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COTTON POLICY ANALYSIS FOR 2022-23 CROP

AGRICULTURE POLICY INSTITUTE
MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH
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Preface

The fundamental objective of this report is to provide information on various economic aspects of the seed cotton crop, crucial for the formulation of the intervention Price Policy. A report of this kind is always important because a broader audience benefits, ranging from policy makers to planners, academia, researchers, student community, growers/growers associations, chambers of agriculture, traders, etc.

The single title of the report may not lengthily reflect the scope and purpose, unless the reader travels through the important elements of the report. The document contains a number of important economic factors adopted for the analysis of seed cotton crop. Many portions are relevant, however, a few economic factors have been described as the building blocks which provide useful insights into the intervention Price Policy perspective. It is partly uncontainable curiosity of the stakeholders and partly the practical needs of policy makers that this report be there to give answers to the questions on determining of producer price of the commodity.

We as API team, collectively owe thanks to all the Committee members and participants of the various meetings, for their valuable discussion and input, Federal and Provincial Government departments for sharing of information, without all that it would have not been possible to complete the report.

API greatly appreciates the feedback and suggestions from all four corners and looking forward for a continued partnership in the formulation of price policy analysis and producing of important reports concerning agriculture and food security.

Abdul Karim
Director General

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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
GAP	:	Good Agriculture Practice
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 2022-23 CROP

SUMMARY OF FINDINGS AND RECOMMENDATIONS

- Findings

Area and Production

- Punjab and Sindh on an average, contribute 67.5 and 30.8 per cent, respectively of the cotton production while the cumulative share of both Khyber Pakhtunkhwa and Balochistan is 1.7 per cent.
- During the last decade, cotton production at country level decreased @ 5.7 per cent per annum mainly due to 3.6 per cent decline in area while 2.2 per cent reduction in yield.
- Cotton production in 2021-22 is produced at 8.247 million bales, as compared to last year 7.064 million bales, which is 16.7 per cent higher than 2020-21.
- Cotton production has fallen short of the target by 21.5 per cent during 2021-22 due to mostly 16.6 and 5.9 per cent shortage in area and yield, respectively.

Major Varieties

- According to the annual field survey reports of API and Pakistan Central Cotton Research Institute, Multan, the major cotton varieties sown in Pakistan were Bt.cotton, 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, Rarzan-1, IR-NIBGE-1524, Neelum-121, CIM-496.

Domestic Prices

- Monthly average market prices of seed cotton for 2021-22 crop during the post harvest months in major producing areas have generally remained higher than the last year.
- The monthly wholesale market prices of seed cotton during the post harvest period averaged at Rs. 6,106 per 40 kgs in the Punjab and Rs.5,803 per 40 kgs in Sindh.
- Monthly average wholesale prices of seed cotton ranged from Rs. 4,970 to Rs. 8,800 per 40 kgs during the post harvest months in major producing areas of the Punjab and Rs. 5,220 to 6,310 per 40 kgs in Sindh.
- Monthly average spot prices of cotton lint at Karachi averaged at Rs 16,787 per 40 kgs in 2021-22 which is 70.67 per cent higher than the last year.

Cost of Production

- In Punjab, the net cost of cotton cultivation for the 2022-23 season is estimated at Rs. 97,280 per acre.
- The cost of production at the market / ginnery level of Punjab would be Rs 4,790 per 40 kgs, reflecting gain of 12.32 per cent over the last year.

- In Sindh, the net cost of cotton cultivation for 2022-23 crop is expected at Rs 101,645 per acre.
- The cost of production at market / ginnery level would come to Rs 4,370 per 40 kgs, showing enlargement of 7.04 per cent over the last year.
- Key elements of this increase in cost of cultivation are price hike particularly of the fertilizers, pesticides, seed and labor, etc.

Economics of Cotton and Competing Crops

- Punjab

- Cotton has paid the farmer with better returns as compared to Basmati and IRRI Paddy in terms of returns to overall investment. In terms of gross revenue per rupee of purchased inputs and irrigation water, cotton performs significantly higher than both Basmati and IRRI (paddy).
- In case of indirect competition, sugarcane farmers though, fetchet relatively better prices for their produce over and above the indicative prices, however, the crop could not give a competing level of returns over the cotton combinations with wheat and sunflower. Cotton combinations, both with wheat and sunflower performed significantly higher than the sugarcane crop in terms of all the economic indicators analyzed.

- Sindh

- Cotton farming performed much better than IRRI paddy in terms of all the economic criteria. Cotton could successfully make it giving back to farmer what the farmer had invested by 43 percent. IRRI growers also not only met their costs but received a rewarding price for their produce, i.e 24 percent.
- In case of indirect competition, cotton combinations with wheat & sunflower have gained better position against its main competitor – sugarcane in all the economic criteria. In particular, Cotton + wheat have shown much better position in the entire economic criteria adopted in this analysis.
- By virtue of better prices, seed cotton has revived and paid back to the grower considerably higher return. This encouraging the farmer to invest/allocate the resources with a ray of hope.

Economics of Fertilizer use in 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 a mix situation, favourable in terms of N but unfavourable in context of P fertilizer during 2021-22.
- Regarding the parity ratio between prices of fertilizer and seed cotton, the quantity of seed cotton required to purchase one nutrient tonne of N fertilizer has fluctuated between 0.65 and 1.24 tonnes while that of P fertilizer between 1.15 and 2.40.

Nominal and Real Market Prices

- The nominal market prices of seed cotton in the Punjab indicate an overall increase of 128 per cent while the real market prices have shown an increase of 44 per cent during 2015-16 to 2021-22.
- In Sindh, the nominal market prices of seed cotton have observed overall increase of 135 per cent while the real market prices have increased 48 per cent against the base year level.

World Production and Prices

- World cotton production estimated at 25.89 million tonnes in 2021-22 and projected to increase at 26.13 million tonnes in 2022-23.
- International prices of Index-A cottons have widely fluctuated from the lowest level of 70.30 cents per pound in 2015-16 to 99.75 cents per pound in 2011-12. The price remained higher during 2021-22 averaging at the highest level of 119.83 cent per pound.

Export Parity Prices

- The export parity price comes to Rs. 6,828 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 2020-21, the import parity price of seed cotton works to Rs 6,389 per 40 kgs and Rs. 4,762 for average of 2018-19 to 2020-21.
- Based on CFR Far Eastern quoted price of Index – A cottons, the import parity price comes to Rs. 7,670 per 40 kgs during 2021-22 and Rs. 5,401 on average of 2018-19 to 2021-22.

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 remained below the one throughout the analysis period. This indicates no economic protection to seed cotton growers in Punjab and Sindh.
- However, under export scenario, NPC estimates both for Punjab and Sindh are either closer to one or slightly higher than one for Punjab and Sindh. During the period 2017-18 to 2021-22, they remained implecitly taxed as NPC was less than one.
- Similarly, the EPCs are less than one under export/import scenario in the Punjab and Sindh during 2018-19 to 2020-21, it reveals that input/output prices seed cotton are stable that may suddenly affect cotton growers profit and development of the crop.

- 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 2016-17 to 2019-20 both in Punjab and Sindh. Generally the situation implies a Comparative Advantage in seed cotton production, both under export and import scenario.
- The findngs 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 stands at 4th position in the cotton producer countries in terms of area and 5th in terms of production but ranks at 33rd position in terms of yield and was 32nd position in the last year.
- In terms of cotton production, China is on the top with 29.5 million tonnes in world production followed by India with 17.73 and USA with 9.74 million tonnes.
- China Mainland is lead in yield with 9077 kgs per hectare followed by Australia with 5335 kgs per hectare. In the region, India, however is far behind at 37th position.

Policy Options

Based on the analysis of relevant factors covered in the main text of the Report, the likely policy options for seed cotton 2022-23 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:	
	Futures contract prices of New York No.2 cotton (average of October, December 2022 and March 2023	6,828
2	Import parity prices based on average:	
	i) Actual cif Karachi prices of imported cotton:	
	- During 2021-22 (Augt-March)	6,389
	- During 2018-19 to 2020-21	4,762
	ii) CFR Far Estern quoted price of Index-A Cottons	
	- During 2021-22 (Augt-March)	7,670
	- During 2018-19 to 2020-21	5,401
3	Average wholesale prices of seed cotton in Major Producer Area Markets during the post-harvest period in 2021-22.	
	- Punjab (Aug– Dec)	6,106
	- Sindh (Aug – Dec)	5,803
4	Cost of production for 2022-23 crop (at market)	
	- Punjab	4,790
	- Sindh	4,370

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 2022-23 crop, in view of world cotton situation and high input costs, if deem necessary.

- This price would provide 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 Agriculture Extension Departments should play their role actively and provide technical assistance to the growers at farm level. The Department should mention area wise details of pest attack and name of pesticide with contents and doses on their webside. The extension departments should monitor the quality of seed and pesticide during the crop season. The agriculture extension also provide on farm training to farmers for better use of pesticide during season.

- Instead of providing incentive to dealers, the pesticide companies should provide training to their field men and they help the growers properly. The pesticide companies should get the responsibility of effectiveness of the pesticide. If pesticide does not work properly and could not controlled the attacks, the company should impose fine/bane.

- A campaign should be started through media during the pest attacks, its severity, management, name of proper pesticide with contents and doses for awareness of farmers.

- The government policy of encouraging the role of private sector in cotton marketing and trade may be continued.

- In view of trade libralization 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

- Using the better cotton standard system encourage farmers to implement better cotton production principle and criteria, Good Agriculture Practice (GAP) by providing participatory training to farmers.

- In Pakistan, crop productivity can be enhanced significatly by improving availability of good quality agriculture inputs like seed, fertilizers, pesticides, water and their efficient, judicious and balanced use.

- The Government should ensure implementation of Federal Seed Act 2015 - the Cotton Research Institute should only release varieties.

- 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.

- 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.

- The Pest Scouting and Warning System should be further strengthened enabling the farmers to take timely action and apply appropriate pesticides.

- The Punjab Seed Corporation is working well. Government of Sindh, Khyber Paktunkhwa and Balochistan should also pay a special attention to seed production to meet their provincial requirements.

- The cotton production potential exixting in the KPK and Balochistan may be taped through cotton supporting activities. The Provincial Governments should launch awareness compaign to educate the growers about cotton production technology.

- 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.

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.

- Cotton quality can be improved if the generies strictly follow the policy to only procure high quality seed cotton.

- Like other commodities, a Regulatory 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 vigorus 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.

COTTON POLICY ANALYSIS FOR 2022-23 CROP

1. INTRODUCTION

Cotton is fibrous and cash crop of Pakistan. This crop has the most importance in the National Economy. It contributes around 3.1 percent of the value added in agriculture sector and about 0.6 percent share in GDP[1]. It provides raw material not only to the textile industry but also to the oil production too. Cotton and cotton made commodities has the largest share in the country's exports. Being cash crop it provides reasonable profit to the farmers along with the employment to the labour. Pakistan is the 5th largest country in the world for cotton production. Cotton is named as "kapas" and seed cotton is called "phutti" in local Pakistani languages.

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 chains, 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, on an average, is being cultivated on 2.2 million hectares 2019-20 to 2021-22, showing a decline as compared to last year, by 4.3 per cent. Pakistan produced 8.328 million bales in the year 2021-22 against 7.064 million bales last year showing an increase of 17.19 per cent. The production increased due to favorable weather conditions and improvement in 54.15 percent in yield. 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. In preparing this Report for Seed Cotton 2022-23 crop, the following steps were undertaken:

- The data on different aspects of cotton production, input prices, trade situation, ginning and marketing were collected from the primary and secondary sources and analysed by the Agriculture Policy Institute.

- A field survey was also conducted by the API during November and December 2021, in major cotton producing areas of the country. Main purpose of survey was to collect primary data on input prices and cost of field operations to annually update cost of production of seed cotton. Interviews and discussions were held with the growers, local leaders and officials of the Provincial Departments of Agriculture, cotton ginners and traders, etc. The data of field survey was analysed and the findings were duly considered in the policy analysis.

- A meeting of the API's Committee on Cotton was held and chaired by honourable Minister Syed Fakhar Imam on 9th February, 2022 at Islamabad. The meeting was attended by the representatives of cotton growers/ associations, Chambers of Agriculture, Progressive Growers, Cotton Experts and officials of Federal and Provincial Governments concerned with farm inputs, cotton production and marketing, etc. Issues relating to cotton production, consumption, marketing and price situation both national and international were discussed in the meeting. The proceedings of the meeting were issued and the viewpoints of the committee members were duly considered in formulating the price policy proposals.

[1] Economic Survey of Pakistan, 2020-21

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 Cotton[2] 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.

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.

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.

[2] Base grade 3 with staple length 1-1/16″

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	1st May to 15th June
Mianwali	10th May to 15th June
Multan, Lodhran, Vehari Muzaffargarh, Layyah, D.G.Khan, Rajanpur	1st May to end of June
Khanewal	15th May to 15th June
Bahawalnagar	1st May to 20th June
Sindh	
Thatta	15th March to 31st March
Tharparkar, Mirpurkhas and Badin	1st April to 30th April
Hyderabad	15th April to 15th May
Sanghar	15th April to 20th May
Dadu, Nawabshah and Naushahro Feroz	1st May to 31st May
Khairpur, Sukkur, Ghotki, Larkana, Shikarpur & Jacobabad	15th May to 15th June
Khyber Pakhthunkhwa	
D.I.Khan	1st May to 31st May
Balochistan	
Lasbela, Dera Murad Jamali, Nasirabad	1st May to 31st May

Sources:

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

9. Picking of cotton in Sindh starts in July 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.

10. Bt cotton varieties are largely grown by farmers covering around 90 % of area under Bt Cotton with different varieties/labels in Sindh and Punjab. There may be an 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 are presented in Table - 2.

