

# **Wheat Varietal Diffusion in the Irrigated Punjab: Results from 1988-89**



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**AERU Faisalabad Staff paper No. 89-1**

**Agricultural Economics Research Unit (PARC)  
Ayub Agricultural Research Institute, Faisalabad  
PARC/CIMMYT Collaborative Programme**

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### Technical Terms

Bhusa: Threshed wheat straw

### Abbreviations

AARI: Ayub Agricultural Research Institute.  
AERU: Agricultural Economics Research Unit.  
CIMMYT: International Maize and Wheat Improvement Center.

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# WHEAT VARIETAL DIFFUSION IN THE IRRIGATED PUNJAB: RESULTS FROM 1988-89

## Introduction

Wheat (*Triticum aestivum*), the major rabi food crop is planted on all major agro-climatic conditions of the irrigated Punjab. Presently, a large number of wheat varieties are grown in different wheat areas of Punjab. Farmers grow these cultivars according to their own preferences, knowledge and perceptions. In spite of the role of seed organizations and other agencies involved in the dissemination of these newly-released cultivars, the rate of adoption is slow (Akhtar et al. 1986; Heisey et al. 1988; Sharif et al. 1988). Promising wheat varieties that were released even in the early eighties still are not widely adopted by many of the farmers in the area.

This study was undertaken as part of a regular annual exercise carried out by the social scientists of AERU, Faisalabad, to assess wheat varietal adoption and to find out the farmers' reasons for growing banned wheat varieties in different areas of irrigated Punjab. The major purpose of this report is to present the existing diffusion and adoption of different wheat varieties for breeders, policy makers and all other segments involved in the wheat industry.

## Research Methods

For the 1988-89 wheat crop, a survey was conducted in late March, 1989, in the three main ecological zones of the irrigated Punjab. Previously this exercise was limited to two zones only, the rice zone and the cotton zone. One more representative area, the mixed zone of central Punjab was included in the sample. This addition was made to extend the scope of the study and to provide a more complete coverage of irrigated wheat in the Punjab. From the rice and cotton zones, the same randomly chosen villages were surveyed. These villages were chosen from two cropping systems, i.e. rice-wheat in the northern districts and cotton-wheat in the southern districts of the irrigated Punjab. Twenty four villages were selected from three adjacent Tehsils in both zones. Ferozewala, Gujranwala and Daska Tehsils were selected from Sheikhpura, Gujranwala and Sialkot Districts respectively for the rice zone (Figure 1). Lodhran, Mailsi and Bahawalpur Tehsils were selected from Multan, Vehari and Bahawalpur Districts respectively, for the cotton zone. For the mixed zone, twenty four villages were randomly selected from three Tehsils having the highest area under wheat. Jhang,

