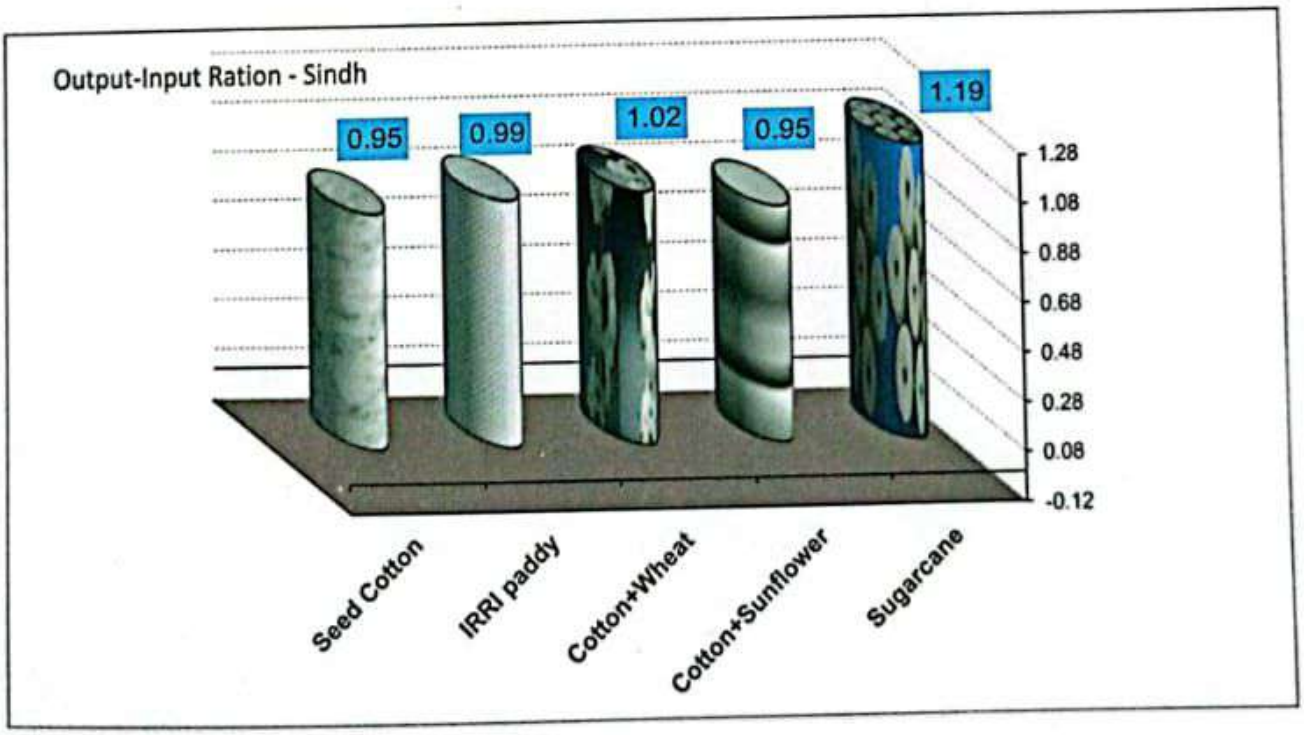
API SERIES NO. 258

POLICY ANALYSIS REPORT
SEED COTTON - 2016-17 CROP



GOVERNMENT OF PAKISTAN

AGRICULTURE POLICY INSTITUTE

MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH

ISLAMABAD

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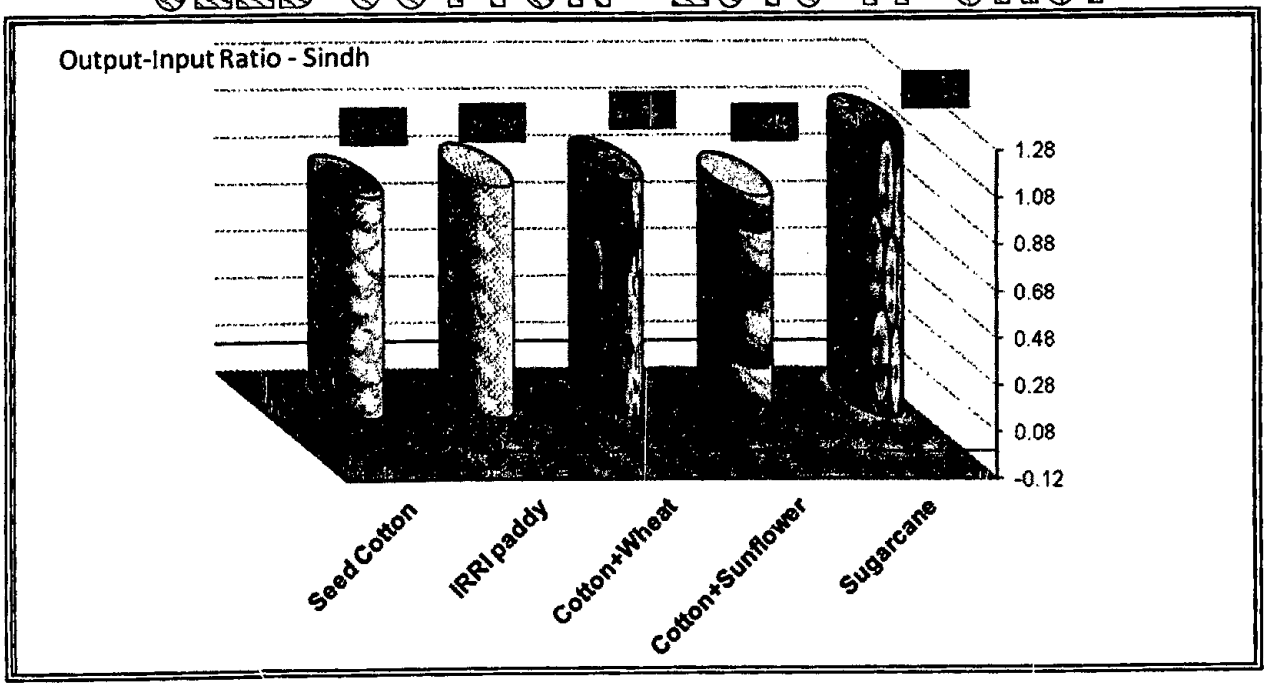

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CONTENTS

ABBREVIATIONS

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

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Findings

The findings of the Analysis are precisely summarized below:

Area and Production:

- The two largest cotton producing provinces of Punjab and Sindh contribute 70.3 and 28.8 per cent, respectively, while the share of both KPK and Balochistan is 0.9 per cent.
- During the last decade, cotton production has shrinked @ 0.1 per cent per annum mainly due to 1.5 per cent decline in area as the yield has improved @ 1.0 per cent per year.
- Cotton production in 2015-16 is estimated at 10.07 million bales, against 13.94 million bales last year, a decline of 29.0 per cent.
- Cotton production has fallen short of the target by 36.0 per cent during 2015-16.

Major Varieties

- According to the Annual Field Survey Report of API for 2015-16 cotton crop, major cotton varieties sown in Punjab were Bt.cotton, CIM-496, CIM-499, CIM-473, CIM-506, S-5000, MNH-786, MNH-886 and MNH-121.

Domestic Prices

- Monthly average market prices of seed cotton for 2015-16 crop during the post harvest months in major producing areas have generally remained slightly below the actual export parity prices.
- The monthly wholesale market prices of seed cotton during the post harvest period averaged at Rs 2626 per 40 kgs in the Punjab and Rs 2461 in Sindh.
- Monthly average wholesale prices of seed cotton ranged from Rs 2126 to Rs 3135 per 40 kgs during the post harvest months in major producing areas of the Punjab and Rs 2200 to Rs 2950 per 40 kgs in Sindh.
- Monthly average spot prices of cotton lint at Karachi averaged at Rs 5559 per 40 kgs in 2015-16, higher from Rs 5509 in 2014-15.

Cost of Production

- In the Punjab, the cost of cotton cultivation during 2016-17 season is estimated at Rs 56,748 per acre.
- The cost of production at the market/ginnery level of Punjab would be Rs 3058 per 40 kgs, reflecting a rise of 4.16 per cent over the last year.
- In Sindh, the cost of cotton cultivation for 2016-17 crop is expected at Rs 51,072 per acre.
- The cost of production at market/ginnery level of Sindh would come to Rs 2642 per 40 kgs, showing an increase of 1.67 per cent over the last year.

Economics of Cotton and Competing Crops

- The economics of cotton has a comparative edge over basmati and IRRI in Punjab during 2015-16 in respect of entire economic criteria, except crop duration.
- In case of indirect competition, sugarcane paid better than cotton combinations in returns to overall invesment, purchased inputs and crop duration, but lagged behind in the irrigation water.
- In Sindh, cotton farming evidenced its superiority over IRRI paddy in terms of returns to purchased inputs irrigation water. IRRI on the other hand, performed better in terms of remaining indicators.
- In case of indirect competition, the cotton combinations with wheat or sunflower perfomed lower to sugarcane in terms of returns to overall investment, purchased inputs and crop duration. However, the combinations paid much better than sugarcane in terms of irrigation water.

Economics of Fertilizer Use on Cotton Crop

- Benefit Cost Ratio refers to the ratio between the value of additional produce obtained by using a certain dose of fertilizer and the additional costs incurred therein. These ratios have shown favourable situation in context of cotton crop during 2015-16.
- Regarding the parity ratio between prices of fertilizer and seed cotton, the quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has fluctuated between 0.63 and 1.24 tonnes while that of P fertilizer between 0.78 and 3.16.

Nominal and Real Market Prices

- The nominal prices of seed cotton in the Punjab indicate an overall increase of 76.7 per cent while the real market prices have shown a fall of 12.8 per cent during 2007-08 to 2015-16.

- In Sindh, the nominal market prices of seed cotton have observed overall escalation of 69 per cent while the real market prices have fall by over 16.6 per cent against the base year level.
- The erosion in the real value of crop over the years has proved dis-incentive for the farmers to grow cotton and shifting to other crops\enterprises.

World Production and Prices

- World cotton production estimated at 21.98 million tonnes in 2015-16 is projected to increase to 22.96 million in 2016-17.
- International prices of Index-A cottons have widely fluctuated from the lowest level of 61 cents per pound in 2008-09 to the highest level of 165 cents per pound in 2010-11. The price remained subdued during 2015-16 averaging at 69.01 US cent per pound. Orleans Texas could reach 100.53 cents in 2012-13, the highest ever during the period under review.

Export Parity Prices

- Based on actual export price of Pakistani cotton during 2015-16, the export parity price of seed cotton calculates to Rs 2897 per 40 kgs and Rs 3137 on the basis of average during 2012 to 2015.
- The export parity price comes to Rs 2431 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 2015-16, the import parity price of seed cotton works to Rs 3396 per 40 kgs and Rs 3949 for average of 2012 to 2015.
- Based on CFR Far Eastern quoted price of Index – A cottons, the import parity price comes to Rs 3139 per 40 kgs during 2015-16 and Rs 3604 on average of 2012 to 2015.

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 NPC estimates both for Punjab and Sindh provinces have been continuously much less than one during the period.. Both the NPC and EPC values imply that cotton growers in Pakistan occasionally get economic price (export parity price) and thus are implicitly taxed.
- Domestic Resource Cost (DRC) coefficients in seed cotton production calculated at export parity prices are less than one both for Punjab and Sindh provinces

- NPC estimates both for Punjab and Sindh under export scenario are occasionally higher than one (though with small margin) except in 2011/12 and 2015-16.
- Efficiency of cotton crop in Pakistan is sensitive to its price in the domestic market and may suddenly affect cotton growers' profits and development of the crop.
- The DRC indicates the opportunity cost of domestic resources employed per unit of value added in production of a commodity.
- The findngs of economic efficiency analysis warrant more investment in cotton production and marketing for export purpose as well as to meet domestic requirements of textile industry as the imports are more expensive.

World Comparison

- Pakistan is the 4th largest cotton producer in terms of area and production but ranks at 12th position in terms of yield.
- Among 6 competing countries, cost of production of seed cotton was estimated at Pak Rs 3446 per 40 kgs in USA while in India, it was reported at Pak Rs 2395 per 40 kgs.
- The cost of production of seed cotton is estimated at equivalent to Pak Rs 3239.2 per 40 kgs in China and Rs 2774 in Pakistan during 2013-14 according to the International Cotton Advisory Committee (ICAC), Washington DC, USA.

Policy Options

Based on the analysis of relevant factors covered in the main text of the Report, the likely policy options for seed cotton 2016-17 crop are presented below:

S.No.	Base	Worked back price of seed cotton at ginnery level Rs/40 kgs	
1	Export parity prices based on average:		
	i) Actual export price of Pakistani cotton:		
	- During 2015-16 (Oct-May)	2897	
	- During 2012-13 to 2014-15	3137	
	ii) Futures contract prices of New York No.2 cotton (average of October, December 2016 and March 2017)	2431	
2	Import parity prices based on average:		
	i) Actual cif Karachi prices of imported cotton:		
	- During 2015-16 (Oct-May)	3396	
	- During 2012-13 to 2014-15	3949	
	ii) CFR Far Estern quoted price of Index-A Cottons:		
	- During 2015-16 (Oct-May)	3139	
	- During 2012-13 to 2014-15	3604	
3	Average wholesale prices of seed cotton in Major Producer Area Markets during the post-harvest period in 2015-16:		
	- Punjab (Sep – Feb)	2626	
	- Sindh (Sep – Dec)	2461	
4	Cost of production for 2016-17 crop:		
	- Punjab	3058	
	- Sindh	2642	
5	Cost of domestic resources involved in:	At exchange rate of Pak Rs 104.81	
		Punjab	Sindh
	i) Producing cotton for import substitution based on 2015-16 prices of cotton (actual average)	75.89	64.77
	ii) Producing cotton for export based on 2015-16 prices of cotton (actual average)	95.9	79.3

- **Recommendations**

In view of the field information, consultation with the stakeholders in the API Committee meeting on cotton and analysis of relevant factors, following recommendations are suggested 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 2016-17 crop in view of world and domestic cotton situation and the input costs, if deem necessary.
- The intervention 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.
- In view of trade libralization and active role of private sector, the actual incentive to cotton growers should come through the market forces.
- The government policy of encouraging the role of private sector in cotton marketing and trade may be continued.
- TCP should be designated as the implementing agency for seed cotton through buying lint at the price determined on the basis of intervention price of seed cotton, if announced in case of need.

Improving Productivity:

- A comprehensive National Seed Policy should be announced by the Government and implemented in true spirit.
- The Government should ensure implementation of Federal Seed Act 2015 - the Cotton Research Institute should only release varieties
- A plan should be designed for balanced use of inputs and new technology by the Research and Provincial Agriculture Extension Departments and disseminated widely.
- The coordination among the Provincial and Federal Research Institutes should be strengthened in order to improve research activities for productive outcome.
- 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.