Table 2 : Crop season and zoning for cultivation of Bt cotton in the Punjab and Sindh

A.

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

B.

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

Source:-CCRI, Multan

Bt Cotton varieties for general cultivation

11. The following Bt cotton varieties has been shared with Central Cotton Research Institute, Multan for areas of the Punjab:

> "MNH-886 , FH-490, FH-142, IR-3701, IUB-2013, AGC-555, FH-LALAZAR, BS-15, FH-114, NIAB-878, MNH-1026, MNH-1020, MNH-1016, CIM-663, BS-20, CKC-03".

3. PROVINCIAL SHARES IN AREA AND PRODUCTION

12. Provincial shares in area and production of cotton based on average of 2019-20 2021-22 are provided in Table-3. During this period cotton production averaged at 8.154 million bales from 2.178 million hectares (5.381 million acres).

Table-3: Provincial shares in area and production of cotton: average of 2019-20 to 2021-22

Country/ Province	Area		Production	
	000 hectares	Per cent	000 bales	Per cent
Pakistan	**2177.5**	**100.0**	**8154.0**	**100.0**
Punjab	1568.4	72.0	5506.1	67.5
Sindh	555.8	25.5	2508.0	30.8
KPK& Baluchistan	53.3	2.4	139.9	1.7

Source: Annex-I

13. Punjab and Sindh account for 72.0 and 25.5 per cent in cotton area and 67.5 and 30.8 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 KPK & Baluchistan together in production is 1.7 per cent from 2.4 per cent area.

Figure-1: SHARES IN AREA

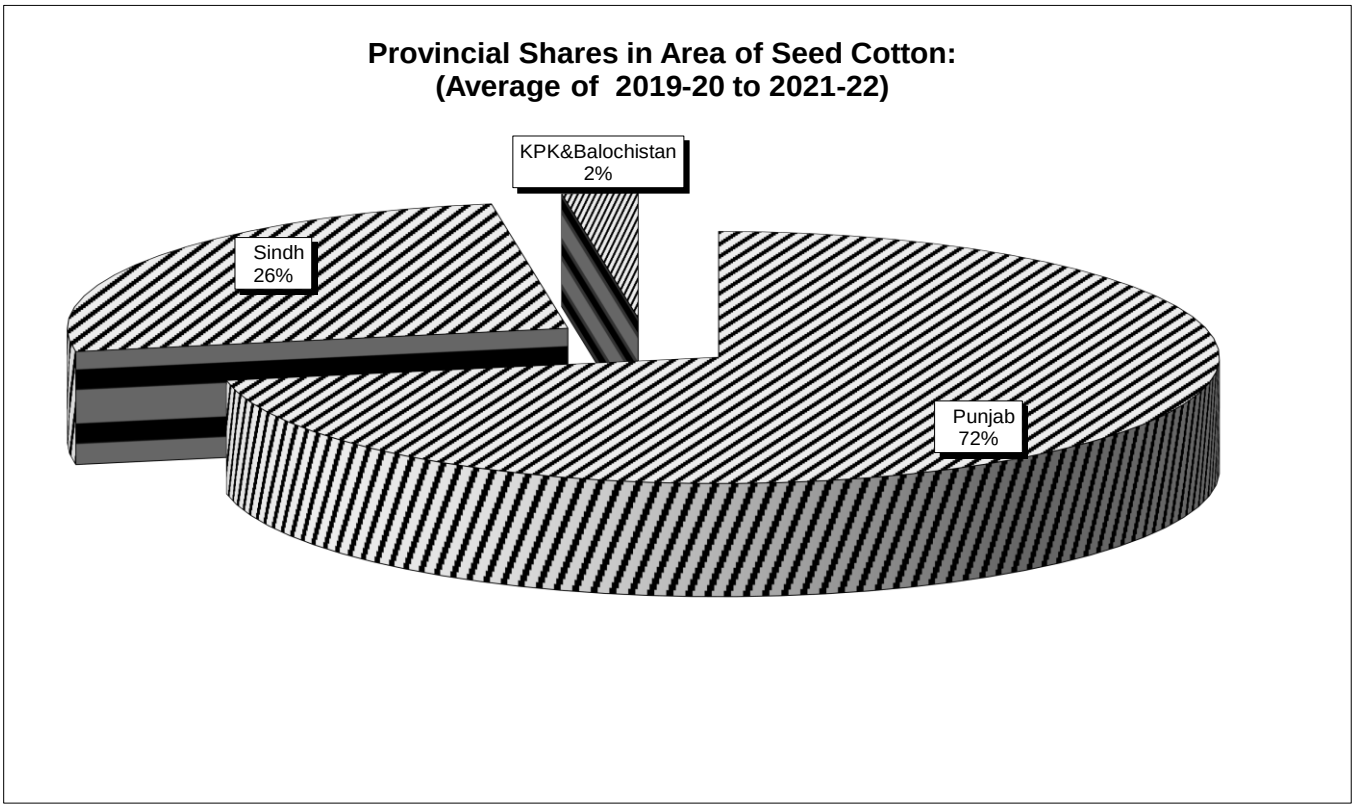
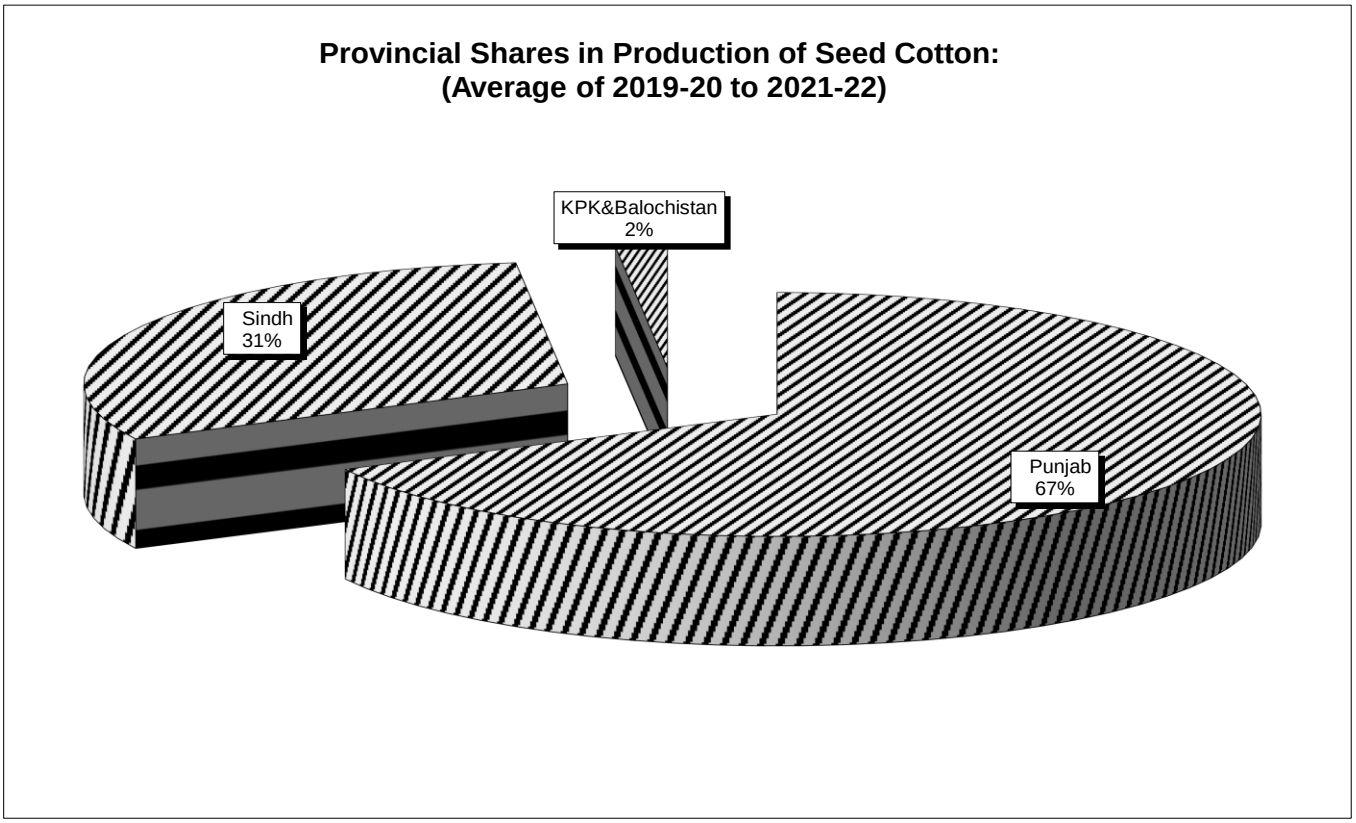


Figure-2: SHARES IN PRODUCTION



Source: Annex-I

4. IMPORTANT COTTON GROWING DISTRICTS

14. The district-wise data on area and production of cotton are given in Annex-III. The districts producing more than 100 thousand bales of cotton per year each are Bahawalnagar, Bahawalpur, Rahim Yar Khan, Lodhran, Rajanpur, Khanewal, Multan, Vehari, Muzzafargarh, D.G.Khan, Sahiwal, Layyah and Mianwali from the Punjab province and Sanghar, Ghotki, Khairpur, Nawabshah, Noushero Feroz, Matiari, Sukkur and Mirpurkhas from Sindh Province. These 21 districts account for more than 92 per cent of the cotton production in the country. The districts of Bahawalnagar, Bahawalpur, and Rahim Yar Khan each producing more than half million bales per year altogether account for 46 per cent of the cotton in the Punjab.

5. CHANGES IN AREA, YIELD AND PRODUCTION

15. During the period of 2011-12 to 2021-22, cotton area ranged between 1.937 and 2.961 million hectares (4.786 and 7.318 million acres) and yield between 578 and 891 kgs per hectare (234 to 361 kgs per acre). Therefore, cotton production fluctuated between 7.064 and 13.960 million bales. Long term and short term changes in area, yield and production are discussed below:

5.1 Long-term Changes: 2011-12 to 2021-22

16. During the period under reference, cotton production at country level decreased @ 5.7 per cent per annum mainly due to 3.6 per cent decline in area while 2.2 per cent reduction in yield (Table-4).

Table-4: Average annual growth rates of area, yield and production of cotton: 2011-12 To 2021-22

Country/ Province	Area	Yield	Production
	---------- Per cent ----------		
Pakistan	**-3.6**	**-2.2**	**-5.7**
Punjab	-5.3	-1.9	-7.1
Sindh	3.0	-5.0	-2.2

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 @ 7.1 per cent annually due to decline of 5.3 and 1.9 per cent in area and yield respectively. In Sindh, cotton production also decreased @ 2.2 per cent per annum solely due to 5.0 percent depressed in yield however, area increased @ 3.0 percent.

5.2 Short-term Changes 2020-21 Vs 2021-22

18. According to the second estimates provided by the provincial Agricultural Department, cotton production during 2021-22 at country level worked out as 8.247 million bales, as compared, 7.064 million bales produced in 2020-21 (Table-5). Increase of 17.9 per cent production is due to improvement in 54.2 per cent in yield, however, 6.8 per cent declined in area.

Table-5: Area, yield and production of cotton: 2020-21 and 2021-22 crop

Country/ Province	Area		Changes in 2021-22 over 2020-21	Yield		Changes in 2021-22 over 2020-21	Production		Changes in 2021-22 over 2020-21
	2020-21	2021-22		2020-21	2021-22		2020-21	2021-22	
	-- 000 hectares --		Per cent	--Kgs/hectare --		Per cent	-- 000 bales --		Per cent
Pakistan	**2078.9**	**1936.9**	**-6.83**	**578**	**731**	**54.15**	**7063.9**	**8328**	**17.9**
Punjab	1546.3	1279.2	**-17.27**	555	687	**50.27**	5044	5168	**2.5**
Sindh	474.8	593.9	**25.1**	667	859	**51.9**	1861.8	2998	**61.0**
KPK	0.11	0.17	**54.6**	510	510	**18.0**	0.33	0.51	**54.5**
Baluchistan	57.7	63.7	**10.40**	465	433	**13.12**	157.8	162	**2.7**

Source: Annex-I

19. Cotton production in the Punjab estimated at 5.168 million bales, 2.5 per cent higher than 5.044 million bales produced in 2020-21. Production is solely due to increase in yield by 50.27 per cent, however, 17.3 per cent decreased in area.

20. In Sindh, cotton production remained 2.998 million bales, 61.0 per cent also higher than 1.862 million bales in 2021-22. Increase in production is due to increase by 25.1 and 51.9 per cent in area and yield respectively.

6. TARGETS VS ACHIEVEMENTS: 2021-22 CROP

21. Federal Committee on Cotton (FCC) has fixed Seed Cotton production target for 2021-22 crop at 10.504 million bales. As per second estimates of Provincial Agriculture Departments, cotton production is reported at 8.247 million bales 20.7 per cent less than the target due to 16.6 per cent shortfall in area and there was also 5.9 per cent decrease in yield (Table-6).

Table-6: Targets and estimated achievements of area, yield and production of seed cotton: 2021-22 crop

Country/ Province	Area		Deviation from the target	Yield		Deviation from the target	Production		Deviation from the target
	Target	Achievement		Target	Achievement		Target	Achievement	
	-- 000 ha --		Percent	-Kgs/hectare -		Per cent	-- 000 bales --		Percent
Pakistan	**2322.2**	**1936.9**	**-16.6**	**769.4**	**724.2**	**-5.9**	**10504.2**	**8328**	**-20.7**
Punjab	1610.0	1279.2	-20.5	641.3	687.2	7.2	6070.0	5168	-14.9
Sindh	640.0	593.9	-7.2	1063.1	835.3	-21.4	4000.0	2998	-25.1
KPK	2.2	0.1	-94.5	322.4	496.1	53.9	4.2	0.51	-87.9
Baluchistan	70.0	63.7	-9.0	1044.8	432.6	-58.6	430.0	162	-62.3

Sources: 1. For targets: Federal Committee on Agriculture held on 7th October, 2021
2. For achievements: Annex-I.

