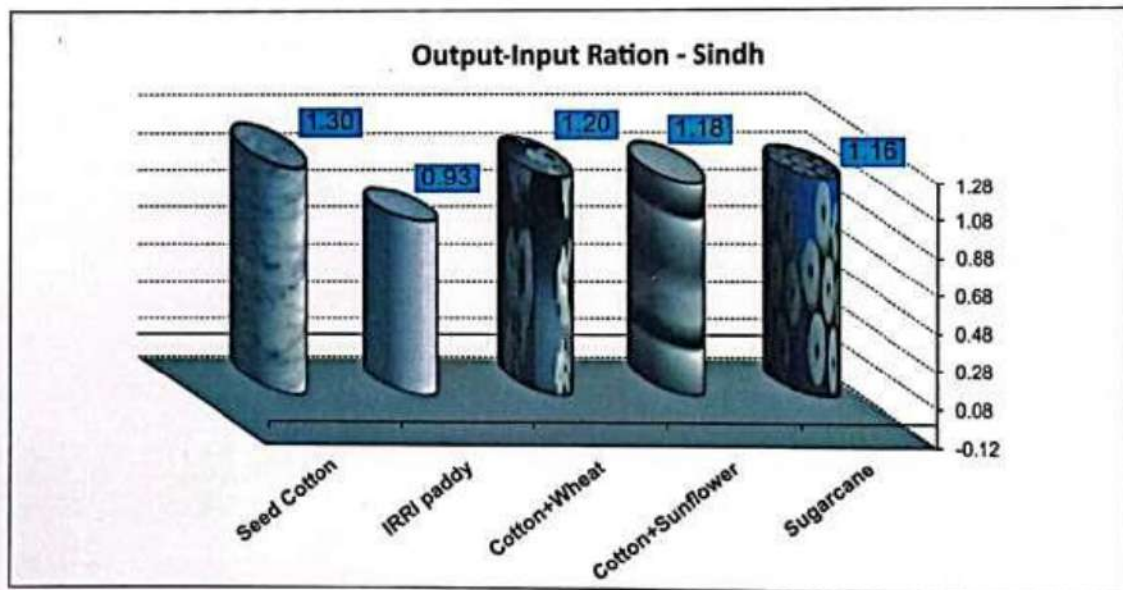




COTTON POLICY ANALYSIS FOR 2019-20 CROP



AGRICULTURE POLICY INSTITUTE
MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH
GOVERNMENT OF PAKISTAN
ISLAMABAD

DECEMBER 2019

ACKNOWLEDGEMENT

The technical contribution and professional efforts of the following staff members are highly appreciated in completion of Cotton Policy Analysis Report for 2019-20 Crop:

Officers

- | | | |
|----|-------------------------|-----------------------------|
| 1. | Mr. Abdul Karim | Chief |
| 2. | Mr. Muhammad Ejaz Ahmed | Chief |
| 3. | Mr. Hussain Ali Turi | Deputy Chief (Coordinator) |
| 4. | Mr. Muhammad Amin | Deputy Chief |
| 5. | Syed Riaz Ali Shah | Assistant Chief |
| 6. | Ms Shagufta Tasleem | Research Officer Dy. Coord) |

Staff

- | | | |
|----|--------------------|--|
| 7. | Mr. Hafeez Ahmed | Assistant Private Secretary
(Composed the Report) |
| 8. | Mr. Shamir Ahmed | Assistant Private Secretary |
| 9. | Mr. Muhammad Naeem | Machine Operator |

Dr. Javed Humayun
**Senior Joint Secretary/
Director General**
M/o NFS&R

CONTENTS

	Page No
Summary of Findings and Recommendations	i -ix
1. Introduction	1
2. Sowing and Picking Times of Cotton	3
3. Provincial Shares in Area and Production	5
4. Important Cotton Growing Districts	5
5. Changes in Area, Yield and Production	7
5.1 Long-term Changes: 2008-09 to 2018-19	7
5.2 Short-term Changes: 2017-18 Vs 2018-19	7
6. Targets Vs Achievements: 2018-19 CROP	8
7. Domestic Supply, Demand, Stocks and Price Situation	9
7.1 Domestic Supply, Demand and Stocks	9
7.2 Domestic Price Situation	9
8. Cost of Production of Seed Cotton	11
9. Economics of Cotton and Competing Crops	14
10. Economics of Fertilizer Use on Cotton Crop	17
10.1 Benefit Cost Ratio (BCR)	17
10.2 Parity Ratio Between Prices of Fertilizer and Seed Cotton	18
11. Nominal and Real Market Prices of Seed Cotton	18
11.1 At Market Prices of Seed Cotton in the Punjab	19
11.2 At Market Prices of Seed Cotton in Sindh	20
12. World Supply, Demand, Stocks, Trade and Price Situation	22
13. International Prices	23
14. Export and Import Parity Prices	23
15. Economic Efficiency of Resource Use in Seed Cotton Production	24
15.1 Under Export Scenario	24
15.2 Nominal Protection Coefficient (NPC)	25
15.3 Effective Protection Coefficient (EPC)	25
15.4 Domestic Resource Coefficient (DRC)	26
15.5 Under Import Scenario	27
16. Cotton Yield Among Competing Countries	27
17. Cotton Varieties and Yield Potential in Pakistan	30
18. Annexes	32 to 47

S.No.	TABLES	Page No
1	Recommended Sowing Times of American Cotton	3
2	Zoning for Cultivation of Bt. Cotton in the Punjab and Sindh Crop Season	4
3	Provincial Shares in Area and Production of Cotton: Average of 2016-17 to 2018-19	5
4	Average Annual Growth Rates of Area, Yield and Production of Cotton: 2008-09 to 2018-19	7
5	Area, Yield and Production of Cotton: 2017-18 and 2018-19 Crops	8
6	Targets and Estimated Achievements of Area, Yield and Production of Seed Cotton: 2018-19 Crop	8
7	Domestic Production, Demand and Stocks of Cotton Lint: 2016-17 to 2018-19 (August-July)	9
8	Monthly Average Wholesale Prices of Seed Cotton (Phutti) in the Main Producer Area Markets of Punjab: 2018-19 Crop	10
9	Monthly Average Wholesale Prices of Seed Cotton (Phutti) in the Main Producer Area Markets of Sindh: 2018-19 Crop	10
10	Monthly Average Spot Prices of Raw Cotton at Karachi for 2016-17 and 2018-19 crop (August-January)	11
11.	Average Farmers' Cost of Production of Seed Cotton in Punjab and Sindh: 2018-19 and 2019-20 Crops	12
12.	Component-wise Cost of Production of Seed Cotton in Punjab: 2018-19 and 2019-20 Crops	12
13	Component-wise Cost of Production of Cotton in Sindh: 2018-19 and 2019-20 Crops	13
14	Economics of Cotton and Competing Crops at Prices Realized by the Growers in the Punjab: 2018-19 Crops	14
15	Economics of Cotton and Competing Crops at Prices Realized by the Growers in Sindh: 2018-19 Crops	16
16	Benefit Cost Ratio (BCR) of Fertilizer Use on Cotton: 2007-08 to 2018-19	17
17	Parity Ratio Between the Prices of Fertilizer and Seed Cotton: 2007-08 to 2018-19	18
18	Nominal and Real Market Prices of Seed Cotton (Phutti) in the Punjab: 2007-08 to 2018-19	19
19	Nominal and Real Market Prices of Seed Cotton (Phutti) in Sindh: 2007-08 to 2018-19	21
20	World Production, Consumption, Stocks and Trade in Cotton: 2016-17 to 2018-19	22
21	Export/Import Parity Prices of Seed Cotton as Worked from Various Reference Prices	24
22	Economic Efficiency Parameters Based on Export Parity Prices	26
23	Economic Efficiency Parameters Based on Import Parity Prices	27
24	Cotton Area in Major Cotton Producing Countries of the World: 2017 Crop	28
25.	Cotton Production in Major Cotton Producing Countries of the World: 2017 Crop	29
26.	Yield per Hectare of Major Cotton Producing Countries in the World: 2017 Crop	30
27.	Cotton Varieties and Yield Potential in Pakistan	31

S.No.	ANNEXES	Page No.
I	PROVINCE-WISE AREA (HECTARES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN: 2008-09 TO 2018-19	32
II	PROVINCE-WISE AREA (ACRES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN: 2008-09 TO 2018-19	33
III	DISTRICT-WISE AREA, YIELD AND PRODUCTION OF SEED COTTON: AVERAGE OF 2016-17 TO 2018-19	34
IV	AVERAGE FARMERS' COST OF PRODUCTION ESTIMATES OF SEED COTTON IN THE PUNJAB: 2018-19 AND 2019-20 CROPS	35
V	AVERAGE FARMERS' COST OF PRODUCTION ESTIMATES OF SEED COTTON IN SINDH: 2018-19 AND 2019-20 CROPS	36
VI	ECONOMICS OF SEED COTTON AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2018-19 CROPS	37
VII	PROFITABILITY OF FERTILIZER USE ON SEED COTTON AT THE MARKET PRICE: 2018-19	40
VIII	INTERNATIONAL PRICES OF COTTONS: 2007-08 TO 2018-19	41
IX	EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF ACTUAL AVERAGE EXPORT PRICE OF PAKISTANI COTTON	42
X	EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF FUTURE'S CONTRACT PRICE OF NEW YORK NO.2 COTTON (AVERAGE OF OCTOBER, DECEMBER, 2019 AND MARCH, 2020)	43
XI	IMPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF ACTUAL AVERAGE CIF (KARACHI) PRICE OF IMPORTED COTTON	44
XII	IMPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF AVERAGE CFR FAR EASTERN QUOTED PRICE OF INDEX A-COTTONS	45
XIII	ECONOMIC EFFICIENCY OF RESOURCE USE IN SEED COTTON BASED ON EXPORT PARITY PRICES	46
XIV	ECONOMIC EFFICIENCY OF RESOURCE USE IN SEED COTTON BASED ON IMPORT PARITY PRICES	47

S.No.	FIGURES	Page No.
1	PROVINCIAL SHARES IN AREA OF SEED COTTON: AVERAGE OF 2016-17 TO 2018-19	6
2	PROVINCIAL SHARES IN PRODUCTION OF SEED COTTON: AVERAGE OF 2016-17 TO 2018-19	6
3	RETURN TO OVER ALL INVESTMENT IN PUNJAB	15
4	RETURN TO OVER ALL INVESTMENT IN SINDH	16
5	NOMINAL AND REAL MARKET PRICES OF SEED COTTON (PHUTTI) IN THE PUNJAB: 2007-08 TO 2018-19	20
6	NOMINAL AND REAL MARKET PRICES OF SEED COTTON (PHUTTI) IN SINDH: 2007-08 TO 2018-19	21
7	INDEX-A COTTON	23

ABBREVIATIONS

AARI	:	Ayub Agricultural Research Institute
API	:	Agriculture Policy Institute
APTMA	:	All Pakistan Textile Mills Association
BCR	:	Benefit Cost Ratio
BPS	:	Basic Pay Scale
CFR	:	Cost and Freight
CIF	:	Cost, Insurance and Freight
CLCV	:	Cotton Leaf Curl Virus
COP	:	Cost of Production
CPI	:	Consumer Price Index
CRI	:	Cotton Research Institute
DAP	:	Di. Ammonium Phosphate
DRC	:	Domestic Resource Cost
ECC	:	Economic Coordination Committee
E&M	:	Economics & Marketing
EPC	:	Effective Protection Coefficient
FAO	:	Food and Agriculture Organization
FOB	:	Free on Board
FSC&RD	:	Federal Seed Certification and Registration Department
FYM	:	Farm Yard Manure
GDP	:	Gross Domestic Product
GOT	:	Ginning Out Turn
HSD	:	High Speed Diesel
ICAC	:	International Cotton Advisory Committee
ICPM	:	Integrated Crop Production Management
IPM	:	Integrated Pest Management
IPNS	:	Integrated Plant Nutrition System
IRRI	:	International Rice Research Institute
ITMF	:	International Textile Mills Forum
KCA	:	Karachi Cotton Association
KPK	:	Khyber Pakhtunkhwa
MOC	:	Ministry of Commerce
NARC	:	National Agricultural Research Centre
NCL	:	No Control Limit
NFS&RD	:	National Food Security and Research Division
NIAB	:	Nuclear Institute of Agriculture and Biology
NPC	:	Nominal Protection Coefficient
NSC	:	National Seed Council
OLS	:	Ordinary Least Squares
PAPA	:	Pakistan Agriculture Pesticides Association
PARC	:	Pakistan Agricultural Research Council
PBS	:	Pakistan Bureau of Statistics
PCCC	:	Pakistan Central Cotton Committee
PCGA	:	Pakistan Cotton Ginners Association
PCSI	:	Pakistan Cotton Standards Institute
PSC	:	Punjab Seed Corporation
SSC	:	Sindh Seed Corporation
TCP	:	Trading Corporation of Pakistan
WTO	:	World Trade Organization

COTTON POLICY ANALYSIS FOR 2019-20 CROP

SUMMARY OF FINDINGS AND RECOMMENDATIONS

- Findings

Area and Production

- Punjab and Sindh contribute 67.4 and 31.7 per cent of the cotton production while the share of both Khyber Pakhtunkhwa and Balochistan is 0.9 per cent.
- During the last decade, cotton production at country level decreased @ 1.8 per cent per annum mainly due to 1.4 per cent contraction in area although 0.4 per cent reduction in yield.
- Cotton production in 2018-19 is produced at 9.86 million bales, against 11.94 million bales last year, which is -17.5 per cent lower than 2017-18.
- Cotton production has fallen short of the target by -31.4 per cent during 2018-19 due to mainly -19.7 and -14.5 per cent shortage in area and yield respectively.

Major Varieties

- According to the Annual Field Survey Report of API for 2014-15 to 2017-18 and Pakistan Central Cotton Research Institute, Multan, major cotton varieties sown in Pakistan were Bt.cotton, CIM-496, CIM-598, Hybrid GN-2085, MG-6, FH-113, Ali Akber-802, Ali Akber-703, N-141, A-One, NIBGE-3, MNH-886 and MNH-121, CIM-602, BGC-09, Cyto-178, RH-647, VH-327, FH-326, NIAB-878B, Cyoto-128, Cyoto-179, CIM-600, CRIS-508.

Domestic Prices

- Monthly average market prices of seed cotton for 2018-19 crop during the post harvest months in major producing areas have generally remained slightly below the actual export parity prices.

- The monthly wholesale market prices of seed cotton during the post harvest period averaged at Rs 3796 per 40 kgs in the Punjab and Rs 3808 in Sindh.
- Monthly average wholesale prices of seed cotton ranged from Rs 3546 to Rs 4092 per 40 kgs during the post harvest months in major producing areas of the Punjab and Rs 2700 to Rs 4062 per 40 kgs in Sindh.
- Monthly average spot prices of cotton lint at Karachi averaged at Rs 9174 per 40 kgs in 2018-19 which is 30.55 per cent higher the last year.

Cost of Production

- In the Punjab, the cost of cotton cultivation during 2019-20 season is estimated at Rs 71,858 per acre.
- The cost of production at the market / ginnery level of Punjab would be Rs 3462 per 40 kgs, reflecting gain of 18.4 per cent over the last year.
- In Sindh, the cost of cotton cultivation for 2019-20 crop is expected at Rs 79,146 per acre.
- The cost of production at market / ginnery level of Sindh would come to Rs 3206 per 40 kgs, shown increasing of 15 per cent over the last year.

Economics of Cotton and Competing Crops

- The economics of cotton and competing crop has been analysed in terms of input-output prices paid and received by the growers during 2018-19 crop year..
- In case of indirect competition, sugarcane farmers were reported receiving the indicative price as announced by the provincial government, paid relatively better returns over the cotton combination with sunflower particular in respect of output – input and purchased input cost.
- In Sindh, cotton farming performed better than IRRI paddy in terms of returns to all the economic criteria.

- In case of indirect competition, cotton combinations with wheat has gained better position against their main competitor sugarcane in some of the economic criteria. Cotton+wheat has shown much better in terms of economic criteria except purchased inputs.