- 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.
- 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.
- 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.
- Early sowing of Bt cotton has raised some problems like boll rottening and pest attack which need to be addressed.
- The government should strengthen the IPM programme of NARC for its effective implementation in the entire cotton growing area.
- The Pest Scouting and Warning System should be further strengthened enabling the farmers to take timely action and apply appropriate pesticides.
- On the pattern on Punjab Seed Corporation of the Government of Sindh, KPK and Balochistan should also pay a special attention to seed production to meet their provincial requirements.
- There is a need to encourage the Soil Testing facilities to assess the need of appropriate fertilizers for balanced input use.
- In order to acknowledge the innovative work of the genuine breeders, the seed of a new variety should be auctioned in the open market.
- The NIBGE in collaboration with Cotton Research Institutes should work hard on heat / drought resistant varieties to avoid excessive boll shedding and improving boll weight.
- The Government should take strict measures in order to control the Mealy Bug through management practices and biological control.
- PARC may be advised to test EM technology, Bio-fertilizer and other relevant technologies of fertilizer for balanced fertilizer use to reduce cost of production.
- In order to promote cotton cultivation in the country, there should be restriction on establishing new sugarmills in the cotton region.
- The Plant Breeders Rights Act may be approved and implemented in order to promote the varital development.
- pH value of soil has gone to the range of 8-10 due to indiscriminate use of chemical inputs and shallow tillage operations. There is a need of encouraging deep ploughing and Disc plough in cotton growing areas.
- There is a dire need to introduce Land Use Act to conserve the fertile Agriculture land for crop cultivation and not for residential accommodation.

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,
- Research on Ginning may be carried out to deal with the issues of cotton ginning and related matters.
- The deductions and underweightment in cotton marketing for various quality consideration need to be standdardized. Supervisory committee consisting of representatives of growers, local market committee, cotton delears and provincial agriculture departments should be constituted to check malpractices in cotton marketing.
- 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.
- Like other commodities, a Regulartory Authority may be established to control prices and quality of agriculture inputs.
- The effective Cotton Standardization and Grading System may be implemented in accordance with the provisions of the Pakistan Cotton Standardization Ordinance, 2002.
- Cotton quality can be improved if implemented at ginnery level to only procure high quality seed cotton.
- Provincial governments should implement quality standards in the true spirit in order to improve the quality of cotton in the country.
- 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.
- Marketing of cotton is a big problem as no ginning factory is properly working and also due to load shedding and non-availability of skilled labour for picking, etc. Therefore, government may consider amending the Cotton Control Act according to the prevailing situation and effective implementation.

Muhammad Abid Javed
Secretary
M/o National Food Security
and Research

October, 2016

COTTON POLICY ANALYSIS FOR 2016-17 CROP

INTRODUCTION

Cotton is integral to the economic development of Pakistan and the crop is one of the largest contributors to the economy of the country. Cotton is an important cash crop and the largest primary source of raw material for the textile industry of Pakistan. It contributes around 5.1 per cent to the value addition in agriculture sector and about 1.0 per cent share in GDP[1]. Cotton farming is a major source of employment and income for rural labour especially the women as pickers. Hundreds of ginneries are spread all over the country, especially at village/town level in remote areas and the livelihood of their seasonal/permanent labour depends on cotton crop. It also provides raw material to oil extraction mills and the cotton seed cake which is a key source of animal feed. The cotton sticks are also widely used as firewood at village level.

2. The crop is considered the primary and essential source of raw material for the textile sector. Last year, Textile Industries contribution to the foreign exchange earning was to the tune of US $ 9.364 billion from export of cotton products. Besides, factories and textile mills in the country employing millions of skilled and unskilled labour along the entire cotton value added chains, from weaving to textile and garment export. In view of dynamic nature and multifaceted role of cotton in the country through exports and providing livelihood to millions of farmers, traders and workmen, cotton has been getting attention of the government.

3. In 2015-16, Cotton was cultivated on 2.917 million hectares, covering 13 per cent of the cropped area, squeezed by 1.5 per cent on the previous year. Pakistan produced 10.07 million bales in the year 2015-16 against 13.96 million bales last year showing a decrease of 27.87 per cent. As the crop is susceptible to a host of insect/pests during rainy season and various diseases, its cultivation is a risky proposition. Even in bumper crop harvests, farmers have suffered a lot because of low prices. This move to-and-fro in cotton production and prices has adversely affected all the cotton related sectors of the economy. In view of the importance of cotton, there is an urgent need to minimize incidence of such fluctuations and take effective measures to stabilize its production overtime.

4. The Government has been analysing the Intervention Price for Cotton[2]. The fundamental objective of announcing intervention price has been to ensure a reasonable production level for the domestic textile industry and safeguard the interest of the cotton growers. However, the price has been implemented only when the market prices of seed

[1] Economic Survey of Pakistan 2015-16
[2] Base grade 3 with staple length 1-1/16"

cotton fall below the intervention price level. Otherwise, the Government always encourages the role of private sector in marketing and trade of cotton. Accordingly, no intervention was required during the last couple of years as the market prices remained at reasonable level during the season. However, in view of the fragile market situation, the Government retained the intervention price for seed cotton at Rs 3000 per 40 kgs for 2015-16 crop.

5. Following three important procedures have been adopted as basis for the analysis of the Seed Cotton 2016-17 crop and preparation of the Report:

- 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 March, 2016 in major cotton producing areas of the country. Interviews and discussions were held with the growers, local leaders and officials of the Provincial Departments of Agriculture, cotton ginners and traders, etc. The data of field survey was analysed and the findings were duly considered in the policy analysis.
- A meeting of the API Committee on Cotton was held on 2nd June, 2016 at API, Islamabad. It was attended by the representatives of cotton growers/ associations, Karachi Cotton Association (KCA), Trading Corporation of Pakistan (TCP), Chambers of Agriculture, Progressive Growers, Cotton Experts and officials of Federal and Provincial Governments concerned with farm inputs, cotton production and marketing, etc. Issues relating to cotton production, consumption, marketing and price situation both national and international were discussed in the meeting. The proceedings of the meeting were issued and the viewpoints of the committee members were duly considered in formulating the price policy proposals.

6. With the global implementation of the WTO agreements, the cotton trade has gone through various quality standards measures, hence become increasingly quality conscious. Demand for contamination free and clean cotton is increasing in the global trade. To meet the increasing demand, the local textile industry also requires accomplishing the standards in manufacturing of 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.

7. A number of challenges and issues like cultivation of un-approved varieties, attack of diseases like, CLCV, Mealy bug and traditional farm management practices, are affecting the productivity of the crop. It was identified that Pakistan is lacking CLCV resistant germplasm and there is a dire need of importing global cotton germplasm to widen the cotton genetic base in the country. In order to implement the case, the government has approached the USDA. The USDA had agreed to provide support under the Cotton Productivity Enhancement Project with the technical expertise of ICARDA and the domestic Cotton Research Institutes.

8. With the aim 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 has approved certain varieties of Bt-cotton with the purpose to benefit the farming community of new technology and boost the production at competitive level.

2. SOWING AND PICKING TIMES OF COTTON

9. In major cotton growing districts of the Punjab and Sindh, sowing of American cotton varieties is generally recommended by Provincial Agriculture Departments from 1st May to end June in the Punjab, 15th March to 15th June in Sindh, the whole month of May in the KPK 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
Sindh	
Thatta	15th March - 31st March
Tharparkar, Mirpurkhas and Badin	1st April - 30th April
Hyderabad	15th April - 15th May
Sanghar	15th April - 20th May
Dadu, Nawabshah and Naushahro Feroz	1st May - 31st May
Khairpur, Sukkur, Ghotki, Larkana, Shikarpur & Jacobabad	15th May - 15th June
Khyber Pakhtunkhwa	
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.

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

11. An important development is the rising trend of Bt cotton by farmers. Almost 80 per cent of cotton growing area has become under Bt Cotton with different names in the Punjab and Sindh. There may be 30 % increase in cotton yield due to resistance against chewing pests. It may pay additional income to cotton growers in Pakistan owing to high yield and less cost on plant protection. 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: ZONING FOR CULTIVATION OF BT COTTON IN THE PUNJAB AND SINDH CROP SEASON

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

3. PROVINCIAL SHARES IN AREA AND PRODUCTION

12. Provincial shares in area and production of cotton based on averages of 2013-14 to 2015-16 are provided in Table-3. During this period cotton production averaged at 12.215 million bales from 2.889 million hectares (7.140 million acres).

Table-3: Provincial Shares in Area and Production of Cotton: Average of 2013-14 to 2015-16

Country/ Province	Area		Production	
	000 hectares	Per cent	000 bales	Per cent
Pakistan	**2889.6**	**100.0**	**12215.3**	**100.0**
Punjab	2254.9	78.0	8588.3	70.3
Sindh	595.1	20.6	3523.8	28.8
KPK& Balochistan	39.6	1.4	103.1	0.8

Source: Annex-I.

13. In Pakistan, Punjab and Sindh provinces are major cotton producers and account for 78.0 and 20.6 per cent in cotton area and 70.3 and 28.8 per cent in production, respectively (Figures-1 and Figure-2). However, cotton yield in Sindh is higher than Punjab resultantly production share of Sindh exceeds, its area share. The share of KPK & Baluchistan together in production is 0.8 per cent from their collective share in the cotton area (1.4) per cent. Cotton yield in KPK & Balochistan together is much lower than Punjab and Sindh.

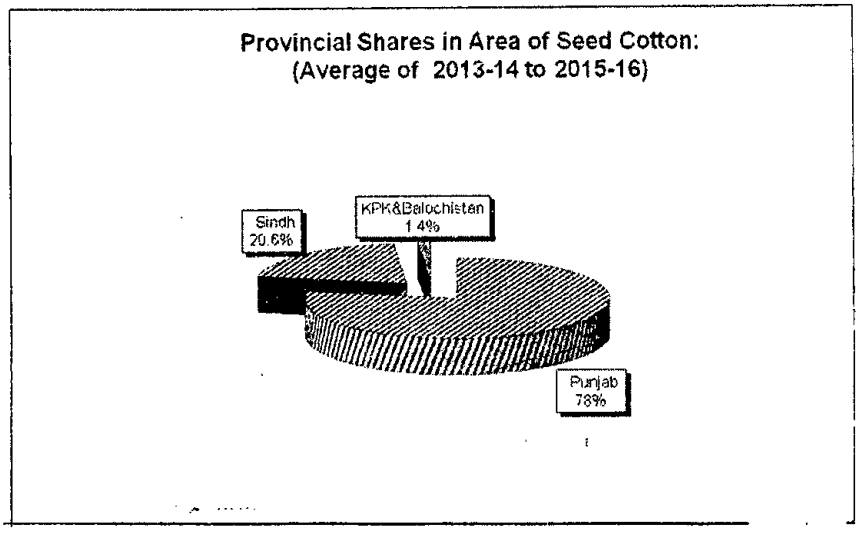

Figure-1: Shares in Area

4. IMPORTANT COTTON GROWING DISTRICTS

14. District-wise data on area and production of cotton are given in Annex-III. The only district that produces more than one million bales of cotton per annum is Bahawalpur. Different districts which produce more than 0.1 Million bales annually are Bahawal Nagar, Rahim Yar Khan, Vehari, Khanewal, Lodhran, Multan, Rajanpur, Muzzafargarh, D.G.Khan, Sahiwal, Pakpattan, T. T. Singh, Layyah, Mianwali and Bhakkar from the Punjab province and Sanghar, Khairpur, Ghotki, Nawabshah, Matiari, Mirpurkhas, Naushero Feroze, Sukkur,

Umerkot, Tando Allahyar and Badin from Sindh. These 27 districts account for more than 95 per cent of the cotton production in the country.

15. The districts of Bahawal Nagar, Rahim Yar Khan, Vehari, Khanewal, Lodhran, Multan, Rajanpur, Muzaffargarh,andSan ghar each producing more than half million bales per year collectively account for 54 per cent of the cotton production in the country.

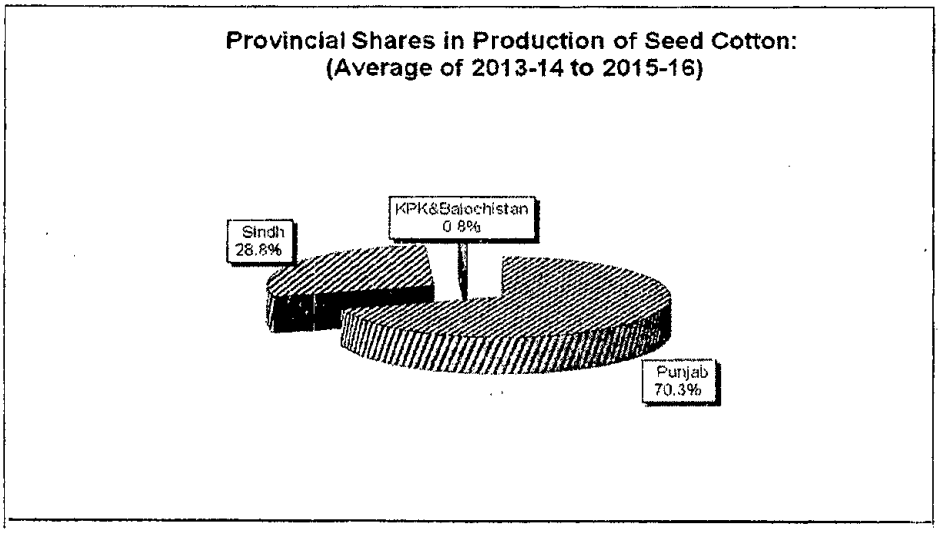

Figure-2: Shares in Production

5. CHANGES IN AREA, YIELD AND PRODUCTION

16. During previous ten years period between 2005-06 and 2015-16, cotton area at the country level ranged between 2689 and 3106 million hectares (Annex-I) and yield between 581 and 816 kgs per hectare. Resultantly, cotton production oscillated between 9917 and 13959.6 million bales. Long term and short term changes in area, yield and production are discussed below:

5.1.1 Long-term trend: 2005-06 to 2015-16

17. It may be seen in Table-4 that during the period between 2005-06 to 2015-16 cotton production at the country level decreased @ 0.5 per cent per annum mainly due to 0.7 per cent decline in area though yield showed slight improvement @ 0.3 per cent.

Table-4: Average Annual Growth Rate of Area, Yield and Production of Cotton: 2005-06 to 2015-16

Country/ Province	Area	Yield	Production
	---------- Per cent ----------		
Pakistan	**-0.7**	**0.3**	**-0.5**
Punjab	-0.7	-1.1	-1.8
Sindh	-1.0	4.4	3.3

Note: The growth rates have been worked out by estimating the equation, $Y=a(1+r)^x$, through Ordinary Least Squares (OLS) method from the data given in Annex-I.

18. So far as provincial trends are concerned, in Punjab cotton production decreased @ 1.8 per cent annually due to area decrease @ 0.7% and yield decline @ 1.1%. In contrast, cotton production in Sindh increased @ 3.3 per cent per annum solely due to 4.4 percent improvement in yield because area had decreased by 1% during the period under study.

5.2 Short-term Changes 2014-15Vs 2015-16

19. According to the final estimates provided by the provincial Agriculture Department, cotton production during 2015-16 at the country level estimates at 9.917 million bales in comparison with 13.960 million bales produced in 2014-15 (Table-5). This drastic decrease in production is attributed to 2% contraction in area and 27.5 per cent reduction in yield.

