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Cotton Production in Pakistan

A SUCCESS STORY

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Foreword

The Asia-Pacific Association of Agricultural Research Institutions (APAARI) is committed to promote exchange of scientific and technical know-how in agriculture and information base, strengthening of research organization and management capabilities among member nations. The APAARI Executive published six success stories, in different fields of agriculture, of various NARS in the APAARI region, during 1994 and 1995, as analytical and catalytic measure to promote similar technologies and management approaches in the region. In the February, 1996 meeting held at New Delhi, six more success stories were approved for publication and three draft scripts received by the APAARI Secretariat as a follow up. Out of these, the Success Story of Transformation in Korean Farming is already published and released during the Expert Consultation on Research Priority Settings by NARS in the Asia-Pacific Region and Fourth General Assembly of APAARI, November 26, 1996.

The story of success of Cotton Production in Pakistan highlights enhancement in Cotton Economy through effective governmental support for increase in area with assured irrigation, improved production technology including superior varieties evolved, increased use of critical inputs, assured minimum support price incentive and liberal credit facility, strong institutional support for research, training and quality control and balanced domestic consumption and export maintaining steady prices, demand and supply.

I am sure that the information presented in this booklet is both informative and useful to other nations as well and also highlights the positive, analytical, catalytic and suggestive role of APAARI in the region in bridging the information gap and providing analysis for further improvement.

New Delhi
December 31, 1996

(R.S. PARODA)
Executive Secretary
APAARI

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Introduction

Cotton is the most important cash crop in Pakistan that significantly influences the cotton Industry, the Gross Nation Product (GNP), the agrarian socio-economic conditions vis-a-vis national economy and prosperity of the country. It contributes towards 60% of the foreign exchange earnings, 85% of the domestic vegetable oil production and 35% of the country's labour employment, in about 7,000 factories.

The yield of upland cotton enhanced by about five times since 1947-48, having reached the maximum level of 768 kg/ha in 1991-92. Production during the same period increased from 1.1 million to 12.8 million bales (170 kg/bale) which is an average increase of 24 percent per annum (Figure 1). In these five decades the cotton crop also faced a number of vagaries of weather, insect pests, and diseases but due to the continued efforts of the scientists under a well established research system the overall performance improved, with a number of new varieties with desired characteristics evolved along with standardizing their package of improved production technology. Availability of quality inputs, appropriate plant protection measures and liberal trade policy of the government influenced this remarkable increase in the productivity and improvement in the ginning out-turn and staple length. This story narrates the success and also the factors responsible for the remarkable progress made so far in Pakistan, in terms of cotton productivity, production, quality, industry and trade.

Historical Background

Pakistan is the ancient home of cultivated cotton since the dawn of Indus civilization; recorded as back as 3,000 B.C. from the Archaeological remains of Moenjo Daro in the Sindh Province.

Historically, in the past, only Asiatic "desi" *arboreum* cottons were cultivated in Pakistan, which were rough and short stapled. The seed of upland *hirsutum* types was first imported in the Indo-Pak Sub-Continent in the 15th Century by the Portuguese and subsequently, in the 19th Century, by the East India Company and other organizations, who performed intensive adaptability experiments towards the end of this century. In the beginning, efforts to grow imported cottons were not successful and these varieties were cultivated only in mixture with the varieties of indigenous cotton. However, with the establishment of an Agricultural College and Research Station at Lyallpur (now Faisalabad) in the Punjab Province in 1905, the research on cotton was streamlined and varietal improvement through selection started on scientific basis.

The first acclimatized variety "4F", was released in 1914 for cultivation in Punjab and was planted on about 800 hectares during that year. This variety, along with "289F", also formed the base for the introduction of American varieties in Sindh Province, where the breeding work on cotton was intensified in the year 1926. Subsequently, the process of evaluation continued for other zones also and the varietal spectrum kept on changing. The construction of irrigation

net-work in the Punjab and Sindh Provinces helped in fast replacement of the "desi" with the American cottons. In Punjab, the percentage of area under American cotton increased to 54% in the quinquennium ending 1934-35. Today, the "desi" and the American varieties occupy, 3% and 97% of the total cotton acreage of Pakistan, respectively. A list of varieties of "desi" and American cotton developed for commercial production in Pakistan over years is given in Table 1.