Economics of Fertilizer Use on Cotton Crop

- Benefit Cost Ratio refers to the ratio between the value of additional produce obtained by using a certain dose of fertilizer and the additional costs incurred therein. These ratios have shown favourable situation in context of cotton crop during 2018-19.
- Regarding the parity ratio between prices of fertilizer and seed cotton, the quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has fluctuated between 0.39 and 1.24 tonnes while that of P fertilizer between 0.78 and 3.16.

Nominal and Real Market Prices

- The nominal prices of seed cotton in the Punjab indicate an overall increase of 154 per cent while the real market prices have shown an increase of 10 per cent during 2007-08 to 2018-19.
- In Sindh, the nominal market prices of seed cotton have observed overall increase of 150 per cent while the real market prices have increased 4.05 per cent against the base year level.

World Production and Prices

- World cotton production estimated at 25.92 million tonnes in 2018-19 is projected to increase to 25.98 million in 2018-19.
- International prices of Index-A cottons have widely fluctuated from the lowest level of 70.80 cents per pound in 2009-10 to the highest level of 165 cents per pound in 2010-11. The price remained subdued during 2017-18 averaging at 87.98 US cent per pound.

Export Parity Prices

- Based on actual export price of Pakistani cotton during 2018-19, the export parity price of seed cotton calculates to Rs 3626 per 40 kgs and Rs 3534 on the basis of average during 2015-16 to 2017-18.
- The export parity price comes to Rs 3259 per 40 kgs on the basis of Futures contract prices of New York No.2 Cotton.

Import Parity Prices

- Based on actual cif (Karachi) price of imported cotton during 2018-19, the import parity price of seed cotton works to Rs 4376 per 40 kgs and Rs 3436 for average of 2015 to 2018.
- Based on CFR Far Eastern quoted price of Index – A cottons, the import parity price comes to Rs 4721 per 40 kgs during 2018-19 and Rs 4412 on average of 2015-16 to 2017-18.

Economic Efficiency

- Economic efficiency of resource use in cotton production has been evaluated by estimating the Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost (DRC).
- The NPCs and EPCs under import scenario value of both are below one throughout the analysis period. This indicates no economic protection to seed growers in Punjab and Sindh.
- However, under export scenario that NPC estimates both for Punjab and Sindh are either closer to one or slightly higher than one for Punjab. During the period 2015-16 and 2017-18, they remained taxed as NPC was less than one.
- Similarly, the EPCs are greater than one under export/import scenario in the Punjab and Sindh during 2018-19, it reveals that input/output prices seed cotton are stable that may suddenly affect cotton growers profit.
- The DRC indicates the opportunity cost of domestic resources employed per unit of value added in production of a commodity.

- The DRCs have been less than one during the period under analysis since 2011-12 except 2014-15 in the Punjab and for entire period in Sindh under export situation. Generally the situation implies a Comparative Advantage in seed cotton production, both under export and import scenario.

- The findings of economic efficiency analysis warrant more investment in cotton production and marketing for export purposes may benefit Pakistan by saving foreign exchange.

World Comparison

- Pakistan is the 4th largest cotton producer in terms of area and production but ranks at 26th position in terms of yield.

- In term of cotton production, India is on the top with 6.0 million tonnes in world production and second China with 5.8 Million tonnes, than USA with 4.73 million tonnes.

Policy Options

Based on the analysis of relevant factors covered in the main text of the Report, the likely policy options for seed cotton 2018-19 crop are presented below:

S.No.	Base	Worked back price of seed cotton at ginnery level	
		Rs/40 kgs	
1	Export parity prices based on average:		
	i) Actual export price of Pakistani cotton		
	- During 2018-19 (Augt-Jan)		3626
	- During 2015-16 to 2017-18		3534
	ii) Futures contract prices of New York No.2 cotton (average of October, December 2019 and March 2019)		3259
2	Import parity prices based on average:		
	i) Actual cif Karachi prices of imported cotton:		
	- During 2018-19 (Augt-Jan)		4376
	- During 2015-16 to 2017-18		2436
	ii) CFR Far Eastern quoted price of Index-A Cottons		
	- During 2018-19 (Augt-Jan)		4721
	- During 2015-16 to 2017-18		4412
3	Average wholesale prices of seed cotton in Major Producer Area Markets during the post-harvest period in 2018-19		
	- Punjab (Sep – Jan)		3796
	- Sindh (Aug – Dec)		3808
4	Cost of production for 2019-20 crop		
	- Punjab		3461
	- Sindh		3205
5	Cost of domestic resources involved in:	At exchange rate of Pak Rs 105.35	
		Punjab	Sindh
	i) Producing cotton for import substitution based on 2016-17 prices of cotton (actual average)	68.11	.86.87
	ii) Producing cotton for export based on 2018-19 prices of cotton (actual average)	73.61	74.62

- Recommendations

In view of the field information, consultation with the stakeholders in the API Committee meeting on cotton and analysis of relevant factors, following proposals are made regarding intervention price and improving productivity, quality and marketing of cotton crop:

Intervention Price

- The Government may like to consider for announcement of intervention price of seed cotton (Base grade 3 with staple length 1-1/16") for 2019-20 crop around Rs 3000 per 40 kgs in view of world cotton situation and high input costs, if deemed necessary.
- It provides a reference point to intervene by the public sector agency, if needed. It is to be implemented only when the market prices of seed cotton fall below the Intervention Price.
- The government policy of encouraging the role of private sector in cotton marketing and trade may be continued.
- In view of trade liberalization and active role of private sector, the actual incentive to cotton growers should come through the market forces.
- The TCP should be designated as the implementing agency for seed cotton through buying lint at the price determined on the basis of intervention price of seed cotton, if announced in case of need.

Improving Productivity

- A comprehensive National Seed Policy should be announced by the Government and implemented in true spirit.
- The coordination among the Provincial and Federal Research Institutes should be strengthened in order to improve research activities for productive outcome.
- The Government should ensure implementation of Federal Seed Act 2015 - the Cotton Research Institute should only release varieties

- Comprehensive plan should be designed for balanced use of inputs and new technology by the Research and Provincial Agriculture Extension Departments.
- The role of private sector may be promoted to supply certified seed through public – private partnership. The APTMA may be involved in research, marketing and quality improvement programmes.
- Availability of certified seed is a serious problem. The Punjab Seed Corporation should supply the certified cotton seed to the growers at a reasonable price.
- The price, date of manufacture and weight should be labelled on the bags of fertilizer and brands of pesticides/weedicides.
- Awareness campaign for cotton growers should be undertaken by the research and provincial agriculture extension departments. This may include identification of pure Bt cotton seed and other important considerations in relation to the cotton crop with the adoption of updated Bt. technology.
- There is a need of zoning at this time to conserve areas for precious crops like cotton as sugarmills are being installed in the heart of cotton growing regions.
- Early sowing of Bt cotton has raised some problems like boll rotting and pest attack which need to be addressed.
- The Pest Scouting and Warning System should be further strengthened enabling the farmers to take timely action and apply appropriate pesticides.
- On the pattern of Punjab Seed Corporation of the Government of Sindh, Khyber Paktunkhwa and Balochistan should also pay a special attention to seed production to meet their provincial requirements.
- There is a need to encourage the Soil Testing facilities to assess the need of appropriate fertilizers for balanced input use.
- There is a dire need to introduce an appropriate monitoring system to verify the performance of Bt cotton varieties in the field particularly for toxin level.
-
- The Government should take strict measures in order to control the Mealy Bug through management practices and biological control.

- PARC may be advised to test EM technology, Bio-fertilizer and other relevant technologies of fertilizer for balanced fertilizer use to reduce cost of production.
- In order to promote cotton cultivation in the country, there should be restriction on establishing new sugarmills in the cotton region.
- The Plant Breeders Rights Act may be approved and implemented in order to promote the varital development.
- pH value of soil has gone to the range of 8-10 due to indiscriminate use of chemical inputs and shallow tillage operations. There is a need of encouraging deep ploughing and Disc plough in cotton growing areas.

Improving Quality and Marketing

- To improve and maintain quality of seed cotton, educational campaign informing the pickers about the proper methods, timing and handling should be launched through media and bruchure,
- Like other commodities, regularity authority may be stablished to control prices and quality of agricultural inputs
- The deductions and underweightment in cotton marketing for various quality consideration need to be standdardized..
- Government should take serious action to improve the quality of cotton lint for export promotion and launch a vigorous programme to ensure proper packing and truthful labelling.
- APTMA should buy cotton on the basis of standards approved by the Pakistan Cotton Standards Institute.
- Instead of exporting raw cotton, the textile industry should be updated in order to promote production of value added cotton made ups for exports.

**Sr. JS/Director General
M/o NFS&R/API**

December, 2019

COTTON POLICY ANALYSIS FOR 2019-20 CROP

INTRODUCTION

Certain crops are contributing significantly to the economy of the country and cotton is one of those enterprises. Cotton is an important cash crop and the largest primary source of raw material for the textile industry of Pakistan. It contributes around 4.5 per cent of the value added in agriculture sector and about 0.8 per cent share in GDP¹. Cotton farming is a major source of income for rural labour especially the women as pickers. The cotton sticks are also widely used as firewood at village level. Hundreds of ginneries are spread all over the country, especially at village/town level in remote areas and the livelihood of their seasonal/permanent labour depend on cotton crop. It also provides raw material to oil extraction mills and the cotton seed cake which is a key source of animal feed.

2. Cotton farming is the principal source of raw material for the textile sector. Besides, factories and textile mills in the country employing millions of skilled and unskilled labour along the entire cotton value added chain, from weaving to textile and garment export. In view of dynamic nature and multifaceted role of cotton in the country through exports and providing livelihood to millions of farmers, traders and workmen, it has always received priority and preference of the government particularly in textile industry.

3. The crop was cultivated on 2.373 million hectares in 2018-19 accounting for 12.1 per cent of the cropped area, showing contraction in the cultivated area as compared to last year. Pakistan produced 9.86 million bales in the year 2018-19 against 11.94 million bales last year showing decrease of 17.5 per cent. The production decreased due to unfavorable weather conditions, stunting of crops, attack of white fly, pink ball worm and other pests/insects also hampered crop out. In view of the importance of cotton, there is an urgent need to minimize incidence of such fluctuations and take effective measures to stabilize its production overtime.

4. In order to ensure a reasonable production level for the domestic textile industry and safeguard the interest of the cotton growers, the Government has been analysing the Intervention Price for Cotton² in the past to be implemented only when the market prices of seed cotton fall below the intervention price level. Otherwise, the Government always encourages the role of private sector in marketing and trade of cotton. Accordingly, no intervention was required during the last couple of years as the market prices remained at reasonable level during the season. However, in view of the fragile market situation, the Government retained the intervention price for seed cotton at Rs 3000 per 40 kgs for 2019-20 crop.

¹ Economic Survey of Pakistan 2018-19

² Base grade 3 with staple length 1-1/16"

5. Under the WTO regime, the cotton trade has become increasingly quality conscious. Demand for contamination free and clean cotton is increasing in the global trade, even the local textile industries demand for the standard cotton for manufacturing the quality made ups. Challenges in the textile industry would become more serious in the years ahead, which warrant for Pakistan to prepare its cotton production and marketing strategies to face the emerging issues in the domestic and global markets. The Government is well aware of the importance of improving the quality of cotton and controlling the pest attack on cotton production. The Pakistan Cotton Standards Institute (PCSI) promoting the quality control of cotton in the country was invited to provide training to the Cotton Pickers' Trainers. Accordingly, the PCSI has made a proposal for the training of Cotton Pickers' Trainers in picking for promotion of clean cotton production in the Punjab.

6. Cultivation of un-approved varieties, attack of diseases like, CLCV, Mealy bug and traditional farm management practices, are a few issues which affect the productivity of the crop. It was identified that Pakistan is lacking CLCV resistant germ palms and there is a dire need of importing global cotton germ palms to widen the cotton genetic base in the country. In order to implement the case, the government has approached the USDA. The USDA has agreed to provide funds through the Cotton Productivity Enhancement Project to be disbursed through an international agency ICARDA in Pakistan, and the Cotton Research Institutes.

7. To address the yield gaps and the low productivity issues, several steps are being undertaken like introduction of cotton in other potential areas and bridging the yield gap through adequate supply of certified seed, balanced use of inputs and optimal plant population etc. Measures are also being taken to develop the disease/heat/drought resistant and Genetically Modified cotton varieties. Pest Scouting and Early Warning system is being strengthened by the provincial governments to control any disease attack. The private sector is being facilitated for production of Bt-cotton hybrid seeds through technical and financial assistance. The Government have also approved some Bt-cotton varieties for getting benefit of new technology to boost cotton production in the country.

2. SOWING AND PICKING TIMES OF COTTON

8. In major cotton growing districts of the Punjab and Sindh, sowing of American cotton varieties is generally recommended by Provincial Agriculture Departments from 1st May to end June in the Punjab, 15th March to 15th June in Sindh, the whole month of May in the Khyber Pakhtunkhwa and Balochistan. Province-wise details of the recommended sowing times for cotton growing districts are given in Table-1.

Table-1: Recommended Sowing Times of American Cotton

Province/District	Time of Sowing
Punjab	
Faisalabad, Sargodha, Jhang, Toba Tek -Singh Sahiwal, Pak Pattan, Okara Bahawalpur, R.Y.Khan	1 st May to 15 th June
Mianwali	10 th May to 15 th June
Multan, Lodhran, Vehari Muzaffargarh, Layyah, D.G.Khan, Rajanpur	1 st May to end of June
Khanewal	15 th May to 15 th June
Bahawalnagar	1 st May to 20 th June
Sindh	
Thatta	15 th March - 31 st March
Tharparkar, Mirpurkhas and Badin	1 st April - 30 th April
Hyderabad	15 th April - 15 th May
Sanghar	15 th April - 20 th May
Dadu, Nawabshah and Naushahro Feroz	1 st May - 31 st May
Khairpur, Sukkur, Ghotki, Larkana, Shikarpur & Jacobabad	15 th May - 15 th June
Khyber Pakhtunkhwa	
D.I.Khan	1 st May to 31 st May
Balochistan	
Lasbela, Dera Murad Jamali, Nasirabad	1 st May to 31 st May

Sources:

1. Cotton Research Institute, Multan.
2. PCCC, Karachi.
3. Cotton Research Institute, Sakrand.

9. Picking of cotton in Sindh and in some parts of the Punjab starts in August and may continue up to February in certain cases depending upon the crop and climatic conditions.

Table 2: Zoning for Cultivation of Bt Cotton in the Punjab and Sindh Crop Season A.

Bt Variety	Suitable Areas for Cultivation	Time of Sowing
IR-NIBGE-3701	All Fertile Lands of Punjab especially Bahawalpur and Rahim Yar Khan	15 th April to 15 th May
Ali Akbar 703	Rahim Yar Khan, Rajanpur, Bahawalpur, D.G. Khan and areas of early sown cotton	1 st March to 15 th April
MG-6	Low Fertile Lands and less irrigation water available areas especially areas of Muzafargarh, Bahawalnagar and Bahawalpur	1 st April to 15 th May
Sitara-008	Central Fertile Areas of Cotton, Khanewal, Multan, Vehari and Lodhran	1 st March to 15 th May
FH-113	Low Fertile Lands and Less Water Available Areas (Rahim Yar Khan, Rajanpur, D.G. Khan and Non Core Areas of Cotton), Layyah, Muzafargarh, Bahawalnagar, Haroonabad, Fort Abbas, Sandy Areas of Bhakkar and Hard Pan of Bahawalpur	16 th April to 15 th May
Neelum 121	Fertile and Irrigation Water Available Non Core Areas, Especially cotton sowing areas after potato crops (Okara, Sahiwal)	1 st March to 30 th April
Ali Akbar 802	Highly Virus Affected Areas, Multan, Lodhran, Muzafargarh, Khanewal and Non Core Areas of Cotton	15 th April to 15 th May
IR-NIBGE-1524	Low Fertile Lands with less water availability areas of Southern Punjab (Bahawalpur, Bahawalnagar)	15 th April to 15 th May
Hybrid GN-2085	All Fertile Lands of Punjab and suitable for progressive farmers	15 th April to 15 th May

B

Bt Variety	Suitable Areas for Cultivation	Time of Sowing
<i>Bt</i> .CIM-598	All Fertile Lands and Irrigation Water Available, Core and Non-Core Areas of Punjab	1 st March to 30 th April
Sitara-009	All Fertile Lands of Punjab	1 st March to 15 th May
MNH-886	All Fertile Lands of Punjab	1 st March to 15 th May
Tarzan-1	Central Fertile Lands of Punjab	15 th March to 15 th May
N-141	All Fertile Lands and Irrigation Water Available Areas	15 th March to 30 th April
A-One	Central Fertile Areas of Cotton, Khanewal, Multan, Vehari and Lodhran	1 st March to 15 th April
NIBGE-3	Fertile and Irrigation Water Available Areas	1 st March to 1 st week of April

Source: CCRI, Multan

10. An important development is the increasing usage of Bt cotton by farmers. Almost 80 % of cotton growing area has become under Bt Cotton with different names in Sindh and Punjab. There may be 30 % increase in cotton yield due to resistance against chewing pest and hence additional income to poor farmers in Pakistan. However, the Bt. Cotton varieties grown are susceptible to cotton Leaf Curl Virus (CLCV) and sucking pests like Mealy Bug, Jassid and White fly which are a major threat to cotton crop in Pakistan. The time of sowing and suitable areas for cultivation of BT cotton in the Punjab presented in Table-2.

