



**CLUSTER DEVELOPMENT BASED AGRICULTURE TRANSFORMATION PLAN VISION-
2025**

Tobacco Cluster Feasibility and Transformation Study



**Planning Commission of Pakistan, Ministry of
Planning, Development & Special Initiatives**

February 2020





FOREWORD

In many developed and developing countries, the cluster-based development approach has become the basis for the transformation of various sectors of the economy including the agriculture sector. This approach not only improves efficiency of development efforts by enhancing stakeholders' synergistic collaboration to resolve issues in the value chain in their local contexts, but also helps to gather resources from large number of small investors into the desirable size needed for the cluster development. I congratulate the Centre for Agriculture and Bioscience International (CABI) and its team to undertake this study on **Feasibility Analysis for Cluster Development Based Agriculture Transformation**. An important aspect of the study is the estimation of resources and infrastructure required to implement various interventions along the value chain for the development of clusters of large number of agriculture commodities. The methodology used in the study can also be applied as a guide in evaluating various investment options put forward to the Planning Commission of Pakistan for various sectors, especially where regional variation is important in the project design.

Muhammad Jehanzeb Khan,
Deputy Chairman
Planning Commission of Pakistan
Ministry of Planning Development and
Special Initiatives
Government of Pakistan.



FOREWORD

To improve enhance Pakistan's competitiveness in the agriculture sector in national and international markets, the need to evaluate the value chain of agricultural commodities in the regional contexts in which these are produced, marketed, processed and traded was long felt. The Planning Commission of Pakistan was pleased to sponsor this study on the **Feasibility Analysis for Cluster Development Based Agriculture Transformation** to fill this gap. The study aims to cover a large number of agriculture commodities spread in various clusters throughout the country.

I truly hope that the policies, strategies, and interventions suggested in this report will facilitate the federal and provincial governments to chalk out and implement plans for cluster-based transformation of the agriculture sector.

A handwritten signature in black ink, appearing to read 'Zafar Hasan', with a long horizontal stroke extending to the right.

Zafar Hasan,
Secretary,
Ministry of Planning Development and Special
Initiatives
Government of Pakistan



FOREWORD

This is part of the series of studies on 33 agriculture commodities undertaken for the purpose of preparing a cluster-based transformation plan based on the regional realities in the entire value chain including production, processing, value addition, and marketing. I congratulate the whole team of the project especially the Team Lead, Dr. Mubarik Ali to undertake and successfully complete this monumental study. We are thankful to all commodity specialists who have contributed to this assignment. The CABI Project officers Mr. Yasar Saleem Khan and Ms. Aqsa Yasin deserve appreciation. I truly believe that this study will serve as a basis to make and implement plans for cluster-based agriculture transformation. I hope you will enjoy reading the study and it can help you making your investment decisions along the value chain of various agriculture commodities.

Dr. Babar Ehsan Bajwa
Regional Director
CAB International



FOREWORD

This report is part of the series of studies on 33 agriculture commodities to prepare the agriculture transformation plan by incorporating regional realities at the cluster level. In the report, the clusters of various commodities are identified and characterized, and viable investment options along the value chain of each cluster are proposed. For this purpose, the study team has analyzed macro data, reviewed the literature, and made extensive consultation with stakeholders along the value chain. Foreign and local internationally reputed consultants, Dr. Derek Byerlee and Dr. Kijiro. Otsuka and national consultant Mr. Sohail Moghal were also engaged to understand the cluster-based development approach and conduct cluster-based feasibility analysis. An EXCEL-based Model was developed which was validated by our national consultants. Separate viabilities for individual technologies and products suggested in each commodity are also estimated. This humongous task would not have been possible to complete without the excellent cooperation and facilities provide by CABI, the hard work of commodity specialists and our research team especially Mr. Yasar Saleem Khan and Ms. Aqsa Yasin. The true reward of our hard work is the implementation of the proposed policies, strategies and interventions to develop agriculture commodity clusters in the country.

