analysis is presented in **Table-24** for Punjab and **Table-25** for Sindh. Also, the Output-Input ratios have been graphically presented in Fig-3 and Fig-4 for both the provinces. Details of the analysis are provided in Annex-VI.

Punjab:

87. Basmati’s performance in Punjab in terms of returns to overall investment has been lower than seed cotton. Similarly, in terms of purchased inputs and irrigation water, Basmati’s returns to farmer for the farm investment were much lower than the cotton. Also, in terms of crop duration Basmati has performed lower than cotton.

88. IRRI paddy in Punjab also could not perform against seed cotton in any of the economic indicators analyzed and cotton out-competed the earlier comprehensively. Not only that both Basmati and IRRI paddy were out performed

Table-24: Economics of Rice and competing crops at prices realized by the growers in Punjab: 2018-19 crop

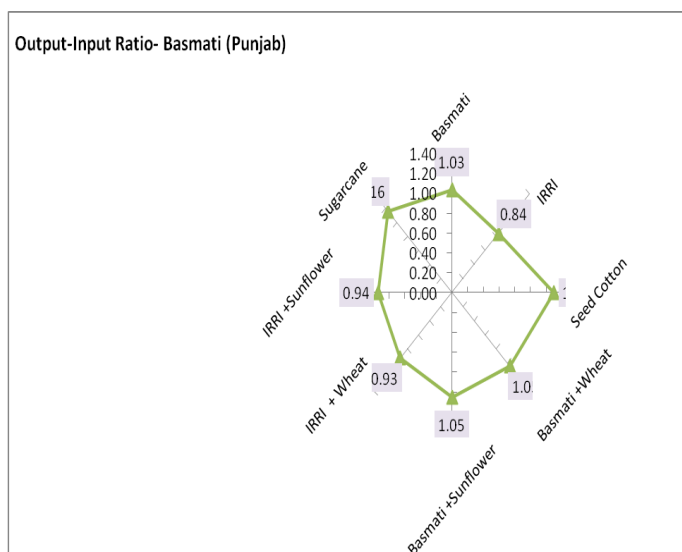
Crop/crop combination	Output-input ratio	Gross revenue per		
		rupee of purchased inputs cost	day of crop duration	Acre-inch of irrigation water used
		----- Rupees -----		
1. Basmati paddy	1.03	2.12	360	1117
2. IRRI paddy	0.84	1.87	295	856
3. Seed Cotton	1.30	3.96	347	3781
4. Basmati+wheat	1.05	2.62	309	1590
5. Basmati+sunflower	1.05	2.51	314	1411
6. IRRI+wheat	0.93	2.47	277	1346
7. IRRI+sunflower	0.94	2.37	281	1205
8. Sugarcane	1.16	4.90	260	2133

Source: Annex- .

by seed cotton, IRRI paddy even couldn't gain break-even and its returns to overall investment i.e output-input ratio, was below than 1 which indicates that farmer's cost could not be met in cultivating IRRI paddy.

Fig-3: Output-input Ratio in Punjab for Basmati Paddy

89. In case of indirect competition, Basmati combinations with Wheat and Sunflower though show better returns however still lag far behind sugarcane in terms of output-input ratio. Sugarcane, based on the indicative price, performed much better against the earlier in terms of all the indicators including purchased inputs and irrigation water, but lagged behind rice combinations in terms of crop duration. IRRI combinations remained considerably lower in respect of all the economic indicators analyzed. The IRRI combination with Wheat gained a marginal edge over Sunflower combinations in terms of returns to purchased inputs. IRRI along with sunflower could not pay back to the farmer even the cost of cultivation, as the returns of overall investment remained below.



Sindh

90. In Sindh, IRRI paddy farming could not gain better results in any of the economic criteria and, remained below its main competitor - cotton crop. In terms of entire criteria, IRRI could not match or compete with the Cotton (**Table-25**).

Table-25: Economics of IRRI Paddy and Competing Crops at Prices Realized by the Growers in Sindh: 2018-19 Crops

Crop/crop combination	Output-input ratio	Gross revenue per		
		rupee of purchased inputs cost	day of crop duration	acre-inch of irrigation water used
----- Rupees -----				
1. IRRI paddy	0.93	2.58	268	862
2. Seed Cotton	1.30	3.85	379	5051
3. IRRI+wheat	0.98	2.94	259	1369
4. IRRI+sunflower	0.93	2.73	224	1035
5. Sugarcane	1.16	4.23	256	1761

Source:

Annex-VII

91. In context of indirect competition with sugarcane, the economic position of IRRI+ wheat rotation is healthier than sugarcane in terms of returns to crop duration. However, the performance of IRRI + sunflower combination has been considerably lower to the sugarcane in terms of overall investment and the remaining indicators. An identical situation of this combination is depicted against the IRRI+Wheat combination, lagging behind all the economic criteria analyzed.