3. PROVINCIAL SHARES IN AREA AND PRODUCTION

11. Provincial shares in area and production of cotton based on average of 2016-17 to 2018-19 are provided in Table-3. During this period cotton production averaged at 10.826 million bales from 2.521 million hectares (6.229 million acres).

Table-3: Provincial Shares in Area and Production of Cotton: Average of 2016-17 to 2018-19

Country/ Province	Area		Production	
	000 hectares	Per cent	000 bales	Per cent
Pakistan	2520.8	100.0	10825.9	100.0
Punjab	1918.7	76.1	7293.7	67.4
Sindh	565.5	22.4	3437.0	31.7
Khyber Pakhtunkhwa and Balochistan	36.6	1.5	95.2	0.9

Source: Annex-I & II.

12. Punjab and Sindh account for 76.1 and 22.4 per cent in cotton area and 67.4 and 31.7 per cent in production (Figures 1 and 2). Cotton yield in Sindh is higher than Punjab resultantly production share of Sindh exceed its area share. The share of Khyber Pakhtunkhwa & Balochistan together in production is 0.9 per cent from 1.5 per cent area. Cotton yield in Khyber Pakhtunkhwa & Balochistan together is much lower than Punjab and Sindh.

4. IMPORTANT COTTON GROWING DISTRICTS

13. The district-wise data on area and production of cotton are given in Annex-III. The district producing more than one million bales of cotton per annum is only Bahawalpur. The districts producing more than 100 thousand bales of cotton per year each are Bahawalpur, Bahawalnagar, Rahim Yar Khan, Lodhran, Rajanpur, Khanewal, Vehari, Multan, Muzafargarh, D.G.Khan, Sahiwal, Layyah, and Mianwali from the Punjab province and Sanghar, Ghotki, Khairpur, Nawabshah, Matiari, Naushero Feroze, Sukkur, Mirpurkhas, Tando Allahyar and Umerkot from Sindh Province. These 23 districts account for more than 93 per cent of the cotton production in the country.

Figure-1: SHARES IN AREA

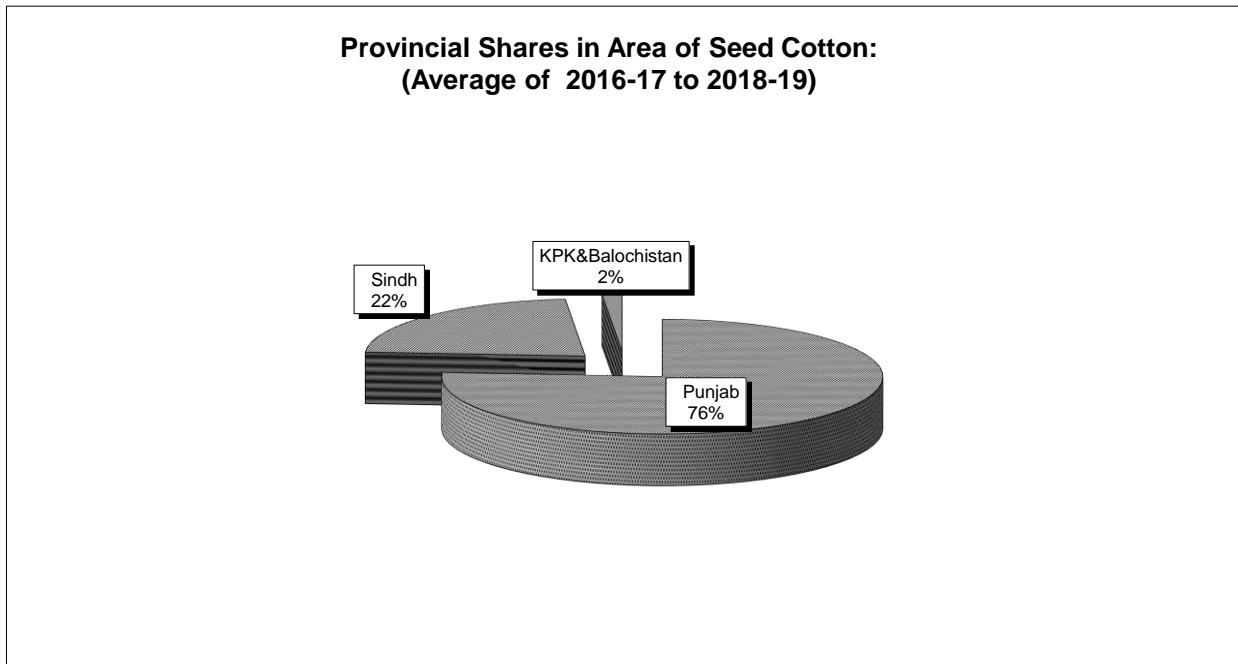
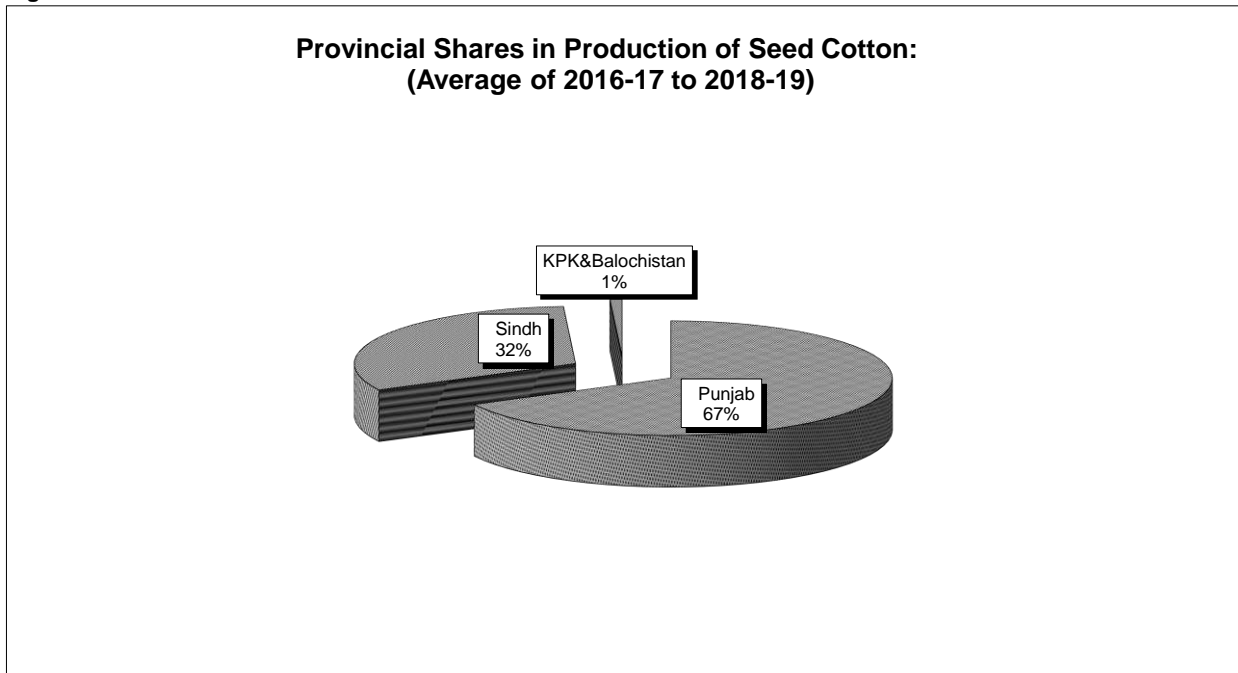


Figure-2: SHARES IN PRODUCTION



Source: Annex-I

14. The districts of Bahawalpur, Bahawalnagar, Rahim Yar Khan, Lodhran, Rajanpur, Khanewal, Vehari, Multan, Sanghar and Ghotki each producing more than half million bales per year altogether account for 54 per cent of the cotton in the country.

5. CHANGES IN AREA, YIELD AND PRODUCTION

15. During the period of 2008-09 to 2018-19, cotton area ranged between 2.373 and 3.106 million hectares (5.864 and 7.674 million acres) and yield between 581 and 816 kgs per hectare (235 to 330 kgs per acre). Therefore, cotton production oscillated between 9.861 and 13.960 million bales. Long term and short term changes in area, yield and production are discussed below:

5.1 Long-term Changes: 2008-09 to 2018-19

16. During the period under reference, cotton production at country level decreased @ 1.8 per cent per annum mainly due to 1.4 and 0.4 per cent contraction in area and yield respectively (Table-4).

Table-4: Average Annual Growth Rates of Area, Yield and Production of Cotton: 2008-09 to 2018-19

Country/ Province	Area	Yield	Production
	----- Per cent -----		
Pakistan	-1.4	-0.4	-1.8
Punjab	-2.1	-0.5	-2.6
Sindh	1.5	-1.1	0.3

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.

17. In the Punjab, cotton production decreased @ 2.6 per cent annually due to decrease of 2.1 and 0.5 per cent in area and yield respectively. In Sindh, cotton production decreased @ 0.3 per cent per annum solely due to 1.1 per cent reduction in yield but the area increased @ 1.5 per cent.

5.2 Short-term Changes 2017-18 Vs 2018-19

18. According to the final estimates provided by the provincial Agricultural Department, cotton production during 2018-19 at country level worked out as 9.860 million bales, as compared, 11.945 million bales produced in 2017-18 (Table-5). Decrease of 17.5 per cent production is due to decrease of 12.1 and 6.1 per cent in area and yield.

Table-5: Area, Yield and Production of Cotton: 2017-18 and 2018-19 Crops

Country/ Province	Area		Changes in 2018- 19 over 2017-18	Yield		Changes in 2018- 19 over 2017-18	Production		Changes in 2018- 19 over 2017-18
	2017-18	2018-19		2017-18	2018- 19		2017-18	2018-19	
	-- 000 hectares --		Per cent	--Kgs/hectare --		Per cent	-- 000 bales --		Per cent
Pakistan	2700.3	2373.0	-12.1	752.5	706.8	-6.1	11945.6	9860.8	-17.5
Punjab	2052.9	1887.8	-8.0	669.2	615.0	-8.1	8077.0	6826.0	-15.5
Sindh	611.7	448.2	-26.7	1049.9	1115.1	6.2	3775.8	2938.4	-22.2
KPK	0.2	0.2	-5.9	530.3	510.3	-3.8	0.5	0.5	-9.4
Balochistan	35.5	36.8	3.7	442.4	443.3	0.2	92.3	95.9	3.9

Source: Annex-I

19. Cotton production in the Punjab estimated at 6.826 million bales, 15.5 per cent less than 8.077 million bales produced in 2017-18. Lower production is due to decrease in area and yield by 8.0 and 8.1 per cent respectively.

20. In Sindh, cotton production remained 2.938 million bales, 22.2 per cent also less than 3.776 million bales in 2017-18. Decrease in production is also due to decrease in area by 26.7 per cent although 6.2 per cent improvement in yield.

6. TARGETS VS ACHIEVEMENTS: 2018-19 CROP

21. Federal Committee on Cotton (FCC) has fixed Seed Cotton production target for 2018-19 crop at 14.370 million bales. As per final estimates of Provincial Agriculture Departments, cotton production is reported at 9.860 million bales 31.4 per cent less than the target due to mainly 19.7 and 14.5 per cent shortage in area and yield respectively (Table-6).

Table-6: Targets and Estimated Achievements of Area, Yield and Production of Seed Cotton: 2018-19 Crop

Country/ Province	Area		Deviation from the target	Yield		Deviation from the target	Production		Deviation from the target
	Target	Achieve- ment		Target	Achieve- ment		Target	Achieve- ment	
	--- 000 ha ----		Per cent	Tonnes/ha		Per cent	-- 000 bales --		Per cent
Pakistan	2955.0	2373.0	-19.7	827.1	706.8	-14.5	14370.0	9860.8	-31.4
Punjab	2300.0	1887.8	-17.9	739.5	615.0	-16.8	10000.0	6826.0	-31.7
Sindh	620.0	448.2	-27.7	1152.2	1115.1	-3.2	4200.0	2938.4	-30.0
KPK	5.0	0.2	-96.8	680.4	510.3	-25.0	20.0	0.5	-97.6
Balochistan	30.0	36.8	22.7	850.5	443.3	-47.9	150.0	95.9	-36.1

Sources: 1. For targets: Respective Provincial Agriculture Departments.

2. For achievements: Annex-I.

22. Area, Yield and Production of cotton was not be achieved the targets except one Balochistan area surpassed by 22.7 per cent.

7. DOMESTIC SUPPLY, DEMAND, STOCKS AND PRICE SITUATION

7.1 Domestic Supply, Demand and Stocks

23. The country has produced only 11.95. million bales during 2017-18 crop, which is 1.60 million bales higher than last year's production. . Adding opening stocks of 0.23 million, the total supply estimated at 12.18 million. About 14.75 million bales have been consumed by the local textile industry while only 0.21 million bales were exported.

24. The severe shortage of canal water and pest attack during 2018-19 reduced the area and production of cotton . According to second estimates, the production of cotton lint has reached at 10.15 million bales, 1.80 million bales lower than the last year. After adding the opening stocks of 0.80 million bales, the total supply worked out to 10.95 million bales. The consumption of cotton lint by the local textile industry on the basis of three years average is projected at 13.48 million bales. To meet the deficit, the country would have to import 1.85 million bales during 2018-19 (Aug-July).

Table-7: Domestic Production, Demand and Stocks of Cotton (Lint): 2016-17 to 2018-19 (August-July)

Item	2016-17	2017-18 (estimated)	2018-19 (Provisional)
----- Million bales * -----			
1. Opening stocks	0.55	0.23	0.80
2. Production	10.79	11.95	10.15
3. Total supply	10.79	12.18	10.95
4. Likely Consumption	13.06	14.75	13.48
5. Imports**	2.61	3.58	0.73
6. Exports**	0.11	0.21	0.05
7. Closing stocks	0.23	0.80	-1.85

* One bale = 170 kgs = 375 lbs.

** Import and export are upto Aug 2018 to February 2019.

Sources:

a) For item 1 & 4 Textile Commissioner Organization (TCO).

b) For item 2, 5 & 6, PBS, Karachi..

7.2 Domestic Price Situation

7.2.1 Seed cotton (phutti)

25. Monthly average wholesale prices of seed cotton in the main producing area markets of Punjab and Sindh during the post-harvest period of 2018-19 crop are detailed in Table-8.

Table-8: Monthly Average Wholesale Prices of Seed Cotton (Phutti) in the Main Producer Area Markets of Punjab 2018-19 Crop.

Market	Sept	Oct	Nov	Dec	Jan	Avg
	-----Rs per 40 kgs-----					
Bahawalnagar	3667	3848	3956	3729	3695	3779
Mailsi	3568	3710	3833	3769	3875	3751
D.G Khan	3905	4030	3869	3909	3890	3921
Bahawalpur	3644	3803	3894	3835	3780	3791
R.Y Khan	3682	3945	4092	3976	-	3924
Khanewal	3575	3742	3865	3753	-	3734
Burewala	3654	3763	3714	3549	3677	3671
Vehari	3613	3760	3832	3880	3908	3799
Average	3664	3825	3882	3800	3804	3796

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

26. Monthly average wholesale prices of seed cotton during the post-harvest period in Punjab ranged between Rs 3549 per 40 kgs in Burewala market during month of December 2018 and Rs 4092 per 40 kgs in Rahim Yar Khan market during November 2018. The seasonal average price of seed cotton ranged between Rs 3671 to Rs 3924 per 40 kgs.