Dr. Mubarik Ali
Team Leader
Cluster Development Based Agriculture
Transformation Plan-Vision 2020 Project
Planning Commission of Pakistan and
CAB International



ACKNOWLEDGEMENT

It is not possible to mention the names of all those who collaborated with us in completing this report, but my foremost gratitude goes to numerous stakeholders along the value chain who generously shared the information about tobacco production, marketing, trade and value chain. Without their support, this report would not have reached to the level of present quality.

My sincere thanks go to **Planning Commission of Pakistan** for this initiative and especially financial assistance to complete the project activities. Here I am especially thankful to **Dr. Muhammad Azeem Khan** (Ex-Member, Food Security and Climate Change, Planning Commission of Pakistan), **Dr. Aamir Arshad** (Chief Agriculture, Planning Commission of Pakistan), **Mr. Muhammad Akram Khan** (Project Director; CDBAT project) and other CDBAT project team member **Mr. Muhammad Arif** (Research Associate) and **Dr. Habib Gul** (Research Associate) for successful coordination and support for the project.

I am also grateful to **Centre for Agriculture and Bioscience International (CABI)** and its Regional Director for Central and West Asia, Dr. Babar Ehsan Bajwa and CABI team especially Mr. Yasar Saleem Khan for selecting me as commodity specialist for this task and offering outstanding cooperation, support and advice during all the stages of this project. However, the research team takes the responsibility of any shortcoming left in the report.

Dr. Umar Farooq
Senior Author

Citation:

Farooq, Umar., Ali Mubarik, and Yasin Aqsa. (2020). Tobacco Cluster Feasibility and Transformation Study. In Ali Mubarik, (ed.). (2020). *Cluster Development Based Agriculture Transformation Plan Vision-2025*. Project No. 131(434)PC/AGR/CDBAT-120/2018., Planning Commission of Pakistan, Islamabad, Pakistan and Centre for Agriculture and Biosciences International (CABI), Rawalpindi, Pakistan.



DISCLAIMER

This report is prepared by using the data from various published and unpublished sources and that obtained during the consultations with stakeholders. The research team took utmost care to arrive at the figures to be used, but is not responsible for any variation of the data in this report than those reported in other sources. Moreover, the views expressed in this report are purely of the authors and do not reflect the official views of the Planning Commission of Pakistan, Ministry of Planning Development and Special Initiatives or the Centre for Agriculture Bioscience (International).



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LIST OF ABBREVIATION

AAG	Ali Akbar Group
ARDL	Auto Regressive Distributed Lag Model
BATC	British American Tobacco Company
BY	Burley Tobacco
CSR	Corporate Social Responsibility
DAC	Dark Air Cured
EFL	Engro Fertilizers Limited
FCTC	WHO's Framework Convention on Tobacco Control
FCV	Flue Cured Virginia
FFC	Fauji Fertilizers Company Limited
ha	Hectare(s)
IREN	Inland Revenue Enforcement Network
KTC	Khyber Tobacco Company
LRC	Learning Resource Center
M.	Million(s)
MNFS&R	Ministry of National Food Security and Research
PMI	Philip Morris International
PMPKL	Philip Morris Pakistan Limited
PTB	Pakistan Tobacco Board
PTC	Pakistan Tobacco Company
R&D	Research and Development
STP	Sustainable Tobacco Production
SWOT	Strengths, Weaknesses, Opportunities and Threats
UAE	United Arab Emirates
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USTR	United States Trade Representative
WHO	World Health Organization
WP	White <i>Patta</i>



EXECUTIVE SUMMARY

Tobacco is cultivated in almost all continents of the world. As per last available statistics tobacco was cultivated globally on 3.53 million ha producing more than 6.50 million tonnes of tobacco leaves and giving 1.84 tonne per ha yield. During the same year, Pakistan cultivated tobacco on 47.7 thousand ha and produced 113.4 thousand tonnes of tobacco leaves with an average per ha yield of 2.37 tonnes. Although per ha yield of tobacco in Pakistan is higher than the world average, but a significant potential for improvement exists as the country yield is far lower than the world top tobacco yield achievers.

