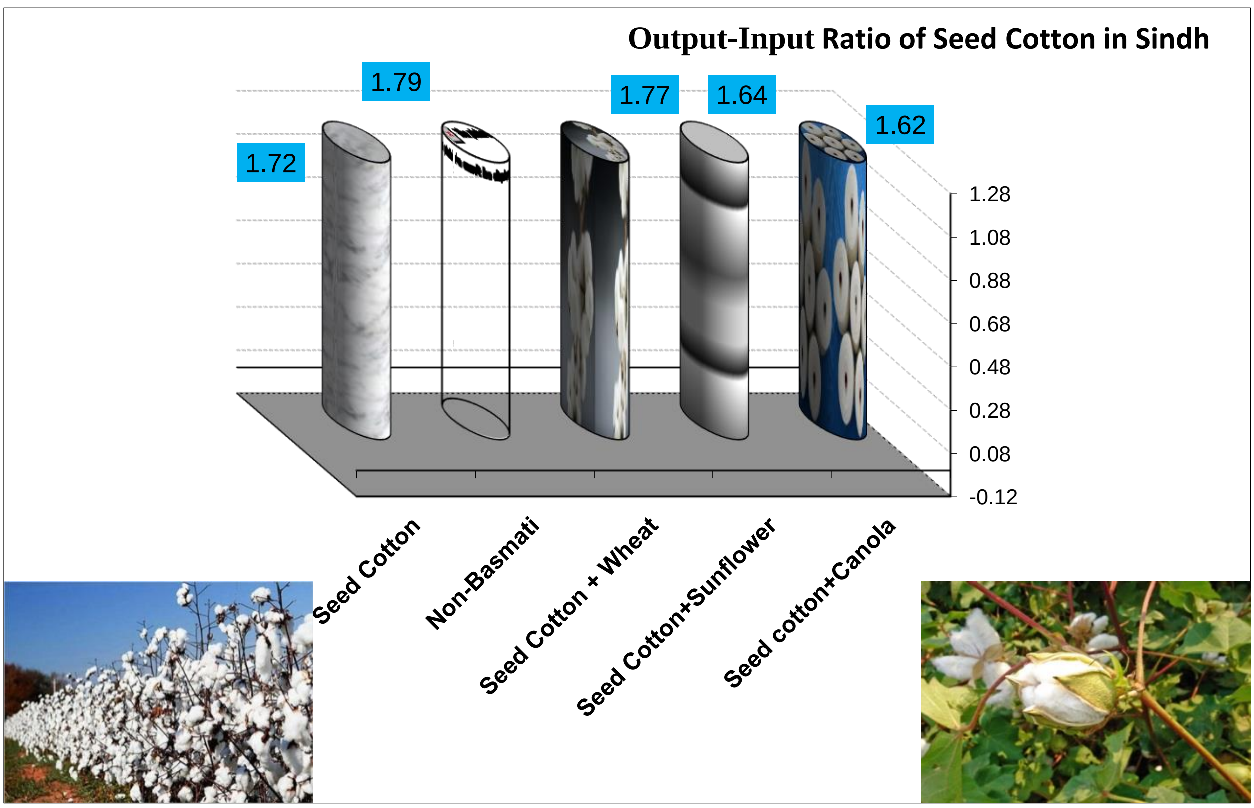
API SERIES NO. 285

COTTON POLICY ANALYSIS FOR 2023-24 CROP



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

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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 2023-24 CROP

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Area and Production

- Punjab and Sindh, sow seed cotton on average shares of 70 and 27 percent respectively of the total area while the collective share of both Khyber Pakhtunkhwa and Balochistan is 3.1 percent.
- Punjab and Sindh on average, contribute 66.1 and 31.8 per cent, respectively of the cotton production while the collective share of both Khyber Pakhtunkhwa and Balochistan is 2.1 percent.
- During the last decade, cotton production at country level decreased @ 7.7 per cent per annum mainly due to 3.9 per cent decline in area while 4 per cent reduction in yield.
- Cotton production in 2022-23 is reported at 4.909 million bales, as compared to last year 8.328 million bales, which is 41.1 per cent decline over 2021-22.
- Cotton production has fallen short of the target by 55.5 per cent during 2022-23 due to 15.4 and 47.4 per cent decline 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 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.

Domestic Prices

- Monthly average market prices of seed cotton for 2022-23 crop during the post harvest months in major producing areas have generally remained higher than the last year.
- The monthly market prices of seed cotton during the post harvest period averaged at Rs. 8,618 per 40 kgs in the Punjab and Rs.7,637 per 40 kgs in Sindh.
- Monthly average prices of seed cotton ranged from Rs.6,858 to Rs. 11,627 per 40 kgs during the post harvest months in major producing areas of the Punjab and Rs. 6,979 to 9,126 per 40 kgs in Sindh.
- Monthly average spot prices of cotton lint at Karachi averaged at Rs 19,829 per 40 kgs in 2022-23 which is 18.12 per cent higher than the last year.

Cost of Production

- In Punjab, the net cost of cotton cultivation for the 2023-24 season is estimated at Rs. 145,055 peracre.
- The cost of production at the market/ginnery level of Punjab would be Rs. 6,962 per 40 kgs, reflecting gain of 45.34 percent over the last year.
- In Sindh, the net cost of cotton cultivation for 2023-24 crop is estimated at Rs. 115,576 peracre.
- The cost of production at market/ginnery level in Sindh would come to Rs. 5,554 per 40 kgs, showing enlargement of 27.26 per cent over the last year.
- Key element of this increase in cost of cultivation is the price hike particularly of the fertilizers, pesticides, seed and labor, etc.

Economics of Cotton and Competing Crops

- Punjab

- Cotton in Punjab paid better returns to the farmer as compared to Basmati and Non-Basmati Paddy in terms of returns to overall investment and other indicators analyzed.
- In case of indirect competition, although sugarcane farmers were reported receiving better prices for their produce, still could not compete with other commodities. Cotton combinations, both with wheat and sunflower performed better giving back to the grower higher returns as compared to the sugarcane crop in terms of all the economic indicators analyzed.

- Sindh

- In Sindh, cotton farming performed less than Non-Basmati paddy in terms of return to overall investment but considerably better in terms of rest of the economic criteria. Non-Basmati paddy could successfully make it giving back to farmer what the farmer had invested Similarly, Cotton growers not only met their costs considerably but also received a rewarding price for their produce.
- In case of indirect competition, cotton combinations with wheat & sunflower have gained much better position against its main competitor – sugarcane in all the economic criteria. In particular, Cotton + wheat have paid significantly higher returns in the entire economic criteria adopted.

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 2022-23.

- 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 0.5 and 1.24 tonnes while that of P fertilizer between 1.10 and 2.40.

Nominal and Real Market Prices

- The nominal market prices of seed cotton in the Punjab indicate an overall increase of 228 per cent while the real market prices have shown an increase of 86 per cent during 2015-16 to 2023-24.
- In Sindh, the nominal market prices of seed cotton have observed overall increase of 210 per cent while the real market prices have increased 76 per cent against the base year level.

World Production and Prices

- World cotton production estimated at 24.96 million tonnes in 2022-23 and projected to decrease at 24.27 million tonnes in 2023-24.
- International prices of Index-A cottons have widely fluctuated from the lowest level of 70.30 cents per pound in the prices increase 2017-18 at 87.98. However, during the current season 2022-23, price showing a decreasing pattern and average at cent (110.72) per pound.

Export Parity Prices

- The export parity price comes to Rs. 6,872 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 2022-23, the import parity price of seed cotton works to Rs 9,851 per 40 kgs and Rs. 7,882 for average of 2019-20 to 2021-22.
- Based on CFR Far Eastern quoted price of Index – A cottons, the import parity price comes to Rs. 9,573 per 40 kgs during 2022-23 and Rs. 8,614 on average of 2019-20 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 2018-19 to 2022-23, they remained implecitly taxed as NPC was less than one in especially Sindh.
- Similarly, the EPCs are show asymmetrical behaviour more or less than one under export/import scenario in the Punjab and Sindh during 2018-19 to 2022-23, it reveals that no economic protection to seed cotton growers in Punjab and Sindh. This implies that under import situation cotton growers are implicity taxed and resources outflow through cotton cultivation.
- 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 2018-19 to 2022-23 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 23rd position in terms of yield.
- In terms of cotton production, China is on the top with 17.366 million tonnes in production followed by India with 17.204 and USA with 11.247 million tonnes.
- China Mainland leads in yield with 5.735 tonnes per hectare followed by Turkiya with 5.205 tonnes per hectare. In the region, India, however, is far behind at 46th 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 2023-24 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 July, October, December 2023)	6,872
2	Import parity prices based on average:	
	i) Actual cif Karachi prices of imported cotton:	
	- During 2023-24 (Aug.-Dec.)	9,851
	- During 2019-20 to 2021-22	7,882
	ii) CFR Far Eastern quoted price of Index-A Cottons	
	- During 2022-23 (Aug.- Nov.)	9,573
	- During 2019-20 to 2021-22	8,614
3	Average wholesale prices of seed cotton in Major Producer Area Markets during the post-harvest period in 2022-23.	
	- Punjab (Aug.– Dec.)	8,618
	- Sindh (Aug.– Dec.)	7,637
4	Cost of production for 2023-24 crop (at market)	
	- Punjab	6,962
	- Sindh	5,554

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 2023-24 crop, in view of domestic 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. However, an over-night of the price of produce paid to growers is essential to ensure that they receive a fair remuneratаion for their investments.
- 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 established 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 2023-24 CROP

1. INTRODUCTION

Cotton is fibrous and cash crop of Pakistan. This crop has the most importance in the National Economy. During 2022-23, it contributed around 0.3 percent to GDP[1] and 1.4 percent to the value added in agriculture. It provides raw material not only to the Textile Industry but also to the oil production too. Cotton and Cotton made commodities have 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 while standing at 23rd position in terms of productivity[2]. Cotton is named as "Kapas" and Seed Cotton is called "Phutti" in local Pakistani languages.

2. In view of the dynamic nature and multifaceted role of cotton in the economy through exports and providing livelihood to millions of farmers, traders and workmen, cotton, has been receiving attention of the Government. However, the resource allocation for research and development reflects that there is lacking of resolve by the key decision makers and the industry.

3. The Government has been analysing the Intervention Price for Cotton[3], mainly to ensure a reasonable production level for the domestic textile industry and safeguard the interest of the cotton growers. In formulating the price policy recommendations, the major factors considered include growth trends in area and production, domestic and global supply and demand situation; international and domestic prices; export and import parity prices; cost of production, economics of competing crops, economic efficiency of resource use, economics of fertilizer use, etc. In preparing this Report for Seed Cotton 2023-24 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 January 2023, 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 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 in Ministry of National Food Security & Research on 26th January, 2023 at Islamabad. The senior officers of Ministry of National Food Security & Research, Pakistan Bureau of Statistics,

[1] Pakistan Economic Survey 2022-23.
[2] Food & Agriculture Organization, 2021
[3] Base grade 3 with staple length 1-1/16″

attached Departments of M/o NFS&R, representatives of cotton growers/growers' associations, Research Scientists, Experts, and Provincial Extension and Research Departments attended the meeting in person and on zoom.

- 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.