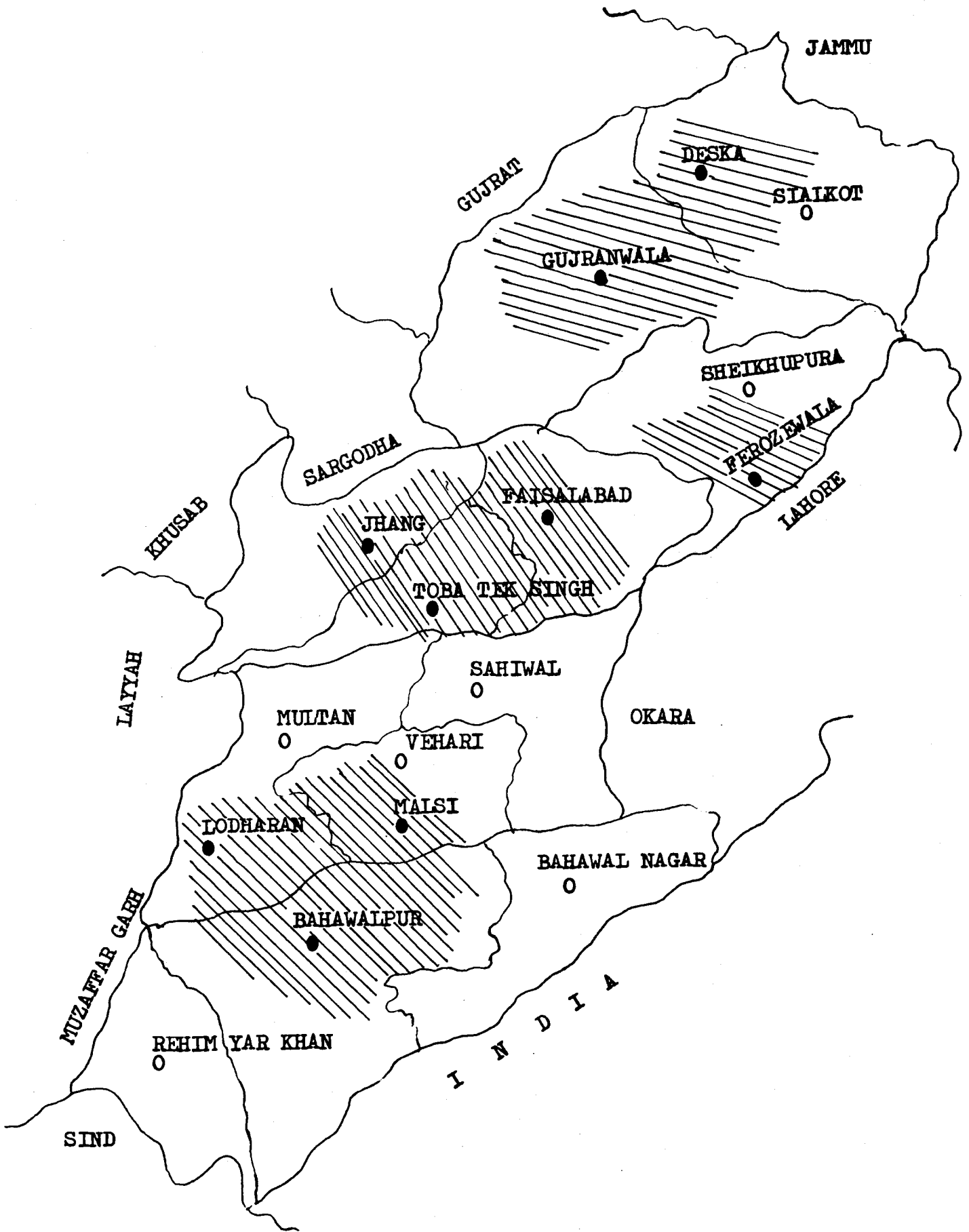


Figure 1. Spatial Distribution of the Sample Rice, Cotton and Mixed Zones



Samundri and Toba Tek Singh Tehsils were selected from Jhang, Faisalabad and Toba Tek Singh Districts respectively. The main cropping pattern of the mixed zone are rice-wheat, sugarcane-wheat, cotton-wheat and maize-wheat etc. Fifteen farmers were interviewed from each sample village to give a total sample size of 1080 farmers. Data were analyzed on a microcomputer using the SPSS package. Data in Table 1 show the breakdown of sample farmers by cropping zone and Tehsils. Overall, 54, 26 and 20 percent of the farmers were in small (<5 ha), medium (5-10 ha) and large (>10 ha) farm size categories, respectively. Furthermore, farm size distribution reveals the higher proportion of small farms in the rice and mixed zones as compared to the cotton zone in the irrigated Punjab.

**Table 1. Sample distribution by Tehsil and farm size in the rice, cotton and mixed zones of irrigated Punjab, 1988-89**

Area (Tehsils)	Farmers		Farm Size		
	Number	Percent	Small (<5ha)	Medium (5-10 ha)	Large (>10 ha)
<b>(Percent farmers)</b>					
<b>Rice Zone</b>					
Gujranwala	120	11.1	59.2	25.0	15.8
Daska	120	11.1	72.5	19.2	8.3
Ferozewala	120	11.1	49.2	19.2	31.7
<b>All</b>	<b>360</b>	<b>33.3</b>	<b>60.3</b>	<b>21.1</b>	<b>18.6</b>
<b>Mixed Zone</b>					
Jhang	120	11.1	60.8	24.2	15.0
Sumandri	120	11.1	54.2	30.0	15.8
Toba	120	11.1	58.3	29.2	12.5
<b>All</b>	<b>360</b>	<b>33.3</b>	<b>57.8</b>	<b>27.8</b>	<b>14.4</b>
<b>Cotton Zone</b>					
Bahawalpur	120	11.1	39.2	21.3	39.2
Lodhran	120	11.1	55.8	22.5	21.7
Mailsi	120	11.1	37.5	42.5	20.0
<b>All</b>	<b>360</b>	<b>33.3</b>	<b>44.2</b>	<b>28.9</b>	<b>26.9</b>
<b>All Zones</b>	<b>1080</b>	<b>100.0</b>	<b>54.1</b>	<b>25.9</b>	<b>20.0</b>

## Results and Discussion

### Farm Size and Wheat Area

Average farm size and area planted to wheat are presented in Table 2 for the rice, cotton and mixed zones respectively. Generally, farmers were allocating more than half of the farm area to wheat in all zones. In the rice and mixed zones, small farmers were devoting about the same area to wheat as medium and large farmers. However, in the cotton zone, small farmers devoted a larger share of area to wheat than large farmers. This is mainly due to large farmers keeping land fallow for the main cash crop cotton, while small farmers have less fallow and more of their land in a cotton-wheat rotation.

**Table 2: Average farm size and wheat area in the rice, cotton and mixed zones of irrigated Punjab, 1987-88**

Zone/ Farm size	Average Total Area (ha)	Average Wheat Area (ha)	Percent Farm Area in Wheat
<b>Rice Zone</b>			
Small (<5 ha)	2.8	1.6	59
Medium (5-10 ha)	6.9	4.0	58
Large (>10 ha)	19.6	11.1	57
<b>All</b>	<b>6.8</b>	<b>3.9</b>	<b>57</b>
<b>Mixed Zone</b>			
Small (<5 ha)	2.8	1.6	58
Medium (5-10 ha)	6.3	3.6	57
Large (>10 ha)	15.4	8.6	56
<b>All</b>	<b>5.6</b>	<b>3.2</b>	<b>57</b>
<b>Cotton Zone</b>			
Small (<5 ha)	3.0	2.1	69
Medium (5-10 ha)	6.3	4.1	65
Large (>10 ha)	22.6	12.2	54
<b>All</b>	<b>9.2</b>	<b>5.4</b>	<b>59</b>
<b>All Zones</b>	<b>7.2</b>	<b>4.1</b>	<b>58</b>

