

Monitoring Wheat Varieties Grown in Irrigated Baluchistan



**Qazi Bashir Ahmad
Umar Farooq
Jim Longmire**

AERU, Quetta Staff Paper No. 89-2

Agricultural Economics Research Unit (PARC)
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Sariab, Quetta.
PARC/CIMMYT Collaborative Programme
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Formal Survey

- Qazi Bashir Ahmad (P.I.)
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- Abdul Haq
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A.R.O., ARI, Quetta.

Data Analysis and Report Writing

- Qazi Bashir Ahmad (P.I.)
AERU, ARI, Quetta.
- Umar Farooq (R.A)
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- Jim Longmire (Economist)
CIMMYT, Islamabad.

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Abbreviations

ARO	:	Assistant Research Officer
AERU	:	Agricultural Economics Research Unit.
A.O.	:	Agricultural Officer.
ARI	:	Agricultural Research Institute.
CIMMYT	:	International Maize and Wheat Improvement Center.
E.A.D.A.	:	Extra Assistant Director Agriculture.
PARC	:	Pakistan Agricultural Research Council.
P.I.	:	Principal Investigator.
SSD	:	Social Sciences Division.
R.A.	:	Research Assistant.

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Introduction

Wheat occupies a large area of the rabi season crop land in Baluchistan. Approximately 294 thousand hectares were planted to wheat in Baluchistan in 1986-87. Improved wheat varieties play a vital role in increasing wheat productivity. Wheat scientists and breeders in Pakistan are working continuously to develop rust and disease resistant varieties. Despite this, adoption of new improved wheat varieties in Pakistan is rather slow (Akhtar et al. 1986-87; Heisey et al. 1988).

Presently, wheat varieties planted by farmers are not regularly monitored in Baluchistan. A regular wheat varietal monitoring, in farmers' fields is needed. The main objective of this study is to identify the varieties grown in selected villages of Jafarabad and Kalat districts of Baluchistan during 1988.

A Perspective on Wheat in Baluchistan

Wheat is grown in Baluchistan under several quite different agro-ecological conditions. In the irrigated areas of the Indus plains of Baluchistan, wheat is grown in rotation with rice or sorghum -- although cropping intensity is not high. Water availability is a key constraint to crop production, and salinity and waterlogging are very serious problems. Baluchistan is divided into two main categories on the basis of altitudes. Area having altitude less than 1000 meters fall under lowlands category, while remaining as uplands. Upland Baluchistan encompasses the districts of Kachhi, Khuzdar, Kalat, Loralai, Pishin, Quetta and Zhob. Upland areas of Baluchistan also grow considerable wheat, both irrigated and under rainfed conditions. Westerly rains, combined with cold winters are typical of upland conditions of Baluchistan (Masood M.A. et al. 1988). Approximately 60 percent of Baluchistan's wheat is grown on the Indus plains, the remainder being grown in upland areas.

Table 1 and 2 shows the province-wise change and annual growth in area, yield and production of wheat in Pakistan from 1970-71 to 1986-87. The growth and its annual rate for area, yield and production since 1970-71 are much above those of other provinces of the country. Similarly, the growth and percent annual increase in area and production of wheat in low lands is much higher compared to uplands. But the increase and increment of yield per hectare is higher for uplands (Table 3 & 4).

Table 1: Province-wise Area, Yield and Production of Wheat in Pakistan, 1969-72 and 1985-88.

		Punjab	Sind	NWFP	Baluch- istan	Pakistan
Area (000 ha)	Av. 1969-70 to 1971-72	4364	852	603	181	6001
	Av. 1985-86 to 1987-88	5420	1031	780	242	7473
Percent Change		24	21	29	34	25
Yield/ha (Kg)	Av. 1968-69 to 1972-73	1213	1308	637	530	1147
	Av. 1985-86 to 1987-88	1723	2123	1181	1810	1722
Percent Change		42	62	85	242	50
Production (000 tons)	Av. 1968-69 to 1972-73	5294	1114	384	96	6887
	Av. 1985-86 to 1987-88	9323	2188	922	438	12871
Percent Change		76	96	140	356	74

Source : Statistical Bulletin on Wheat in Pakistan, SSD, PARC, Islamabad.
Agricultural Statistics of Pakistan 1987-88.

Table 2: Percent Change per Annum in Area, Yield and Production of Wheat in Different Provinces of Pakistan, 1969-72 to 1985-88.

	Punjab	Sind	NWFP	Baluch- istan	Pakistan
Area	1.4	1.2	1.6	1.8	1.4
Yield/ha	2.2	3.1	3.9	8.0	2.6
Production	3.6	4.3	5.6	9.9	4.0

Table 3: Area, Yield and Production of Wheat in Uplands and Lowlands of Baluchistan, 1970-75 and 1984-87.