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 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 cotton 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.

8. Pakistan produced 8.328 million bales in the year 2021-22, while for 2022-23, a considerable quantity of shortage in production is predicted[4], mainly due to the climate change impact, flood damages, lower yields, etc. SUPARCO, however, estimates at 6.775 million bales for the season 2022-23. The Floods 2022 affected the crop badly and the production, as of 1st March 2023, is reduced to 4.909 million bales. While the demand for cotton is around 12.5 to 13 million bales, the gap is being filled through imports of huge quantities. In view of the importance of cotton, there is an urgent need to minimize occurrence of such widening gaps and fluctuations through efficient measures to stabilize its production overtime.

9. The Federal Government has also re-initiated, after couple of years announcing of intervention price for seed cotton since 2021-22. The Minimum Intervention Price was announced at Rs 5,000/40 kg for Seed Cotton 2021-22 crop, which was enhanced to Rs 5,700/40 kg for 2022-23 crop. For 2023-24 crop Minimum Intervention Price is announced by the Prime Minister of Pakistan at Rs.8,500/40 kg.

10. The purpose of this initiative is to revive the cotton, which is shrinking in area, mainly for increasing cost of production, non-availability of quality seed and plant protection insecticides and declining margins for the farmer. Favorable cotton prices and better management of the crop have helped the farmer, besides better/ conducive weather conditions helped in the improvement of yield, particularly in 2021-22.

2. SOWING AND PICKING TIMES OF COTTON

11. 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 of June in the Punjab, 15th March to 15th June in Sindh, the whole month of May in the Khyber Pakhtunkhwa and Balochistan. Province-wise details of the recommended sowing times for cotton growing districts are given in Table-1.

Table-1: Recommended Sowing Times of American Cotton

Province/District	Time of Sowing
Punjab	
Faisalabad, Sargodha, Jhang, Toba Tek -Singh Sahiwal, Pak Pattan, Okara Bahawalpur, R.Y.Khan	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

[4] Minutes of 18th Meeting of FCA for Kharif held on 31st March, 2022.

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.

12. 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.

13. 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	16th April to 15th May

	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	
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

2.1 Bt Cotton varieties for general cultivation

14. 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 AREAAND PRODUCTION

15. Provincial shares in area and production of cotton based on average of 2020-21 to 2022-23 are provided in Table-3. During this period cotton production averaged at 6.768 million bales from 2.053 million hectares (5.073 million acres).

Table-3: Provincial Shares in Area and Production of Cotton: Average of 2020-21 to 2022-23

Country/ Province	Area		Production	
	000 hectares	Per cent	000 bales	Per cent
Pakistan	**2053.2**	**100.0**	**6767.5**	**100.0**
Punjab	1436.9	70.0	4474.0	66.1
Sindh	552.8	26.9	2148.8	31.8
KPK& Baluchistan	63.5	3.1	144.6	2.1

Source**:** Annex-I.

16. Punjab and Sindh account for 70.0 and 26.9 per cent in cotton area and 66.1 and 31.8 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 2.1 per cent from 3. 1 per cent area.

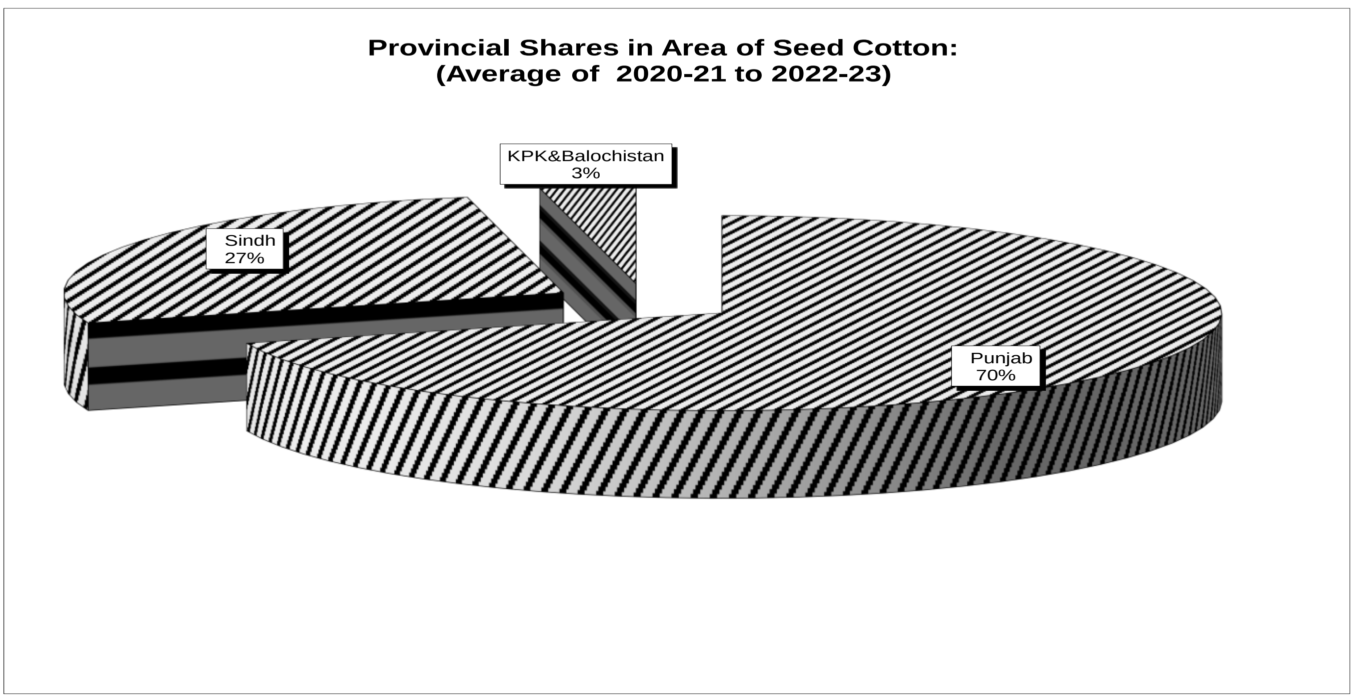


Figure 1: Shares in Area

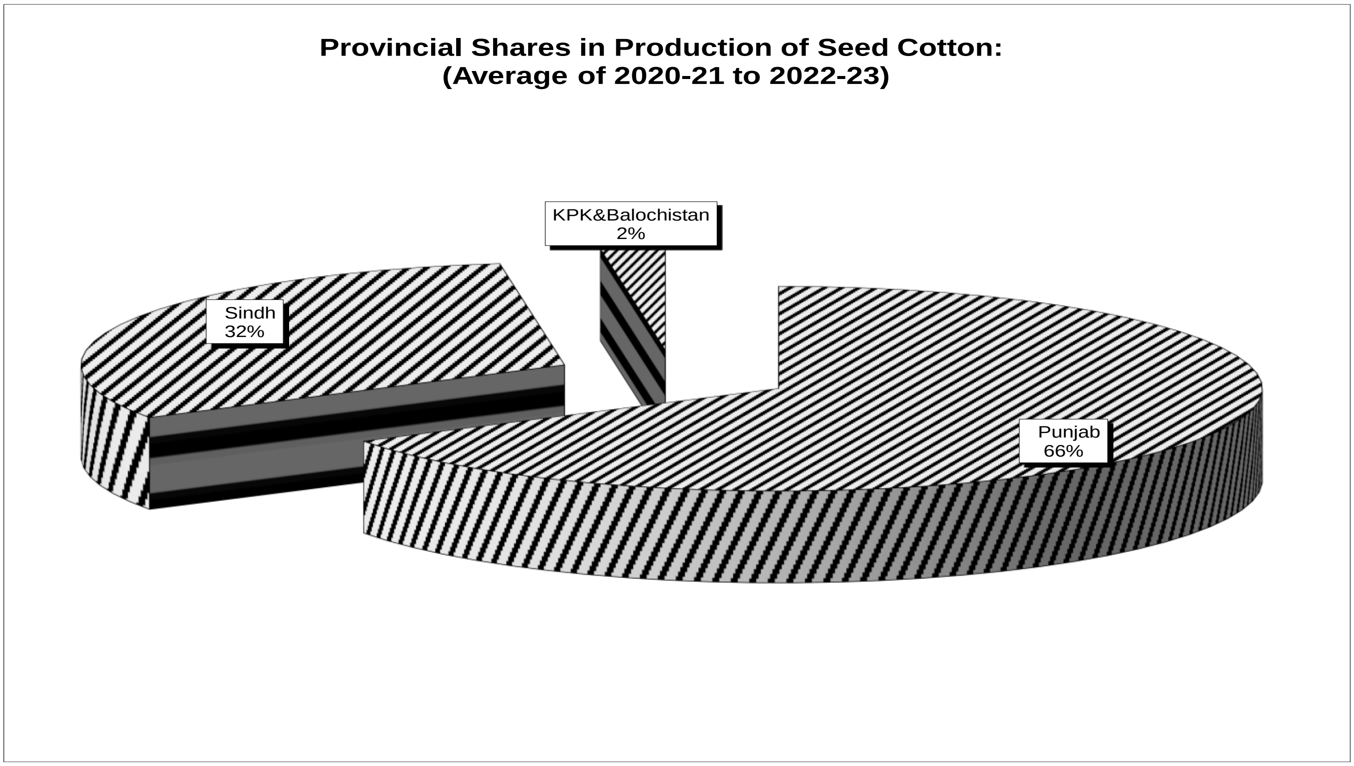


Figure 2: Shares in Production

4. IMPORTANT COTTON GROWING DISTRICTS

17. 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, Muzzafargarh, Vehari, D.G.Khan, and Sahiwal from the Punjab province and Sanghar, Ghotki, Khairpur, Nawabshah, Sukkur, Noushero Feroz, and Matiari from Sindh Province. These 18 districts account for more than 89 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 49 percent of the cotton in the Punjab and district of Sanghar contributing 26 percent in Sindh.

5. CHANGES IN AREA, YIELD AND PRODUCTION

18. During the period of 2012-13 to 2022-23, cotton area ranged between 1.937 and 2.961 million hectares (4.786 and 7.318 million acres) and yield between 390 and 802 kgs per hectare (158 to 324 kgs per acre). Therefore, cotton production fluctuated between 4.910 and 13.960 million bales. Long term and short term changes in area, yield and production are discussed below:

5.1 Long-term Changes: 2012-13 to 2022-23

19. During the period under reference, cotton production at country level decreased @ 7.7 per cent per annum mainly due to 3.9 per cent decline in area, while 4.0 per cent reduction in yield (Table-4).

Table-4: Average Annual Growth Rates of Area, Yield and Production of Cotton: 2012-13 to 2022-23

Country/ Province	Area	Yield	Production
	------------------ Per cent ------------------		
Pakistan	**-3.9**	**-4.0**	**-7.7**
Punjab	-5.2	-3.6	-8.6
Sindh	-0.4	-5.9	-6.2

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.

20. In the Punjab, cotton production decreased @ 8.6 per cent annually due to decline of 5.2 and 3.6 per cent in area and yield, respectively. In Sindh, cotton production also decreased @ 6.2 per cent per annum due to 0.4 and 5.9 percent decline in area and yield, respectively.