Table-5: Short-term Change in Area, Yield and Production of Cotton: 2014-15 and 2015-16 Crops

Country/ Province	Area		Changes in 2015-16 over 2014-15	Yield		Changes in 2015-16 over 2014-15	Production		Changes in 2015-16 over 2014-15
	2014-15	2015-16		2014-15	2015-16		2014-15	2015-16	
	-- 000 hectares --		Per cent	--Kgs/hectare --		Per cent	-- 000 bales --		Per cent
Pakistan	**2961.3**	**2901.9**	**-2.0**	**801.8**	**581.3**	**-27.5**	**13959.6**	**9917.4**	**-29.0**
Punjab	2322.9	2242.7	-3.5	752.5	481.1	-36.1	10277.0	6343.0	-38.3
Sindh	596.2	621.2	4.2	1019.2	951.6	-6.6	3572.5	3475.6	-2.7
KPK	1.0	0.4	-58.9	517.3	523.0	1.1	3.0	1.2	-60
Balochistan	41.2	37.6	-8.7	442.2	441.5	-0.2	107.1	97.6	-8.87

Source: Annex-I.

20. It is visible from Table-5 that maximum decline in cotton production occurred in KPK and Punjab. In Punjab cotton production during 2015-16 was estimated at 6.343 million bales (decrease of 38.3% against 2014-15 production) and 0.0012 Million bales in KPK (60% reduction against 2014-15 production). In Punjab, production declined mainly due to yield decline of 36.1% and in KPK due to reduction in area by 58.9%.

21. In Sindh, cotton production remained 3.475 million bales, 2.7 per cent less than 3.572 million bales of 2014-15. Decrease in production is primarily the result of decrease in yield by 6.6 per cent.

22. Provincial Agricultural Departments have provided following reasons for changes in area, yield and production.

❖ **Punjab**

23. Cotton area reduction may be attributed to the following factors:

1. Less economic returns received from the 2014-15 crop discouraged the growers to bring more area under cotton.

2. Shifting of farmers from cotton to maize and sugarcane in Sahiwal, Pakpatan, Vehari, Multan, Lodhran, Khanewal, T.T Sing, Muzaffargarh and Bahawalnagar districts.

3. In Punjab 2014-15 crop was severely damaged due to heavy rains due to which yield drastically declined in this province.

❖ **Sindh**

1. Due to ban imposed on Rice cultivation along Left Bank of Indus River, growers switched over to Cotton Crop, therefore, cotton area increased in Sindh.
2. Production declined also in Sindh due to rains at the flowering stage.

6. TARGETS VS ACHIEVEMENTS: 2015-16 CROP

24. The Federal Committee on Cotton fixed Seed Cotton production target for 2015-16 crop at 15.489 million bales. As per final estimates of Provincial Agriculture Departments, cotton production at the country level is reported at 9.917 million bales 36 percent less than the target. This happened due to 7.3 percent shortfall in target of area and 30.9% shortfall in yield target (Table-6).

Table-6: Targets and Estimated Achievements of Area, Yield and Production of Seed Cotton: 2015-16 Crop

Country/ Province	Area		Deviation from the target	Yield		Deviation from the target	Production		Deviation from the target
	Target	Achieve - Ment		Target	Achiev e-ment		Target	Achiev e-ment	
	--- 000 ha ----		Per cent	kgs/ha		Per cent	-- 000 bales --		Per cent
Pakistan	**3131.5**	**2901.9**	**-7.3**	**841.3**	**581.3**	**-30.9**	**15489.5**	**9917.4**	**-36.0**
Punjab	2428.0	2242.7	-7.6	735.6	481.1	-34.6	10500.0	6343.0	-39.6
Sindh	650.0	621.2	-4.4	1151.4	951.6	-17.4	4400.0	3475.6	-21.0
KPK	3.5	0.4	-88.6	73.9	523.0	608.1	1.5	1.2	-20.0
Balochistan	50.0	37.6	-24.8	2000.3	441.5	-77.9	588.0	97.6	-83.4

Sources: 1. For targets: Respective Federal Committee on Cotton: 2nd Meeting of the Cotton Crop Assessment Committee, 2015-16, Ministry of Textile Industry, Islamabad.
2. For achievements: Annex-I.

25. Data in Table-6 indicates that production of cotton fell short of the target by 39.6, 21.0, 20 and 83.4 percent in the Punjab, Sindh, KPK and Baluchistan, respectively. The underlying reason is that area and yield targets could not be achieved in any of the provinces – yield in KPK being an exception.

Table-8: Monthly Average Wholesale Prices of Seed Cotton (Phutti) in the Main Producer Area Markets for 2015-16 Crop.

Market	Sept	Oct	Nov	Dec	Jan	Feb	Avg
Punjab	----------Rs per 40 kgs----------						
Multan	-	2,693	2,666	2,435	-	-	**2,598**
Okara	2,126	2,218	2,341	2,240	-	-	**2,232**
R. Y. Khan	2,200	2,816	2,798	2,776	2,861	2,777	**2,705**
Bahawalpur	2,294	2,855	2,892	2,581	2,741	2,764	**2,688**
D. G. Khan	2,167	2,898	3,135	3,059	3,098	3,100	**2,910**
Average	**2,197**	**2,696**	**2,766**	**2,618**	**2,900**	**2,880**	**2,626**
Sindh							
Mirpur Khas	2,350	2,456	2,550	2,550	-	-	**2,477**
Sanghar	2,335	2,625	2,713	2,417	-	-	**2,522**
Hyderabad	2,275	2,488	2,200	2,250	-	-	**2,303**
Nawabshah	2,356	2,731	2,950	2,750	-	-	**2,697**
N.Feroz	2,333	2,750	2,738	2,771	-	-	**2,648**
Khyerpur	2,350	2,746	2,863	2,750	-	-	**2,677**
Sukkur	-	2,892	2,948	2,850	-	-	**2,172**
Ghotki	-	2,867	2,950	2,950	-	-	**2,192**
Average	**2,333**	**2,694**	**2,739**	**2,661**	-	-	**2,461**

Sources:

1. Directorate of Agriculture (E&M), Punjab, Lahore.
2. D.G. Agriculture Extension, Hyderabad, Sindh.

28. Monthly average wholesale prices of seed cotton during the post harvest period averaged at Rs 2626 per 40 kgs in the Punjab and Rs 2461 in Sindh.

Table-9: Monthly Average Spot Prices of Raw Cotton at Karachi for 2014-15 and 2015-16 Crops (August-May)

Month	Base Grade -3, staple length 1-1/16", Micronaire Value 3.8 to 4.9 NCL (No Control Limit)	
	2014-15	2015-16
	Rupees per 40 kgs	
August	5797	4883
September	5857	5133
October	5513	5739
November	5291	5699
December	5078	5607
January	5431	5762
February	5251	5623
March	5405	5620
April	5641	5802
May	5824	5717
Average	**5509**	**5559**

Source: Karachi Cotton Association (KCA). Karachi.

7.2.2 Cotton Lint (Raw Cotton)

29. Monthly average spot prices of raw cotton at Karachi during 2014-15 and 2015-16 are presented in Table-9. The spot price during 2015-16 averaged at Rs 5509 per 40 kgs which is 0.91 percent higher than last year.

8. COST OF PRODUCTION (COP) OF SEED COTTON

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

31. Cost of production estimates for seed cotton: 2016-17 crop are derived by using the same input-output parameters as done in the Cotton Policy Analysis report for 2015-16. 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 during March 2016 in the cotton zones of 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-10:

Table-10: Average Farmer Cost of Production of Cotton: 2015-16 and 2016-17 Crops

S. No	Item	Unit	Cost estimate		Change in 2016-17 against 2015-16
			2015-16 crop	2016-17 crop	
	Punjab				
1	Cost of cultivation	Rs./acre	55032	56748	1379
2	Yield	Kgs/ acre	1760	752	-8
3	Cost of production at farm level	Rs./40 Kg	2896	3018.50	122.5
4	Marketing cost	"	40	40	0
5	Cost of production at Market/ ginnery	"	2936.43	3058.50	122.07
	Sindh				
1	Cost of cultivation	Rs./acre	50988	51072	84
2	Yield	Kgs/ acre	797	785	12
3	Cost of production at farm level	Rs./40 Kg	2558.99	2602.38	43.39
4	Marketing cost	"	40	40	0
5	Cost of production at Market/ ginnery	"	2598.99	2642.38	43.39

Source: Annex-V and VI.

Punjab

32. During 2016-17, the cost of raising one acre of seed cotton in Punjab is likely to be Rs 56748 inclusive land rent (Table-10). Based on an average yield of 752 Kg per acre, the cost of production at the farm level works out to Rs 3018.50 per 40 Kg. It needs to be mentioned here that 2015-16 crop was damaged in Punjab due to heavy rains and per acre yield declined considerably. Therefore, this yield level is not justifiable to use for 2016-17 COP calculations. Consequently, previous three years' average yield (752 Kg/acre) is used as a proxy for deriving COP estimates for the 2016-17 crop.

33. For determining ginnery level cost of production per 40 kg, marketing expenses @ Rs 40 per 40 Kgs are added to the farm level cost of production which gives ginnery level cost of Rs 3058.50 per 40 kg, Rs 122.07 higher than the corresponding COP of 2015-16.

Sindh

34. During 2016-17 crop seasons, the cost of cultivation of cotton in Sindh including land rent works out to Rs 51072 per acre. Based on an average yield of 785 Kgs per acre, farm level cost of production of cotton is estimated at Rs 2602.38 per 40 Kg. By adding marketing expenses @ Rs 40 per 40 Kg to the farm level COP, the mill gate cost of production would be Rs 2642.38 per 40 Kg – more by Rs. 43.39/40 Kg than the last year cost of Rs 2598.99 per 40 Kg.

8.1 Cost of major operations/ inputs

35. Shares of different production operations/ inputs for 2015-16 and 2016-17 for Punjab and Sindh are shown in Table-11 are described below:

Table-11: Gross Cost of Cultivation of Seed Cotton: 2015-16 and 2016-17 (Cost/acre)

S.No	Inputs/ operations	2015-16	2016-17 (Estimated)
	Punjab		
1	Land preparation	4394 (8)	4278 (7)
2	Seed and sowing operations	2634 (5)	3763 (7)
3	Irrigation	4760 (8)	4933 (9)
4	Interculture	3458 (6)	3688 (6)
5	Plant Protection including application	4615 (8)	4038 (6)
6	Fertilizers	8801 (14)	8415 (15)
7	Land rent for 8 months	16667 (30)	16667 (29)
8	Payment to pickers	5700 (10)	5700 (10)
9	Other costs	5704 (10)	6265 (11)
10	Gross cost	56032	57748 (100)
	Sindh		
1	Land preparation	5591 (11)	5579 (11)
2	Seed and sowing operations	3677 (7)	4794 (9)
3	Irrigation	3415 (7)	3365 (6)
4	Interculture	3606 (7)	3019 (6)
5	Plant Protection including application	3360 (6)	2940 (6)
6	Fertilizers	7167 (14)	6799 (13)
7	Land rent for 8 months	13333 (26)	13333 (26)
8	Payment to pickers	5978 (11)	5888 (11)
9	Other cost	5862 (11)	6355 (12)
10	Gross cost	51988 (100)	52072 (100)

Notes: S. No. 10 represents Gross Cost per acre.
Numbers are rounded off to zero decimals due to which calculations may result in slight differences
Figures in parenthesis represent average shares in the gross cost of cultivation per acre.
'Other costs' include FYM, mark-up on investment, management charges, land revenue, land tax, drainage Cess and cutting of cotton sticks.

Punjab

36. Land rent would be the major component of the cost of production of seed cotton in Punjab during 2016-17 like 2015-16. It adds to the total cost by 29% followed by fertilizer 15%, other costs 11% and payment to pickers @ 10%. 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 from 6-9% percent.

Sindh

37. For Sindh, major components of cost of production for 2016-17 crop are expected to be: land rent (26%), fertilizer (13%), other costs (12%) and land preparation and payment to pickers each accounts for (11%).

9. ECONOMICS OF COTTON AND COMPETING CROPS

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

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

40. The economics of cotton and competing crops has been analyzed in terms of input-output prices paid and received by the growers during the 2015-16 crop year. The details of the analysis are provided in Annex-VI. A summary of various economic indicators for the Punjab and Sindh is presented in Tables 12 & 13 and depicted at Figures 3 & 4:

Table-12 : Economics of Cotton and Competing Crops at Prices Realized by the Growers in the Punjab: 2015-16 Crops

Province/Crop/ Crop combination	Output-input ratio	Gross revenue per		
		rupee of purchased inputs cost	day of crop duration	acre-inch of irrigation water used
		------- Rupees ------		
1. Cotton	0.90	2.64	209	2279
2. Basmati paddy	0.85	1.74	225	699
3. IRRI paddy	0.74	1.57	184	533
4. Cotton + Wheat	0.98	2.77	218	2695
5. Cotton + Sunflower	0.93	2.45	215	2055
6. Sugarcane	1.16	3.86	237	1943

Source: Annex-VI

Punjab

41. Cotton, in Punjab, though rewarded the farmer with better returns as compared to Basmati and IRRI Paddy in terms of returns to overall investment, but failed to make break even and paid back less than the cost of production. However, in terms of remaining indicators, like gross revenue per rupee of purchased inputs and irrigation water, cotton's performance was significantly better than both Basmati and IRRI paddy. Basmati paddy could compete only in terms of returns to crop duration paying relatively better than cotton. IRRI paddy could not compete, neither Cotton nor Basmati, in any of the criteria adopted for the economic analysis.

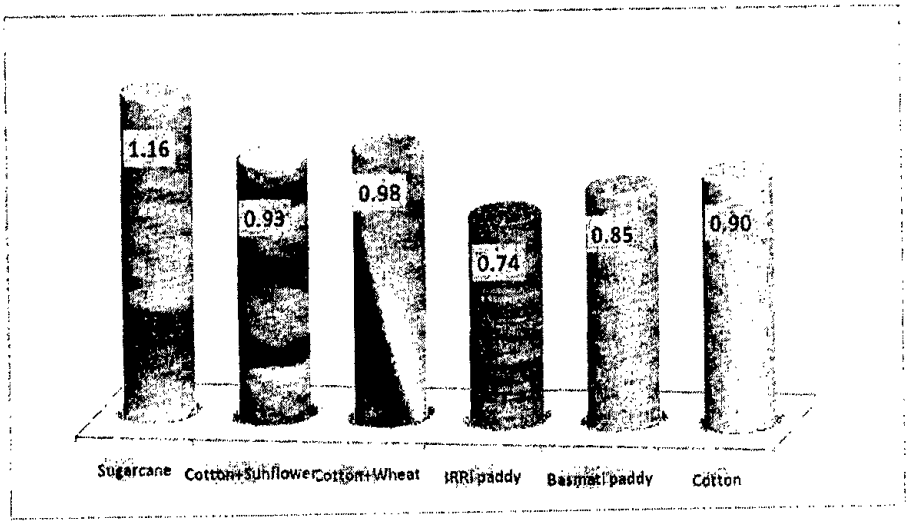

Fig-3: Returns to Overall Investment in Punjab

42. In case of indirect competition, sugarcane paid considerably better returns over both the cotton combinations in respect of all the economic criteria except irrigation water.