		Uplands	Lowlands	Total
Area (000 ha)	Av. 1970-71 to 1974-75	97.9	65.9	163.8
	Av. 1984-85 to 1986-87	126.1	146.8	272.9
Percent Change		28.8	122.8	66.7
Yield/ha (Kg)	Av. 1970-71 to 1974-75	471	716	569
	Av. 1984-85 to 1986-87	1333	1944	1662
Percent Change		183	172	192
Production (000 tons)	Av. 1970-71 to 1974-75	46.1	47.1	93.2
	Av. 1984-85 to 1986-87	168.1	285.4	453.5
Percent Change		264.6	505.9	386.6

Source : Statistical Bulletin on Wheat in Pakistan, SSD, PARC, Islamabad.
Agricultural Statistics of Pakistan 1987-88.

Table 4: Percent Change in Area, Yield and Production of Wheat in Uplands and Lowlands of Baluchistan, 1970-75 and 1984-87.

	Uplands	Lowlands	Total
Area	2.0	6.3	4.0
Yield/ha	8.3	8.0	8.6
Production	10.5	14.9	12.9

Table 5 shows the province-wise performance of High Yielding Varieties (HYV's) in Pakistan in 1970-71 and 1987-88. Baluchistan is again impressive in terms of growth of area, yield and production. Clearly, the farmers of Baluchistan have very rapidly adopted high yielding varieties. Further evidence of this rapid growth in use of improved wheats in Baluchistan is presented in Table 6.

Table 5: Province-wise Area, Yield and Production of High Yielding Varieties of Wheat in Pakistan, 1969-72 and 1985-88.

		Punjab	Sind	NWFP	Baluch- istan	Pakistan
Area (000 ha)	Av. 1969-70 to 1971-72	2299	501	210	22	3032
	Av. 1985-86 to 1987-88	5146	992	569	178	6885
Percent Change		124	98	171	709	127
Yield/ha (Kg)	Av. 1969-70 to 1971-72	1683	1655	1000	1136	1627
	Av. 1985-86 to 1987-88	1767	2162	1353	2112	1799
Percent Change		5	31	35	86	11
Production (000 tons)	Av. 1969-70 to 1971-72	3869	829	210	25	4933
	Av. 1985-86 to 1987-88	9095	2145	770	376	12386
Percent Change		135	159	267	1404	151

Source : Statistical Bulletin on Wheat in Pakistan, SSD, PARC, Islamabad.
Agricultural Statistics of Pakistan 1987-88.

Table 6: Percent Change per Annum in Area, Yield and Production, of High Yielding Wheat Varieties in Different Provinces of Pakistan, 1969-72 to 1985-88.

	Punjab	Sind	NWFP	Baluch- istan	Pakistan
Area	5.2	4.4	6.4	14.0	5.3
Yield/ha	0.3	1.7	1.9	4.0	0.6
Production	5.5	6.1	8.4	18.5	5.9

Research Methods

A wheat varietal adoption survey was conducted by AERU, Sariab, Quetta in October 1988. The survey was undertaken in two major growing areas -- the rice-wheat area of the Indus Valley and the potato-wheat area of Upland Baluchistan. For the wheat-rice growing area of Baluchistan, Jafarabad district was selected, while Kalat district was selected for the potato-wheat area. Two tehsils (Dera Allahyar and Usta Mohammad) were chosen for the survey from Jafarabad district and five tehsils (Kalat, Kad Kocha, Manguchar, Surab, and Mastung) were selected from Kalat district. Ninety and one hundred farmers were interviewed from Jafarabad and Kalat districts, respectively. The data presented in Table 7 show the sample distribution by farm size and district in the study area. Overall, the sample contained 38% small farmers, 33% medium and 29% large in the study area. The proportion of small and medium farmers is higher in Kalat district as compared to the Jafarabad district, while the percentage of large farmers is more in Jafarabad.

Table 7: Sample Distribution by Farm Size Groups in Jafarabad and Kalat Districts of Baluchistan, 1988.

Tehsils	Farm Size Groups			All Tehsils
	Small	Medium	Large	
	(percent farmers)			
Jafarabad	33.3	24.4	42.3	47.4
Kalat	42.0	40.0	18.0	52.6

Note : Small Farmers are defined as those with cultivated area less than 10 hectares; medium, 10-20 hectares; and large, with more than 30 hectares.

The sample distribution by tenurial status and district is given in Table 8. About 80 percent of the farmers were owner operators, the remainder being tenant operators. The percentage of owner operators is higher in Kalat district as compared to Jafarabad.