5.2 Short-term Changes 2021-22 VS 2022-23

21. According to the final estimates provided by the provincial Agricultural Department, cotton production during 2022-23 at country level worked out as 4.910 million bales, as compared to 8.329 million bales produced in 2021-22 (Table-5). Decrease of 41.1 per cent production is solely due to decline of 46.7 per cent in yield as the area expanded by 10.7 percent annually during this period.

Table-5: Area, Yield and Production of Cotton: 2021-22 and 2022-23 Crop

Country/ Province	Area		Changes in 2022-23 over 2021-22	Yield		Changes in 2022-23 over 2021-22	Production		Changes in 2022-23 over 2021-22
	2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
	-- 000 hectares --		Per cent	--Kgs/hectare --		Per cent	-- 000 bales --		Per cent
Pakistan	**1937.0**	**2143.7**	**10.7**	**731.4**	**389.5**	**-46.7**	**8328.9**	**4909.5**	**-41.1**
Punjab	1279.2	1485.2	16.1	687.2	367.6	-46.5	5168.0	3210.0	-37.9
Sindh	593.9	589.8	-0.7	858.7	457.5	-46.7	2998.4	1586.3	-47.1
KPK	0.2	0.2	5.9	510.3	510.3	0.0	0.5	0.5	5.9
Baluchistan	63.7	68.5	7.5	432.6	279.8	-35.3	162.0	112.7	-30.4

Source: Annex-I

22. Cotton production in the Punjab estimated at 3.210 million bales, 37.9 percent less than 5.168 million bales produced in 2021-22. This huge reduction in production is solely due to decrease in yield by 46.5 per cent, as the area expanded by 16.1 percent.

23. In Sindh, cotton production remained 1.586 million bales, 47.1 percent less than 2.998 million bales in 2022-23. Decrease in production is due to decrease by 0.7 and 46.7 per cent in area and yield, respectively.

6. TARGETS VS ACHIEVEMENTS: 2022-23 CROP

24. Federal Committee on Agriculture (FCA) has fixed Seed Cotton production target for 2022-23 crop at 11.034 million bales. As per final estimates of Provincial Agriculture Departments, cotton production is reported at 4.910 million bales 55.5 per cent less than the target due to 15.4 per cent shortage in area and 47.4 percent decline in yield (Table-6).

Table-6: Targets and Estimated Achievements of Area, Yield and Production of Seed Cotton: 2022-23 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 ----		Per cent	Tonnes/ha		Per cent	-- 000 bales --		Per cent
Pakistan	**2533.3**	**2143.7**	**-15.4**	**740.8**	**389.5**	**-47.4**	**11034.0**	**4909.5**	**-55.5**
Punjab	1821.1	1485.2	-18.4	616.4	367.6	-40.4	6600.0	3210.0	-51.4
Sindh	640.0	589.8	-7.8	1063.1	457.5	-57.0	4000.0	1586.3	-60.3
KPK	2.2	0.2	-91.8	309.3	510.3	65.0	4.0	0.5	-86.5
Baluch.	70.0	68.5	-2.1	1044.8	279.8	-73.2	430.0	112.7	-73.8

Sources: 1. For targets: Minutes of 18th meeting of FCA for Kharif held on 31st March, 2022
2. For achievements: Annex-I.

25. Production of cotton fell short of the target by 51.4, 60.3, 86.5 and 73.8 per cent in Punjab, Sindh, KP and Balochistan, respectively. Area of cotton also fell down of the target by 18.4, 7.8, 91.8 and 2.1 percent in Punjab, Sindh, KP and Balochistan, respectively. Thus, yield of Punjab, Sindh and Baluchistan could not be achieved by 40.4, 57.0 and 73.2 percent, respectively.

25.a. This scenario presents a discouraging performance of the crop on all three indicators. The FCA may consider determining the targets based on realistic estimates from the Provinces, keeping in view the farmers; response and price of the commodities.

7. DOMESTIC SUPPLY, DEMAND, STOCKS AND PRICE SITUATION

7.1 Domestic Supply, Demand and Stocks

26. Cotton production in country has been declined significantly due to flash flood during 2022-23. The climate change is also another factor, reducing continuously the cotton production in Pakistan. Resultantly, the production has been declined to 4.91 thousand bales (according to final estimates, in which, Punjab's share is 3210 thousand bales and Sindh produced 1586 thousand bales, while KPK and Balochistan contributed 0.54 and 112.7 thousand bales respectively) during 2022-23 crop. After adding the opening stocks of 0.03 million bales, the total supply projected at 5.03 million bales. On the basis of last four years average (2017-18 to 2021-22) consumption, the mill consumption requirement is projected around 12.50 million bales, a short falls of 5.51 million bales, therefore the gap will be filled through imports from international markets, out of that 1.96 million bales has been imported during August to December, 2022 (Table-7).

Table-7: Domestic Production, Demand and Stocks of Cotton (Lint): 2020-21 to 2022-23 (August-July)

Item	2020-21	2021-22	2022-23
	----------- Million bales	----------	
1. Opening stocks	0.27	0.38	0.03
2. Production	7.06	8.33	4.91
3. Total supply	7.33	8.71	5.03
4. Likely Consumption	12.10	13.03	12.50
5. Imports**	5.15	4.64	1.96
6. Exports**	0.003	0.02	0
7. Closing stocks	0.38	0.30	-5.51

Note: Production data is Second Estimate of Punjab and Sindh which has been increased in the light of previous data of Khyber Pakhtunkhwa and Balochistan.

* One bale = 170 kgs = 375 lbs.

** Import and export are up to December, 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)

27. Monthly average wholesale prices of seed cotton in the main producing area markets of Punjab during the post-harvest period of 2022-23 crop is detailed in Table-8.

Table-8: Monthly average wholesale prices of seed cotton (Phutti) in the main producer area markets of Punjab 2022-23 crop.

Market	Aug	Sept	Oct	Nov	Dec	**Avg**
	------------------------- Rs. per 40 kgs ------------------------					
Bahawalnagar	9,251	11,627	8,623	7,456	8,162	9,024
Haroonabad	8,969	10,160	8,627	7,865	8,352	8,794
Hasilpur	-	10,030	9,470	8,840	-	9,447
Pakpattan	8,604	9,859	8,156	7,069	6,858	8,109
Arifwala	8,390	10,079	8,727	7,552	-	8,687
D.G Khan	-	11,500	9,883	9,270	8,000	9,663
Bahawalpur	-	10,121	8,492	7,600	7,600	8,453
R.Y Khan	-	10,581	8,552	8,191	8,198	8,881
T.T singh	8,498	9,731	8,240	7,561	7,764	8,359
Sahiwal	8,028	9,738	8,752	8,364	-	8,721
Vehari	8,438	9,721	8,318	7,986	7,762	8,445
Mailsi	8,764	9,571	8,815	7,378	7,169	8,340
Burewala	8,644	9,833	8,410	7,630	7,781	8,459
Khanewal	8,480	10,006	8,542	7,872	8,075	8,595
Mian Channu	8,942	9,928	8,287	7,855	7,771	8,556
Lodhran	-	9,699	8,240	7,264	7,248	8,113
Rajanpur	-	10,175	8,544	7,540	7,131	8,348
Layyah	7,983	9,748	8,270	7,338	7,321	8,132
Average	**8,583**	**10,117**	**8,608**	**7,813**	**7,679**	**8,618**

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

28. Monthly average wholesale prices of seed cotton during the post-harvest period in Punjab ranged between Rs 6,858 and Rs 11,627 per 40 kgs in the month of November 2022 in Pakpattan market and Bahawalnagar month of December 2022.

29. Monthly average wholesale prices of seed cotton during the post-harvest period in Sindh are in Table:9.

Table-9: Monthly average wholesale prices of seed cotton (Phutti) in the main producer area markets of Sindh 2022-23 crop.

Market	Aug	Sept	Oct	Nov	Dec	Avg
	-----------------------Rs per 40 kgs --------------------					
Hyderabad	7,174	8,346	7,288	7,048	7,140	7,399
M.P. Khas	7,145	8,256	7,236	6,979	-	7,404
Khair Pur	-	9,122	7,955	7,476	7,593	8,037
Sukhar	-	9,126	8,044	7,584	7,493	8,062
Average	**7,160**	**8,713**	**7,631**	**7,272**	**7,409**	**7,637**

Source: Cotton Review January, 2023, PCCC, Multan

7.2.2 Cotton Lint (Raw Cotton)

30. Monthly average spot prices of raw cotton at Karachi during 2021-22 and 2022-23 are presented in Table-10. The Karachi spot price during 2022-23 (Aug-Jan) averaged at Rs 19,319 per 40 kgs which is 18.12 percent higher than last year.

Table-10: Monthly Average Spot Prices of Raw Cotton at Karachi for 2021-22 and 2022-23 Crops (August-January)

Month	Base Grade -3, staple length 1-1/16", Micronairc Value 3.8 to 4.9 NCL (No Control Limit)	
	2021-22	**2022-23**
	Rupees per 40 kgs	
August	14,547	19,976
September	14,383	21,785
October	15,611	17,727
November	17,799	17966
December	18,219	17745
January	20161	20714
Average	16,787	19,319

Source: Karachi Cotton Association (KCA). Karachi.

8. COST OF PRODUCTION (COP) OF SEED COTTON

31. Cost of production is one of the main factors in formulation of the intervention price Policy 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.

32. Cost of production estimates for seed cotton: 2023-24 crop are derived by using the field data from 2023 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: Resourceful Farmer's Cost of Production of Cotton: 2022-23 and 2023-24 Crops

S. No	Item	Unit	Cost estimate		Change in 2023-24 against 2022-23
	Punjab		2022-23 crop	2023-24 crop	
1	Net cost of cultivation	Rs./acre	97,280	145,055	47,774
2	Yield	40 Kgs/ acre	20.5	21.0	0.5
3	Cost of production at farm level				
	a) with land rent	Rs./40 Kg	4,745	6,907	2,162
	b) without land rent	Rs./40 Kg	3,445	5,241	1,796
4	Marketing cost	Rs./40 Kg	45	55	10.0
5	Cost of production at Market/ ginnery				
	a) with land rent	Rs./40 Kg	4,790	6,962	2,172
	b) without land rent	Rs./40 Kg	3,490	5,296	1,806
1	**Sindh**				
	Net cost of cultivation	Rs./acre	103,545	115,576	12,030
2	Yield	40 Kgs/ acre	23.5	21.0	-3
3	Cost of production at farm level				
	a) with land rent	Rs./40 Kg	4,325	5,504	1,178
	b) without land rent	Rs./40 Kg	3,191	4,170	980
4	Marketing cost	Rs./40 Kg	45	50	5
5	Cost of production at Market/ ginnery				
	a) with land rent	Rs./40 Kg	4,370	5,554	1,183
	b) without land rent	Rs./40 Kg	3,236	4,220	985

Source: Annex-V and VI.

- **Punjab**

33. During 2023-24, net cost of raising one acre of seed cotton (inclusive land rent) in Punjab is likely to be Rs 145,055 (Table-11). Based on an average yield of 21.0 Kgs per acre, cost of production at the farm level works out to Rs 6,907 with land rent per 40 Kgs and Rs 5,241 without land rent per 40 kgs.