Table 1

COMMERCIAL VARIETIES OF COTTON IN PAKISTAN

S.No.	Variety	S.No.	Variety
PUNJAB		17.	BH-36
American types		18.	NIAB-26N
1.	B-557	**Desi types**	
2.	MNH-93	1.	D-9
3.	NIAB-78	2.	Ravi
4.	MS-94	3.	Rohi
5.	SLH-41	**SINDH**	
6.	MNH-129	**American types**	
7.	CIM-70	1.	M-4(N.T)
8.	S-12	2.	M-100 (N.T.
9.	FH-87	3.	Qallandri
10.	CIM-109	4.	S-59-1
11.	GOHAR-87	5.	K-68-9
12.	RH-1	6.	Rehmani
13.	NIAB-86	7.	Shaheen
14.	CIM-240	8.	Reshmi
15.	MNH-147	**Desi type**	
16.	FH-682	1.	SDX-10/19

Source: Personal Communication, 1996.

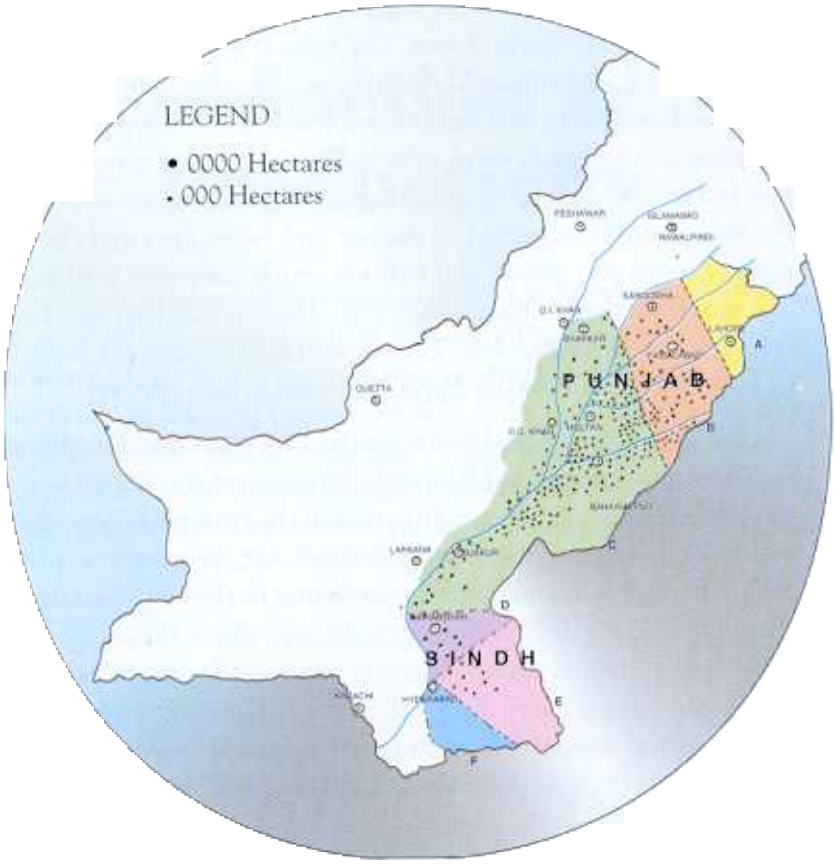
Area and Production Zones

Area under cotton increased progressively from 1.24 million hectare in 1947 to 3.05 million hectare in 1995-96 (Table 2) which was made possible by bringing new areas under cultivation as well as with improved supply of irrigation water. The cotton growing area in Pakistan, in general, stretches from 25°N to 34°N, wherein the area north of 33°N is negligible. This area is situated in different cotton ecological zones (Map 1), demarcated primarily

Table 2
AREA, PRODUCTION AND YIELD OF COTTON IN PAKISTAN

Year	Area ('000 ha)	Production ('000 bales)	Yield (kg lint/ha)
1947-48	1237	1106	159
1950-51	1211	1406	295
1960-61	1293	1692	233
1970-71	1733	3050	313
1980-81	2108	4201	339
1990-91	2662	9628	615
1991-92	2835	12821	768
1992-93	2835	9053	543
1993-94	2805	8041	488
1994-95	2650	8693	558
1995-96	3047	10600	591

Source: Agriculture Statistics of Pakistan 1993-94 Economic Survey 1995-96, Economic Advisor's, Finance Division Government of Pakistan.



Map *Cotton Area and Different Ecological Zones in Pakistan*

on the basis of rainfall and temperature. Zones A, B and C, fallii from North to South between Sialkot Division and Upper Sind are characterized by annual average rainfall of 50-75, 25-50 and <5 cm, respectively. Zone C is the biggest cotton growing zone, coverir over 0.8 million hectares of area. The Zone D is transitional betwee zones C and E, showing mild climate due to sea breeze. Frosty nigh occur very seldom in this zone. The Zone E is characterized by mi temperatures and high wind velocity. Although this zone general has less rainfall, yet many times it receives damaging showers durir the boll maturation period in August and September and the cro suffers due to pest attack and boll rot which coincides with humi and moderate temperature conditions. These conditions also creat the seed maturation problem. Zone F, with mild climate, is considere to be suitable for growing Egyptian (barbadense) cottons.