Cotton combinations, both with wheat and sunflower, failed to give back to the grower even the cost of producing the crops, as the output-input ratio remained below 1.

Sindh

43. In Sindh, cotton farming performed in a mix way - better than IRRI paddy in terms of some of the economic criteria including purchased inputs and irrigation water, while IRRI paddy paid better returns in terms of output-input ratio and crop duration. However, the noticeable point is that both Cotton and IRRI paddy failed to give back to farmer what the farmer had invested - cost of production.

Table-13: Economics of Cotton and Competing Crops at Prices Realized by the Growers in Sindh: 2015-16 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	0.95	3.07	205	2735
2. IRRI paddy	0.99	2.75	211	678
3. Cotton +Wheat	1.02	3.08	213	2980
4. Cotton +Sunflower	0.95	3.08	213	2238
5. Sugarcane	1.19	3.77	232	1597

Source: Annex-VI

44. In case of indirect competition, sugarcane farming has shown better returns over the cotton combinations with wheat or sunflower in respect of certain economic criteria like returns to Overall investment, purchased inputs and crop duration. However, in terms of irrigation water, both the cotton combinations have out-competed the sugarcane with a considerable margin.

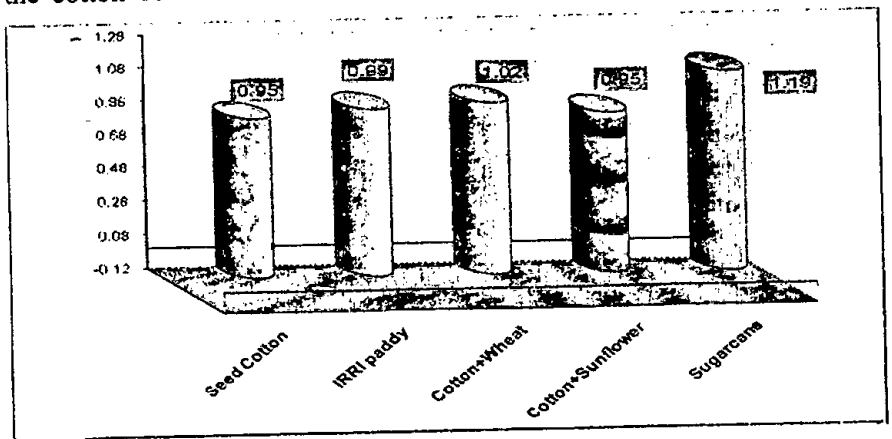

Fig-4 : Returns to Overall Investment in Sindh

10. ECONOMICS OF FERTILIZER USE IN COTTON CROP

45. 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)

46. 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-14.

Table-14: Benefit Cost Ratio (BCR) of Fertilizer Use on Cotton: 2006-07 to 2015-16

Year	Response Ratios (Seed Cotton: Nutrient) of			
	3.00:1	3.75:1	4.50:1	5.25:1
2006-07	1.53	1.84	2.13	2.41
2007-08	2.72	3.22	3.68	4.10
2008-09	1.24	1.51	1.77	2.02
2009-10	2.72	3.27	3.78	4.26
2010-11	3.08	3.72	4.32	4.88
2011-12	1.63	1.96	2.26	2.54
2012-13	1.32	1.60	1.86	2.10
2013-14	1.51	1.82	2.11	2.38
2014-15	1.19	1.46	1.64	1.84
2015-16	1.20	1.44	1.67	1.98

Sources: 1. For 2006-07 to 2014-15: Cotton Policy Analysis Report for 2015-16 crop, by API.
2. For 2015-16: Annex-VII.

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

10.2 Parity Ratio Between Prices of Fertilizer and Seed Cotton

48. 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 2006-07 to 2015-16 and presented in Table-15. The quantity of seed cotton needed to buy one nutrient tonne of N fertilizer has ranged between 0.39 to 1.24 tonnes. The parity ratios between prices of seed cotton and those of phosphatic fertilizer have fluctuated from 0.78 to 2.35 during the period of analysis except

2008-09 where the parity ratio jumped to 3.16 because of hike in domestic prices of DAP due to exorbitant rise in world prices. During 2015-16 the prices of phosphorus and nitrogen are greater than the last year which, however had been declining constantly during 2012-13 to 2014-15.

Table-15: Parity Ratio between the Prices of Fertilizer and Seed Cotton: 2006-07 to 2015-16

Crop Year	Sale Prices of		Market Prices of Seed Cotton	Quantity of Seed Cotton needed to buy one nutrient tonne of:	
	Nitrogen N	Phosphorous P		Nitrogen N	Phosphorous P
	----------Rupees per tonne----------			----------Tonnes---------	
2006-07	21600	39000	27400	0.79	1.42
2007-08	22850	28390	36400	0.63	0.78
2008-09	28760	120000	38000	0.76	3.16
2009-10	31850	73620	61150	0.52	1.20
2010-11	35000	98260	89475	0.39	1.10
2011-12	45870	118750	57612	0.80	2.06
2012-13	77870	149570	63688	1.22	2.35
2013-14	74260	139980	72500	1.02	1.93
2014-15	72870	124830	72488	1.00	1.72
2015-16	80950	129190	64825	1.24	1.99

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

49. The intervention price of seed cotton is annually reviewed by the government well before sowing time, mainly with the purpose to regulate the market in case the market prices fall in the open market below a certain level. The Government always encourages the role of private sector in marketing and trade of cotton. As a result, most of transactions in cotton are made in the open market. To ascertain overtime changes in the purchasing power of cotton, the nominal market prices of cotton are being deflated by the Consumer Price Index (CPI). The nominal and real market prices of seed cotton for the Punjab and Sindh for the period 2007-08 to 2015-16 are presented in Table-16 and 17.

11.1 At Market Prices of Seed Cotton in the Punjab

50. The nominal and real market prices of seed cotton for 2007-08 to 2015-16 are shown in Table-16 below and depicted in Figure-5.

Table-16: Nominal and Real Market Prices of Seed Cotton (Phutti) in the Punjab: 2007-08 to 2015-16

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

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 2015-16, Economic Survey of Pakistan 2015-16.

51. The nominal price of seed cotton averaging at Rs 1486 per 40 kgs for 2007-08 crop rose to Rs 4003 per 40 kgs in 2010-11, the highest ever price during the study period, which however, declined in the following two years to Rs 2558 and Rs 2552 per 40 kgs in 2011-12 and 2012-13, respectively. The nominal market price again took an upward trend and reached at Rs.3044 per 40 kgs in 2013-14 which, however once again declined to Rs 2549 per 40 kgs in 2014-15 the lowest since 2010-11. The price improved by 3 per cent in 2015-16 to Rs 2626 per 40 kgs.

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

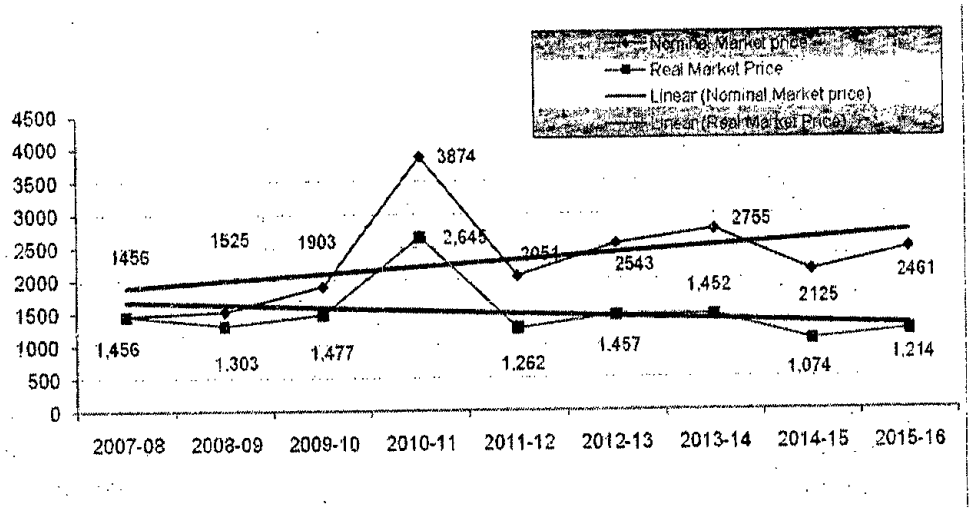

Fig: 5 Nominal and real market prices of seed cotton (Phutti) in Punjab 2007-08 to 2015-16

53. During 2015-16, the nominal market price averaged at Rs 2626 per 40 kgs, which is little bit high by the previous year level. Consequently, the real value of seed cotton has improved by 0.5 per cent over the previous year, but still 13 per cent lower than the base year level. The real price of seed cotton in 2015-16 is, in fact, the second lowest in the entire period under review.

11.2 At Market Prices of Seed Cotton in Sindh

54. The nominal and real market prices of seed cotton in Sindh for 2007-08 to 2015-16 are presented in Table-17 and depicted in Figure-6.

Table-17: Nominal and Real Market Prices of Seed Cotton (Phutti) in Sindh: 2007-08 to 2015-16

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

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 2015-16, Economic Survey of Pakistan, 2015-16.

55. It may be seen from Table-17, that there seems a steady growth trend during 2007-10 in the nominal price of seed cotton in Sindh Province. The degree of fluctuation in the nominal price reflects a similar situation as in Punjab, however, with a different degree of variation. The nominal market price of seed cotton averaging at Rs 1456 per 40 kgs in 2007-08 shot up by 104 per cent to Rs 3874 per 40 kgs in 2010-11, exceptionally, which, however, could not retain and dropped to Rs 2051 per 40 kgs in very next year, i.e. by 47 per cent. The price regained a rising trend in the next two years, but again declined to Rs 2125 per 40 kgs in 2014-15 and 2461 per 40 kgs shows again rising trend in 2015-16. The real market price has experienced same fluctuations, touching the highest value of Rs 2645 per 40 kgs in 2010-11 and the lowest level of Rs 1074 per 40 kgs in 2014-15 over the base line value. In 2015-16, the price, however, evidenced a moderate income for example 13 per cent over the previous year.

56. It is important to note that for five years, the real value of seed cotton remained lower against the base year level. Similarly, due to high inflationary trend throughout the period under review, the real price remained significantly lower than the relative nominal price, which indicates that cotton growers in Sindh have received lower level of real economic returns from the crop.

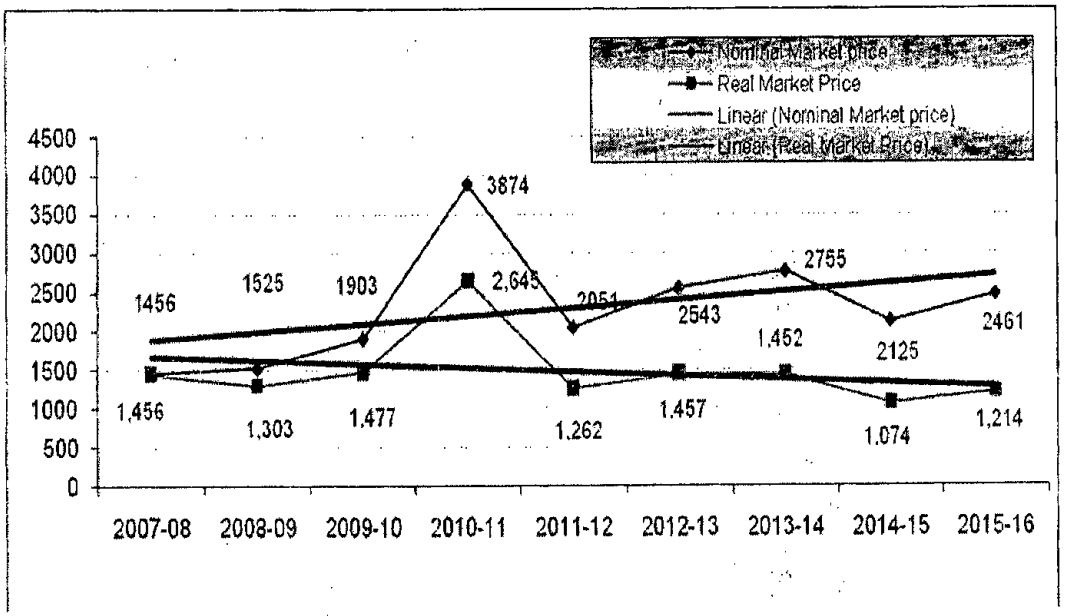

Fig-6: Nominal and real market prices of seed cotton (Phutti) in Sindh 2007-08 to 2015-16

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

57. As reported by the International Cotton Advisory Committee (ICAC) in its May 2, 2016 issue, the global production of cotton during 2015-16 is projected at 21.98 million tones. This is significantly lower @15.85 percent than the production of 26.12 million in 2014-15. During 2016-17, the world production is forecast to increase by 4.46 percent and reach the level of 22.96 million tones. After adding the opening stocks of 22.09 million tones, total supply in 2015-16 worked to 44.07 million tones, 5.29 percent lower than 2014-15. In spite of higher production, the closing stocks forecast to decline to the level of 19.59 million tonnes due to reduced opening stocks for 2016-17.

58. The world consumption of cotton during 2015-16 projected at 23.67 million tones is 0.66 million tonnes lower than the last year level. For 2016-17, cotton consumption is projected at 23.77 million tones, 0.42 percent slightly higher than 2015-16.

59. The end year stocks during 2015-16 projected at 20.40 million tones are about 7.65 percent less than the last year, which are forecast to further decrease to 19.59 million tonnes in 2016-17. The details are provided in table-17.

Table-18: World Production, Consumption, Stocks and Trade in Cotton: 2014-15 to 2016-17

S.No.	Item	2014-15 (Actual)	2015-16 (Estimated)	2016-17 (Projection)
		---------- Million tones ----------		
1.	Opening stocks	20.41	22.09	20.40
2.	Production	26.12	21.98	22.96
3.	Total supply (1+2)	46.53	44.07	43.36
4.	Likely consumption	24.33	23.67	23.77
5.	Trade imbalance and stocks adjustment *	(-)0.11	0.00	0.00
6.	Closing stocks (3-4+5)	22.09	20.40	19.59

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

Source: International Cotton Advisory Committee, May 2, 2016.

13. INTERNATIONAL PRICES

60. The international prices of Index- A and Orleans/Texas Cottons during 2007-08 to 2015-16 are placed in Annex-VIII.

61. The price of Index-A Cotton has been fluctuating between 61,14 US cents, per pound to 165.13 during 2007-11. Since 2011-12, the price is continuously declining and reaching the lowest average of 69.01 cents/lbs in the year 2015-16.

62. Since 2013-14, the Orleans/Texas is not being traded in international market.

14. EXPORT AND IMPORT PARITY PRICES

63. 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.

64. The export and import parity prices of seed cotton have been calculated on the basis of their actual and quoted prices. Detailed calculations in this regard are given at Annex-IX to XII and summarized in Table-19.