34. For determining ginnery level cost of production per 40 kg, marketing expenses @ Rs. 55/40kg are added to the farm level cost of production which gives ginnery level cost of Rs 6,962 with land rent and Rs 5,296 without land rent per 40 kgs. These estimates are higher by Rs 2,172 and 1,806, resultantly over the corresponding COP estimates of 2022-23.

- **Sindh**

35. During 2023-24 crop season, net cost of cultivation of cotton in Sindh including land rent works out to Rs. 115,576 per acre. Based on an average yield of 21.0 Kgs per acre, farm level with land rent cost of production of cotton is estimated at Rs. 5,504 per 40 Kg. By adding marketing expenses @ Rs 50 to the farm level COP, mill gate cost of production would be Rs 5,554 per 40 Kgs – higher by Rs. 1,183/40 Kgs over the last year cost of Rs. 4,370 per 40 Kg.

8.1 Cost of major operations and inputs

36. Shares of different production operations/ inputs for 2022-23 and 2023-24 for Punjab and Sindh provinces are shown in Table-12 are described below:

Table-12: Gross Cost of Cultivation of Seed Cotton: 2022-23 and 2023-24.
(Cost/acre)

S.No	Inputs/ operations	2022-23	Share (Percent)	2023-24 (Estimated)	Share (Percent)
	Punjab				
1	Land preparation	7,256	7	9,550	7
2	Seed and sowing operations	7,094	7	8,550	6
3	Irrigation	6,072	6	7,625	5
4	Interculture	4,080	4	4,800	3
5	Plant Protection	12,000	12	22,400	15
6	Fertilizers including FYM	18,907	19	26,125	18
7	Land rent	26,667	27	35,000	24
8	Picking charges	10,250	10	19,950	14
9	Others	6,856	7	11,055	8
10	Gross cost	**99,180**	**100**	**145,055**	**100**
	Sindh				
1	Land preparation	8,125	8	6,850	6
2	Seed and sowing operations	7,438	7	8,956	8
3	Irrigation	5,813	6	7,925	7
4	Interculture	5,400	5	5,600	5
5	Plant Protection	10,200	10	13,200	11
6	Fertilizers including FYM	18,561	18	22,858	20
7	Land rent	26,667	26	28,000	24
8	Picking charges	13,513	13	12,600	11
9	Others	7,829	8	9,587	8
10	Gross cost	**103,545**	**100**	**115,576**	**100**

Notes:

- Numbers are rounded off to zero decimals due to which calculations may result in slight difference
- Other costs' include mark-up on investment, management charges, picking charges, land revenue, land tax, drainage Cess and cutting of cotton sticks.

- **Punjab**

37. Like 2022-23, land rent would be the major component of the cost of production of seed cotton in Punjab during 2023-24. It adds to the total cost by 24% followed by fertilizers 18%, Plant protection and picking charges 14%, seed and sowing operations, irrigation, land preparation and other costs 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) range between 5 and 8 per cent.

- **Sindh**

38. For Sindh, major components of cost of production for 2023-24 crop are land rent (24%), fertilizers including FYM (20%), Picking charges (11%), Plant protection (11%), Other costs (8%). Other costs (all operations other than the above mentioned) range between 5 and 8 percent.

9. ECONOMICS OF COTTON AND COMPETING CROPS

39. 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.

40. 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.

41. The economics of cotton and competing crops has been analyzed in terms of output-input prices paid and received by the growers during the 2022-23 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: 2022-23 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	1.66	4.22	775	7,399
2. Basmati paddy	1.52	2.79	692	2,148
3. Non-Basmati paddy	1.57	3.19	689	2,000
4. Cotton + Wheat	1.67	4.42	808	8,555
5. Cotton + Sunflower	1.60	4.03	778	6,897
6. Sugarcane	1.24	3.10	540	4,433

Source: Annex- VII.

- Punjab

42. Cotton in Punjab paid significantly better returns to the farmer as compared to Basmati and Non-Basmati 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 Non-basmati paddy.

43. Basmati & Non-Basmati 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 above than 1.

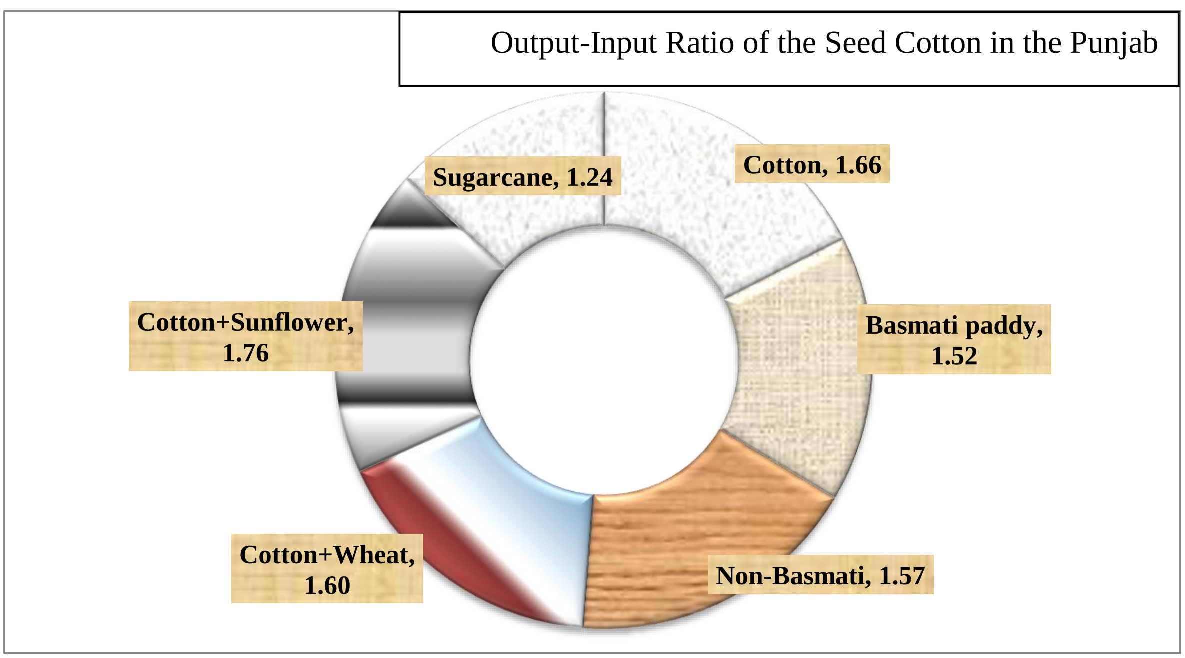


Fig-3: Returns to Overall Investment in the Punjab.

44. 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 competing commodities. Cotton combinations, both with wheat and sunflower performed better and giving back to the grower considerably higher returns as compared to the sugarcane crop in terms of entire economic criteria adjusted in this analysis.

- Sindh

45. In Sindh, cotton farming performed less than Non-Basmati paddy in terms of return to overall investment but considerably better in terms of rest of the economic criteria. However, the noticeable point is that Non-Basmati paddy could successfully make it giving back to farmer what the farmer had invested - cost of production, i.e by 79 percent. This indicates that farmers of the Non-Basmati 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 72 percent.

Table-14: Economics of Cotton and Competing Crops at Prices Realized by the Growers in Sindh: 2022-23 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	1.72	4.94	855	9,974
2. Non-Basmati paddy	1.79	4.44	764	2,454
3. Cotton +Wheat	1.77	4.94	893	10,714
4. Cotton + Sunflower	1.64	4.39	732	7,136
5. Sugarcane	1.14	2.94	393	2,701

Source: Annex-VII.

46. In case of indirect competition, cotton combinations with wheat & sunflower have gained much better position against its main competitor – sugarcane in all the economic criteria. In particular, Cotton + wheat have paid significantly higher returns in the entire economic criteria adopted.

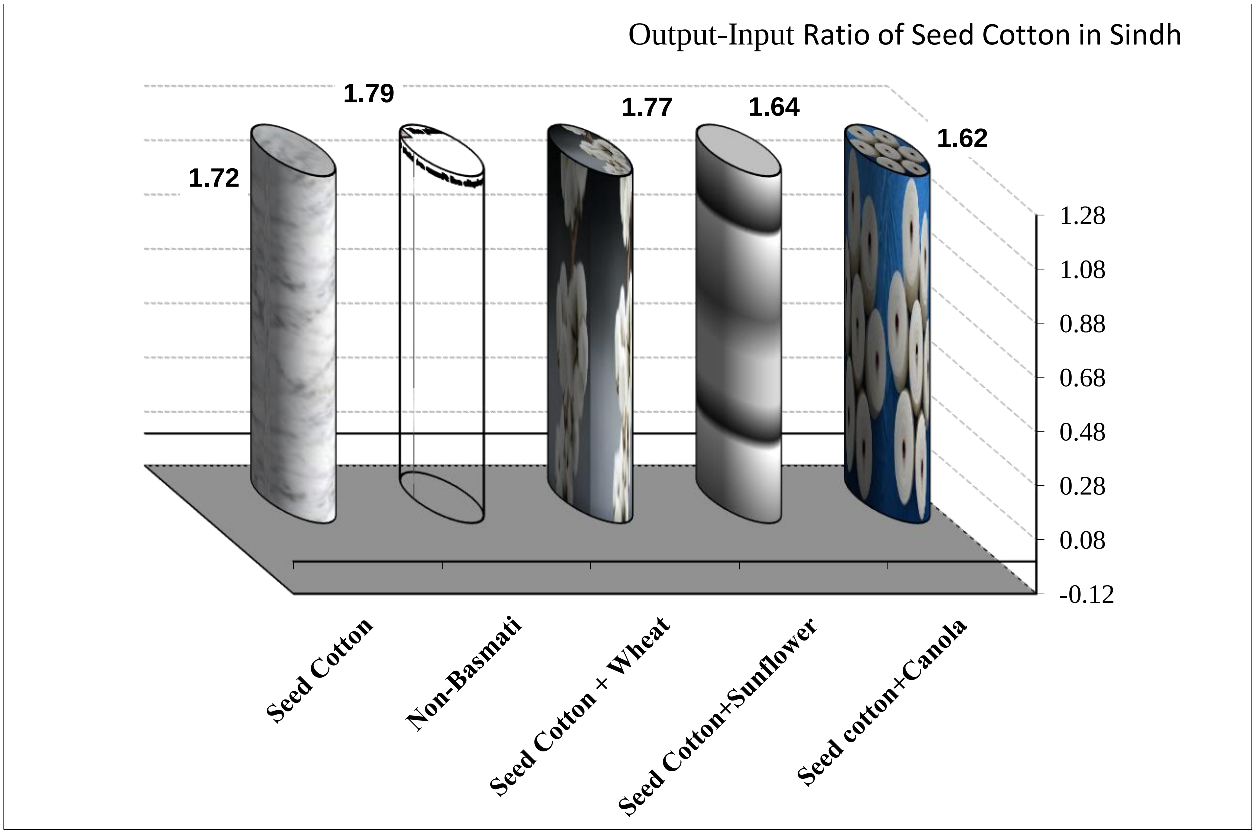


Fig-4: Returns to Overall Investment in Sindh

47. This illustrates 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

48. 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)

49. 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.