Zoning of the upland/desi varieties of cotton developed unde the National Agricultural Research System over the last 50 years strictly followed for cotton cultivation in the country in accordanc with the provision of the Cotton Control Act, in order to maintai the purity and avoid admixture. According to this act, varieties ar recommended for different ecological zones where these have bee found better adapted. Notifications in respect of Zoning of individua varieties are issued every year by the Provincial Governments befor the sowing of cotton. The zoning advice is also widely publishe through news-papers, pamphlets, and electronic media.

Production and Productivity

Cotton Production increased from 1.11 million bales in 1947 to 10.60 million bales in 1995, attaining a maximum level of 12.82 million bales in 1991. The increase in production was achieved partly as a result of 2.5 folds increase in area and partly due to increasing trend in the national average yield. Three short periods of decline in production were clearly recorded between 1971-1978, 1983 and 1992 (Figure 1). The cotton production during 1983 declined

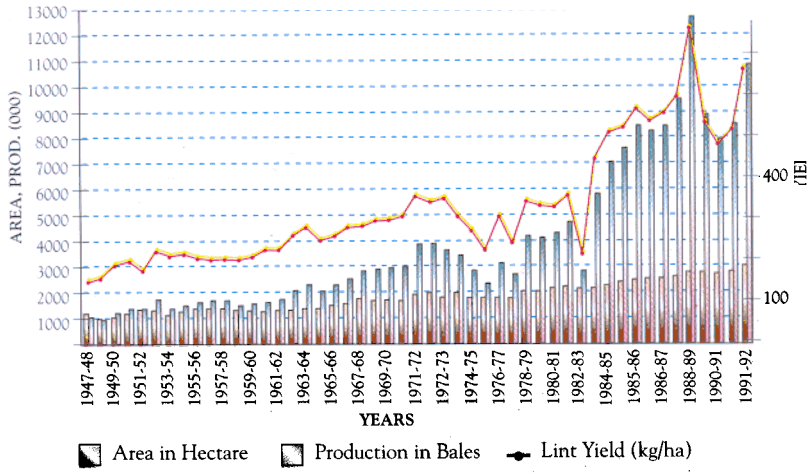


Fig. Cotton – Area, Production and Yield in Pakistan

disappointingly because of the excessive rains, persistent cloudy weather and increase in atmospheric humidity which caused both direct and indirect damage to the crop. The indirect damage was through outbreak of insect-pests. The main reasons for low production in 1992, against a record production of 12.82 million bales in 1991, was the flare up of cotton leaf curl virus in addition to damage caused by rains and floods.

Average cotton yield in Pakistan remained stagnant between 1947-48 to 1959-60 (Figure 2) and it ranged between 155 kg to 219 kg per hectare, although a number of new improved varieties were developed and released for general cultivation during this period. In 1960, chemical fertilizers were introduced which became popular in a few years and raised the yield. Stagnation/Decline in yield was further noted in 1971-72 to 1976-77 although the cotton trade was nationalized and seed cotton support price introduced. In 1983-84 Pakistan was faced to import cotton for the first time in its history due to heavy rains at the wrong time resulting in general crop failure. However, by 1986-87 the country steadily winded up the national