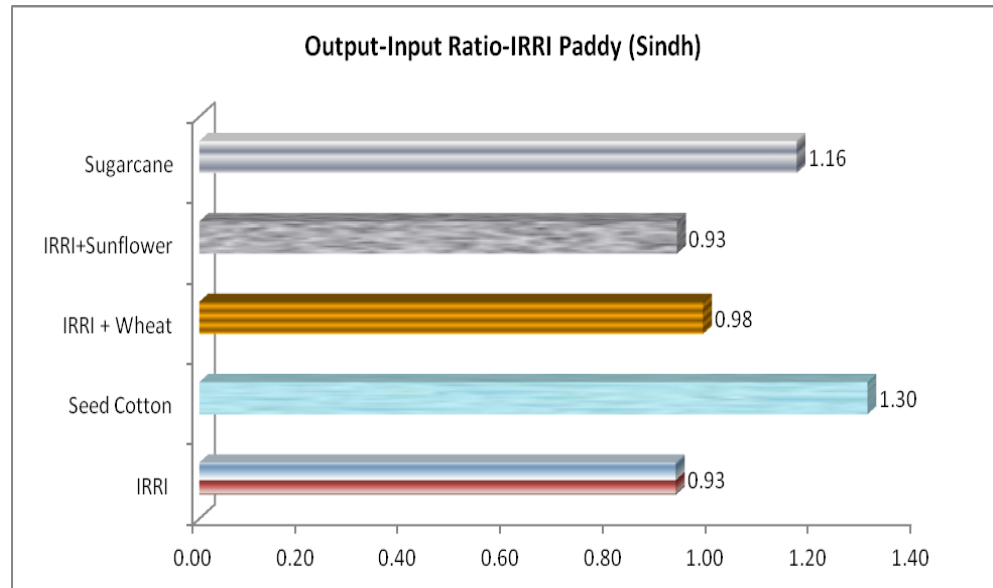


Fig-4: Output-input Ratio in Sindh for IRRI Paddy

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 23 December, 2019

**AREA, YIELD AND PRODUCTION OF RICE BY VARIETY AND PROVINCE:
2008-09 TO 2018-19**

Year	PUNJAB				SINDH			KP	Baloch	Pakistan			
	Basmati	IRRI	Others	Total	IRRI	Others	Total	Total (Others)	Total (IRRI)	Basmati	IRRI	Others	Total
AREA	----- Thousand hectares -----												
2008-09	1548.3	202.3	227.0	1977.6	560.3	173.2	733.5	61.3	190.1	1548.3	952.7	461.5	2962.5
2009-10	1414.0	218.9	298.6	1931.5	518.9	188.8	707.7	53.8	190.1	1414.0	927.9	541.2	2883.1
2010-11	1333.8	182.5	250.5	1766.8	274.7	86.5	361.2	46.1	191.2	1333.8	648.4	383.1	2365.3
2011-12	1121.0	183.3	409.9	1714.2	405.3	230.5	635.8	50.1	171.1	1121.0	759.7	690.5	2571.2
2012-13	995.1	210.0	506.3	1711.4	331.6	179.5	511.1	48.8	37.5	995.1	579.1	734.6	2308.8
2013-14	1192.6	189.4	426.9	1808.9	426.8	318.7	745.5	55.3	179.5	1192.6	795.7	800.9	2789.2
2014-15	1320.0	196.7	361.0	1877.7	423.4	358.1	781.5	56.9	174.3	1320.0	794.4	776.0	2890.4
2015-16	1254.1	183.3	342.8	1780.2	357.1	362.7	719.8	64.7	174.8	1254.1	715.2	770.2	2739.5
2016-17	1352.8	145.3	238.4	1736.5	333.4	417.1	750.5	67.0	170.0	1352.8	648.7	722.5	2724.0
2017-18	1416.4	134.8	289.7	1840.9	351.6	476.7	828.3	61.6	169.8	1416.4	656.2	828.0	2900.6
2018-19	1473.0	133.6	297.4	1904.0	262.0	428.2	690.2	62.3	153.5	1473.0	549.1	787.9	2810.0
YIELD	----- kgs per hectare -----												
2008-09	1680	2559	2307	1842	3479	3393	3459	2091	3386	1680	3265	2686	2347
2009-10	1751	2431	2362	1922	3331	3677	3423	1903	3393	1751	3131	2775	2387
2010-11	1773	2443	2287	1915	3347	3594	3406	1701	683	1773	2307	2512	2039
2011-12	1685	2491	2272	1912	3570	3528	3555	1890	3089	1685	3202	2663	2396
2012-13	1767	2607	2316	2032	3471	3860	3608	1922	3205	1767	3140	2667	2398
2013-14	1725	2625	2171	1924	3013	4177	3511	2024	3275	1725	2980	2959	2437
2014-15	1771	2559	2237	1943	2743	4164	3394	2302	3277	1771	2815	3131	2423
2015-16	1817	2514	2223	1967	2925	4214	3574	2377	3276	1817	2906	3173	2483
2016-17	1866	2696	2344	2001	2789	4152	3546	2361	3262	1866	2892	3389	2514
2017-18	1989	2689	2482	2117	2498	4137	3441	2394	3261	1989	2735	3428	2568
2018-19	2002	2627	2282	2090	2906	4226	3725	2469	3245	2002	2933	3353	2563
PRODUCTION	----- Thousand tonnes -----												
2008-09	2601.6	517.7	523.7	3643.0	1949.3	587.7	2537.0	128.2	643.7	2601.6	3110.7	1239.6	6951.9
2009-10	2475.4	532.2	705.4	3713.0	1728.2	694.2	2422.4	102.4	645.0	2475.4	2905.4	1502.0	6882.8
2010-11	2365.2	445.8	573.0	3384.0	919.4	310.9	1230.3	78.4	130.6	2365.2	1495.8	962.3	4823.3
2011-12	1889.1	456.6	931.3	3277.0	1447.1	813.0	2260.1	94.7	528.6	1889.1	2432.3	1839.0	6160.4
2012-13	1758.1	547.4	1172.5	3478.0	1151.0	692.9	1843.9	93.8	120.2	1758.1	1818.6	1959.2	5535.9
2013-14	2057.1	497.2	926.7	3481.0	1286.1	1331.2	2617.3	111.9	587.9	2057.1	2371.2	2369.8	6798.1
2014-15	2337.2	503.3	807.5	3648.0	1161.5	1491.1	2652.6	131.0	571.2	2337.2	2236.0	2429.6	7002.8
2015-16	2279.2	460.8	762.0	3502.0	1044.6	1528.2	2572.8	153.8	572.7	2279.2	2078.1	2444.0	6801.3
2016-17	2524.4	391.8	558.8	3475.0	929.8	1731.8	2661.6	158.2	554.5	2524.4	1876.1	2448.8	6849.3
2017-18	2816.6	362.5	718.9	3898.0	878.3	1972.2	2850.5	147.5	553.8	2816.6	1794.6	2838.6	7449.8
2018-19	2949.2	351.0	678.8	3979.0	761.4	1809.6	2571.0	153.8	498.1	2949.2	1610.5	2642.2	7201.9
Note:-	The varieties of basmati grown in the KPK are of different characteristics than those in the Punjab, therefore, area and production of basmati varieties of this province have not been included with data of basmati of Punjab. Instead data of all varieties of rice in the KPK have been included under "Others" in the province as well as on overall basis. Rice grown in Balochistan has been considered as of IRRI variety as variety-wise breakup is not available.												
Source	1. For 2008-09 to 2016-17, Agricultural Statistics of Pakistan 2015-16, MINFA Islamabad. 2. For 2017-18 : Final estimates provided by concerned Provincial Agriculture Departments. 3. For 2018-19 : Final estimates provided by concerned Provincial Agriculture Departments.												