Table-9: Monthly Average Wholesale Prices of Seed Cotton (Phutti) in the Main Producer Area Markets of Sindh 2018-19 Crop.

Market	Aug	Sept	Oct	Nov	Dec	Average
	-----Rs per 40 kgs-----					
Mirpur Khas	3918	3775	3367	3000	2700	3352
Sanghar	3875	3806	3583	3350	3150	3553
Hyderabad	3950	3925	3517	3133	--	3631
Badin	3768	3612	3300	3525	2750	3391
Shaheed Benazir Abad	3722	3722	3767	3900	3600	3742
N.S.Feroz	3700	3700	3767	4000	3750	3783
Khairpur	3725	3725	3725	3925	3767	3773
Sukkur	-	-	3875	4008	3992	3958
Ghotki	-	-	3838	3925	4062	3942
Average	3808	3752	3638	3641	3471	3808

Source: D.G. Agriculture Extension, Hyderabad, Sindh.

27. In Sindh, average monthly wholesale prices of seed cotton during the post-harvest period ranged between Rs 2700 per 40 kgs in Mirpurkhas market during December 2018 and Rs 4062 per 40 kgs in Gotki market during December 2018. The seasonal average price of seed cotton ranged between Rs 3352 to Rs 3958 per 40 kgs.

7.2.2 Cotton Lint (Raw Cotton)

28. Monthly average spot prices of raw cotton at Karachi during 2017-18 and 2018-19 are presented in Table-10. The spot price during 2018-19 (Aug-Jan) averaged at Rs 9174 per 40 kgs which is 30.55 percent higher than last year.

Table-10: Monthly Average Spot Prices of Raw Cotton at Karachi for 2017-18 and 2018-19 Crops (August-Jan)

Month	Base Grade -3, staple length 1-1/16", Micronaire Value 3.8 to 4.9 NCL (No Control Limit)	
	2017-18	2018-19
	Rupees per 40 kgs	
August	6650	9171
September	6468	8735
October	6570	8986
November	6945	9410
December	7397	9403
January	8132	9338
Average	7027	9174

Source: Karachi Cotton Association (KCA). Karachi.

8. COST OF PRODUCTION OF SEED COTTON

- Punjab

29. Cost of production of farm produce is one of the important factors in its pricing. The empirical estimation of cost of production, however, involves a number of conceptual and practical problems, which may be ascribed to diverse farming systems, cropping pattern diversities, input use levels, mechanical technologies used and varying yield, etc.

30. Cost of production of prospective seed cotton crop (2019-20) in Punjab and Sindh Provinces were updated by using the input output parameters adapted by the Agriculture Policy Institute (API) in conjunction with the latest input prices and rates of field operations. These input prices and rates of field operations were obtained through the field survey conducted for the respective provinces by the API during January, 2019. These rates were also supplemented with the information provided by the officials of the provincial Agriculture Departments and farmers participating in the API consultative meeting held at the premises of API. Details of the cost of production estimates for Punjab and Sindh are given in Annex-IV & V the results are summarized in Table-11 below:

Table-11: Average Farmer Cost of Production of Seed Cotton in Punjab and Sindh: 2018-19 and 2019-20 crops

S. No	Item	Unit	Cost estimate		Changes in 2019-20 over 2018-19
			2018-19 crop	2019-20 crop	
Punjab					
1	Cost of cultivation	Rs/ acre	63425	71858	8433.00
2	Yield	Kg/acre	880	840	-40
3	Cost of production at farm level	Rs/40 Kg	2882.97	3421.82	538.85
4	Marketing cost	.....do.....	40	40	0
5	Cost of production at market level	.....do.....	2922.97	3461.82	538.85
Sindh					
1	Cost of cultivation	Rs/ acre	68722	79146	10424
2	Yield	Kg./ acre	1000	1000	0
3	Cost of production at farm level	Rs/40 Kg	2748.88	3165.8	416.92
4	Marketing cost	.....do.....	40	40	0
5	Cost of production at market level	.....do.....	2788.88	3205.8	416.92

Source: Annex-IV & V.

31. In Punjab cost of growing one acre of seed cotton during 2019-20 crop year is likely to be Rs 71858. Assuming yield 840 Kg/acre, cost of production at the farm level turns out to be Rs 3421.82 per 40 Kg. Adding marketing charges @ Rs. 40/40 Kg, cost of cotton at the market/ginnery level should work out to Rs 3461.82 40 Kg. This cost is up by Rs 538.85 over the cost estimated at Rs 2922.97 per 40 Kg. Principal constituents in the cost of cultivation of cotton in Punjab are found, land rent (27.85%), fertilizer including Farm Yard Manure (16.54%), land preparation (13.23%), picking charges (11.69%), irrigation, plant protection each approximately (7.5%), other costs (7%) and seed and sowing operations and interculture cumulatively make about (8%) of the likely gross cost of production of cotton for 2019-20 crop.

Table-12: Component- wise Cost of Production of Cotton in Punjab: 2018-19 and 2019-20 crop

S. No	Inputs/ operations	2018-19 crop	2019-20 crop	Share in Cost of 2019-20 crop (%)
		....Rs./ acre.....		
Punjab				
1	Land preparation cost	9172.0	9508.7	13.23
2	Seed and sowing operations	3500.0	4000.0	5.57
3	Irrigation	5079.7	5625.7	7.83
4	Interculture	1680.0	1880.4	2.62
5	Plant protection	5100.0	5400.0	7.51
6	Fertilizers including FYM	9541.2	11882.6	16.54
7	Land rent	18000.0	20000.0	27.83
8	Picking charges	6600.0	8400.0	11.69
9	Others	4752.5	5160.8	7.18
10	Gross cost	63425.4	71858.3	100.00

- **Sindh**

32. The estimated cost of raising one acre of cotton in Sindh, during 2019-20 crop year is likely to be Rs 79146.1 including land rent. With average yield of 1000 Kg/ acre, farm level cost of production turns out to be Rs 3165.8 per 40 Kg. Adding marketing cost @ Rs 40/ 40 Kg, production cost at the market level turns out to be Rs 3205.8/ 40 Kg. This indicates an increase of Rs 416.97 per 40 Kg during 2019-20 over 2018-19 at the market level.

33. Major components of the cost of production are found: land rent (25%), chemical fertilizer inclusive of Farm Yard manure (17%), picking charges (13%) and land preparation (11%). Plant protection and 'other' cost (8 and %) each and seed & sowing operations and irrigation each are likely to add by 6% and interculture by 5% in total cost of production of the following crop.

34. Increase in the above said cost of production is attributable to increase in price of diesel, withdrawal of fertilizer subsidy and rise in pesticide prices. It may be noted that pesticide companies have increased pesticide prices by a considerable proportion because these prices have been considerably raised in China and a number of pesticides are imported from China.

35. Land rent has significantly increased over the last year. Its main reason is that last year cotton prices relatively remained higher which increased farmers' income from cotton crop. Consequently land rent has been increased.

Table-13: Component wise cost of production of cotton: 2018-19 and 2019-20 crop

S. No	Inputs/ operations	2018-19 crop	2019-20 crop	Share in cost (%)
		...Rs./ acre.....		
	SINDH			
1	Land preparation	7603.6	8318.0	11
2	Seed and sowing operations	3200.0	4400.0	6
3	Irrigation	4530.4	4978.2	6
4	Interculture	3800.0	4300.0	5
5	Plant protection	6000.0	7200.0	9
6	Fertilizers including FYM	11861	13694.7	17
7	Land rent	16666.7	20000.0	25
8	Picking charges	10000.0	10000.0	13
9	Others	5060.2	6255.1	8
10	Gross cost	68721.9	79146.1	100

9. ECONOMICS OF COTTON AND COMPETING CROPS

36. Farmers' priorities and decisions regarding resource allocation among the competing crops are primarily governed by a number of economic considerations particularly focusing on gross cost, gross income, gross margin, net income, output-input ratio, etc. These indicators provide useful insights into the pattern of resource use at the farm level, both by individual as well as the whole farming community.

37. Cotton, a kharif crop, competes with rice for land, water and other farm resources in the areas where cultivation of both the crops is technically feasible. Cotton also faces indirect competition from sugarcane, which occupies the land throughout the year as an annual crop.

38. The economics of cotton and competing crops has been analyzed in terms of input-output prices paid and received by the growers during the 2018-19 crop year. The details of the analysis are provided in Annex-VI. A summary of various economic indicators for the Punjab and Sindh is presented in Tables 14 & 15 and depicted at Figures 3 & 4 :

Table-14: Economics of Cotton and Competing Crops at Prices Realized by the Growers in the Punjab: 2018-19 Crops

Province/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. Cotton	1.30	3.96	347	3781
2. Basmati paddy	1.03	2.12	360	1117
3. IRRI paddy	0.84	1.87	295	856
4. Cotton + Wheat	1.21	3.93	309	3814
5. Cotton + Sunflower	1.21	3.71	313	2984
6. Sugarcane	1.16	4.90	260	2133

Source: Annex-

- Punjab

39. Cotton in Punjab has rewarded the farmer with better returns as compared to Basmati and IRRI Paddy in terms of returns to overall investment and other indicators analyzed. In terms of gross revenue per rupee of purchased inputs and irrigation water, cotton's performance was significantly better than both Basmati and IRRI paddy.

40. Basmati paddy could outperform cotton only in terms of returns to crop duration. IRRI paddy not only lagged behind Cotton, in any of the criteria adopted for the economic analysis but even failed to return to its farmer the cost of cultivation, as the output input ratio remained below 1.

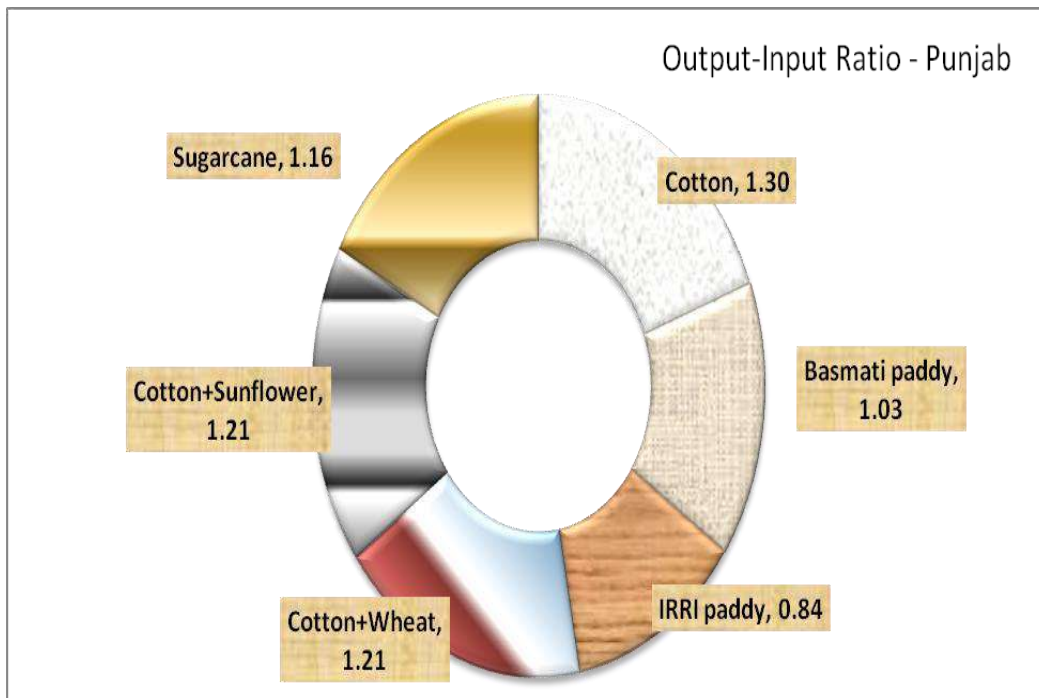


Fig-3 : Returns to Overall Investment in Punjab

41. In case of indirect competition, sugarcane farmers were reported receiving the indicative prices as announced by the provincial government, hence paid relatively better returns over the cotton combination with sunflower particularly in respect of output-input ratio and purchased inputs cost. Cotton combinations, both with wheat and sunflower performed better, giving back to the grower higher returns as compared to the sugarcane crop particularly in terms of crop duration and irrigation water. Cotton + wheat proved better than Sugarcane in terms of returns to overall investment.

- **Sindh**

42. In Sindh, cotton farming performed much better than IRRI paddy in terms of all the economic criteria. However, the noticeable point is that Cotton could successfully make it giving back to farmer what the farmer had invested - cost of production, considerably i.e by one-third. This indicates that farmers of the crop received better prices for their produce. However, IRRI growers could not meet their costs mainly for higher input prices, due to discontinuation of fertilizer subsidy scheme.

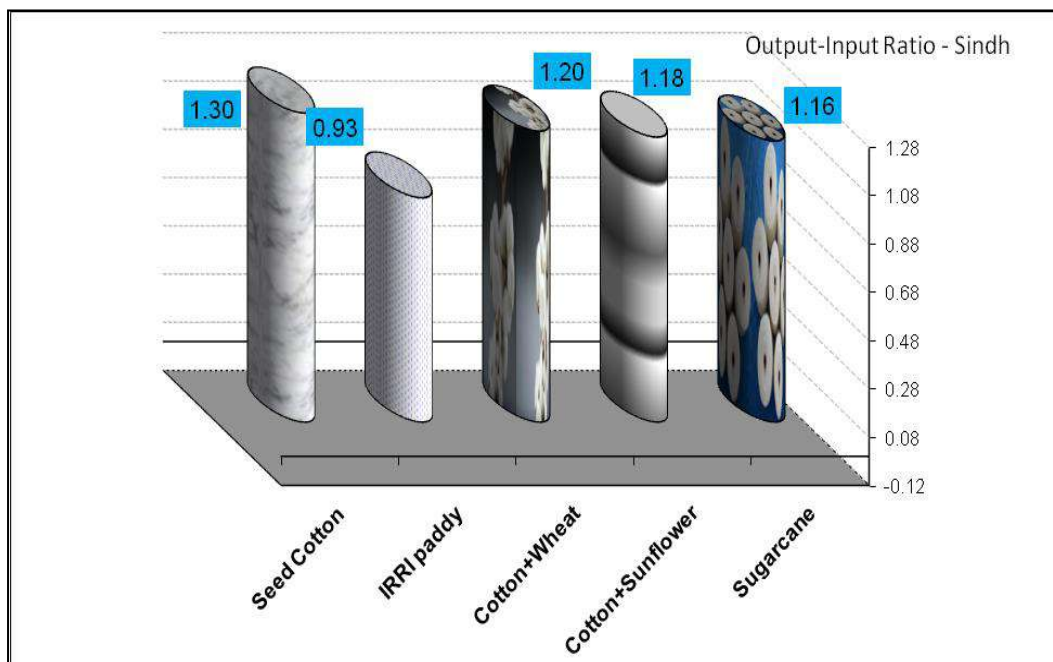
Table-15: Economics of Cotton and Competing Crops at Prices Realized by the Growers in Sindh: 2018-19 Crops

Province/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. Seed Cotton	1.30	3.85	379	5051
2. IRRI paddy	0.93	2.58	268	862
3. Cotton +Wheat	1.20	3.72	323	4525
4. Cotton +Sunflower	1.18	3.38	294	3084
5. Sugarcane	1.16	4.23	256	1761

Source: Annex-VI.

.43. In case of indirect competition, cotton combination with wheat has gained better position against its main competitor – sugarcane in some of the economic criteria. In particular, Cotton + wheat has shown much better position in terms of entire economic criteria except purchased inputs.

Sugarcane farming has shown relatively low returns over the cotton combination with sunflower in respect of certain economic criteria like returns to overall



investment and other criteria except purchased inputs. However, in terms of irrigation water, both the cotton combinations have out-competed the sugarcane with a considerable margin.

Fig- 4: Returns to Overall Investment in Sindh

10. ECONOMICS OF FERTILIZER USE IN COTTON CROP

44. The economics of using fertilizer in cotton crop has been analyzed through estimating (i) Benefit Cost Ratio of fertilizer use and (ii) Parity Ratio between the prices of fertilizers and seed cotton.