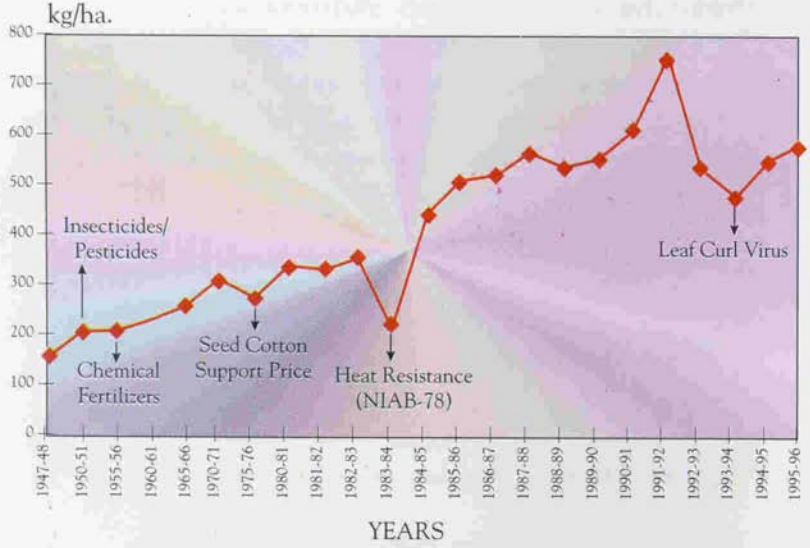


Fig. 2 : Cotton Yield of Pakistan

yield gap with the world average and further, during 1991-92, outpassed the world average yield by 130 kg per hectare. Certain constraints inhibiting increase in cotton yield were further removed after the local yields surpassed the world average yield. Improvement in ginning out-turn and staple length was also achieved; the ginning out-turn increased over years from 30% to 40% (Figure 3) and staple length from 20 mm to 32 mm (Figure 4).

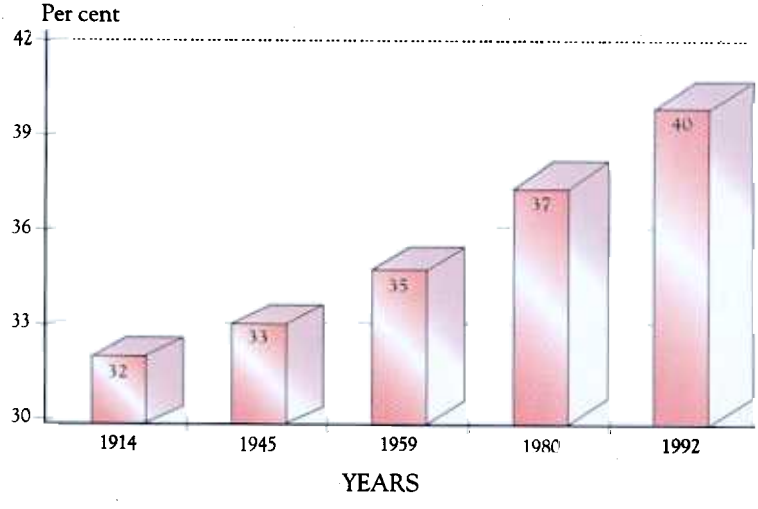


Fig.3 : Improvement in Ginning Out Turn (G.O.T.)

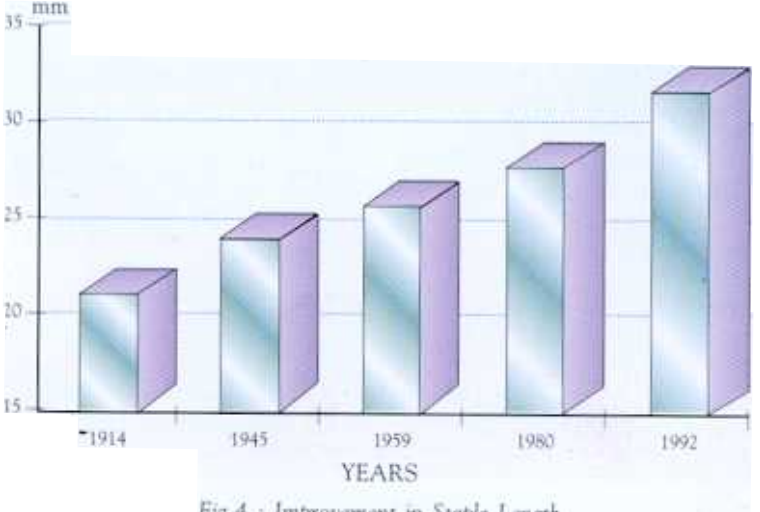


Fig.4 : Improvement in Staple Length

Cotton Exports

Raw cotton

Pakistan is one of the leading exporters of raw cotton and cotton made products. In raw cotton, Pakistan ranked the 3rd largest exporter in the world; achieving the first ranking in 1985. From 1986 to 1992 many textile mills were added, thereby resulting in the increased consumption of raw cotton within the country. Pakistan's share in raw cotton export has thus considerably dropped (Table 3). The present mill consumption is estimated between 8.0 to 8.5 million bales of 170 kg each. By the year 2000 Pakistan will consume at least 10 million bales. With the present production level there shall still be sufficient surplus of raw cotton available for export.