22. Production of cotton fell short of the target by 14.9, 25.1, 87.9 and 62.3 per cent in Punjab, Sindh, KP and Baluchistan respectively. Area of cotton also fell down of the target by 20.5, 7.2, 95.45 and 9.0 in Punjab, Sindh, KP and Baluchistan respectively. Thus yield in Punjab and KP significantly achieved the target by 7.2 and 53.9 per cent respectively. However, in Sindh and Baluchistan couldn't able to achieve the targets and shows decrease in yield by 21.4 and 58.6 per cent respectively.

7. DOMESTIC SUPPLY, DEMAND, STOCKS AND PRICE SITUATION

7.1 Domestic Supply, Demand and Stocks

23. Cotton crop stands vital in agriculture as well as textile sector of the economy. It contributes around 0.6 per cent to GDP and 3.1 per cent of the value added in agriculture. It is a significant source of foreign earnings from export of textile products. Cotton crop faces multiple challenges and competes with other crops especially sugarcane.

24. The cotton production in country was declined significantly due to climate change, the temperature was higher at flowering time and abrupt rain fall has increased the pest attack. Resultantly the production was declined to 7.06 million bales during 2020-21 crop. However, during 2021-22, according to second estimates, cotton production has been increased to 8.25 million bales, 16.86 per cent higher than last year.

25. As mentioned above country has produced 8.25, after adding the opening stocks of 0.38 million bales, the total supply estimated at 8.63 million bales. On the basis of last three years average (2019-20 to 2021-22) consumption, the mill consumption requirement is projected around 13.03 million bales, a short falls of 4.40 million bales. To meet the deficit, the country would have to import cotton. From August, 2021 to January 2022 the country has imported 2.18 million bales and remaining 2.23 million bales will be imported during 2021-22 season.

Table-7: Domestic production, demand and stocks of cotton (lint): 2019-20 to 2021-22 (August-July)

Item	2019-20	2020-21 (Provisional)	2021-22 (Projected)
	---------- Million bales ----------		
1. Opening stocks	1.09	0.27	0.38
2. Production	9.15	7.06	8.25
3. Total supply	10.24	7.33	8.63
4. Likely Consumption	13.17	12.10	13.03
5. Imports**	3.26	5.15	2.18
6. Exports**	0.06	0.003	0.01
7. Closing stocks	0.27	0.38	-2.23

* One bale = 170 kgs = 375 lbs.

** Import and export are up to Jan 2022.

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)

26. Monthly average wholesale prices of seed cotton in the main producing area markets of Punjab and Sindh during the post-harvest period of 2021-22 crop are detailed in Table-8 and 9.

Table-8: Monthly average wholesale prices of seed cotton (Phutti) in the main producer area markets of Punjab 2021-22 crop.

Market	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
	----------Rs per 40 kgs----------					
Bahawalpur	-	5,494	6,043	7,005	6,710	**6,313**
Bahawalnagar	5,732	5,719	5,923	7,101	6,791	**6,253**
Lodhran	5,795	5,556	5,818	6,605	6,285	**6,012**
Khanewal	5,733	5,449	5,570	6,437	6,852	**6,008**
R.Y Khan	-	5,356	5,814	6,654	6,574	**6,099**
Vehari	5,898	5,518	5,530	6,101	6,013	**5,812**
D.G Khan	-	6,500	6,900	7,554	8,800	**7,438**
Sahiwal	-	5,577	5,223	6,058	6,040	**5,724**
Layyah	6,050	5,737	5,745	6,765	-	**6,074**
Pakpattan	5,600	5,347	4,970	5,381	-	**5,325**
Average	**5,801**	**5,625**	**5,754**	**6,566**	**6,758**	**6,106**

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

27. Monthly average wholesale prices of seed cotton during the post-harvest period in Punjab ranged between Rs. 4,970 and Rs. 8,800 per 40 kgs in the month of October 2021 in Pakpattan market and D.G Khan market during month of December 2021. The seasonal average price of seed cotton ranged between Rs. 5,325 to Rs. 7,438 per 40 kgs.

Table-9: Monthly average wholesale prices of seed cotton (Phutti) in the main producer area markets of Sindh 2021-22 crop.

Market	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
	----------Rs per 40 kgs----------					
Hyderabad	5,973	5,487	5,276	5,536	-	**5,568**
Mirpurkhas	5,927	5,469	5,220	5,424	-	**5,510**
Khairpur	-	5,760	6,122	6,310	6,094	**6,072**
Sukkur	-	5,750	6,078	6,307	6,107	**6,061**
Average	**5,950**	**5,617**	**5,674**	**5,894**	**6,101**	**5,803**

Source: Pakistan Central Cotton Committee (PCCC).

28. In Sindh, monthly wholesale prices of seed cotton during the post-harvest period was Rs. 5,220/40 kg in Mirpurkhas during the month of October 2021, Rs. 6,310 /40 kg in Khairpur during the month of November 2021. The seasonal average price of seed cotton ranged between Rs. 5,510 to Rs. 6,072 per 40 kgs.

7.2.2 Cotton Lint (Raw Cotton)

29. Monthly average spot prices of raw cotton at Karachi during 2020-21 and 2021-22 are presented in Table-10. The Karachi spot price during 2021-22 (Aug-Dec) averaged at Rs. 16,787 per 40 kgs which is 70.67 per cent higher than last year.

Table-10: Monthly average spot prices of raw cotton at Karachi for 2020-21 and 2021-22 crops (august-dec)

Month	Base Grade -3, staple length 1-1/16″, Micronaire Value 3.8 to 4.9 NCL (No Control Limit)	
	2020-21	**2021-22**
	Rupees per 40 kgs	
August	8,962	14,547
September	9,368	14,383
October	10,346	15,611
November	10,146	17,799
December	10,360	18,219
Average	**9,836**	**16,787**

Source: Karachi Cotton Association (KCA). Karachi.

8. COST OF PRODUCTION (COP) OF SEED COTTON

30. Cost of production is one of the main factors in formulation of the indicative price suggestions for the farm produce. However, its calculation involves several conceptual difficulties due to wide variations in agro-climatic conditions, input use levels and farming systems under which the crop is grown.

31. Cost of production estimates for seed cotton: 2022-23 crops are derived by using the field data 2022 survey. Updated rates of different cultivation operations and inputs' prices for Punjab and Sindh provinces (major cotton producing provinces) were collected by API from the field through a survey carried out in Punjab and Sindh. The detailed cost estimates for Punjab and Sindh are given in Annex-V and Annex-VI respectively while a summary of the results is presented below in Table-11.

Table-11: Average farmer net cost of production of cotton: 2021-22 and 2022-23 crops

S. No	Item	Unit	Cost estimate		Change in 2022-23 against 2021-22
			2021-22 crop	2022-23 crop	
	Punjab				
1	**Net cost of cultivation**		84,502	97,280	12,788
2	**Yield**	**Kgs/ acre**	800	820	20
3	**Cost of production at farm level including land rent**	**Rs./40 Kg**	4,225	4,745	520
4	**Marketing cost**	**,**	40	45	5
5	**Cost of production at Market/ ginnery including land rent**	**,**	4,265	4,790	525
	Sindh				
1	**Net cost of cultivation**	**Rs./acre**	88,942	101,645	12,703
2	**Yield**	**Kgs/ acre**	880	940	60
3	**Cost of production at farm level including land rent**	**Rs./40 Kg**	4,043	4,325	282
4	**Marketing cost**	**,**	40	45	5
5	**Cost of production at Market/ ginnery including land rent**	**,**	4,083	4,370	287

Source**:** Annex-V and VI.

- **Punjab**

32. During 2022-23, net cost of raising one acre of seed cotton (inclusive land rent) in Punjab is likely to be Rs. 97,280 (Table-11). Based on an average yield of 820 Kgs per acre, cost of production at the farm level works out to Rs. 4,745 per 40 Kg.

33. For determining ginnery level cost of production per 45 kg, marketing expenses @ are added to the farm level cost of production which gives ginnery level cost of Rs. 4,790 per 40 kg, Rs. 525 is greater than to corresponding COP of 2021-22.

- **Sindh**

34. During 2022-23 crop season, net cost of cultivation of cotton in Sindh including land rent works out to Rs. 101,645 per acre. Based on an average yield of 940 Kgs per acre, farm level cost of production of cotton is estimated at Rs. 4,325 per 40 Kg. By adding marketing expenses @ Rs 45 to the farm level COP, mill gate cost of production would be Rs. 4,370 per 40 Kg greater by Rs. 287 per 40 Kg than the last year cost of Rs. 4,083 per 40 Kg.

8.1 Cost of major operations and inputs

35. Shares of different production operations/ inputs for 2021-22 and 2022-23 for Punjab and Sindh provinces are shown in Table-12.

- **Punjab**

36. Like 2021-22 Land rent might be the major component of the cost of production of seed cotton in Punjab during 2022-23. It adds to the total cost by 27% followed by plant protection 12%, fertilizer including FYM 19%, picking charges 11%, land preparation 7%, seed and sowing operations and Others @ 7%. Others cost consist of mark-up on capital, land tax, management

charges, land revenue, 'Drainage Cess' and cutting of cotton sticks. Other costs (all operations other than the above mentioned) lei between 4 and 7 per cent.

- **Sindh**

37. For Sindh, major components of cost of production for 2022-23 crop are expected to be land rent (26%), Picking charges (14%), fertilizer including FYM (18%), Plant protection (10%), land preparation (8%), other costs (8%). Other costs (all operations other than the above mentioned) lei between 5 and 6 per cent.

Table-12: Gross cost of cultivation of seed cotton: 2021-22 and 2022-23

S.No	Inputs/ operations	2021-22	2022-23 (Estimated)
	Punjab		
1	Land preparation	7,197 (9)	7,256(7)
2	Seed and sowing operations	6,630 (8)	7,094(7)
3	Irrigation	5,799 (7)	6,072(6)
4	Interculture	3,590 (4)	4,080(4)
5	Plant Protection	10,800(13)	12,000(12)
6	Fertilizers including FYM	12,094 (14)	18,906(19)
7	Land rent	23,333 (28)	26,667(27)
8	Picking charges	8,600 (10)	10,500(11)
9	Others	6,460 (8)	6,856(7)
10	Net cost of cultivation	84,502 (100)	97,280(100)
	Sindh		
1	Land preparation	8,075 (9)	8,125(8)
2	Seed and sowing operations	7,004 (8)	7,438(7)
3	Irrigation	5,540 (6)	5,813(6)
4	Interculture	4,800 (5)	5,400(5)
5	Plant Protection	9,000 (11)	10,200(10)
6	Fertilizers including FYM	13,504 (16)	18,561(18)
7	Land rent	22,000 (25)	26,667(26)
8	Picking charges	12,100 (14)	13,512(14)
9	Others	6,918 (8)	7,829(8)
10	Net cost of cultivation	88,942 (100)	101,645(100)

Notes:

- Numbers are rounded off to zero decimals due to which calculations may result in slight differences
- Figures in parenthesis represent average shares in the gross cost of cultivation per acre.
- 'Other costs' include mark-up on investment, management charges, picking charges, land revenue, land tax, drainage Cess and cutting of cotton sticks.

9. ECONOMICS OF COTTON AND COMPETING CROPS

38. 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.

39. 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.

40. The economics of cotton and competing crops has been analyzed in terms of input-output prices paid and received by the growers during the 2021-22 crop year. The details of the analysis are provided in Annex-VII. A summary of various economic indicators for the Punjab and Sindh is presented in Tables 13 and 14 and depicted at Figures 3 and 4:

Table-13: Economics of cotton and competing crops at prices realized by the growers in the Punjab: 2021-22 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	1.41	3.85	496	5,415
2. Basmati paddy	1.08	2.00	419	1,300
3. IRRI paddy	1.10	2.32	443	1,285
4. Cotton + Wheat	1.30	3.64	444	5,491
5. Cotton + Sunflower	1.35	3.80	483	4,608
6. Sugarcane	1.25	3.42	421	3,458

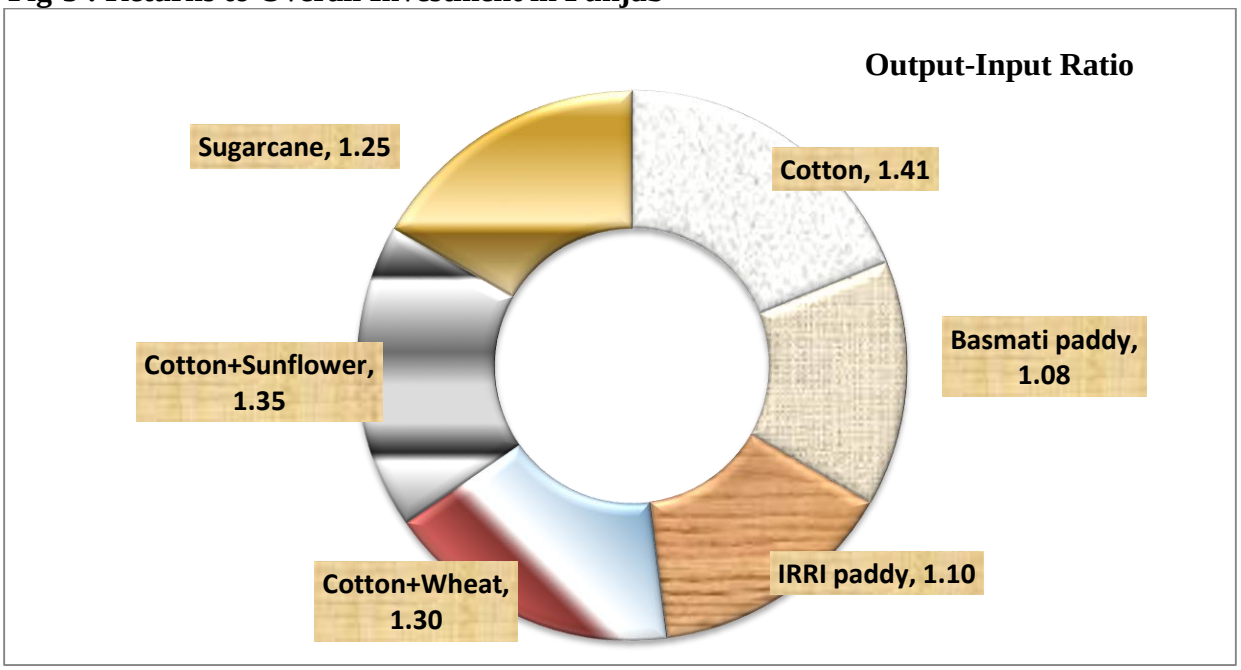
Source: Annex- VII.