The analysis of data from 2001-16, has showed that the tobacco global production and per ha yield has increased at a rate of 0.72% and 0.86% per annum, while area under tobacco cultivation contracted slightly. Tobacco production in Pakistan, on the other hand, performed relatively better as it increased at a rate of 1.90% per annum also mainly because of the improvement in per ha yield as area under the crop expanded at 0.26% per annum only. The production of FCV type tobacco mainly used in tobacco manufacturing, however, expanded at much lower rate at 0.64% per annum, thus cigarette production in the country was also limited to this rate, which is much lower than the population growth, suggesting that per capita availability of cigarettes in the country is on a declining trend.

China, Brazil, and India are the top tobacco producing countries of the world and Pakistan stands at the 8th position in this list. However, globally tobacco production has shifted from USA to developing countries in Asia and Africa like China, India, Zimbabwe etc., and Pakistan has also benefited from this shift as its relative position in the list of tobacco producing countries has upgraded from 13th to 8th during the 2000s period.

The world trade of tobacco and cigarettes has reached to 2.4 and 1.4 million tonnes with an estimated worth of US\$11.1 and 23.9 billion, respectively. The combined tobacco and cigarette export in terms of value is expanding at a rate of 4.92% per annum. Pakistan did not benefit from this expansion in the world trade of tobacco and cigarettes as the country's contribution in the trade remains insignificant. While the global ratio of cigarette export in the total value of tobacco sector export remained between 30-35% during the period, Pakistan could earn only 10% from cigarettes in the tobacco-sector. Moreover, the cigarettes export is highly variable across the year. This also implies that Pakistan tobacco production in the country although has performed relatively well, but the performance of cigarette manufacturing and its export was poor and it failed to establish its international markets. However, whatever small quantities of cigarettes and tobacco are being exported from Pakistan, it earns higher price than the world average export prices suggesting that Pakistani tobacco and cigarettes do have some quality edge in international markets.

Tobacco holds an economic significance in Pakistan economy in terms of valuable foreign exchange earnings from the export of especially tobacco, tax revenue to the exchequer, income to the farmers, and employment to the poor skill and unskilled labour in the whole value chain. Looking the importance of the tobacco industry, the Planning Commission of Pakistan has decided to launch this study to maintain and improve the competitiveness of the industry in the domestic and international market by evaluating the whole tobacco value chain,



identifying the gaps and potential, and suggesting viable interventions in the value chain along with policy measures and strategies to adopt these interventions. The study was conducted at the major tobacco producing cluster in the country to incorporate the site-specific situation in the analysis. To achieve the objectives of the study, a large number of stakeholders were consulted, related literature was reviewed, and macro and micro data were collected. An EXL spreadsheet model was also developed to analyse the feasibilities of the suggested interventions along the value chain.

We found the Flue Cured Virginia (FCV) is grown in Swabi, Mardan, Charsadda, Mansehra, and Buner districts of KP, but for our study we have identified FCV cluster mainly concentrated in Swabi and Mardan as the main tobacco producing cluster with some tehsils of these districts as its focal point. Other varieties of tobacco do not fall under the definition of a cluster because they do not have any regional concentration and they do not involve any industrial processing.

As part of the study, we identify challenges and opportunities-ranging from global to down the industry and farmers' level to improve the competitiveness of the FCV tobacco cluster of KP. Among the constraints include virtually non-existence of its R&D in the public sector (like major crops), poor harvesting and post-harvest management, and social and economic discouragement (through taxes and duties) on the pretext of health concerns of tobacco smoking. The potential includes the tobacco industry strive for creating win-win situation for both farmers and the industry itself by providing imported high-yielding varieties to the farmers, good networking between farmers, industry and the government, availability of protocols and technologies for improved harvest and post-harvest management like tobacco-barn curing which if introduced can improve the whole tobacco value chain.

Looking at the constraints and potential in tobacco value chain, performance targets were fixed with the consultation of stakeholders and four interventions proposed to improve the competitiveness of FCV tobacco cluster in KP are: i) 1.5% per annum yield improvement through better crop management, ii) improving the quality of harvested tobacco by shifting to priming based tobacco harvesting method; iii) improved processing by switching to Turbo Barn curing method, and vi) providing incentives to substitute tobacco export with the cigarette export from the country.