Table 3
PAKISTAN'S SHARE IN EXPORT OF RAW COTTON ('000 MT)

Year	World Export	Pakistan Export	Pakistan Share (%)
1980	4279	331	7.7
1985	4426	685	15.5
1988	5732	823	14.4
1989	5275	296	5.6
1990	5023	272	5.4
1991	6060	399	6.6
1992	5844	468	8.0

Source: Potential for expanding cotton production in Pakistan, CCRI, Multan, 1994

Cotton Yarn

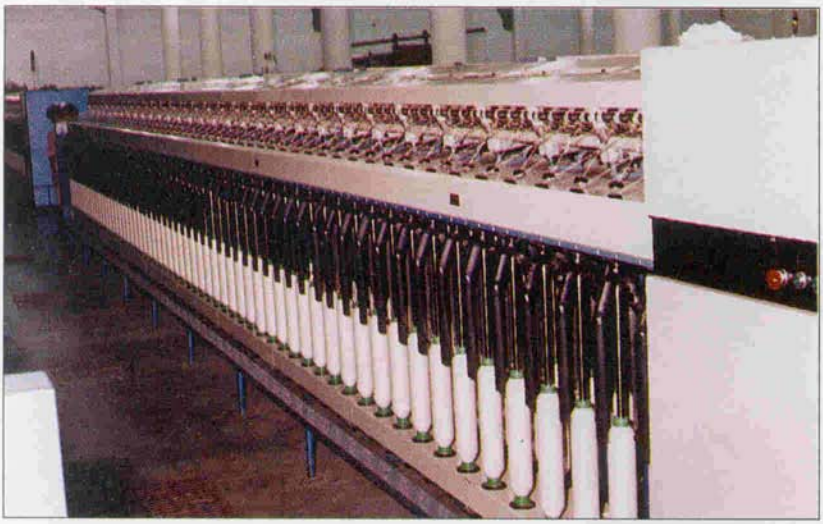
Pakistan is the largest exporter of cotton yarn and has been maintaining first position since 1980. At present about 30% of the total world export goes from Pakistan (Table 4). The value of 1 kg of lint in Pakistan is worth US$ 2.18 whereas the value of the same lint from Korea is US$ 18.35 and in China it is US$ 13.25.

Textile Mills consume about 1.5 million tonnes of Raw Cotton

Table 4
PAKISTAN'S SHARE IN EXPORT OF COTTON YARN ('000 MT)

Year	World Export	Pakistan Export	Pakistan Share (%)
1980	708	97	13.7
1985	995	145	14.6
1988	1293	236	18.3
1989	1475	331	22.5
1990	1519	436	28.7
1991	1610	474	29.4

Source: Potential for expanding cotton production in Pakistan, CCRI, Multan, 1994.



Spinning of Cotton Yarn

Cotton Cloth

Pakistan is also a major exporter of cotton cloth in the international market, exporting about 1,70,000 metric tonnes of Grey Cloth at present, which is about 7.5% of the total world export. There is still a scope for more exports of cotton cloth from the country in the world market (Table 5).

Table 5
PAKISTAN'S SHARE IN EXPORT OF COTTON CLOTH ('000 MT)

Year	World Export	Pakistan Export	Pakistan Share (%)
1980	1356	67	4.9
1985	1617	106	6.6
1988	1992	124	6.2
1989	2208	139	6.3
1990	2214	156	7.0
1991	2271	170	7.5

Source: Potential for expanding cotton production in Pakistan, CCRI, Multan, 1994.

Cotton Made Garments

The Government policy has been that instead of exporting raw cotton and cotton yarn, the value added products of cotton should be exported. In 1980, the total garment export share was 2.54% only. During the following years it has increased and in 1990 Pakistan exported garments worth US$ 494.03 million which is approximately 8% of the total cotton exports. This quantity is still very small when compared to the total value of the crop (Table 6).

Table 6
EXPORT OF READY-MADE GARMENTS OVER YEARS

Year	Garments (M.US$)	Share (%)
1980	75.26	2.54
1985	206.07	6.71
1988	335.52	7.20
1989	393.76	7.95
1990	494.03	8.08

Source: Potential for expanding cotton production in Pakistan, CCRI, Multan, 1994.

