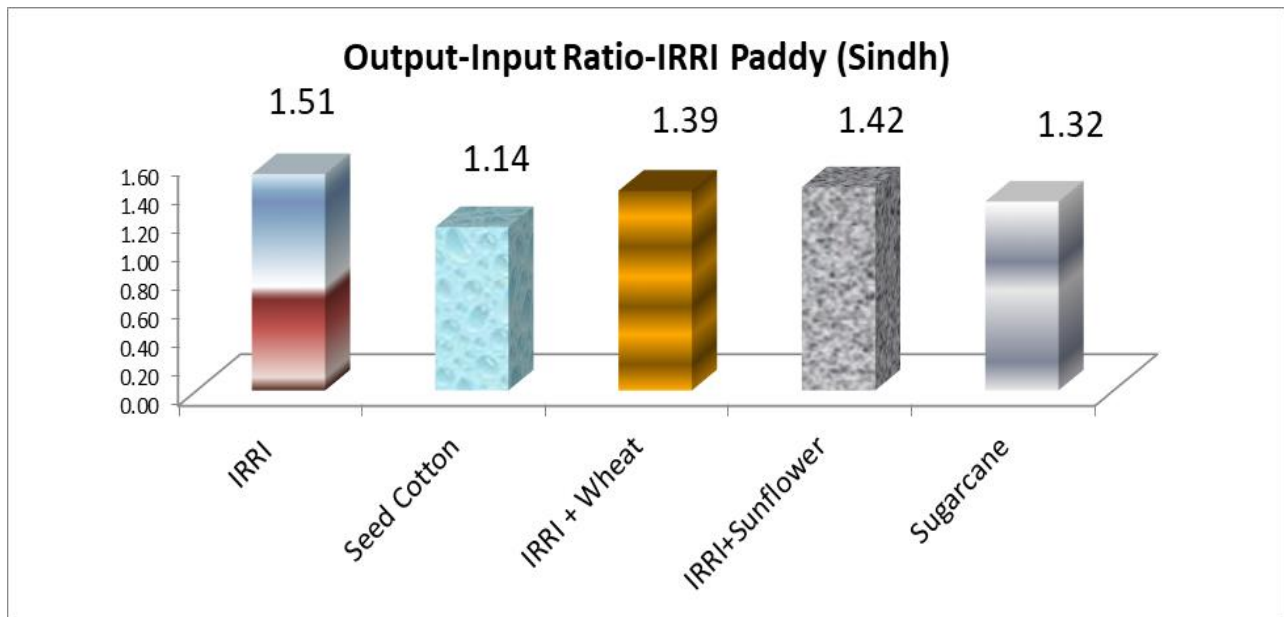




RICE PADDY POLICY ANALYSIS FOR 2021-22 CROP



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RESEARCH
GOVERNMENT OF PAKISTAN
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Preface

The fundamental objective of this report is to provide information on various economic aspects of the rice crop. In this context for dynamic agricultural cost and price environment, price policy is increasingly becoming concern with anticipating future movements in agricultural production and prices and facilitating the adjustment process to those movements.

The Principal product of this institute is the economic analysis, which culminates in the recommendations to the Government with respect to minimum support price and other relevant aspects of price policy. These reports, in general, and this report, in particular, is the product of substantial background study; compilation of cost of production, widespread enquiry into markets, both at home and abroad; detailed analysis of international price data; technical studies (NPC, EPC, DRC); interviews of the farmers, including field visits; and consideration of a large number of non-price factors.

We as API, collectively owe thanks to all the committee members and participants of the various meetings, for their valuable discussion and input, Federal and Provincial Governments for sharing of information, without all that it would have not been possible to complete.

API greatly appreciates feedback and suggestions ranging from policy makers to planners, academia, researches, student community, grower's/farmers associations, chambers of agriculture, traders etc. We are looking forward for a continued partnership in the formulation of price policy analysis and producing effective and applicable reports akin to agriculture and food security.

(Abdul Karim)

Director General

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ACRONYMS AND ABBREVIATIONS

API	Agriculture Policy Institute
BMR	Balancing Modernization Replacement
COP	Cost of Production
CPI	Consumer Price Index
DR	Dokri Research
DRC	Domestic Resource Cost
E&M	Economics and Marketing
ECC	Economic Coordination Committee of the Cabinet
EPC	Effective Protection Coefficient
FAO	Food and Agriculture Organization
FAQ	Fair Average Quality
FCA	Federal Committee on Agriculture
FOB	Free on Board
FMI	Farm Machinery Institute
FSC&RD	Federal Seed Certification and Registration Department
FYM	Farm Yard Manure
GAP	Good Agriculture Practices
GST	General Sales Tax
IPM	Integrated Pest Management
IRRI	International Rice Research Institute
KS	Kala Shah Kaku
NFS&R	M/o National Food Security and Research
NARC	National Agricultural Research Centre
NIAB	Nuclear Institute for Agriculture and Biology
NPC	Nominal Protection Coefficient
PARC	Pakistan Agricultural Research Council
PASSCO	Pakistan Agricultural Storage and Services Corporation
PBS	Pakistan Bureau of Statistics
PSC	Punjab Seed Corporation
RRI	Rice Research Institute
SSC	Sindh Seed Corporation
WBPH	White Back Plant Hopper
WTO	World Trade Organization
CIS	Common Wealth of Independent States

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SUMMARY OF FINDINGS AND RECOMMENDATIONS

Findings

1. Area and Production

- Rice production at the country level during the decade ending 2020-21 has grown @ 4.2% per annum owing to 2.8% expansion in area and 1.4% improvement in yield.
- At the country level production of rice from 2020-21 crop is estimated at 8.419 million tonnes which is higher by 13.6% against the 2019-20 production (7.414 million tonnes). In Punjab, production in 2020-21 increased by 27.9% which mainly happened due to 18.0% increase in area of the crop.
- In Sindh production of rice from 2020-21 crop declined by 6.2% primarily due to 8.6% decrease in area of the crop.
- Shares of the Punjab, Sindh and Khyber Pakhtunkhwa in production of 'other' varieties of rice during the period 2018-19 to 2020-21 stood at 26.7%, 67.5% and 5.8% respectively. Share of Basmati, IRRI and Others in overall rice production are 44.3, 20.2 and 35.5 per cent.

2. Domestic Prices

- Monthly average wholesale market prices of basmati paddy in Punjab during the post-harvest season of 2020-21 ranged between Rs. 1844 and Rs. 2104/ 40 Kg.
- Monthly average wholesale market prices of Kainat paddy in Punjab during the post-harvest season of 2020-21 ranged between Rs. 1858 and Rs. 2399/ 40 Kg.
- In Sindh, monthly average wholesale market prices of IRRI paddy in major rice producing area markets ranged between 1357 and Rs. 1633/ 40 Kg.

3. Cost of Production

- Net cost of cultivation of basmati paddy in Punjab for 2021-22 crop (inclusive land rent) is estimated at Rs. 65016 per acre. Based on this estimate cost per 40 Kg at the market level approximates to Rs. 1918.
- Net cost of cultivation of IRRI paddy in Punjab for 2021-22 crop (inclusive land rent) is estimated at Rs 63847 per acre. Based on this estimate cost per 40 kgs at the market level approximates to Rs 1337.
- The cost of cultivation of IRRI paddy in Sindh for 2021-22 crop is estimated at Rs. 57322 per acre. Adding to this Rs 60/40 Kg as marketing cost, market level cost of production of IRRI paddy in Sindh comes to Rs. 1102 per 40 kgs.

4. Economics of Rice Paddy 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.
- Basmati's performance in Punjab in terms of returns to overall investment has been slightly lower than seed cotton. However, in terms of crop duration Basmati has performed better than seed cotton. 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, except crop duration.
- In Sindh, IRRI paddy farming has shown slightly better results in terms of returns to overall investment against seed cotton. 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.

5. Real Prices

- Nominal market price of basmati paddy decreased by 8.0% in 2020-21 against the previous year.
- In real terms, the real market price of basmati paddy in the Punjab exceeded the base year price during the period between 2015-16 and 2019-20.

- The nominal market price of IRRI paddy in Sindh during the post-harvest season of 2015-16 has increased to in 2020-21, indicating overall increase of 76.57 per cent. It also exceeded the base year real market price whole time during the reference period.

6. World Situation

- World production of rice in 2021-22 projected stood at 511 million tonnes which is 1.2% higher than the previous year 2020-21 estimated production (505 Mill. Tonnes).
- World rice trade during 2020-21 is reported at 46 million tonnes which is higher than the 2019-20 and projected to 47 million tonnes in 2021-22.
- Global trade in rice reported at 46 million tonnes in 2020-21 is projected to increase to 47 million tonnes in 2021-22.
- According to 2019 data, Pakistan lies at number 10th in terms of area under rice varieties and in terms of production in the world. But in yield, Pakistan is far behind other rice producing countries and holds 61th position in the world.
- In terms of global production of rice, China (main land) is on the top with 139.74 million tonnes followed by India with 118.43 million tonnes and Indonesia with 36.40 million tonnes.
- In terms of yield, Australia lies at the top with 5847 kg/ha, followed by Tajikistan with 5725 and USA+Egypt with 5582 kg/hect while Pakistan has 2442 kg/hectare.

7. Export Parity Prices

- During 2020-21 the average FOB Karachi price of basmati rice is reported at US\$ 915.09 per tonne. On the basis of these prices export parity price of basmati paddy in the domestic market of Pakistan approximates to Rs 2923 per 40 kg.
- Average FOB Karachi price of IRRI rice during the referred period is at US\$ 478.61 per tonne. The equivalent export parity price of IRRI paddy in the domestic market estimates Rs. 1849 per 40 kg.

8. Economic Efficiency

- Economic efficiency of resources used in rice production has been evaluated by estimating Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost (DRC).
- Basmati growers in Pakistan are implicitly taxed as NPC estimates have been less than one during the period 2016-17 through 2020-21. Similarly, EPC value for basmati paddy in Punjab also remained less than one during the referred period.

- In case of IRRI rice in Sindh, NPCs and EPCs both of last three years (2018-19 and 2020-21) also remained less than one showing some implicit taxed to the IRRI growers in Sindh.
- DRC indicates the opportunity cost of domestic resource used in the production of a commodity. The DRC less than one indicate a commodity system having comparative advantage and vice versa.
- DRCs for basmati rice have been less than one during the period under review implying that Pakistan has comparative advantage in basmati production.
- DRCs for IRRI paddy in Sindh remained less than one during the period under review (2016-17 exception), indicating comparative advantage for Sindh in IRRI rice for export.

10. Policy Options

- Based on the analysis of relevant factors covered in the main text of this Report, likely indicative price policy options for rice paddy 2021-22 crop are presented below:

Basis		Worked back price of Rice paddy at mill-gate (Rs./40 Kg)
A.	Export parity prices based on actual Fob (Karachi) prices of Pakistani basmati and IRRI rice:	
	i) Basmati	
	▪ June, 2021	2819
	▪ 2020-21	2923
B.	ii) IRRI	
	▪ June, 2021	1827
	▪ 2020-21	1849
B.	Domestic market price of rice paddy during Nov-Dec 2020-21	
	i) Basmati Punjab	2015
	ii) IRRI-6 Sindh	1519
C.	Cost of production at market level for 2021-22 Crop	
	i) Basmati (Punjab)	1875
	i) IRRI (Sindh)	1102

Recommendations

In view of the economic 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 carried out for paddy 2021-22 crop policy by the API. The following suggestions are advanced:

a. Indicative price of rice paddy for 2021-22 crop

- In view of increase in cost of production of paddy, it is suggested that the government may consider announcement of indicative price of Basmati and IRRI paddy with a reasonable profit margin to sustain the crop.
- Minimize the prices of pesticides by withdrawing GST.
- API suggests to give subsidy on fertilizer 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 the 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 irrigation.
- 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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Director General

RICE POLICY ANALYSIS FOR 2021-22 CROP

INTRODUCTION

Rice plays an important role in Pakistan's agrarian economy. It is second staple food of the country. It also makes significant contribution in the foreign exchange earnings of the country. Rice industry is an important source of employment and income for rural people.

2. Rice accounts for 3.5% of the value added in agriculture and 0.7% of GDP (Economic Survey 2020-21). Area under rice during 2020-21 was 3.336 million hectares. Rice production in the country consists of Basmati, IRRI and 'Other' varieties. All these cumulatively turned out 8.419 million tonnes during 2020-21.

3. Rice is cultivated in all of the four provinces at varying levels of production. Basmati is long grain aromatic variety mainly produced in Punjab while Sindh leads in coarse (IRRI) varieties. The crop also provides feed for livestock in the form of rice straw and husk. It is also used as a raw material in the manufacturing industry.

4. Rice production was at its lowest ebb (4.823 Mill. Tonne) during 2010-11. Since 2010-11 onward, rice production has increased in a fluctuating manner and stood at 8.419 million tonnes in 2020-21. During 2020-21, rice was cultivated on an area of 3336 thousand hectares, 9.9% higher than the last year's area of 3034 thousand hectares. Country production stood at 8419.3 thousand tonnes against the target of 7990.0 thousand tonnes, showing an excess of 5.4% against the target. Thus 2020-21 production was slightly higher than the 2019-20 production by 13.6%. This production turnover happened mainly due to increase in area and yield by 9.9% and 3.3%, respectively.

5. There is a dire need to protect Pakistani rice exports and invest in research, pest eradication, storage, improvement in yield, develop international demanded varieties and have to keep it up by having GAP (Good Agriculture Practice) certification at farm level. The efforts should be made that our rice markets remain intact.

6. This report covers different aspects of the paddy extending from production to export. Necessary quantitative analysis is conducted on each aspect to draw important implications for making price policy suggestions for the 2021-22 crop.

7. Section-1 'Introduction' is preceded by summary of findings and recommendations. Section-2 gives sowing and transplanting time of rice (paddy) in Pakistan. Performance of the 2020-21 crop is reviewed in Section-3 while Section-4 is on domestic demand, supply and price situation of rice which is followed by Section-5 presenting cost of production of rice (paddy) for 2021-22 crop. Section-6 of the report is on economics of rice (paddy) and competing crops. Paddy prices in real/ nominal terms are analyzed in Section-7. It covers prices for both basmati and IRRI varieties. Section-8 deals with world supply, demand, stocks, trade and international prices of milled rice. Analysis regarding rice export from Pakistan during 2019-20 is presented in Section-9 of the report. Section-10 is assigned to

analyze and describe economic efficiency in rice production in Pakistan. Section-11 gives rice yield among competing countries. Yield potential of domestic varieties of rice is assessed in Section-12. Next Section-13 casts on availability of improved seed of rice (paddy) during 2019-20 and last section-14 is attributed to acknowledgements.

