

WHEAT VARIETAL VERIFICATION IN THE
IRRIGATED SIND:
FARMERS' AND BREEDERS' PERCEPTIONS

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Preface

This study is the joint venture of Agricultural Economists of AERU (PARC), Sind Agriculture University and Wheat Botanists of A.R.I, Tando Jam.

To determine the impact on research and the transfer of new technology, this study entitled "Wheat varietal verification in the irrigated Sind: Farmers' and Breeders' perceptions" has been carried out. I am confident that the material presented in this report will be of great help to scholars, teachers, researchers, economists and policy makers in developing and designing research work and in formulating plans and policy of national importance.

The researchers who worked hard with devotion and motivation to be congratulated for such data collection, analysis and presentation of the document.



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This study is a result of a multi-disciplinary team of Social Scientists i.e Agricultural Economists from the AERU (PARC), S.A.U.Tandojam and Biological Scientists from A.R.I Tandojam. The following scientists contributed at various stages of the study:

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Abbreviations:

A.E.R.U Agricultural Economics Research Unit, Tandojam

A.R.I Agriculture Research Institute Tandojam

CIMMYT International Maize and Wheat Improvement Center,
Islamabad

P.A.R.C Pakistan Agricultural Research Council

S.A.U Sind Agriculture University Tandojam.

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WHEAT VARIETAL VERIFICATION IN THE IRRIGATED SIND: FARMERS' AND BREEDERS' PERCEPTION

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Introduction

One of the most pressing issues in Pakistan is to accelerate agricultural growth and to achieve self-sufficiency in food. The solution for this problem necessitates not only a physical increase in food production but also its efficient management and distribution through out the country. Wheat is the staple food grain of Pakistan. The wheat crop occupies vast acreage in rabi season. An increase in wheat production to the level of sustained self-sufficiency is technically possible (Memon, 1983).

Recommended wheat varieties are an important component of improved wheat technology. Presently, wheat varieties planted by farmers are not regularly monitored in Sind. Researchers and policy makers are not fully aware of farmers behaviour with regards to choice of varieties planted. This information

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is necessary since severe rust epidemics can cause huge losses to national welfare. A regular wheat varietal monitoring in farmers fields is needed. This would also help to determine the impact of research and the transfer of new technology.

The main objective of this study is to report/identify the varieties grown in selected villages of Hyderabad and Badin districts of Sind province during 1986-87 planted by farmers and identified by the breeders. The results of the report could be utilized by researchers and policy makers. The report also suggests appropriate methodology for monitoring varieties.

RESEARCH METHODS

Sample and survey design

The wheat varietal verification survey was conducted by a team of agricultural economists and wheat breeders' in two stages. In the first stage, during the second week of March 1987, agricultural economists from the Agricultural Economics Research Unit (PARC), Tandojam and the Department of Agricultural Economics, Sind Agriculture University Tandojam undertook a survey of farmers use, knowledge and perceptions of improved wheat technology in cotton-wheat and sugarcane-wheat cropping systems of Sind. 18 and 14 villages, from two adjacent talukas for each cropping system were randomly selected with the probability of selection proportional to the size of the village population. Tando Allahyar and Hala talukas were selected from

Hyderabad District for the cotton-wheat cropping system and Matli and Badin talukas were selected from Badin district for the sugarcane-wheat cropping system (Fig. 1 and 2).

The survey team interviewed 15-20 farmers from each village, depending on the availability of farmers, about the wheat area that they had planted under different varieties in 1986-87. At this time 450 farmers were interviewed. Table 1 indicates the breakdown of interviews by cropping system and by taluka.

Table 1. Farmers and wheat fields sampled in the cotton and sugarcane zones by talukas, 1986-87.

AREA (TALUKAS)	FARMERS		FIELDS	
	Number	Percent	Number	Percent
COTTON ZONE				
Tando Allahyar	120	26.7	190	30.2
Hala	130	28.8	175	27.8
All	250	55.5	365	58.00
SUGARCANE ZONE				
Matli	104	23.2	143	22.7
Badin	96	21.3	121	19.3
All	200	44.5	264	42.00
Both zones	450	100	629	100