Table-19: Export/Import Parity Prices of Seed Cotton as Worked from Various Reference Prices

S. No.	Base/period	Reference price	Worked back price of seed cotton at gin
		US cents/lb	Rs/40 kgs
1.	**Export parity prices based on average:**		
	i) Actual export price of Pakistani cotton		
	- During 2015-16 (Oct-May)	70.01	2,897
	- During 2012-13 to 2014-15	78.81	3,137
	ii) Future's contract prices of New York No.2 cotton(average of Oct, Dec 2016 and March 2017)	65.90	2,431
2.	**Import parity prices based on average:**		
	i) Actual cif (Karachi) prices of imported cotton:	Rs/40 kgs	
	- During 2015-16 (Oct-May)	7,212	3,396
	- During 2012-13 to 2014-15	8,869	3,949
	ii) Index-A Cottons	US cents/lb	
	- During 2015-16 (Oct-May)	69.01	3,139
	- During 2012-13 to 2014-15	83.04	3,604

Sources: Annex-IX to XII.

15. ECONOMIC EFFICIENCY OF RESOURCE USE IN SEED COTTON PRODUCTION

65. Seed cotton is an important cash crop of Pakistan and occupies considerable proportion of the cropped area in the country. On national basis valuable resources in the form of land, water, capital and labour are employed in production of this crop. There-fore, it is very important to estimate efficiency of resources used for producing the crop. Most commonly used measures for this estimation are Nominal Protection Coefficient (NPC), Effective Protection Coefficient and Domestic Resource Cost Coefficient (DRC) and these are derived by constructing Policy Analysis Matrix (PAM). The analysis is based on cost of seed cotton production in Punjab and Sindh, import and export parity prices and foreign exchange rate. Estimated coefficients are summarized in Table-19.

- **Seed cotton under import situation**

66. Data in Table-20 represents economic efficiency estimates under import situation.

67. It may be seen from the referred Table that NPC estimates both for Punjab and Sindh provinces have been continuously much less than one during the period under study. Though these indicate slight variation over the years but mostly have been closer to 0.7. The situation explains that seed cotton growers are implicitly taxed in Pakistan and is suggestive that

sufficient room exists for increasing indicative price of cotton in Pakistan. Because higher price may encourage development of the crop while lower price would do the opposite.

68. Both the NPC and EPC values imply that cotton growers in Pakistan occasionally get economic price (export parity price) and thus are implicitly taxed.

69. The Domestic Resource Cost (DRC) coefficients in seed cotton production calculated at export parity prices are less than one both for Punjab and Sindh provinces. It needs to be noted that DRCs are widely different across the years which may be the result of varying import prices. The DRC values suggest that cost of domestic resources employed in production of the crop is significantly less than the corresponding import cost. Thus seed cotton has comparative advantage in the crop and it would be wise to invest in cotton crop than to import. Last column in Table-20 provides implications for DRCs. The figures are derived by multiplying DRCs with the exchange rate during the concerned year. It is indicated from the Forex earning costs that they fluctuated widely; however, these are too less at times and endorse comparative advantage in seed cotton production in Pakistan.

Table – 20: Nominal and Effective Protection Coefficients for Seed Cotton (Import situation): 2011-12 to 2015-16

Crop/ year	NPC	EPC	DRC	Cost of DRC to earn/ save Forex
Seed cotton (Punjab)				
2011-12	0.64	0.52	0.41	37.14
2012-13	0.83	0.69	0.64	62.91
2013-14	0.80	0.68	0.52	51.18
2014-15	0.66	0.48	0.62	62.95
2015-16	0.67	0.46	0.72	75.89
Seed cotton (Sindh)				
2011-12	0.51	0.38	0.35	31.78
2012-13	0.83	0.70	0.54	53.16
2013-14	0.73	0.60	0.44	44.05
2014-15	0.62	0.44	0.53	53.47
2015-16	0.69	0.51	0.62	64.77

Source: Estimated from the data in Annexes XIII & XIV.

- **Seed cotton under export situation**

70. This analysis is based on cost of production of the foregone crop, its wholesale price in the domestic market and international market price i.e. fob price at Karachi.

- **Nominal Protection Coefficient (NPC)**

71. For the present analysis NPC values for the Punjab and Sindh provinces are produced in Table-21.

72. It is observed in the referred table that NPC estimates both for Punjab and Sindh under export scenario are occasionally higher than one (though with small margin) except in 2011/12 and 2015-16. The same trend is almost maintained for Sindh. From these estimates it may be deduced that on the whole cotton growers in Pakistan have some degree of price protection. In Punjab, they remained taxed during 2011-12 and 2015-16 as NPC was less than one while in Sindh they were taxed during 2012-13 and 2013-14. Since 2012-13 onward domestic prices exceeded the corresponding export parity prices, consequently NPC values for these years exceeded one. It reflects price incentive for increasing cotton production in Pakistan.

73. Being more specific to 2015-16 crop, in this year NPC values for both cotton producing provinces (Punjab, Sindh) declined against the preceding three years. Its main reason is that during 2015-16 price of cotton in the domestic market declined due to price fall in the international market. This calls for revisiting domestic cotton production policy for stabilizing its price in the country.

- **Effective Protection Coefficient (EPC)**

74. Estimates of EPCs under export situation are also presented in Table-21. EPC values during the period 2011-12 to 2015-16 show cyclical behavior. During earlier years of analysis EPC remained below one while in 2013-14 it exceeded for Punjab to 1.15. In 2015-16 it dropped to its lowest ebb during the period of analysis. This analysis reveals that efficiency of cotton crop in Pakistan is sensitive to its price in the domestic market and may suddenly affect cotton growers' profits and development of the crop.

- **Domestic Resource Cost Coefficient (DRC)**

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

76. 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 (Table-21). These figures are derived by multiplying DRCs with exchange rates for the respective years.

Table-21: Nominal, Effective Protection and Domestic Resource Cost Coefficients for Seed Cotton (Export situation): 2011-12 to 2015-16

Crop/ year	NPC	EPC	DRC	Cost of DRC to earn/ save Forex
Seed cotton (Punjab)				
2011-12	0.96	0.88	0.69	62.6
2012-13	1.06	0.98	0.91	89.7
2013-14	1.17	1.15	0.87	86.6
2014-15	1.03	0.92	1.18	120.4
2015-16	0.80	0.60	0.92	95.9
Seed cotton (Sindh)				
2011-12	0.77	0.64	0.58	52.9
2012-13	1.05	0.98	0.76	74.8
2013-14	1.06	0.99	0.74	73.2
2014-15	0.96	0.82	0.97	99.2
2015-16	0.81	0.65	0.76	79.3

Source: Estimated from the data in Annexes XIII & XIV.

77. DRC estimates under import scenario are found significantly less than one which means that Pakistan has comparative advantage in seed cotton production. Very low values of DRCs show that surplus potential in cotton yet remains to be exploited in Pakistan.

16. COTTON YIELD AMONG COMPETING COUNTRIES

78. According to FAO - Statistics Division the latest data on the cotton yield among competing countries are available for 2014. The area, yield and production among competing countries are produced in detail in Annex-XV, while a summary of these factors is presented in Table-22.

79. Globally, the cotton crop occupied an area of 33.535 million hectares in 2014 with a total production of 76.872 million tonnes. The world top 34 cotton producing countries contributed 97.8 per cent of total area and 98.8 per cent of total production.

80. World cotton production for 2014 was estimated at 76.872 million tonnes against 73.038 million tonnes in 2013 which is more by 5.2 per cent. Main reason for increased global production is significant production increase in India.

Table-22: Area, Yield and Production of Seed Cotton Among Competing Countries: 2014

S. No	Country	Area (million ha)	Yield (tonnes/ha)	Production (million tonnes)
1	India	11.800(35.2)	1.610	19.000(24.7)
2	China	4.220(12.6)	4.367	18.430(24.0)
3	United States of America	3.783(11.3)	2.458	9.299(12.1)
4	**Pakistan**	**2.800(8.3)**	**2.268**	**6.350(8.3)**
5	Brazil	1.149	3.732	4.289
6	Uzbekistan	1.301	2.613	3.400
7	Australia	0.450	6.000	2.700
8	Turkey	0.468	5.020	2.350
9	Argentina	0.513	1.988	1.020
10	Greece	0.283	3.257	0.920
11	Burkina Faso	0.651	1.374	0.895
12	Mexico	0.184	4.694	0.862
13	Turkmenistan	0.550	1.036	0.570
14	Egypt	0.200	2.625	0.525
15	Mali	0.570	0.877	0.500
16	Myanmar	0.234	2.106	0.494
17	Côte d'Ivoire	0.250	1.640	0.410
18	Kazakhstan	0.140	2.857	0.400
19	Benin	0.405	0.941	0.382
20	Tajikistan	0.178	2.098	0.373
21	United Republic of Tanzania	0.455	0.791	0.360
22	Zimbabwe	0.400	0.750	0.300
23	Nigeria	0.439	0.682	0.300
24	Cameroon	0.200	1.250	0.250
25	Iran (Islamic Republic of)	0.100	2.250	0.225
26	Spain	0.074	2.961	0.220
27	Malawi	0.190	1.053	0.200
28	Sudan	0.066	2.683	0.176
29	Syrian Arab Republic	0.073	2.234	0.162
30	Zambia	0.125	0.963	0.120
Total of 34 top producing countries		32.795	2.140	75.924
	World Total	33.535	1.668	76.872
	World Total 2013	36.916	1.978	73.038
Top producing countries share at the global level (%)		97.8	-	98.8

Note: The figures in parenthesis are respective% shares.
Source: http://faostat3.fao.org/download/Q/QC/E

81. For 2014, India ranks top in the world with 11.8 million hectares area, followed by China and USA with 4.22 and 3.783 million hectares. Pakistan occupies 4th position cultivating 2.8 million hectares (Table-22).

82. In cotton production, India again ranks on the top with 19 million tonnes, followed by China 18.430 million tonnes and USA 9.299 million tonnes. Pakistan retained 4th position with 6.35 million tonnes in the world.

83. In 2014, Indian share in world cotton area and production is 35.2 and 24.7 percent respectively. China and USA follows India. China has 12.6% share in area and 24% in production. While USA got 11.3% share in area and 12.1 percent in production.

84. So for as yield of the cotton is concerned in the world, Australia is on the top with 6.0 tonnes per hectare. According to 2014 statistics, China ranked 4th in yield with 4.367 tonnes per hectare, while Pakistan occupies 13th position. Cotton yield in Pakistan is at 2.268 tonnes per hectare. This is an alarming situation and deserves special attention among the concerned quarters to enhance yield per unit area in Pakistan to keep up with other leading countries' yield level.

17. COTTON VARIETIES AND YIELD POTENTIAL IN PAKISTAN

85. Cotton is an important cash crop, contributes significantly in foreign exchange earnings. It accounts for 5.1 per cent of the value added in agriculture sector and about 1.0 per cent in the GDP (Pak. Economic Survey 2015-16). Around two-thirds of the country's export earnings are from the cotton made-ups and textiles.

86. Despite of the world's 4th largest cotton producer and a leading exporter of yarn in the world, Pakistan ranked 21th in the world in terms of yield during 2013. As a result, Pakistan annually **imports up to 2.273 million bales** of cotton to meet the growing needs of local textile industry. Therefore it has become vital for Pakistan to increase its yield per acre.

87. Various cotton varieties sown in Pakistan in various ecological zones along with yield potential are presented at Annex-XVI. The data indicate that in the country above hundred varieties are grown. Among those varieties, 93 are upland varieties, 3 hybrid and 13 desi varieties. The yield potential of these varieties ranges from 600 kgs to 4500 kgs per hectare or 15 to 113 maunds of 40 kgs per acre.

88. Several BT cotton varieties have been approved for commercialization in Pakistan. These include IR-1524 developed by the Nuclear Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad FH-113 developed by the Cotton Research Institute, Faisalabad . Bt. Cotton varieties like CEMB-1 and CEMB-2 by the Centre of Excellence in

Molecular Biology institute of the Punjab University Lahore. Ali Akbar-802 of M/s Ali Akbar Seed Multan and Neelam-121 developed by M/s Neelam Seed, Multan. Two hybrid varieties GN-2085 and GN-31 developed by M/s Guard Agricultural Research Services, Raiwind Road also received an endorsement for planting.

89. According to the Annual summary report progress report of Central Cotton Research Institute, Multan for 2009-10, Bt cotton dominated the farmers choice for cultivation, major cotton varieties sown in the Punjab were CIM-496, CIM-499, CIM-473, CIM-506, S-2000, MNH-786, MNH 886 and MNH 121.

90. The Government of Pakistan has officially approved genetically modified cotton crops for cultivation in the country. Bt. Cotton varieties like CEMB-1 and CEMB-2, were developed by the scientists at the Centre of Excellence in Molecular Biology of the Punjab University Lahore. These varieties were recommended by PCCC after more than two years of trials in the field.

18. COST OF PRODUCTION OF SEED COTTON IN COMPETING COUNTRIES

91. The cost of production is the most important part of the multiple criteria used for making price policy proposals. It varies from country to country particularly owing to different price structure, farm incentives and level of input use and technologies. In this section, the cost of production of seed cotton in Pakistan and other competing countries like China, India, Brazil and USA will be discussed. The cost of production of seed cotton in competing countries for 2015-16 crop is provided by the International Cotton Advisory Committee (ICAC). The cost of production of seed cotton has been presented in Pak Rupees by using the average exchange rate during 2015-16 in Table-24 and also depicted in Fig-8.

Table-23: Cost of Production of Seed Cotton in Competing Countries during 2015-16

Country	Average yield per hectare		Cost of cultivation per hectare		Cost of production per 40 kgs	
	Kgs	40 Kgs	US $*	Pak Rupees	US $*	Pak Rupees
China	3919	97.98	3022.7	317383.5	30.84	3239.2
India	2400	60 00	1368.6	143703.0	22.80	2395.0
Brazil	3975	99.38	2151.6	225918.0	21.64	2273.2
USA	2080	52.00	1706.6	179193.0	32.81	3446.0
Pakistan	**1924**	48.10	1271.0	133455.0	26.42	2774.5

Note: * One US $ = Pak Rs 96.4 (average of 2015-16) 105.0 Pak Rs.

Sources: 1. International Cotton Advisory Committee (ICAC), Washington DC, USA.
2. Cotton Policy Analysis for 2015-16 crop, API.

92. The cost of production of seed cotton calculated at Pak Rs 2839 per 40 kgs in Iran is the highest among competing countries followed by Rs 2540 in USA, Rs 2479 in China and Rs 2471 in India. The lowest production cost is reported in Pakistan at Rs 1929 per 40 kgs, while in Turkey, it is Rs 2209.39 per 40 kgs, the nearest country producing cotton at lower cost.