- **Punjab**

41. Cotton in Punjab paid better returns to the farmer 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 higher than both Basmati and IRRI paddy.

42. Basmati & IRRI paddy not only lagged behind Cotton, in any of the criteria adopted for the economic analysis but hardly managed to return to its farmer the cost of cultivation, as the output input ratio remained slightly above than 1, indicating 8-10 percent over and above the cost incurred by the growing community.

Fig-3 : Returns to Overall Investment in Punjab



43. In case of indirect competition, although sugarcane farmers were reported receiving better prices for their produce over and above the indicative prices as announced by the Provincial Government, still could not compete with other commodities. Cotton combinations, both with wheat and sunflower performed better and giving back to the grower higher returns as compared to the sugarcane crop in terms of all the economic indicators analyzed.

- **Sindh**

44. In Sindh, cotton farming performed much better than IRRI paddy in terms of all the economic criteria. However, the noticeable point is that IRRI paddy could successfully make it giving back to farmer what the farmer had invested - cost of production, i.e by 24 percent. This indicates that farmers of the IRRI received attractive price for their produce. Similarly, Cotton growers not only met their costs considerably but also received a rewarding price for their produce, i.e 43 percent.

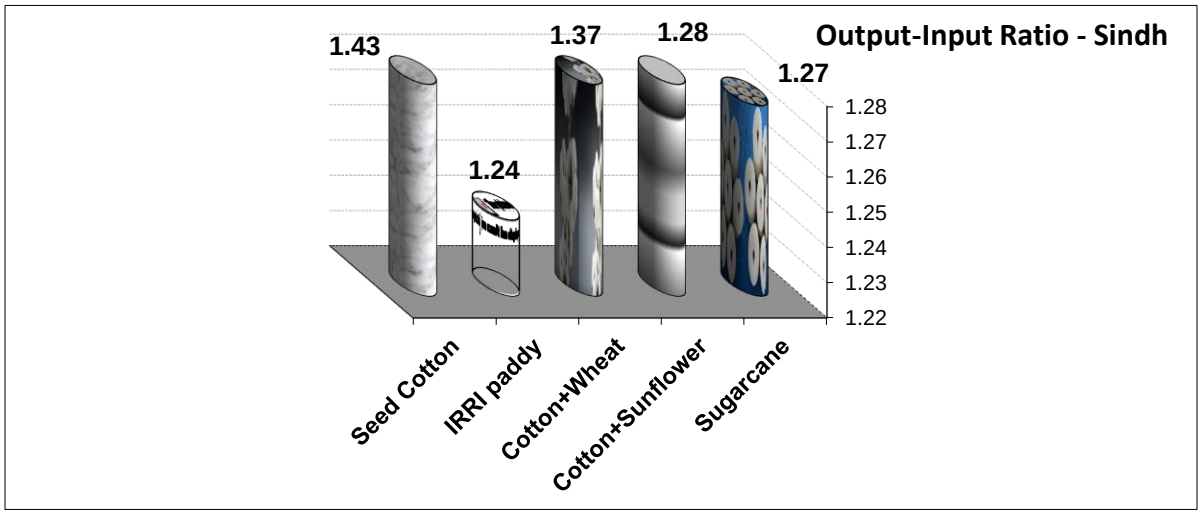
Table-14: Economics of Cotton and Competing Crops at Prices Realized by the Growers in Sindh: 2021-22 Crops

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	1.43	4.19	532	7,087
2. IRRI paddy	1.24	3.33	468	1,504
3. Cotton +Wheat	1.37	3.99	497	6,958
4. Cotton + Sunflower	1.28	3.56	443	4,651
5. Sugarcane	1.27	3.69	333	2,286

Source: Annex-VII.

45. In case of indirect competition, cotton combinations with wheat & sunflower has gained better position against its main competitor – sugarcane in all the economic criteria. In particular, Cotton + wheat have shown much better position in the entire examined criteria adopted.

Fig-4: Returns to Overall Investment in Sindh.



46. Sugarcane farming has shown relatively better performance over the cotton combination with sunflower in respect of the above situation depicts a favorable scenario for cotton crop, mainly due to encouraging price of the commodity, after couple of years of depressed prices. This analysis precisely indicates that cotton crop has great potential to give back to the grower, once rewarded properly.

10. ECONOMICS OF FERTILIZER USE IN COTTON CROP

47. 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)

48. 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-15

49. It may be seen from the Table-15, the BCR's witnessed greater than one throughout the period under analysis, 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.

Table-15: Benefit cost ratio (BCR) of fertilizer use on cotton: 2007- 08 to 2021-22

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	2.86	3.19
2019-20	1.81	2.15	2.44	2.71
2020-21	1.89	2.24	2.55	2.84
2021-22	1.50	1.81	2.10	2.48

Sources: 1. For 2007-08 to 2021-22: Cotton Policy Analysis Report for 2020-21 Crop, API.
2. For 2021-22: Annex-IV.

10.2 Parity Ratio between Prices of Fertilizer and Seed Cotton

50. 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 2012-13 to 2021-22 and presented in Table-16. The quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has ranged between 0.65 to 1.24 tonnes. The parity ratios between prices of seed cotton and those of phosphatic fertilizer have fluctuated from 1.15 to 2.40 during the period of analysis. During 2021-22 the price of nitrogen is higher over the previous years which, however, had been fluctuating sporadically during the period 2012-13 to 2021-22. Phosphorus price is higher too during this period. During the current crop season, the ratio of Nitrogen has improved slightly in favor of cotton crop, mainly because of better prices of seed cotton received by the growers. However, the ratio of Phosphorus has gravely worsened in disfavor of seed cotton. In order for making the favorable parity ratios, one option may be to subsidize fertilizer prices and ensure their regular and timely supply.

Table-16: **Parity Ratio between the Prices of Fertilizer and Seed Cotton: 2012-13 to 2021-22**

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----------	
2012-13	77,870	149,570	63,688	1.22	2.35
2013-14	74,260	139,980	72,500	1.02	1.93
2014-15	72,870	124,830	72,488	1.00	1.72
2015-16	80,950	129,190	64,825	1.24	1.99
2016-17	57,610	87,240	75,725	0.76	1.16
2017-18	59,782	85,303	74,012	0.80	1.15
2018-19	68,152	112,460	92,662	0.73	1.21
2019-20	81,520	126,790	81,520	0.86	1.34
2020-21	76,080	146,316	109,562	0.69	1.33
2021-22	95,652	353,876	147,237	0.65	2.40

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

51. The intervention price of seed cotton needs to be reviewed well before the sowing time, mainly with the purpose to regulate the market in case the 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 2015-16 to 2021-22 are presented in Table-17 and 18.

11.1 At Market Prices of Seed Cotton in the Punjab

52. The nominal and real market prices of seed cotton for 2015-16 to 2021-22 are shown in Table-17 below and depicted in Figure-5.

Table-17: Nominal and real market prices of seed cotton (phutti) in the Punjab during 2015-16 to 2021-22

Crop year	Nominal Market Prices	Consumer Price Index (CPI)	Real Market Prices
	Rs per 40 kgs	2015-16= 100	---- Rs per 40 kgs -
1	2	3	4 = (2/3)x100
2015-16	2,626	100.00	2,626
2016-17	3,090	104.81	2,948
2017-18	3,133	109.72	2,855
2018-19	3,776	117.18	3,222
2019-20	3,932	129.76	3,030
2020-21	4,506	140.94	3,197
2021-22	6,106	158.78	3,846

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

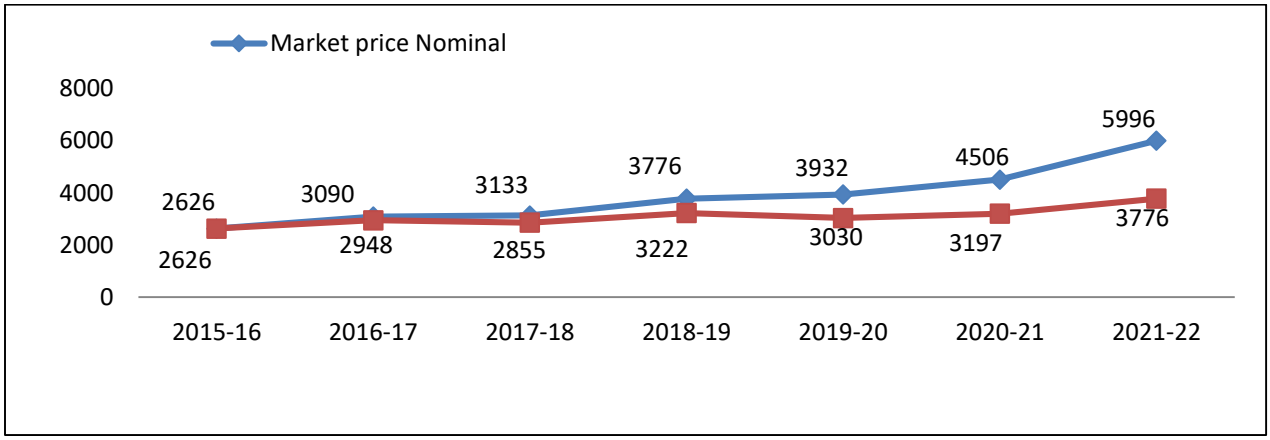
Sources: For CPI, Economic Survey of Pakistan 2021-22.

53. The nominal market price of seed cotton has experienced and overall rise of 133 per cent during the study period. Deflating against the cumulative increase in CPI by 58.78 per cent over the same period, the overall change in real market price is observed 46.4 per cent increases in 2021-22 against the base year.

54. During the period under review, the real market price has experienced wide fluctuations, starting from the lowest level of Rs.2,626 per 40 kgs in 2015-16 in terms of real value to reaching the highest level of Rs 3,846 per 40 kgs in 2021-22.

55. During 2021-22, the nominal market price averaged at Rs. 6,106 per 40 kgs, which is 35 per cent high over the previous year. Consequently, the real value of seed cotton has improved over the previous year. The real price of seed cotton in 2021-22 increased by 20.30 per cent over the last year. This widening gap between nominal and real values of the commodity is mainly due to the increasing trend in CPI.

Fig- 5: Trend in nominal and real market prices of seed cotton (phutti) in Punjab during 2015-16 to 2021-22



11.2 At Market Prices of Seed Cotton in Sindh

56. The nominal and real market prices of seed cotton in Sindh for 2015-16 to 2021-22 are presented in Table-18 and depicted in Figure-6.

57 There seems a discrete growth trend since 2015-16 onward, in the nominal price of seed cotton in Sindh Province. The degree of fluctuation in the nominal price does not reflect as in the Punjab. The nominal market price of seed cotton averaging at Rs. 2,461 per 40 kgs in 2015-16 shot up by 21 per cent to Rs. 2,968 per 40 kgs in 2016-17. The price however, declined in 2017-18 against the previous year. In 2018-19 the price again increased by 23 per cent with a slight decline in 2019-20, the price took another leap by 9 per cent in 2020-21 and continued a rising trend with Rs. 5,803 per 40 kgs in 2021-22.

Table-18: Nominal and real market prices of seed cotton (phutti) in Sindh: 2015-16 to 2021-22

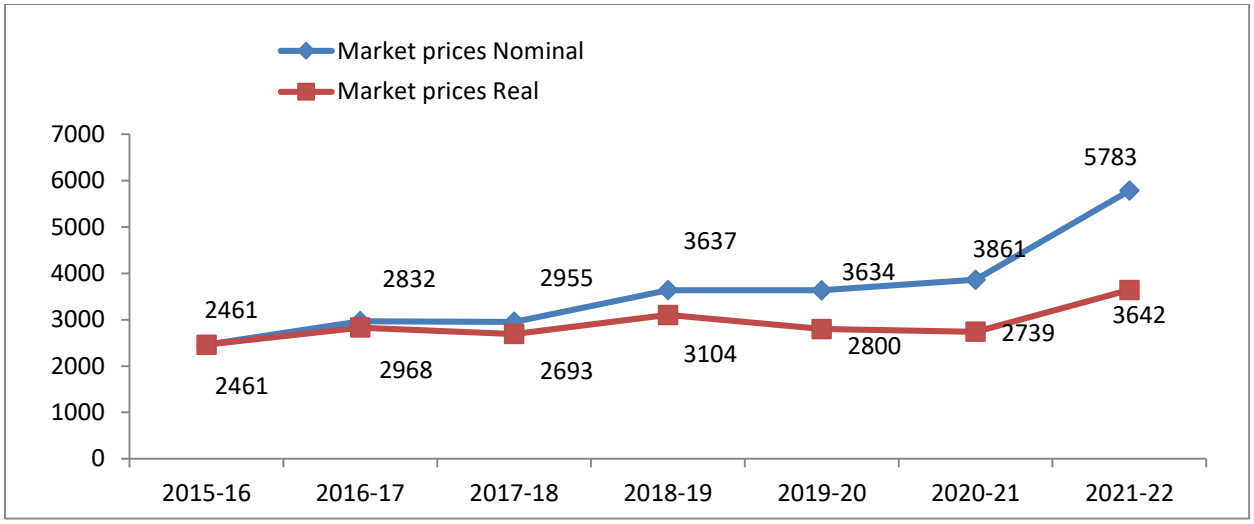
Crop year	Nominal Market Prices	Consumer Price Index (CPI)	Real Market Prices
	Rs per 40 kgs	2015-16= 100	--- Rs per 40 kgs ----
1	2	3	4= (2/3)x100
2015-16	2,461	100.00	2,461
2016-17	2,968	104.81	2,832
2017-18	2,955	109.72	2,693
2018-19	3,637	117.18	3,104
2019-20	3,634	129.76	2,800
2020-21	3,861	140.94	2,739
2021-22	5,803	158.78	3,655

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, Economic Survey of Pakistan, 2021-22.