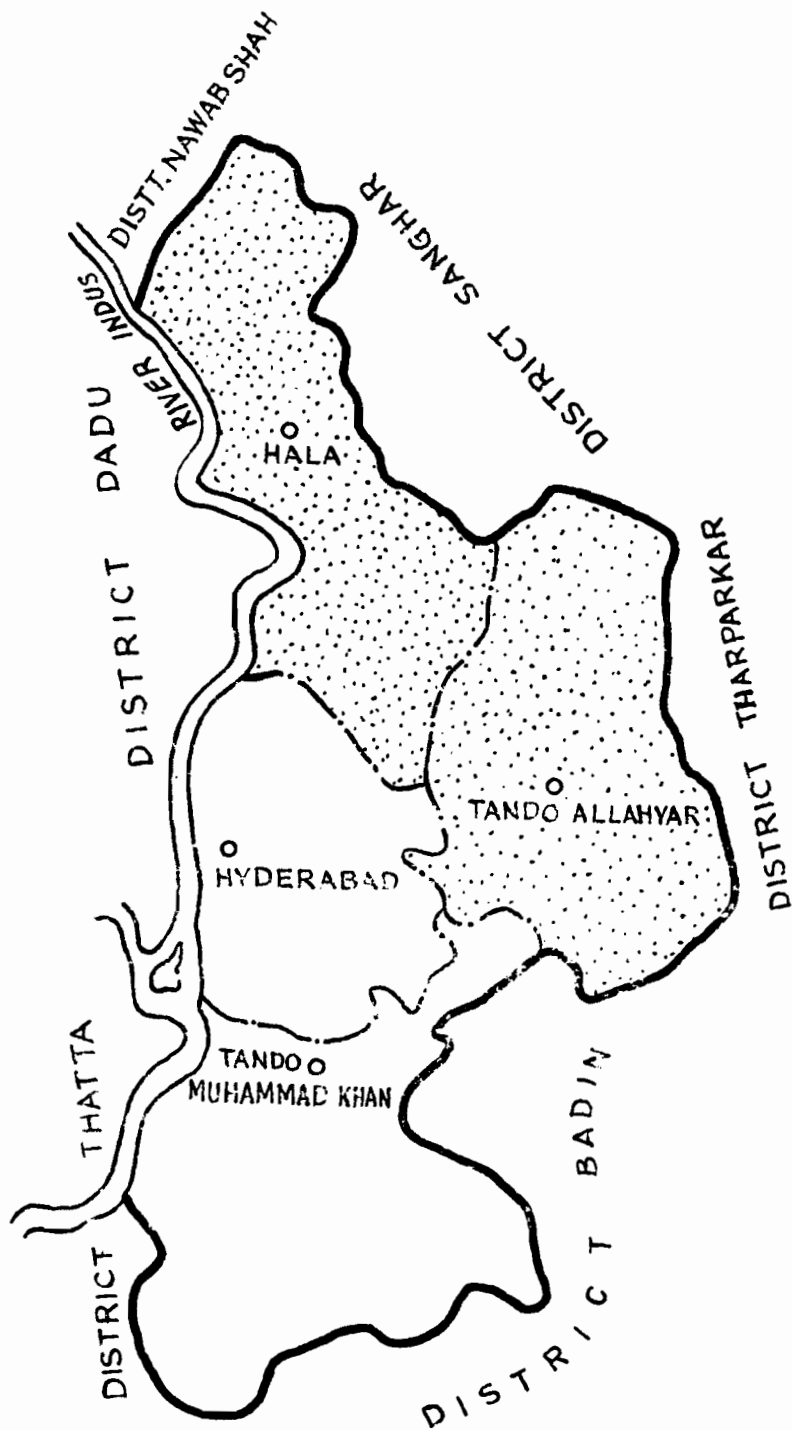


Fig. 1. MAP SHOWING SURVEY AREA
IN HYDERABAD DISTRICT. 1986-87

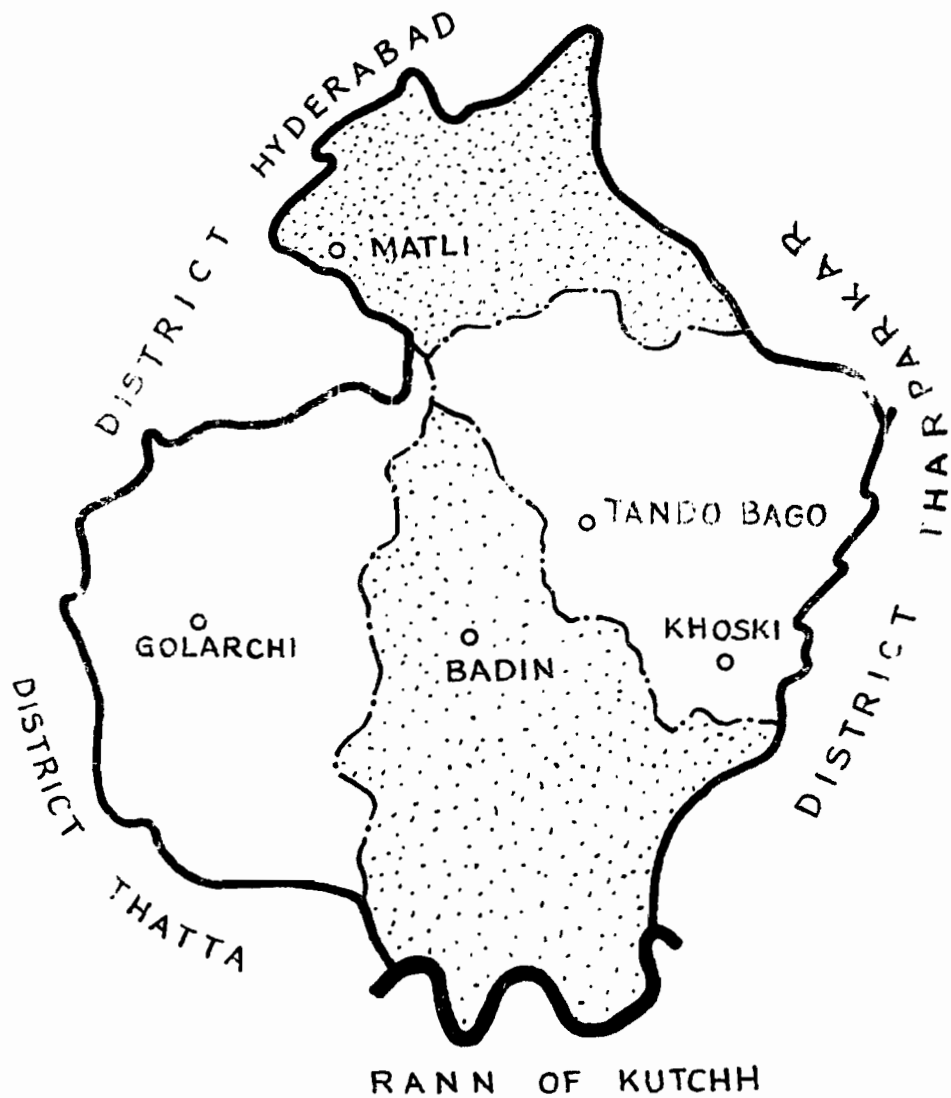


Fig. 2. MAP SHOWING SURVEY AREA
IN BADIN DISTRICT. 1986-87

Seventy one, twenty and nine percent of the sampled farmers were small (< 5 ha), medium (5-10 ha) and large (> 10 ha), respectively (Table 2).

At a later stage wheat breeders from Agriculture Research Institute Tandojam and agricultural economists from the Agricultural Economics Research Unit, and Sind Agriculture University Tandojam visited the same villages mentioned above. The survey was conducted in the first week of April 1987, when the crop was almost mature, making it easier for the breeders to identify the wheat varieties in the farmers' fields. The team travelled around the same sampled villages to identify wheat varieties in the fields. The sampling unit was the wheat field. The number of wheat fields sampled varied from 25 to 35 per village, depending on the village area. Out of the total sample of 629 wheat fields 58 and 42 percent were from the cotton-wheat and sugarcane-wheat zones respectively (Table 1).

Table 2. Farm size of the farmers interviewed in the cotton and sugarcane zones by talukas, 1986-87.

AREA	FARM SIZE		
	Small (<5 ha)	Medium (5-10 ha)	Large (> 10 ha)
COTTON ZONE			
Tando Allahyar	73	16	11
Hala	68	24	8
All	70.5	20	9.5
SUGARCANE ZONE			
Matli	67	24	9
Badin	75	16	9
All	71	20	9
Both zones	71	20	9

Figures 3 and 4 show the farm size of the farmers interviewed in the cotton and sugarcane zone by talukas.

RESULTS AND DISCUSSION

Farmers perception of wheat varieties planted

Table 3 shows the wheat area planted under different varieties in cotton and sugarcane zones. About 80 percent of the wheat area was planted under the varieties that the farmers could identify by name. In 20 percent of the cases farmers could not definitely identify the variety.