## Number of Wheat Varieties Grown

In all representative wheat areas, almost three fourths of the farmers were growing only one wheat variety (Table 3). However, a large proportion of medium and large farmers was planting more than one variety. This was done to accommodate the differences in planting dates for wheat in all zones, a spread of approximately two months in the cotton zone (Byerlee et al. 1987) and slightly less for the rice zone (Sharif et al. 1989). Information regarding number of varieties grown in the irrigated Punjab reflects no discernible change over time (Akhtar et al. 1987, Sharif et al. 1988).

**Table 3. Number of wheat varieties planted by farm size in the rice, cotton and mixed zones of irrigated Punjab, 1987-88**

Farm Size Groups	Number of Varieties Planted		
	One	Two	More than two
(Percent Farmers)			
<b>Rice Zone</b>			
Small (<5 ha)	87.1	12.0	0.9
Medium (5-10 ha)	63.2	26.3	10.5
Large (>10 ha)	64.1	23.9	12.0
<b>All</b>	<b>77.8</b>	<b>17.2</b>	<b>5.0</b>
<b>Mixed Zone</b>			
Small (<5 ha)	81.3	16.8	1.9
Medium (5-10 ha)	60.0	33.0	7.0
Large (>10 ha)	40.4	30.8	28.8
<b>All</b>	<b>69.4</b>	<b>23.3</b>	<b>7.3</b>
<b>Cotton Zone</b>			
Small (<5 ha)	89.3	10.7	-
Medium (5-10 ha)	82.7	13.5	3.8
Large (>10 ha)	43.3	39.2	17.5
<b>All</b>	<b>75.0</b>	<b>19.2</b>	<b>5.8</b>
<b>ALL Zones</b>	<b>74.1</b>	<b>19.9</b>	<b>6.0</b>

## Wheat Varietal Diffusion

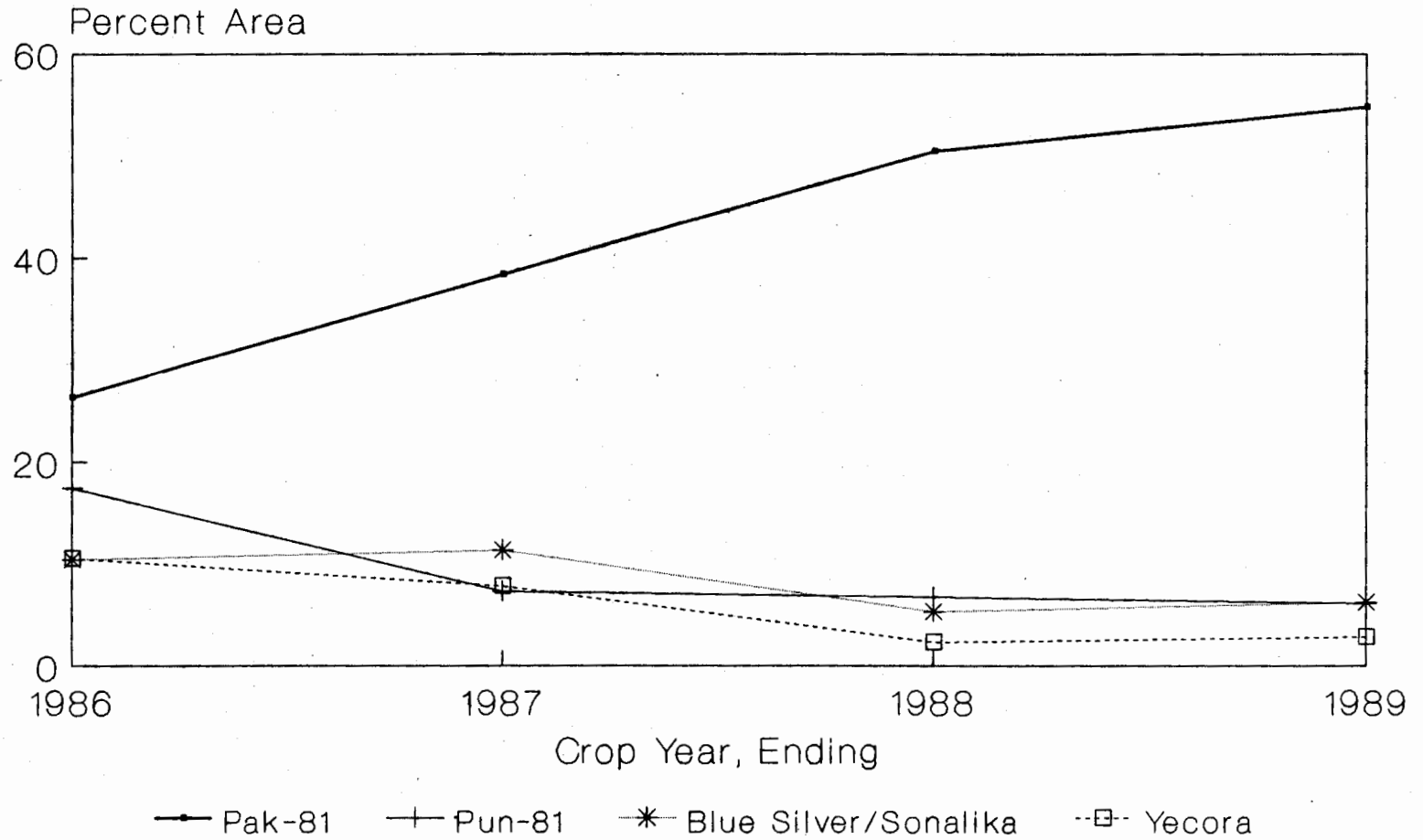
In all three zones, approximately fifteen varieties of wheat were in use. The break-up of area under different wheat varieties by tehsil is given in Appendices i, ii and iii.