2. SOWING AND TRANSPLANTING TIME OF RICE PADDY

8. Rice crop in Pakistan is mostly sown by transplanting of seedlings raised in nurseries. Direct seeding is also practiced but on a limited scale. Sowing time of nurseries and transplanting differ by variety and region. The recommended sowing time of nurseries and their transplanting in various regions are given in Table-1.

Table-1: Sowing Times of Rice Crop in Pakistan

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

Sources:

- For Punjab: Rice Research Institute, Kala Shah Kaku
- For Sindh: Rice Research Institute, Dokri, Sindh
- For KPK and Balochistan: Rice Coordinator, NARC, Islamabad

3. REVIEW OF 2020-21 CROP

3.1 Provincial Shares in Area and Production of Rice (Paddy)

9. During the period (2018-19 to 2020-21), average annual production of rice worked out at 7.678 million tonnes from average area of 3.060 million hectares (7.561 million acres), (Table-2). Variety-wise break-up of rice production (Table-2) shows that Punjab having best suited agro climatic conditions in production of basmati rice is the sole producer of basmati rice in the country. In total production of IRRI rice; Punjab, Sindh, and Balochistan contributed 22.2, 43.9 and 33.9 percent respectively. In 'Other' varieties category, shares of Punjab, Sindh and KPK are 26.7, 67.6 and 5.8 percent respectively.

10. Provincial shares of Punjab, Sindh, KPK and Balochistan in area under rice crop are 68.9, 23.7, 2.1 and 5.3 percent respectively. Basmati accounts for 54.5 percent while IRRI and 'Others' varieties carried 17.8 and 27.7 percent of the total area.

Table-2: Province Wise Average Share in Area and Production of Rice: 2018-19 to 2020-21 Crops

Variety	Pakistan		Punjab	Sindh	KPK	Balochistan
<u>Area (000 hectares)</u>		%	-----%-----			
Total	3059.8 (7561.3)	100.0	68.9	23.7	2.1	5.3
Basmati	1668.9 (4123.9)	54.5	100.0	-	-	-
IRRI	543.4 (1342.8)	17.8	24.4	45.9	-	29.7
Other	847.6 (2094.5)	27.7	36.3	56.1	7.6	-
<u>Production (000 tonnes)</u>		%	-----%-----			
Total	7678.3	100.0	58.3	32.8	2.0	6.8
Basmati	3403.1	44.3	100.0	-	-	-
IRRI	1550.5	20.2	22.2	43.9	-	33.9
Other	2724.7	35.5	26.7	67.6	5.8	-

Note: *Figures in parenthesis are thousand acres

Source: *Worked out from data in Annex-I

3.2 Overtime Changes in Area, Yield and Production of Rice

11. Area under rice crop during the period between 2010-11 and 2020-21 ranged between 2.309 and 3.336 million hectares (Annex-I) which in acre units ranged between 5.705 and 8.242 million acres (Annex-1A). During the same period production oscillated between 4.823 and 8.419 million tonnes (Annex-I) while yield during this period fluctuated between 2039 and 252 kg per hectare. Long and short term changes in area, yield and production of rice are discussed below:

Fig-1: VARIETAL SHARES IN PRODUCTION OF RICE: AVERAGE OF 2018-19 TO 2020-21

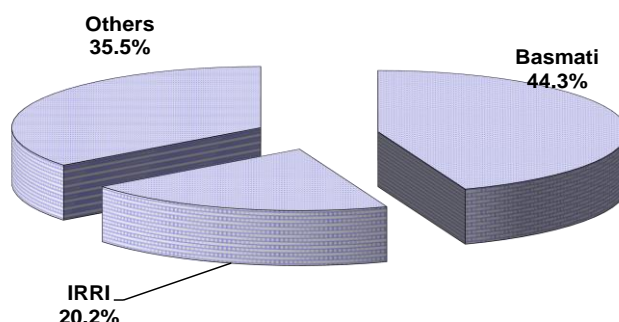
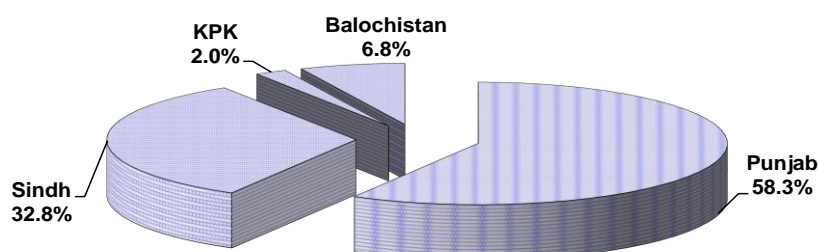


Fig-2: PROVINCIAL SHARES IN PRODUCTION OF RICE: AVERAGE OF 2018-19 TO 2020-21



3.3 Long Term Changes (Growth Rates): 2010-11 to 2020-21

12. During the decade ending 2020-21, production of rice at country level is estimated to have increased @ 4.2 percent per annum as a cumulative effect of increase in yield @ 1.4 percent and area @ 2.8 percent. These data are given in Table-3.

- Punjab

13. Annual growth of rice production in Punjab during the period 2010-11 to 2020-21 remained 3.5 percent as a result of 1.2 percent per annum increase in yield and 2.3 percent per annum in area. Production of basmati rice during the same period increased by 6.6 percent per annum mainly due to 4.5 and 2.1 percent per annum increase in area and yield respectively. Production of IRRI rice, during the reference period decreased by 4.3 percent annually, due to 4.8 percent decrease in area, however, 0.5 percent escalations in yield.

Production of varieties in 'Other' category also decreased @ 1.8 percent per annum mainly due to decrease in area @ 2.4 percent, but, 0.7 percent improvement in yield.

- **Sindh**

14. In Sindh, where only coarse rice varieties are cultivated, rice production during the period under reference is estimated to have increased @ 4.7 percent annually due to 4.9 percent growth in area despite of 0.2 percent down in yield.

Table-3: Average Annual Growth Rate of Area, Yield and Production of Rice: 2010-11 to 2020-21

Country/Province	Variety	Area	Yield	Production
		-----Per cent per annum-----		
Pakistan	All varieties	2.8	1.4	4.2
	Basmati	4.5	2.1	6.6
	IRRI	-2.7	0.1	-2.5
	Others	5.0	2.6	7.7
Punjab	All varieties	2.3	1.2	3.5
	Basmati	4.5	2.1	6.6
	IRRI	-4.8	0.5	-4.3
	Others	-2.4	0.7	-1.8
Sindh	All varieties	4.9	-0.2	4.7
	IRRI	-3.6	-2.8	-6.4
	Others	15.0	0.5	15.6
KPK	All varieties	3.6	3.7	7.4
Balochistan	All varieties	3.0	7.6	10.8

Note: The growth rates have been worked out by estimating the equation $Y=a(1+r)^x$ through Ordinary Least Squares (OLS) Method from the data given in Annex-I.

- **KPK**

15. In KPK, production of rice during the referred period increased i.e. 7.4 percent per annum due to only surge in area and yield @ 3.6 and 3.7 percent per annum respectively.

- **Baluchistan**

16. In Balochistan, rice production during the period under reference has recorded positive growth rate 10.8 percent due to also increase in area @ 3.0 percent and rise in yield @ 7.6 percent per annum.

3.4 Short Term Changes (Growth Rates): 2019-20 to 2020-21

17. According to the Final estimates, rice production estimated at 8.419 million tonnes in 2020-21 is 13.6 percent higher than last year production of 7.414 million tonnes (Table-4). The production increased mainly due to increase in area and yield by 9.9 and 3.3 percent. Changes in area, yield and production by province and by variety in 2020-21 in relation to 2019-20 are given in Table-4.

- **Punjab**

18. In Punjab, overall production of rice shows 27.9 percent increase during 2020-21 as compared with 2019-20. Rise in production occurred mainly due to 18.0 percent increase in area. Production of basmati increased by 23.8 percent due to 12.6 and 9.9 percent increase in

area and yield respectively. IRRI varieties show increase of 93.8 percent due to expansion both in area and yield by 89.4 and 2.1 percent respectively. Production of ‘Other’ rice also increased in 2020-21 by 25.4 percent due to 26.9 percent increase in area; however the yield decreased @1.4 percent.

- **Sindh**

19. In Sindh, overall production of rice decreased in 2020-21 by 6.2 percent mainly due to area decrease of 8.6 percent however, yield has increased by 2.6 percent against the last year. Production of IRRI variety increased by 13.7 percent mainly due to yield increased by 31.1 percent however the area decreased by 13.3 percent against the last year. Production of ‘Other’ rice decreased in 2020-21 by 12.2 percent over the previous year. The reason is area and yield reduction by 6.3 and 6.4 percent.

- **Baluchistan**

20. In Balochistan, where IRRI variety is grown, production in 2020-21 crop increased by 1.6 percent mainly due to increase in area by 1.8 percent although yield decreased by 0.2 percent against the last year.

Table-4: Area, Yield and Production of Rice by Variety: 2019-20 and 2020-21 Crop

Country/ Pakistan	Area		Change	Yield		Change	Production		Change
	2019-20	2020-21		2019-20	2020-21		2019-20	2020-21	
	000 hectares		%	Kgs/hectare		%	000 tonnes		%
Pakistan	3034.0	3335.5	9.9	2443.5	2524.1	3.3	7413.7	8419.3	13.6
Basmati	1662.0	1871.6	12.6	1951.9	2145.8	9.9	3244.0	4016.0	23.8
IRRI	515.6	565.4	9.7	2650.5	2961.2	11.7	1366.6	1674.4	22.5
Others	856.4	898.5	4.9	3273.0	3037.3	-7.2	2803.1	2728.9	-2.6
Punjab	2029.1	2394.4	18.0	2042.1	2213.9	8.4	4143.7	5301.0	27.9
Basmati	1662.0	1871.6	12.6	1951.9	2145.8	9.9	3244.0	4016.0	23.8
IRRI	91.1	172.5	89.4	2552.1	2606.7	2.1	232.5	449.8	93.4
Others	276.0	350.3	26.9	2417.4	2384.4	-1.4	667.2	835.3	25.2
Sindh	775.8	709.0	-8.6	3321.0	3407.9	2.6	2576.5	2416.1	-6.2
IRRI	260.3	225.7	-13.3	2301.6	3016.8	31.1	599.1	680.9	13.7
Others	515.5	483.3	-6.3	3835.7	3590.5	-6.4	1977.4	1735.2	-12.2
KPK	64.9	64.9	0.0	2442.2	2442.2	0.0	158.5	158.5	0.0
Balochistan	164.2	167.2	1.8	3258.2	3251.8	-0.2	535.0	543.7	1.6

Source: Annex-I

4 TARGETS VS ACHIEVEMENTS OF 2020-21 CROP

21. Federal Committee on Agriculture (FCA) fixed area target for 2020-21 rice crop at 2.957 million hectares and production target at 7.990 million tonnes in its meeting of October 22, 2020 held at Islamabad. So far as 2020-21 crop achievements are concerned, Provincial Agriculture Departments have reported its final estimate of area at 3.336 million hectares is higher than the respective target by 12.8 percent and production at 8.419 million tonnes that is also higher than the respective targets by 5.4 percent (Table-5).

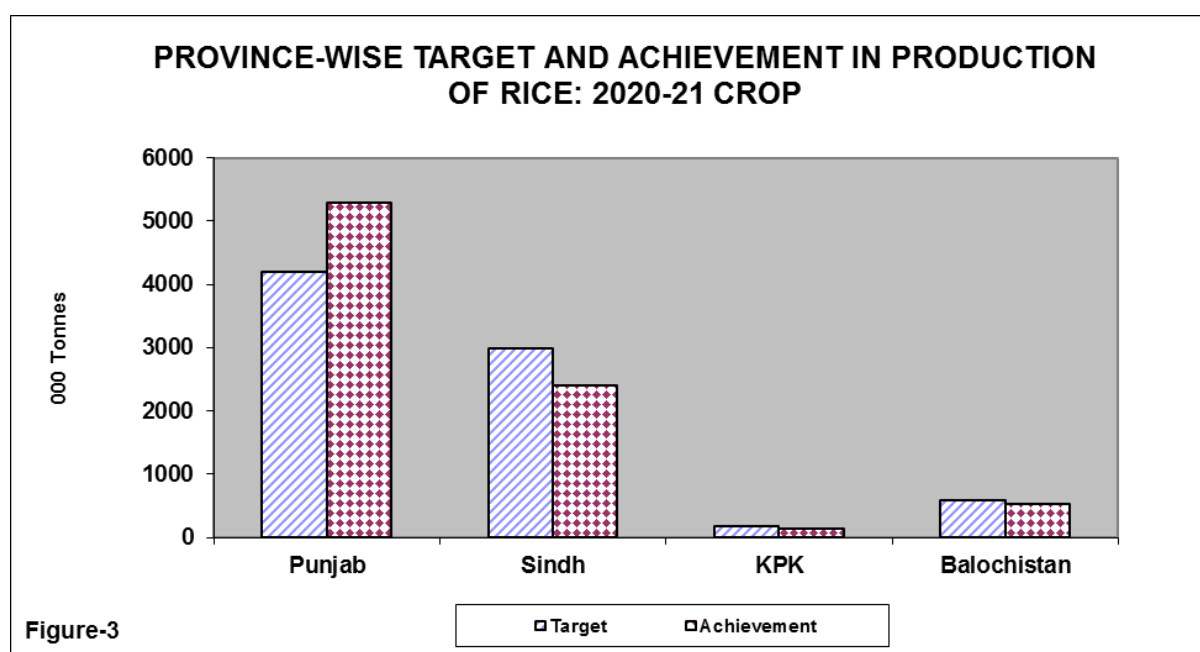
Table-5: Targets and Estimated Achievements of Area, Yield and Production of Rice: 2020-21 Crop