10.1 Benefit Cost Ratio (BCR)

45. The BCR refers to the ratio between value of additional produce obtained by using a certain dose of fertilizers and the additional costs incurred therein. The BCR greater than one means that benefits are higher than the costs entailed in the process and vice versa. In order to account for the variation in cotton-fertilizer response under different conditions, the BCRs have been computed at 4 different response levels. The results of the exercise are set out in Table-16.

Table-16: Benefit Cost Ratio (BCR) of Fertilizer Use on Cotton: 2007-08 to 2018-19

Year	Response Ratios (Seed Cotton: Nutrient) of			
	3.00:1	3.75:1	4.50:1	5.25:1
2007-08	2.72	3.22	3.68	4.10
2008-09	1.24	1.51	1.77	2.02
2009-10	2.72	3.27	3.78	4.26
2010-11	3.08	3.72	4.32	4.88
2011-12	1.63	1.96	2.26	2.54
2012-13	1.32	1.60	1.86	2.10
2013-14	1.51	1.82	2.11	2.38
2014-15	1.19	1.46	1.64	1.84
2015-16	1.20	1.44	1.67	1.98
2016-17	1.70	2.05	3.26	2.62
2017-18	1.73	2.07	2.37	2.65
2018-19	2.12	2.52	2.28	3.19

Sources: 1. For 2007-08 to 2018-19: Cotton Policy Analysis Report for 2018-19 crop, by API.

2. For 2018-19: Annex-VII.

46. It may be seen from the above Table that the BCR is substantially higher than one even at the lowest cotton-fertilizer response ratio of 3:1. It implies that the benefits of using a certain dose of fertilizer for cotton farming are much higher than the corresponding costs.

10.2 Parity Ratio between Prices of Fertilizer and Seed Cotton

47. The parity ratio between prices of fertilizers and seed cotton refers to the quantity of seed cotton required to purchase a certain quantity of chemical fertilizers. In view of fluctuating prices, the ratio has been calculated for 2007-08 to 2018-19 and presented in Table-17. The quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has ranged between 0.39 to 1.24 tonnes. The parity ratios between prices of seed cotton and those of phosphatic fertilizer have fluctuated from 0.78 to 2.35 during the period of analysis except 2008-09 where the parity ratio jumped to 3.16 because of hike in domestic prices of DAP due to exorbitant rise in world prices. During 2018-19 the prices of phosphorus and nitrogen are lessor than the last year which, however had been declining constantly during 2012-13 to 2018-19.

Table-17: Parity Ratio between the Prices of Fertilizer and Seed Cotton: 2007-08 to 2018-19

Crop Year	Sale Prices of		Market Prices of Seed Cotton	Quantity of Seed Cotton needed to buy one nutrient tonne of	
	Nitrogen N	Phosphorous P		Nitrogen N	Phosphorous P
	-----Rupees per tonne-----			-----Tonnes-----	
2007-08	22850	28390	36400	0.63	0.78
2008-09	28760	120000	38000	0.76	3.16
2009-10	31850	73620	61150	0.52	1.20
2010-11	35000	98260	89475	0.39	1.10
2011-12	45870	118750	57612	0.80	2.06
2012-13	77870	149570	63688	1.22	2.35
2013-14	74260	139980	72500	1.02	1.93
2014-15	72870	124830	72488	1.00	1.72
2015-16	80950	129190	64825	1.24	1.99
2016-17	57610	87240	75725	0.76	1.16
2017-18	59782	85303	74012	0.80	1.15
2018-19	68152	112460	92662	0.73	1.21

Notes: 1. The prices of N and P have been worked out from those of Urea and DAP as adopted in estimating the cost of production of seed cotton.

2. The market price of seed cotton is the average price prevailed in the producer area markets of the Punjab and Sindh.

11. NOMINAL AND REAL MARKET PRICES OF SEED COTTON

48. The intervention price of seed cotton is annually reviewed by the government well before sowing time, mainly with the purpose to regulate the market in case the market prices fall in the

open market below a certain level. The Government always encourages the role of private sector in marketing and trade of cotton. As a result, most of transactions in cotton are made in the open market. To ascertain overtime changes in the purchasing power of cotton, the nominal market prices of cotton are being deflated by the Consumer Price Index (CPI). The nominal and real market prices of seed cotton for the Punjab and Sindh for the period 2007-08 to 2018-19 are presented in Table-16 and 17.

11.1 At Market Prices of Seed Cotton in the Punjab

49. The nominal and real market prices of seed cotton for 2007-08 to 2018-19 are shown in Table-18 below and depicted in Figure-5.

Table-18: Nominal and Real Market Prices of Seed Cotton (Phutti) in the Punjab: 2007-08 to 2018-19

Crop year	Nominal Market Prices	Consumer Price Index (CPI)	Real Market Prices
	Rs per 40 kgs	2007-08= 100	---- Rs per 40 kgs -
1	2	3	4 = (2/3)x100
2007-08	1486	100.00	1,486
2008-09	1557	117.03	1,330
2009-10	1916	128.85	1,487
2010-11	4003	146.45	2,733
2011-12	2558	162.57	1,573
2012-13	2552	174.53	1,462
2013-14	3044	189.69	1,605
2014-15	2549	197.74	1,289
2015-16	2626	203.25	1295
2016-17	3090	212.16	1,456
2017-18	3133	219.01	1431
2018-19	3776	240.00	1573

Note: Market prices are the average monthly wholesale prices of seed cotton during post-harvest period in major producing area markets of the Punjab.

Sources: For CPI 2017-18, Economic Survey of Pakistan 2018-19.

50. The nominal price of seed cotton averaging at Rs 1486 per 40 kgs for 2007-08 crop had peaked all time higher level to Rs 4003 per 40 kgs in 2010-11, during the study period, which however, declined in the following two years to Rs 2558 and Rs 2552 per 40 kgs in 2011-12 and 2012-13, respectively. The nominal market price again took an upward trend and reached at Rs.3090 per 40 kgs in 2016-17 which, however once again declined to Rs 2549 per 40 kgs in 2014-15 the lowest since 2010-11. The price improved consecutively next two years in 2017-18 and 2018-19 at Rs 3133 and 3776 per 40 kgs.

51. During the period under review, the real market price has experienced fluctuations, touching the lowest level of Rs.1289 per 40 kgs in 2014-15 and in terms of real value the highest level of Rs 2733 per 40 kgs in 2010-11.

52. During 2018-19, the nominal market price averaged at Rs 3776 per 40 kgs, which is high by the previous year level. Consequently, the real value of seed cotton improved by over the previous year, now this year the real prices of seed cotton is 5.85 per cent increases than the base year level. The real price of seed cotton in 2018-19 increases 10 per cent higher against the last year.

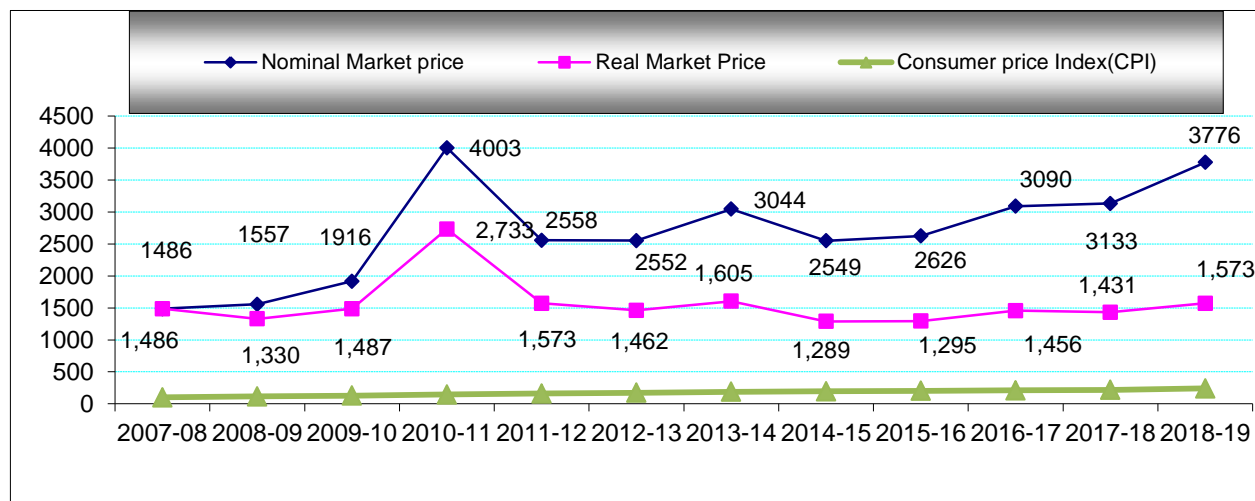


Fig- 5: Nominal and real market prices of seed cotton (Phutti) in Punjab 2007-08 to 2018-19

11.2 At Market Prices of Seed Cotton in Sindh

53. The nominal and real market prices of seed cotton in Sindh for 2007-08 to 2018-19 are presented in Table-19 and depicted in Figure-6.

54. It may be seen from Table-19, that there seems a steady growth trend during 2007-10 in the nominal price of seed cotton in Sindh Province. The degree of fluctuation in the nominal price reflects a similar situation as in Punjab, however, with a different degree of variation. The nominal market price of seed cotton averaging at Rs 1456 per 40 kgs in 2007-08 shot up by 104 per cent to Rs 3874 per 40 kgs in 2010-11, exceptionally, which however could not retain and dropped to Rs 2051 per 40 kgs in very next year, i.e. by 47 per cent. The price regained a rising trend in the next two years, but again declined to Rs 2125 per 40 kgs in 2014-15 and 2968 rising trend in 2016-17 and decline to Rs 2955 per 40 kgs in 2017-18 and Rs 3637 per 40 kgs in 2018-19 showing rising trend.

55. The real market price has experienced same fluctuations, touching the highest value of Rs 2645 per 40 kgs in 2010-11 and the lowest level of Rs 1074 per 40 kgs in 2014-15 over the base line value. In 2018-19, the price, however, evidenced (12 %) increase than the previous year and 4 per cent increase against the base year.

Table-19: Nominal and Real Market Prices of Seed Cotton (Phutti) in Sindh: 2007-08 to 2018-19

Crop year	Nominal Market Prices	Consumer Price Index (CPI)	Real Market Prices
	Rs per 40 kgs	2007-08= 100	----- Rs per 40 kgs - -----
1	2	3	4= (2/3)x100
2007-08	1456	100.00	1,456
2008-09	1525	117.03	1,303
2009-10	1903	128.85	1,477
2010-11	3874	146.45	2,645
2011-12	2051	162.57	1,262
2012-13	2543	174.53	1,457
2013-14	2755	189.69	1,452
2014-15	2125	197.74	1,074
2015-16	2461	203.25	1,214
2016-17	2968	212.16	1,399
2017-18	2955	219.01	1,350
2018-19	3637	240.00	1,515

Note: Market prices are the average monthly wholesale prices of seed cotton during post-harvest period in major producing area markets of Sindh.

Sources: 1. Price Policy Reports of Seed Cotton by API (various issues).
2. For CPI 2018-19, Economic Survey of Pakistan, 2018-19.

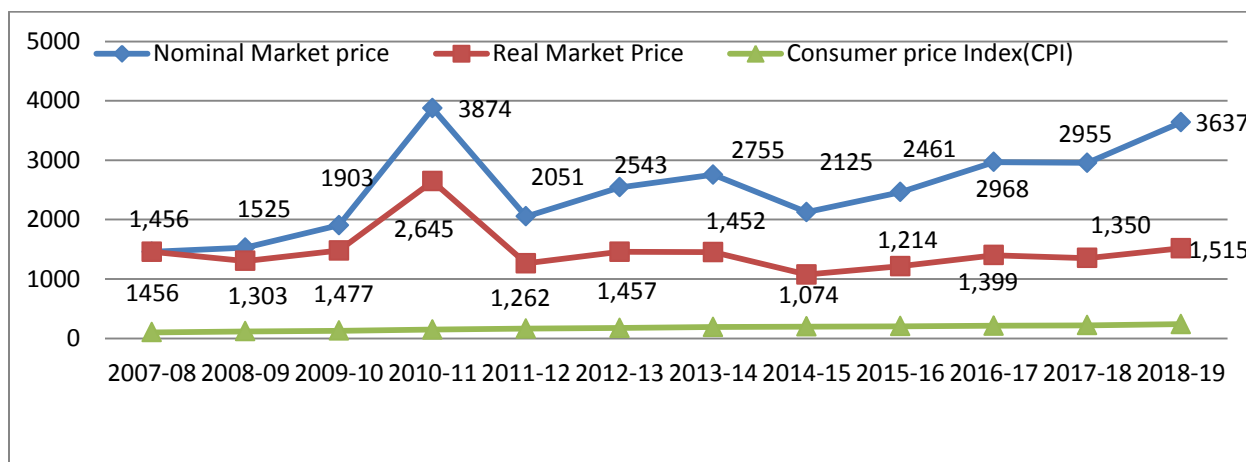


Fig-6: Nominal and real market prices of seed cotton (Phutti) in Sindh 2007-08 to 2018-19

56. It is important to note that for five years, the real value of seed cotton remained lower against the base year level. Similarly, due to high inflationary trend throughout the period under review. In large part of the analysis the real prices look not much favourable to cotton grower. However, in the last year the nominal as well as real prices have paid the farmers better return. It

is important that as the cotton is the largest cash crop, it farmers should be encouraged to receive regarding returns to keep him in the business.

12. WORLD SUPPLY, DEMAND, STOCKS, TRADE AND PRICE SITUATION

57. The global production of cotton during 2018-19 is estimated at 25.72 million tonnes which is significantly lower, 3.59 percent, than the production of 26.68 million in 2017-18. According to International Cotton Advisory Committee (ICAC), September 03, 2019 issue world production during 2019-20, is forecast to increase by 4.54 percent to the level of 26.89 million tonnes. Accounting for the opening stocks of 18.72 million tonnes, total supply in 2018-19 worked to 44.44 million tonnes, (-1.59 percent lower than 2017-18).

58. The world consumption of cotton during 2018-19 estimated at 26.34 million tonnes, is -0.11 percent lower than the last year level. For 2019-20, cotton consumption forecast 26.66 million tonnes, slightly higher 1.21 percent than 2018-19.

59. The end year stocks during 2018-19 estimated at 18.09 million tonnes, -3.37 percent lower than level of previous year which are forecast to further significantly increase to 18.33 million tonnes in 2019-20. The details are provided in Table-20.

Table-20: World Production, Consumption, Stocks and Trade in Cotton: 2017-18 to 2019-20

S.No.	Item	2017-18 (Actual)	2018-19 (Estimated)	2019-20 (Projection)
		----- Million tonnes -----		
1.	Opening stocks	18.48	18.72	18.09
2.	Production	26.68	25.72	26.89
3.	Total supply (1+2)	45.16	44.44	44.98
4.	Likely consumption	26.37	26.34	26.66
5.	Trade imbalance and stocks adjustment *	(-)0.07	(-)0.01	(+)0.01
6.	Closing stocks (3-4+5)	18.72	18.09	18.33

Note: *Trade imbalance, i.e. the difference in world imports and exports may exist due to inclusion of linter and waste, changes in weight during transit, difference in reporting periods and measurement error. Need for stock adjustment may arise due to difference between calculated stocks and actual ones.

Source: International Cotton Advisory Committee December 03, 2019.

13. INTERNATIONAL PRICES OF INDEX-A COTTONS

60. The international prices of Index- A during 2009-10 to 2017-18 are placed in Annex-VIII.
61. The prices of Index-A cottons showed a volatile and widely fluctuated pattern during the period under review.
62. These prices have averaged at US Cent 70.80 per pound in 2009-10. In next year these prices increased sharply and averaged at US Cent 165.13 per pound, the highest level of prices during the period under review.
63. During 2011-12 the prices started declining and reached at US Cent 70.30 per pound during 2015-16, the lowest level of price during period under review. From next year prices started recovering and averaged at US Cent 87.98 per pound during 2017-18.
64. During current year 2018-19 (August-Jan), the prices of Index-A cottons have gradually shown a upward trend during August and September 2018 and averaged at 94.73 and 90.54 respectively but during October 2018 to January 2019, prices shown down ward trend and averaged at US Cent 82.19 in January 2019 per pound. Pattern and trend reached at averaged at US Cent 86.14 per pound.