For the year 1988-89, in the rice zone, over one-half of the wheat area was under Pak-81, followed by Blue-Silver/Sonalika (6%) and Punjab-85 (5%) (Table 4). In the mixed zone, the major varieties were: Pak-81 (26%), WL-711 (15%), Punjab-81 (12%) and Blue-silver/Sonalika (7%). In the cotton zone, Blue Silver/Sonalika (35%), Pak-81 (17%), WL-711 (14%) and Bahawalpur-79 (9%) were the most widely used varieties for this year (Table 5). The results from 1985 to 1989 show that the area under Pak-81 has increased over time in the rice zone (Figure 2). Overall, no obvious replacement for Pak-81 has emerged so far, so a very high proportion of area was planted to this variety, especially in this zone.

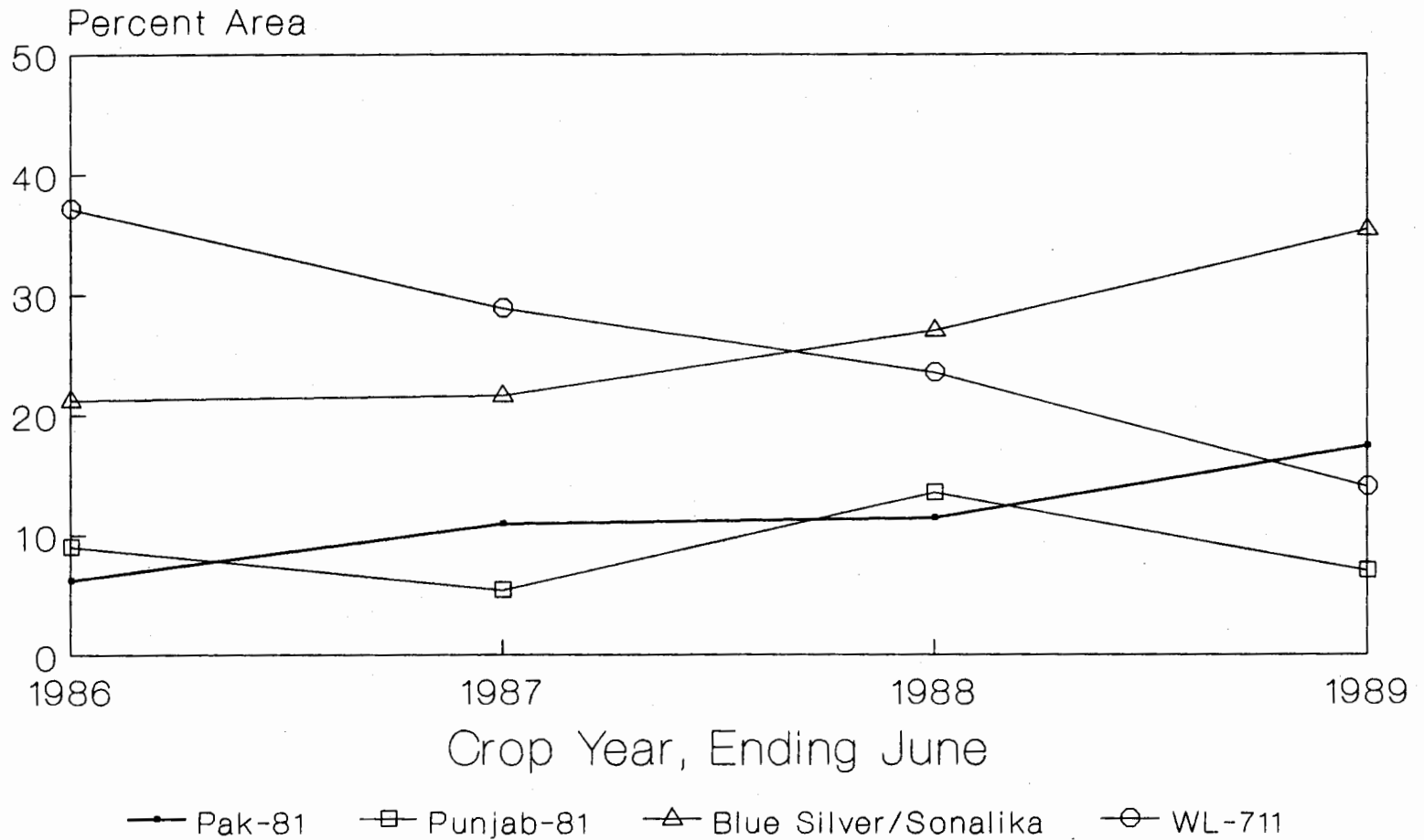
The other important finding of this study is the decrease in the area under the banned variety WL-711 being mainly replaced by Blue Silver/Sonalika variety in the cotton zone, where it was grown previously on a large area (Figure 3). Its area was decreased from 23 percent in 1987-88 to 14 percent in the year 1988-89. Another banned variety, Yecora, also declined in the rice zone.