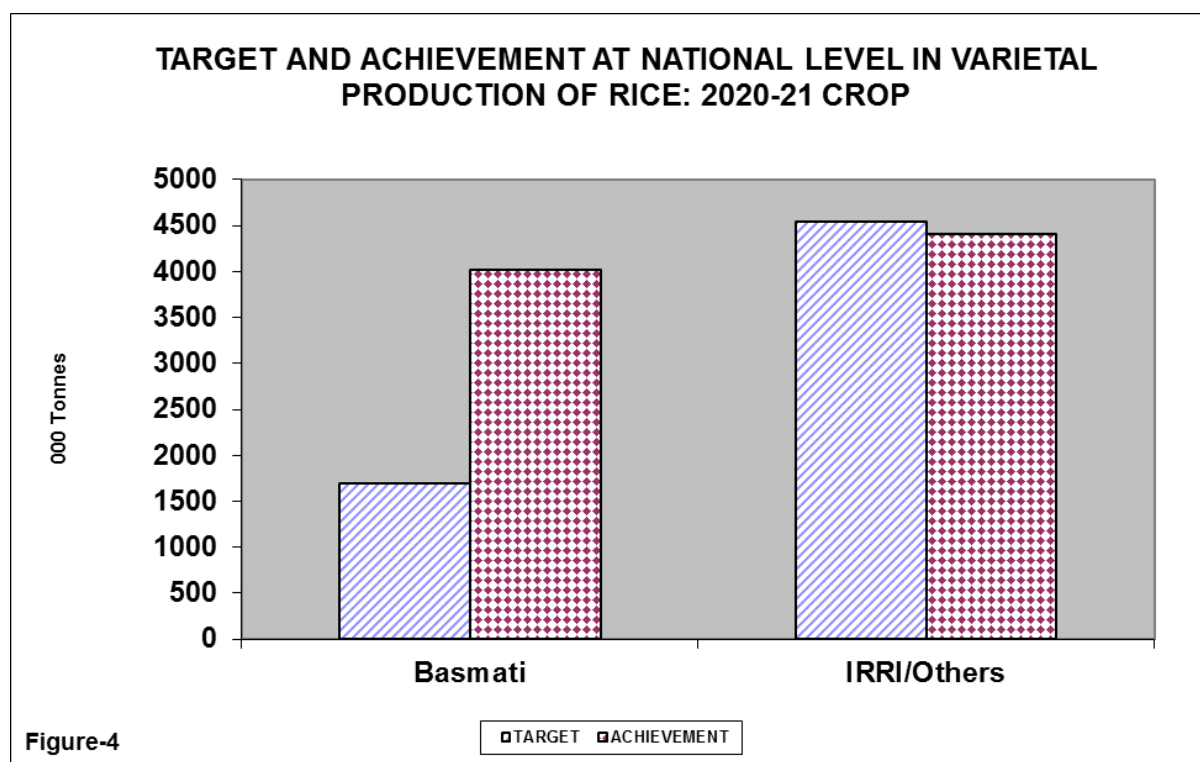
Country/ Province	Area		Deviation from target	Yield		Deviation from Target	Production		Deviation from target
	Target	Achievement		Target	Achievement		Target	Achievement	
	000 hectares		%	kgs per hectare		%	000 tonnes		%
Pakistan	2957.0	3335.5	12.8	2702.1	2524.1	-6.6	7990.0	8419.3	5.4
Punjab	1900.0	2394.4	26.0	2210.5	2213.9	0.2	4200.0	5301.0	26.2
Sindh	800.0	709.0	-11.4	3750.0	3407.9	-9.1	3000.0	2416.1	-19.5
KPK	67.0	64.9	-3.1	2835.8	2442.2	-13.9	190.0	158.5	-16.6
Baluchistan	190.0	167.2	-12.0	3157.9	3251.8	3.0	600.0	543.7	-9.4

Sources:

1. For targets: Minutes of the Federal Committee on Agriculture (FCA) Meeting held in October 22, 2020 in Islamabad
2. For achievements: Derived from Annex-I

22. Area and production targets of the 2020-21 crop by province wise presented in Table-5. In Punjab area target remained exceed by 26.0 percent, but Sindh, KPK and Baluchistan remained short by 11.4, 3.1 and 12.0 percent restrictively. Production of Punjab also remained higher than respective target by 26.2 percent; however, Sindh, KPK and Baluchistan were also less than the target by 19.5, 16.6 and 9.4 percent respectively. The Punjab and Baluchistan yield increased the target by 0.2 and 3.0 percent respectively. However, Sindh and KPK yield target could not be achieved and that were down by 9.1 and 13.9 percent respectively.





5. IMPORTANT RICE PRODUCING DISTRICTS

23. Districts based on 2018-19 to 2020-21 average production (with varietal break-up) are arranged in descending order in Annex-II. Districts producing more than 50 thousand tonnes of rice include Gujranwala, Sheikhpura, Okara, Hafizabad, Sialkot, Nankana Sahib, Jhang, Bahawalnagar, Pakpattan, Kasur, M.B. Din, Narowal, T.T. Singh, D.G. Khan, Chiniot, Vehari, Khanewal, Muzaffargarh, Faisalabad, Sahiwal, Lahore, Sargodha, Multan and Gujrat from Punjab; Badin, Larkana, Jacobabad, Shikarpur, Qamber, Kashmore, Thatta, Dadu and Tando Muhammad Khan from Sindh and Jafarabad and Nasirabad from Balochistan. These 35 districts collectively produced 94.7% of total production of rice in the country. Main basmati producing districts which contribute about 71.9% of total basmati in the country are Sheikhpura, Hafizabad, Sialkot, Okara, Nankana Sahib, Jhang, Gujranwala, Pakpattan, Bahawalnagar, Narowal, M.B. Din, and T.T. Singh, While 58.8% of total IRRI rice production is contributed by Larkana, Thatta, Qambar, Nasirabad and Jafarabad. These districts are above 100 thousand tonnes producer (Annex-III).

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

6.1 Domestic Demand and Supply of Rice

24. Rice is an important food as well as cash crop. It is the second main staple food crop after wheat and the second major exportable commodity after cotton.

25. Based on annual per capita availability of rice averaging at 14.32 kgs during the period 2017-18 to 2019-20 (Annex-III), the domestic consumption requirement in 2020-21 for population of 222.22 million has been estimated at 3187 thousand tonnes. According to second estimates the country has produced 8419 thousand tonnes rice during 2020-21 crop. After deduction of 505 thousand tons for the seed and wastage allowance @ 6 per cent of the production, the net available rice for consumption and trade comes to 7914 thousand tons, hence Pakistan has an export surplus of 4727 thousand tonnes during 2020-21.

6.2 Domestic Prices of Basmati Rice Paddy

26. During current season 2020-21, the farmers of Basmati paddy have fetched a less price as compared to last year. The wholesale prices of basmati super paddy in major markets in colar area (area designated/suitable for aromatic basmati rice) has been presented in Table-6. The price of basmati super paddy ranged between Rs 1839 per 40 kgs in Hafizabad market during November 2020 and Rs 2248 per 40 kgs in Mandi Bahudin market during December 2020. The season average prices of basmati super (paddy) in the Punjab have ranged between Rs 1844 and Rs 2104 per 40 kgs.

Table-6: Monthly Average Wholesale Prices of Basmati Super (Paddy) in Major Producer Area Markets of the Punjab: Nov-Dec,2020-21 crop

S.No	Markets	Nov	Dec	Average
		-----Rs per 40kgs-----		
1	Sheikhupura	2031	2088	2059
2	Hafizabad	1839	1850	1844
3	Nankana Sahib	1943		1943
4	Sialkot	1918	2078	1998
5	Gujranwala	2079	2072	2076
6	Narowal	1925	2243	2084
7	M.B.Din	1960	2248	2104
Average		1956	2096	2015

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

6.3 Domestic Prices of Kainat Paddy

27. The data regarding wholesale price of extra-long and pearl white kainat paddy in main producing area markets of Punjab is presented in Table-7. The price of kainat paddy has also followed the prices of basmati paddy. The price of kainat paddy ranged between Rs 1810 per 40 kgs in Chiniot market during December 2020 and Rs 2616 per 40 kgs in Pakpattan market during January 21. The season average prices of Kinat (paddy) in the Punjab have ranged between Rs 1858 and Rs 2399 per 40 kgs.

Table-7: Monthly Average Wholesale Prices of Kainat (Paddy) in Major Producer Area Markets of the Punjab: Oct 2020 to Jan 2021

S.No	Markets	Oct	Nov	Dec	Jan	Average
		-----Rs per 40kgs-----				
1	Sheikhupura	2050	2084	2029		2054
2	Hafizabad	2061	1950	1991		2001
3	Okara	-	2105	2147	2319	2190
4	Nankana Sahib	2093	2001	2052		2048
5	Sialkot	1978	1904	1865		1916
6	Pakpattan	2070	2112	2392	2616	2297
7	Chiniot	-	1906	1810		1858
8	Sargodha	-	1824	2120	2421	2122
9	Burewala	2003	1860	2186	2422	2118
10	Arifwala	-	2267	2381	2551	2399
	Average	2042	2001	2097	2466	2100

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

28. The average wholesale market prices of IRRI Paddy in Sindh are depicted in (Table-8). During the current season, the farmers have received extra ordinary price of IRRI-6 paddy. The prices have ranged between Rs 1100 to Rs 1850/ 40 kgs. Both the lowest and the highest prices were observed in Larkana market during September and November, 2020. The seasonal average during 2020-21 crop ranged between Rs 1357 to Rs 1633 per 40kgs.

Table-8: Monthly Average Wholesale Prices of IRRI-6 Paddy in Major Producer Area Markets of Sindh during October 2020 to February 2021

S.No	Markets	Sept	Oct	Nov	Dec	Jan	Feb	Average
		-----Rs per 40kgs-----						
1	Badin	1475	1475	1475	1475	1625	1625	1525
2	T. M. Khan	1450	1400	1280	1300	1310	1400	1357
3	Hyderabad	1375	1500	1550	1600	1700	1750	1579
4	Thatta / Sujawal	1450	1450	1625	1625	1825	1825	1633
5	Dadu	1400	1400	1400	1625	1525	1525	1479
6	Larkana	1850	1060	1100	1540	1720	1825	1516
7	Shikarpur	--	1125	1330	1360	1675	1675	1433
8	Jacobabad	1320	1415	1520	1520	1700	1760	1539
9	Kashmore-K. Kot	1450	1475	1635	1812	1650	1625	1608
10	Kambar-Shahdadkot	--	1055	1445	1550	1750	1800	1520
	Average	1471	1336	1436	1541	1648	1681	1519

Source: Market Committees, Sindh.

7. COST OF PRODUCTION OF RICE PADDY

29. Cost of production (COP) is one of the important factors in making price suggestion for farm commodities. However, its estimation involves a number of conceptual problems and practical difficulties. In this regard, wide variations in the inputs use level, technology adoption and diverse farming practices resulting in varying yield levels are worth mentioning.

30. Cost of production estimates for Punjab and Sindh for various varieties groups of rice paddy for the 2021-22 crop have been updated by adapting the input-output parameters as used in the Price Policy Report for Rice Paddy 2020-21 crop in conjunction with the latest prices and rates of different inputs and cultural operations collected from main rice producing districts of Punjab and Sindh provinces. The prices of inputs and custom hiring rates of field operations were updated with the information provided by the participants in the API meeting held at Islamabad and annual field survey conducted by the API teams in the important rice growing areas of Punjab and Sindh during March 2021. COP estimates for rice paddy for the Punjab and Sindh are detailed in Annex-IV to V, while summary of these is shown in Table-9.

7.1 Average farmer's expected cost of production of rice paddy for 2021-22 crop against 2020-21

31. Expected cost of production estimates of basmati for Punjab and IRRI for Sindh in 2021-22 versus 2020-21 are summarized and presented in the Table-9.

Table-9: Average Farmer's Cost of Production of Rice Paddy: 2020-21 and 2021-22 Crops

Item	Unit	Cost estimate		Change in 2021-22 over 2020-21 [3]=[2]-[1]
		2020-21 crop [1]	2021-22 crop [2]	
Punjab (Basmati)				
1. Net cost of cultivation including land rent	Rs/acre	57618	65016	7398
2. Yield	Kgs/acre	1363	1400	37
3. Cost of production at farm gate	Rs/40 kgs	1691	1858	167
4. Marketing cost i.e. loading, transport, Commission	"	55	60	5
5. Cost of production at market level	"	1746	1918	172
Punjab (IRRI)				
1. Net cost of cultivation including land rent	Rs/acre	56524	63847	7323
2. Yield	Kgs/acre	2000	2000	0
3. Cost of production at farm gate	Rs/40 kgs	1130	1277	146
4. Marketing cost i.e. loading, transport, commission etc.	"	55	60	5
5. Cost of production at market level	"	1185	1337	151
Sindh (IRRI)				
1. Net cost of cultivation including land rent	Rs/acre	46343	57322	10979
2. Yield	Kgs/acre	2000	2200	200
3. Cost of production at farm gate	Rs/40 kgs	927	1042	115
4. Marketing cost i.e. loading, transport, commission etc.	"	55	60	5
5. Cost of production at market level	"	982	1102	120

Source: Annex-V to VII

Notes: Figures in last column may show slight difference due to rounding of decimals in column [1] and column [2].

- **Punjab**

Basmati

32. According to analysis presented in the above referred table, net cost of growing one acre of basmati paddy at the current inputs prices and hiring rates of different cultural operations prevailing in Punjab during 2021-22 crop year is anticipated at Rs 65016 inclusive land rent. Based on the average yield of 1400 kg per acre, farm level cost of production works out to Rs 1858 per 40 kg. Adding marketing cost @ Rs 60 per 40 kg, cost of production till harvest and disposal in the market or at the Sheller would be Rs. 1918 per 40 kg - more by Rs 172 per 40 kgs than the last year corresponding cost estimated at 1746 per 40 kg.

IRRI

33. According to analysis presented in the above referred table, net cost of growing one acre of irri paddy at the current inputs prices and hiring rates of different cultural operations prevailing in Punjab during 2021-22 crop year is anticipated at Rs 6384.7 inclusive land rent. Based on the average yield of 2000 kg per acre, farm level cost of production works out to Rs 1277 per 40 kg. Adding marketing cost @ Rs 60 per 40 kg, cost of production till harvest and disposal in the market or at the Sheller would be Rs. 1337 per 40 kg - more by Rs 151 per 40 kgs than the last year corresponding cost estimated at 1185 per 40 kg.

- **Sindh**

34. In Sindh, net cost of cultivation for one acre of IRRI/ hybrid paddy during 2021-22 crop year is expected to cost Rs 57322 inclusive land rent. Based on 2020-21 average yield of 2200 kg per acre – as reported by the farmers during the API field survey, cost of production at farm level would be Rs 1042 per 40 kg. Including marketing expenses @ Rs 60 per 40 kg, the cost of production to deliver at Sheller/ market would be Rs 1182 per 40 kgs, against Rs 1185/ 40 kg in 2020-21 - more by Rs 121 per 40 kgs.

35. Main factors behind these changes are increased in diesel price during 2021, increased in fertilizer prices i.e DAP from Rs 3600 to Rs 6500.

7.2 Cost of Major Operations/Inputs

36. Break-up of costs of various field operations and farm inputs in the gross cost of cultivation of rice paddy in Punjab and Sindh during 2020-21 and expected in 2021-22 (with respective changes) over the previous year are presented in Table-10.