14. EXPORT AND IMPORT PARITY PRICES

65. Estimation of export parity price of a commodity is helpful in ascertaining its competitiveness in international market while its import parity price is a useful measure of determining the opportunity cost of resources used in its domestic production. Since Pakistan is exporting as well as importing cotton, both the export and import parity prices of cotton have been worked out for analyzing price policy options for the next crop season.
66. The export and import parity prices of seed cotton have been analysed on the basis of their actual and quoted prices. Detailed calculations in this regard are given at Annex-IX to XIII and summarized in Table-21.

Fig-7: Index-A Cottons

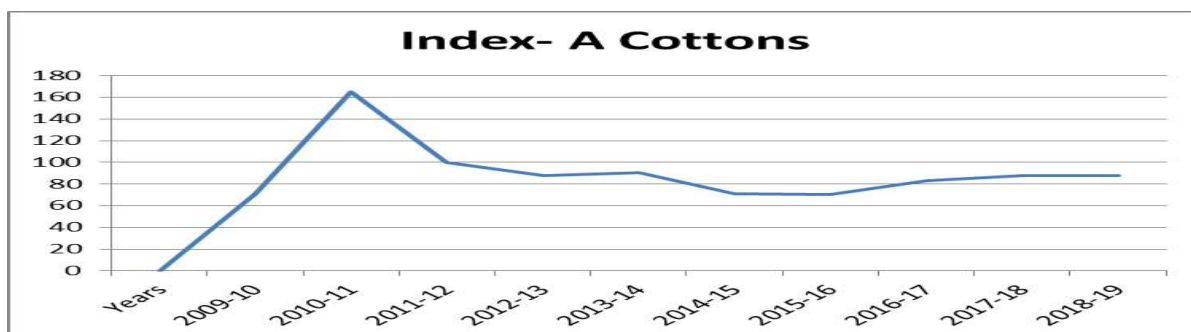


Table-21: Export/Import Parity Prices of Seed Cotton as Worked from Various Reference Prices

S.No.	Base/period	Reference price	Worked back price of seed cotton at gin
		US cents/lb	Rs/40 kgs
1. Export parity prices based on average:			
i) Actual export price of Pakistani cotton			
	- During 2018-19 (Aug-Jan)	73.61	3,626
	- During 2015-16 to 2017-18	71.35	3,534
ii) Future's contract prices of New York No.2 cotton (average of Oct, Dec 2019 and March 2020)			
		74.59	3,259
2. Import parity prices based on average:			
i) Actual cif (Karachi) prices of imported cotton:		Rs/40 kgs	
	- During 2018-19 (Aug-Jan)	10,274	4,376
	- During 2015-16 to 2017-18	7,588	3,436
ii) Index-A Cottons		US cents/lb	
	- During 2018-19 (Aug-Jan)	87.75	4,721
	- During 2015-16 to 2017-18	80.87	4,412

Sources: Annex-IX to XIII.

15. ECONOMIC EFFICIENCY OF SEED COTTON PRODUCTION IN PAKISTAN

67. Economic efficiency measurement of a crop requires study of performance of different resources employed in production of that crop. Briefly it helps assess if it is wise enough to put resources in that crop or not?

68. There are three widely accepted measures of economic efficiency. These are; Nominal Protection Coefficient (NPC), Effective Protection Co-efficient (EPC) and Domestic Resource Cost Co-efficient (DRC). These parameters and their estimates are derived through rigorous economic analysis which is described in the following paragraphs.

15.1 Under Export Scenario

69. Raw cotton is one of the commodities being exported by Pakistan. Accordingly, it necessitates studying resource use efficiency in the crop. In this analysis we study resource use

efficiency under both export and import scenarios. For both situations, analysis is based on cost of production of the foregone crop, its wholesale price in the domestic market and international market prices i.e. fob price at Karachi for export situation analysis and actual average (cif) Karachi price for import situation analysis.

70. In the following paragraphs results of analysis (NPC, EPC and DRC estimates) are described to explain effect of input/output pricing policies during 2018-19 for assessing efficiency of different resources used in production of the 2018-19 cotton crop. Estimation procedures are described in detail along with the respective Annex.

15.2 Nominal Protection Coefficient (NPC)

71. NPC is the ratio of the domestic market price to the social price of a commodity while social price is the respective import or export parity price. NPC includes domestic market price of the crop and excludes prices of respective inputs. Thus it ignores policy interventions in the input prices. As a rule of thumb if NPC is greater than one, it means local producers have price protection in lieu of the domestic pricing policy of seed cotton. On the other hand, if NPC is less than one it means that domestic producers of the crop are implicitly taxed. Implicit taxation to the growers means flow of resources from the concerned crop. For the present analysis, NPC values for the Punjab and Sindh provinces are produced in Table-21.

72. It is observed from the referred table that NPC estimates both for Punjab and Sindh under export scenario are either closer to one or slightly higher than one for Punjab. From these estimates it may be deduced that on the whole cotton growers in Pakistan have some degree of price protection. During the period 2015-16 and 2017-18 they remained taxed as NPC was less than one. Since 2014-15 onward domestic prices exceeded the corresponding export parity prices, consequently NPC values for these years exceeded one. It reflects price incentive for increasing cotton production in Pakistan.

73. Being more specific to 2018-19 crop, NPC values for both cotton producing provinces (Punjab, Sindh) slightly increased against 2017-18. Its main reason is that during 2013-14 price of cotton in the domestic market increased due to raise prices of the international market. This calls for revisiting domestic cotton production policy for stabilizing its price.

15.3 Effective Protection Coefficient (EPC)

74. Effective Protection Coefficient (EPC) is the ratio of the difference of revenue and total cost of tradable inputs at the private prices to the difference of the revenue and total cost of tradable inputs at social prices. As EPC reflects the net impact of both output and inputs prices, it indicates net incentive or disincentive of all policies on the grower of the crop. Decisive rule remains same i.e EPC greater than one, means private profit higher than it could be without government interventions in the input/output markets. Contrarily, EPC less than one imply net effect of input/output policies in reduction of private profits. In the former case growers of the

concerned crop have policy protection while in the later they are implicitly taxed. Later situation will discourage domestic production of the crop. Estimates of EPCs under export situation are presented in Table-20. EPC values during the period 2014-15 to 2018-19 show below one throughout the analysis period except one 2018-19 the estimated slightly exceeded for Punjab and Sindh. This analysis reveals that input/ output prices of seed cotton are stable that may suddenly affects cotton growers' profits and development of the crop.

15.4 Domestic Resource Cost Coefficient (DRC)

75. DRC is the ratio of the social cost of domestic factors to value added at social prices. If DRC is less than one it implies comparative advantage in the reference crop because in this situation domestic production may save foreign exchange at cost less than the corresponding cost of imports. When DRC is greater than one, it indicates comparative disadvantage in domestic production of a crop as domestic production is costly as compared with the importing cost.

76. DRC estimates for cotton production under export scenario are produced in Table-22. It is evident from the data in the referred Table that Pakistan has comparative advantage in cotton production as DRC values both for Punjab and Sindh are less than one except in 2014-15 for Punjab. Data on private and social profitability in background of the above estimates are produced in Annex-XIII and XIV.

77. It may be concluded from the above findings that more investment in cotton production and marketing for export purposes may benefit Pakistan by saving foreign exchange. It is supported by the cost of domestic resources to earn save foreign exchange. These figures are derived by multiplying DRCs with exchange rates for the respective years.

Table-22: Economic Efficiency Parameters Based on Export Parity Prices

Province/Year	NPC	EPC	DRC	NPC earn /save	Exchange rate Rs./US \$
Punjab					
2014-15	1.03	0.92	1.18	120.4	101.8
2015-16	0.79	0.58	0.92	95.4	104.2
2016-17	1.02	0.94	0.88	91.7	104.7
2017-18	0.94	0.82	0.82	90.4	109.8
2018-19	1.06	1.01	0.65	87.6	134.4
Sindh					
2014-15	0.96	0.82	0.97	98.6	101.8
2015-16	0.81	0.65	0.75	78.3	104.2
2016-17	0.93	0.82	0.71	73.9	104.7
2017-18	0.88	0.73	0.80	87.6	109.8
2018-19	1.06	1.02	0.61	82.3	134.4

15.5 Under Import Scenario

78. Under import scenario values of both NPC and EPCs are below one throughout the analysis period (Table-23). This indicates no economic protection to seed cotton growers in Punjab or Sindh. This implies that under import situation cotton growers are implicitly taxed and resources outflow from agriculture through cotton cultivation. DRC values are also found less than one which reflects Pakistan's comparative advantage in cotton production. Lower values of DRCs indicate that surplus potential in cotton yet remains to be exploited in Pakistan. It will be wise enough to invest domestic resources in cotton production rather to import it in Pakistan.

Table-23: Economic Efficiency Parameters Based on Import Parity Prices

Province/Year	NPC	EPC	DRC	Cost of DR to earn /save Forex	Exchange rate Rs./US \$
Punjab					
2014-15	0.66	0.48	0.62	62.95	101.8
2015-16	0.67	0.46	0.72	75.47	104.2
2016-17	0.67	0.45	0.76	79.95	104.7
2017-18	0.65	0.42	0.76	83.49	109.8
2018-19	0.88	0.78	0.65	87.30	134.4
Sindh					
2014-15	0.62	0.44	0.52	53.28	101.8
2015-16	0.69	0.52	0.60	62.75	104.2
2016-17	0.84	0.72	0.63	66.3	104.7
2017-18	0.83	0.67	0.74	80.9	109.8
2018-19	0.88	0.79	0.48	64.2	134.4

16. COTTON YIELD AMONG COMPETING COUNTRIES

79. Globally, the cotton crop occupied an area of 32.42 million hectares during 2018 with a total production of 71 million tonnes. The world top 30 cotton producing countries contribute 96.9 per cent of total area and 98.3 per cent of total production.

80. India ranks on the top with 12.35 million hectares, followed by USA and China with 4.26 and 3.35 million hectares. Pakistan occupies 5th position with 2.37 million hectares in this regard as narrated in the following Table -24.

81. In terms of cotton production, India is on the top with 17.71 million tonnes due to highest 24.95 % share in world area and China with 14.66 million tones, followed by USA with 11.43 million tonnes. However, Pakistan retains 5th position in cotton production with 4.83 million tonnes in the world.

Table-24: Cotton Area in Major Cotton Producing Countries of the World: 2018 crop

S.No.	Country	Area in (000) hectares	per cent share in world area
1	India	12350.0	38.10
2	United States of America	4261.6	13.15
3	China, mainland	3354.4	10.35
4	Pakistan	2373.0	7.32
5	Brazil	1148.5	3.54
6	Uzbekistan	1108.2	3.42
7	Benin	600.0	1.85
8	Mali	577.8	1.78
9	Turkmenistan	535.0	1.65
10	Turkey	518.6	1.60
11	Australia	485.1	1.50
12	Burkina Faso	473.4	1.46
13	Cote d'Ivoire	370.0	1.14
14	United Republic of Tanzania	350.9	1.08
15	Argentina	319.3	0.98
16	Nigeria	316.3	0.98
17	Greece	265.5	0.82
18	Mexico	240.6	0.74
19	Cameroon	229.2	0.71
20	Tajikistan	185.8	0.57
21	Togo	180.3	0.56
22	Myanmar	164.2	0.51
23	Syrian Arab Republic	144.9	0.45
24	Egypt	140.0	0.43
25	Kazakhstan	132.6	0.41
26	Azerbaijan	132.5	0.41
27	Bolivia (Plurinational State of)	126.0	0.39
28	Chad	120.0	0.37
29	Zambia	106.9	0.33
30	Ethiopia	106.0	0.33
Total of 30 top producing countries		31416.42	96.91
Total World Area		32979.140	100

Source: FAO Production Year Book 2018.

82. India has the largest area under cotton in the world representing almost 38 percent of the world cotton area. However, its production is very low as compared to other major cotton producing countries. The main reason is its low per acre productivity. Table-

Table-25: Cotton Production in Major Cotton Producing Countries Of the World: 2017
Crop

Country	Production in (000) tonnes	per cent share in world Production
China, mainland	17711.96	24.945
India	14657.00	20.643
United States of America	11429.94	16.098
Brazil	4930.52	6.944
Pakistan	4828.44	6.800
Turkey	2570.00	3.620
Australia	2500.00	3.521
Uzbekistan	2293.04	3.229
Mexico	1162.60	1.637
Greece	837.43	1.179
Argentina	813.69	1.146
Benin	758.00	1.068
Mali	750.00	1.056
Turkmenistan	618.20	0.871
Burkina Faso	482.17	0.679
Kazakhstan	343.62	0.484
Cote d'Ivoire	316.16	0.445
Myanmar	313.34	0.441
Egypt	310.98	0.438
Tajikistan	300.34	0.423
Nigeria	270.53	0.381
Cameroon	249.16	0.351
United Republic of Tanzania	238.00	0.335
Azerbaijan	233.59	0.329
Sudan	160.00	0.225
Spain	156.00	0.220
Iran (Islamic Republic of)	152.45	0.215
Ethiopia	140.00	0.197
Togo	127.46	0.180
Chad	120.00	0.169
Total of 30 top producing countries	69774.6	98.27
Total World Production	71003.8	100.00

Source:FAO Production Year Book 2018

83. Pakistan ranks 5th in terms of production of cotton but lies at 24th position in terms of yield during 2018. It implies that there is a lot of potential to enhance cotton productivity per hectare in Pakistan. It is an alarming situation and deserve special attention by all concerned

quarters. The cotton yield in Pakistan is at 2035 kgs per hectare, in India at 1187 kgs. However, the Yield of cotton in Pakistan is close to the world average at 2290 kgs per hectare as narrated in

Table-26: **Yield Per Hectare Of Major Cotton Producing Countries In The World: 2018 Crop**

S.No.	Country	Yield per Hactare in Kgs	S.No.	Country	Yield per Hactare in Kgs
1	China, mainland	5280	23	Uzbekistan	2069
2	Australia	5154	24	Pakistan	035
3	Turkey	4955	25	Botswana	000
4	Mexico	4833	26	Paraguay	000
5	Brazil	4293	27	Sudan	951
6	Colombia	3908	28	Democratic People's Republic of Korea	944
7	Bangladesh	3655	29	Myanmar	908
8	Israel	3609	30	Iraq	901
9	Kyrgyzstan	3242	31	Angola	833
10	Lao People's Democratic Republic	3181	32	Honduras	818
11	Greece	3154	33	Azerbaijan	763
12	Guatemala	3064	34	Tajikistan	616
13	Peru	2942	35	Thailand	497
14	South Africa	2750	36	Uganda	370
15	United States of America	2682	37	Cambodia	330
16	Kazakhstan	2592	38	Ethiopia	321
17	Argentina	2548	39	Mali	298
18	Nicaragua	2445	40	Ecuador	294
19	Spain	2396	41	Benin	263
20	Iran (Islamic Republic of)	2282	42	El Salvador	222
21	Egypt	2221	43	India	187
22	Morocco	2087			
World Average					2190

17. COTTON VARIETIES AND YIELD POTENTIAL IN PAKISTAN

84. Cotton is essentially produced for its fiber, which is used as a textile raw material. Cotton is an important commodity in the world economy and a heavily traded agricultural commodity. It contributes significantly in foreign exchange earnings. It has a 0.8 percent share in GDP and contributes 4.5 percent in agriculture value addition. Around two-thirds of the country's export earnings are from the cotton made-ups and textiles.

85. Pakistan is world's 4th largest cotton producer and a leading exporter of yarn in the world. In terms of yield, Pakistan ranked 2nd in the South Asia. During 2018-19, cotton production remained moderate at 9.861 million bales, Punjab and Sindh are the major cotton growing provinces, and a decrease of 17.5 percent over the last year's production of 11.946 million bales has recorded. This decrease is mainly because of contraction in cultivated area.

86. Various cotton varieties sown in Pakistan in various ecological zones along with yield potential are presented in the table. Above hundred varieties are grown in the country. The table shows the data of 8 varieties from the year 2016 to 2018. The yield potential of these varieties ranges from 3954 kgs to 4942 kgs per hectare.