Some uncertainty existed in identifying one non-recommended wheat variety. Wheat breeders identified this as Chenab-79. However, the farmers named it as a "low seed rate" variety (applying 12 to 15 kg/ac seed compared to 40 kg/ac for Pak-81). The main reasons reported by the farmers for its adoption were the low seed rate and better yield characteristics. For this year, area under this variety was 4%, 6% and 1% percent in the rice, mixed and cotton zones, respectively.

Figure 2. Wheat Varietal Adoption in the Rice Zone, 1985-86 to 1988-89



**Figure 3. Wheat Varietal Adoption in the Cotton Zone, 1985-86 to 1988-89**



**Table 4. Area under different wheat varieties in the rice zone of the irrigated Punjab, during 1985-86, 1986-87, 1987-88 and 1988-89**

Varietal Group	Rice Zone			
	1985-86	1986-87	1987-88	1988-89
	(Percent area)			
<b>New Recommended</b>				
Pak-81	26.3	38.4	50.5	54.8
Punjab-85	-	-	-	5.0
Faisalabad-83	0.2	1.4	1.4	0.4
Faisalabad-85	-	-	0.1	2.6
Kohinoor-83	0.1	0.8	1.7	0.3
Shalimar-88	-	-	-	-
New but does not know name	4.7	7.2	15.2	7.6
<b>Old but still Recommended</b>				
Bahawalpur-79	-	-	-	-
Blue Silver/Sonalika	10.4	11.3	5.3	6.2
Sandal	5.7	5.3	4.0	1.7
Pari-73	4.1	3.4	1.7	0.6
LU-26	1.4	1.6	1.2	2.6
Lyallpur-73	4.3	1.8	1.1	2.5
<b>Not recommended</b>				
Chenab-79 (LSR) <sup>1</sup>	-	-	-	3.6
<b>Banned</b>				
Punjab-81 <sup>2</sup>	17.4	7.3	6.7	6.1
Bahawalpur-79	0.2	-	-	-
WL-711	2.3	0.4	1.0	0.2
Yecora	10.5	7.8	2.3	2.8
Old but does not know name	9.2	9.8	4.8	0.8
Others <sup>3</sup>	3.2	3.5	3.0	0.3

<sup>1</sup> Farmers named this variety as low seed rate variety (applying 12 to 15 kg/ac. seed)

<sup>2</sup> Punjab-81 & Bahawalpur-79 varieties are banned for the rice zone and recommended only for the cotton zone of the Punjab (Bajwa et.al. 1987).

<sup>3</sup> Mix, Noori, Chenab-70, Mexi Pak, Pavon, etc.

**Source:** Akhtar et al. (1985-86 and 1986-87) and (Sharif et al. 1987-88)

**Table 5. Area under different wheat varieties in the Mixed and cotton zones of irrigated Punjab, during 1985-86, 1986-87, 1987-88 and 1988-89**

Varietal Group	Mixed Zone		Cotton Zone		
	1988-89	1985-86	1986-87	1987-88	1988-89
(Percent area)					
<b>New Recommended</b>					
Pak-81	26.4	6.2	10.9	11.4	17.4
Punjab-81	12.3	9.0	5.4	13.5	7.0
Punjab-85	1.8	-	-	-	0.1
Faisalabad-83	2.3	0.5	-	0.8	1.5
Faisalabad-85	5.4	-	-	-	0.9
Kohinoor-83	1.3	0.1	1.5	2.1	1.8
New but does not know name	5.9	3.2	8.9	3.2	5.5
<b>Old but still Recommended</b>					
Bahawalpur-79	0.1	12.3	9.1	12.3	9.4
B. Silver/Sonalika	7.4	21.2	21.6	27.0	35.4
Sandal	0.1	0.6	0.8	0.7	0.6
Pari-73	0.5	0.1	-	-	-
LU-26	4.0	0.1	0.2	1.2	1.8
Lyallpur-73	6.5	0.7	0.4	1.7	0.4
<b>Not Recommended</b>					
Chenab (LSR)	5.9	-	-	-	1.0
<b>Banned</b>					
WL-711	14.5	37.2	28.9	23.5	14.0
Chenab-70	0.5	-	-	-	0.8
Yecora	4.4	1.0	1.3	0.1	1.6
Old but does not know name	4.0	5.7	5.8	1.0	0.1
Others <sup>1</sup>	1.1	2.1	5.2	1.5	0.4

<sup>1</sup> Mix, Noori, Chenab-70, Mexi, Pawan, etc.