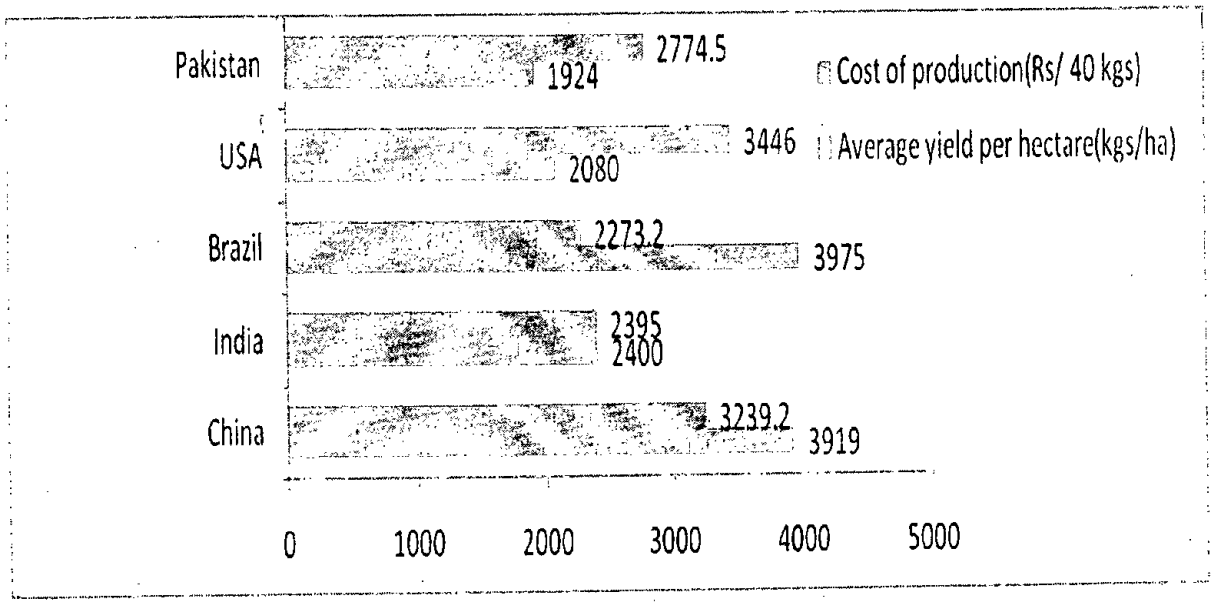

Fig-7: Average Yield and Cost of Production of Seed Cotton in Competing Countries

19. ACKNOWLEDGEMENT

94. The efforts of the following staff members are highly appreciated in completion of Cotton Policy Analysis Report for 2016-17 Crop:

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1.	Sohail Muhammad Khan	Deputy Chief
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Secretary
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ANNEX-I

PROVINCE-WISE AREA (HECTARES), PRODUCTION AND YIELD OF COTTON IN PAKISTAN : 2005-06 TO 2015-16

YEAR	PUNJAB	SINDH	KHYBER PUKHTUNKHWA	BALOCHISTAN	PAKISTAN
AREA		**---------- 000 hectares ----------**			
2005-06	2426.0	637.1	2.10	37.8	3103.0
2006-07	2462.9	570.1	0.30	41.6	3074.9
2007-08	2424.8	607.4	0.20	21.9	3054.3
2008-09	2223.7	561.5	0.20	34.5	2819.9
2009-10	2435.8	634.7	0.04	35.1	3105.6
2010-11	2200.6	457.0	0.17	31.3	2689.1
2011-12	2533.7	259.2	0.24	41.4	2834.5
2012-13	2308.7	530.1	0.24	39.8	2878.8
2013-14	2199.0	568.0	0.26	38.4	2805.7
2014-15	2322.9	596.2	0.97	41.2	2961.3
2015-16	2242.7	621.2	0.40	37.6	2901.9
YIELD		**---------- Kgs per hectare ----------**			
2005-06	720	707	421	440	714
2006-07	715	716	340	439	711
2007-08	636	710	425	438	649
2008-09	669	902	425	440	713
2009-10	597	1144	340	440	707
2010-11	607	1316	430	374	725
2011-12	747	1547	468	446	816
2012-13	702	1091	482	443	770
2013-14	707	1055	497	442	774
2014-15	753	1019	517	442	802
2015-16	481	952	523	442	581
PRODUCTION		**---------- 000 bales ----------**			
2005-06	10268.0	2648.0	5.20	97.7	13018.9
2006-07	10350.0	2398.2	0.60	107.4	12856.2
2007-08	9062.0	2536.2	0.50	56.4	11655.1
2008-09	8751.0	2978.3	0.50	89.2	11819.0
2009-10	8552.0	4270.7	0.08	90.7	12913.5
2010-11	7854.0	3536.8	0.43	68.9	11460.1
2011-12	11129.0	2356.8	0.66	108.5	13595.0
2012-13	9526.0	3400.4	0.68	103.6	13030.7
2013-14	9145.0	3523.4	0.76	99.7	12768.9
2014-15	10277.0	3572.5	2.95	107.1	13959.6
2015-16	6343.0	3475.6	1.23	97.6	9917.4

Sources:

1- For 2005-06 to 2013-14 : Agricultural Statistics of Pakistan 2012-13,NFS&R, Islamabad

2- For 2014-15: Final estimates provided by respective Provincial Agriculture Departments

2- For 2015-16: Final estimates provided by respective Provincial Agriculture Departments

ANNEX-II

PROVINCE-WISE AREA (ACRES),PRODUCTION AND YIELD OF COTTON IN PAKISTAN : 2005-06 TO 2015-16

YEAR	PUNJAB	SINDH	KHYBER PUKHTUNKHWA	BALOCHISTAN	PAKISTAN
AREA			---------- 000 acres ----------		
2005-06	5994.9	1574.3	5.19	93.4	7667.8
2006-07	6086.1	1408.8	0.74	102.8	7598.4
2007-08	5991.9	1500.9	0.49	54.1	7547.5
2008-09	5495.0	1387.5	0.49	85.3	6968.3
2009-10	6019.1	1568.4	0.10	86.7	7674.3
2010-11	5437.9	1129.3	0.42	77.3	6645.0
2011-12	6261.0	640.5	0.59	102.3	7004.4
2012-13	5705.0	1309.9	0.59	98.3	7113.9
2013-14	5433.9	1403.6	0.64	94.9	6933.1
2014-15	5740.1	1473.3	2.40	101.8	7317.6
2015-16	5541.9	1535.0	0.99	92.9	7170.9
YIELD			---------- Kgs per acre ----------		
2005-06	291	286	170	178	289
2006-07	289	290	138	178	288
2007-08	257	287	172	177	263
2008-09	271	365	172	178	288
2009-10	242	463	138	178	286
2010-11	246	533	174	152	293
2011-12	302	626	189	180	330
2012-13	284	442	195	179	312
2013-14	286	427	201	179	313
2014-15	305	412	209	179	324
2015-16	195	385	212	179	235
PRODUCTION			---------- 000 bales ----------		
2005-06	10268.0	2648.0	5.20	97.7	13018.9
2006-07	10350.0	2398.2	0.60	107.4	12856.2
2007-08	9062.0	2536.2	0.50	56.4	11655.1
2008-09	8751.0	2978.3	0.50	89.2	11819.0
2009-10	8552.0	4270.7	0.08	90.7	12913.5
2010-11	7854.0	3536.8	0.43	68.9	11460.1
2011-12	11129.0	2356.8	0.66	108.5	13595.0
2012-13	9526.0	3400.4	0.68	103.6	13030.7
2013-14	9145.0	3523.4	0.76	99.7	12768.9
2014-15	10277.0	3572.5	2.95	107.1	13959.6
2015-16	6343.0	3475.6	1.23	97.6	9917.4

Sources: 1- For 2005-06 to 2013-14 : Agricultural Statistics of Pakistan 2012-13,NFS&R, Islamabad

2- For 2014-15: Final estimates provided by respective Provincial Agriculture Departments

2- For 2015-16: Final estimates provided by respective Provincial Agriculture Departments

ANNEX-III

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SEED COTTON AVERAGE OF 2013-14 TO 2015-16

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

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield
	PUNJAB				
1	Bahawalpur	272.50	1077.46	8.82	672
2	Bahawalnagar	232.51	965.11	7.90	706
3	R.Y.Khan	212.36	860.94	7.05	689
4	Vehari	206.14	823.33	6.74	679
5	Khanewal	190.57	800.00	6.55	714
6	Lodhran	191.68	741.00	6.07	657
7	Multan	148.19	587.70	4.81	674
8	Rajanpur	127.17	530.00	4.34	709
9	Muzaffargarh	143.91	523.44	4.29	618
10	D.G.Khan	100.86	359.66	2.94	606
11	Sahiwal	80.01	297.80	2.44	633
12	Pakpattan	46.62	178.25	1.46	650
13	T.T.Singh	41.73	152.89	1.25	623
14	Layyah	52.40	141.41	1.16	459
15	Mianwali	51.81	136.47	1.12	448
16	Bhakkar	39.78	110.22	0.90	471
17	Jhang	38.57	91.77	0.75	404
18	Okara	20.81	83.18	0.68	680
19	Faisalabad	30.81	80.89	0.66	446
20	Kasur	11.47	24.50	0.20	363
21	Sargodha	7.86	10.91	0.09	236
22	Chiniot	2.67	4.33	0.04	275
23	Khushab	1.33	1.99	0.02	254
24	M.B.Din	1.20	1.72	0.01	244
25	Nankana Sahib	0.94	1.40	0.01	254
26	Jhelum	0.41	0.85	0.01	355
27	Sheikhupura	0.27	0.60	0.00	382
28	Chakwal	0.27	0.52	0.00	328
	Sub Total Punjab	**2254.84**	**8588.33**	**70.31**	**648**
	SINDH				
1	Sanghar	125.37	809.37	6.63	1097
2	Khairpur	79.86	427.15	3.50	909
3	Ghotki	68.37	398.24	3.26	990
4	Nawabshah	59.19	326.24	2.67	937
5	Matiari	40.95	256.79	2.10	1066
6	Mirpurkhas	39.22	252.23	2.06	1093
7	N.Feroze	33.41	187.74	1.54	955
8	Sukkur	30.97	184.20	1.51	1011
9	Umerkot	27.37	162.80	1.33	1011
10	Tando Allaahyar	23.15	139.14	1.14	1022
11	Badin	21.39	118.28	0.97	940
12	Jamshoro	15.44	92.83	0.76	1022
13	Dadu	10.62	59.28	0.49	949
14	Hyderabad	6.54	39.25	0.32	1020
15	Thatta	6.44	33.60	0.28	887
16	Tando Muhammad Khan	4.13	22.95	0.19	945
17	Tharparkar	1.09	6.07	0.05	944
18	Larkana	0.95	4.34	0.04	779
19	Karachi	0.67	3.27	0.03	830
20	Shikarpur	0.02	0.09	0.00	816
	Sub Total Sindh	**595.14**	**3523.85**	**28.85**	**1007**
	Sub Total of Khyber Pukhtunkhwa	**0.54**	**1.65**	**0.01**	**515**
	Sub Total of Balochistan	**39.07**	**101.47**	**0.83**	**442**
	Total of Pakistan	**2889.59**	**12215.30**	**100.00**	**719**

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

Sources: 1- MINFA, Islamabad
2- Respected Agriculture Provincial Departments

Annex-IV

AVERAGE FARMER COST OF PRODUCTION ESTIMATES OF SEED COTTON IN THE PUNJAB: 2015-16 TO 2016-17

No.		Av. No of operations per acre based on 2002-03 Survey	2015-16		2016-17		Change in 2016-17 over 2015-16
			Rate per unit	Cost per acre	Rate per unit	Cost per acre	
		3	4	5=3*4	6	7=3*6	8=7-5
1	Land preparation:				Rupees		
	1.1 Deep ploughing	0.228	1400	319.20	1200	273.60	-46
	1.2 Rotavator	0.233	1600	372.80	1300	302.90	-70
	1.3 Ploughing	3.200	700	2240.00	700	2240.00	0
	1.4 Planking	0.421	350	147.35	350	147.35	0
	1.5 Ploughing+planking	1.341	700	938.70	700	938.70	0
	1.6 Levelling (tractor hrs)	0.537	700	375.90	700	375.90	0
2	Seed and sowing operations:						
	2.1 Seed (Kg)	7.643	200	1528.60	260	1987.18	459
	2.2 Sowing						
	2.2.1 Ploughing + planking	0.394	700	275.80	700	275.80	0
	2.2.2 Ridging	0.228	700	159.60	700	159.60	0
	2.2.3 Drilling	0.772	700	540.40	700	540.40	0
	2.2.4 Manual labour for sowing (M. day)	0.369	350	129.15		800.00	671
3	Irrigation: (Nos)						
	3.1 Canal	2.156		95.72		95.72	0
	3.2 Private tubewell	1.706	900	1535.00	900	1535.40	0
	3.3 Mixed	2.739	700	1917.30	700	1917.30	0
	3.4 Labour for irrigation and water course cleaning (m.days)	3.462	350	1211.70	400	1384.80	173
4	Interculture:						
	4.1 With tractor	2.640	700	1848.00	700	1848.00	0
	4.2 Manual weeding/thining (m.days)	4.600	350	1610.00	400	1840.00	230
5	Plant Protection including application (weedicides + pesticides)	5.769	800	4615.20	700	4038.30	-577
6	Farm Yard Manure including transport and application 50% (Per acre)			700.00		800.00	100
7	Fertilizers: (bags)						
	7.1 DAP	0.731	3768	2754.41	3100	2266.10	-488
	7.2 SSP	0.071	1086	77.11	1086	77.11	0
	7.3 NP	0.069	2591	178.78	2100	144.90	-34
	7.4 SOP	0.029	4900	142.10	5200	150.80	9
	7.5 Urea	2.297	1867	4288.50	1820	4180.54	-108
	7.6 CAN	0.224	1614	361.54	1614	361.54	0
	7.7 NPK	0.046	3108	142.97	3100	142.60	0
	7.8 Humic Acid (Ltr)	1.000			800	800.00	800
	7.9 Fertilizer transport and application (bag)	3.467	45	156.02	84	291.23	135
8	Mark up on investment @ 15 % per annum for 8 months on items 1 to 8 minus 3(1)			2857		2982	2982
9	Management charges for 8 months			1454.00		1790.40	336
10	Land rent for 8 months		25000	16667	25000	16667	0
11	Average weighted land Tax @Rs 132/acre/annum for 8 months		132	88.00	132	88.00	0
12	Land revenue including local rate, chaukidara etc			5.00		5.00	0
13	Payment to pickers (Rs./40Kg)		300	5700.00	303	5700.00	0
14	Cutting of cotton sticks			600.00		600.00	0
15	Gross cost (item 1 to 14)			56,032.11		57,747.83	1716
16	Value of cotton sticks			1000.00		1000.00	0
17	Net cultivation cost (item 15-16)			55032		56748	1716
18	Yield per acre (kgs)			**760.00**		**752.00**	-8
19	Cost of production per 40 kgs at farm level						
	19.1 including land rent			2896.43		3018.50	122
	19.2 excluding land rent			2019.23		2131.98	113
20	Marketing expenses: (Rs/40 kgs)			40.00		40.00	0
21	Cost (Rs/ 40 kgs) at market/ginnery:						
	21.1 including land rent			2936.43		3058.50	122
	21.2 excluding land rent			2059.23		2171.98	113

Notes:

Manual labour for sowing for 2016-17 is contract cost/ acre.

Yield - average of last three years as given in the respective API policy reports.