58. The real market price has experienced same fluctuations, touching the highest value of Rs. 3,104 per 40 kgs in 2018-19 and the lowest level of Rs. 2,461 per 40 kgs in 2015-16, the base line value. In 2020-21, the price, however, evidenced (-2.17 %) decrease than the previous year. The real price increased by 33.44% in 2021-22 as compared to the last year and by 48.5% overall increase against the base year.

Fig-6: Trend in nominal and real market prices of seed cotton (phutti) in Sindh during 2015-16 to 2021-22



59. Due to high inflationary trend throughout the period under review in large part of the analysis, the real prices look not much favorable 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 should be encouraged in such a way that the farmers could receive spirit returns to keep themselves in the business.

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

60. According to International Cotton Advisory Committee (ICAC), June 1st , 2022 issue, the global production of cotton during 2021-22 is estimated at 25.89 million tons which is 6.19 per cent lower last year production of 24.38 million tons. The world production during 2022-23, is forecast to increase significantly by 0.93 per cent to the level of 26.13 million tons. Accounting for the opening stocks of 20.61 million tons, the total supply in 2021-22 worked out at 46.50 at the same level of previous year.

61. The world consumption of cotton during 2021-22 was estimated at 26.16 million tons is 1.95 per cent higher than the last year level. For 2022-23, cotton consumption is forecast at 26.09 million tones minutely lower than the previous year's level.

62. The end year stocks during 2021-22 estimated at 20.34 million tons, which is 5.88 percent lower than level of previous year which are forecast to increase to 20.38 million tons in 2022-23. The details are provided in Table-19:-

Table-19: World production, consumption, stocks and trade in cotton: 2020-21 to 2022-23

S.No	Item	2020-21	2021-22 (Estimated)	2022-23 (Projection)
		--- Million tonnes---		
1.	Opening stocks	22.12	20.61	20.34
2.	Production	24.38	25.89	26.13
3.	Total supply (1+2)	46.50	46.50	46.47
4.	Likely consumption	25.66	26.16	26.09
5.	Trade imbalance and stocks adjustment *	0.77	0.00	0.00
6.	Closing stocks (3-4+5)	21.61	20.34	20.38

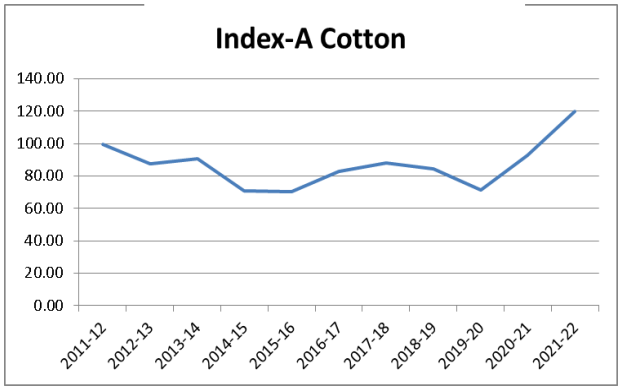
Note: *Trade imbalance, i.e. the difference in world imports and exports may exist due to inclusion of linter and waste, changes in weight during transit, difference in reporting periods and measurement error. Need for stock adjustment may arise due to difference between calculated stocks and actual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

Source: ICAC, June 1st, 2022.

13. INTERNATIONAL PRICES OF INDEX-A COTTONS

63. The international prices of Index- A during 2011-12 to 2021-22 (Aug-Feb) are placed in Annex-VIII.

Fig7: Index-A Cotton



64. The prices of Index-A cottons showed a volatile and widely fluctuated pattern during the period under review. These prices have averaged at US Cent 99.75 per pound in 2011-12 but decreased to US Cent 87.84 per pound in 2012-13, however the price again increase to US Cent 90.53 per pound in the next year. In the next couple of years these prices have shown a decreasing trend and reached at US cent 70.30 per pound during 2015-16, the lowest level of price during period under review. The prices started increasing and reached at US Cent 87.98 per pound during 2017-18. Moreover, looks a declining trend and reached at US Cent 71.33 per pound during 2019-20, but again increased to Cent 86.11 per pound during 2020-21.

65. During the current season 2021-22 (Aug-Feb) the price increased significantly and averaging at Cent 119.83, the highest price during the period under review.

14. EXPORT AND IMPORT PARITY PRICES

66. 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.

67. The export and import parity prices of seed cotton have been analyzed on the basis of their actual and quoted prices. Detailed calculations in this regard are given at Annex-IX to XII and summarized in Table-20.

Table-20: 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 2020-21 (Aug-Mar)	107.66	6,548
	- During 2019-20 to 2020-21	62.38	4,079
	ii) Future's contract prices of New York No.2 cotton (average of Oct, Dec 2022 and March 2023)	122.80	6,828
2.	**Import parity prices based on average:**		
	i) Actual CIF (Karachi) prices of imported cotton:	Rs/40 kgs	
	- During 2021-22 (Aug-Mar)	15,349	6,389
	- During 2018-19 to 2020-21	10,699	4,762
	ii) Index-A Cottons	US cents/lb	
	- During 2021-22 (Aug-Feb)	122.32	7,670
	- During 2018-19 to 2020-21	80.60	5,401

Sources: Annex-IX to XII.

15. ECONOMIC EFFICIENCY OF SEED COTTON PRODUCTION IN PAKISTAN

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

69. 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

70. 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.

71. In the following paragraphs results of analysis (NPC, EPC and DRC estimates) are described to explain effect of input/output pricing policies during 2021-22 for assessing efficiency of different resources used in production of the 2021-22 cotton crop. Estimation procedures are described in detail along with the respective Annex XIII and XIV.

15.2 Nominal Protection Coefficient (NPC)

72. 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.

73. 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 (though with small margin). From these estimates, it may be deduced that on the whole cotton growers in Pakistan have some degree of price protection. During the period 2017-18 in Punjab and 2017-18 and 2020-22 in Sindh they remained taxed as NPC was less than one. The 2020-21 domestic prices exceeded the corresponding export parity prices; thus NPC value for this year exceeded one. It reflects price incentive for increasing cotton production in Pakistan.

74. The 2021-22 crop, NPC values for both cotton producing provinces (Punjab, Sindh) decreased against 2020-21. It reflects that during 2021-22, price of cotton in the domestic market increased due to high prices of the international market.

15.3 Effective Protection Coefficient (EPC)

75. 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-21. .EPC values during the period 2017-18 to 2021-22 show asymmetrical behavior. During earlier years of analysis, EPC remained considerably below one while in 2018- 20, the estimate exceeded for Punjab and Sindh. For 2021-22, it dropped for Punjab and

Sindh province. This analysis reveals that input/ output prices of seed cotton are not stable that may suddenly affect cotton growers' profits and development of the crop in the long run.

15.4 Domestic Resource Cost Coefficient (DRC)

76. 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.

77. DRC estimates for cotton production under export scenario are produced in Table-21. 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 during the period of 2017-18 to 2021-22. Data on private and social profitability in background of the above estimates are produced in Annex-XIII and XIV.

78. 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-21: Economic efficiency parameters based on export parity prices

Province/ Year	NPC	EPC	DRC	Cost of DR to earn /save	Exchange rate Rs./US $
Punjab					
2017-18	0.94	0.82	0.82	90.4	109.8
2018-19	1.06	1.01	0.65	87.6	134.4
2019-20	1.19	1.19	0.89	138.7	156.3
2020-21	1.11	1.08	0.82	136.9	167.5
2021-22	1.01	0.96	0.55	96.1	175.0
Sindh					
2017-18	0.88	0.73	0.80	87.6	109.8
2018-19	1.06	1.02	0.61	82.3	134.4
2019-20	1.10	1.05	0.84	130.7	156.3
2020-21	0.95	0.85	0.78	129.8	167.5
2021-22	0.98	0.91	0.53	92.1	175.0

15.5 Under Import Scenario

79. Under import scenario, the values of both NPC and EPCs are below one throughout the analysis period (Table-22). 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-22: 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					
2017-18	0.65	0.42	0.76	83.49	109.8
2018-19	0.88	0.78	0.65	87.30	134.4
2019-20	0.91	0.81	0.60	94.52	156.3
2020-21	0.97	0.89	0.68	113.25	167.5
2021-22	0.95	0.88	0.50	88.02	175.0
Sindh					
2017-18	0.83	0.67	0.74	80.9	109.8
2018-19	0.88	0.79	0.48	64.2	134.4
2019-20	0.84	0.72	0.57	89.6	156.3
2020-21	0.83	0.70	0.64	107.8	167.5
2021-22	0.91	0.84	0.48	84.6	175.0

16. COTTON YIELD AMONG COMPETING COUNTRIES

80. Globally, the cotton crop occupied an area of 31.48 million hectares during 2020 with a total production of 82 million tonnes. The world top 27 cotton producing countries contribute 96.66 per cent of total area and 98.33 per cent of total production.

81. India rank**s** on the top with 12.86 million hectares, followed by USA and China with 3.52 and 3.25 million hectares. Pakistan occupies 4th position with 2.08 million hectares in this regard, 27 top producing countries is narrated in the following Table-23:

Table-23: **Cotton area in major seed cotton producing countries of the world:2020 crop**

S.No.	Country	Area (Mln Hectares)	Share in world (%)
1	India	12.86	40.87
2	United States of America	3.52	11.19
3	China, mainland	3.25	10.32
4	**Pakistan**	**2.08**	**6.60**
5	Brazil	1.63	5.19
6	Uzbekistan	1.06	3.36
7	Burkina Faso	0.65	2.06
8	Benin	0.62	1.97
9	Turkmenistan	0.54	1.70
10	United Republic of Tanzania	0.50	1.59
11	C?te d'Ivoire	0.44	1.40
12	Argentina	0.41	1.31
13	Nigeria	0.37	1.19
14	Turkey	0.36	1.14
15	Cameroon	0.25	0.79
16	Chad	0.22	0.70
17	Sudan	0.20	0.64
18	Tajikistan	0.20	0.63
19	Myanmar	0.18	0.57
20	Mali	0.16	0.52
21	Togo	0.16	0.50
22	Mexico	0.14	0.46
23	Bolivia (Plurinational State of)	0.14	0.45
24	Mozambique	0.14	0.43
25	Kazakhstan	0.13	0.40
26	Zimbabwe	0.12	0.37
27	Azerbaijan	0.10	0.32
	Total of 27 top Producing Countries Area	**30.43**	**96.66**
	Total of 96 World Producing Countries Area	**31.48**	100.00

Source: FAO Production Year Book 2020

82. In terms of cotton production, China is on the top with 29.5 million tonnes due to highest 35.98 percent share in world production and India with 17.73 million tones, followed by USA, Brazil with 9.74, 7.07 million tonnes. However, Pakistan retains 5th position in cotton production with 3.45 million tonnes, in the world.

83. India has the largest area under cotton in the world representing almost 40.87 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-24.

Table-24: Cotton production in major seed cotton producing countries of the world: 2020 crop

S.No.	Country	Production (Mln tonnes)	Share in world (%)
1	China, mainland	29.50	35.98
2	India	17.73	21.62
3	United States of America	9.74	11.87
4	Brazil	7.07	8.62
5	**Pakistan**	**3.45**	**4.21**
6	Uzbekistan	3.06	3.74
7	Turkey	1.77	2.16
8	Argentina	1.05	1.28
9	Burkina Faso	0.78	0.95
10	Benin	0.73	0.89
11	Mexico	0.67	0.82
12	Turkmenistan	0.64	0.78
13	C?te d'Ivoire	0.49	0.60
14	Cameroon	0.45	0.54
15	Tajikistan	0.40	0.49
16	Australia	0.37	0.45
17	Azerbaijan	0.34	0.41
18	Kazakhstan	0.33	0.40
19	Sudan	0.32	0.39
20	Myanmar	0.31	0.38
21	United Republic of Tanzania	0.30	0.37
22	Nigeria	0.28	0.34
23	Egypt	0.22	0.26
24	Ethiopia	0.19	0.23
25	Mali	0.15	0.18
26	Chad	0.15	0.18
27	Iran (Islamic Republic of)	0.15	0.18
	Total of 27 top Producing Countries Prod.	**80.63**	**98.33**
	Total of 96 World Producing Countries Prod.	**82.00**	100.00

Source: FAO Production Year Book 2020

84. Pakistan ranks 5th in terms of production of cotton but stands at far below 33rd position in terms of yield during 2020. It implies that there is a lot of potential to enhance cotton productivity per space/hectare in Pakistan. It is an alarming situation and deserves special attention by all concerned stake holders. The cotton yield in Pakistan is at 1662 kgs per hectare, in India at 1378 kgs. Hence, the Yield of cotton in Pakistan is much below to the world average at 2605 kgs per hectare as narrated in Table-25.