Source: 1985-86 and 1986-87 data, Akhtar et al. 1986 and 1987, respectively.

Source: Akhtar et al. (1985-86 and 1986-87) and Sharif et al. (1987-88).



Varieties were further classified into new recommended (released since 1980), old but still recommended (released before 1980) and banned or not recommended (see Akhtar et al. 1987). Under this criterion 77%, 55%, and 34% of 1988-89 wheat crop were planted to new recommended varieties in the rice, mixed and cotton zones, respectively (Table 6). Similarly, 14%, 18% and 47% of area was planted to old recommended varieties in the above mentioned three zones respectively. In the cotton zone, this relatively large area planted to old recommended varieties is attributable to the recent popularity of Blue Silver/Sonalika, an early-maturing variety. Area under banned varieties was considerably higher in the mixed and cotton zones. WL-711 and Yecora are the main banned varieties in these zones.

**Table 6. Summary of wheat varieties planted in the rice, cotton and mixed zones of the irrigated Punjab, 1988-89**

Area (Tehsils)	Category			
	New Recommended	Old Recommended	Not Recommended	Banned
(Percent area)				
<b>Rice Zone</b>				
Gujranwala	74.5	16.2	4.6	4.8
Daska	75.9	12.8	1.2	10.1
Ferozewala	78.9	11.9	3.9	5.3
<b>All</b>	<b>76.7</b>	<b>13.6</b>	<b>3.6</b>	<b>6.1</b>
<b>Mixed Zone</b>				
Jhang	22.4	17.9	1.8	26.8
Samundri	42.2	17.6	0.1	16.6
Toba	27.2	20.4	2.8	30.5
<b>All</b>	<b>55.4</b>	<b>18.6</b>	<b>1.5</b>	<b>24.5</b>
<b>Cotton Zone</b>				
Bahawalpur	34.4	53.8	1.2	10.6
Lodhran	43.6	39.2	1.0	16.2
Mailsi	24.4	46.9	0.7	28.0
<b>All</b>	<b>34.4</b>	<b>47.6</b>	<b>1.0</b>	<b>17.0</b>

Information regarding the reasons for planting banned varieties is presented in Table 7. For WL-711, the majority of the farmers in the rice and cotton zone ranked the non-availability of other varieties seed, the ready availability of own seed, a strong preference for home consumption and more bhusa quantity as important reasons for its planting. In the mixed zone it was planted mainly because of its high yield performances. For Yecora, farmers reported that it was planted mainly because of its higher yield characteristics, its high quality for consumption and the non-availability of new seed.

**Table 7. Farmers reason for adoption of banned varieties in different zones of irrigated Punjab, 1988-89**

Reasons	Zones and Varieties					
	WL-711			Yecora		
	Rice	Mixed	Cotton	Rice	Mixed	Cotton
	(Percent ranked)					
-Non availability of seed of other new varieties	-	-	24	13	3	-
-Preferred for consumption	-	11	21	28	20	-
-High yielding	-	48	2	44	35	-
-Better and more bhusa	-	6	18	4	7	-
- Availability of seed of this variety	-	24	23	11	36	-
-Best for late planting	-	6	5	-	-	-
-Resistant to water stress or lodging	-	5	7	-	-	-

#### **Wheat Varietal Diffusion by Farm Size**

Analysis of varietal use by farm size and by zone suggests that small farmers were relatively slow in adopting new recommended wheat varieties (Table 8). The percentage of area under banned varieties was higher on small farms than on large farms, in all three zones. Likewise, the area under varieties released since 1980 was significantly higher on large farms as compared to small farms in the rice and mixed zones. But, in the cotton zone, a higher proportion of small farmers grow recommended varieties than large farmers. The results concerning wheat area planted to different varieties by zones and farm size are presented in Appendices iv, v, and vi.

**Table 8. Area under different varietal groups by farm size and zone, in the irrigated Punjab, 1987-88**

<b>Zone/ Farm Size</b>	<b>Recommended</b>	<b>Old Recommended</b>	<b>Not Recommended</b>	<b>Banned</b>
(Percent area)				
<b>Rice Zone</b>				
Small	73	16	3	8
Medium	68	16	6	11
Large	82	12	3	3
<b>Mixed Zone</b>				
Small	48	16	2	34
Medium	55	20	2	22
Large	61	19	1	19
<b>Cotton Zone</b>				
Small	38	46	2	14
Medium	32	40	1	26
Large	34	51	1	14

#### **Area Under Different Wheat Varieties: Temporal Change**

Akhtar et al. (1986 and 1987) and Sharif et al. (1987-88) conducted the wheat varietal verification survey for 1985-86, 1986-87 and 1987-88 wheat crops in the same villages of both zones. These data can be used to analyze the change over time in the adoption of wheat varieties (Table 9). The area under new recommended varieties increased from 31 to 77 percent in the rice zone. Correspondingly, the area under banned varieties decreased from 43 to 6 percent. In the cotton zone, the area under new recommended varieties has slightly increased from 31 to 34 percent, but the area under banned varieties decreased sizably from 46 to 17 percent. Overall, some healthy trends have been observed over time as farmers have switched from banned varieties towards new recommended varieties.