Pavon, Blue Silver, Yacora, Z.A-77 and WL-711 were the major varieties planted in cotton zone, where as Pavon, Maxi-Pak, Blue Silver and Nuri were the major varieties in the sugarcane zone.

Seventy, two, eight and twenty percent of wheat area was under old recommended, new recommended, banned and unknown varieties in the cotton zone, respectively. The area under old recommended, new recommended banned and unknown varieties in the sugarcane zone was 67, 2, 13 and 19 percent respectively. The highest proportion of area under banned varieties (20 percent) was in the sugarcane area.

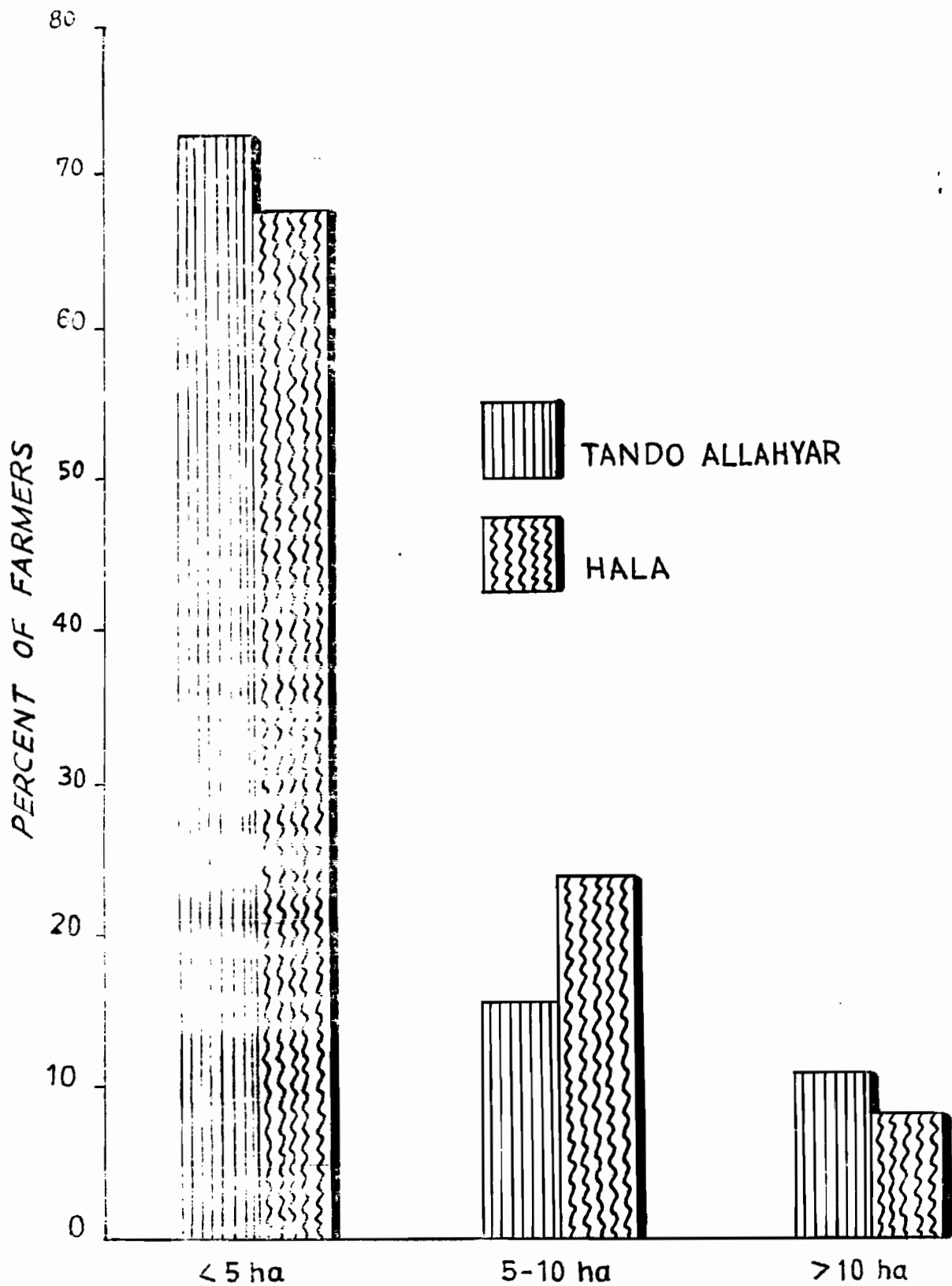


Fig.3. DISTRIBUTION OF FARM SIZE BY TALUKAS IN HYDERABAD DISTRICT. 1986-87

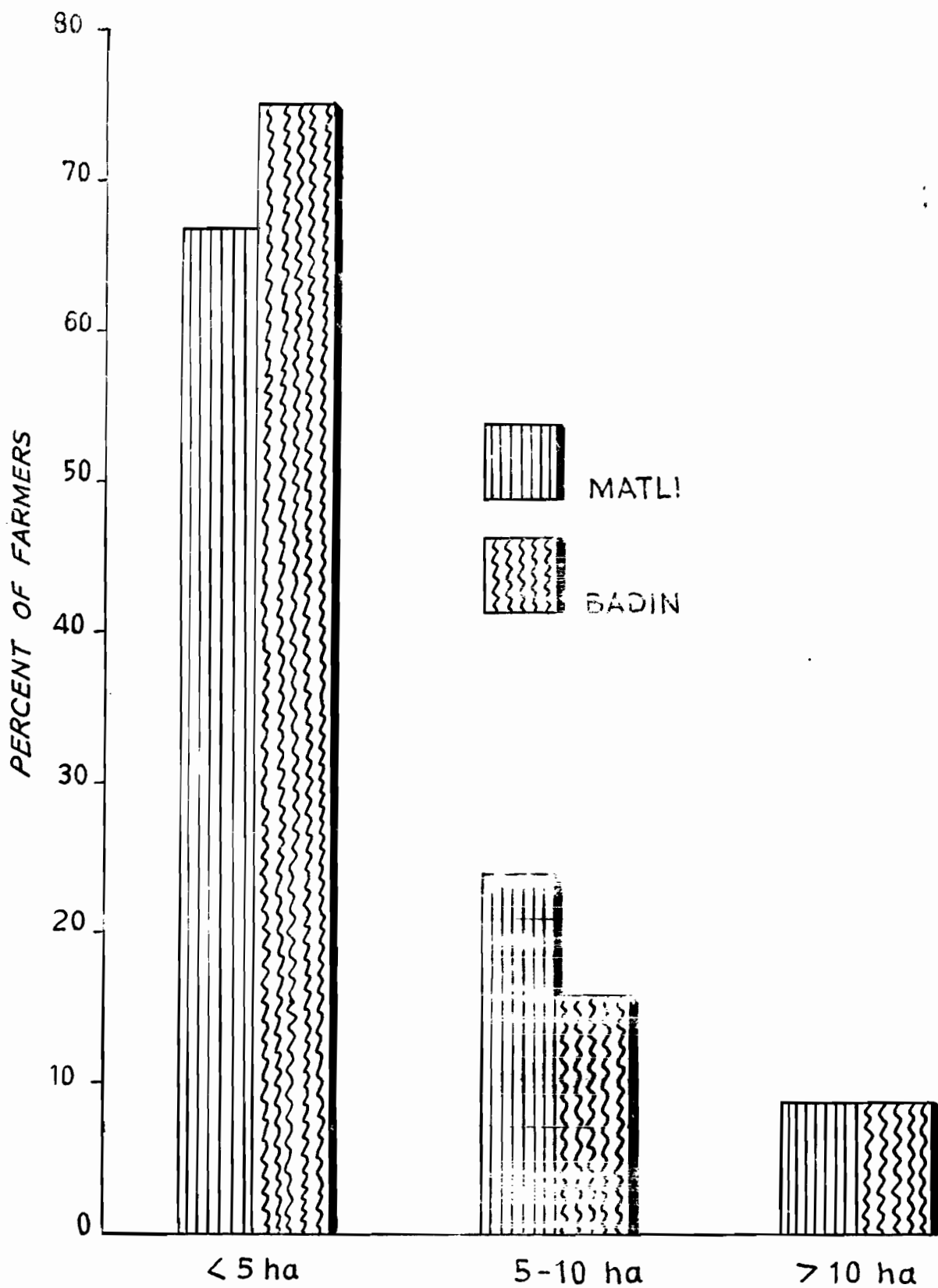


Fig. 4. DISTRIBUTION OF FARM SIZE BY TALUKAS IN BADIN DISTRICT. 1986-87

Table 3. Area under wheat varieties in the irrigated Sind: Farmers perception, 1986-87.