Table-25: Yield per hectare of major seed cotton producing countries in the world: 2020 crop

S.No.	Country	Yield (Kgs/ha)	S.No.	Country	Yield (Kgs/ha)
1	China, mainland	9077	22	Ethiopia	2350
2	Australia	5335	23	Morocco	2075
3	Turkey	4937	24	Tajikistan	2025
4	Mexico	4686	25	D.People's Repub. of Korea	1993
5	Brazil	4329	26	Israel	1922
6	Bangladesh	3398	27	Angola	1867
7	Azerbaijan	3360	28	Ghana	1867
8	Kyrgyzstan	3344	29	El Salvador	1849
9	Egypt	3308	30	Honduras	1799
10	Lao People's D. Republic	3175	31	Cameroon	1783
11	Uzbekistan	2897	32	Myanmar	1716
12	Guatemala	2788	**33**	**Pakistan**	**1662**
13	United States of America	2765	34	Thailand	1596
14	South Africa	2746	35	Botswana	1589
15	Peru	2731	36	Sudan	1586
16	Syrian Arab Republic	2651	37	India	**1378**
17	Kazakhstan	2593	38	Uganda	1359
18	Iran (Islamic Republic of)	2591	39	Cambodia	1319
19	Argentina	2529	40	Ecuador	1309
20	Paraguay	2461	41	Afghanistan	1305
21	Nicaragua	2427		**World Average**	**2605**

Source: FAO Production Year Book 2020

17. COTTON VARIETIES AND YIELD POTENTIAL IN PAKISTAN

85. 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 0.6 percent share in GDP and contributes 3.1 percent in agriculture value addition. Around two-thirds of the country's export earnings are from the cotton made-ups and textiles.

86. Pakistan is world's 5th largest cotton producer however, placed at 33rd position in the world in terms of yield. During 2020-21, cotton production is estimated at around 8.328 million bales which higher by 17.9 per cent over the last year production of 7.064 million bales. The Punjab and Sindh are the major cotton growing provinces. This increase is mainly due to favorable weather, water availability and low pest attack.

87. Various cotton varieties sown in Pakistan in various ecological zones along with yield potential are presented in the Table-26. Above hundred varieties are grown in the country. The table shows the data of 15 varieties from the year 2013 to 2018.

Table-26: Cotton Varieties and Yield Potential in Pakistan

Sr. No.	Name of Variety	Year of Release	Yield Potential (Maunds/Acre)
1	FH-152	2018	35 to 40
2	RH-662	2018	35 to 40
3	RH-668	2018	35 to 40
4	SLH-8	2018	35 to 40
5	FH-326	2017	35 to 40
6	FH-Lalazar	2016	35 to 40
7	MNH-988	2016	35 to 40
8	VH-305	2016	35 to 40
9	BH-184	2016	35 to 40
10	RH-647	2016	35 to 40
11	VH-327	2016	35 to 40
12	FH-118	2013	35 to 40
13	FH-142	2013	35 to 40
14	BH-178	2013	35 to 40
15	VH-259	2013	35 to 40

Source: Pakistan Central Cotton Research Institute, Multan

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Officers

1.	Mr. Hussain Ali Turi	Chief **(Coordinator)**
2.	Mr. Muhammad Amin	Chief
3.	Syed Riaz Ali Shah	Assistant Chief
4.	Mr. Salman Mahmood	Assistant Chief (Dy. Coord)
5.	Ms. Shagufta Tasleem	Assistant Chief
6.	Dr. Farrah Yasmin	Assistant Chief

Staff

7.	Mr. Sher Ahmed Khan	Assistant Private Secretary (Composed the Report)
8.	Mr. Shamir Ahmed	Assistant Private Secretary
9.	Mr . Muhammad Naeem	Machine Operator

ANNEX-I

PROVINCE-WISE AREA (HECTARES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN : 2011-12 TO 2021-22

YEAR	PUNJAB	SINDH	KPK	BALOCHISTAN	PAKISTAN
AREA	---------- 000 hectares ----------				
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
2019-20	1879.7	598.7	0.21	38.0	2516.6
2020-21	1546.3	474.8	0.11	57.7	2078.9
2021-22	1279.2	593.9	0.17	63.7	1937.0
YIELD	---------- Kgs per hectare ----------				
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
2019-20	571	780	526	442	619
2020-21	555	667	510	465	578
2021-22	687	859	510	433	731
PRODUCTION	---------- 000 bales ----------				
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
2019-20	6306.4	2745.6	0.65	98.7	9151.4
2020-21	5044.0	1861.8	0.33	157.8	7063.9
2021-22	5168.0	2998.0	0.51	162.0	8328.5

Sources:
1- For 2011-12 to 2019-20 : Policy Analysis Report for Seed Cotton: 2019-20 Crop
2- For 2020-21: Final estimates provided by respective Provincial Agriculture Departments
3- For 2021-22: Second estimates of Punjab, Sindh, KPK and Balochistan provided by respective Provincial Agriculture Departments

ANNEX-II

PROVINCE-WISE AREA (ACRES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN : 2011-12 TO 2021-22

Year	Punjab	Sindh	Khyber Pakhtunkawa	Balochistan	Pakistan
AREA	---------- (000) acres ----------				
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
2019-20	4644.9	1479.4	0.52	93.9	6218.8
2020-21	3821.1	1173.3	0.27	142.6	5137.2
2021-22	3161.0	1467.6	0.42	157.4	4786.3
YIELD	---------- Kgs per acres----------				
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
2019-20	231	316	213	179	250
2020-21	225	270	206	188	234
2021-22	338	410	244	213	361
PRODUCTION	---------- (000) bales ----------				
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
2019-20	6306.4	2745.6	0.65	98.7	9151.4
2020-21	5044.0	1861.8	0.33	157.8	7063.9
2021-22	5168.0	2998.0	0.51	162.0	8328.0

Sources:
1- For 2011-12 to 2019-20 : Policy Analysis Report for Seed Cotton: 2019-20 Crop
2- For 2020-21 : Final estimates provided by respective Provincial Agriculture Departments
3- For 2021-22 : Second estimates of Punjab and Balochistan and Final estimates for Sindh and KP provided by respective Provincial Agriculture Departments

ANNEX-III

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SEED COTTON
AVERAGE OF 2019-20 TO 2021-22

Area: 000 ha
Production: 000 bales
Yield: Kgs/ha

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield
	PUNJAB				
1	Bahawalnagar	224.62	944.40	11.54	715
2	Bahawalpur	238.72	912.56	11.15	650
3	R.Y.Khan	188.19	691.64	8.45	625
4	Lodhran	131.74	463.66	5.67	598
5	Rajanpur	119.45	388.26	4.75	553
6	Khanewal	123.82	385.45	4.71	529
7	Multan	110.90	365.08	4.46	560
8	Vehari	86.03	283.47	3.46	560
9	Muzaffargarh	118.31	275.87	3.37	396
10	D.G.Khan	73.74	222.93	2.72	514
11	Sahiwal	32.46	141.69	1.73	742
12	Layyah	33.09	117.90	1.44	606
13	Mianwali	25.71	104.98	1.28	694
14	T.T.Singh	12.23	44.07	0.54	612
15	Faisalabad	9.89	35.35	0.43	607
16	Pakpattan	8.69	32.99	0.40	646
17	Jhang	9.67	29.32	0.36	516
18	Okara	7.10	28.72	0.35	688
19	Bhakkar	8.22	25.07	0.31	519
20	Kasur	2.63	7.13	0.09	461
21	Sargodha	2.44	4.55	0.06	316
22	M.B.Din	0.51	0.48	0.01	162
23	Chiniot	0.13	0.31	0.00	416
	Sub Total Punjab	**1568.39**	**5506.12**	**67.30**	**597**
	SINDH				
1	Sanghar	92.62	578.66	7.07	1062
2	Ghotki	103.06	429.93	5.26	709
3	Khairpur	90.40	305.77	3.74	575
4	Nawabshah	66.52	253.37	3.10	647
5	Sukkur	31.57	189.75	2.32	1022
6	Matiari	40.78	175.07	2.14	730
7	N.Feroze	30.08	171.12	2.09	967
8	Mirpurkhas	27.68	110.84	1.35	681
9	Jamshoro	13.89	72.50	0.89	887
10	Dadu	11.84	68.29	0.83	980
11	Tando Allaahyar	11.64	54.23	0.66	792
12	Badin	10.76	38.06	0.47	601
13	Umerkot	12.43	30.87	0.38	422
14	Hyderabad	5.60	30.08	0.37	913
15	Thatta	3.46	11.93	0.15	586
16	Tando Muhammad Khan	1.81	7.79	0.10	731
17	Larkana	0.63	3.11	0.04	834
18	Tharparkar	0.51	1.84	0.02	619
19	Karachi	0.41	1.49	0.02	619
20	Shikarpur	0.13	0.44	0.01	575
	Sub Total Sindh	**555.8**	**2535.12**	**30.99**	**776**
	Sub Total of Khyber Pukhtunkhwa	**0.2**	**0.50**	**0.01**	**517**
	Sub Total of Balochistan	**53.1**	**139.50**	**1.71**	**447**
	Total of Pakistan	**2177.53**	**8181.24**	**100.00**	**639**
	Notes:	1. Data have been arranged in decending order of production.			
		2. Percentage shares are calculated on the basis of country total.			
	Sources:	Respected Agriculture Provincial Departments			

ANNEX-IV

PROFITABILITY OF FERTILIZER USE ON SEED COTTON AT THE MARKET PRICE: 2021-22

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 2240.9 per nutrient kg (i.e. Rs 191.30,353.87 and Rs.344 per nutrient kg of N,P and K at the recommended NPK ratio of 2:1:1(a)		2,240.9	2,240.9	2,240.9	2,240.9
3	Indirect cost due to the application of additional fertilizer as detailed below(b)		692.93	798.16	907.50	875.64
	3.1	Transportation and application charges of 20 kgs of fertilizer @ Rs 125 per bag of fertilizer	50	50	50	50
	3.2	Picking charges for additional produce @ Rs 538 per 40 kgs	403.5	504.3	605.2	564.9
	3.3	Marketing charges for additional produce @ Rs 45 per 40 kgs	37.75	42.18	50.62	59.06
	3.4	Mark up on direct cost of fertilizer (item2+3.1) for 8 months @ 13.5 % per annum	201.68	201.68	201.68	201.68
4	Total additional cost (item 2+3)		2,933.83	3,039.06	3,148.40	3,116.54
5	Value of additional produce @ Rs 5889.5 per 40 kgs(c)		4,417.1	5,521.4	6,626.5	7,730.8
6	Benefit cost ratio (item 5 divided by item 4)		**1.50**	**1.81**	**2.10**	**2.48**

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 2021-22 crop taken respectively as Rs 2200, 9000 and 8600 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 2021-22 crop.

c) Mark up on direct cost of fertilizer has taken from averages of Punjab and Sindh divided by 2 is 13.5%.

ANNEX-V

AVERAGE FARMER'S COST OF PRODUCTION ESTIMATE FOR SEED COTTON IN PUNJAB 2021-22 VS 2022-23 CROPS

S. No	Operations / Inputs	Unit	Average No. of oprs/units/ acre	2021-22 crop		2022-23 crop	
				Cost per unit	Cost per acre	Cost per unit	Cost per acre
1	2		3	4	5 =3*4	6	7 =3*6
1	**Land preparation:**				……..Rs……..		
	1.1 Rotavator/disc plough	Operation	1.000	1,600.0	1,600.0	2,000.0	2,000.0
	1.2 Ploughing	Operation	3.000	850.0	2,550.0	1,200.0	3,600.0
	1.3 Planking	Operation	0.330	400.0	192.0	600.0	198.0
	1.4 Ploughing + planking	Operation	0.330	850.0	850.0	1,200.0	396.0
	1.5 Tractor levelling	Operation	0.500	850.0	654.5	1,200.0	600.0
	1.6 Laser levelling	Operation	0.330	1,350.0	1,350.0	1,400.0	462.0
2	**Seed and sowing operations:**						
	2.1 Seed used	kg	10.000	400.0	4,000.0	400.0	4,000.0
	2.2 Ploughing + planking	Operation	1.000	850.0	850.0	1,200.0	1,200.0
	2.2.1 Ridging including soil removal from ends of ridges	Operation	0.680	950.0	646.0	950.0	646.0
	2.2.2 Drilling	Operation	0.040	850.0	34.0	1,200.0	48.0
	2.2.3 Manual labour for sowing	Contract			1,100.0		1,200.0
3	**Irrigation:**						
	3.1 Canal	Nos.	7.000		95.7		95.7
	3.2 Private tubewell (Rs./irrigation)	Nos.	4.000	950.0	3,800.0	975.0	3,900.0
	3.3 Labour for irrigation and water course cleaning	M. days	3.460	550.0	1,903.0	600.0	2,076.0
4	**Interculture:**						
	4.1 With tractor	hr/ acre	1.400	850.0	1,190.0	1,200.0	1,680.0
	4.2 Manual weeding/ thinning	contract	1.200	2,000.0	2,400.0	2,000.0	2,400.0
5	**Plant protection** (weedicides+pesticides) includ appl cost	Nos.	6.000	1,800.0	10,800.0	2,000.0	12,000.0
6	Farm Yard Manure including transport and appl cost	No/M.day	0.560	3,200.0	1,792.0	3,500.0	1,960.0
7	**Fertilizers:**						
	7.1 DAP	bags	1.000	4,000.0	4,000.0	9,000.0	9,000.0
	7.2 Urea	bags	2.000	1,800.0	3,600.0	2,150.0	4,300.0
	7.3 NP	bags	0.250	2,680.0	1,179.2	5,600.0	1,400.0
	7.4 SOP	bags	0.160	4,200.0	672.0	8,600.0	1,376.0
	7.5 CAN	bags	0.240	1,525.0	366.0	1,650.0	396.0
	7.6 Fertilizer transport and application		3.650	125.0	485.0	130.0	474.5
8	**Mark up on investment ****	Rs/acre			4,785.4		5,162.50
9	Management charges	Rs/acre			1,581.3		1600.0
10	**Land rent**	Rs/acre		35,000.0	23,333.3	40,000.0	26,666.7
11	Average weighted land tax @ Rs 132/acre/annum	Rs/acre		132.0	88.0	132.0	88.0
12	Land revenue including local rate, chaukidara etc	Rs/acre			5.0		5.0
13	Payment to pickers	Rs./40 Kg		430.0	8,600.0	500.0	10,250.0
14	Gross cost of cultivation (Item 1-13)	Rs/acre			84,502.4		99,180.4
15	**Subsidy on inputs/fertilizers**	Rs/acre	0.600		0	1500.0	900.0
16	Value of by-products/cotton sticks	Rs/acre	1.000		0	1000.0	1,000
17	**Net cost of cultivation (14-15-16)**	Rs/acre			84,502		97,280
18	**Yield**	kg/acre			800.0		820.0
19	Cost of production at farm level:	Rs/40 kgs					
	19.1 Including land rent				4,225.1		4,745.4
	19.2 Excluding land rent				3,058.5		3,444.6
20	Marketing cost	Rs/40 kgs			40.0		45.0
21	**Cost of production at market/ginnery**	Rs/40 kgs					
	21.1 Including land rent				4,265.12		**4,790.38**
	21.2 Excluding land rent				3,098.5		3,489.57