ANNEX-I-A													
AREA, YIELD AND PRODUCTION OF RICE BY VARIETY AND PROVINCE:													
2008-09 TO 2018-19													
Year	PUNJAB				SINDH			KH. PUKH	Baloch.	Pakistan			
	Basmati	IRRI	Others	Total	IRRI	Others	Total	Total (Others)	Total (IRRI)	Basmati	IRRI	Others	Total
AREA	----- Thousand acres -----												
2008-09	3826.0	499.9	560.9	4886.8	1384.6	428.0	1812.6	151.5	469.8	3826.0	2354.2	1140.4	7320.6
2009-10	3494.1	540.9	737.9	4772.9	1282.3	466.5	1748.8	132.9	469.8	3494.1	2292.9	1337.4	7124.4
2010-11	3296.0	451.0	619.0	4365.9	678.8	213.8	892.6	113.9	472.5	3296.0	1602.3	946.7	5844.9
2011-12	2770.1	453.0	1012.9	4236.0	1001.5	569.5	1571.1	123.8	422.8	2770.1	1877.3	1706.2	6353.6
2012-13	2459.0	518.9	1251.1	4229.0	819.4	443.6	1263.0	120.6	92.7	2459.0	1431.0	1815.3	5705.3
2013-14	2947.0	468.0	1054.9	4470.0	1054.7	787.5	1842.2	136.7	443.6	2947.0	1966.3	1979.1	6892.4
2014-15	3261.9	486.1	892.1	4640.0	1046.3	884.9	1931.2	140.6	430.7	3261.9	1963.0	1917.6	7142.5
2015-16	3099.0	453.0	847.1	4399.1	882.4	896.2	1778.6	159.9	431.9	3099.0	1767.3	1903.2	6769.5
2016-17	3342.9	359.1	589.1	4291.1	823.9	1030.7	1854.6	165.6	420.1	3342.9	1603.0	1785.4	6731.3
2017-18	3500.1	333.1	715.9	4549.0	868.8	1178.0	2046.9	152.2	419.6	3500.1	1621.5	2046.1	7167.7
2018-19	3639.9	330.1	734.9	4705.0	647.4	1058.1	1705.6	153.9	379.3	3639.9	1356.9	1947.0	6943.8
YIELD	----- kgs per acre -----												
2008-09	680	1036	934	745	1408	1373	1400	846	1370	680	1321	1087	950
2009-10	708	984	956	778	1348	1488	1385	770	1373	708	1267	1123	966
2010-11	718	989	926	775	1354	1454	1378	688	276	718	934	1016	825
2011-12	682	1008	919	774	1445	1428	1439	765	1250	682	1296	1078	970
2012-13	715	1055	937	822	1405	1562	1460	778	1297	715	1271	1079	970
2013-14	698	1062	878	779	1219	1690	1421	819	1325	698	1206	1197	986
2014-15	717	1035	905	786	1110	1685	1374	932	1326	717	1139	1267	980
2015-16	735	1017	900	796	1184	1705	1446	962	1326	735	1176	1284	1005
2016-17	755	1091	949	810	1129	1680	1435	956	1320	755	1170	1372	1018
2017-18	805	1088	1004	857	1011	1674	1393	969	1320	805	1107	1387	1039
2018-19	810	1063	924	846	1176	1710	1507	999	1313	810	1187	1357	1037
PRODUCTION	----- Thousand tonnes -----												
2008-09	2601.6	517.7	523.7	3643.0	1949.3	587.7	2537.0	128.2	643.7	2601.6	3110.7	1239.6	6951.9
2009-10	2475.4	532.2	705.4	3713.0	1728.2	694.2	2422.4	102.4	645.0	2475.4	2905.4	1502.0	6882.8
2010-11	2365.2	445.8	573.0	3384.0	919.4	310.9	1230.3	78.4	130.6	2365.2	1495.8	962.3	4823.3
2011-12	1889.1	456.6	931.3	3277.0	1447.1	813.0	2260.1	94.7	528.6	1889.1	2432.3	1839.0	6160.4
2012-13	1758.1	547.4	1172.5	3478.0	1151.0	692.9	1843.9	93.8	120.2	1758.1	1818.6	1959.2	5535.9
2013-14	2057.1	497.2	926.7	3481.0	1286.1	1331.2	2617.3	111.9	587.9	2057.1	2371.2	2369.8	6798.1
2014-15	2337.2	503.3	807.5	3648.0	1161.5	1491.1	2652.6	131.0	571.2	2337.2	2236.0	2429.6	7002.8
2015-16	2279.2	460.8	762.0	3502.0	1044.6	1528.2	2572.8	153.8	572.7	2279.2	2078.1	2444.0	6801.3
2016-17	2524.4	391.8	558.8	3475.0	929.8	1731.8	2661.6	158.2	554.5	2524.4	1876.1	2448.8	6849.3
2017-18	2816.6	362.5	718.9	3898.0	878.3	1972.2	2850.5	147.5	553.8	2816.6	1794.6	2838.6	7449.8
2018-19	2949.2	351.0	678.8	3979.0	761.4	1809.6	2571.0	153.8	498.1	2949.2	1610.5	2642.2	7201.9
Note:	The varieties of basmati grown in the KPK are of different characteristics than those in the Punjab, therefore, area and production of basmati varieties of this province have not been included with data of basmati of Punjab. Instead data of all varieties of rice in the KPK have been included under "Others" in the province as well as on overall basis. Rice grown in Balochistan has been considered as of IRRI variety as variety-wise breakup is not available.												
Source:	1. For 2008-09 to 2016-17, Agricultural Statistics of Pakistan 2015-16, MINFA Islamabad.												
	2. For 2017-18 : Final estimates provided by concerned Provincial Agriculture Departments.												
	3. For 2018-19 : Final estimates provided by concerned Provincial Agriculture Departments.												

ANNEX-II													
DISTRICT-WASE PRODUCTION OF RICE BY VARIETY: AVERAGE OF 2016-17 TO 2018-19													
"000" tonnes													
S.No	Province/ District	Basmati	IRRI	Others	Total	%	S.No	Province/ District	Basmati	IRRI	Others	Total	%
	<u>Punjab</u>							<u>KPK</u>					
1	Gujranwala	201.0	0.0	296.8	497.9	6.9	1	D.I.Khan	-	-	31.6	31.6	0.4
2	Okara	146.8	166.2	40.3	353.4	4.9	2	Dir Lower	-	-	22.5	22.5	0.3
3	Sheikhupura	301.6	0.0	42.3	343.9	4.8	3	Kurram AG.	-	-	20.8	20.8	0.3
4	Hafizabad	244.3	0.0	63.5	307.8	4.3	4	Swat	-	-	15.8	15.8	0.2
5	Sialkot	221.9	0.0	27.2	249.1	3.5	5	Dir Upper	-	-	14.6	14.6	0.2
6	Nankana Sahib	204.3	0.0	22.5	226.8	3.2	6	Malakand	-	-	10.9	10.9	0.2
7	Bahawalnagar	122.9	8.7	30.3	161.9	2.3	7	Bajour AG.	-	-	6.9	6.9	0.1
8	Pakpattan	113.9	16.9	5.9	136.8	1.9	8	Bannu	-	-	6.2	6.2	0.1
9	Kasur	62.8	19.7	49.0	131.5	1.8	9	Mansehra	-	-	4.4	4.4	0.1
10	Jhang	124.6	0.0	1.3	125.9	1.8	10	Chitral	-	-	4.2	4.2	0.1
11	Narowal	122.4	0.0	1.4	123.8	1.7	11	Battagram	-	-	3.8	3.8	0.1
12	M.B.Din	111.2	0.0	12.5	123.7	1.7	12	Shangla	-	-	3.4	3.4	0.0
13	T.T.Singh	100.4	0.0	0.0	100.4	1.4	13	Mardan	-	-	3.2	3.2	0.0
14	D.G.Khan	1.9	97.4	0.0	99.2	1.4	14	Swabi	-	-	1.1	1.1	0.0
15	Chiniot	62.8	5.7	9.1	77.6	1.1	15	Peshawar	-	-	0.7	0.7	0.0
16	Vehari	69.9	1.8	0.0	71.8	1.0	16	Bunir	-	-	0.5	0.5	0.0
17	Muzaffargarh	37.9	24.3	4.1	66.3	0.9	17	Hangu	-	-	0.5	0.5	0.0
18	Lahore	42.5	0.0	21.5	64.1	0.9	18	Lakki Marwat	-	-	0.5	0.5	0.0
19	Khanewal	62.7	0.0	0.7	63.5	0.9	19	Tank	-	-	0.4	0.4	0.0
20	Sahiwal	60.5	0.0	1.4	61.9	0.9	20	Orakzai AG	-	-	0.4	0.4	0.0
21	Multan	39.6	11.3	6.1	56.9	0.8	21	Charsadda	-	-	0.2	0.2	0.0
22	Sargodha	52.5	0.0	4.4	56.9	0.8	22	Nowshera	-	-	0.2	0.2	0.0
23	Gujrat	50.3	0.0	5.7	56.0	0.8	23	Kohistan	-	-	0.2	0.2	0.0
24	Faisalabad	45.9	0.0	6.2	52.1	0.7	24	F.R.D.I.Khan	-	-	0.1	0.1	0.0
25	Khushab	46.8	0.0	0.0	46.8	0.7	25	Kohat	-	-	0.1	0.1	0.0
26	R.Y.Khan	34.4	3.9	0.0	38.3	0.5	26	N.Waziristan	-	-	0.1	0.1	0.0
27	Bahawalpur	23.6	1.6	0.0	25.2	0.4							
28	Lodhran	22.0	0.0	0.0	22.0	0.3							
29	Layyah	18.4	0.0	0.0	18.4	0.3							
30	Rajanpur	0.3	11.0	0.0	11.3	0.2							
31	Mianwali	10.2	0.0	0.0	10.2	0.1							
32	Jhelum	2.2	0.0	0.0	2.2	0.0							
33	Bhakkar	0.8	0.0	0.0	0.8	0.0							
	Punjab Total	2763.4	368.5	652.2	3784.0	52.8		KPK Total	0.0	0.0	153.2	153.2	2.1
	<u>Sindh</u>							<u>Balochistan</u>					
1	Badin	-	106.9	409.7	516.6	7.2	1	Jaffarabad	-	308.1	-	308.1	4.3
2	Larkana	-	174.8	218.6	393.4	5.5	2	Nasirabad	-	220.9	-	220.9	3.1
3	Shikarpur	-	105.2	258.5	363.8	5.1	3	Khuzdar	-	2.9	-	2.9	0.0
4	Jacobabad	-	28.9	316.1	345.0	4.8	4	Turbat	-	2.3	-	2.3	0.0
5	Qambar	-	138.2	162.8	301.0	4.2	5	Awaran	-	0.6	-	0.6	0.0
6	Kashmore	-	59.7	221.4	281.0	3.9	6	Jhal Magsi	-	0.5	-	0.5	0.0
7	Thatta	-	159.6	84.3	243.9	3.4	7	Dera Budghti	-	0.2	-	0.2	0.0
8	Dadu	-	68.0	112.9	180.8	2.5	8	Sibi	-	0.1	-	0.1	0.0
9	T.M.Khan	-	14.6	50.3	64.9	0.9							
10	Hyderabad	-	0.7	3.3	4.0	0.1							
	Sindh Total	-	856.5	1837.9	2694.4	37.6		Balochistan Total	-	535.5	-	535.5	7.5
								Pakistan Total	2763.4	1760.5	2643.2	7167.0	100.0
Notes:	1. Data have been arranged in descending order on the basis of total production of rice in each district.												
	2. Percentage share calculated on the basis of country total.												
	3. Rounding may result in slight differences in figures.												
Source:	Respective Provincial Agriculture departments												