50. It may be seen from the Table-16, 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: 2013-14 to 2022-23

Year	Response Ratios (Seed Cotton: Nutrient) of:			
	3.00:1	**3.75:1**	**4.50:1**	**5.25:1**
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
2022-23	2.04	2.43	2.78	3.11

Sources: 1. For 2013-14 to 2022-23: Cotton Policy Analysis Report for 2021-22 crop, API.
2. For 2022-23: Annex-IV.

10.2 Parity Ratio between Prices of Fertilizer and Seed Cotton

51. 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 2013-14 to 2022-23 and presented in Table-16. The quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has ranged between 0.50 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 2022-23 the price of nitrogen are lower than the previous year which, however, had been declining constantly during 2013-14 to 2022-23. But phosphorus price is higher than the last five years but as compared to last year it little bit low. During the current crop season, the ratio of Nitrogen has improved slightly in favor of cotton crop, mainly because of better prices of Cotton received by the growers; However, the ratio of Phosphorus has gravely worsen in favour of Cotton . In order for making the favorable parity ratios, one option may be to subsidize fertilizer prices and ensures their regular and timely supply.

Table-16:**Parity Ratio between the Prices of Fertilizer and Seed Cotton:2013-14 to 2022-23**

Crop Year	Sale Prices of Nitrogen N	Sale Prices of Phosphorous P	Market Prices of Seed Cotton	Quantity of Seed Cotton needed to buy one nutrient tonne of Nitrogen N	Quantity of Seed Cotton needed to buy one nutrient tonne of Phosphorous P
	------------Rupees per tonne------------			------------Tonnes------------	
2013-14	74260	139980	72500	1.02	1.93
2014-15	72870	124830	72488	1.00	1.72
2015-16	80950	129190	64825	1.24	1.99
2016-17	57610	87240	75725	0.76	1.16
2017-18	59782	85303	74012	0.80	1.15
2018-19	68152	112460	92662	0.73	1.21
2019-20	81520	126790	81520	0.86	1.34
2020-21	76080	146316	109562	0.69	1.33
2021-22	95652	353876	147237	0.65	2.40
2022-23	105435	389179	210050	0.50	1.85

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

52. The intervention price of seed cotton needs to be reviewed well before sowing time, mainly with the purpose to regulate the market in case the market prices fall in the open market below a certain level. The Government always encourages the role of private sector in marketing and trade of cotton. As a result, most of transactions in cotton are made in the open market. To ascertain overtime changes in the purchasing power of cotton, the nominal market prices of cotton are being deflated by the Consumer Price Index (CPI). The nominal and real market prices of seed cotton for the Punjab and Sindh for the period 2015-16 to 2022-23 are presented in Table-17 and 18.

11.1 At Market Prices of Seed Cotton in the Punjab

53. The nominal and real market prices of seed cotton for 2015-16 to 2022-23 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: 2015-16 to 2022-23

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	5,996	158.78	3,776
2022-23	8,618	176.71	4,877

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

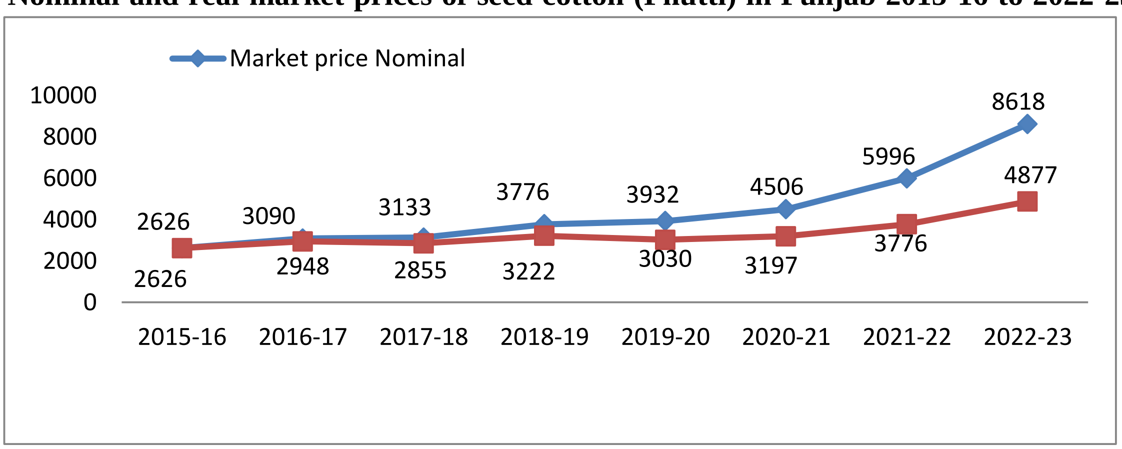
Sources: For CPI, Economic Survey of Pakistan 2022-23.

54. The nominal market price of seed cotton has experienced and overall rise of 228 per cent during the study period. Deflating against the cumulative increase in CPI by 76.71 per cent over the same period, the overall change in real market price is observed 86 per cent increases in 2022-23 against the base year.

55. 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 4,877 per 40 kgs in 2022-23.

56. During 2022-23, the nominal market price averaged at Rs 8,618 per 40 kgs, which is 44 per cent high over the previous year. Consequently, the real value of seed cotton has improved by 29.15 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: Nominal and real market prices of seed cotton (Phutti) in Punjab 2015-16 to 2022-23



11.2 At Market Prices of Seed Cotton in Sindh

57. The nominal and real market prices of seed cotton for 2015-16 to 2022-23 are shown in Table-17 below and depicted in Figure-6.

58. 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. Though 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.The price regained a rising /jump with Rs. 5,783 per 40 kgs in 2021-22 and more jump with 7637/40kg in 2022-23.

Table-18: Nominal and Real Market Prices of Seed Cotton (Phutti) in Sindh: 2015-16 to 2022-23

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	5,783	158.78	3,642
2022-23	7,637	176.71	4,322

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, 2022-23.

59. The real market price has experienced same fluctuations, touching the highest value of Rs 4322 per 40 kgs in 2022-23 and the lowest level of Rs 2461 per 40 kgs in 2015-16, the base line value. In 2020-21, the price, however, evidenced (-2.17 %) decrease than the previous year and the real prices increased 33% in 2021-22 as compared to last year. The nominal market price sharply rising in 2022-23which is 32.05% increased than the previous year and the real market prices also increased powerfully 18.67%as compared to the last year and 88 percent overall increased against the base year .

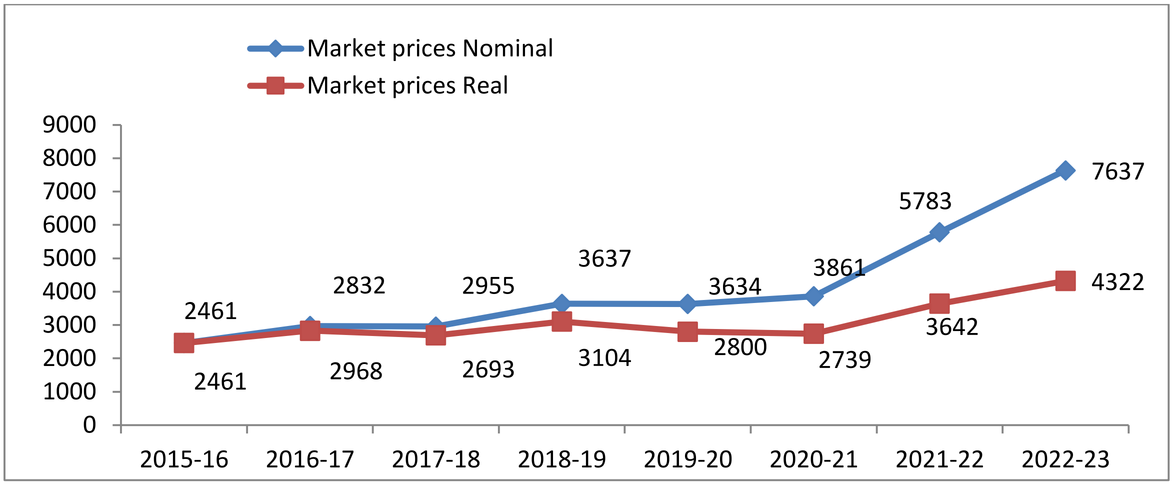


Fig-6: Nominal and real market prices of seed cotton (Phutti) in Sindh 2015-16 to 2022-23

60. 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

61. According to the International Cotton Advisory Committee (ICAC) report, the global production of cotton during 2022-23 is estimated at 24.96 million tons which is 2.37 per cent higher than last year production of 24.38 million tons the world production during 2023-24, is forecast to decrease by 2.76 per cent to the level of 24.27 million tons almost close to production of 2022-23. Accounting for the opening stocks of 20.54 million tons, total supply in 2022-23 worked to 45.50 million tons.

62. The world consumption of cotton during 2022-23 estimated at 24.94 million tons which is 0.51 per cent higher than the last year level. For 2023-24, cotton consumption is forecast at significantly reduce to 23.00 million tons, 10.51 million tons or 2.70 per cent lower than previous year's level of 25.70 million tons.

63. The end-year stocks for 2023-24 are estimated at 19.79 million tons, which are 3.65 per cent lower than the level of previous year, are forecast to increase to 21.06 million tons in 2022- 23 in spite lower production. If the forecast regarding closing stocks comes true in future, the prices of cotton in international market would stable or slightly decrease.

Table-19: World production, consumption, stocks and trade in cotton: 2021-22 to 2023-24

S.No	Item	2021-22	2022-23 (Estimated)	2023-24 (Projection)
		--- Million tonnes---		
1.	Opening stocks	22.12	20.54	19.79
2.	Production	24.06	24.96	24.27
3.	Total supply (1+2)	46.18	45.50	44.06
4.	Likely consumption	25.57	25.70	23.00
5.	Trade imbalance and stocks adjustment *	0.07	(0.01)	0.00
6.	Closing stocks (3-4+5)	20.54	19.79	21.06

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, December 15, 2022.

13. INTERNATIONAL PRICES OF INDEX-A COTTONS

64. The international prices of Index- A during 2012-13 to 2022-23 (Aug-Nov) are placed in Annex-VIII.

65. 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 87.84 pound and increased to US Cent 90.53 per pound in the next year. Next couple of year these price have been shown 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, the prices showed declining trend and reached al US Cent 71.33 per pound, during 2019-20, however in next two year prices started increasing and jumped to US Cent 132.02 per pound during 2021 -22 the highest level during period under review. During the current season 2022-23 (Aug-Nov) price showing a decreasing pattern and averaged at Cent 110.72, the highest period under review.