Source:

1. API field survey data, Jan 2022

Notes:

Cost of production for 2022-23 rose primarily due to increase in input prices incl pesticides, diesel and fertilizers.

Recommended IP including profit margin:

**: on item 1 to 7 minus item 3(1) @KIBOR+5 % per annum

ANNEX-VI

AVERAGE FARMERS' COST OF PRODUCTION OF SEED COTTON IN SINDH 2021-22 VS 2022-23 CROPS

S. No	Operations / Inputs/activity	Unit	Average No. of oprs/units/acre	2021-22 crop		2022-23 crop	
				Cost per acre	Cost per acre	Cost per acre	Cost per acre
1	2		3	4	5 =3*4	6	7 =3*6
1	**Land preparation:**			……Rs……			
	1.1 Deep ploughing	Operation	0.500	2,500.0	825.0	2,500.0	1,250.0
	1.2 Ploughing (cultivator plus gobal)	Operation	3.000	1,200.0	3,600.0	1,400.0	4,200.0
	1.3 Ploughing + planking	Operation	0.750	1,200.0	1,200.0	1,400.0	1,050.0
	1.4 Planking	Operation	0.250	600.0	600.0	700.0	175.0
	1.5 Tractor levelling	Operation	0.500	1,200.0	1,200.0	1,400.0	700.0
	1.6 Laser levelling	Operation	0.500	1,300.0	650.0	1,500.0	750.0
2	**Seed and sowing operations:**						
	2.1 Seed used	kg	10.000	400.0	4,000.0	400.0	4,000.0
	2.2 Ploughing plus planking	Operation	0.160	1,200.0	192.0	1,400.0	224.0
	2.3 ridging including soil removal from ends of ridges	Operation	1.000	1,200.0	1,200.0	1,400.0	1,400.0
	2.4 drilling	Operation	0.010	1,200.0	12.0	1,400.0	14.0
	2.5 manual sowing (on contract)	Contract			1,600.0		1,800.0
3	**Irrigation:**						
	3.1 Canal	Nos.			93.1		93.1
	3.2 Private tubewell	Rs./irrigation	2.500	900.0	2,250.0	925.0	2,312.5
	3.3 Mixed	Rs./irrigation	0.413	900.0	371.7	925.0	382.0
	3.3 Lift	Rs./irrigation	1.000	900.0	900.0	925.0	925.0
	3.3 Labour for irrigation and water course cleaning	M. days	3.500	550.0	1,925.0	600.0	2,100.0
4	**Interculture:**						
	4.1 With tractor	hr/ acre	1.000	1,200.0	1,200.0	1,400.0	1,400.0
	4.2 Manual weeding/ thinning on contract	contract	2.000	1,800.0	3,600.0	2,000.0	4,000.0
5	Plant protection incldg application cost (weedicide+pesticic	Nos.	6.000	1,500.0	9,000.0	1,700.0	10,200.0
6	Farm Yard Manure including transport and application co	No/M.day	0.500	3,200.0	1,600.0	3,500.0	1,750.0
7	**Fertilizers:**						
	7.1 DAP	bags	1.000	4,100.0	4,100.0	9,000.0	9,000.0
	7.3 Urea	bags	3.000	1,700.0	6,800.0	2,250.0	6,750.0
	7.4 CAN	bags	0.240	1,600.0	384.0	1,600.0	384.0
	7.5 NP	bags	0.030	2,900.0	87.0	5,500.0	165.0
	7.6 Fertilizer transport and application		4.270	100.0	533.7	120.0	512.4
8	**Mark up on investment ***	Rs/acre			4,464.2		5,174.8
9	Management charges	Rs/acre			2,200.0		2,400.0
10	**Land rent**	Rs/acre		33,000.0	22,000.0	40,000.0	26,666.7
11	Average weighted land tax @ Rs 200/acre/annum	Rs/acre		350.0	233.3	350.0	233.3
12	Land revenue including local rate, chaukidara etc	Rs/acre			5.0		5.0
13	Drainage Cess @ Rs 24/annum	Rs/acre			16.0		16.0
13	Payment to pickers	Rs./40 Kg		550.0	12,100.0	575.0	13,512.5
14	Gross cost of cultivation(Item 1-13)	Rs/acre			88,942.0		103,545.3
15	Subsidy on inputs/fertilizers	Rs/acre	0.600		-	1,500.0	900.0
16	Value of by-products/cotton sticks	Rs/acre	1.000		-	1,000.0	1,000.0
17	**Net cost of cultivation (14-15-16)**	Rs/acre			88,942.0		101,645.3
17	**Yield**	Kg/acre			880.0		940.0
18	Cost of production at farm level:	Rs/40 kgs					
	18.1 Including land rent				4,042.8		4,325.3
	18.2 Excluding land rent				2,942.8		3,190.6
19	Marketing cost	Rs/40 kgs			40.0		45.0
20	**Cost of production at market/ginnery**	Rs/40 kgs					
	20.1 Including land rent				4,082.8		**4,370.3**
	20.2 Excluding land rent				2,982.8		3,235.6

Source: API field survey data Jan 2022

For yield, average of Crop Reporting Service, Sindh and API Field survey.

Notes: Cost of production estimates for 2022-23 increased primarily due to increase in prices of all inputs incl seed, fertilizers, Payment of pickers is adjusted for value to cotton sticks.

*: On items 1 to 7 minus item 3(1) @KIBOR+5 % per annum.

ANNEX-VII

ECONOMICS OF SEED COTTON AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2021-22 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		
										Rupee of purchased inputs	Crop day	Acre inch of water used
		Days	Acre inches	.....Rupees per acre.....					Ratio	.....Rupees.....		
	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	84502	30901	119120	88219	34618	1.41	3.85	496	5415
2	Basmati Paddy	180	58	69585	37708	75425	37717	5840	1.08	2.00	419	1300
3	IRRI Paddy	180	62	72721	34284	79700	45416	6979	1.10	2.32	443	1285
4	Wheat	180	12	59081	20349	67569	47220	8488	1.14	3.32	375	5631
5	Sunflower (spring)	180	22	66080	22423	83625	61202	17545	1.27	3.73	465	3801
6	Seed Cotton + Wheat	420	34	143583	51250	186689	135439	43106	1.30	3.64	444	5491
7	Seed Cotton+Sunflower	420	44	150582	53324	202745	149421	52163	1.35	3.80	483	4608
8	Basmati Paddy+Wheat	360	70	128665	58057	142994	84937	14329	1.11	2.46	397	2043
9	Basmati Paddy+Sunflower	360	80	135665	60131	159050	98919	23385	1.17	2.65	442	1988
10	IRRI Paddy + Wheat	360	74	131802	54633	147269	92636	15467	1.12	2.70	409	1990
11	IRRI Paddy+Sunflower	360	84	138801	56707	163325	106618	24524	1.18	2.88	454	1944
12	Sugarcane	394	48	133068	48550	165960	117410	32892	1.25	3.42	421	3458
	Sindh											
1	Seed Cotton	240	18	88942	30444	127561	97117	38619	1.43	4.19	532	7087
2	IRRI Paddy	180	56	67854	25315	84245	58930	16391	1.24	3.33	468	1504
3	Wheat	180	12	63478	21839	81185	59346	17707	1.28	3.72	451	6765
4	Sunflower (spring)	180	22	56393	17343	58472	41129	2079	1.04	3.37	325	2658
5	Seed Cotton + Wheat	420	30	152420	52283	208746	156463	56326	1.37	3.99	497	6958
6	Seed Cotton+Sunflower	420	40	145335	52283	186033	133749	40698	1.28	3.56	443	4651
7	IRRI Paddy+ Wheat	360	68	131332	47154	165430	118276	34098	1.26	3.51	460	2433
8	IRRI Paddy+Sunflower	360	78	124247	42658	142717	100059	18470	1.15	3.35	396	1830
9	Sugarcane	488	71	127429	43966	162338	118372	34909	1.27	3.69	333	2286

Notes for Annex - VII:

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2021-22 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, 2021-22 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 2021-22 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2021-22 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 wheat is Rs 2,200 per 40 kgs, as maintained by the Punjab and Rs 2,200 by Sindh for 2021-22 crops have 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 2,015 and Rs 1,514 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 1,519 per 40 kgs.

    4.3 The wholesale market prices of seed cotton during the post-harvest months of 2021-22 in the main producer area markets have averaged at Rs 6,106 per 40 kgs in the Punjab and Rs 5,803 Sindh.

    4.4 The price of Sunflower crops has been reported hovering around Rs 4,500/40 kgs and Rs 4,500/40 kgs for Canola during 2021-22.

    4.5 The average market prices of sugarcane as realized by the farmers are taken for the analysis i.e Rs 250 per 40 kgs in the Punjab and 260 per 40 kgs in Sindh. However, the prices notified by the provincial governments were lower i.e Rs 225 and 250 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 19.5 per 40 kgs in Punjab and Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 60 for rice paddy in Punjab and Sindh, and for wheat and oilseeds, Rs 40 in Punjab and Rs 45 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.

ANNEX- VIII

INTERNATIONAL PRICES OF COTTONS: 2011-12 TO 2021-22

Years Aug-Jul		**Index- A Cottons**
		-----US Cent per pound-----
2011-12		99.75
2012-13		87.84
2013-14		90.53
2014-15		70.75
2015-16		70.30
2016-17		82.82
2017-18		87.98
2018-19		84.36
2019-20		71.33
2020-21		86.11
2021-22		**119.83**
	August	101.24
	September	103.47
	October	117.32
	November	126.57
	December	119.83
	January	131.91
	February	138.46

Source: ICAC.

ANNEX- IX

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

S.No	Item	2021-22 (Aug-Mar)	2019-20 to 2020-21
		US Cents per pound	
1.	Actual average export price	107.66	62.38
		OR Rupees (a)	
	Actual average export price per 40 Kgs	17,611	10,204
2.	Marketing expenses (Transportation, port handling forwarding, wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	1,020	1,020
3.	Ex- gin price of lint per 40 Kgs (item 1- item 2)	16,591	9,184
4.	Value of 80 kgs of cotton seed (b)	3,652	3,652
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)	19,643	12,236
7.	Seed cotton price per 40 kgs (item 6 / 3)	6,548	4,079

Notes:

a) One US $ = 185.50 Pak rupees.
b) Average price of cotton seed for August 2021 to January 2022 Multan and Hyderabad markets was Rs 1,826 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 2022 AND MARCH 2023)

S.No	Item	Price calculations
		US Cents per pound
1.	Future's contract price (as reported by KCA April 27, 2022)	122.80
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	112.8
		OR Rupees (a)
	Parity price per 40 kgs	18,452
5.	Marketing expenses (Transportation, port handling forwarding, wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	1,020
6.	Ex- gin price of cotton lint per 40 kgs (item 4 - item 5)	17,432
7.	Value of 80 kgs of cotton seed (b)	3,652
8.	Ginning charges for 120 kgs of seed cotton	600
9.	Value of 120 kgs of seed cotton (c) (items 6 + 7 - item 8)	20,484
10.	Seed cotton price per 40 kgs (item 9 / 3)	6,828

Notes:

a) One US $ = 185.50 Pak rupees.

b) Average price of cotton seed for August 2021 to January 2022 Multan and Hyderabad markets was Rs 1826 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	2021-22 (Aug-Mar)	2018-19 to 2020-21
		Rupees per 40 kgs	
1.	Actual average CIF (Karachi) price	15,349	10,699
2.	Handling charges at port and transport cost from port to textile mill at Karachi @ 5 % of CIF price	767	535
3.	Ex- gin price of cotton lint (Item 1+ item 2)	16,116	11,234
4.	Value of 80 kgs of cotton seed (a)	3,652	3,652
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)	19,168	14,286
7.	Seed cotton price (item 6/ 3)	6,389	4,762

Note:

a) Average price of cotton seed for August 2021 to January 2022 Multan and Hyderabad markets was Rs 1826 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.