VARIETY	COTTON ZONE	SUGARCANE ZONE
	(Percent area)	
NEW RECOMMENDED		
Jauhar	0	0.53
TJ-83	0.07	0
Sind-81	0.95	0
Sarsabz	1.35	0
All:-	2.37	0.53
OLD BUT STILL RECOMMENDED		
Blue Silver	15.02	7.51
Pavon	35.32	54.32
Z.A-77	3.13	0
All:-	53.47	61.83
DANNED		
Maxi-Pak	6.98	15.00
Pal-70	0.1	0.66
WL-711	2.41	0.10
Nuni	2.29	4.19
Yacora	4.75	0
All:-	16.53	19.95
Don't know the variety name:-	17.56	17.69
All:-	100.00	100.00

Breeders verification of wheat varieties planted

Wheat breeders' verification of varieties planted in the cotton and sugarcane cropping zones is given in table 4. An important finding of the survey was that many fields were mixed with two to three varieties. (Fields were counted as mixed if less than 80 percent of the area was covered by the major variety). In the cotton zone, about 14 percent of the wheat fields had mixed varieties and in the sugarcane zone the figure was about nine percent. This mixture of seed in wheat causes yield reduction in the field. Wheat scientists have estimated that mixed seed can lead to 10 percent loss in yields (PARC, 1986). The farmers reported the following reasons for the use of mixed seed:

1. Continuous use of own seed leads to eventual mixture.
2. Mixed seed supply by other sources of seed, such as other farmers, friends and relatives.
3. Mixed seed supply by the seed corporation.

Table 4. Area under wheat varieties in the irrigated Sind: Breeders perceptions, 1986-87

VARIETY	COTTON ZONE	SUGARCANE' ZONE
		(Percent area)
NEW RECOMMENDED		
Jauhar	0	0.5
TJ-83	0.80	0
Sind-81	0.80	-
Sarsabz	0.80	-
All:-	2.4	0.5
OLD BUT STILL RECOMMENDED		
Blue Silver	12.6	10.0
Pavon	54.6	63.0
Z.A-77	3.7	3.0
All:-	70.9	76.0
BANNED		
Maxi-Pak	6.00	9.3
Pak-70	1.3	2.3
WL-711	4.2	2.3
Nuri	0	0.5
Yacora	1.2	0
Mixed	14.0	9.1
All:-	26.40	23.5
All:-	100.00	100.00

Summary of the wheat varieties planted in cotton and sugarcane zones: Breeders perception.

New recommended	2.4	0.5
Old recommended	70.9	76.0
Banned	12.7	14.4
Mixed	14.0	9.1

Comparison of farmer's and breeder's perceptions of varieties

Table 5 summarises farmers and wheat breeders' perceptions about wheat varieties. There is a little difference in the figures from these two groups in both the cotton and sugarcane zone. In the cotton zone, the area under new recommended varieties was 2.57 according to farmers, while for breeders the respective figure was 2.4 percent. Similar figures for the cotton area for old recommended was 69.77 for farmers and 70.9 percent for breeders. There were small differences between the two views in respect of banned varieties. In the cotton area the figure from the survey of farmers was 8.5 percent, and from the breeders' survey, it was 12 percent. In the sugarcane area the estimates were 20 percent and 24.6 percent, respectively.

Farmers identified reasons for seed mixture but did not specify planting of mixed fields. The breeders did identify mixed varieties. According to their estimates 14 percent of the wheat fields in the cotton zone were mixed, and nine percent in the sugarcane zone.

Finally, a comparison of Table 3 and 4 shows that the estimates from the two surveys did not differ in any meaningful way with respect to individual varieties. Both farmers and breeders indicated that Pavon was by far the most widely planted variety, covering over half the wheat area in each zone. Likewise, both surveys estimated that Blue Silver was another major variety in both zones.

Table 5. Area under different wheat varietal groups in the irrigated Sind. Comparison of farmer's and breeders perception, 1986-87.