Annex-V

AVERAGE FARMER COST OF PRODUCTION ESTIMATES OF SEED COTTON IN THE SINDH: 2015-16 TO 2016-17

Sr. No.	Operations / inputs	Av. No of operations per acre based on 2002-03 Survey	2015-16		2016-17		Change in 2016-17 over 2015-16
			Rate per unit	Cost per acre	Rate per unit	Cost per acre	
1	2	3	4	5=3*4	6	7=3*6	8=7-5
1	Land preparation:						
	1.1 Deep ploughing	0.553	1600	884.80	1400	774.20	-111
	1.2 Rotavator	1.000			1200	1200.00	1200
	1.3 Ploughing	2.071	1100	2278.10	700	1449.70	-828
	1.4 Planking	0.030	550	16.50	350	10.50	-6
	1.5 Ploughing+planking	1.333	1100	1466.30	900	1199.70	-267
	1.6 Levelling (tractor hrs)	0.859	1100	944.90	1100	944.90	0
2	Seed and sowing operations:						
	2.1 Seed (Kg)	10.279	200	2055.80	300	3083.70	1028
	2.2 Sowing						
	2.2.1 Ploughing + planking	0.160	1100	176.00	1100	176.00	0
	2.2.2 Ridging	0.236	1100	259.60	850	200.60	-59
	2.2.3 Drilling	0.763	1100	839.30	700	534.10	-305
	2.2.4 Manual labour for sowing (M.day)	0.988	350	345.80		800.00	454
3	Irrigation: (Nos)						
	3.1 Canal	3.148		93.09		93.09	0
	3.2 Private tubewell	2.454	700	1717.80	700	1717.80	0
	3.3 Mixed	0.413	600	247.80	600	247.80	0
	3.4 Lift irrigation	0.251	200	50.20			-50
	3.5 Labour for irrigation and water course cleaning (m.days)	3.732	350	1306.20	350	1306.20	0
4	Interculture:						
	4.1 With tractor	0.524	1100	576.40	700	366.80	-210
	4.2 With bullock	1.259	1100	1384.90	800	1007.20	-378
	4.3 Manual weeding/thining (m.days)	4.700	350	1645.00	350	1645.00	0
5	Plant Protection including application (weedicides + pesticides)	4.200	800	3360.00	700	2940.00	-420
6	Farm Yard Manure including transport and application 50% (per acre)			600.00		700.00	100
7	Fertilizers: (bags)						
	7.1 DAP	0.893	3633	3244.27	2700	2411.10	-833
	7.2 NP	0.076	2577	195.85	2187	166.21	-30
	7.3 Urea	1.834	1853	3398.40	1839	3372.73	-26
	7.4 CAN	0.016	1577	25.23			-25
	7.5 NPK	0.056	3100	173.60			-174
	7.6 Humic Acid (Ltr)	1.000			598	598.00	598
	7.7 Fertilizer transport and application (bag)	2.880	45	129.60	87	250.56	121
8	Mark up on investment @ 15 % per annum for 8 months on items 1 to 8 minus 3(1)			2732		2710	-22
9	Management charges for 8 months			1375.00		1790.40	415
10	Land rent for 8 months		20000	13333	20000	13333	0
11	Average weighted land Tax @Rs 132/acre/annum for 8 months		200	133.33	200	133.33	0
12	Land revenue including local rate, chaukidara etc			5.00		5.00	0
13	Drainage Cess @Rs 24/acre/annum for 8 months		24	16.00		16.00	0
14	Payment to pickers (Rs./ 40 Kg)		300	5,977.50	300	5,887.50	-90
15	Cutting of cotton sticks.			1000.00		1000.00	0
16	Gross cost (item 1 to 14)			51,987.85		52,071.73	84
17	Value of cotton sticks			1000.00		1000.00	0
18	Net cultivation cost (item 16-17)			50988		51072	84
19	Yield per acre (kgs)			797.00		785.00	-12
20	Cost of production per 40 kgs at farm level						
	20.1 including land rent			2558.99		2602.38	43
	20.2 excluding land rent			1889.81		1,922.98	33
21	Marketing expenses: (Rs/40 kgs)			40.00		40.00	0
22	Cost (Rs/ 40 kgs) at market/ginnery:						
	22.1 including land rent			2598.99		2642.38	43
	22.2 excluding land rent			1929.81		1962.98	33

Notes: Manual labour for sowing is contarct cost per acre.
Yield - average of last three years as given in the respective API policy reports.

Notes for Annexes -IV & V:

1. The input-output parameters for estimating cost of production of Seed Cotton, 2015-16 crop have been adopted from the "Cotton Policy Analysis for 2014-15 crop", API Series No.250.

2. The inputs' prices, hiring rates of cultural operations, water rate and picking charges are revised in the light of data collected through the annual field survey of API conducted in major cotton producing areas of Punjab and Sindh during March 2016, discussions made and information provided by the representatives of Provincial Departments and Farmers' Associations in the meeting of the Standing Committee on Seed Cotton, held on 2 March, 2016 at the API premises in Islamabad.

3. The prices of chemical fertilizers have been revised in the light of fertilizer prices collected from the field through the API survey.

4. The cost of plant protection measures is revised in view of with-drawl of GST on pesticides @ 10% by the government in 2015 and field information.

5. The cost of supplementary irrigation has been adjusted in view of reduction in diesel price since July 2015 onward and rate actually charged by the farmers in the field and reduction in power tariff from Rs 8.85 to 5.35/kwh between July 2015 and June 2016.

6. The management charges for a manger looking after a 25 acre farm and devoting one-fourth of his time to the managerial activities has been worked out at Rs 15950 per month for a Field Assistant at the 15th stage in BPS-6 as per revised scale of July 2016, including 50% Adhoc Relief of 2010.

7. Land rent is a very important component of the cost of production in both provinces. It is influenced by several factors and widely varies from field to field and region to region. For updating the land rentals, there is no precise measure available at hand. However, keeping in view the observations obtained during the field survey of March 2016 and discussions made in the meeting of the API Committee on Cotton, the land rentals have been adjusted accordingly.

ANNEX-VI

ECONOMICS OF SEED COTTON AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2015-16 CROPS

S #	Province/crops/crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per		
										Rupee of purchased inputs	Crop day	Acre inch of water used
		Days	Acre inches	.....Rupees per acre.....					Ratio	.....Rupees.....		
	1	2	3	4	5	6	7=6-5	8=6-4	9=6/4	10=6/5	11=6/2	12=6/3
	Punjab											
1	Seed Cotton	240	22	55454	18998	50134	31136	-5320	0.90	2.64	209	2279
2	Basmati Paddy	180	58	47869	23330	40564	17234	-7304	0.85	1.74	225	699
3	IRRI Paddy	180	62	44457	20988	33039	12051	-11418	0.74	1.57	184	533
4	Wheat	180	12	38343	14094	41510	27416	3167	1.08	2.95	231	3459
5	Sunflower (spring)	180	22	41690	17858	40300	22443	-1390	0.97	2.26	224	1832
6	Seed Cotton + Wheat	420	34	93797	33092	91644	58552	-2153	0.98	2.77	218	2695
7	Seed Cotton+Sunflower	420	44	97144	36856	90434	53578	-6710	0.93	2.45	215	2055
8	Basmati Paddy+Wheat	360	70	86212	37424	82074	44650	-4138	0.95	2.19	228	1172
9	Basmati Paddy+Sunflower	360	80	89559	41188	80864	39677	-8695	0.90	1.96	225	1011
10	IRRI Paddy + Wheat	360	74	82800	35082	74549	39467	-8251	0.90	2.12	207	1007
11	IRRI Paddy+Sunflower	360	84	86147	38846	73339	34493	-12808	0.85	1.89	204	873
12	Sugarcane	394	48	80503	24139	93250	69111	12747	1.16	3.86	237	1943
	Sindh											
1	Seed Cotton	240	18	52041	16047	49238	33192	-2803	0.95	3.07	205	2735
2	IRRI Paddy	180	56	38300	13822	37967	24145	-334	0.99	2.75	211	678
3	Wheat	180	12	35877	13025	40173	27148	4296	1.12	3.08	223	3348
4	Sunflower (spring)	180	22	42280	17908	40300	22393	-1980	0.95	2.25	224	1832
5	Seed Cotton + Wheat	420	30	87918	29071	89411	60340	1493	1.02	3.08	213	2980
6	Seed Cotton+Sunflower	420	40	94321	29071	89538	60467	-4783	0.95	3.08	213	2238
7	IRRI Paddy+ Wheat	360	68	74177	26847	78139	51293	3962	1.05	2.91	217	1149
8	IRRI Paddy+Sunflower	360	78	80581	31729	78267	46537	-2314	0.97	2.47	217	1003
9	Sugarcane	488	71	95334	30037	113355	83318	18021	1.19	3.77	232	1597

Notes for Annex - VI

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2015-16 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, 2015-16 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 2015-16 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2015-16 crops, some marginal revisions have been made as under:

2.1 The cost of fertilizers has been revised in view of their prices prevailed at the time of application for the respective crops in 2015-16 season.

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 minimum guaranteed price of wheat at Rs 1300 per 40 kgs, as maintained by the government for 2015-16 crop, has been adopted for the current analysis.

4.2 The wholesale market prices of basmati paddy and IRRI paddy during the post- harvest period in major producer area markets have averaged at Rs 1320 and Rs 801 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 713 per 40 kgs.

4.3 The wholesale market prices of seed cotton during the post-harvest months of Sep - Feb 2015-16 in the main producer area markets have averaged at Rs 2626 per 40 kgs in the Punjab and Rs 2461 in Sindh.

4.4 The price of sunflower 2014-15 crop has been reported hovering around Rs 2050/40 kgs and Rs 2375 for canola.

4.5 The market prices of sugarcane at mill-gate in the major cane producing areas are reported to hover around Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh.

5. The market prices have been adjusted for the marketing expenses to make them effective at the farm level. These expenses amount to Rs 15 per 40 kgs in Punjab and Rs 14.32 in Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 45 for rice paddy in Punjab and Sindh, and Rs 35 for wheat and oilseeds.

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.

Annex-VII

PROFITABILITY OF FERTILIZER USE ON SEED COTTON AT THE MARKET PRICE: 2015-16

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	37.5	45	52.5
			-------- Rupees -------			
2	Direct cost of 10 kgs of NPK fertilizer at the weighted average price of Rs 1217.7 per nutrient kg (i.e. Rs 161.9, 129.19 and Rs.196.00 per nutrient kg of N,P and K at the recommended NPK ratio of 2:1:1(a)		1217.7	1217.7	1217.7	1217.7
3	Indirect cost due to the application of additional fertilizer as detailed below(b)		396.51	460.2	524.01	584
	3.1	Transportation and application charges of 20 kgs of fertilizer @ Rs 45.0 per bag of fertilizer	18	18	18	18
	3.2	Picking charges for additional produce @ Rs 300.0 per 40 kgs	225	281.2	337.5	390
	3.3	Marketing charges for additional produce @ Rs 40.0 per 40 kgs	30	37.5	45	52.5
	3.4	Mark up on direct cost of fertilizer (item2+3.1) for 8 months @ 15 % per annum	123.51	123.51	123.51	123.51
4	Total additional cost (item 2+3)		1614.2	1677.9	1741.7	1801.7
5	Value of additional produce @ Rs 2593 per 40 kgs(c)		1944	2430.7	2917	3403
6	Benefit cost ratio (item 5 divided by item 4)		1.2	1.44	1.67	1.98

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 2015-16 crop taken respectively as Rs 1860, 3700 and 4900 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 2015-16 crop.

c) Average market prices of seed cotton for 2015-16 crop in the Punjab and Sindh during September to December, 2015 have been used.

ANNEX- VIII

INTERNATIONAL PRICES OF COTTONS: 2005-06 TO 2015-16

Years Aug-Jul	Index- A Cottons	Orleans/ Texas SLM 1-1/32"
	-----US Cent per pound-----	
2007-08	72.90	69.83
2008-09 *	61.14	56.05
2009-10	70.80	77.58
2010-11	165.13	89.00
2011-12	99.75	100.53
2012-13	87.84	88.32
2013-14	90.53	N.Q
2014-15	70.75	N.Q
2015-16	**69.01**	**N.Q**
August	72.00	N.Q
September	69.00	N.Q
October	69.00	N.Q
November	69.21	N.Q
December	70.52	N.Q
January	69.00	N.Q
February	66.55	N.Q
March	65.38	N.Q
April	69.17	N.Q
May	70.27	N.Q

Note:

* From 2008-09, the prices of Orleans/ Texas 1-1/32" and Index-A cottons are for CFR Eastren Quotation.

Source: Cotton Outlook (various issues).

ANNEX- IX

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

S.No	Item	2015-16 (Aug-Apr)	2012-13 to 2014-15
		US Cents per pound	
1.	Actual average export price	71.01	78.81
		OR Rupees (a)	
	Actual average export price per 40 Kgs	6563	7284
2.	Marketing expenses (Transportation, port handling forwarding,wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	425	425
3.	Ex- gin price of lint per 40 Kgs (item 1- item 2)	6138	6859
4.	Value of 80 kgs of cotton seed (b)	3152	3152
5.	Ginning charges for 120 kgs of seed cotton	600	600
6.	Value of 120 kgs of seed cotton (c) (items 3 +4 - item 5)	8690	9411
7.	Seed cotton price per 40 kgs (item 6 / 3)	2897	3137

Notes:

a) One US $ = 104.81 Pak rupees.

b) Average price of cotton seed for October 2015 to May, 2016 in Multan, R.Y. Khan, D.G. khan and Bahawalpur markets was Rs 1576 per 40kgs

c) 120 kgs of seed cotton = 80 kgs of cotton seed + 40 kgs of lint.

Sources:

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

ANNEX- X

EXPORT PARITY PRICE OF SEED COTTON ON THE BASIS OF FUTURE'S CONTRACT PRICE OF NEW YORK NO. 2 COTTON (AVERAGE OF OCTOBER, DECEMBER, 2016 AND MARCH, 2017)

S.No	Item	Price calculations
		US Cents per pound
1.	Future's contract price as reported by KCA 'June 07, 2016	65.90
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	55.9
		OR Rupees (a)
	Parity price per 40 kgs	5167
5.	Marketing expenses (Transportation, port handling forwarding,wharfage, packing, taxes and duties, insurance etc) per 40 Kgs	425
6.	Ex- gin price of cotton lint per 40 kgs (item 4 - item 5)	4742
7.	Value of 80 kgs of cotton seed (b)	3152
8.	Ginning charges for 120 kgs of seed cotton	600
9.	Value of 120 kgs of seed cotton (c) (items 6 + 7 - item 8)	7294
10.	Seed cotton price per 40 kgs (item 9 / 3)	2431

Notes:

a) One US $ = 101.79 Pak rupees.

b) Average price of cotton seed for October 2015 to May, 2016 in Multan, R.Y. Khan, D.G. khan and Bahawalpur markets was Rs 1576 per 40kgs

c) 120 kgs of seed cotton = 80 kgs of cotton seed + 40 kgs of lint.