ANNEX- XII

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

S. No	Item	2021-22 (Aug-Feb)	2018-19 to 2020-21
		US cent per pound	
1.	Index-A cottons assumed as CIF (Karachi) price	122.32	80.60
2.	Insurance, agents commission, and port handling charges @ 5% CIF price	6.12	4.03
3.	Landed cost at Karachi	128.44	84.63
		OR Rupees (a)	
	Landed cost at Karachi per 40 kgs	21,010	13,844
4.	Handling charges at port and transport cost from port to textile mills at Karachi @ 5 % of CIF price	1,050	692
5.	Ex- gin price of cotton lint (item 3 + item 4)	19.,959	13,152
6.	Value of 80 kgs of cotton seed (b)	3,652	3,652
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)	23,011	16,204
9.	Seed cotton price per 40 kgs (item 8/ 3)	7,670	5,401

Notes:

a) One US $ = 185.50 Pak rupees.
b) Average price of cotton seed for August 2021 to January 2022 Multan and Hyderabad markets was Rs 1826 per 40kgs

Sources:

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

ANNEX-XIII

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
PUNJAB		**Rupees per acre**		
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
2019-20				
Private Prices	86504	29049	43947	13508
Social Prices	72886	24597	42865	5424
Transfers	13618	4452	1082	8084
2020-21				
Private Prices	90120	30705	46091	13324
Social Prices	81120	26133	44940	10047
Transfers	9000	4572	1150	3278
2021-22				
Private Prices	119920	35386	49116	35418
Social Prices	118400	30343	48354	39704
Transfers	1520	5044	762	-4286
SINDH				
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
2019-20				
Private Prices	90850	32055	47193	11602
Social Prices	82825	26926	46754	9145
Transfers	8025	5129	439	2457
2020-21				
Private Prices	84942	32828	48382	3732
Social Prices	89232	27575	47791	13865
Transfers	-4290	5252	591	-10134
2021-22				
Private Prices	127226	35718	53224	38284
Social Prices	130240	30003	52737	47500
Transfers	-3014	5715	487	-9216

Source: Cost of Production: 2017-18 to 2021-22

ANNEX-XIV

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
PUNJAB		**Rupees per acre**		
2017-18				
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
2019-20				
Private Prices	86504	29049	43947	13508
Social Prices	95480	24597	42865	28018
Transfers	-8976	4452	1082	-14510
2020-21				
Private Prices	90120	30705	46091	13324
Social Prices	92600	26133	44940	21527
Transfers	-2480	4572	1150	-8202
2021-22				
Private Prices	119920	35386	49116	35418
Social Prices	126480	30343	48354	47784
Transfers	-6560	5044	762	-12366
SINDH	-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
2019-20				
Private Prices	90850	32055	47193	11602
Social Prices	108500	26926	46754	34820
Transfers	-17650	5129	439	-23218
2020-21				
Private Prices	84942	32828	48382	3732
Social Prices	101860	27575	47791	26493
Transfers	-16918	5252	591	-22762
2021-22				
Private Prices	127226	35718	53224	38284
Social Prices	139128	30003	52737	56388
Transfers	-11902	5715	487	-18104

Source: Cost of Production: 2017-18 to 2021-22

Annex- XV-A

COTTON VARITIES DEVELOPED BY THE PCCC (1985 TO 2020) AND THEIR FIBR CHARACTERISTICS

Sr. No.	Variety	Year of Release	Lint % age	Staple length (mm)	Micronaire (ug inch-1)	Strength (tppsi/gtex^{-1})
1	SLH-41	1985	36.0	26.4	4.4	958
2	CIM-70	1986	31.5	29.0	4.2	92.5
3	CIM-109	1990	3531	27.2	4.4	92.0
4	CIM-240	1992	36.5	27.5	4.7	93.7
5	CRIS-9	1992	34.5	26.5	-	97.0
6	BH-36	1992	38.7	28.0	4.3	100.3
7	CIM-1100	1996	38.0	29.0	3.9	94.0
8	CIM-448	1996	38.0	28.5	4.5	93.8
9	CIM-443	1998	36.7	27.6	4.9	96.0
10	CIM-446	1998	36.2	27.0	4.7	97.4
11	CIM-482	2000	39.2	28.5	4.5	98.0
12	BH-118	2000	38.7	27.6	4.6	96.2
13	Marvi CRIS-5A	2001	35.5	26.8	-	97.5
14	CIM-473	2002	39.7	29.6	4.3	95.2
15	CIM-499	2003	40.2	29.6	4.4	97.3
16	CIM-707	2004	38.1	32.2	4.2	97.5
17	CIM-506	2004	38.5	28.7	4.5	98.9
18	CIM-496	2005	41.1	29.7	4.6	93.5
19	CRIS-134	2004	36.5	27.5	-	97.5
20	CRIS-467	2004	37.0	27.5	4.6	97.2
21	CIM-534	2006	40.1	29.0	4.5	97.2
22	CRIS-121	2006	36.8	27.5	4.9	98.5
23	CIM-554	2009	41.5	28.5	4.7	96.8
24	CRIS-342	2010	38.5	28.4	4.3	95.5
25	CIM-573	2012	39.3	31.6	4.6	90.2
26	Bt CIM-598	2012	41.8	29.0	4.3	94.8
27	BH-167	2012	41.1	29.1	4.7	92.7
28	SLH-317	2012	38.0	29.8	4.4	96.7
29	Bt CIM-595	2013	39.5	29.0	4.7	97.5
30	Bt CIM-599	2013	41.6	28.9	4.6	95.0
31	Bt CIM-602	2013	40.3	29.1	4.2	94.8
32	CIM-608	2013	41.1	28.5	4.6	93.9
33	CRIS-129	2014	38.5	28.5	-	98.5
34	Cyto-124	2016	42.6	30.3	4.4	92.4
35	CIM-620	2016	40.2	28.9	4.6	93.0
36	SLH-8*	2016	39.0	29.0	4.6	-
37	Bt.Cyto-178	2016	40.8	29.0	4.3	105.2
38	Bt CIM-600	2017	40.3	29.0	4.7	94.8
39	Bt Cyto-177	2017	40.0	29.0	4.3	99.9
40	Bt.CIM-179	2017	40.2	28.2	4.2	107.6
41	CIM-598	2017	40.0	29.5	4.6	96.0
42	BT CRIS-508	2017	40.5	28.7	4.7	99.4
43	CRIS-510	2017	39.0	28.2	4.0	92.8
44	CRIS-533	2017	40.5	28.8	4.0	97.8
45	CIM-610	2018	40.2	28.8	4.3	101.9
46	BT.CIM-632	2018	41.6	28.8	4.3	100.4
47	CRIS-585	2020	39.6	28.6	-	31.2
48	CRIS-543	2020	40.5	28.3	-	30.1

Source: Pakistan Central Cotton Committee (PCCC), Multan

Cotton Varieties Developed by Cotton Research Institute, Punjab

Sr. No.	Varieties	Year of Release	Sowing Time	Yield Potential (Maunds/Acre)	Recommended Areas	Salient Features			
						G.O.T (%)	SL (mm)	Mike (µg/inch)	Strength (tppsi)
1	FH-152	2018	1st April-31st May	35 to 40	All Areas of Punjab	40.3	28.9	4.2	115.5
2	RH-662	2018	1st April-31st May	35 to 40	DG Khan & Bahawalpur Divisions	39.9	29.1	4.3	105.3
3	RH-668	2018	1st April-31st May	35 to 40	DG Khan & Bahawalpur Divisions	39.4	28.8	4.5	103.2
4	SLH-8	2018	1st April-31st May	35 to 40	All Areas of Punjab	41.0	30.1	4.3	96.3
5	FH-326	2017	1st April-31st May	35 to 40	Faisalabad, DG Khan & Bahawalpur Divisions	38.8	29.2	4.3	95.3
6	FH-Lalazar	2016	1st April-31st May	35 to 40	All Areas of Punjab	42.0	28.9	4.8	98.6
7	MNH-988	2016	1st April-31st May	35 to 40	All Areas of Punjab	42.0	28.5	4.8	96.1
8	VH-305	2016	1st April-31st May	35 to 40	All Areas of Punjab	39.8	28.1	4.8	96.0
9	BH-184	2016	1st April-31st May	35 to 40	All Areas of Punjab	40.0	28.7	4.9	95.5
10	RH-647	2016	1st April-31st May	35 to 40	All Areas of Punjab	40.2	28.3	4.2	99.2
11	VH-327	2016	1st April-31st May	35 to 40	DG Khan & Bahawalpur Divisions	37.7	30.2	3.9	101.0
12	FH-118	2013	15th April-31st May	35 to 40	All Areas of Punjab	39.2	28.0	4.2	100.8
13	FH-142	2013	15th April-31st May	35 to 40	All Areas of Punjab	40.0	29.0	4.7	99.6
14	BH-178	2013	15th April-31st May	35 to 40	All Areas of Punjab	41.5	29.5	4.9	98.6
15	VH-259	2013	15th April-31st May	35 to 40	All Areas of Punjab	39.5	27.5	4.9	93.0
16	FH-114	2012	15th April-31st May	35 to 40	All Areas of Punjab	39.6	28.1	4.9	95.5
17	MNH-886	2012	15th April-31st May	35 to 40	All Areas of Punjab	41.0	28.2	4.9	99.5
18	FH-942	2012	15th April-31st May	35 to 40	All Areas of Punjab	38.0	29.6	4.2	95.1
19	B H-167	2012	15th April-31st May	35 to 40	All Areas of Punjab	41.2	29.1	4.8	92.7
20	SLH-317	2012	15th April-31st May	35 to 40	All Areas of Punjab	38.0	29.8	4.4	96.7
21	FH-113	2010	15th April-31st May	35 to 40	All Areas of Punjab	40.0	28.0	4.7	98.0
22	CRSM-38	2009	15th April-31st May	35 to 40	All Areas of Punjab	39.5	29.0	4.5	95.0

23	MNH-786	2006	15th April-31st May	35 to 40	All Areas of Punjab	39.5	27.5	4.7	101.0
24	BH-160	2004	15th April-31st May	30 to 35	All Areas of Punjab	35.3	29.5	4.6	101.9
25	FH-1000	2003	15th April-31st May	30 to 35	All Areas of Punjab	38.8	27.5	4.9	96.9
26	FH900	2000	15th April-31st May	30 to 35	All Areas of Punjab	37.5	28.5	4.5	94.0
27	FH901	2000	15th April-31st May	30 to 35	All Areas of Punjab	38.2	26.7	5.1	92.0
28	MNH554	2000	15th April-31st May	30 to 35	All Areas of Punjab	43.0	28.5	4.3	98.9
29	MNH552	2000	15th April-31st May	30 to 35	All Areas of Punjab	40.0	27.5	5.2	96.3
30	BH-118	1999	1st May-31st May	30 to 35	All Areas of Punjab	37.5	28.5	4.7	96.9
31	FVH-53	1998	1st May-31st May	35 to 40	All Areas of Punjab	35.8	27.5	4.8	101.2
32	MNH329	1996	1st May-31st May	30 to 35	All Areas of Punjab	41.8	28.5	4.2	96.6
33	FH-634	1996	1st May-31st May	30 to 35	All Areas of Punjab	36.3	28.5	4.1	95.1
34	RH-112	1996	1st May-31st May	30 to 35	All Areas of Punjab	34.3	27.6	4.6	95.1
35	S-14	1995	1st May-31st May	35 to 40	All Areas of Punjab	43.9	29.5	4.2	93.6
36	SLS-1	1995	1st May-31st May	30 to 35	All Areas of Punjab	36.8	27.4	4.6	95.3

Source: Cotton Research Institute, Multan

Annex- XVI

CONVERSION FACTORS

Weights

One pound (16. Oz)	=	0.45359 Kgs	=	0.48609 Seer.
One hundred weight(112 lbs)	=	50.80208 Kgs	=	1.361 Maunds.
One ton (2240 lbs)	=	1.01605 M.tons	=	27.22 Maunds.
			=	5.60/5.71 bales
			=	of jute/cotton
One tonne	=	0.984 Tons	=	26.792 Maunds.
Cotton bale(375 Lbs)	=	170.09 Kgs	=	4.5571 Maunds
			=	0.1674 Long ton
1 Bushel per acre	=	67.253 Kgs. per hectare		
1 Bushel	=	0.73 Maund.		
	=	29.17 Seers.		
	=	60.00 Lbs.		

Length

One inch	=	25.3999 Millimeters
One foot (12 inches)	=	0.3048 Meter
One yard (3 feet)	=	0.9144 Meter
One mile (1760 yards)	=	1.60934 Kilometers

Square Measures

One square yard	=	Nine Square Feet	=	0.83613 Square Meter
One acre	=	4840 Square Yards	=	0.40468 Hectares
One square mile	=	640 Acres	=	258.99842 Hectare
One square kilometer			=	0.3861 Square Mile
One Hectare			=	2.4711 Acres
One Cubic Meter			=	2.4711 Acres/ (35.3147 Cubic Feet)

Liquid

One imperial gallon	=	4.5461 liters or 1.2 U.S gallons
One U.S. gallon	=	3.7853 liters.

GENERAL CONVERSIONS

Divide	By Factor	To obtain
Acres	2.4711	Hectares
Long ton	0.9842	M.tons
Cotton bales (375 lbs)	5.973	Long tons
Cotton bales (375 lbs)	5.879	M.tons
Maunds	26.79	M.tons
Price per 40 kgs.	1.0716	Price/maund
Yield kgs per hect.	92.2313	Yield maunds/acre.
Rice	0.666	Paddy
Cotton Lint	0.333	Seed Cotton

N.B. In case of vice-versa multiply with the factor.