- **Punjab**

Basmati

37. In Table-10 cost of production of paddy is consolidated under broader headings rather than individual items. Analysis is presented for Punjab and Sindh provinces for basmati and IRRI varieties. The data comprise major operations/ inputs of cost of production of paddy. It helps us identify where policy support can be more beneficial to paddy growers.

38. Figures in parenthesis in Table-10 show respective percentages. It may be seen from the data that major component of the cost of basmati paddy production is land rent (23%). Next higher item is fertilizer inclusive farm yard manure (FYM) and irrigation. Expenditure on irrigation mainly comes from tube well water which supplements the canal water. Fertilizer carries 18% of the gross cost and thus is a crucial item in the cost of production estimate. All other cost items carry lesser weight in the gross cost of production of paddy.

Table-10: Cost of major operations/inputs of rice paddy: 2020-21 and 2021-22 crops

Operations/inputs	2020-21	2021-22	Change in 2021-22 over 2020-21
	Crop	Crop	
(Rs/acre)			
Punjab (Basmati)			
1. Land preparation	8789(14)	9673(13)	884
2. Nursery, uprooting and transplanting	7341(11)	8090(11)	749
3. Weeding	633(1)	690(1)	58
4. Plant protection	1940(3)	2050(3)	110
5. Irrigation	12451(18)	13006(18)	555
6. Fertilizer including FYM	10085(19)	13227(18)	3142
7. Land rent	15000(21)	16500(23)	1500
8. Harvesting and threshing etc	3000(4)	3000(4)	0
9. Others	4780(8)	5780(8)	1000
10. Gross cost	64018(100)	72016(100)	7998
Punjab (IRRI)			
1. Land preparation	7969(13)	8783(12)	814
2. Nursery, uprooting and transplanting	7141(11)	7890(11)	749
3. Weeding	633(1)	690(1)	58
4. Plant protection	1940(3)	2050(3)	110
5. Irrigation	12451(20)	13006(18)	555
6. Fertilizer including FYM	10085(16)	13227(19)	3142
7. Land rent	15000(24)	16500(23)	
8. Harvesting and threshing etc	3000(5)	3000(4)	0
9. Others	4706(7)	5701(8)	995
10. Gross cost	62924(100)	70847(100)	6423
Sindh (IRRI)			
1. Land preparation	6500(13)	7150(12)	650
2. Nursery/uprooting and transplanting	7300(15)	9000(15)	1700
3. Weeding	1260(3)	1440(2)	180
4. Plant protection	979(2)	1500(2)	521
5. Irrigation	3520(7)	3956(6)	436
6. Fertilizer including FYM	8778(17)	11834(19)	3056
7. Land rent	15000(30)	16500(27)	
8. Harvesting and threshing etc	2250(4)	4000(7)	1750
9. Others	4756(9)	5943(10)	1187
10. Gross cost	50343(100)	61322(100)	10979

Notes: Others' include cost of bund making, mark-up, management, land tax, land revenue and drainage cess.

- Figures in parenthesis are percent shares in total cost of cultivation.
- Rounding off figures may result in slight differences

IRRI

39. Figures in parenthesis in Table-10 show respective percentages. It may be seen from the data that major component of the cost of irri paddy production is land rent (23%). Next followed by higher item is fertilizer inclusive farm yard manure (FMY) 19% followed by irrigation expenditure (18%). Expenditure on irrigation mainly comes from tube well water which supplements the canal water. Fertilizer carries 19% of the gross cost and thus is a crucial item in the cost of production estimate. All other cost items carry lesser weight in the gross cost of production of paddy.

- Sindh

IRRI

40. For IRRI paddy grown in Sindh, again land rent cost is the major cost component (27%), followed by fertilizer inclusive farm yard manure (farm yard manure) (19%), Nursery/uprooting and transplanting (15%) and land preparation (12%). It needs to be noted that in all of the three categories land rent, land preparation and fertilizer emerges as major components of the cost of production of paddy. Thus these may be suggested for giving subsidy etc for minimizing cost of production of this crop.

41. Last column of the above referred Table indicates overtime increase or decrease in the cost of production of basmati and IRRI varieties against the last year. The data identify potential inputs and cultural operations whose cost may be reduced by providing subsidy to minimize cost of production of paddy. It may be assessed from the data that irrigation expenditure, land preparation costs and fertilizer cost may be reduced by subsidizing electricity for agricultural tube wells, removing GST on fertilizer and reducing price of diesel.

8. ECONOMICS OF RICE PADDY AND COMPETING CROPS

42. 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. The coarse and fine varieties of rice may also compete among themselves. Rice also faces indirect competition from sugarcane, an annual crop, which occupies the land over the year.

43. The economics of rice and competing crops has been analyzed in terms of input-output prices paid and received by the growers for the 2020-21 crops. A summary of the relevant economic indicators emerging from the analysis is presented in Table-11 for the Punjab and Table-12 for Sindh. Also, the Output-Input ratios have been graphically presented in Fig-5 and Fig-6 for both the provinces. Details of the analysis are provided in Annex-VII.

- Punjab

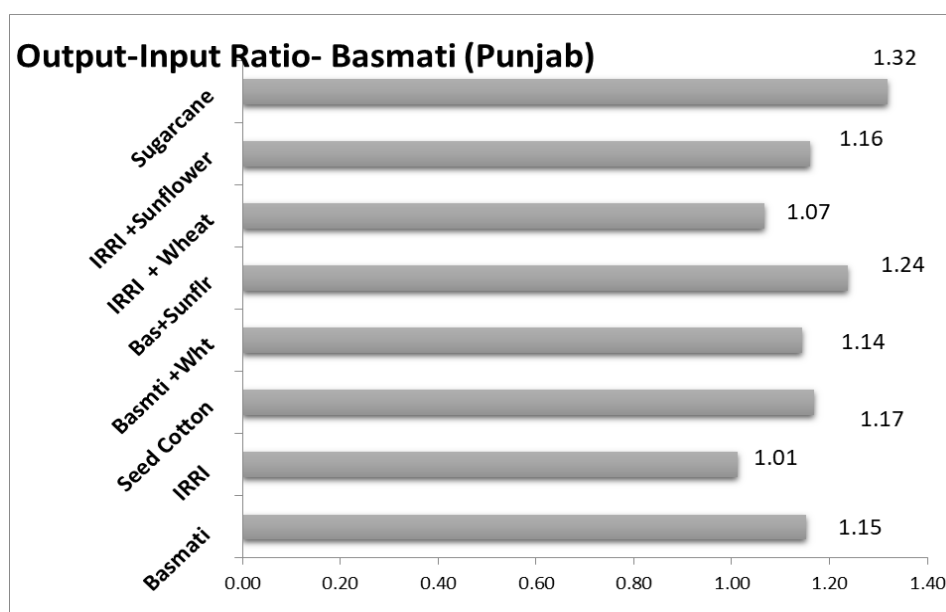
44. Basmati's performance in Punjab in terms of returns to overall investment has been slightly lower than seed cotton. Similarly, in terms of purchased inputs and irrigation water, Basmati's returns to farmer for the farm investment were much lower than the cotton. However, in terms of crop duration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

Table-11: Economics of Rice and Competing Crops at Prices Realized by the Paddy Growers in the Punjab: 2020-21 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. Basmati paddy	1.15	2.25	405	1256
2. IRRI paddy	1.01	2.26	362	1052
3. Seed Cotton	1.17	3.45	374	4076
4. Basmati+wheat	1.14	2.71	370	1904
5. Basmati+sunflower	1.24	2.86	409	1839
6. IRRI+wheat	1.07	2.75	349	1698
7. IRRI+sunflower	1.16	2.91	387	1661
8. Sugarcane	1.32	4.08	411	3376

Source: Annex-VII.

45. 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 by seed cotton, the IRRI even hardly could gain break-even point and its returns to overall investment i.e output-input ratio, were slightly above than 1, which indicates that farmer's costs have slightly met in cultivating IRRI paddy.



46. 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. Sugarcane, based

Fig-5: Output-input Ratio in Punjab for Basmati Paddy

on the market price received by the farmers, has performed much better against the earlier in terms of all the indicators IRRI combinations remained considerably lower in respect of all the economic indicators analyzed. However, the IRRI combination with Wheat gained a marginal edge over Sunflower combinations in terms of returns to purchased inputs.

- **Sindh**

47. In Sindh, IRRI paddy farming has shown considerably better results in terms of returns to overall investment and in the rest of the economic criteria except Irrigation water, against seed cotton. This situation indicates that the rice growers have been able to get rewarding prices for their produce, enabling them to compete with cotton successfully. However, IRRI is lagging behind cotton in terms of returns to irrigation water, where the later out-competes the earlier significantly.

Table-12: Economics of IRRI Paddy and Competing Crops at Prices Realized by the Growers in Sindh: 2020-21 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	1.51	3.88	424	1362
2. Seed Cotton	1.14	3.29	385	5135
3. IRRI+wheat	1.39	3.93	406	2151
4. IRRI+sunflower	1.42	3.76	356	1643
5. Sugarcane	1.32	4.10	313	2152

Source: Annex-VII.

48. In context of indirect competition with sugarcane, the economic position of IRRI's combinations with wheat and sunflower is healthier than sugarcane in terms of output-input ratio and returns to crop duration. However, the performance of these combinations has been lower to the sugarcane in terms of the remaining indicators.

49. The above situation portrays an encouraging situation for rice growers in Sindh, while in Punjab, they have yet to achieve efficiency through improved productivity and fetching better prices.

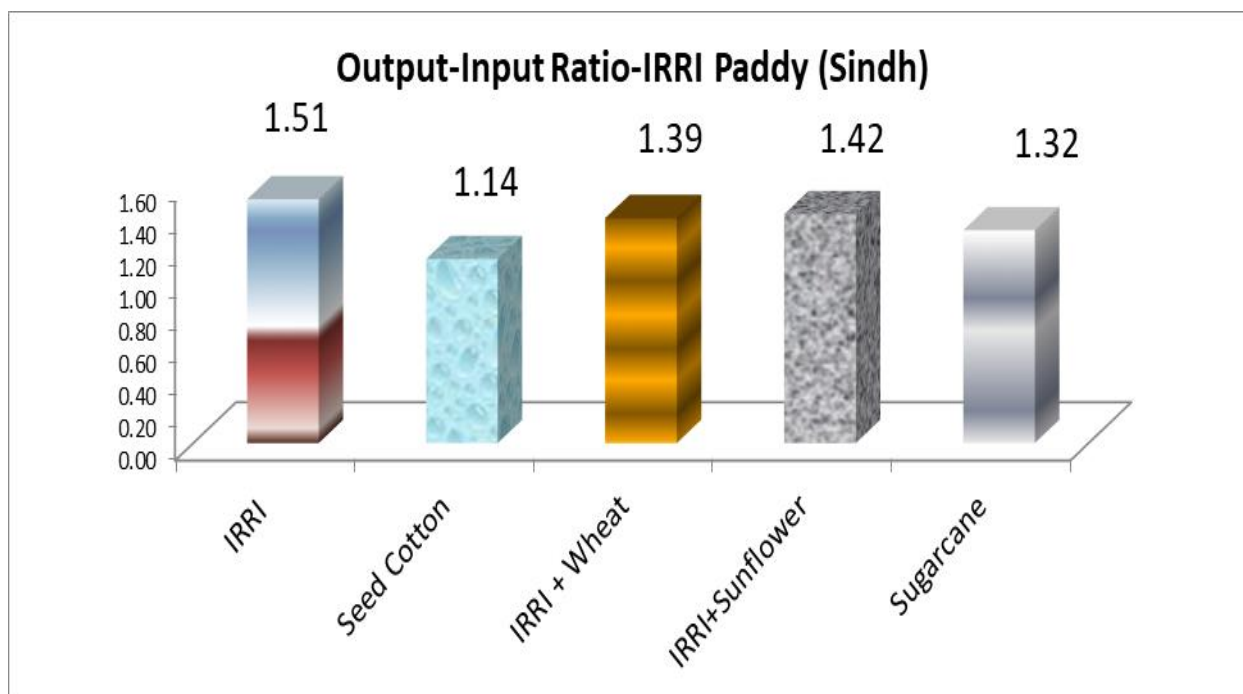


Fig-6: Output-input Ratio in Sindh for IRRI Paddy

9. NOMINAL AND REAL MARKET PRICES OF BASMATI AND IRRI PADDY: 2015-16 to 2020-21

50. To analyze the overtime changes in the purchasing power of basmati (Punjab) and IRRI paddy (Sindh), the nominal and real market prices of rice paddy for the period 2015-16 to 2020-21 crops were deflated by the Consumer Price Index (CPI), the most common measures of inflation in the economy. The results are given in Table-13 and also depicted in Figs-7 and 8.

51. It is important to note from the above analysis that due to increasing trend of general inflation in the economy, the gap between nominal and real prices, both of Basmati and IRRI paddy is widening every year. It shows the deterioration of the purchasing power of the commodity overtime in real terms. Variety-wise detail of basmati and IRRI paddy is discussed in the following paragraphs.

9.1 Basmati Paddy (Punjab)

52. The data in Table-13 reveals that the nominal market price of Basmati paddy has evidenced 58.1 per cent overall increase against the base year during the period under review while its real value improved by only 13 per cent. The major reason for this slow increasing trend in the real purchasing power of the crop is the 40.06 per cent general inflation observed in the economy during the same period.