Sources:

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

ANNEX- XI

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

S. No	Item	2015-16 (Aug-Apr)	2012-13 to 2014-15
		Rupees per 40 kgs	
1.	Actual average cif (Karachi) price	7212	8869
2.	Handling charges at port and transport cost from port to textile mill at Karachi @ 5 % of cif price	425	425
3.	Ex- gin price of cotton lint (Item 1+ item 2)	7637	9294
4.	Value of 80 kgs of cotton seed (a)	3152	3152
5.	Ginning charges for 120 kgs of seed cotton including ginning losses	600	600
6.	Value of 120 kgs of seed cotton (item 3 +item 4 - item 5)	10189	11846
7.	Seed cotton price (item 6/ 3)	3396	3949

Note:

a) Average price of cotton seed for October 2015 to May, 2016 in Multan, R.Y. Khan, D.G. khan and Bahawalpur markets was Rs 1576 per 40kgs

Sources:

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

ANNEX- XII

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

S. No	Item	2015-16 (Aug-Apr)	2012-13 to 2014-15
		US cent per pound	
1.	Index-A cottons assumed as cif (Karachi) price	69.01	83.04
2.	Insurance, agents commission, and port handling charges @ 5% cif price	3.45	4.15
3.	Landed cost at Karachi	72.46	87.19
		OR Rupees (a)	
	Landed cost at Karachi per 40 kgs	6697	8059
4.	Handling charges at port and transport cost from port to textile mills at Karachi @ 2.5 % of cif price	167	201
5.	Ex- gin price of cotton lint (item 3 + item 4)	6865	8260
6.	Value of 80 kgs of cotton seed (b)	3152	3152
7.	Ginning charges for 120 kgs of seed cotton including ginning losses	600	600
8.	Value of 120 kgs of seed cotton (item 5 +item 6 - item 7)	9417	10812
9.	Seed cotton price per 40 kgs (item 8/ 3)	3139	3604

Notes:

a) One US $ = 101.79 Pak rupees.

b) Average price of cotton seed for October 2015 to May, 2016 in Multan, R.Y. Khan, D.G. khan and Bahawalpur markets was Rs 1576 per 40kgs

Sources:

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

Annex -XIII

Based on Export Parity Price

ECONOMIC EFFICIENCY OF RESOURCE USE IN SEEDCOTTON

(POLICY ANALYSIS MATRIX)

Province/Year	Gross Revenue	Traded cost	Domestic Factors Cost	Profits
	Rupees per acre			
PUNJAB				
2011-12				
Private Prices	48535	16377	24974	7184
Social Prices	50292	13757	25175	11361
Transfers	-1758	2620	-201	-4177
2012-13				
Private Prices	48522	20329	26177	2017
Social Prices	45923	17076	26375	2472
Transfers	2599	3253	-198	-455
2013-14				
Private Prices	57723	20939	27711	9073
Social Prices	49514	17589	27910	4015
Transfers	8209	3350	-199	5058
2014-15				
Private Prices	47759	22451	32923	-7616
Social Prices	46562	18998	32613	-5049
Transfers	1197	3453	310	-2566
2015-16				
Private Prices	44529	22870	33162	-11503
Social Prices	55283	19398	32847	3039
Transfers	-10754	3473	315	-14542
SINDH				
2011-12				
Private Prices	40048	15523	22204	2321
Social Prices	51512	13039	22386	16086
Transfers	-11464	2484	-183	-13765
2012-13				
Private Prices	49508	19161	23400	6947
Social Prices	47028	16096	23581	7352
Transfers	2480	3066	-181	-405
2013-14				
Private Prices	53552	19807	24881	8864
Social Prices	50690	16638	25163	8890
Transfers	2861	3169	-282	-26
2014-15				
Private Prices	46648	21312	30440	-5104
Social Prices	48780	17902	30087	791
Transfers	-2132	3410	353	-5895
2015-16				
Private Prices	46648	21434	30554	-5340
Social Prices	57926	18005	30197	9724
Transfers	-11278	3429	356	-15063

Annex - XIV

Based on Import Parity Price

ECONOMIC EFFICIENCY OF RESOURCE USE IN SEEDCOTTON

(POLICY ANALYSIS MATRIX)

Province/Year	Gross Revenue	Traded cost	Domestic Factors Cost	Profits
PUNJAB	Rupees per acre			
2011-12				
Private Prices	48535	16377	24974	7184
Social Prices	75350	13757	25175	36419
Transfers	-26816	2620	-201	-29235
2012-13				
Private Prices	48522	20329	26177	2017
Social Prices	58228	17076	26375	14776
Transfers	-9705	3253	-198	-12759
2013-14				
Private Prices	57723	20939	27711	9073
Social Prices	71580	17589	27910	26081
Transfers	-13857	3350	-199	-17008
2014-15				
Private Prices	47759	22451	32923	-7616
Social Prices	71737	18998	32613	20126
Transfers	-23978	3453	310	-27741
2015-16				
Private Prices	44529	22870	33162	-11503
Social Prices	64764	19398	32847	12520
Transfers	-20235	3473	315	-24023
SINDH				
2011-12				
Private Prices	40048	15523	22204	2321
Social Prices	77034	13039	22386	41609
Transfers	-36986	2484	-183	-39288
2012-13				
Private Prices	49508	19161	23400	6947
Social Prices	59637	16096	23581	19960
Transfers	-10129	3066	-181	-13014
2013-14				
Private Prices	53552	19807	24881	8864
Social Prices	73199	16638	25163	31399
Transfers	-19647	3169	-282	-22535
2014-15				
Private Prices	46648	21312	30440	-5104
Social Prices	75181	17902	30087	27192
Transfers	-28533	3410	353	-32296
2015-16				
Private Prices	45648	21434	30554	-6340
Social Prices	66868	18005	30197	18666
Transfers	-21220	3429	356	-25006

Notes for Annexes- XIV & XV:

- **Nominal and Effective Protection Coefficients**

Nominal Protection Coefficient refers to the ratio between domestic output prices and social prices that measure the impact of output pricing policies without including interventions/ distortions in the input market. If NPC is greater than one it indicates level of protection granted to a particular crop. It encourages farmers to produce more. And if NPC is less than one it reflects an implicit taxation to the domestic growers. The later situation implies outflow of resources from agriculture through the seed cotton crop.

- **Domestic Resource Cost Coefficient (DRC)**

DRC refers to the ratio of domestic factors' cost at social prices to the value added at social prices. DRC less than one implies comparative advantage since the domestic production can save foreign exchange at costs less than the cost of corresponding imports. A situation where DRC value is less than one, indicates comparative advantage in the crop and the vice versa. It may, however, be pointed out that DRC would vary with the changes in the opportunity cost of non-tradable inputs and social value of output.

ANNEX-XV

AREA, YIELD AND PRODUCTION OF SEED COTTON AMONG COMPETING COUNTRIES: 2014

Area (million ha)
Yield (tonnes/ha)
Prodn. (million tonnes)

S.No	Country	Area	Yield	Production	S.No	Country	Area	Yield	Production
1	Australia	0.444	6.027	2.676	27	Angola	0.003	1.833	0.006
2	Turkey	0.451	4.990	2.250	28	Iran (Islamic Republic of)	0.110	1.818	0.200
3	Mexico	0.124	4.735	0.587	30	Nicaragua	0.002	1.818	0.004
4	China, mainland	4.350	4.352	18.930	31	Morocco	0.000	1.680	0.000
5	Brazil	0.939	3.625	3.404	32	**India**	**11.700**	**1.616**	**18.913**
6	Greece	0.250	3.440	0.860	33	Argentina	0.361	1.502	0.543
7	South Africa	0.007	3.286	0.023	34	Mozambique	0.185	1.395	0.258
8	Bangladesh	0.017	3.247	0.055	35	Viet Nam	0.007	1.308	0.009
9	Guatemala	0.001	3.182	0.004	36	Cambodia	0.000	1.300	0.000
10	Israel	0.009	3.178	0.029	37	Myanmar	0.330	1.288	0.425
11	Syrian Arab Republic	0.155	3.161	0.490	38	Ecuador	0.003	1.277	0.004
12	Republic	0.002	3.158	0.006	39	Ethiopia	0.085	1.235	0.105
13	Egypt	0.140	3.107	0.435	40	Sudan (former)	0.068	1.225	0.084
14	Kyrgyzstan	0.023	2.925	0.069	41	Yemen	0.018	1.194	0.022
15	Kazakhstan	0.138	2.875	0.397	42	Thailand	0.007	1.185	0.008
16	Peru	0.031	2.649	0.082	43	Burkina Faso	0.500	1.180	0.590
17	Uzbekistan	1.308	2.570	3.361	44	Afghanistan	0.036	1.162	0.042
18	United States of America	3.053	2.498	7.626	45	Côte d'Ivoire	0.230	1.143	0.263
19	Iraq	0.015	2.483	0.036	46	Cameroon	0.210	1.143	0.240
20	Spain	0.064	2.275	0.146	47	Albania	0.001	1.108	0.001
21	**Pakistan**	**2.806**	**2.210**	**6.200**	48	Paraguay	0.045	1.100	0.050
22	Botswana	0.000	2.128	0.001	49	Madagascar	0.013	1.100	0.014
23	Tajikistan	0.200	2.100	0.420	50	Guinea-Bissau	0.005	1.064	0.005
24	Democratic People's Republic of Korea	0.019	2.053	0.039	51	Colombia	0.032	1.056	0.033
25	El Salvador	0.000	1.947	0.001	52	Senegal	0.032	1.031	0.033
26	Azerbaijan	0.024	1.923	0.045	53	Mali	0.484	1.000	0.484
27	Honduras	0.002	1.875	0.003	54	Venezuela (Bolivarian Rep)	0.025	1.000	0.025
	World Avg. Yield		**1.978**						

Source:World Statistics Year Book 2014

COTTON VARIETIES AND YIELD POTENTIAL IN PAKISTAN

ANNEX-XVI

S.No.	Name of variety	Yield (Kgs/hect.)	S.No.	Name of variety	Yield (Kgs/hect.)
	Upland				
1	Sindh-1, ARI, Tandoo Jam	4500	56	MNH 554, CRS, Multan	2800
2	CRIS-134, CCRI-Sakrand	4500	57	FH 634, CRI, Faisalabad	2800
3	Malmal, ARI, Tando Jam	4238	58	Gomal 93, CRS, D.I.Khan	2800
4	CRIS-342, CCRI-Sakrand	4000	59	NIAB 86, NIAB, Faisalabad	2800
5	CRIS-121, CCRI-Sakrand	4000	60	CRIS 134, CRI, Sakrand	2700
6	Hari Dost, ARI, Tando Jam	3948	61	Niab 111 Nhiab, Faisalabad	2600
7	Marvi, CCRI-Sakrand	3900	62	Sohani NIA, Tandojam	2500
8	S 12, CRS, Multan	3900	63	Reshmi, ARI, Tando Jam	2290
9	CRIS-467, CCRI-Sakrand	3800	64	BH 160 CRS, Bahawalpur	2500
10	Chandi-95, NIA, Tando Jam	3800	65	Marvi, CRI, Sakrand	2500
11	Sadori, ARI, Tando Jam	3500	66	Shahbaz 95 ARI, Tandojam	2500
12	Sohni, NIA, Tando Jam	3500	67	B557, CRI, Faisalabad	2500
13	SLS 1, CRS, Sahiwal	3500	68	Shaheen, CRS, Ghotki	2200
14	NIAB 78, NIAB, Faisalabad	3500	69	SLH 41, CRS, Sahiwal	2200
15	MNH 93, CRS, Multan	3500	70	MS 84, CRS, Multan	2100
16	MNH 147, CRS, Multan	3300	71	K 68/9, CRS, Ghotki	2000
17	NIA-Ufaq, NIA, Tando Jam	3200	72	Qalandari, CRS, Tandojam	2000
18	FH 682, CRI Faisalabad	3200	73	149 F, CRS, Multan	2000
19	CRIS-9, CCR-Sakrand	3100	74	Sar,ast. CRS. Tandojam	1800
20	CRIS 9, CRI, Sakrand	3100	75	MS 40, CRS, Multan	1700
21	BH36, CRS, Bahawalpur	3100	76	MS 39, CRS, Multan	1650
22	CIM 70, CCRI, Multan	3100	77	AC 134, CRI, Faisalabad	1600
23	CIM 496, CCRI, Multan	3000	78	Lasani 11, CRI, Faisalabad	1600
24	CRIS 467 CRI Sakrand	3000	79	M 100, CRS, Tandojam	1500
25	CIM 707 CCRI, Multan	3000	80	362 F, CRI, Faisalabad	1500
26	CIM 506 CCRI, Multan	3000	81	BS1 CRSS, Khanpur	1200
27	CIM 499 CCRI, Multan	3000	82	238F, CRI, Faisalabad	1000
28	FH 1000, Faisalabad	3000	83	268F, CRI, Faisalabad	1000
29	NIAB 78, NIAB, Faisalabad	3000	84	216F, CRI, Faisalabad	1000
30	CIM 473, CCRI, Multan	3000	85	LSS, CRI, Faisalabad	1000
31	FH 118, CRS, Bahawalpur	3000	86	289F/K25, BCGA, Khanewal	1000
32	CIM 482, CCRI, Multan	3000	87	289F, CRI, Faisalabad	950
33	FH 900, CRI, Faisalabad	3000	88	199F, CRS, Multan	900
34	FH 901, CRI, Faisalabad	3000	89	124 F, CRI, Faisalabad	900
35	CIM 443 CCRI, Multan	3000	90	M 4, CRS, Tandojam	900
36	CIM 446 CCRI, Multan	3000	91	289 F/43, CRI, Faisalabad	900
37	FVH 53, CRS, Vehai	3000	92	4F, CRI, Faisalabad	800
38	Chandi 95, NIA Tandojam	3000	93	3F, CRI, Faisalabad	600
39	CIM 448, CCRI, Multan	3000		Hybrid	
40	CIM 1100, CCRI, Multan	3000	1	H151, Alseemi, Multan	3500
41	Krishma, NIAB, Faisalabad	3000	2	H115, Alseemi, Multan	3500
42	MNH 329, RS, Multan	3000	3	H160, Alseemi, Multan	3500
43	RH 112, CRS, R.Y. Khan	3000	4	Desi	
44	S 14, CRS, Multan	3000	5	FDH 170, CRI, Faisalabad	2500
45	CIM 240, CCRI, Multan	3000	6	FDH 228, CRI, Faisalabad	2000
46	NIAB 26N, NIAB, Faisalabad	3000	7	Rohi, CRI, Bahawalpur	2000
47	Rehmani 90, CRO, Tandojam	3000	8	Ravi, CRI, Faisalabad	1900
48	CIM 109, CCRI, Multan	3000	9	SKD 10/19, CRI Sakrand	1700
49	Gohar 87, CRS, Bahawalpur	3000	10	D9, CRI, Faisalabad	1400
50	RH1, CRS, R.Y.Khan	3000	11	TD 1, CRS Tandijam	1000
51	FH 87, CRI, Faisalabad	3000	12	231 R, CRI, Multan	1000
52	MNH 129, CRS, Multan	3000	13	119 S, CRI, Multan	800
53	Rehmani, CRS, Tandojam	3000			
54	Shahbaz, ARI, Tando Jam	2992			
55	MNH 552, CRS, Multan	2900			

Sources: 1. A booklet titled as "Cotton Varieties of Pakistan", FSC & RD, Islamabad.

2. Cotton Research Institute ,Faisalabad