Table 8: Sample Distribution by Tenancy Status in Jafarabad and Kalat Districts of Baluchistan, 1988.

Tehsils	Tenancy Status Groups		All Tehsils
	Owners	Tenants	
	(percent farmers)		
Jafarabad	66.7	33.3	47.4
Kalat	91.0	9.0	52.6

Results and Discussions

Farm Size and Wheat Area

The data regarding farm size and average wheat area per farm are presented in Table 9. Overall, wheat amounted to about 40 percent of the total cropped area on the sampled farms. However, Kalat farmers devoted more area to wheat as compared to those of Jafarabad. Generally, large farmers devoted slightly more of their area to wheat than small farmers. This reflects the fact that the major source of income for small farmers is rice in Jafarabad district, and potatoes in Kalat. Also, large farmers probably have better access to water to grow wheat.

Table 9: Average Wheat Area by Farm Size Groups in Jafarabad and Kalat Districts of Baluchistan, 1988.

Tehsil/ Farm Size Groups	Average Farm Area (ha)	Average Area Under Wheat (ha)	Area Under Wheat (%)
Jafarabad			
Small Farmers	5.9	1.9	31.7
Medium Farmers	13.6	4.6	34.1
Large Farmers	70.4	26.3	37.4
Total	35.0	12.9	36.7
Kalat			
Small Farmers	6.1	2.5	41.1
Medium Farmers	13.6	5.7	39.6
Large Farmers	33.0	15.8	47.9
Total	13.9	6.2	44.3

Information about farm size and wheat area by tenure is shown in Table 10. The average farm size of owner-operated farms was about three times more than that of the tenants. Slightly more of the rabi cropped area was devoted to wheat by tenant.

Table 10: Average Wheat Area by Tenurial Status Groups in Jafarabad and Kalat Districts of Baluchistan, 1988.

Tehsil/ Tenancy Groups	Average Farm Area (ha)	Average Area Under Wheat (ha)	Area Under Wheat (%)
Jafarabad			
Owners	47.8	17.3	36.2
Tenants	9.4	4.0	42.2
Total	35.0	12.9	36.7
Kalat			
Owners	14.5	6.3	43.8
Tenants	8.7	4.5	52.3
Total	13.9	6.2	44.3

Number of Wheat Varieties Planted

Information regarding the number of wheat varieties grown by farm size groups are presented in Table 11. 68 percent of the farmers grow only one variety while 32 percent of the farmers grew two or more varieties in the sampled area. A much higher percentage of small and medium sized farms was growing only one wheat variety as compared to large farms. The percentage of small and medium farmers growing only one variety was higher in Jafarabad district as compared to Kalat.

Table 11: Number of Wheat Varieties Planted in Jafarabad and Kalat Districts of Baluchistan by Farmers of Various Farm Size Groups, 1988.

District/ Farm Size Groups	Number of Varieties Planted		
	One	Two	More than Two
	(percent farmers)		
<u>Jafarabad</u>			
Small Farmers	88.2	11.8	-
Medium Farmers	83.3	16.7	-
Large Farmers	45.9	29.7	24.3
Total	65.3	22.2	12.5
<u>Kalat</u>			
Small Farmers	65.8	26.3	7.9
Medium Farmers	73.7	21.1	5.3
Large Farmers	66.7	16.7	16.6
Total	69.1	22.3	8.5

Percent Area Under Main Wheat Varieties Planted

The percentage of area planted to different varieties of wheat by farm size and overall is presented in Table 12. About 90 percent of the area is under improved varieties in Jafarabad district, while about 65 percent of the area in Kalat district is cultivated with local varieties. WL-711 occupies the largest percentage of the wheat area among small and large farmers in Jafarabad district, although PAK-81 and Pavon are also important. Improved varieties of importance in the Kalat district are Sonalika and Pavon.

Table 12: Area Under Different Wheat Varieties Planted by Farmers of Various Farm Size Groups in Jafarabad and Kalat Districts, Baluchistan, 1988.

Districts/ Varieties	Farm Size Groups			Overall
	Small	Medium	Large	
(percentage of total wheat area)				
Jafarabad				
PAK-81	5.8	27.9	18.9	19.0
Mexi-Pak	0.0	0.0	3.6	3.1
W1-711	61.2	21.7	45.3	44.0
Pavon	24.4	27.1	17.1	18.4
Sonalika	2.9	12.4	4.9	5.4
Zarghoon	0.0	3.9	0.3	0.6
Chanab 70	5.7	0.0	0.0	0.3
Punjab 81	0.0	1.6	0.9	0.9
Faisalabad 83	0.0	0.0	2.0	1.7
Johar	0.0	0.0	3.9	3.4
Local	0.0	5.4	3.1	3.2
Kalat				
PAK-81	2.5	0.9	0.0	0.7
Pavon	20.2	13.1	15.9	15.6
Sonalika	0.0	6.7	17.2	10.4
Zarghoon	8.5	6.2	3.6	5.4
Yecora	0.0	8.2	0.0	3.1
Local	68.8	64.9	63.3	64.8