Factors Underlying the Success

The factors responsible for increase in cotton production in th country are as follows:

Improved Production Technology

Formulation of package of cotton production technology has beei one of the major research goals to exploit maximum yield potentia of a crop variety under specific environments. Some of the majo agronomic practices responsible for increase in the cotton yield ar given below:

Increase in Area under Improved Varieties

The area under two improved varieties viz., MNH-93 and NIAB-78, released for general cultivation in Punjab during 1980 and 1983 respectively, has been progressively increasing with the corresponding decrease in the area under relatively low yielding variety B-557. It is estimated that area under three major cotton varieties, namely, NIAB-78, MNH-93 and B-557, in Punjab during 1986-87, was 62%, 25% and 4%, respectively. Introduction of new cotton varieties such as S-12 in 1988 and CIM-240 in 1992 started replacement of the old varieties (Table 7). In 1990-92 the area under the best commercial varieties decreased due to the high incidence of leaf curl virus (LCV) on these cultivars. These varieties were slowly replaced by the new varieties/lines resistant or moderately resistant to LCV. The improved

Table 7
CHANGE IN PER CENT AREA OF
DIFFERENT VARIETIES DURING 1992-1995

Variety	Year			
	1992	1993	1994	1995
MNH-93	10.0	12.5	5.8	4.7
NIAB-78	32.2	35.7	23.4	19.0
S-12	47.0	16.2	7.3	6.9
CIM-240	–	12.6	36.4	54.0

Source : Annual report of CCRI, Multan, 1995-96.

new varieties have thus gained sufficient coverage resulting in bet per hectare out-put.

Seed Rate/Plant Population

Low seed rate was a persistent problem in Punjab, especially w the small farmers; whereas in Sindh the situation was relatively bett A constant education and motivation of the farmers, howev resulted in a marked improvement in seed rate and plant populati in Punjab, from the conventional 25-30,000 plants per hectare 35-40,000 plants per hectare. In Sindh, it is estimated to be betwe 42-49,000 plants per hectare. The increasing tendency among th farmers to use acid delinted seed for sowing by drill has also helpe in better germination of seed, ultimately leading to high plar population.

Line sowing is popularized to facilitate adoption of appropriate cultural practices and for effective plant protection measures

Line Sowing/Weed Control

Campaigns were made to popularize line sowing so as to facilitate adoption of appropriate cultural practices and for effective plant protection measures which proved fruitful and the line sowing improved from 40% in 1970 to 100% in 1994 onwards in Punjab. However, cotton crop in the Sindh province is traditionally sown in lines. Further, as a result of extensive campaign and promotional programmes, the impact of weed control in cotton was realised by the farmers and a considerable improvement in the use of weedicides recorded during last 25 years; only 20% farmers adopted weed control measures in 1970 which increased to 60% in 1995.

Increased Use of Critical Inputs

Much attention was given, particularly during last two decades, to make various critical inputs available and also create awareness among the farmers to appropriately use these inputs. Resultantly, the consumption of inputs increased many folds which ultimately enhanced the yield of various crops, including cotton.

High Quality Seed

An increased emphasis on entire process of production, multiplication, certification, and distribution of quality seed to farmers resulted in an improvement of 29% in the supply of certified seeds to the farmers during 1984-85, which further increased by 4.4% in 1986 and 17.1% in 1986-87. This increase was 18.7% more in the Punjab as against that of Sindh. Further, an overall average increase of 11.4% per year was recorded in the supply of improved seed during 1970-1994. Credit was provided by Agricultural Development Bank of Pakistan for the purchase of seed and Seed Corporations established in both Punjab and Sindh. The Corporations, in turn, set-up seed processing plants. Private sector also established some sophisticated seed processing plants throughout the country especially in Punjab.

Appropriate Use of Fertilizer

The average annual increase in the use of fertilizer during 1970-1990 was 25.7% which is the highest among the 10 countries enlisted in Table 8. No chemical fertilizers were consumed in Pakistan prior to 1955 and in 1955-1956, for the first time, 3,000 N/tons of fertilizer was used which further shot up to 31,000 N/tons during 1959-60. In 1961, the government of Pakistan set up an Agricultural Development Corporation, charged with responsibilities of procurement, storage, and distribution of farm supplies, particularly the fertilizers. Increase in yield of various crops due to the enhanced use of fertilizer, made this critical input quite popular with the farmers, resulting in about 25% average annual increase in the off-take of fertilizer during last 24 years. Further, consumption of fertilizer during the kharif season (April-September) increased by about 7 times, from 1,23,000 N/tons in 1970 to 8,89,000 N/tons in 1992 (Table 9). Estimates showed that 60-80 per cent of fertilizer consumed in Pakistan is during kharif season alone and 15-16 per cent of the total fertilizer used is applied on the cotton crop.

Table 8
FERTILIZER CONSUMPTION (KG/HA) IN VARIOUS COUNTRIES IN 1970 AND 1990

Country	1970	1990	PAAGR*
Netherlands	749	610	– 1.0
Germany	400	394	– 0.1
Japan	384	451	+ 0.1
France	241	316	+ 1.2
Egypt	122	401	+ 11.4
Italy	90	200	+ 6.1
USA	87	96	+ 0.5
India	13	31	+ 23.0
USSR	40	81	+ 8.9
Pakistan	15	53	+ 25.7

Source : FAO Production Year Book, 1992-93.
PAAGR* : Percent Average Annual Growth Rate.