Table-27: Cotton Varieties And Yield Potential In Pakistan

S.NO	NAME OF VARIETY	(KGs/hect.)	Year of Release
1.	CYTO-124	4448	2016
2.	CIM-620	3954	2016
3.	BT.CYTO-178	4942	2016
4.	BT.CIM-600	4448	2017
5.	BT.CIM-177	3954	2017
6.	BT.CIM-179	4448	2017
7.	CIM-610	3954	2018
8.	BT.CIM-632	4942	2018

Source: Pakistan Central Cotton Research Institute, Multan

**PROVINCE-WISE AREA (HECTARES), PRODUCTION AND YIELD OF COTTON
IN PAKISTAN : 2008-09 TO 2018-19**

YEAR	PUNJAB	SINDH	KHYBER PUKHTUNKHWA	BALOCHISTAN	PAKISTAN
AREA	----- 000 hectares -----				
2008-09	2223.7	561.5	0.20	34.5	2819.9
2009-10	2435.8	634.7	0.04	35.1	3105.6
2010-11	2200.6	457.0	0.17	31.3	2689.1
2011-12	2533.7	259.2	0.24	41.4	2834.5
2012-13	2308.7	530.1	0.24	39.8	2878.8
2013-14	2199.0	568.0	0.26	38.4	2805.7
2014-15	2322.9	596.2	0.97	41.2	2961.3
2015-16	2242.7	621.2	0.40	37.6	2901.9
2016-17	1815.3	636.6	0.40	36.8	2489.1
2017-18	2052.9	611.7	0.17	35.5	2700.3
2018-19	1887.8	448.2	0.16	36.8	2373.0
YIELD	----- Kgs per hectare -----				
2008-09	669	902	425	440	713
2009-10	597	1144	340	440	707
2010-11	607	1316	430	374	725
2011-12	747	1547	468	446	816
2012-13	702	1091	482	443	770
2013-14	707	1055	497	442	774
2014-15	753	1019	517	442	802
2015-16	481	952	510	442	581
2016-17	654	961	510	440	729
2017-18	669	1050	530	442	752
2018-19	615	1115	510	443	707
PRODUCTION	----- 000 bales -----				
2008-09	8751.0	2978.3	0.50	89.2	11819.0
2009-10	8552.0	4270.7	0.08	90.7	12913.5
2010-11	7854.0	3536.8	0.43	68.9	11460.1
2011-12	11129.0	2356.8	0.66	108.5	13595.0
2012-13	9526.0	3400.4	0.68	103.6	13030.7
2013-14	9145.0	3523.4	0.76	99.7	12768.9
2014-15	10277.0	3572.5	2.95	107.1	13959.6
2015-16	6343.0	3475.6	1.20	97.6	9917.4
2016-17	6978.0	3596.9	1.20	95.1	10671.2
2017-18	8077.0	3775.8	0.53	92.3	11945.6
2018-19	6826.0	2938.4	0.48	95.9	9860.8

Sources: 1- For 2008-09 to 2016-17 : Policy Analysis Report for Seed Cotton: 2017-18 Crop
2- For 2017-18: Final estimates provided by respective Provincial Agriculture Departments
3- For 2018-19: Final estimates provided by respective Provincial Agriculture Departments

**PROVINCE-WISE AREA (ACRES), PRODUCTION AND YIELD OF COTTON
IN PAKISTAN : 2008-09 TO 2018-19**

YEAR	PUNJAB	SINDH	KHYBER PUKHTUNKHWA	BALUCHISTAN	PAKISTAN
AREA	----- 000 acres -----				
2008-09	5495.0	1387.5	0.49	85.3	6968.3
2009-10	6019.1	1568.4	0.10	86.7	7674.3
2010-11	5437.9	1129.3	0.42	77.3	6645.0
2011-12	6261.0	640.5	0.59	102.3	7004.4
2012-13	5705.0	1309.9	0.59	98.3	7113.9
2013-14	5433.9	1403.6	0.64	94.9	6933.1
2014-15	5740.1	1473.3	2.40	101.8	7317.6
2015-16	5541.9	1535.0	0.99	92.9	7170.9
2016-17	4485.8	1573.1	0.99	90.9	6150.8
2017-18	5072.9	1511.6	0.42	87.7	6672.6
2018-19	4664.9	1107.5	0.40	90.9	5863.8
YIELD	----- Kgs per acre -----				
2008-09	271	365	172	178	288
2009-10	242	463	138	178	286
2010-11	246	533	174	152	293
2011-12	302	626	189	180	330
2012-13	284	442	195	179	312
2013-14	286	427	201	179	313
2014-15	305	412	209	179	324
2015-16	195	385	206	179	235
2016-17	265	389	206	178	295
2017-18	271	425	215	179	305
2018-19	249	451	206	179	286
PRODUCTION	----- 000 bales -----				
2008-09	8751.0	2978.3	0.50	89.2	11819.0
2009-10	8552.0	4270.7	0.08	90.7	12913.5
2010-11	7854.0	3536.8	0.43	68.9	11460.1
2011-12	11129.0	2356.8	0.66	108.5	13595.0
2012-13	9526.0	3400.4	0.68	103.6	13030.7
2013-14	9145.0	3523.4	0.76	99.7	12768.9
2014-15	10277.0	3572.5	2.95	107.1	13959.6
2015-16	6343.0	3475.6	1.20	97.6	9917.4
2016-17	6978.0	3596.9	1.20	95.1	10671.2
2017-18	8077.0	3775.8	0.53	92.3	11945.6
2018-19	6826.0	2938.4	0.48	95.9	9860.8

Sources: 1- For 2008-09 to 2016-17 : Policy Analysis Report for Seed Cotton: 2017-18 Crop
2- For 2017-18: Final estimates provided by respective Provincial Agriculture Departments
3- For 2018-19: Final estimates provided by respective Provincial Agriculture Departments

**DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SEED COTTON
AVERAGE OF 2016-17 TO 2018-19**

ANNEX-III
Area: 000 ha
Production: 000 bales
Yield: Kgs/ha

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield
<u>PUNJAB</u>					
1	Bahawalpur	259.71	1059.53	9.79	694
2	Bahawalnagar	220.45	798.35	7.37	616
3	R.Y.Khan	165.01	680.35	6.28	701
4	Lodhran	165.95	656.05	6.06	672
5	Rajanpur	138.04	647.07	5.98	797
6	Khanewal	162.76	643.83	5.95	672
7	Vehari	154.08	602.76	5.57	665
8	Multan	146.72	549.46	5.08	637
9	Muzaffargarh	138.42	452.66	4.18	556
10	D.G.Khan	86.73	335.89	3.10	658
11	Sahiwal	59.08	188.45	1.74	542
12	Layyah	42.11	147.66	1.36	596
13	Mianwali	40.55	127.16	1.17	533
14	Pakpattan	23.77	83.03	0.77	594
15	T.T.Singh	25.40	73.42	0.68	491
16	Bhakkar	22.73	65.39	0.60	489
17	Faisalabad	19.28	57.11	0.53	504
18	Jhang	22.05	53.34	0.49	411
19	Okara	11.84	44.58	0.41	640
20	Kasur	5.17	12.77	0.12	420
21	Sargodha	4.89	8.14	0.08	283
22	Chiniot	1.09	2.68	0.02	420
23	Khushab	1.36	1.89	0.02	235
24	M.B.Din	0.82	0.83	0.01	174
25	Sheikhupura	0.13	0.55	0.01	706
26	Jhelum	0.41	0.39	0.00	165
27	Nankana Sahib	0.13	0.32	0.00	404
Sub Total Punjab		1918.68	7293.67	67.37	647
<u>SINDH</u>					
1	Sanghar	105.20	670.19	6.19	1083
2	Ghotki	90.81	590.48	5.45	1105
3	Khairpur	73.94	430.22	3.97	989
4	Nawabshah	60.40	374.76	3.46	1055
5	Matari	38.43	238.64	2.20	1056
6	N.Feroze	37.28	233.42	2.16	1064
7	Sukkur	34.48	215.68	1.99	1063
8	Mirpurkhas	26.91	157.15	1.45	993
9	Tando Allaahyar	20.62	116.72	1.08	962
10	Umerkot	21.57	107.41	0.99	846
11	Jamshoro	14.65	88.17	0.81	1023
12	Dadu	10.69	64.49	0.60	1025
13	Badin	12.15	53.83	0.50	753
14	Hyderabad	6.03	36.88	0.34	1040
15	Thatta	5.69	25.14	0.23	751
16	Tando Muhammad Khan	3.74	19.85	0.18	902
17	Larkana	1.71	8.40	0.08	836
18	Tharparkar	0.70	3.10	0.03	755
19	Karachi	0.38	1.86	0.02	830
20	Shikarpur	0.13	0.62	0.01	834
Sub Total Sindh		565.50	3437.01	31.75	1034
Sub Total of Khyber Pukhtunkhwa		0.24	0.74	0.01	515
Sub Total of Balochistan		36.36	94.43	0.87	442
Total of Pakistan		2520.79	10825.85	100.00	730

Notes:

1. Data have been arranged in descending order of production.
2. Percentage shares are calculated on the basis of country total.

Sources:

Respected Agriculture Provincial Departments

AVERAGE FARMER COST OF PRODUCTION OF SEED COTTON IN PUNJAB: 2018-19 TO 2019-20 CROPS							ANNEX-IV
S.No	Operations / Inputs	Average	2018-19		2019-20 crop		Change
		No. of oprs/units/ acre	Cost per unit	Cost per acre	Cost per unit	Cost per acre	in 2019-20 over 2018-19
1	2	3	4	5=3*4	6	7=3*6	8=7-5
		<u>Field data 2017</u>	.....RS.....				
1	Land preparation:						
	1.1 Rotavator/disc plough	1	1400	1400	1500	1500	100
	1.2 Ploughing	3	800	2400	830	2490	90
	1.3 Planking	0.48	400	192	400	192	0
	1.4 Ploughing + planking	1	800	800	830	830	30
	1.5 Tractor levelling (hrs)	0.77	800	616	830	639.1	23.1
	1.6 Laser levelling	1	1200	1200	1200	1200	0
2	Seed and sowing operations:						
	2.1 Seed used (kgs)	10	250	2500	295	2950	450
	2.2 Ploughing + planking	1	800	800	830	830	30
	2.2.1 Ridging including soil removal from ends of ridges	0.68	900	612	930	632.4	20.4
	2.2.2 Drilling	0.04	800	32	830	33.2	1.2
	2.2.3 Manual labour for sowing (on contract)			1000		1050	50
3	Irrigation: * (Nos)						
	3.1 Canal	7	-	95.72		95.72	0
	3.2 Private tubewell (Rs./irrigation)	4	900	3600	950	3800	200
	3.3 Labour for irrigation and water course cleaning (M. days)	3.46	400	1384	500	1730	346
4	Interculture:						
	4.1 With tractor (hr/ acre)	1.4	800	1120	830	1162	42
	4.2 Manual weeding/ thinning on contract	1.2	1400	1680	1567	1880.4	200.4
5	Plant protection including application cost (weedicide+pesticides)	6	850	5100	900	5400	300
6	Farm Yard Manure including transport and application cost	0.56	2000	1120	3000	1680	560
7	Fertilizers: (bags)						
	7.1 DAP	1	3200	3200	3655	3655	455
	7.2 SOP	0.16	2450	392	4000	640	248
	7.3 NPK	0.04	3100	124	3100	124	0
	7.4 Urea	2	1450	2900	1820	3640	740
	7.5 CAN	0.24	1230	295.2	1620	388.8	93.6
	7.6 NP	0.44	2550	1122	2930	1289.2	167.2
	7.7 Fertilizer transport and application	3.88	100	388	120	465.6	77.6
	GROSS EXPENDITURE		33977.2		38201.7		
8	Mark up on investment on item 1 to 7 excluding item 5(1) @14.5 % per annum for 6 months			3284.46		3692.83	408.4
9	Management charges for 8 months			1375		1375	0
10	Land rent for 8 months		27000	18000	30000	20000	2000
11	Average weighted land tax @ Rs 132/acre/annum for 8 months		132	88	132	88	0
12	Land revenue including local rate, chaukidara etc			5		5	0
13	Payment to pickers (Rs./40 Kg)		300	6600	400	8400	1800
14	Total cost (Item1-13)			63425.4		71858.3	8432.9
15	Yield per acre (kgs)			880		840	-40
16	Cost of production at farm level: (Rs/40 kgs)						
	16.1 Including land rent			2882.97		3421.82	538.8
	16.2 Excluding land rent			2064.79		2469.44	404.7
17	Marketing cost (Rs/40 kgs)			40		40	0
18	Cost of production at market/ginnery						
	18.1 Including land rent			2922.97		3461.82	538.8
	18.2 Excluding land rent			2104.79		2509.44	404.7
Source:							
1. API field survey data, 2019							
2. For yield, Crop Reporting Service, Punjab, Lahore second estimates for 2018-19 crop							
Notes:							
Cost of production for 2019-20 rose primarily due to increase in prices of pesticides, diesel and withdrawal of subsidy on fertilizer and partly due to decrease in yield.							

ANNEX-V

AVERAGE FARMER COST OF PRODUCTION OF SEED COTTON IN SINDH: 2018-19 TO 2019-20 CROPS							
S.No	Operations / Inputs	Average No. of oprs/units/acre	2018-19		2019-20 crop		Change in 2019-20 over 2018-19
			Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5 =3*4	6	7 =3*6	2018-19
		Basis Field Data					
		2017	.....Rs.....		.....Rs.....		
1	Land preparation:						
	1.1 Deep ploughing	0.41	2000	820	2100	861	41
	1.2 Ploughing (cultivator plus gobal)	3	1000	3000	1100	3300	300
	1.3 Ploughing + planking	1	1000	1000	1100	1100	100
	1.4 Planking	1	500	500	550	550	50
	1.5 Tractor levelling (hrs)	1	1000	1000	1100	1100	100
	1.6 Laser levelling	0.1	1136	113.6	1200	120	6.4
2	Seed and sowing operations:						
	2.1 Seed used (kgs)	10	200	2000	300	3000	1000
	2.2 Ploughing plus planking	0.16	1000	160	1100	176	16
	2.3 ridging including soil removal from ends of ridges	1	1000	1000	1100	1100	100
	2.4 drilling	0.01	1000	10	1100	11	1
	2.5 manual sowing (on contract)			1200		1400	200
3	Irrigation: * (Nos)						
	3.1 Canal	6	-	93.09	0	93.09	0
	3.2 Private tubewell (Rs./irrigation)	2.5	800	2000	825	2062.5	62.5
	3.3 Mixed	0.413	800	330.4	825	340.725	10.3
	3.3 Lift	1	800	800	825	825	25
	3.3 Labour for irrigation and water course cleaning (M. days)	3.5	400	1400	500	1750	350
4	Interculture:						
	4.1 With tractor	1	800	800	1100	1100	300
	4.2 Manual weeding/ thinning on contract	2	1500	3000	1600	3200	200
5	Plant protection including application cost (weedicide+pesticides)	6	1000	6000	1200	7200	1200
6	Farm Yard Manure including transport and application cost	0.5	2610	870	3100	1550	680
7	Fertilizers: (bags)						
	7.1 DAP	1	3200	3200	3700	3700	500
	7.2 NPK	0.067	3100	207.7	3100	207.7	0
	7.3 Urea	4	1685	6740	1820	7280	540
	7.4 CAN	0.24	1250	300	1620	388.8	88.8
	7.5 NP	0.03	2100	63	2930	87.9	24.9
	7.6 Fertilizer transport and application	5.337	90	480.33	90	480.33	0
	GROSS EXPENDITURE		36995.03		42890.96		
8	Mark up on investment on item 1 to 7 excluding item 5(1) @14.5 % per annum for 8 months			3576.186		4146.126	569.9
9	Management charges for 8 months			1375		2000	625
10	Land rent for 8 months		25000	16666.67	30000	20000	3333.3
11	Average weighted land tax @ Rs 200/acre/annum for 8 months		132	88	132	88	0
12	Land revenue including local rate, chaukidara etc			5		5	0
13	Drainage Cess @ Rs 24/annum for 8 months			16		16	0
13	Payment to pickers (Rs./40 Kg)		400	10000	400	10000	0
14	Total cost (Item1-13)			68721.88		79146.08	10424.2
15	Yield per acre (kgs)			1000		1000	0
16	Cost of production at farm level: (Rs/40 kgs)						
	16.1 Including land rent			2748.875		3165.843	417.0
	16.2 Excluding land rent			2082.209		2365.843	283.6
17	Marketing cost (Rs/40 kgs)			40		40	0
18	Cost of production at market/ginnery						
	18.1 Including land rent			2788.875		3205.843	417.0
	18.2 Excluding land rent			2122.209		2405.843	283.6
	Source:						
	API field survey data 2019						
	For yield, Crop Reporting Service, Sindh second estimates for 2018-19 crop.						
	Notes:						
	Cost of production for 2019-20 rose primarily due to increase in prices of pesticides, diesel and withdrawl of subsidy on fertilizer.						