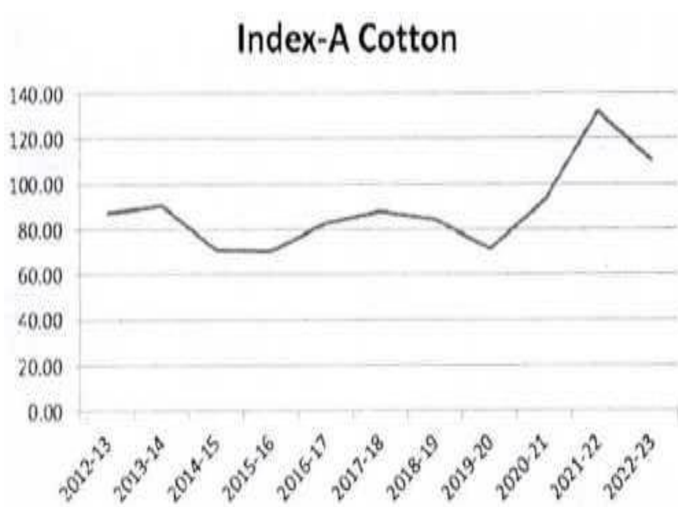


Fig-7: Index-A Cotton

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 XI 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:**		
	Future's contract prices of New York No.2 cotton (average of Jul, Oct and Dec 2023)	85.52	6,872
2.	**Import parity prices based on average:**		
	i) Actual cif (Karachi) prices of imported cotton:	Rs/40 kgs	
	- During 2022-23 (Aug-Dec)	22,128	9,851
	- During 2019-20 to 2021-22	16,500	7,882
	ii) Index-A Cottons	US ccnts/lb	
	- During 2022-23 (Aug-Nov)	110.72	9,573
	- During 2019-20 to 2021-22	96.49	8,614

Sources: Annex-IX to XI.

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 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 2022-23 for assessing efficiency of different resources used in production of the 2022-23 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 for Punjab under export scenario is higher than one and Sindh under export scenario is 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 2020-21 and 2021-22 in Sindh they remained taxed as NPC was less than one. The 2018-20 and 2022-23 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 2022-23 crop, NPC values for both cotton producing provinces (Punjab, Sindh) increased against 2021-22. It reflects that during 2022-23, 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 2018-19 to 2022-23 show asymmetrical behavior. During earlier years of analysis, EPC remained considerably higher than one while in 2021- 22 the estimate diminished for Punjab and while in 2020-21 and 2021-22 for Sindh province. This analysis reveals that input/ output prices of seed cotton are stable that may suddenly affects cotton growers' profits and development of the crop.

15.4 Domestic Resource Cost Coefficient (DRC)

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 2018-19 to 2022-23. Data on private and social profitability in background of the above estimates are produced in Annex-XII and XIII.

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					
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	1.03	0.98	0.55	96.1	175.0
2022-23	1.12	1.10	0.53	121.8	230.0
Sindh					
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	0.92	0.53	92.1	175.0
2022-23	1.30	1.33	0.48	110.8	230.0

15.5 Under Import Scenario

79. Under import scenario 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

A.

Province/ year	NPC	EPC	DRC	Cost of DR to earn /save Forex	Exchange rate Rs./US $
Punjab					
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	0.97	0.90	0.50	88.02	175.0
2022-23	0.74	0.65	0.31	72.04	230.0

B.

Province/ Year	NPC	EPC	DRC	Cost of DR to	Exchange rate
Sindh					
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	0.92	0.84	0.48	84.6	175.0
2022-23	0.86	0.80	0.29	67.47	230.0

16. COTTON YIELD AMONG COMPETING COUNTRIES

80. Globally, the cotton crop occupied an area of 32.526 million hectares during 2021 with a total production of 72.7 million tonnes. The world top 30 cotton producing countries contribute 97.83 per cent of total area and 98.77 per cent of total production.

81. India rank**s** on the top with 13.477 million hectares, followed by USA and China with 4.034 and 3.028 million hectares. Pakistan occupies 4th position with 1.937 million hectares in this regard, 30 top producing countries is narrated in the following Table-23:

Table No- 23: Cotton Area in Major Seed Cotton Producing Countries of the World:2021 Crop

S.No.	Country	Area in (Mln) hectares	per cent share in world area
1	India	13.477	41.43
2	United States of America	4.034	12.40
3	China, mainland	3.028	9.31
4	**Pakistan**	**1.937**	**5.96**
5	Brazil	1.370	4.21
6	Uzbekistan	1.022	3.14
7	Mali	0.720	2.21
8	Benin	0.680	2.09
9	Burkina Faso	0.636	1.96
10	Turkmenistan	0.626	1.92
11	Côte d'Ivoire	0.460	1.41
12	Türkiye	0.432	1.33
13	Argentina	0.406	1.25
14	Nigeria	0.371	1.14
15	Chad	0.320	0.98
16	Australia	0.275	0.85
17	Cameroon	0.230	0.71
18	Sudan	0.197	0.60
19	United Republic of Tanzania	0.183	0.56
20	Tajikistan	0.177	0.54
21	Togo	0.166	0.51
22	Mexico	0.159	0.49
23	Myanmar	0.149	0.46
24	Malawi	0.133	0.41
25	Mozambique	0.130	0.40
26	Kazakhstan	0.110	0.34
27	Zimbabwe	0.101	0.31
28	Azerbaijan	0.101	0.31
29	Uganda	0.099	0.30
30	Egypt	0.090	0.28
	Total of 30 top producing countries	**31.82**	97.83
	Total World 94 Countries Area	**32.526**	100.00

Source: FAO Production Year Book 2022

82. In terms of cotton production, China is on the top with 17.366 million tonnes due to highest 23.904 percent share in world production and India with 17.204 million tonnes, followed by USA, Brazil with 11.247, 5.712 million tonnes. However, Pakistan retains 5th position in cotton production with 4.096 million tonnes, in the world.

83. India has the largest area under cotton in the world representing almost 41.43 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: 2021 crop

S.No.	Country	Production in (Mln) tonnes	Per cent share in world Production
1	China, mainland	17.366	23.904
2	India	17.204	23.680
3	United States of America	11.247	15.480
4	Brazil	5.712	7.863
5	**Pakistan**	**4.096**	**5.638**
6	Uzbekistan	3.373	4.643
7	Türkiye	2.250	3.097
8	Australia	1.229	1.691
9	Turkmenistan	1.096	1.509
10	Argentina	1.040	1.432
11	Mexico	0.813	1.119
12	Benin	0.766	1.055
13	Burkina Faso	0.755	1.039
14	Mali	0.731	1.006
15	Tajikistan	0.531	0.731
16	Côte d'Ivoire	0.490	0.675
17	Cameroon	0.399	0.549
18	Sudan	0.352	0.485
19	Kazakhstan	0.290	0.400
20	Azerbaijan	0.287	0.395
21	Nigeria	0.274	0.377
22	Myanmar	0.241	0.332
23	Zimbabwe	0.192	0.265
24	Egypt	0.190	0.262
25	Chad	0.174	0.239
26	Ethiopia	0.170	0.234
27	Uganda	0.141	0.194
28	United Republic of Tanzania	0.123	0.169
29	Iran (Islamic Republic of)	0.120	0.165
30	Togo	0.108	0.148
	Total of 30 top producing countries	**71.8**	98.77
	Total World 94 Countries Production	**72.7**	100.00

Source: FAO Production Year Book 2022

84. Pakistan ranks 5th in terms of production of cotton but stands at far below 23rd position in terms of yield during 2021. 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 2.115 tonnes per hectare, in India at 1.277 tonnes as narrated in Table-25.

Table-25: Yield Per Hectare of Major Seed Cotton Producing Countries in the World:2021 Crop

S.No.	Country	Yield per Hactare in tonnes	S.No.	Country	Yield per Hactare in tonnes
1	China, mainland	5.735	30	Angola	1.869
2	Türkiye	5.205	31	Ghana	1.867
3	Mexico	5.122	32	Israel	1.848
4	Australia	4.466	33	Sudan	1.789
5	Brazil	4.171	34	Honduras	1.766
6	Nicaragua	3.485	35	Turkmenistan	1.751
7	Kyrgyzstan	3.480	36	Cameroon	1.733
8	Peru	3.423	37	Myanmar	1.624
9	Bangladesh	3.369	38	Thailand	1.604
10	Uzbekistan	3.299	39	South Africa	1.589
11	Lao People's Demo. Rep.	3.240	40	Iraq	1.500
12	Tajikistan	2.999	41	Bolivia (State)	1.494
13	Azerbaijan	2.854	42	Uganda	1.421
14	United States of America	2.788	43	Botswana	1.385
15	Guatemala	2.788	44	Cambodia	1.311
16	Kazakhstan	2.641	45	Ecuador	1.310
17	Argentina	2.560	**46**	**India**	**1.277**
18	Iran (Islamic Republic of)	2.528	47	Afghanistan	1.276
19	Paraguay	2.483	48	Senegal	1.188
20	Colombia	2.373	49	Burkina Faso	1.187
21	Syrian Arab Republic	2.269	50	Venezuela (Republic)	1.129
22	Philippines	2.128	51	Benin	1.127
23	**Pakistan**	**2.115**	52	Albania	1.123
24	Egypt	2.111	53	Guinea-Bissau	1.068
25	Ethiopia	2.048	54	Côte d'Ivoire	1.066
26	Morocco	2.039	55	Madagascar	1.058
27	Democratic People's Republic of Korea	2.004	56	Mali	1.015
28	Zimbabwe	1.908	57	Yemen	1.006
29	El Salvador	1.905	58	Nepal	1.000
	World Average				**2.23**

Source: FAO Production Year Book 2022

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 0.3 percent share in GDP and contributes 1.4 percent in agriculture value addition. Around two-thirds of the country's export earnings are from the cotton made-ups and textiles.

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

ANNEX-I

PROVINCE-WISE AREA (HECTARES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN : 2012-13 TO 2022-23

YEAR	PUNJAB	SINDH	KPK	BALOCHISTAN	PAKISTAN
AREA		------------------------- **000 hectares** -----------------------------------			
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
2022-23	1485.2	589.8	0.18	68.5	2143.7
YIELD		-------------------------- **Kgs per hectare** -----------------------------			
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
2022-23	368	457	510	280	390
PRODUCTION		----------------------------- **000 bales** ------------------------------------			
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	2998.4	0.51	162.0	8328.9
2022-23	3210.0	1586.3	0.54	112.7	4909.5

Sources: 1- For 2011-12 to 2019-20 : Policy Analysis Report for Seed Cotton: 2020-21 Crop
2- For 2021-22: Final estimates provided by respective Provincial Agriculture Departments
3- For 2022-23: Final 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 : 2012-13 TO 2022-23

YEAR	PUNJAB	SINDH	KPK	BALOCHISTAN	PAKISTAN
AREA		------------------------- 000 acres	--------------------------------------		
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	4786.4
2022-23	3670.1	1457.5	0.44	169.3	5297.2
YIELD		-------------------------- Kgs per acre	---------------------------------		
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	278	348	206	175	296
2022-23	149	185	206	113	158
PRODUCTION		----------------------------- 000 bales	------------------------------------		
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	2998.4	0.51	162.0	8328.9
2022-23	3210.0	1586.3	0.54	112.7	4909.5

Sources:
1- For 2011-12 to 2019-20 : Policy Analysis Report for Seed Cotton: 2020-21 Crop
2- For 2021-22: Final estimates provided by respective Provincial Agriculture Departments
3- For 2022-23: Final estimates of Punjab, Sindh, KPK and Balochistan provided by respective Provincial Agriculture Departments

ANNEX-III

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SEED COTTON
AVERAGE OF 2020-21 TO 2022-23