Table 9
CONSUMPTION OF FERTILIZER FOR KHARIF CROPS IN PAKISTAN 1970-92

Year	N	P	K	'000 N/tons ALL
1970	116	7	–	123
1975	238	56	2	296
1980	325	66	4	395
1985	457	95	9	561
1990	692	150	10	852
1992	737	144	8	889

Source : Agricultural Statistics of Pakistan (various issues), Economic Survey of Pakistan, 1995-96.

Judicious use of Pesticides

An integrated pest control approach was advocated to farmers who were educated and motivated to adopt new and recommended low cost cultural control practices, rather than depending wholly on chemical control, thereby allowing the bio-agents to play their beneficial role. The rapid increase in the use of pesticides and area covered by plant protection since 1981 onwards clearly demonstrates the increasing awareness among the farmers in terms of use of pesticides (Table 10) and number of sprays done by the farmers in the Punjab province (Table 11). Pest scouting teams, duly assisted by the national and multi-national agro-chemical companies provided timely information on pest occurrence, and guidance for its timely control.

Enhanced Supply of Irrigation Water

Supply of irrigation water has improved through various dams constructed after independence, Indus water Treaty and encouragement by the government for digging tube wells wherever the sub-soil water is fit for irrigation. On-farm water management and lined water

Table 10
CONSUMPTION OF PESTICIDES IN PAKISTAN DURING 1981-95

Year	A.I. M. tons	% Growth per year	% Growth since 1981
1981	905	–	–
1982	1345	49	49
1983	1757	31	94
1984	2585	47	185
1985	3489	35	285
1986	4111	18	354
1987	4429	8	389
1988	4065	– 8	349
1989	4706	16	420
1990	5730	22	533
1991	5920	3	554
1992	5619	– 5	520
1993	4919	–11	443
1994	6183	26	583
1995	7645	24	845

Source: Economic Survey of Pakistan, 1995-96

Aerial Spray under an Integrated Pest Control Approach in Cotton

Table 11
NUMBER OF PESTICIDE SPRAYS DONE IN PUNJAB OVER YEARS

Year	Zero Spray	One Spray	Two Sprays	Three Sprays	Four Sprays	Five Sprays	Six Sprays	Seven Sprays
1987	28.88	19.75	22.83	23.44	4.28	0.82	0.00	0.00
1988	26.15	25.68	20.80	20.35	6.22	0.80	0.00	0.00
1989	9.18	15.71	17.89	25.80	18.21	13.21	0.00	0.00
1990	6.76	2.60	8.92	23.24	38.75	19.73	0.00	0.00
1991	0.81	1.67	2.07	42.20	36.01	17.24	0.00	0.00
1992	0.00	0.49	7.14	26.37	38.93	25.03	2.04	0.00
1993	0.00	2.94	5.05	26.94	29.44	25.32	9.63	0.00
1994	0.00	0.90	5.40	11.90	31.50	32.60	18.10	0.00
1995	0.00	0.00	4.50	14.20	27.27	36.82	11.82	5.39

Source: Annual Report of CCRI, Multan, 1995-96.

channels were given due priority to reduce water losses in the distribution system. About 25% increase was recorded in the water availability during last 20 years (Table 12).

Support Price Incentive

There was no support price of seed cotton or lint to begin with. The price, which the farmers or the traders got, depended on market forces of demand and supply. Farmers could then, and even today can, sell their produce either to a middle man (Aarhti) or, to the ginning

Table 12
WATER AVAILABILITY IN PAKISTAN DURING 1975-1994

Year	Water availability (Million acre foot)
1975	25.95
1980	97.79
1985	104.73
1990	119.62
1994	130.90

Source: Economic Survey of Pakistan, 1995-96; Federal Bureau of Statistics.

factory. In Punjab, a well organized middle-men market called "Mandi" also exists, in addition to the above two sources. Ginner, in Pakistan, is a merchant in addition to being a ginner. He buys seed cotton, gins it, sells lint, sells or crushes seed for oil and generates funds for himself.

At the time, when the local textile industry was in the stage of infancy, prices were largely dependent on the export market. But as the domestic textile industry grew and export of cotton yarn increased, the price of cotton yarn became the influencing factor. Due to a ready demand from the textile industry, cotton prices generally maintained a steady level. The local prices were protected through the levy of export duty and as a matter of official policy exports were continued for the exportable surplus only.