ANNEX-III**PER CAPITA AVAILABILITY CONSUMPTION OF RICE: 2015-16 to 2017-18**

S.No	Items	2015-16	2016-17	2017-18
		-----Thousands tonnes-----		
1	Production	6802	6849	7450
2	Deduction for seed, feed and wastage @ 6 percent for production	411	411	447
3	Export	4246	3523	4097
4	Net availability	2192	2915	2906
		-----Millions-----		
5	Population	202.1	205.9	215.08
		-----Kgs-----		
6	Per capita availability (consumption)	10.85	14.16	13.51
7	Average per capita availability			
	Average (2015-16 to 2017-18)		12.84	
Sources:				
1	For Imports and Exports:	Federal Bureau of Statistics, Karachi.		
2	For Population of Pakistan:	Economic Survey, 2017-18.		

**AVERAGE FARMER COST OF PRODUCTION OF BASMATI PADDY IN PUNJAB:
2018-19 AND 2019-20 CROPS**

S. No	operation/input	Unit	Avg. no of operations/ acre	Rate/ unit	Cost/ acre	Rate/ unit	Cost/ acre	Change in 2019-20 over 2018-19
				.....2018-19.....				
				....Rs....		.....Rs.....		
1	Land preparation							
	1.1 Dry ploughing	No. of ploughings/ acre	3.0	600	1800	800.0	2400	600
	1.2 Dry planking	No. of plankings/ acre	0.3	300	90	400.0	120	30
	1.3 Wet ploughing	No. of ploughings/ acre	3.0	800	2400	1200.0	3600	1200
	1.4 Wet planking	No. of plankings/ acre	2.0	400	800	600.0	1200	400
	1.5 Rotavator	No. of ploughings/ acre	0.4	1000	400	1050.0	420	20
	1.6 Levelling	Tractor Hours./ acre	1.0	750	750	900.0	900	150
2	Seed							
	2.1 Cost of nursery	Rs./ acre			1063		1500	437
	2.2 Cost of nursery uprooting, transport and planting	Rs./acre			4000		4500	500
3	Labour for bund making	M. day/ acre	0.984	400	394	500	492	98
4	Weeding							
	4.1 Manual	No./ acre	1.15	400	460	500	575	115
	4.2 Weedicides	No. of applications/ acre	1	562	562	669	669	107
	4.3 Pesticides spray	"	1	1000	1000	1000	1000	0
5	Irrigation							
	5.1 Canal	Rs./ acre			95.72		95.72	0
	5.2 Private tube well	No. of irrigations/acre	10	750	7500	875	8750	1250
	5.3 Labour used for irrigation & water course cleaning	M. days/ acre	6.1	400	2440	500	3050	610
6	FYM @ 25% of the actual cost including transport & application	No. of trolleys	1.34	2544	852	2600	871	19
7	Fertilizer							
	7.1 DAP	No. of bag/ acre	1.0	2500	2500	3740	3740	1240
	7.2 Urea	"	2.0	1400	2800	1850	3700	900
	7.3 NP	"	0.06	2000	120	2525	152	32
	7.4 Zinc sulphate	"	0.84	687	577	860	722	145
	7.5 Potash	"	0.07	3470	243	3500	245	2
	7.6 Fertilizer transport & application	Rs./ bag	3.97	120	476	128	508	32
8	Traded inputs cost (Item 1 to 7 minus 5.1)	Rs/ acre			31323		39210	7887
9	Mark up on investment @ 14.5 % for 6 months on item 8-item 5.1	"			2271		2843	572
10	Harvesting, threshing etc	Rs/ acre			2300		2816	516
11	Management charges for 6 months	Rs/ acre			1563		1719	156
12	Land rent for 6 months	Rs./acre/annum		30000	15000	30000	15000	0
13	Land revenue, local rate, panchotra etc	"			5		5	0
14	Average land tax @ Rs 132 acre/ annum	"		132	66	132	66	0
15	Gross cost (item 1 to 15)	Rs./ acre			52528		61658	9131
16	Value of paddy straw	Rs./acre			5600		6000	400
17	Net cost of cultivation (item 15-16)	Rs./acre						
	17.1 Including land rent	Rs./ acre			46928		55658	8731
	17.2 Excluding land rent	Rs./ acre			31928		40658	8731
18	Yield	Kg/ acre			1325		1363	38
19	Cost of production at farm gate (Rs./40 Kg)							
	19.1 With land rent	Rs./ 40 Kg			1417		1633	217
	19.2 Without land rent	Rs./ 40 Kg			964		1193	229
20	Marketing chrages (Rs./ 40 Kg)	Rs./ 40 Kg			50		50	0
21	Cost of production at market level (Rs./40 Kg)							
	21.1 With land rent	Rs./ 40 Kg			1467		1683	217
	21.2 Without land rent	Rs./ 40 Kg			1014		1243	229

Source:

* API field surveys

Notes:

- Cost of one tube well irrigation is derived by multiplying Rs 350/hour by 2.5 hours (time per irrigation).
- Cost of FYM is 25% of actual expenditure incurred on purchase of manure, loading/ unloading and transport expenditure. Underlying assumption is that effect of FYM lasts for two years i.e 50% of it will be consumed by rice crop and rest of the 50% will be consumed by the following crops. Again 50% consumption by paddy is reduced to one half because paddy is a six month crop.
- Calculation may have minor differences due to decimal fractions.