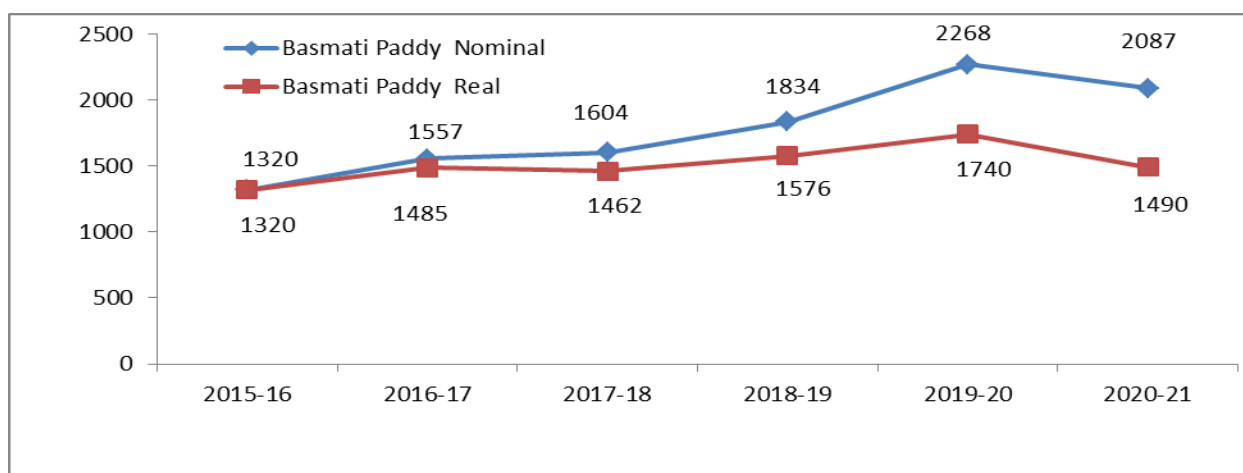
Table-13: Nominal and Real Market Prices of Basmati and IRRI-6 Paddy: 2015-16 to 2020-21

Crop year	Nominal Market Prices		Consumer Price Index (CPI)	Real Market Prices	
	Basmati (Punjab)	IRRI-6 (Sindh)		Basmati	IRRI-6
1	2	3	4	5=(2/4)*100	6=(3/4)*100
	Rs per 40 kgs		2015-16=100	Rs per 40 kgs	
2015-16	1320	713	100.00	1320	713
2016-17	1557	832	104.81	1485	793
2017-18	1604	898	109.72	1462	818
2018-19	1834	1121	116.35	1576	963
2019-20	2268	1225	130.33	1740	940
2020-21	2087	1259	140.06	1490	899

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

Sources: i) Economic Survey of Pakistan, 2020-21.
ii) CPI 2007-08 base year series converted into base year 2015-16.
iii) Directorate of Agriculture, (E&M), Lahore, Punjab.
iv) Directorate of Agriculture Farms and Major Crops Development, Hyderabad, Sindh.

53. For the entire period under review, the real market price remained above the base year level consecutively up to now. About 9 per cent the nominal market prices lower in 2020-21 at per cent as compared to the last year. The year 2020-21 was relatively both for the rice growers as they did fetch highest real prices of Rs 1490 per 40 kgs.

**Fig-7: Nominal and Real Market Price of Basmati Paddy in Punjab: 2015-16 to 2020-21**

9.2 IRRI Paddy (Sindh)

54. It may be seen from Table-13, that the nominal market price of IRRI paddy in Sindh averaging at Rs 713/- per 40 kgs during the post-harvest season of 2015-16 has increased to

Rs 1259/- per 40 kgs in 2020-21, indicating overall increase of 76.57 per cent. For the rise in CPI by 40.06 per cent, the consequent increase in the real market price of IRRI paddy is estimated at 26.08 per cent from Rs 713/- in base year to Rs 899/- per 40 kgs in 2020-21.

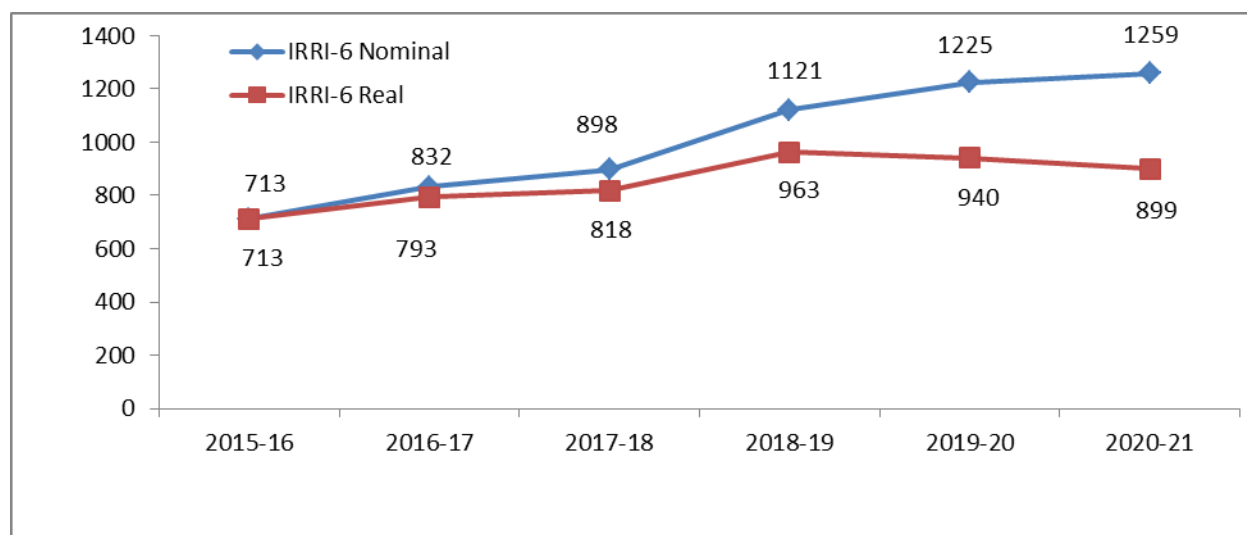


Fig-8: Real Market Price of IRRI-6 in Sindh: 2015-16 to 2020-21

55. The data also reveals that during the whole period in question, the real market prices of IRRI paddy remained above the base year level of Rs.713/- per 40 kg. However, during, 2020-21, the real IRRI prices slightly decrease over last year by 4.36 per cent. The real value of the crop remained higher to base year level throughout the period under review.

10. WORLD SUPPLY, DEMAND, STOCKS, TRADE AND PRICES SITUATION OF MILLED RICE

10.1 World Supply, Demand, Stocks, and Trade

56. The estimated and projected data of production, consumption, stocks and trade of rice reported by the International Grain Council from 2019-20 to 2021-22 is presented in Table-14.

57. The world production of rice in 2020-21 is estimated at 505 million tons, only 6 million tons higher than year 2019-20, accounting for the opening stocks of 173 million tons, total supply works out at 678 million tons, 4 million tons higher than previous year.

58. Rice production in 2021-22 is projected to significantly increase to 511 million tons, 6 million tons higher than in 2020-21; the increase is at par to last year increase. With the addition of opening stocks of 170 million tons, total supply would be at 681 million tons, an increase of 3 million tons during 2021-22. The global consumption is projected to increase from 510 million tons in 2021-22 from 508 million tons in 2020-21. Resultantly the end year stocks are projected to increase from 170 million tons to 171 million tons during 2021-22. The global trade in rice reported at 46 million tons in 2020-21 is projected to slightly increase to 47 million tons in 2021-22.

Table-14: World Supply, Demand, Stocks and Trade in Rice: 2019-20 to 2021-22

S.No	Item	2019-20	2020-21 Estimated	2021-22 Projected
		-----Million tones-----		
1.	Opening stocks	175	173	170
2.	Production	499	505	511
3.	Total supply (Items 1+2)	674	678	681
4.	Consumption/disappearance	500	508	510
5.	Closing stocks	173	170	171
6.	Trade	44	46	47

Source: International Grain Council, August 2021.

11. RICE EXPORT FROM PAKISTAN

59. Pakistan is one of the largest exporters of rice with an average share of 8.54 per cent in global rice market during 2017-2019. Export of rice has decreased from 3.38 to 3.02 million tons during 2019-20 over 2018-19 in quantity and US\$ 1.73 to 1.64 million in value terms. The reduction observed in coarse rice.

60. Export of basmati rice has increased by 31.29 per cent in 2019-20 over 2018-19 in quantity and 20.30 per cent in value, while export of coarse rice have decreased by 20.96 per cent in quantity and 138 per cent in value. Region wise export of rice 2019-20 over 2018-19 are given in Table-15.

61. The region-wise statistics revealed that bulk of the basmati rice export were destined to Asian countries (60.19 per cent) followed by European countries (14.91 per cent). Basmati rice during 2019-20 over 2018-19 has increased in Africa 162.82 per cent, Asia by 57.10 per cent, America 58.42 per cent, Oceania 27.85 per cent, while it is decreased in Europe 35.34 per cent, and CIS countries by 5.17 per cent respectively.

62. In case of coarse rice, overall export of coarse rice has decreased by 20.96. The major decline observed in CIS countries by 60.87 per cent, Asia by 42.23 per cent Europe by 38.25 per cent, Africa by 0.21 per cent but share of these countries in total export is at marginal level except Asian countries. The main destinations were African countries 60.54 per cent followed by Asian countries 32.55 per cent.

**Table-15: PER CENT CHANGE IN EXPORT OF BASMATI AND COARSE RICE
2018-19 OVER 2019-20**

Region	Basmati Rice	Coarse Rice	Basmati Rice	Coarse Rice	Basmati Rice		Coarse Rice	
	Quantity		Value		% share in total export			
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
	..... Percent change.....				2018-19	2019-20	2018-19	2019-20
Asia	57.10	-42.23	45.45	-42.76	50.30	60.19	44.53	32.55
Oceania	27.85	-4.17	22.25	2.28	2.69	2.62	0.06	0.07
Europe	-35.34	-38.25	-32.08	-54.35	30.27	14.91	1.52	1.19
Africa	162.82	-0.21	130.68	0.41	5.81	11.63	47.95	60.54
America	58.42	8.74	40.53	14.79	5.70	6.88	3.08	4.24
CIS	-5.17	-60.87	-22.82	-58.58	5.23	3.78	2.87	1.42
Total	31.29	-20.96	22.30	138.22	100.00	100.00	100.00	100.00

Source: Annex- X

12. EXPORT PARITY PRICES OF RICE (PADDY)

63. 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. The details of these calculations are given in Annexes--and -- , a summary is given in table-16.

Table-16: Export Parity Prices of Basmati and IRRI Paddy

Items	June 2021	2020-21	Average 2019-2021
A) Export Parity Price of Basmati Paddy			
Average fob Karachi prices (US\$/ton)	883.69	915.09	927.22
Exchange Rate (Rs/US\$)	163.25	163.25	163.25
Average fob Karachi prices (Rs/40Kgs)	5770	5976	6055
Mill-gate price of 40 Kgs paddy	2819S	2923	2964
B) Export Parity Price Of IRRI Paddy			
Average fob (Karachi) prices (US\$/ton)	473.30	478.61	439.12
Exchange Rate (Rs/US\$)	163.25	163.25	163.25
Average fob Karachi prices (Rs/40Kgs)	3091	3125	2867
Mill-gate price of 40 Kgs paddy	1827	1849	1690

Source: Annexes VIII to IX.

13. ECONOMIC EFFICIENCY IN RICE PRODUCTION

64. Economic efficiency in rice production has been evaluated by estimating most frequently used economic parameters i.e Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost Coefficient (DRC). To assess the impact of price policy changes on rice producers and Pakistan's comparative advantage in rice production, the analysis is conducted from 2016-17 till 2020-21. NPC, EPC and DRC estimates are produced in Table-16 and background analyses given in Annex-XI to Annex-XII.

13.1 Nominal Protection Coefficient (NPC) under Export Situation

65. NPC is a measure of protection or taxation to the producers of a crop in lieu of open market price of the crop. In this calculation open market price is numerator while social price is denominator. By definition, social price is the export parity price minus marketing cost incurred in shifting the commodity from farm gate to the market.

66. NPC, EPC and DRC coefficients are separately calculated for Basmati and IRRI varieties of rice and produced in Table-17.

Table-17: Economic Efficiency Coefficients for Rice in Pakistan under Export Situation

Province/ Year	NPC	EPC	DRC	US \$ 1= Pak Rs	Domestic Resources Spent (Rs) to earn Forex worth US\$ 1
Punjab					
Basmati					
2016-17	0.59	0.52	0.52	54.30	104.68
2017-18	0.54	0.50	0.34	37.42	109.84
2018-19	0.65	0.59	0.40	63.26	156.30
2019-20	0.79	0.74	0.46	77.67	167.39
2020-21	0.70	0.63	0.48	77.95	163.25
Sindh					
IRRI					
2016-17	1.64	1.91	1.25	130.48	104.68
2017-18	1.21	1.25	0.75	81.94	109.84
2018-19	0.76	0.71	0.43	67.00	156.30
2019-20	0.79	0.74	0.46	77.48	167.39
2020-21	0.85	0.81	0.42	69.33	163.25

Source: Annex-XI and XII

67. It is observed from the data given in Table-16 that for Basmati grown in Punjab, NPC values have been drastically fluctuating during the reference period. It indicates unstable domestic and international prices of basmati paddy

68. The decisive rule is that if NPC is smaller than one, local producers get price less than the corresponding export parity price and thus are implicitly taxed and vice versa.

69. For IRRI paddy grown in Sindh NPC coefficients have been continuously above one during the period under study except in 2018-19 to 2020-21. It means that on the whole, IRRI paddy growers are protected through the output price policy which induces producers for promoting the crop.

13.2 Effective Protection Coefficient (EPC) under Export Situation

70. Effective Protection Coefficient unlike NPC includes both input and output prices in its calculation. Thus it captures cumulative effect of both input costs and price of the crop on respective growers. In EPC calculation, difference of the crop revenue and traded inputs cost at private price is numerator and difference of the crop revenue and traded inputs cost at social price is denominator. However, it needs to be mentioned that EPC does not consider all input costs rather considers only traded inputs costs – those inputs which are purchased with cash. These are seed, fertilizer, tube well water, machinery (tractor etc). As a general principle if EPC is greater than one, producers of the crop are protected and if it is less than one they are implicitly taxed. In the former situation farmers are induced to produce more while in the later situation development of the crop is discouraged.

71. It is understood from EPC values for Basmati paddy produced in **Table-16** that produce prices of basmati have not been consistent with input prices in Pakistan. These have been highly fluctuating during the reference period. EPC values mentioned in the referred table indicate that basmati growers in Punjab remained implicitly taxed because EPCs were less than one during last five years.

72. EPC values for IRRI paddy in Sindh mentioned in the referred table indicate that IRRI growers in Sindh remained implicitly taxed because EPCs were less than one during last three years.

73. The above analysis implies that input output pricing policy in Pakistan favours IRRI growers more than the basmati growers which may increase its production in future.

13.3 Domestic Resource Cost Coefficient (DRC)

- Basmati paddy

74. Domestic Resource Cost Coefficient (DRC) is a measure of opportunity cost of domestic resources used per unit of the value added in production of a crop. DRC value less than one indicates a country's comparative advantage in a particular commodity and the vice versa. In this calculation numerator is the total non-traded inputs expenditure at social

prices and denominator is difference of the crop revenue and the traded inputs cost at social prices. As a principle, if DRC coefficient is greater than one, country does not have comparative advantage in the concerned crop and if it is less than one, it has comparative advantage in that crop. In other words, the crop is efficiently produced in that particular country and cost of resources employed in its production is less than its import cost.