In 1973-74, the government introduced programme to safeguard cotton growers from wide fluctuations by assuring a minimum guaranteed price. This was implemented through buying and selling operations of the Cotton Export Corporation (CEC). In the following year (1974-75), the CEC was entrusted with the responsibility of purchasing cotton directly from the ginning factories instead of purchasing from the market. Thus, CEC became the bulk purchaser of cotton, getting thereby an upper hand in price determination. Hedge market was closed as CEC became the sole buyer of cotton from the ginning factories, thereby safeguarding the interests of growers and the ginners. This indirect price maintenance, however, did not produce quick effects, and, therefore, the present Assured Minimum Support Price programme was introduced, in 1976-77. As a result of this programme, the area under cotton crop and yield per hectare have increased gradually.

Under the present assured minimum support price Programme, the government fixes the minimum price of seed cotton, depending upon the cost of production, competitiveness of cotton with other crops, export parity prices, export priorities, viability of textile industry, the world demand and supply, and the price of cotton. After

giving due consideration to all such factors, the government announces the minimum assured price well before the sowing is done, so that the growers get time to firm up their intention about cotton cultivation. The lint prices are worked out on the basis of three variables, viz., seed cotton price, the cotton seed price prevailing in the market, and the ginning expenses approved by the government.

Credit Facility

The liberal policy of the government to provide more and more credit facilities to the farmers especially in the form of interest free loans for the small farmers encouraged the growers to use the recommended doses of inputs for getting better yield per hectare. Further, for getting credit at an appropriate time, Agricultural Development Bank of Pakistan (ADBP) was set up to carry out the liberal policies of the government. In addition, government gives *Taccavi* loans and Commercial Banks and Cooperative Societies also advance agricultural

On-farm training to farmers at Multan

loans to farmers. This policy has helped and encouraged the farmers to purchase farm implements and use recommended doses of inputs, which ultimately helped in enhanced cotton productivity.

Institutional Support

For obvious reasons, research has been given a high priority in cotton production programme of the country. The main objective was to establish a nation-wide research system for both fundamental and applied aspects. Development of new cotton varieties with high yield potential and desired fiber characteristics along with improved packages of their cultivation practices have been the ultimate goals.

Agricultural research on cotton, at the federal level, is primarily the responsibility of Pakistan Central Cotton Committee (PCCC). However, Pakistan Agricultural Research Council (PARC) also provides research advisory services, at national and international level, finances training, seminars and workshops. At the provincial and regional levels, the Provincial Agriculture Departments, Atomic Energy Centers, Agriculture Universities and Progressive Growers conduct research on specific problems and priorities. The success of cotton in Pakistan, in fact, is the result of integrated efforts of all these agencies. Yet the PCCC provides nucleus for orderly planning and, in several cases, technical and financial assistance to the research programme/projects. As an apex research organization PCCC is responsible for monitoring of programmes and strengthening coordination in scientific research for all disciplines on cotton.

Pakistan Cotton Standards Institute (PCSI), a component of the Umbrella Cotton Development Project, set up in February 1987, introduced and implements the standardization of Pakistan cottons based upon internationally acceptable grading and classic system and also trains new generation of cotton graders, arbitrators and instructors.

Secrets of Success

The key factors responsible for success of cotton production vis-a-vis economy in Pakistan may be summarized as below:

1. Increase in area under cotton due to improved/ assured irrigation water availability.
2. Improved production technology, including superior varieties with high productivity and quality; and cultivation practices, such as, increased seed rate/ plant population, line sowing and weed control.
3. Increased use of critical inputs, e.g., high quality seed, fertilizers, pesticides/ low-cost cultural control practices and irrigation water.
4. Assured Minimum Support Price incentive.
5. Liberal government policy for credit facility, including interest free loans.
6. Institutional support to boost up cotton research, extension, quality control, training and co-ordination.
7. Balanced domestic consumption and exports of raw cotton and cotton production, maintaining steady levels of prices, demand and supply.

Epilogue

Besides the success achieved in Pakistan in terms of increased cotton production, having produced 12.82 and 10.60 million bales in 1992 and 1995, respectively, it is, in fact, the change brought out in the infrastructure and the set-up, as a result of many subjective and objective strategies, that made cotton cultivation the most economical among commercial crops for the farmers of Pakistan.

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However, this story of success of cotton in the country also suggests for making further serious efforts to maintain the progress made. Some of the specialized areas such as bio-technology, genetic engineering, physiological stresses and bio-chemical pathways should be given high due attention in future, to achieve the best, since the economy of the country is largely dependent on the export of cotton crop.

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