**Table 9. Area under different wheat varieties in the rice, cotton and mixed zones of the irrigated Punjab; Temporal change**

	<b>New Recommended</b>	<b>Old Recommended</b>	<b>Not Recommended</b>	<b>Banned</b>
(Percent area)				
<b>Rice Zone</b>				
1985-86	31	26	-	43
1986-87	48	23	-	29
1987-88	69	13	-	18
1988-89	77	14	4	6
<b>Mixed Zone</b>				
1988-89	55	19	2	24
<b>Cotton Zone</b>				
1985-86	31	23	-	46
1986-87	27	32	-	41
1987-88	31	43	-	26
1988-89	34	48	1	17

**Source:** Akhtar et al. (1985-86 and 1986-87) and Sharif et al. 1987-88

### **Summary and Conclusions**

For the first time, the varietal survey covered all major growing environments of the irrigated Punjab. The area under banned wheat varieties continued to decline, especially in the rice zone. In all zones, new recommended varieties increased their share of total wheat area. Pak-81 continued being the dominant variety of the rice and mixed zones. In the cotton zone, however the banned variety WL-711 was replaced mainly by Blue-Silver/Sonalika.

On the basis of the results the following conclusions may be drawn:

- Firstly, a very high share of wheat area is now planted to one variety, Pak-81. With no obvious replacement, this concentration on one variety could increase in the next few years. There is a danger that Pak-81 might become disease susceptible, thus putting a large area of the wheat crop of Punjab at risk. There is an urgent need for varietal diversification for the study area, especially in the rice zone.

- Secondly, the pace of adoption of new semi-dwarf wheat varieties remains very slow. For instance, it has taken almost a decade for Pak-81 to achieve widespread adoption. For this survey, farmers were asked why they prefer to grow particular varieties, especially the old and banned varieties. One reason for the slow adoption of many newly released varieties was the marginal yield difference between the new available varieties and the older and banned ones, in years of low incidence of diseases. Other main reasons were preferences for quality for eating purposes or for bhusa yield and quality. These preferences were especially noticeable amongst small farmers. This emphasizes the need to improve quality of future wheat varieties to make them more acceptable to small farmers.
- Thirdly, the majority of the small farmers are slow in adopting new cultivars because of the limited availability of seed and lack of knowledge of new varieties (Heisey ed. 1988). To increase the dissemination rate on small farms, it is recommended that seed be distributed at more accessible locations.
- Finally, regular monitoring of wheat varieties in the Punjab is needed to assess the adoption patterns of farmers, along with better understanding why of farmers grow particular varieties.

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**Appendix i: Wheat varieties planted in the rice zone of the irrigated Punjab, by Tehsils, 1988-89**

Category (Varieties)	Tehsils		
	Gujranwala	Daska	Ferozewala
(Percent Area)			
<b>New Recommended</b>			
Pak-81	47.8	62.6	56.5
Faisalabad-83	0.3	0.9	0.1
Faisalabad-85	0.8	2.7	4.0
Punjab-85	0.2	1.2	10.6
Kohinoor-83	0.5	0.5	-
New but does not know name	9.0	6.6	7.0
<b>Old but still Recommended</b>			
Blue Silver/Sonalika	7.5	5.1	5.8
Sandal	1.8	1.9	1.5
Pari-73	0.7	-	0.9
LU-26	3.5	3.0	1.7
Lyallpur-73	2.8	2.8	2.1
<b>Not Recommended</b>			
LSR	4.6	1.2	3.9
<b>Banned</b>			
Punjab-81*	15.9	1.3	0.6
Chenab-70	1.9	2.9	1.7
WL-711	0.6	-	-
Yecora	0.7	6.1	2.8
Old but does not know name	1.3	0.4	0.7
Others**	0.2	0.7	0.1

\* Punjab-81 is banned for rice zone.

\*\* Mix, Noori, Chenab-70, Mexi, Pawan, etc.

**Appendix ii: Wheat varieties planted in the Mixed zone of the irrigated Punjab, by Tehsils, 1988-89**

Category (Varieties)	Tehsils		
	Jhang	Samundry	Toba
(Percent Area)			
<b>New Recommended</b>			
Pak-81	17.9	37.2	23.8
Punjab-81	15.3	9.3	12.3
Punjab-85	3.2	1.7	0.5
Faisalabad-83	1.7	2.5	2.8
Faisalabad-85	3.0	9.9	3.0
Kohinoor-83	0.5	3.1	-
New but does not know name	11.5	2.0	4.0
<b>Old but still Recommended</b>			
Bahawalpur-79	-	-	0.3
Blue Silver/Sonalika	9.6	6.4	6.1
Sandal	0.2	-	-
Pari-73	-	-	1.7
LU-26	4.6	5.2	2.0
Lyallpur-73	3.5	6.0	10.4
<b>Not Recommended</b>			
LSR	1.8	0.1	2.8
<b>Banned</b>			
WL-711	14.7	6.2	23.4
Chenab-70	0.7	0.8	-
Yecora	5.8	4.7	2.5
Old but does not know name	3.7	5.0	3.2
Others*	1.8	-	1.5

\* Mix, Noori, Chenab-70, Mexi, Pawan etc.