**ECONOMICS OF SEED COTTON AND COMPETING CROPS AT
PRICES REALIZED BY THE GROWERS: 2018-19 CROPS**

S #	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		
		Days	Acre inches							Rupee of purchased inputs	Crop day	Acre inch of water used
			Rupees 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												
1	Seed Cotton	240	22	63865	21009	83192	62183	19327	1.30	3.96	347	3781
2	Basmati Paddy	180	58	62597	30560	64779	34220	2183	1.03	2.12	360	1117
3	IRRI Paddy	180	62	63151	28412	53075	24663	-10076	0.84	1.87	295	856
4	Wheat	180	12	43563	11976	46500	34524	2937	1.07	3.88	258	3875
5	Sunflower (spring)	180	22	44777	14370	48126	33756	3348	1.07	3.35	267	2188
6	Seed Cotton + Wheat	420	34	107428	32985	129692	96707	22264	1.21	3.93	309	3814
7	Seed Cotton+Sunflower	420	44	108643	35379	131318	95939	22675	1.21	3.71	313	2984
8	Basmati Paddy+Wheat	360	70	106160	42535	111279	68744	5120	1.05	2.62	309	1590
9	Basmati Paddy+Sunflower	360	80	107374	44930	112905	67976	5531	1.05	2.51	314	1411
10	IRRI Paddy + Wheat	360	74	106714	40388	99575	59187	-7139	0.93	2.47	277	1346
11	IRRI Paddy+Sunflower	360	84	107929	42782	101201	58418	-6728	0.94	2.37	281	1205
12	Sugarcane	394	48	88386	20886	102364	81478	13978	1.16	4.90	260	2133
Sindh												
1	Seed Cotton	240	18	69840	23596	90925	67329	21085	1.30	3.85	379	5051
2	IRRI Paddy	180	56	52012	18745	48295	29550	-3717	0.93	2.58	268	862
3	Wheat	180	12	42841	12935	44813	31877	1972	1.05	3.46	249	3734
4	Sunflower (spring)	180	22	34703	10843	32423	21580	-2280	0.93	2.99	180	1474
5	Seed Cotton + Wheat	420	30	112681	36531	135738	99206	23057	1.20	3.72	323	4525
6	Seed Cotton+Sunflower	420	40	104543	36531	123348	86816	18805	1.18	3.38	294	3084
7	IRRI Paddy+ Wheat	360	68	94852	31680	93108	61428	-1745	0.98	2.94	259	1369
8	IRRI Paddy+Sunflower	360	78	86715	29587	80718	51130	-5997	0.93	2.73	224	1035
9	Sugarcane	488	71	107408	29567	125010	95443	17602	1.16	4.23	256	1761

Notes for Annex - VI:

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2017-18 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, 2017-18 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 2017-18 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2017-18 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 1300 per 40 kgs, as maintained by the government for 2017-18 crop, has 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 1604 and Rs 875 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 898 per 40 kgs.
 - 4.3 The wholesale market prices of seed cotton during the post-harvest months of 2017-18 in the main producer area markets have averaged at Rs 3133 per 40 kgs in the Punjab and Rs 2955 Sindh.
 - 4.4 The price of Sunflower crops has been reported hovering around Rs 2400/40 kgs and Rs 2500/40 kgs for Canola during 2017-18.
 - 4.5 The indicative prices of sugarcane as announced by the provincial governments are taken for the analysis i.e Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh. However, the prices received by the growers remained much lower (ranging Rs 160 and 140, 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 17 per 40 kgs in Punjab and Rs 14.32 in Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 45 for rice paddy in Punjab and Sindh, and for wheat and oilseeds, Rs 38 in Punjab and Rs 42 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.

**PROFITABILITY OF FERTILIZER USE ON SEED COTTON
AT THE MARKET PRICE: 2018-19**

S. No.	Item	Seed Cotton: Nutrient Ratio of			
		3.00:1	3.75:1	4.50:1	5.25:1
		----- Kgs -----			
1	Yield increase due to use of additional 10 nutrient kgs of fertilizer per acre	30.00	37.50	45.00	52.50
		----- Rupees -----			
2	Direct cost of 10 kgs of NPK fertilizer at the weighted average price of Rs 884.9 per nutrient kg (i.e. Rs 136.3,112.46 and Rs.98 per nutrient kg of N,P and K at the recommended NPK ratio of 2:1:1(a)	884.9	884.9	884.9	884.9
3	Indirect cost due to the application of additional fertilizer as detailed below(b)	422.79	492.39	570.78	637.79
	3.1 Transportation and application charges of 20 kgs of fertilizer @ Rs 95 per bag of fertilizer	38.00	38.00	38.00	38.00
	3.2 Picking charges for additional produce @ Rs 350.0 per 40 kgs	262.5	324.6	394.6	455.0
	3.3 Marketing charges for additional produce @ Rs 40.0 per 40 kgs	30	37.5	45.0	52.5
	3.4 Mark up on direct cost of fertilizer (item2+3.1) for 6 months @ 14.5 % per annum	92.29	92.29	92.29	92.29
4	Total additional cost (item 2+3)	1308.5	1377.2	1456.5	1523.5
5	Value of additional produce @ Rs 3706.5 per 40 kgs(c)	2779.8	3474.8	4169.8	4864.7
6	Benefit cost ratio (item 5 divided by item 4)	2.12	2.52	2.86	3.19

Notes:

- a) The prices of N,P and K have been worked out from average prices of Urea, DAP and SOP used in COP estimates of the Punjab and Sindh for 2018-19 crop taken respectively as Rs 1567, 3200 and 2450 per bag of 50 kgs.
- b) The rates of indirect cost items are the average of the rates used in the COP estimates of the Punjab and Sindh for 2018-19 crop.
- c) Average market prices of seed cotton for 2019-20 crop in the Punjab and Sindh during September to January, 2019 have been used.
- d) Punjab and Sindh average prices are 3706.5 per 40 kgs.

INTERNATIONAL PRICES OF COTTONS: 2007-08 TO 2018-19

Years Aug-Jul	Index- A Cottons	Orleans/ Texas SLM 1-1/32"
-----US Cent per pound-----		
2009-10	70.80	77.58
2010-11	165.13	89.00
2011-12	99.75	100.53
2012-13	87.84	88.32
2013-14	90.53	N.Q
2014-15	70.75	N.Q
2015-16	70.30	N.Q
2016-17	82.82	N.Q
2017-18	87.98	N.Q
2018-19	87.75	N.Q
August	94.73	N.Q
September	90.54	N.Q
October	86.72	N.Q
November	86.58	N.Q
December	85.75	N.Q
January	82.19	N.Q

Source: Cotton Outlook

EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF ACTUAL
AVERAGE EXPORT PRICE OF PAKISTANI COTTON

S.No	Item	2018-19 (Aug-Jan)	2015-16 To 2017-18
		US Cents per pound	
1.	Actual average export price	73.61	71.35
		OR (a) Rupees	
	Actual average export price per 40 Kgs	8997	8721
2.	Marketing expenses (Transportation, port handling forwarding, wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	450	450
3.	Ex- gin price of lint per 40 Kgs (item 1- item 2)	8547	8271
4.	Value of 80 kgs of cotton seed (b)	2932	2932
5.	Ginning charges for 120 kgs of seed cotton	600	600
6.	Value of 120 kgs of seed cotton (c) (items 3 +4 - item 5)	10879	10603
7.	Seed cotton price per 40 kgs (item 6 / 3)	3626	3534

Notes:

- a) One US \$ = 138.60 Pak rupees.
- b) Average price of cotton seed for September 2018 to Feb 2019 in Multan, Bahwalpur, D.G. Khan and Raheem Yar Khan markets was Rs 1470 per 40kgs
- c) 120 kgs of seed cotton = 80 kgs of cotton seed + 40 kgs of lint.

Sources:

1. PBS for export prices.
2. KCA, Karachi for marketing expenses.
3. Pakistan Cotton Ginners Association, Karachi for ginning charges.
4. Directorate of Agriculture (E&M), Punjab, Lahore.

ANNEX-X

EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF FUTURE'S
CONTRACT PRICE OF NEW YORK NO. 2 COTTON (AVERAGE OF
OCTOBER, DECEMBER, 2019 AND MARCH, 2020)

S.No	Item	Price calculations
		US Cents per pound
1.	Future's contract price as reported by KCA January 22/1/2019	74.59
2.	Grade and staple discount	4.5
3.	Discount on account of inland transportation and certification of stocks	5.5
4.	Parity price of Pakistani cotton at Karachi	64.59
		OR Rupees (a)
	Parity price per 40 kgs	7894
5.	Marketing expenses (Transportation, port handling forwarding, wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	450
6.	Ex- gin price of cotton lint per 40 kgs (item 4 - item 5)	7444
7.	Value of 80 kgs of cotton seed (b)	2932
8.	Ginning charges for 120 kgs of seed cotton	600
9.	Value of 120 kgs of seed cotton (c) (items 6 + 7 - item 8)	9776
10.	Seed cotton price per 40 kgs (item 9 / 3)	3259

Notes:

- a) One US \$ = 138.60 Pak rupees.
Average price of cotton seed for September 2018 to Feb 2019 in Multan, Bahwalpur, D.G.
- b) Khan
and Raheem Yar Khan markets was Rs 1470 per 40kgs
- c) 120 kgs of seed cotton = 80 kgs of cotton seed + 40 kgs of lint.

Sources:

1. KCA, Karachi for marketing expenses and future contract prices.
2. Pakistan Cotton Ginners Association, Karachi for ginning charges.

ANNEX- XI

IMPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF ACTUAL AVERAGE
CIF (KARACHI) PRICE OF IMPORTED COTTON

S. No	Item	2018-19 (Aug-Jan)	2015-16 To 2017-18
		kgs	
		Rupees per 40	
1.	Actual average cif (Karachi) price	10274	7588
2.	Handling charges at port and transport cost from port to textile mill at Karachi @ 5 % of cif price	514	379
3.	Ex- gin price of cotton lint (Item 1+ item 2)	10788	7967
4.	Value of 80 kgs of cotton seed (a)	2940	2940
5.	Ginning charges for 120 kgs of seed cotton including ginning losses	600	600
6.	Value of 120 kgs of seed cotton (item 3 +item 4 - item 5)	13128	10307
7.	Seed cotton price (item 6/ 3)	4376	3436

Note:

- a) Average price of cotton seed for September 2018 to Feb 2019 in Multan, Bahawalpur, D.G. Khan and Rahim Yar Khan markets was Rs 1470 per 40kgs

Sources:

1. PBS, for cif (Karachi price).
2. KCA, for incidental charges.
3. Pakistan Cotton Ginners Association, Karachi for ginning charges.
4. Directorate of Agriculture (E&M), Punjab, Lahore.

IMPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF AVERAGE
CFR FAR EASTERN QUOTED PRICE OF INDEX A-COTTONS

S. No	Item	2018-19 (Aug-Jan)	2015-16 To 2017-18
		US cent per pound	
1.	Index-A cottons assumed as cif (Karachi) price	87.75	80.87
2.	Insurance, agents commission, and port handling charges @ 5% cif price	4.39	4.04
3.	Landed cost at Karachi	92.14	84.91
		OR Rupees (a)	
	Landed cost at Karachi per 40 kgs	11261	10378
4.	Handling charges at port and transport cost from port to textile mills at Karachi @ 5 % of cif price	563	519
5.	Ex- gin price of cotton lint (item 3 + item 4)	11824	10897
6.	Value of 80 kgs of cotton seed (b)	2940	2940
7.	Ginning charges for 120 kgs of seed cotton including ginning losses	600	600
8.	Value of 120 kgs of seed cotton (item 5 +item 6 - item 7)	14164	13237
9.	Seed cotton price per 40 kgs (item 8/ 3)	4721	4412

Notes:

- a) One US \$ = 105.35 Pak rupees.
- b) Average price of cotton seed for September 2018 to Feb 2019 in Multan, Bahwalpur, D.G. Khan and Raheem Yar Khan markets was Rs 1470 per 40kgs

Sources:

1. Index-A cotton price Annex - VIII
2. KCA, for incidental charges.
3. Pakistan Cotton Ginners Association, Karachi for ginning charges.

Based on Export Parity Price
ECONOMIC EFFICIENCY OF RESOURCE USE IN SEEDCOTTON
(POLICY ANALYSIS MATRIX)

Province/Year	Gross Revenue	Traded Cost	Domestic Factors Cost	Profit
<u>PUNJAB</u>				
Rupees per acre				
2014-15				
Private Prices	47759	22451	32923	-7616
Social Prices	46562	18998	32613	-5049
Transfers	1197	3453	310	-2566
2015-16				
Private Prices	43845	22870	33162	-12187
Social Prices	55283	19398	32847	3039
Transfers	-11438	3473	315	-15226
2016-17				
Private Prices	59900	22890	34858	2153
Social Prices	58791	19362	34529	4900
Transfers	1109	3528	329	-2747
2017-18				
Private Prices	59235	24558	35064	-387
Social Prices	62940	20788	34697	7454
Transfers	-3705	3770	366	-7841
2018-19				
Private Prices	83512	26159	37266	20087
Social Prices	78892	22171	36980	19741
Transfers	4620	3988	286	346
<u>SINDH</u>				
2014-15				
Private Prices	46648	21162	30396	-4910
Social Prices	48780	17776	30047	957
Transfers	-2132	3386	350	-5868
2015-16				
Private Prices	47186	21172	30498	-4484
Social Prices	57926	17785	30148	9993
Transfers	-10740	3388	350	-14478
2016-17				
Private Prices	56853	20731	31340	4781
Social Prices	61327	17414	30996	12917
Transfers	-4475	3317	344	-8136
2017-18				
Private Prices	56049	24314	35115	-3380
Social Prices	63978	20424	34728	8825
Transfers	-7929	3890	387	-12206
2018-19				
Private Prices	95200	27871	40850	26478
Social Prices	89650	23412	40595	25643
Transfers	5550	4459	255	835

Based on Import Parity Price
ECONOMIC EFFICIENCY OF RESOURCE USE IN SEEDCOTTON
(POLICY ANALYSIS MATRIX)

Province/Year	Gross Revenue	Traded Cost	Domestic Factors Cost	Profit
<u>PUNJAB</u>				
Rupees per acre				
2014-15				
Private Prices	47759	22451	32923	-7616
Social Prices	71737	18998	32613	20126
Transfers	-23978	3453	310	-27741
2015-16				
Private Prices	43845	22870	33162	-12187
Social Prices	64764	19398	32847	12520
Transfers	-20919	3473	315	-24707
2016-17				
Private Prices	43394	22890	34858	-14353
Social Prices	64582	19362	34529	10691
Transfers	-21188	3528	329	-25044
<u>2017-18</u>				
Private Prices	43845	24558	35064	-15777
Social Prices	66436	20788	34697	10950
Transfers	-22591	3770	366	-26727
2018-19				
Private Prices	83512	26159	37266	20087
Social Prices	95392	22171	36980	36241
Transfers	-11880	3988	286	-16154
<u>SINDH</u>				
2014-15				
Private Prices	46648	21162	30396	-4910
Social Prices	75181	17776	30047	27358
Transfers	-28533	3386	350	-32268
2015-16				
Private Prices	47186	21172	30498	-4484
Social Prices	67868	17785	30148	19936
Transfers	-20682	3388	350	-24420
2016-17				
Private Prices	55853	20731	31340	3781
Social Prices	66372	17414	30996	17962
Transfers	-10519	3317	344	-14180
2017-18				
Private Prices	56049	24314	35115	-3380
Social Prices	67589	20424	34728	12436
Transfers	-11540	3890	387	-15817
2018-19				
Private Prices	95200	27871	40850	26478
Social Prices	108400	23412	40595	44393
Transfers	-13200	4459	255	-17915