75. DRC values for Basmati and IRRI are also produced in **Table-16**. It is observed from the data in this Table that DRC coefficient for basmati paddy in Punjab and IRRI in Sindh (2016-17 exception for Sindh) has been always less than one during the analysis period which indicates Pakistan's comparative advantage for Basmati in Punjab and for IRRI in Sindh.

13.4 Cost of Earning Foreign Exchange

76. It is already mentioned that DRC coefficient is a measure of the opportunity cost of the domestic resources (family labour, interest on capital, management charges, canal water charges, etc.) used in production of a crop. Thus DRC coefficient may be used to determine cost of foreign exchange earning in terms of domestic resources. The foreign exchange earning cost estimates are derived from the analysis produced in Table-16.

77. It is observed from column 5 in the referred table that we spend less to earn forex through Basmati than IRRI because cost of domestic resources to earn one dollar are consistently less in Basmati than IRRI. Furthermore, these costs are relatively more stable and consistent in Basmati than IRRI paddy.

14. RICE YIELD AMONG COMPETING COUNTRIES

78. Global rice during 2019 occupied an area of 150.21 million hectares with a total production of 479.56 million tonnes. The world top 17 producing countries contribute 85.17 per cent of total area and 93.33 per cent of total production (Annex-XIV).

79. In terms of rice area, India is on the top with 43.780 million hectares followed by China, mainland with 29.69 million, Bangladesh with 11.18 and Indonesia, Thailand with 10.68,10.41 million hectares. Pakistan lies at 10th number in this regard.

80. In terms of rice production, China is on the top with 139.74 million tonnes followed by India with 118.43 million, Indonesia 36.40 and Bangladesh, Vietnam, Thailand with 36.39,29.36,21.46 million tonnes respectively. However, Pakistan lies at 9th position in rice production of the world.

81. In terms of yield per hectare, Australia lies at the top with 5847 kgs per hectare followed by Tajikistan with 5725, USA with 5582 and Egypt with 5582 kgs per hectare. It is very wonderful situation that Pakistan ranks at 61st in terms of yield while India falls at 55th position.(Annex-) It implies that there is a lot of potential to raise rice productivity per hectare in Pakistan.

15. MAJOR RICE VARIETIES AND THEIR YIELD POTENTIAL IN PAKISTAN

82. In Pakistan, rice is an important food and cash crop. It is the 2nd most important source of cash for the paddy growers. It also earns billion of rupees through its export. The yield potential of rice of different varieties sown in Punjab and Sindh are presented in Table-18.

83. Pakistan is a major rice exporting country in the World. However, the national yield at the farm level is low despite that tremendous potential exists there. According to the Provincial Agriculture Departments, based on last three years (2018-19 to 2020-21) average yield of rice paddy of different varieties of Punjab and Sindh, is 823 kgs per acre for Basmati, 1050 kgs for IRRI and 956 kgs for “others; in the Punjab. In Sindh, average yield level of IRRI paddy is 1109 kgs per acre and 1572 kgs for other varieties. These yields are much below than the available potential. To meet the ever growing domestic food and export requirements for foreign exchanges, there is a need to make solid efforts to achieve the available yield potential. Yield potential of important rice varieties is presented in Table-18.

Table-18: Major Rice Varieties and Their Yield Potential

Variety	Yield Potential of Rice Paddy		Share in the total area of rice paddy (%)
	(Maund/acre)	(Kg/acre)	
Punjab			
a) Basmati			
Basmati-385	55	2600	6.05
Super Basmati	65	2600	70.72
b) IRRI			
IRRI-6	80	3200	4.86
Niab- IRRI-9	80	3000	1.95
KS-282	100	3200	2.28
Sindh			
a) IRRI-8			
IRRI-6	80	3200	80
IRRI-6	70	2800	
DR-82	70	2800	
DR-83	50-55	2100	
IRRI-92	70	2800	
Khanewal 95	50-55	2100	
Sada Hayat	60-65	2500	
Shaheen	80	3200	
Lateefy (Aromatic)	40	1600	
b) In Pipe Line			
DR-57	80	3200	
DR-58	85	3400	
DR-65 (Aromatic)	40-45	1700	

Sources: i) Nuclear Institute for Agriculture & Biology (NIAB), Faisalabad. ii) Rice Research Institute (RRI), Dokri Sindh.

16. IMPROVED SEED AVAILABILITY OF RICE PADDY

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

85. In order to review the overtime progress regarding coverage of quality seed, the annual gross and replacement of certified seed of rice and its availability during the period from 2015-16 to 2020-21 is presented in Annex-XVI.

86. It may be seen in Annex-XVI that supply of certified seed shows an irregular trend. Availability of certified seed at the country level during the referred period augmented and remained approximately 71.120 thousand tonnes in 2020-21 higher by 60.81% than the available certified seed (44.226 thousand tonnes) during 2019-20.

87. Varietal breakup of the supply of certified seed of rice both in public and private sectors for the crop year 2020-21 is presented in the Table-19.

Table-19: Variety wise Certified Seed of Paddy Supplied by Public and Private Sectors for 2020-21 Crop

Province/variety	Seed availability			Area sown	Seed requirement	Seed enough for area
	Public sector	Pvt. Sector	Total			%
	(Tonne)			000 hac.	(Tonne)	
Punjab	5727.1	58398.0	64125.1	2394.4	35530.2	180.5
Basmati (Fine)	2042.2	22092.0	24134.2	1871.6	22459.2	107.5
IRRI & others	3684.9	36306.0	39990.9	522.8	13071.0	306.0
Sindh (IRRI+others)	118.7	4572.1	4690.8	709.0	17724.2	26.5
KPK (IRRI + other)	32.8	1371.0	1403.8	64.9	1622.5	86.5
Balochistan (IRRI)	0.0	900.0	900.0	167.2	4180.0	21.5
	All Pakistan					
Basmati	2042.2	22092.0	24134.2	1871.6	22459.2	107.5
IRRI +other	3836.4	43149.1	46985.5	1463.9	36597.7	128.4
Total	5878.6	65241.1	71119.7	3335.5	59056.9	120.4

Source: FSC&RD, Islamabad

88. Provincial variety-wise data presented in the above table show that in all provinces major source of supply of certified seed was private sector. Share of the private sector in total seed availability is: Punjab (91%), Sindh (97%), Khyber Pakhtunkhwa (98%), Balochistan 100% and at country level 92%. Thus, it is concluded that certified seed of paddy was available to meet 120.4% of the total requirement in the country. The supply of certified seed does not need to be increased to ensure paddy growers' access to certified seed.

17. ACKNOWLEDGEMENTS

89. In preparing this Report, following officers and officials have put a lot of effort and hard work which is appreciated.

Officers

- | | | |
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| 1. | Mr. Hussain Ali Turi | Chief |
| 2. | Mr. Muhammad Amin | Chief |
| 3. | Syed Riaz Ali Shah | Assistant Chief (Coordinator) |
| 4. | Mr. Salman Mahmood | Assistant Chief |
| 5. | Mrs. Shagufta Tasleem | Assistant Chief |

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(Composed the Report) |
| 2. | Mr. Muhammad Shamir | Assistant Private Secretary |
| 3. | Mr. Muhammad Naeem | DMO |

Abdul Karim
Director General

ANNEX-I

AREA, YIELD AND PRODUCTION OF RICE BY VARIETY AND PROVINCE: 2010-11 TO 2020-21

Year	PUNJAB				SINDH			KPK Total (Others)	Baloch Total (IRRI)	Pakistan			
	Basmati	IRRI	Others	Total	IRRI	Others	Total			Basmati	IRRI	Others	Total

AREA

----- Thousand hectares -----

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
2019-20	1662.0	91.1	276.0	2029.1	260.3	515.5	775.8	64.9	164.2	1662.0	515.6	856.4	3034.0
2020-21	1871.6	172.5	350.30	2394.4	225.7	483.3	709.0	64.9	167.2	1871.6	565.4	898.5	3335.5

YIELD

----- kgs per hectare -----

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
2019-20	1952	2552	2417	2042	2302	3836	3321	2442	3258	1952	2651	3273	2444
2020-21	2146	2607	2384	2214	3017	3591	3408	2442	3252	2146	2961	3037	2524

PRODUCTION

----- Thousand tonnes -----

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
2019-20	3244.0	232.5	667.2	4143.7	599.1	1977.4	2576.5	158.5	535.0	3244.0	1366.6	2803.1	7413.7
2020-21	4016.0	449.8	835.3	5301.0	680.9	1735.2	2416.1	158.5	543.7	4016.0	1674.4	2728.9	8419.3

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.

Sources

1. For 2010-11 to 2019-20, Rice Paddy Policy Analysis for Crop of API, M/o NFS&R Islamabad.
2. For 2020-21 : Final estimates of Punjab, Sindh, KPK and Balochistan provided by concerned Provincial Agriculture Depts. Provincial Agriculture Departments.

AREA, YIELD AND PRODUCTION OF RICE BY VARIETY AND PROVINCE: 2010-11 TO 2020-21

Year	PUNJAB				SINDH			KPK Total	Baloch. Total	Pakistan			
	Basmati	IRRI	Others	Total	IRRI	Others	Total	(Others)	(IRRI)	Basmati	IRRI	Others	Total

AREA

----- Thousand acres -----

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
2019-20	4107.0	225.1	682.0	5014.1	643.2	1273.9	1917.2	160.4	405.8	4107.0	1274.1	2116.3	7497.4
2020-21	4624.9	426.4	865.6	5916.9	557.7	1194.2	1751.9	160.4	413.2	4624.9	1397.3	2220.2	8242.4

YIELD

----- kgs per acre -----

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
2019-20	790	1033	978	826	931	1552	1344	988	1319	790	1073	1325	989
2020-21	868	1055	965	896	1221	1453	1379	988	1316	868	1198	1229	1021

PRODUCTION

----- Thousand tonnes -----

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
2019-20	3244.0	232.5	667.2	4143.7	599.1	1977.4	2576.5	158.5	535.0	3244.0	1366.6	2803.1	7413.7
2020-21	4016.0	449.8	835.3	5301.0	680.9	1735.2	2416.1	158.5	543.7	4016.0	1674.4	2728.9	8419.3

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.

Sources

1. For 2010-11 to 2019-20, Rice Paddy Policy Analysis for Crop of API, M/o NFS&R Islamabad.
2. For 2020-21 : Final estimates of Punjab, Sindh, KPK and Balochistan provided by concerned Provincial Agriculture Depts. Provincial Agriculture Departments.

DISTRICT-WASE PRODUCTION OF RICE BY VARIETY: AVERAGE OF 2018-19 TO 2020-21

"000"tonnes

S.No	Province/ District	Basmati	IRRI	Others	Total	Percent	S.No	Province/ District	Basmati	IRRI	Others	Total	Percent
Punjab						KPK							
1	Gujranwala	187.7	52.7	273.7	514.0	6.7	1	D.I.Khan	-	-	31.7	31.7	0.4
2	Sheikhupura	363.5	8.4	53.3	425.2	5.5	2	Dir Lower	-	-	23.8	23.8	0.3
3	Okara	236.1	76.6	56.0	368.6	4.8	3	Kurram AG.	-	-	19.9	19.9	0.3
4	Hafizabad	267.8	7.3	40.6	315.7	4.1	4	Swat	-	-	19.4	19.4	0.3
5	Sialkot	244.1	4.8	27.8	276.6	3.6	5	Dir Upper	-	-	14.6	14.6	0.2
6	Nankana Sahib	228.6	4.3	22.7	255.5	3.3	6	Malakand	-	-	11.1	11.1	0.1
7	Jhang	210.0	1.8	3.9	215.7	2.8	7	Bajour AG.	-	-	7.0	7.0	0.1
8	Bahawalnagar	164.2	16.2	32.9	213.4	2.8	8	Chitral	-	-	5.1	5.1	0.1
9	Pakpattan	165.2	15.6	2.3	183.1	2.4	9	Bannu	-	-	4.9	4.9	0.1
10	Kasur	68.1	21.5	73.6	163.2	2.1	10	Mardan	-	-	3.7	3.7	0.0
11	M.B.Din	123.4	4.6	23.7	151.7	2.0	11	Battagram	-	-	3.7	3.7	0.0
12	Narowal	132.9	0.3	1.7	134.9	1.8	12	Mansehra	-	-	3.6	3.6	0.0
13	T.T.Singh	122.8	0.0	0.0	122.8	1.6	13	Shangla	-	-	3.1	3.1	0.0
14	D.G.Khan	14.9	71.4	31.0	117.4	1.5	14	Lakki Marwat	-	-	0.9	0.9	0.0
15	Chiniot	71.8	7.1	18.1	97.1	1.3	15	Tank	-	-	0.7	0.7	0.0
16	Vehari	84.7	4.9	1.1	90.7	1.2	16	Peshawar	-	-	0.7	0.7	0.0
17	Khanewal	82.5	0.0	0.3	82.8	1.1	17	Swabi	-	-	0.7	0.7	0.0
18	Muzaffargarh	54.7	15.1	8.5	78.2	1.0	18	Orakzai AG	-	-	0.6	0.6	0.0
19	Faisalabad	68.8	1.2	4.1	74.2	1.0	19	Bunir	-	-	0.5	0.5	0.0
20	Sahiwal	73.5	0.0	0.0	73.5	1.0	20	Hangu	-	-	0.4	0.4	0.0
21	Lahore	46.9	2.5	22.9	72.2	0.9	21	Charsadda	-	-	0.2	0.2	0.0
22	Sargodha	59.0	2.0	8.1	69.0	0.9	22	N.Waziristan	-	-	0.1	0.1	0.0
23	Multan	58.0	5.5	5.5	69.0	0.9	23	Kohistan	-	-	0.1	0.1	0.0
24	Gujrat	61.1	0.5	6.0	67.6	0.9	24	F.R.D.I.Khan	-	-	0.1	0.1	0.0
25	R.Y.Khan	46.0	1.5	0.0	47.5	0.6	25	Nowshera	-	-	0.1	0.1	0.0
26	Khushab	46.7	0.0	0.0	46.7	0.6							
27	Lodhran	37.7	0.0	0.0	37.7	0.5							
28	Rajanpur	10.2	17.1	8.0	35.4	0.5							
29	Bahawalpur	31.3	1.7	0.4	33.4	0.4							
30	Layyah	23.3	0.0	1.0	24.3	0.3							
31	Mianwali	12.5	0.0	0.0	12.5	0.2							
32	Jhelum	3.2	0.0	0.0	3.2	0.0							
33	Bhakkar	1.9	0.0	0.0	1.9	0.0							
	Sub Total	3403.1	344.5	727.1	4474.6	58.3		Sub Total	-	-	156.9	156.9	2.0
Sindh						Balochistan							
1	Badin	-	59.5	349.0	408.5	5.3	1	Jaffarabad	-	298.7	-	298.7	3.9
2	Larkana	-	155.3	215.9	371.2	4.8	2	Nasirabad	-	220.4	-	220.4	2.9
3	Jacobabad	-	33.9	330.4	364.3	4.7	3	Khuzdar	-	3.0	-	3.0	0.0
4	Shikarpur	-	75.8	258.2	334.0	4.4	4	Turbat	-	2.1	-	2.1	0.0
5	Qambar	-	99.9	183.7	283.6	3.7	5	Awaran	-	0.6	-	0.6	0.0
6	Kashmore	-	49.7	230.2	280.0	3.6	6	Jhal Magsi	-	0.5	-	0.5	0.0
7	Thatta	-	137.1	106.1	243.1	3.2	7	Dera Budghti	-	0.2	-	0.2	0.0
8	Dadu	-	59.7	119.3	179.1	2.3	8	Harnai	-	0.1	-	0.1	0.0
9	T.M.Khan	-	8.9	45.1	54.1	0.7							
10	Hyderabad	-	0.5	2.8	3.4	0.0							
	Sindh Total	-	680.5	1840.7	2521.2	32.8		histan Total	-	525.6	-	525.6	6.8
								Pakistan Total	3403.1	1550.5	2724.7	7678.3	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: 2017-18 to 2019-20