**Appendix iii: Wheat varieties planted in the cotton zone of the irrigated Punjab, by Tehsils, 1987-88**

Category (Varieties)	Tehsils		
	Bahawalpur	Lodhran	Mailsi
	(Percent Area)		
<b>New Recommended</b>			
Pak-81	13.1	29.2	11.5
Punjab-81	10.2	2.7	6.5
Punjab-85	-	0.3	-
Faisalabad-83	-	4.2	0.3
Faisalabad-85	0.2	1.9	0.8
Kohinoor-83	1.4	2.5	1.7
New but does not know name	8.9	2.7	3.2
<b>Old but still Recommended</b>			
Bahawalpur-79	12.3	10.2	4.0
Blue Silver/Sonalika	37.7	28.8	38.9
Sandal	1.3	0.2	-
Pari-73	-	-	-
LU-26	1.7	-	3.8
Lyallpur-73	0.9	-	0.2
<b>Not Recommended</b>			
LSR	1.2	1.0	0.7
<b>Banned</b>			
WL-711	4.1	16.0	27.4
Yecora	3.5	-	0.5
Old but does not know name	0.3	-	-
Others*	0.9	0.1	0.2

\* Mix, Noori, Chenab-70, Mexi, Pawan etc.

**Appendix iv: Area under different wheat varieties by farm size  
in the rice zone of the irrigated Punjab, 1988-89**

Category (Varieties)	Small ( < 5 ha )	Medium ( 5-10 ha )	Large ( > 10 ha )
( Percent Area )			
<b>New Recommended</b>			
Pak-81	56.1	53.3	54.7
Punjab-81*	-	-	-
Punjab-85	0.8	0.9	8.6
Kohinoor-83	0.5	0.3	0.2
Faisalabad-85	2.3	1.3	3.3
Faisalabad-83	0.7	0.7	0.1
Shalimar			
New but does not know name	10.2	5.0	7.3
<b>Old but still Recommended</b>			
Blue Silver/Sonalika	5.3	5.9	6.8
Sandal	3.0	1.6	1.1
Lyallpur-73	5.6	1.3	1.5
Pari-73	0.5	2.0	0.1
LU-26	1.5	4.9	2.2
<b>Not Recommended</b>			
LSR	2.8	5.6	3.1
<b>Banned</b>			
Punjab-81*	2.8	6.2	7.6
Chenab-70	0.2	6.0	1.3
Yecora	4.3	3.7	1.7
WL-711	0.1	-	0.3
Old but does not know name	2.3	1.3	-
Others**	1.1	-	-

\* Punjab-81 is banned for rice zone.

\*\* Mix, Noori, Chenab-70, Mexi, Pawan etc.

**Appendix v: Area under different wheat varieties by farm size in the mixed zone of the irrigated Punjab, 1988-89**

Category (Varieties)	Farm Size		
	Small ( < 5 ha)	Medium (5-10 ha)	Large ( > 10 ha)
( Percent Area )			
<b>New Recommended</b>			
Pak-81	28.1	23.9	27.1
Punjab-81	10.2	12.2	13.9
Kohinoor-83	0.5	3.0	0.5
Faisalabad-83	1.5	2.6	2.6
Faisalabad-85	0.7	0.2	2.9
Shalimar	1.2	4.7	9.0
New but does not know the name	6.0	7.9	4.3
<b>Old but still Recommended</b>			
Bahawalpur-79	-	0.3	-
Blue Silver/Sonalika	5.8	6.1	9.7
Sandal	0.2	-	-
Pari-73	0.8	0.9	-
LU-26	2.2	4.8	4.8
Lyallpur-73	6.9	8.3	4.8
<b>Not Recommended</b>			
LSR	2.3	1.9	0.6
<b>Banned</b>			
Chenab-70	0.5	1.3	-
WL-711	19.9	10.7	13.5
Yecora	7.2	5.0	1.7
Old but does not know the name	5.0	4.7	2.7
Others	1.2	0.8	1.2

**Appendix vi: Area under different wheat varieties by farm size in the cotton zone of the irrigated Punjab, 1988-89**

Category (Varieties)	Farm Size		
	Small ( < 5 ha )	Medium ( 5-10 ha )	Large ( > 10 ha )
( Percent Area )			
<b>New Recommended</b>			
Pak-81	20.1	17.9	14.0
Punjab-81	6.3	6.7	8.2
Kohinoor-83	2.3	1.6	2.1
Faisalabad-83	2.6	1.2	1.0
Faisalabad-85	0.7	0.2	2.9
Shalimar	-	0.5	-
New but does not know the name	5.6	6.0	4.3
<b>Old but still Recommended</b>			
Bahawalpur-79	9.2	11.5	3.5
Blue Silver/Sonalika	34.3	37.1	31.5
Sandal	0.9	0.5	0.6
Pari-73	-	-	-
LU-26	0.8	0.9	4.8
Lyallpur-73	0.4	0.6	-
<b>Not Recommended</b>			
LSR	1.7	0.8	0.9
<b>Banned</b>			
Chenab-70	0.4	1.2	-
WL-711	12.3	10.2	26.1
Yecora	0.7	2.5	-
Old but does not know the name	0.7	-	-
Others	0.3	0.6	0.2