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

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield
	PUNJAB				
1	Bahawalnagar	228.66	881.70	13.03	656
2	Bahawalpur	224.87	763.54	11.28	577
3	R.Y.Khan	178.24	547.63	8.09	522
4	Lodhran	124.84	389.70	5.76	531
5	Rajanpur	109.80	315.34	4.66	488
6	Khanewal	109.06	299.25	4.42	466
7	Multan	97.78	262.91	3.88	457
8	Muzaffargarh	110.93	213.91	3.16	328
9	Vehari	65.81	204.25	3.02	528
10	D.G.Khan	63.93	161.47	2.39	429
11	Sahiwal	22.56	101.74	1.50	767
12	Mianwali	24.82	97.04	1.43	665
13	Layyah	31.96	95.87	1.42	510
14	T.T.Singh	9.40	31.08	0.46	562
15	Faisalabad	7.89	26.92	0.40	580
16	Okara	5.27	21.43	0.32	691
17	Jhang	7.53	21.17	0.31	478
18	Pakpattan	5.64	20.54	0.30	619
19	Bhakkar	4.52	13.79	0.20	519
20	Sargodha	1.88	2.89	0.04	262
21	Kasur	1.12	1.50	0.02	227
22	M.B.Din	0.36	0.35	0.01	162
	Sub Total Punjab	**1436.87**	**4474.01**	**66.11**	**530**
	SINDH				
1	Sanghar	91.29	562.86	8.32	1048
2	Ghotki	109.65	351.90	5.20	546
3	Khairpur	96.51	251.31	3.71	443
4	Nawabshah	74.04	242.26	3.58	556
5	Sukkur	30.29	181.48	2.68	1019
6	N.Feroze	27.51	153.25	2.26	947
7	Matiari	41.67	139.96	2.07	571
8	Dadu	13.05	66.32	0.98	864
9	Jamshoro	14.21	63.06	0.93	755
10	Mirpurkhas	22.96	57.76	0.85	428
11	Hyderabad	5.29	24.37	0.36	783
12	Tando Allaahyar	6.48	18.22	0.27	478
13	Umerkot	7.59	12.14	0.18	272
14	Badin	7.24	9.73	0.14	229
15	Thatta	2.91	7.96	0.12	465
16	Tando Muhammad Khan	1.17	3.17	0.05	461
17	Karachi	0.44	1.27	0.02	497
18	Larkana	0.16	0.86	0.01	922
19	Tharparkar	0.31	0.74	0.01	399
20	Shikarpur	0.10	0.20	0.00	360
	Sub Total Sindh	**552.9**	**2148.82**	**31.75**	**661**
	Sub Total of Khyber Pukhtunkhwa	**0.2**	**0.46**	**0.01**	**510**
	Sub Total of Balochistan	**63.3**	**144.17**	**2.13**	**387**
	Total of Pakistan	**2053.18**	**6767.45**	**100.00**	**561**

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: 2022-23

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 2148.6 per nutrient kg (i.e. Rs 105.43,389.17and Rs.365 per nutrient kg of N,P and K at the recommended NPK ratio of 2:1:1(a)		2148.6	2148.6	2148.6	2148.6
3	Indirect cost due to the application of additional fertilizer as detailed below(b)		929.09	1086.2	1241.3	1396.5
	3.1	Transportation and application charges of 20 kgs of fertilizer @ Rs 150 per bag of fertilizer	60	60	60	60
	3.2	Picking charges for additional produce @ Rs 775 per 40 kgs	581.2	726.5	871.8	1017.1
	3.3	Marketing charges for additional produce @ Rs 52 per 40 kgs	37.37	49.21	59.06	68.90
	3.4	Mark up on direct cost of fertilizer (item2+3.1) for 7 months @ 20 % per annum	250.52	250.52	250.52	250.52
4	Total additional cost (item 2+3)		3077.6	3234.8	3389.9	3545.1
5	Value of additional produce @ Rs 8402 per 40 kgs(c)		6301.5	7877.1	9452.2	11027.1
6	Benefit cost ratio (item 5 divided by item 4)		**2.04**	**2.43**	**2.78**	**3.11**

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 2022-23 crop taken respectively as Rs 2425, 9900 and 9121 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 2022-23 crop.

c) Mark up on direct cost of fertilizer has taken from averages of Punjab and Sindh divided by 2 is 20%.

ANNEX-V

RESOURCEFUL FARMER'S COST OF PRODUCTION OF SEEDCOTTON IN PUNJAB: 2022-23 TO 2023-24 CROPS

S. No	Operations / Inputs	Average No. of oprs/units/ acre	2022-23 crop		2023-24 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	1.000	2,000.00	2,000.00	3,500.00	3,500.00
	1.2 Ploughing	3.000	1,200.00	3,600.00	1,800.00	4,500.00
	1.3 Planking	0.330	600.00	198.00	900.00	450.00
	1.4 Ploughing + planking	0.330	1,200.00	396.00	-	-
	1.5 Tractor levelling (hrs)	0.500	1,200.00	600.00	-	-
	1.6 Laser levelling	0.330	1,400.00	462.00	2,200.00	1,100.00
2	Seed and sowing operations:					
	2.1 Seed used (kgs)	10.000	400.00	4,000.00	450.00	4,500.00
	2.2 Ploughing + planking	1.000	1,200.00	1,200.00	1,800.00	1,800.00
	2.2.1 Ridging including soil removal from ends of ridges	0.680	950.00	646.00	800.00	400.00
	2.2.2 Drilling	0.040	1,200.00	48.00	1,800.00	450.00
	2.2.3 Manual labour for sowing (on contract)			1,200.00		1,400.00
3	Irrigation: * (Nos)					
	3.1 Canal	7.000		95.72		125.00
	3.2 Private tubewell (Rs./irrigation)	4.000	975.00	3,900.00	1,500.00	6,000.00
	3.3 Labour for irrigation and water course cleaning (M. days)	3.460	600.00	2,076.00	1,000.00	1,500.00
4	Interculture:					
	4.1 With tractor (hr/ acre)	1.400	1,200.00	1,680.00	1,800.00	1,800.00
	4.2 Manual weeding/ thinning on contract	1.200	2,000.00	2,400.00	2,000.00	3,000.00
5	Plant protection including application cost (weedicide+pesticides)	6.000	2,000.00	12,000.00	2,800.00	22,400.00
6	Farm Yard Manure including transport and application cost	0.560	3,500.00	1,960.00	4,000.00	2,000.00
7	Fertilizers: (bags)					
	7.1 DAP	1.000	9,000.00	9,000.00	10,000.00	15,000.00
	7.2 SOP	0.160	8,600.00	1,376.00	-	-
	7.3 NPK		-	-	-	-
	7.4 Urea	2.000	2,150.00	4,300.00	3,200.00	6,400.00
	7.5 CAN	0.240	1,650.00	396.00	2,500.00	625.00
	7.6 NP	0.250	5,600.00	1,400.00	6,000.00	1,500.00
	7.7 Fertilizer transport and application	3.650	130.00	474.50	150.00	600.00
	GROSS EXPENDITURE		**55,312.50**		**78,925.00**	
8	Mark up on investment on item 1 to 7 excluding item 3(1) @average rate of banks per annum for 7 months	0.093	0.583	5,162.50	15,810.00	9,222.50
9	Management charges for 7 months		0.830	1,600.00	3,000.00	1,750.00
10	Land rent for 7 months		40,000.00	26,666.67	60,000.00	35,000.00
11	Average weighted land tax @ Rs 132/acre/annum for 7 months		132.00	88.00	132.00	77.00
12	Land revenue including local rate, chaukidara etc			5.00		5.00
13	Payment to pickers (Rs./40 Kg)		500.00	10,250.00	950.00	19,950.00
14	**Total cost (Item1-13)**			**99,180.39**		**145,055**
15	Subsidy on inputs/fertilizers	0.600	1,500.00	900.00	-	-
16	Value of by-products/Cotton Sticks	1.000	1,000.00	1,000.00	-	-
17	**Net Cost of Production (14-15-16)**			**97,280.39**		**145,055**
18	Yield per acre (40 kgs)			20.50		21.00
19	Cost of production at farm level: (Rs/40 kgs)					
	19.1 Including land rent			4,745.38		6,907.36
	19.2 Excluding land rent			3,444.57		5,240.69
20	Marketing cost (Rs/40 kgs)			45.00		55.00
21	Cost of production at market/ginnery					
	20.1 Including land rent			**4,790.38**		**6,962.36**
	20.2 Excluding land rent			3,489.57		5,295.69

Source: 1. API Field Survey Data, Jan-Feb 2023
2. Average yield of last three years, provided by CRS

Notes: Cost of production for 2023-24 rose primarily due to increase in prices of Fertilizer, pesticides, weedicides and diesel.

ANNEX-VI

RESOURCEFUL FARMERS'S COST OF PRODUCTION OF SEED COTTON IN SINDH: 2022-23 TO 2023-24 CROPS

S. No	Operations / Inputs	Average No. of oprs/units/ acre	2022-23 crop		2023-24 crop	
			Cost per unit	Cost per acre	Cost per unit	Cost per acre
1	2	3	4	5 =3*4	6	7 =3*6
			……………Rs…………			
1	**Land preparation:**					
	1.1 Deep ploughing	0.500	2500.00	1250.00	2500.00	1250.00
	1.2 Ploughing (cultivator plus gobal)	3.000	1400.00	4200.00	1600.00	4000.00
	1.3 Ploughing + planking	0.750	1400.00	1050.00	-	-
	1.4 Planking	0.250	700.00	175.00	800.00	200.00
	1.5 Tractor levelling (hrs)	0.500	1400.00	700.00	1600.00	400.00
	1.6 Laser levelling	0.500	1500.00	750.00	2000.00	1000.00
2	**Seed and sowing operations:**					
	2.1 Seed used (kgs)	10.000	400.00	4000.00	450.00	4500.00
	2.2 Ploughing plus planking	0.160	1400.00	224.00	1600.00	256.00
	2.3 ridging including soil removal from ends of ridges	1.000	1400.00	1400.00	1600.00	1600.00
	2.4 drilling	0.010	1400.00	14.00	1600.00	400.00
	2.5 manual sowing (on contract)			1800.00		2200.00
3	**Irrigation: * (Nos)**					
	3.1 Canal		0.00	93.09	0.00	125.00
	3.2 Private tubewell (Rs./irrigation)	2.500	925.00	2312.50	1000.00	3000.00
	3.3 Mixed	0.413	925.00	382.03	1000.00	1000.00
	3.3 Lift	1.000	925.00	925.00	1000.00	1000.00
	3.3 Labour for irrigation and water course cleaning (M. days)	3.500	600.00	2100.00	800.00	2800.00
4	Interculture:					
	4.1 With tractor	1.000	1400.00	1400.00	1600.00	1600.00
	4.2 Manual weeding/ thinning on contract	2.000	2000.00	4000.00	2000.00	4000.00
5	Plant protection including application cost (weedicide+pesticides)	6.000	1700.00	10200.00	2200.00	13200.00
6	Farm Yard Manure including transport and application cost	0.500	3500.00	1750.00	4000.00	2000.00
7	Fertilizers: (bags)					
	7.1 DAP	1.000	9000.00	9000.00	9800.00	9800.00
	7.2 NPK					
	7.3 Urea	3.000	2250.00	6750.00	2800.00	8400.00
	7.4 CAN	0.240	1600.00	384.00	2350.00	587.50
	7.5 NP	0.030	5500.00	165.00	5580.00	1395.00
	7.6 Fertilizer transport and application	4.270	120.00	512.40	150.00	675.00
	GROSS EXPENDITURE		**55443.93**		**65263.50**	
8	Mark up on investment on item 1 to 7 excluding item 3(1) @average rate of banks per annum for 7 months	0.583		5174.80	13052.70	7614.08
9	Management charges for 7 months	0.583		2400.00	3000.00	1750.00
10	Land rent for 7 months	0.583	40000.00	26666.67	48000.00	28000.00
11	Average weighted land tax @ Rs 200/acre/annum for 7 months		350.00	233.33	350.00	204.17
12	Land revenue including local rate, chaukidara etc			5.00		5.00
13	Drainage Cess @ Rs 24/annum for 7 months			16.00		14.00
13	Payment to pickers (Rs./40 Kg)		575.00	13512.50	600.00	12600.00
14	**Total cost (Item1-13)**			**103545.32**		**115575.74**
15	Subsidy on inputs/fertilizers	0.600	1500.00	900.00	0.00	0.00
16	Value of by-products/Cotton Sticks	1.000	1000.00	1000.00	0.00	0.00
17	**Net Cost of Production (14-15-16)**			**101645.32**		**115575.74**
18	Yield per acre (40 kgs)			23.50		21.00
19	Cost of production at farm level: (Rs/40 kgs)					
	19.1 Including land rent			4325.33		5503.61
	19.2 Excluding land rent			3190.58		4170.27
20	Marketing cost (Rs/40 kgs)			45.00		50.00
21	Cost of production at market/ginnery					
	20.1 Including land rent			**4370.33**		**5553.61**
	20.2 Excluding land rent			3235.58		4220.27