S.No	Items	2017-18	2018-19	2019-20
-----Thousands tonnes-----				
1	Production	7450	7202	7414
2	Deduction for seed, feed and wastage @ 6 percent for production	447	432	445
3	Export	4097	4120	4149
4	Net availability	2906	2650	2819
-----Millions-----				
5	Population	214.09	218.31	222.48
-----Kgs-----				
6	Per capita availability (consumption)	12.38	12.91	12.67
7	Average per capita availability			
	Average (2017-18 to 2019-20)		12.65	

Sources:

- | | | |
|---|-----------------------------|--|
| 1 | For Imports and Exports: | Federal Bureau of Statistics, Karachi. |
| 2 | For Population of Pakistan: | Economic Survey, 2020-21. |

Average farmer's cost of production of Basmati paddy in Punjab: 2020-21 and 2021-22 crops

S. No	Operation/input	Unit	Avg. no of operation/acre	Rate/ unit	Cost/ acre	Rate/ unit	Cost/ acre	Change in 2021-22 over 2020-21
				2020-21	2021-22	2021-22	2020-21	
				.....Rs.....		.....Rs.....		
1	Land preparation							
	1.1 Dry ploughing	No./ acre	3.00	825.0	2475	950.0	2850	375
	1.2 Dry planking	No./ acre	0.30	412.5	124	475.0	143	19
	1.3 Wet ploughing	No./ acre	3.00	1200.0	3600	1300.0	3900	300
	1.4 Wet planking	No./ acre	2.00	600.0	1200	650.0	1300	100
	1.5 Rotavator	No./ acre	0.40	1100.0	440	1200.0	480	40
	1.6 Levelling	Hrs./ acre	1.00	950.0	950	1000.0	1000	50
2	Seed							
	2.1 Cost of nursery (3.39 marlas)	Rs./ acre			1800		2000	200
	2.2 Cost of nursery uprooting, transport and planting	Rs./acre			5000		5500	500
3	Labour for bund making	M. D/acre	0.98	550	541	600	590	49
4	Weeding							
	4.1 Manual	No./ acre	1.15	550	633	600	690	58
	4.2 Weedicides	No. of	1.00	690	690	750	750	60
	4.3 Pesticides spray	No. of	1.00	1250	1250	1300	1300	50
5	Irrigation							
	5.1 Canal	Rs./ acre			95.72		95.72	0
	5.2 Private tube well	No. of	10.00	900	9000	925	9250	250
	5.3 Labour used for irrigation & water course cleaning	M. D acre	6.10	550	3355	600	3660	305
6	FYM @ 25% of the actual cost including transport & application	No.	1.34	2750	921	3000	1005	84
7	Fertilizer							
	7.1 DAP	bag/ acre	1.00	3600	3600	6500	6500	2900
	7.2 Urea	"	2.00	1900	3800	1900	3800	0
	7.3 NP	"	0.06	2590	155	2800	168	13
	7.4 Zinc sulphate	"	0.84	1000	840	1100	924	84
	7.5 Potash	"	0.07	3600	252	4200	294	42
	7.6 Fertilizer transport & application	Rs./ bag	3.97	130	516	135	536	20
8	Traded inputs cost (Item 1 to 7)	Rs/ acre			41238		46736	5498
9	Mark up on investment @ 14.5 % for 6 months on item 8	"			2990		3388	399
10	Harvesting, threshing etc	Rs/ acre			3000		3000	0
11	Management charges for 6 months	Rs/ acre			1719		2321	602
12	Land rent for 6 months	Rs./acre		30000	15000	33000	16500	1500
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			64018		72016	7998
16	Value of paddy straw	Rs./acre			6400		7000	600
17	Net cost of cultivation (item 15-16)	Rs./acre						
	17.1 Including land rent	Rs./ acre			57618		65016	7398
	17.2 Excluding land rent	Rs./ acre			42618		48516	5898
18	Yield	Kg/ acre						
19	Cost of production at farm gate	Rs./ 40 Kg						
	19.1 With land rent	Rs./ 40 Kg						
	19.2 Without land rent	Rs./ 40 Kg			1691		1858	167
20	Marketing charges (Rs./ 40 Kg)	Rs./ 40 Kg			1251		1386	135
21	Cost of production at market level	Rs./ 40 Kg						
	21.1 With land rent	Rs./ 40 Kg						
	21.2 Without land rent	Rs./ 40 Kg			1746		1918	172
					1306		1446	140

Notes:

- Cost of one tube well irrigation is derived by multiplying Rs 360/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.

Average farmer's cost of production of Irri paddy in Punjab: 2020-21 and 2021-22 crops

S. No	Operation/input	Unit	Avg. no of operation/acre	Rate/	Cost/	Rate/	Cost/	Change in 2021-22 over 2020-21
				unit	acre	unit	acre	
				2020-21		2021-22		
				.....Rs.....	.....Rs.....			
1	Land preparation							
	1.1 Dry ploughing	No./ acre	3.00	825.0	2475	950.0	2850	375
	1.2 Dry planking	No./ acre	0.30	412.5	124	475.0	143	19
	1.3 Wet ploughing	No./ acre	3.00	1200.0	3600	1300.0	3900	300
	1.4 Wet planking	No./ acre	1.00	600.0	600	650.0	650	50
	1.5 Rotavator	No./ acre	0.20	1100.0	220	1200.0	240	20
	1.6 Levelling	Hrs./ acre	1.00	950.0	950	1000.0	1000	50
2	Seed							
	2.1 Cost of nursery (3.39 marlas)	Rs./ acre			1600		1800	200
	2.2 Cost of nursery uprooting, transport and planting	Rs./acre			5000		5500	500
3	Labour for bund making	M. D/ acre	0.98	550	541	600	590	49
4	Weeding							
	4.1 Manual	No./ acre	1.15	550	633	600	690	58
	4.2 Weedicides	No. of	1.00	690	690	750	750	60
	4.3 Pesticides spray	No. of	1.00	1250	1250	1300	1300	50
5	Irrigation							
	5.1 Canal	Rs./ acre			95.72		95.72	0
	5.2 Private tube well	No. of	10.00	900	9000	925	9250	250
	5.3 Labour used for irrigation & water course cleaning	M. D/ acre	6.10	550	3355	600	3660	305
6	FYM @ 25% of the actual cost including transport & application	No.	1.34	2750	921	3000	1005	84
7	Fertilizer							
	7.1 DAP	bag/ acre	1.00	3600	3600	6500	6500	2900
	7.2 Urea	"	2.00	1900	3800	1900	3800	0
	7.3 NP	"	0.06	2590	155	2800	168	13
	7.4 Zinc sulphate	"	0.84	1000	840	1100	924	84
	7.5 Potash	"	0.07	3600	252	4200	294	42
	7.6 Fertilizer transport & application	Rs./ bag	3.97	130	516	135	536	20
8	Traded inputs cost (Item 1 to 7)	Rs/ acre			40218		45646	5428
9	Mark up on investment @ 14.5 % for 6 months on item 8	"			2916		3309	394
10	Harvesting, threshing etc	Rs/ acre			3000		3000	0
11	Management charges for 6 months	Rs/ acre			1719		2321	602
12	Land rent for 6 months	Rs./acre		30000	15000	33000	16500	1500
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			62924		70847	7923
16	Value of paddy straw	Rs./acre			6400		7000	600
17	Net cost of cultivation (item 15-16)	Rs./acre						
	17.1 Including land rent	Rs./ acre			56524		63847	7323
	17.2 Excluding land rent	Rs./ acre			41524		47347	5823
18	Yield	Kg/ acre			2000		2000	0
19	Cost of production at farm gate	Rs./ 40 Kg						
	19.1 With land rent	Rs./ 40 Kg			1130		1277	146
	19.2 Without land rent	Rs./ 40 Kg			830		947	116
20	Marketing chrages (Rs./ 40 Kg)	Rs./ 40 Kg			55		60	5
21	Cost of production at market level	Rs./ 40 Kg						
	21.1 With land rent	Rs./ 40 Kg			1185		1337	151
	21.2 Without land rent	Rs./ 40 Kg			885		1007	121

Notes:

- Cost of one tube well irrigation is derived by multiplying Rs 360/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.

Average farmer's cost of production of IRRI paddy in Sindh: 2020-21 and 2021-22 crops

S. No	operation/input	Unit	Avg. no of operations/acre	Rate/	Cost/	Rate/	Cost/	Change in 2021-22 over 2020-21
				unit	acre	unit	acre	
				2020-21		2021-22		
				....Rs.....		....Rs.....		
1	Land preparation							
	1.1 Dry ploughing	No	5.00	1000.0	5000	1100.0	5500	500
	1.2 Dry planking	"	1.00	500.0	500	550.0	550	50
	1.3 Levelling	Hr/acre	1.00	1000.0	1000	1100.0	1100	100
2	Nursery							
	2.1 Cost of nursery	Rs./ acre	1.00	3800	3800	5000	5000	1200
	2.2 Cost of nursery uprooting, transport and planting	Rs./acre			3500		4000	500
3	Labour for bund making	M.D/acre	2.00	525	1050	600	1200	150
4	Manual weeding	M.D/acre	2.40	525	1260	600	1440	180
5	Plant protection							
	5.1 Weedicide	No./ acre	0.73	700	511	1200	876	365
	5.2 Formulated spray	No./ acre	0.39	1200	468	1600	624	156
6	FYM @ 25% of the actual cost including transport & application	No.	1.00	3600	900	4000	1000	100
7	Fertilizer							
	7.1 DAP	bag/ acre	1.00	3700	3700	6500	6500	2800
	7.2 Urea	"	2.00	1850	3700	1900	3800	100
	7.3 Zinc sulphate	"	0.10	750	75	1000	100	25
	7.4 Fertilizer transport & application	Rs./ bag	3.10	130	403	140	434	31
8	Irrigation							
	8.1 Canal	irrig./ acre	17.90	-	95.7	-	95.7	
	8.2 Private tube well (Rs./ irrigation)	irrig./ acre	0.50	969.0	485	1000.0	500	16
	8.3 Labor used for irrigation & water course cleaning	M.D/acre	5.60	525.0	2940	600.0	3360	420
9	Traded inputs cost (Item 1 to 9 minus 9.1)	Rs/ acre			29292		35984	6693
10	Mark up on investment @ 13% for 6 months on item 10				1904		2339	435
11	Harvesting, threshing etc	Rs/ acre			2250		4000	1750
12	Management charges for 6 months	Rs	-		1719		2321	602
13	Land rent for 6 months	Rs./acre		30000	15000	33000	16500	1500
14	Land revenue, local rate, panchotra etc	"		5	5	5	5	0
15	Average land tax @ Rs 132 acre/ annum	"		132	66	132	66	0
16	Drainage Cess			24	12	24	12	0
17	Gross cost (item 1-17)	Rs./ acre			50343		61322	10979
18	Value of paddy straw	Rs./acre			4000		4000	0
19	Net cost of cultivation (item 18-19)	Rs./ acre			46343		57322	10979
20	Yield	Kg/ acre			2000		2200	200
21	Cost of production at farm gate (Rs./40 Kg)							
	21.1 With land rent	Rs./ 40 Kg			927		1042	115
	21.2 Without land rent	Rs./ 40 Kg			627		742	115
22	Marketing chrages (Rs./ 40 Kg)	Rs./ 40 Kg			55		60	5
23	Cost of production at market level (Rs./40 Kg)	Rs./ 40 Kg						
	23.1 With land rent	Rs./ 40 Kg			982		1102	120
	23.2 Without land rent	Rs./ 40 Kg			682		802	120

Source:

* API field surveys

**ECONOMICS OF RICE PADDY AND COMPETING CROPS AT
PRICES REALIZED BY THE GROWERS: 2020-21 CROPS**

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		
									Rupee of purchased inputs	Crop day	Acre inch of water used
	Days	Acre inchesRupees per acre.....						RatioRupees.....	
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

Basmati Paddy	180	58	63164	32362	72846	40484	9682	1.15	2.25	405	1256
IRRI Paddy	180	62	64507	28885	65244	36359	736	1.01	2.26	362	1052
Seed Cotton	240	22	76796	25962	89680	63718	12884	1.17	3.45	374	4076
Wheat	180	12	53313	16857	60400	43543	7087	1.13	3.58	336	5033
Sunflower (spring)	180	22	55703	19098	74250	55152	18547	1.33	3.89	413	3375
Seed Cotton + Wheat	420	34	130108	42820	150080	107260	19972	1.15	3.50	357	4414
Seed Cotton+Sunflower	420	44	132499	45061	163930	118869	31431	1.24	3.64	390	3726
Basmati Paddy+Wheat	360	70	116477	49219	133246	84027	16770	1.14	2.71	370	1904
Basmati Paddy+Sunflower	360	80	118867	51460	147096	95636	28229	1.24	2.86	409	1839
IRRI Paddy + Wheat	360	74	117820	45742	125644	79902	7824	1.07	2.75	349	1698
IRRI Paddy+Sunflower	360	84	120211	47983	139494	91511	19283	1.16	2.91	387	1661
Sugarcane	394	48	122786	39703	162050	122347	39264	1.32	4.08	411	3376

Sindh

IRRI Paddy	180	56	50593	19677	76250	56573	25657	1.51	3.88	424	1362
Seed Cotton	240	18	81210	28060	92422	64362	11212	1.14	3.29	385	5135
Wheat	180	12	54556	17571	70000	52429	15444	1.28	3.98	389	5833
Sunflower (spring)	180	22	39958	14393	51909	37517	11951	1.30	3.61	288	2360
Seed Cotton + Wheat	420	30	135766	45631	162422	116791	26656	1.20	3.56	387	5414
Seed Cotton+Sunflower	420	40	121169	45631	144331	98700	23163	1.19	3.16	344	3608
IRRI Paddy+ Wheat	360	68	105149	37249	146250	109001	41101	1.39	3.93	406	2151
IRRI Paddy+Sunflower	360	78	90551	34070	128159	94090	37608	1.42	3.76	356	1643
Sugarcane	488	71	116096	37238	152790	115552	36694	1.32	4.10	313	2152

Notes for Annex -VII:

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2020-21 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, 2020-21 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 2020-21 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2020-21 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 1800 per 40 kgs, as maintained by the Punjab and Rs 2000 by Sindh for 2020-21 crop, have 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 2000 and Rs 1300 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 1500 per 40 kgs.
 - 4.3 The wholesale market prices of seed cotton during the post-harvest months of 2020-21 in the main producer area markets have averaged at Rs 4524 per 40 kgs in the Punjab and Rs 4241 Sindh.
 - 4.4 The price of Sunflower crops has been reported hovering around Rs 4000/40 kgs and Rs 4000/40 kgs for Canola during 2020-21.
 - 4.5 The average market prices of sugarcane as realized by the farmers are taken for the analysis i.e Rs 250 per 40 kgs in the Punjab and Sindh. However, the prices notified by the provincial governments were lower i.e Rs 200 and 202, 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 18.5 per 40 kgs in Punjab and 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 40 in Punjab and Rs 45 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.

EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB (KARACHI) PRICE

S.No	Item	During June, 2021	
		Basmati	IRRI-6
		----- US \$ Per Tonne -----	
1.	Average fob (Karachi) prices of rice		
	US\$ per tonne	883.69	473.3
	Current exchange rate (Rs per US\$)	163.25	163.25
	Pak Rupees per tonne	144262	77266
		----- Rs per 40 kgs -----	
2.	Expenses from sheller/ market to export point	5770	3091
		175	100
3.	Producer area market level price of rice (item 1-item 2)	5595	2991
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
	vi) Bran powder	8.8	25.0
	v) Husk	25.0	5.0
	vi) Dust and inert matter	9.7	4.5
5.	Prices of products	-----Rs per 40 kgs-----	
	i) Rice as calculated in item 3	5595	2991
	ii) Brokens	3357	2093
	iii) Tips	1000	1000
	vi) Bran powder	800	800
	v) Husk	250	252
	vi) Dust and inert matter	0.00	0.00
6.	Value of products recoverable from 100 kgs paddy	-----Rupees -----	
	i) Rice as calculated in item 3	6715	4336
	ii) Broken (a)	420	262
	iii) Tips	88	63
	vi) Bran powder (b)	70	50
	v) Husk and dust	55	158
	vi) Total value of all products	7346	4868
7.	Husking/Processing /financial per 100 kgs	300	300
8.	Mill-gate price of paddy per 100 kgs	7046	4568
9.	Mill-gate price of paddy per 40 kgs	2819	1827

Sources:

- 1 Federal Bureau of Statistics, Karachi.
- 2 Rice Exporters/Millers for incidental charges.

EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB (KARACHI) PRICE

S.No	Item	During 2020-21		
		Basmati		IRRI-6
		----- US \$ Per Tonne -----		
1.	Average fob (Karachi) prices of rice US\$ per tonne	915.09		478.61
	Current exchange rate (Rs per US\$)	163.25		163.25
	Pak Rupees per tonne	149388		78133
		----- Rs per 40 kgs -----		
2.	Expenses from sheller/ market to export point	5976		3125
		175		100
3.	Producer area market level price of rice (item 1-item 2)	5801		3025
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
	vi) Bran powder	8.8		25.0
	v) Husk	25.0		5.0
	vi) Dust and inert matter	9.7		4.5
5.	Prices of products	-----Rs per 40 kgs-----		
	i) Rice as calculated in item 3	5801		3025
	ii) Brokens	3480		2118
	iii) Tips	1000		1000
	vi) Bran powder	800		800
	v) Husk	250		252
	vi) Dust and inert matter	0.00		0.00
6.	Value of products recoverable from 100 kgs paddy	-----Rupees -----		
	i) Rice as calculated in item 3	6961		4387
	ii) Broken (a)	435		265
	iii) Tips	88		63
	vi) Bran powder (b)	70		50
	v) Husk and dust	55		158
	vi) Total value of all products	7608		4921
7.	Husking/Processing /financial per 100 kgs	300		300
8.	Mill-gate price of paddy per 100 kgs	7308		4621
9.	Mill-gate price of paddy per 40 kgs	2923		1849

Sources:

- 1 Federal Bureau of Statistics, Karachi.
- 2 Rice Exporters/Millers for incidental charges.

EXPORT PARITY PRICES OF BASMATI PADDY ON THE BASIS OF FOB (KARACHI) PRICE

S.No	Item	During 2018-19 to 2020-21	
		Basmati	IRRI-6
		----- US \$ Per Tonne -----	
1.	Average fob (Karachi) prices of rice		
	US\$ per tonne	927.22	439.12
	Current exchange rate (Rs per US\$)	163.25	163.25
	Pak Rupees per tonne	151369	71686
		----- Rs per 40 kgs -----	
2.	Expenses from sheller/ market to export point	6055	2867
		175	100
3.	Producer area market level price of rice (item 1-item 2)	5880	2767
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
	vi) Bran powder	8.8	25.0
	v) Husk	25.0	5.0
	vi) Dust and inert matter	9.7	4.5
5.	Prices of products	-----Rs per 40 kgs-----	
	i) Rice as calculated in item 3	5880	2767
	ii) Brokens	3528	1937
	iii) Tips	1000	1000
	vi) Bran powder	800	800
	v) Husk	250	252
	vi) Dust and inert matter	0.00	0.00
6.	Value	-----Rupees -----	
	i) Rice as calculated in item 3	7056	4013
	ii) Broken (a)	441	242
	iii) Tips	88	63
	vi) Bran powder (b)	70	50
	v) Husk and dust	55	158
	vi) Total value of all products	7709	4525
7.	Husking/Processing /financial per 100 kgs	300	300
8.	Mill-gate price of paddy per 100 kgs	7409	4225
9.	Mill-gate price of paddy per 40 kgs	2964	1690

Sources:

- 1 Federal Bureau of Statistics, Karachi.
- 2 Rice Exporters/Millers for incidental charges.

REGION WISE EXPORT OF BASMATI AND COARSE RICE DURING : 2018-19 AND 2019-20

Region	Quantity			Value			% Share in in total export	
	2018-19	2019-20	%	2018-19	2019-20	%	2018-19	2019-20
	...000 tonnes.....		Change	...Million US \$...		Change	Per cent	
<u>A. Basmati Rice</u>								
Asia	246.004	533.788	116.98	255.414	497.227	94.67	43.85	63.10
Oceania	14.438	22.681	57.09	16.060	21.226	32.17	2.57	2.68
Europe	244.009	129.204	-47.05	248.593	132.516	-46.69	43.49	15.27
Africa	29.777	100.738	238.31	28.917	81.892	183.20	5.31	11.91
America	26.806	59.538	122.11	32.945	53.824	63.38	4.78	7.04
Total	561.034	845.949	50.78	581.929	786.685	35.19	100.00	100.00
CIS*	30.094	1.387	-95.39	30.471	1.468	-95.18	5.36	0.16
<u>B. Coarse Rice</u>								
Asia	1505.258	1142.443	-24.10	657.331	429.315	-34.69	42.46	34.71
Oceania	3.102	2.713	-12.54	2.017	1.664	-17.49	0.09	0.08
Europe	135.721	381.265	180.92	74.742	292.834	291.79	3.83	11.58
Africa	1891.727	1726.714	-8.72	718.104	656.932	-8.52	53.36	52.46
America	9.217	38.467	317.35	4.339	17.549	304.45	0.26	1.17
Total	3545.025	3291.602	-7.15	1456.533	1398.295	-4.00	100.00	100.00
CIS*	201.927	26.469	-86.89	77.796	10.287	-86.78	5.70	0.80

*CIS countries are also included in upper region for 2019-20

Source: FBS, Karachi

ECONOMIC EFFICIENCY OF RESOURCE USE IN BASMATI (PADDY) PRODUCTION IN PUNJAB

Based on export parity prices

Description	Revenues	Traded inputs cost	Domestic	
			factor cost	Profits
----- Rupees per acre -----				
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	67080	20763	31765	14552
Social Prices	100768	21732	31986	47050
Transfers	-33688	-969	-221	-32498
2019-20				
Private Prices	82839	26780	34878	21181
Social Prices	103420	27772	35100	40548
Transfers	-20581	-992	-221	-19368
2020-21				
Private Prices	75061	27084	36204	11773
Social Prices	104297	28009	36425	39863
Transfers	-29236	-924	-221	-28091

ANNEX-XIII

ECONOMIC EFFICIENCY OF RESOURCE USE IN IRRI (PADDY) PRODUCTION IN SINDH

Based on export parity prices

Description	Revenues	Traded inputs cost	Domestic Factor cost	Profits
----- Rupees per acre -----				
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	14277	27134	18339
Social Prices	77550	13764	27343	36443
Transfers	-17800	513	-209	-18104
2019-20				
Private Prices	67400	17076	31375	18950
Social Prices	84550	16316	31584	36650
Transfers	-17150	759	-209	-17700
2020-21				
Private Prices	79950	18191	32231	29528
Social Prices	93700	17310	32440	43950
Transfers	-13750	881	-209	-14422

**AREA AND PRODUCTION OF MAJOR RICE PRODUCING COUNTRIES IN THE
WORLD : 2019 CROP**

S.No.	Country	Area (million)ha	Per cent share
1	India	43.780	29.15
2	China, mainland	29.690	19.77
3	Bangladesh	11.517	7.67
4	Indonesia	10.678	7.11
5	Thailand	10.407	6.93
6	Viet Nam	7.571	5.04
7	Philippines	4.800	3.20
8	Nigeria	3.346	2.23
9	Cambodia	3.001	2.00
10	Pakistan	2.810	1.87
11	Guinea	1.924	1.28
12	Democratic Republic of the Congo	1.813	1.21
13	Brazil	1.710	1.14
14	Japan	1.542	1.03
15	United Republic of Tanzania	1.200	0.80
16	United States of America	1.180	0.79
17	Sri Lanka	1.041	0.69
	Total of 17 countries	138.010	85.17
	World Total 107 countries	150.21	100.00
S.No.	Country	Production million(tonnes)	Per cent share
1	China, mainland	139.74	29.14
2	India	118.43	24.70
3	Indonesia	36.40	7.59
4	Bangladesh	36.39	7.59
5	Viet Nam	29.36	6.12
6	Thailand	21.46	4.48
7	Philippines	12.71	2.65
8	Cambodia	7.26	1.51
9	Pakistan	7.20	1.50
10	Japan	7.02	1.46
11	Brazil	6.91	1.44
12	United States of America	6.78	1.41
13	Nigeria	4.54	0.95
14	Egypt	4.46	0.93
15	Republic of Korea	3.46	0.72
16	Madagascar	2.82	0.59
17	Sri Lanka	2.62	0.55
	Total of 17 countries	447.58	93.33
	World Total 107 Countries	479.56	100.00
Source FAO Stat.(World Statistics Year Book 2019.)			
Note: Rice production has worked out from paddy production assuming rice (paddy)ratio is 2/3			

**YIELD PER HECTARE OF MAJOR RICE PRODUCING COUNTRIES IN THE WORLD:
2019 CROP**

S.No.	Name of Country	Yield	S.No.	Name of Country	Yield
		Kgs/hect			Kgs/hect
1	Australia	5847	32	Kazakhstan	3666
2	Tajikistan	5725	33	France	3645
3	United States of America	5582	34	Portugal	3573
4	Egypt	5582	35	Romania	3547
5	Uruguay	5517	36	Mauritania	3499
6	Morocco	5401	37	Ukraine	3465
7	Turkey	5273	38	Madagascar	3458
8	Peru	5128	39	Indonesia	3409
9	Spain	5023	40	Guyana	3391
10	Greece	4933	41	Costa Rica	3239
11	China, mainland	4707	42	Uzbekistan	3231
12	Republic of Korea	4582	43	Sri Lanka	3197
13	Kenya	4558	44	Bangladesh	3160
14	Japan	4551	45	Iran (Islamic Republic of)	3039
15	Italy	4522	46	Suriname	3038
16	Chile	4443	47	Niger	3036
17	China, Taiwan Province of	4422	48	Iraq	3001
18	Paraguay	4400	49	Lao People's Democratic Republic	2924
19	Argentina	4328	50	Ecuador	2850
20	El Salvador	4277	51	Venezuela (Bolivarian Republic of)	2847
21	Mexico	4244	52	Malaysia	2837
22	Nicaragua	4224	53	Hungary	2775
23	North Macedonia	4075	54	Bhutan	2715
24	Brazil	4042	55	India	2705
25	Democratic People's Republic of Korea	4012	56	Philippines	2697
26	Bulgaria	4000	57	Rwanda	2667
27	Viet Nam	3878	58	Myanmar	2530
28	Russian Federation	3841	59	Nepal	2507
29	Belize	3834	60	Honduras	2505
30	Colombia	3780.8	61	Pakistan	2442
31	Dominican Republic	3686.1			

Source: World Statistics Year Book 2019.

AVAILABILITY OF CERTIFIED SEED OF RICE PADDY: 2015-16 TO 2020-21

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)	
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
2019-20	Punjab	1662.0	367.1	2029.1	29121.5	5824.3	40966.4	140.7	703.4
	Sindh	0.0	775.8	775.8	19395.8	3879.2	2355.0	12.1	60.7
	KPK	0.0	65.1	65.1	1627.5	325.5	695.0	42.7	213.5
	Balochistan	0.0	164.2	164.2	4105.0	821.0	210.0	5.1	25.6
	Total	1662.0	1372.2	3034.2	54249.8	10850.0	44226.4	81.5	407.6
2020-21	Punjab	1871.6	522.8	2394.4	35530.2	7106.0	64125.1	180.5	902.4
	Sindh	0.0	709.0	709.0	17724.2	3544.8	4690.8	26.5	132.3
	KPK	0.0	64.9	64.9	1622.5	324.5	1403.8	86.5	432.6
	Balochistan	0.0	167.2	167.2	4180.0	836.0	900.0	21.5	107.7
	Total	1871.6	1463.9	3335.5	59056.9	11811.4	71119.7	120.4	602.1

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