ANNEX-V**AVERAGE FARMER COST OF PRODUCTION OF IRRIGATION PADDY IN SINDH: 2018-19 AND 2019-20 CROPS**

S. No	operation/input	Unit	Avg. no of operations/acre	Rate/	Cost/	Rate/	Cost/	Change in 2019-20 over 2018-19
				unit	acre	unit	acre	
				....2018-19....		....2019-20....		
				....Rs....		.....Rs.....		
1	Land preparation							
	1.1 Dry ploughing	No	5.0	750	3750	900.0	4500	750
	1.2 Dry planking	"	1.0	375	375	450.0	450	75
	1.3 Levelling	Tractor Hour/acre	1.0	750	750	900.0	900	150
2	Nursery							
	2.1 Cost of nursery	Rs./ acre	1.0	2500	2500	3500	3500	1000
	2.2 Cost of nursery uprooting, transport and planting	Rs./acre			3200		3200	
3	Labour for bund making	M. day/ acre	2	400	800	500	1000	200
4	Manual weeding	M. day/ acre	2.4	400	960	500	1200	-960
5	Plant protection							
	5.1 Weedicide	No. of applications/acre	0.73	460	336	665	485	150
	5.2 Formulated spray	No. of applications/acre	0.39	1000	390	1177	459	69
6	FYM @ 25% of the actual cost including transport & application	No. of trolleys	1	3335	834	3500	875	41
7	Fertilizer							
	7.1 DAP	No. of bag/ acre	1.0	3272	3272	3600	3600	328
	7.2 Urea	"	2.0	1625	3250	1839	3678	428
	7.3 Zinc sulphate	"	0.1	700	70	700	70	
	7.4 Fertilizer transport & application	Rs./ bag	3.1	100	310	125	388	78
8	Irrigation							
	8.1 Canal	No. of irrigation/ acre	17.9	-	95.7	-	95.7	
	8.2 Private tube well (Rs./ irrigation)	No. of irrigation/ acre	0.5	862.5	431	900.0	450	19
	8.3 Labor used for irrigation & water course cleaning	M. day/ acre	5.6	400.0	2240	500.0	2800	560
9	Traded inputs cost (Item 1 to 9 minus 9.1)	Rs/acre		900	23468		27555	2887
10	Mark up on investment @ 14.5 % for 6 months on item 10	"			1701		1998	209
11	Harvesting, threshing etc	Rs/ acre			2000		2000	200
12	Management charges for 6 months	Rs	-		1563		1719	156
13	Land rent for 6 months	Rs./acre/annum		25000	12500	30000	15000	2500
14	Land revenue, local rate, panchotra etc	"		5	5	5	5	
15	Average land tax @ Rs 132 acre/ annum	"		132	66	132	66	
16	Drainage Cess	"		24	12	24	12	
17	Gross cost (item 1-17)	Rs./ acre			41411		48450	5952
18	Value of paddy straw	Rs./acre			3700		3700	
19	Net cost of cultivation (item 18-19)	Rs./ acre			37711		44750	5952
20	Yield	Kg/ acre			2000		2000	
21	Cost of production at farm gate (Rs./40 Kg)							
	21.1 With land rent	Rs./ 40 Kg			754		895	119
	21.2 Without land rent	Rs./ 40 Kg			504		595	69
22	Marketing charges (Rs./ 40 Kg)	Rs./ 40 Kg			50		50	
23	Cost of production at market level (Rs./40 Kg)							
	23.1 With land rent	Rs./ 40 Kg			804		945	119
	23.2 Without land rent	Rs./ 40 Kg			554		645	69
	Source:							
	* API field surveys							

ECONOMICS OF RICE PADDY AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2018-19 CROPS												
S #	Province/crops/crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per		
		Days	Acre inches	.....Rupees per acre.....					Ratio	.....Rupees.....		
				1	2	3	4	5		6	7=6-5	8=6-4	9=6/4	10=6/5	11=6/2	12=6/3
Punjab												
1	Basmati Paddy	180	58	62,597	30,560	64,779	34,220	2,183	1.03	2.12	360	1,117
2	IRRI Paddy	180	62	63,151	28,412	53,075	24,663	(10,076)	0.84	1.87	295	856
3	Seed Cotton	240	22	63,865	21,009	83,192	62,183	19,327	1.30	3.96	347	3,781
4	Wheat	180	12	43,563	11,976	46,500	34,524	2,937	1.07	3.88	258	3,875
5	Sunflower (spring)	180	22	44,777	14,370	48,126	33,756	3,348	1.07	3.35	267	2,188
6	Seed Cotton + Wheat	420	34	107,428	32,985	129,692	96,707	22,264	1.21	3.93	309	3,814
7	Seed Cotton+Sunflower	420	44	108,643	35,379	131,318	95,939	22,675	1.21	3.71	313	2,984
8	Basmati Paddy+Wheat	360	70	106,160	42,535	111,279	68,744	5,120	1.05	2.62	309	1,590
9	Basmati Paddy+Sunflower	360	80	107,374	44,930	112,905	67,976	5,531	1.05	2.51	314	1,411
10	IRRI Paddy + Wheat	360	74	106,714	40,388	99,575	59,187	(7,139)	0.93	2.47	277	1,346
11	IRRI Paddy+Sunflower	360	84	107,929	42,782	101,201	58,418	(6,728)	0.94	2.37	281	1,205
12	Sugarcane	394	48	88,386	20,886	102,364	81,478	13,978	1.16	4.90	260	2,133
Sindh												
1	IRRI Paddy	180	56	52,012	18,745	48,295	29,550	(3,717)	0.93	2.58	268	862
2	Seed Cotton	240	18	69,840	23,596	90,925	67,329	21,085	1.30	3.85	379	5,051
3	Wheat	180	12	42,841	12,935	44,813	31,877	1,972	1.05	3.46	249	3,734
4	Sunflower (spring)	180	22	34,703	10,843	32,423	21,580	(2,280)	0.93	2.99	180	1,474
5	Seed Cotton + Wheat	420	30	112,681	36,531	135,738	99,206	23,057	1.20	3.72	323	4,525
6	Seed Cotton+Sunflower	420	40	104,543	36,531	123,348	86,816	18,805	1.18	3.38	294	3,084
7	IRRI Paddy+ Wheat	360	68	94,852	31,680	93,108	61,428	(1,745)	0.98	2.94	259	1,369
8	IRRI Paddy+Sunflower	360	78	86,715	29,587	80,718	51,130	(5,997)	0.93	2.73	224	1,035
9	Sugarcane	488	71	107,408	29,567	125,010	95,443	17,602	1.16	4.23	256	1,761

Notes for Annex - VI:

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2018-19 crops.
2. The data regarding input-output parameters have been adopted from the API's price policy papers for sugarcane, seed cotton, rice paddy and wheat, 2018-19 crops. However, the relevant data for sunflower and canola were adopted from the last support price policy for non-traditional oilseeds 2000-01 crops, with necessary adjustments in input prices for updating costs and incomes for the 2018-19 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2018-19 crops, some marginal revisions/updates have been incorporated.
3. Water use has been estimated from the number of irrigations as reported in the cost of production estimates of the respective crops assuming each irrigation of 3 inches and 'rauni' of 4 inches.
4. The following prices as realized by the growers for different crops are adopted for the analysis:
 - 4.1 The support price of Rs 1300 per 40 kgs, as maintained by the government for 2018-19 crop, has been adopted for the current analysis.
 - 4.2 The wholesale market prices of basmati paddy and IRRI paddy during the post-harvest period in major producer area markets have averaged at Rs 1775 and Rs 1050 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 1041 per 40 kgs.
 - 4.3 The wholesale market prices of seed cotton during the post-harvest months of 2018-19 in the main producer area markets have averaged at Rs 3776 per 40 kgs in the Punjab and Rs 3637 Sindh.
 - 4.4 The price of Sunflower crops has been reported hovering around Rs 2400/40 kgs and Rs 2500/40 kgs for Canola during 2018-19.
 - 4.5 The indicative prices of sugarcane as announced by the provincial governments are taken for the analysis i.e Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh. However, the prices received by the growers remained much lower (ranging Rs 160 and 140, respectively for Punjab and Sindh).
5. The market prices have been adjusted for the marketing expenses to make them effective at the farm level. These expenses amount to Rs 17 per 40 kgs in Punjab and Rs 15.32 in Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 50 for rice paddy in Punjab and Sindh, and for wheat and oilseeds, Rs 38 in Punjab and Rs 42 in Sindh.
6. Gross income = (Yield per acre multiplied by price of principal produce at farm gate) plus (value of by-products per acre).
7. Cost of purchased inputs = Cost incurred on seed and related items, fertilizer, supplementary irrigation including labour, canal water rate, pesticides and Weedicides.

8. Gross margin = Gross income minus cost of purchased inputs.
9. Net income = Gross income minus gross cost.
10. Output-input ratio = Gross income divided by gross cost
11. Revenue per rupee of purchased inputs cost = Gross income divided by cost of purchased inputs
12. Revenue per crop day = Gross income divided by crop duration in days.
13. Revenue per acre-inch of water used = Gross income divided by irrigation water used in acre inches

		ANNEX-VII	
EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB (KARACHI) PRICE			
S.No	Item	During June, 2019	
		Basmati	IRRI-6
		--- US \$ Per Tonne---	
1.	Average fob (Karachi) prices of rice		
	US\$ per tonne	850.81	402.53
	Current exchange rate (Rs per US\$)	156.30	156.30
	Pak Rupees per tonne	132982	62915
		----- Rs per 40 kgs -----	
		5319	2517
2.	Expenses from sheller/ market to export point	175	100
3.	Producer area market level price of rice (item 1-item 2)	5144	2417
4.	Product recoveries per 100 kgs of paddy	.....Kgs.....	
	i) Rice	48.0	58.00
	ii) Brokens	5.0	5.0
	iii) Tips	3.5	2.5
	iv) Bran powder	8.8	25.0
	v) Husk	25.0	5.0
5.	Prices of products	----- Rs per 40 kgs -----	
	i) Rice as calculated in item 3	5144	2417
	ii) Brokens	3087	1692
	iii) Tips	1000	1000
	iv) Bran powder	800	800
	v) Husk	250	252
6.	Value of products recoverable from 100 kgs paddy	-----Rupees -----	
	i) Rice as calculated in item 3	6173	3504
	ii) Brokens	386	211
	iii) Tips	88	63
	iv) Bran powder	70	50
	v) Husk	55	158
	VI) Total value of all products	6771	3986
7.	Husking/Processing /financial per 100 kgs	300	300
8.	Mill-gate price of paddy per 100 kgs	6471	3686
9.	Mill-gate price of paddy per 40 kgs	2588	1474
Sources:			
1	Federal Bureau of Statistics, Karachi.		
2	Rice Exporters/Millers for incidental charges.		

		ANNEX-VIII	
EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB (KARACHI) PRICE			
S.No		During 2018-19	
		Basmati	IRRI-6
		----- US \$ Per Tonne ---	
1.	Average fob (Karachi) prices of rice		
	US\$ per tonne	955.87	416.26
	Current exchange rate (Rs per US\$)	156.30	156.30
	Pak Rupees per tonne	149402	65061
		----- Rs per 40 kgs -----	
		5976	2602
2.	Expenses from sheller/ market to export point	175	100
3.	Producer area market level price of rice (item 1-item 2)	5801	2502
4.	Product recoveries per 100 kgs of paddy	.....Kgs.....	
	i) Rice	48.0	58.00
	ii) Brokens	5.0	5.0
	iii) Tips	3.5	2.5
	iv) Bran powder	8.8	25.0
	v) Husk	25.0	5.0
5.	Prices of products	-----Rs per 40 kgs-----	
	i) Rice as calculated in item 3	5801	2502
	ii) Brokens	3481	1752
	iii) Tips	1000	1000
	iv) Bran powder	800	800
	v) Husk	250	252
6.	Value of products recoverable from 100 kgs paddy	----Rupees ----	
	i) Rice as calculated in item 3	6961	3629
	ii) Broken (a)	435	219
	iii) Tips	88	63
	iv) Bran powder (b)	70	50
	v) Husk and dust	55	158
	vi) Total value of all products	7609	4118
7.	Husking/Processing /financial per 100 kgs	300	300
8.	Mill-gate price of paddy per 100 kgs	7309	3818
9.	Mill-gate price of paddy per 40 kgs	2923	1527
Sources:			
	, - Federal Bureau of Statistics, Karachi.		
	, - Rice Exporters/Millers for incidental charges.		

		ANNEX-IX	
EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB KARACHI PRICE			
S.No		During 2016-17 to 2018-19	
		Basmati	IRRI-6
		----- US \$ Per Tonne -----	
1.	Average fob (Karachi) prices of rice US\$ per tonne	994.79	405.45
	Current exchange rate (Rs per US\$)	156.30	156.30
	Pak Rupees per tonne	155486	63372
		----- Rs per 40 kgs -----	
		6219	2535
2.	Expenses from sheller/ market to export point	175	100
3.	Producer area market level price of rice (item 1-item 2)	6044	2435
4.	Product recoveries per 100 kgs of paddy	.....Kgs.....	
	i) Rice	48.0	58.00
	ii) Brokens	5.0	5.0
	iii) Tips	3.5	2.5
	iv) Bran powder	8.8	25.0
	v) Husk	25.0	5.0
5.	Prices of products	-----Rs per 40 kgs-----	
	i) Rice as calculated in item 3	6044	2435
	ii) Brokens	3627	1704
	iii) Tips	1000	1000
	iv) Bran powder	800	800
	v) Husk	250	252
6.	Value of products recoverable from 100 kgs paddy	-----Rupees -----	
	i) Rice as calculated in item 3	7253	3531
	ii) Broken (a)	453	213
	iii) Tips	88	63
	iv) Bran powder (b)	70	50
	v) Husk and dust	55	158
	vi) Total value of all products	7919	4014
7.	Husking/Processing /financial per 100 kgs	300	300
8.	Mill-gate price of paddy per 100 kgs	7619	3714
9.	Mill-gate price of paddy per 40 kgs	3048	1485
Sources:			
	1. Federal Bureau of Statistics, Karachi.		
	2. Rice Exporters/Millers for incidental charges.		