Area Under Recommended and Non-Recommended Wheat Varieties

Improved varieties play a key role in increasing the per hectare yield and production of Pakistan. Agriculture Departments make recommendations for suitable varieties for different areas each year. During 1987-88, for Jafarabad district, the recommended varieties were PAK-81, Pavon, Sonalika, Faisalabad 83 and Zarghoon. PAK-81, Pavon, Sonalika and Zarghoon were recommended by the Agriculture Department for Kalat. The percentage of area of total wheat area planted to the recommended high yielding varieties by farmers of various sizes is presented in Table 13. Overall, only 41 percent of the total wheat surveyed area was under recommended varieties. Jafarabad farmers have a much higher proportion of their wheat area under recommended varieties, compared to those of Kalat. This is mainly due to the reason that Jafarabad is near to Sind province and most of the output of this province goes to Sind markets. In contrast, the majority of Kalat farmers are largely self-sufficient in wheat and grow more older varieties. This is probably for three reasons: farmers prefer the quality of local

old varieties more than that of recommended varieties; farmers believe the older local varieties produce more bhusa (straw); and the old local varieties might be more stable in yield and better adapted to some upland conditions than the recommended varieties.

Table 13: Area Under Recommended and Non-Recommended Wheat Varieties Planted by Farmers of Various Farm Size Groups in Jafarabad and Kalat Districts, Baluchistan, 1988.

Districts/Type of Varieties	Farm Size Groups			All Districts
	Small	Medium	Large	
(percentage of total wheat area)				
<u>Jafarabad</u>				
Recommended	33	73	43	45
Non-Recommended	37	27	57	55
<u>Kalat</u>				
Recommended	31	28	37	32
Non-Recommended	69	72	63	68

Information on use of recommended and non-recommended varieties are presented in Table 14. In Jafarabad, tenants are planting a higher share of wheat area to recommended varieties than owners. The opposite is the case in Kalat.

Table 14: Area Under Recommended and Non-Recommended Wheat Varieties Planted by Farmers of Various Tenancy Status Groups in Jafarabad and Kalat Districts, Baluchistan, 1988.

Districts/Type of Varieties	Tenancy Status Groups		All
	Owners	Tenants	
(percentage of total wheat area)			
<u>Jafarabad</u>			
Recommended	43	65	45
Non-Recommended	57	35	55
<u>Kalat</u>			
Recommended	34	15	32
Non-Recommended	66	85	68

Summary and Suggestions

This study was undertaken to assess farmers' use of different wheat varieties in two major growing environments of Baluchistan. Overall, farmers planted wheat on 39% of their cultivated area. Overall, 41 percent of the average cultivated area of the sample farmers was under recommended varieties. However, the share of under recommended varieties was much higher in Jafarabad district (Indus plains) than in Kalat district (upland).

The above results call for strengthening the research and extension in introducing and convincing the Kalat farmers to grow recommended wheat varieties. This will be helpful to increase farmers' income from their main crop. The study also suggests the need for more detailed diagnostic analysis of farmers' circumstances and research and extension needs in both districts.

References

- Akhtar M.R., Z. Ahmad, K.A. Tetlay, 1987. "Monitoring Wheat Varietal Diffusion in the Irrigated Punjab: Results from 1986-87". Agricultural Economics Research Unit (PARC), Staff Paper No. 87-3, Faisalabad.
- Government of Pakistan, Ministry of Food, Agriculture and Cooperatives, Food & Agriculture Division (planning Unit), "Agricultural Statistics of Pakistan, 1983-86".
- Heisey P.W. et al. 1988. "Transferring the Gains from Wheat Breeding Research and Preventing Rust Losses in Pakistan". Draft 3.
- Masood M.A., M. Afzal, J.G. Nagy and S.M. Khan 1988. "Agricultural and Related Statistics of Upland Baluchistan". Research Report No. 20, Arid Zone Research Institute, PARC, Quetta.
- Sharif M., M. Shafique, Z. Ahmad, M. A. Maqbool and J. Longmire, 1988. "Monitoring Wheat Varietal Diffusion in the Irrigated Punjab: Results from 1987-88". AERU, Faisalabad Staff Paper No. 88-5.
- Social Sciences Division, PARC., 1983. "Statistical Bulletin on Wheat in Pakistan". Pakistan Agricultural Research Council, Islamabad.