VARIETAL GROUP	FARMERS PERCEPTION		BREEDERS' PERCEPTION	
	COTTON ZONE	SUGAR-CANE ZONE	COTTON ZONE	SUGAR-CANE ZONE
New recommended	2.4	0.5	2.4	0.5
Old recommended	69.7	61.8	70.9	76.0
Banned	8.4	19.9	12.7	14.4
Don't know	19.4	17.7	-	-
Mixed	-	-	14.0	9.1
All:-	100.00	100.00	100.00	100.00

Wheat varieties planted by farm size

Generally it is observed that small farmers are slower to adopt new recommended technology. Table 5 shows wheat varieties planted by farm size. Area under new recommended varieties is greater with the large farmers and the area under banned varieties more among small farmers. One specific varietal difference was Sonalika/Blue Silver, grown by 20 percent of the large farmers compared to 11 percent of the small farmers. This may be the result of the wide adaptability and performance of this variety compared to other varieties, particularly at later planting dates. Although Blue Silver is rust susceptible and needs replacement, the National Wheat Varietal Evaluation Committee continues to recommend it for lack of appropriate short duration varieties with sufficient seed multiplied.

Table 6. Area under wheat varieties by farm size in the irrigated Sind: Farmers' perception, 1986-87.

VARIETY	FARM SIZE		
	Small (< 5 ha)	Medium (5-10 ha)	Large (> 10 ha)
NEW RECOMMENDED			
Jauhar	0	0	0
TJ-83	0	0.75	0.80
Sind-81	0	0	1.12
Sarsabz	0.59	0	1.37
All:-	0.59	0.75	2.57
OLD BUT STILL RECOMMENDED			
Blue Silver	11.47	10.55	19.86
Pavon	48.05	58.64	55.23
Z.A-77	1.97	3.77	0
All:-	61.49	72.96	75.09
BANNED			
Mahar-Pak	7.89	3.00	3.29
Pak-77	0.55	0	0
WL-711	1.45	3.02	0
Nuri	1.58	0.66	3.29
Yacora	3.63	0	5.64
All:-	15.10	6.68	12.22
Don't the variety name:-	20.84	19.61	12.22
All:-	100.00	100.00	100.00

Wheat varieties: Temporal change

In Sind province a study was conducted during 1985-86 in the cotton-wheat cropping system, presently under discussion (Khushk et.al.1987). Although this study did not specifically focus on wheat varieties, it did contain important varietal information.

On the basis of this information, one could make some analysis of change in the adoption of wheat varieties over time. The data are shown in table 7.

Table 7. Wheat varieties grown in cotton zone:
Temporal change.

VARIETY	COTTON ZONE	
	1985-86**	1986-87*
	(Percent area)	
New recommended	11	21.0
Old recommended	67	79.20
Banned	22	18.40

** Farmers' perception reported by Khushk et.al,1987.

* Breeders' perception.

It can be seen from the table 7 that in the cotton zone, the area under new recommended & banned varieties may have decreased from 11 to 2 and 22 to 13 percent respectively, whereas the area under old recommended varieties has increased from 67 to 79 percent. It is quite likely, however, that the differences in the estimates are caused by sampling procedures. The 1987, survey estimated an even greater area under Pavon than did the cropping system study in 1986. Under any assumptions, Pavon is clearly the dominant variety in the area. Farmers may not have knowledge of new varieties, or they may simply prefer Pavon. Pavon is actually superior to novel varieties in Sind with regard to leaf rust resistance. Nonetheless, there is a need to diversify the genetic material in wheat varieties planted in the Sind (PARC, 1987).

Summary and suggestions

This study reveals that Pavon variety covered the majority of the wheat area. This variety is old but still recommended and it covered two-thirds of the wheat area. It is seen that a very small percentage (less than 5 percent) of the wheat in the sampled region consisted of new recommended varieties. The new varieties recommended for the province have not been adopted by the farmer. The question arises, whether the farmers are not familiar with these new varieties or if they do not want to adopt. Further detailed research is needed in this area.

Most of the wheat area is under old but still recommended, improved and mixed varieties which are susceptible to the rusts and brown smut. Furthermore, some of the new releases show some signs of rust susceptibility (PARC, 1987). There is a need to assess the rust risk in the Sind, as well as the yield losses resulting from the use of present varieties.

The study shows that about 20% of the area under wheat was planted to mixed varieties. This also leads to losses. The farmers complained that mixed seed was being sold by depots and dealers. If the Seed Corporation provided pure seed of new improved varieties in time to the farmer, it would contribute to the solution of this problem.

The Extension Department can assist in the dissemination the new varieties of wheat in the area particularly through demonstrations on the farmers' fields. Seed from these demonstrations should be made available to local farmers.

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