ANNEX-X										
ECONOMIC EFFICIENCY OF RESOURCE USE IN BASMATI (PADDY) IN PUNJAB										
(AVERAGE FARMER CATEGORY)										
Item	2014-15		2015-16		2016-17		2017-18		2018-19	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME										
1. Yield(40 kgs/acre)	26	22.33	26	22.33	30	30.00	30	30.00	34	34
2. Price(Rs/40 kgs)	1326	2191	858	2052	1200	2043	1623	2982	1834	2873
NPC		0.61		0.42		0.59		0.54		0.64
3. Income from paddy	34907	48925	22578	45821	36000	61290	48690	89460	62494	97897
4. Value of straw	7000	7000	7000	7000	7000	7000	7000	7000	6000	6000
5. Gross Income	41907	55925	29578	52821	43000	68290	55690	96460	68494	103897
B. GROSS COSTS										
I. Traded Inputs										
i. Seed	1396	1159	1450	1204	1574	1306	1574	1306	1500	1245
ii. Fertilizer	4899	4067	5025	5427	4321	4667	4321	4667	8559	7104
iii. Plant protection	693	645	745	745	468	468	481	481	1502	1502
iv. Machinery:										
Tractor	4675	3880	4675	3880	4250	3528	3368	2795	6222	5164
Tubewell	8238	6837	8238	10132	5617	6909	5617	6909	7875	9686
Sub-total	19902	16588	20133	21389	16230	16877	15361	16158	25658	24701
II. Domestic Factors										
1. Hired Labour										
1.1 Pre -Harvest	7346	7346	7362	7362	8588	8588	9290	9290	11601	11601
1.2 Harvesting & threshing	4944	4944	2960	2960	2800	2800	2800	2800	2816	2816
2. Working Capital (Mark-up)	2052	2052	2071	2071	1742	1742	1730	1730	2843	2843
3. Farm yard manure	115	115	125	125	87	87	87	87	436	436
4. FYM Transportation										
5. Canal water	96	383	96	383	96	383	96	383	96	383
6. Management charges	1090	1090	1131	1131	1563	1563	1563	1563	1719	1719
7. Land Rent (For 6 month)	11000	11000	11500	11500	11500	11500	11500	11500	15000	15000
8. Land Revenue	5	5	5	5	5	5	5	5	5	5
9. Land Tax	66	0	66	0	66	0	66	0	66	0
Total Domestic Cost (II.1..II.8)	26714	26936	25316	25537	26447	26668	27137	27358	34580	34802
Gross cost	46616		45449		42676		42498	43517	60238	59503
Export parity (mill gate) price based on single year	2236		2102		2093		3032		2923	
Transport charges from farm to mill gate (Rs./ 40 Kg)	45		50		50		50		50	
Price received by the grower (social price/. 40 Kgs)	2191		2052		2043		2982		2873	
Notes:										
Pvt cost of fertilizer obtained by reducing the 2014-15 cost by 25 % as DAP price was reduced by the govt in Fed. Budget 2016-17 from Rs. 3574 to 2500 and UREA from Rs 1854 to Rs 1400/bag. These two items reduced fertilizer expenditure by 25%.										
Social cost of tractor use obtained by reducing pvt cost of diesel by 11%										
Social cost of t.well water obtained by reducing pvt cost by 40% due to 40% decrease in electricity unit rate for agri. T. wells										

ANNEX-XI

**GROSS REVENUE PER ACRE, TRADED INPUTS COST AND DOMESTIC
FACTOR COST ESTIMATED FOR PUNJAB ON THE BASIS OF EXPORT
PARITY PRICES**

Description	Revenues	inputs cost	factor cost	Profits
	----- Rupees per acre -----			
2014-15				
Private Prices	41907	19902	26714	-4709
Social Prices	55925	16588	26936	12402
Transfers	-14018	3314	-221	-17111
2015-16				
Private Prices	29578	20133	25316	-15870
Social Prices	52821	21389	25537	5896
Transfers	-23243	-1255	-221	-21766
2016-17				
Private Prices	43000	16230	26447	324
Social Prices	68290	16877	26668	24745
Transfers	-25290	-647	-221	-24421
2017-18				
Private Prices	55690	15361	27137	13192
Social Prices	96460	16158	27358	52943
Transfers	-40770	-797	-221	-39751
2018-19				
Private Prices	68494	25658	34580	8255
Social Prices	103897	24701	34802	44394
Transfers	-35404	957	-221	-36139

ANNEX-XIII										
ECONOMIC EFFICIENCY OF RESOURCE USE IN IRRI (PADDY) IN SINDH (AVERAGE FARMERS)										
Item	2013-14		2014-15		2015-16		2016-17		2017-18	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME										
1. Yield(40 kgs/acre)	50	50.10	50	50.10	55	55.00	55	55.00	50	50.00
2. Price(Rs/40 kgs)	847	703	718	554	832	506	897	739	1121	835
NPC		1.20		1.30		1.64		1.21		1.34
3. Income from paddy	42435	35220	35972	27755	45760	27830	49335	40645	56050	41750
4. Value of straw	1500	1500	1500	1500	1500	1500	1500	1500	3700	3700
5. Gross Income	43935	36720	37472	29255	47260	29330	50835	42145	59750	45450
B. GROSS COSTS										
I. Traded Inputs										
i. Seed	1875	1556	1950	1619	2000	1660	2000	1660	2500	2075
ii. Fertilizer	5856	4861	6012	6493	4293	4636	4293	4636	6592	7119
iii. Plant protection	444	368	480	480	331	331	341	341	1314	1314
iv. Machinery:										
Tractor	6078	5044	6078	5044	3751	3113	3709	3078	4144	3439
Tubewell	352	292	352	433	352	433	352	433	388	477
Sub-total	14605	12122	14872	14069	10727	10174	10695	10149	14938	14425
II. Domestic Factors										
1. Hired Labour										
1.1 Pre -Harvest	7518	7518	7524	7524	7444	7444	7437	7437	8774	8043
1.2 Harvesting & threshing	3914	3914	3446	3446	3200	3200	3200	3200	2000	2000
2. Working Capital (Mark-up)	1660	1660	1681	1681	1273	1273	1270	1270	1696	1696
3. Farm yard manure	15	15	18	18	10	10	10	10	417	417
4. Transportation	0	0	0	0	0	0	0	0	0	0
5. Canal water	89	355	89	355	96	383	96	383	96	383
6. Management charges	1090	1090	1131	1131	1563	1563	1563	1563	1563	1563
7. Land Rent (For 6 month)	9000	9000	9250	9250	10000	10000	10000	10000	12500	12500
8. Land Revenue	5	5	5	5	5	5	5	5	5	5
9. Land Tax	100	0	100	0	100	0	100	0	66	0
10. Drainage Cess	12		12		12		12		12	
Total Domestic Cost (II.1..II.8)	23404	23558	23255	23409	23702	23877	23693	23868	27128	26606
Gross cost	38009		38127		34429		34388		42066	
Export parity based on single year	748.0		604.0		556.0		789.0		885.0	
Transport charges	45.0		50.0		50.0		50.0		50.0	
Development charges										
Price received by the producer	703		554		506		739		835	