Source: 1-API field survey data December 2020

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

Notes: Cost of production estimates for 2020-21 increased primarily due to increase in prices of pesticides, diesel and decline in yield.

ANNEX-VII

ECONOMICS OF SEED COTTON AND COMPETING CROPS AT
PRICES REALIZED BY THE GROWERS: 2022-23 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	Revenue per: Crop day	Revenue per: 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	210	22	98,321	38,544	162,770	124,226	64,449	1.66	4.22	775	7,399
2	Basmati Paddy	180	58	82,111	44,739	124,600	79,861	42,489	1.52	2.79	692	2,148
3	Non-Basmati	180	62	78,764	38,878	124,000	85,122	45,236	1.57	3.19	689	2,000
4	Wheat	150	12	75,554	27,333	128,100	100,767	52,546	1.70	4.69	854	10,675
5	Sunflower (spring)	120	22	91,416	36,774	140,700	103,926	49,284	1.54	3.83	1173	6,395
6	Canola	180	13	64,930	19,250	124,763	105,512	59,832	1.92	6.48	693	9,597
7	Seed Cotton + Wheat	360	34	173,875	65,877	290,870	224,994	116,995	1.67	4.42	808	8,555
8	Seed Cotton+Sunflower	390	44	189,737	75,317	303,470	228,153	113,733	1.60	4.03	778	6,897
9	Seed Cotton + Canola	390	35	163,251	57,794	287,533	229,738	124,281	1.76	4.98	737	8,215
10	Basmati Paddy+Wheat	330	70	157,666	72,072	252,700	180,628	95,034	1.60	3.51	766	3,610
11	Basmati Paddy+Sunflower	360	80	173,528	81,513	265,300	183,787	91,772	1.53	3.25	737	3,316
12	Basmati paddy+Canola	360	71	147,042	63,990	249,363	185,373	102,321	1.70	3.90	693	3,512
13	Non-Masmati + Wheat	330	74	154,319	66,211	252,100	185,889	97,781	1.63	3.81	764	3,407
14	Non-Basmati+Sunflower	360	84	170,181	75,652	264,700	189,048	94,519	1.56	3.50	735	3,151
15	Non-Basmati+Canola	360	75	143,695	58,129	248,763	190,634	105,068	1.73	4.28	691	3,317
16	Sugarcane	394	48	170,988	68,618	212,800	144,183	41,812	1.24	3.10	540	4,433
	Sindh											
1	Seed Cotton	210	18	104,133	36,312	179,531	143,219	75,398	1.72	4.94	855	9,974
2	Non-Basmati	180	56	76,679	30,927	137,450	106,523	60,771	1.79	4.44	764	2,454
3	Wheat	150	12	77,727	28,766	141,900	113,134	64,173	1.83	4.93	946	11,825
4	Sunflower (spring)	120	22	69,596	30,520	105,900	75,380	36,304	1.52	3.47	883	4,814
5	Canola	180	13	62,716	18,530	90,400	71,870	27,684	1.44	4.88	502	6,954
6	Seed Cotton + Wheat	360	30	181,860	65,077	321,431	256,353	139,571	1.77	4.94	893	10,714
7	Seed Cotton+Sunflower	390	40	173,729	65,077	285,431	220,353	111,702	1.64	4.39	732	7,136
8	Seed cotton+Canola	390	31	166,848	54,842	269,931	215,088	103,082	1.62	4.92	692	8,707
9	Non-Masmati + Wheat	360	68	154,406	59,692	279,350	219,658	124,944	1.81	4.68	776	4,108
10	Non-Basmati+Sunflower	360	78	146,275	61,447	243,350	181,903	97,075	1.66	3.96	676	3,120
11	Non-Basmati+Canola	360	69	139,394	49,457	227,850	178,393	88,456	1.63	4.61	633	3,302
12	Sugarcane	488	71	168,655	65,117	191,760	126,643	23,105	1.14	2.94	393	2,701

Notes for Annex - VII:

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2022-23 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, 2022-23 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 2022-23 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2022-23 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. 3,900 per 40 kgs, as maintained by the Punjab and Rs. 4,000 by Sindh for 2022-23 crop, 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. 3,000 and Rs. 2.400 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs. 2,450 per 40 kgs.

    4.3 The wholesale market prices of seed cotton during the post-harvest months of 2022-23 in the main producer area markets have averaged at Rs. 7,985 per 40 kgs in the Punjab and Rs. 7,646 Sindh.

    4.4 The price each of Sunflower and Canola crops has been reported hovering around Rs. 7,000/40 kgs during 2022-23.

    4.5 The average market prices of sugarcane as realized by the farmers were ranging around Rs. 316 per 40 kgs in the Punjab and Rs. 315 per 40 kgs in Sindh. However, the prices notified by the Provincial Governments i.e Rs. 300 and 302 per 40 kg respectively for Punjab and Sindh have been considered for the economic analysis.

5. The market prices have been adjusted for the marketing expenses to make them effective at the farm level. These expenses amount to Rs. 18.5 per 40 kgs in Punjab and Sindh for sugarcane, Rs. 40 for seed cotton in Punjab and Sindh, Rs. 45 for rice paddy in Punjab and Sindh, and for wheat and oilseeds, Rs. 60 in Punjab and Sindh.

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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.

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ANNEX- VIII

INTERNATIONAL PRICES OF COTTONS: 2012-13 TO 2022-23

Years Aug-Jul		**Index- A Cottons**
		---US Cent per pound-----
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		**132.02**
2022-23		**110.72**
	August	123.62
	September	118.28
	October	99.91
	November	101.08
	December	101.87
	January	100.12

Source: ICAC.

ANNEX- IX

EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF FUTURE'S CONTRACT PRICE OF NEW YORK NO. 2 COTTON (AVERAGE OF JULY, OCTOBER AND DECEMBER 2023)

S.No	Item	Price calculations
		US Cents per pound
1.	Future's contract price as reported by KCA (January 27, 2023)	85.52
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	75.52
		OR Rupees (a)
	Parity price per 40 kgs	15,317
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)	14,297
7.	Value of 80 kgs of cotton seed (b)	7,100
8.	Ginning charges for 120 kgs of seed cotton	780
9.	Value of 120 kgs of seed cotton (c) (items 6 + 7 - item 8)	20,617
10.	Seed cotton price per 40 kgs (item 9 / 3)	6,872

Notes:

a) One US $ = 230 Pak rupees.

b) Average price of cotton seed for August 2022 to December 2022 in Multan and Hyderabad markets was Rs 3550 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- X

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

S. No	Item	2022-23 (Aug-Dec)	(Average) 2019-20 to 2021-22
		Rupees per 40 kgs	
1.	Actual average cif (Karachi) price	22,128	16,500
2.	Handling charges at port and transport cost from port to textile mill at Karachi @ 5 % of cif price	1,106	825
3.	Ex- gin price of cotton lint (Item 1+ item 2)	23,234	17,325
4.	Value of 80 kgs of cotton seed (a)	7,100	7,100
5.	Ginning charges for 120 kgs of seed cotton including ginning losses	780	780
6.	Value of 120 kgs of seed cotton (item 3 +item 4 - item 5)	29,554	23,645
7.	Seed cotton price (item 6/ 3)	9,851	7,882

Note:

Average price of cotton seed for August 2022 to December 2022 in Multan and Hyderabad markets was Rs 3,550 per 40kgs

Sources:

1. PBS, for cif (Karachi price).
2. KCA, for incidental charges.
3. Pakistan Cotton Ginners Association, Karachi for ginning charges.

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

ANNEX- XI

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

S. No	Item	2022-23 (Aug-Nov)	(Average) 2018-19 to 2020-21
		US cent per pound	
1.	Index-A cottons assumed as CIF (Karachi) price	110.72	96.49
2.	Insurance, agents commission, and port handling charges @ 5% CIF price	5.54	4.82
3.	Landed cost at Karachi	116.26	101.31
		OR Rupees (a)	
	Landed cost at Karachi per 40 kgs	23,579	20,549
4.	Handling charges at port and transport cost from port to textile mills at Karachi @ 5 % of CIF price	1,179	1,027
5.	Ex- gin price of cotton lint (item 3 + item 4)	22,400	19,521
6.	Value of 80 kgs of cotton seed (b)	7,100	7,100
7.	Ginning charges for 120 kgs of seed cotton including ginning losses	780	780
8.	Value of 120 kgs of seed cotton (item 5 +item 6 - item 7)	28,720	25,841
9.	Seed cotton price per 40 kgs (item 8/ 3)	9,573	8,614

Notes:

a) One US $ = 230 Pak rupees.

b) Average price of cotton seed for August 2022 to November 2022 in Multan and Hyderabad markets was Rs 3550 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-XII

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**		
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
2022-23				
Private Prices	157825	43988	55193	58645
Social Prices	141056	37590	54795	48671
Transfers	16769	6398	398	9973
SINDH				
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
2022-23				
Private Prices	209492	42225	61320	105947
Social Prices	161552	35469	60736	65347
Transfers	47940	6756	585	40599

Source: Cost of Production: 2018-19 to 2022-23

Annex-XIII

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		
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
2022-23				
Private Prices	157825	43988	55193	58645
Social Prices	212540	37590	54795	120155
Transfers	-54715	6398	398	-61510
SINDH				
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
2022-23				
Private Prices	208492	42225	61320	104947
Social Prices	242497	35469	60736	146292
Transfers	-34005	6756	585	-41345

Source: Cost of Production: 2018-19 to 2022-23

Annex- XIV

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-	35 to 40	All Areas of Punjab	41.2	29.1	4.8	92.7

			31st May						
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.