ANNEX-XIV				
GROSS REVENUE PER ACRE, TRADED INPUTS COST AND DOMESTIC FACTOR COST ESTIMATED FOR SINDH ON THE BASIS OF EXPORT PARITY PRICE OF RICE				
Description	Revenues	Inputs cost	Factor cost	Profits
----- Rupees per acre -----				
2014-15				
Private Prices	43935	14605	23404	5926
Social Prices	36720	12122	23558	1040
Transfers	7214	2483	-154	4886
2015-16				
Private Prices	37472	14872	23255	-655
Social Prices	29255	14069	23409	-8223
Transfers	8216	803	-154	7568
2016-17				
Private Prices	47260	10727	23702	12831
Social Prices	29330	10174	23877	-4721
Transfers	17930	553	-175	17552
2017-18				
Private Prices	50835	10695	23693	16447
Social Prices	42145	10149	23868	8128
Transfers	8690	546	-175	8319
2018-19				
Private Prices	59750	14938	27128	17684
Social Prices	45450	14425	26606	4419
Transfers	14300	513	522	13265

**YIELD PER HECTARE OF MAJOR RICE PRODUCING COUNTRIES
IN THE WORLD: 2018 CROP**

S.No.	Name of Country	Yield	S.No.	Name of Country	Yield
		Kgs/hect			Kgs/hect
1	Australia	6924	30	Mauritania	3541
2	Egypt	5884	31	Nicaragua	3511
3	United States of America	5747	32	Romania	3503
4	Uruguay	5667	33	Uzbekistan	3498
5	Peru	5416	34	Colombia	3482
6	Turkey	5216	35	Indonesia	3457
7	Morocco	5194	36	Iraq	3298
8	Spain	5131	37	Belize	3281
9	Tajikistan	5099	38	Runion	3269
10	Greece	4892	39	Suriname	3247
11	China, Taiwan Province of	4788	40	Somalia	3245
12	Republic of Korea	4695	41	Kazakhstan	3173
13	China, mainland	4684	42	Bangladesh	3158
14	Argentina	4602	43	Costa Rica	3031
15	Japan	4412	44	Ecuador	3017
16	Italy	4392	45	Democratic People's Republic of Korea	2955
17	Chile	4354	46	Senegal	2920
18	El Salvador	4265	47	Madagascar	2895
19	Paraguay	4200	48	Bhutan	2859
20	Mexico	4190	49	Kenya	2833
21	Brazil	4187	50	Lao People's Democratic Republic	2818
22	North Macedonia	4083	51	Venezuela (Bolivarian Republic of)	2770
23	Viet Nam	3879	52	Malaysia	2718
24	Guyana	3846	53	Honduras	2688
25	Bulgaria	3842	54	Philippines	2648
26	Russian Federation	3841	55	Hungary	2641
27	Ukraine	3662	56	India	2585
28	France	3652	57	Pakistan	2563
29	Portugal	3649		World Avg.	3108

Source:

FAOStat. World Statistics Year Book 2018.

Rice production has worked out from paddy production assuming rice

Note: (paddy)ratio is 2/3

Annex- XVI									
AVAILABILITY OF CERTIFIED SEED OF RICE PADDY: 2011-12 TO 2016-17									
Year	Province	Area			Seed requirement at		Total Seed available	Availability of seed	
		Basmati	Irri+Others	Total	Gross	Replacement @ 20 %		Gross requirement	Replacement requirement
		----- 000 hect -----			----- tonnes -----		(per cent)		
2013-14	Punjab	1192.6	616.3	1808.9	29718.7	5943.7	35247.0	118.6	593.0
	Sindh	0.0	745.5	745.5	18637.5	3727.5	9726.0	52.2	260.9
	KPK	0.0	55.3	55.3	1382.5	276.5	73.0	5.3	26.4
	Balochistan	0.0	179.5	179.5	4487.5	897.5	1000.0	22.3	111.4
	Total	1192.6	1596.6	2789.2	54226.2	10845.2	46046.0	84.9	424.6
2014-15	Punjab	1320.0	557.7	1877.7	29782.5	5956.5	38323.0	128.7	643.4
	Sindh	0.0	781.5	781.5	19537.5	3907.5	7044.0	36.1	180.3
	KPK	0.0	56.9	56.9	1422.5	284.5	234.0	16.4	82.2
	Balochistan	0.0	174.3	174.3	4357.5	871.5	2627.0	60.3	301.4
	Total	1320.0	1570.4	2890.4	55100.0	11020.0	48228.0	87.5	437.6
2015-16	Punjab	1254.1	526.1	1780.2	28201.7	5640.3	37253.5	132.1	660.5
	Sindh	0.0	719.8	719.8	17994.3	3598.9	6847.9	38.1	190.3
	KPK	0.0	64.7	64.7	1617.5	323.5	171.2	10.6	52.9
	Balochistan	0.0	174.8	174.8	4370.0	874.0	2046.0	46.8	234.1
	Total	1254.1	1485.4	2739.5	52183.5	10436.7	46318.6	88.8	443.8
2016-17	Punjab	1352.8	383.7	1736.5	25826.1	5165.2	44468.5	172.2	860.9
	Sindh	0.0	750.5	750.5	18763.0	3752.6	7042.8	37.5	187.7
	KPK	0.0	67.0	67.0	1675.0	335.0	23.2	1.4	6.9
	Balochistan	0.0	170.0	170.0	4250.0	850.0	0.0	0.0	0.0
	Total	1352.8	1371.2	2724.0	50514.1	10102.8	51534.6	102.0	510.1
2017-18	Punjab	1416.4	424.5	1840.9	27609.3	5521.9	44468.5	161.1	805.3
	Sindh	0.0	828.3	828.3	20707.5	4141.5	7042.8	34.0	170.1
	KPK	0.0	61.6	61.6	1540.0	308.0	67.0	4.4	21.8
	Balochistan	0.0	169.8	169.8	4245.0	849.0	0.0	0.0	0.0
	Total	1416.4	1484.2	2900.6	54101.8	10820.4	51578.3	95.3	476.7
2018-19	Punjab	1494.1	429.7	1923.8	28671.7	5734.3	59058.0	206.0	1029.9
	Sindh	0.0	690.2	690.2	17255.0	3451.0	6486.4	37.6	188.0
	KPK	0.0	62.3	62.3	1557.5	311.5	33.3	2.1	10.7
	Balochistan	0.0	153.5	153.5	3837.5	767.5	0.0	0.0	0.0
	Total	1494.1	1335.7	2829.8	51321.7	10264.3	65577.7	127.8	638.9
Notes:									
The area under rice for the Punjab province represents area under basmati, IRRI and Others varieties while that of Sindh represents the area under IRRI and 'Other varieties'. For KPK and Balochistan total area under rice represents 'Othrs' and IRRI varieties, respectively.									
The seed requirement has been worked by using the seed rate of 12 kgs per hectare for basmati and 25 kgs per hectare for IRRI and 'others' varieties.									
Sources:									
For Area:		Annex-I							
For Seed:		FSC&RD, Islamabad							