The total investments on cluster development would require US\$17.58 million in five-year time, one third of which will come from the public sector, while two third will be supplied by the private sector. This investment will induce better management practices by farmers and value chain agents which will cost the US\$0.737 million in five years. The project will generate US\$7.789 million net-benefit after deducting all costs and investments on the proposed interventions. The Net Present Value (NPV) of these benefits will be US\$2.183 million. The Internal Rate of Returns (IRR) is estimated as 20.36 percent indicating the economic viability of the project under consideration can be seen in attached Summary Sheet.

To achieve these benefits, however, significant boost in tobacco research would be required by establishing National Tobacco Research Centre that will focus on strategic research especially on the varietal development under local condition, sustainability of tobacco production and health issues of tobacco consumption, and stakeholders' capacity building to adopt sophisticated crop and value chain management practices.



The final outcome of this exercise shall be the supply of the seed of improved varieties and farmers' enhanced capacity building for the adoption of improved management practices, improved tobacco-barn curing technology, and enhanced cigarette export.



Summary Sheet

Tobacco cluster	Tobacco cluster
Area of cluster focal point (ha)	10,522
Production (tonnes)	30,000
Yield of the cluster (tonnes/ha)	2.85
Annual yield growth without intervention (%)	0.74%
Percent area renovated in 5 years	0%
Increase in yield due to improvement in management practices (tonnes/ha)	0.23
Increase in production due to improvement in management practices (t)	2,472
Additional value of production due to improved practices (M. US\$)	4
Enhanced availability of quality leaf after harvest (tonnes)	1,680
New price due to improvement in quality	1,850
Expected value of additional yield due to better leaf composition (Mil US\$)	0.15
Intervention (Shifting from Conventional Curing to Turbo-Barn Curing)	
Shifting to turbo-barn curing method (100% in 5 years)	1.00
Total volume of better-quality tobacco leave (tonne)	35,277
Average Cost saving due to improved curing (US\$/tonne)	2,194,061
Expected value of curing cost saved due to better curing (Mil US\$)	2.19
Average wholesale price of cigarettes in the country (US\$/tonne)	12,000
Additional cigarettes produced from additional supply of tobacco (tonne)	617.94
Percentage of additional cigarette for export (%)	30%
Additional cigarettes available for export (tonne)	185.38
Additional value of export (US\$)	1.20
No of Turbo-Barn units required	11
Investments (Million US\$)	
Investment on R&D including information dissemination	5.00
Farmers' Capacity Building (Crop Management esp. Harvesting)	1.71
Shifting turbo-barn curing	9.74
Interest free loans	1.12
Total investments	17.58
Overall benefits and rate of return (Million US\$)	
Increase in production due to all the yield increasing interventions (tonnes)	4,152
Gross revenue (undiscounted) in 5 th year	9.1
Additional operation costs in 5th year	8.81
Net cash flow (undiscounted) in 5th year	7.810
Public sector investment	9.78
Private sector investment	7.79
NPV	2.183
Internal Rate of Return	20.36%



1. INTRODUCTION

Tobacco¹ (*Nicotiana tabacum*) is an annually grown herbaceous plant, cultivated in all continents of the world except Antarctica². Tobacco has long been used in the Americas, with some cultivation sites in Mexico dating back to 1400-1000 BC. Eastern North American tribes historically carried tobacco in pouches as a readily accepted both socially and ceremonially such as to seal a peace treaty or trade agreement [Wikipedia]. Tobacco became known to the rest of the world during 15th and 16th century, when European explorers found it being used by Native Americans. Presently, it is used in the form of smoke through hubble-bubble, cigarettes, cigars, chewing and snuff, etc. It played considerable role in the economies of the countries where it is grown or traded (Ali *et al.*, 2015).

In Pakistan, tobacco was not grown at the time of Independence, so was imported to meet the domestic needs. Tobacco cultivation in the country began on trial basis in 1948. Initially, about 20 acres of Flue-Cured Virginia (FCV) tobacco were cultivated. However, till 1968, the quality of tobacco grown was not so good and considerable quantities of tobacco was imported. In 1968, the government of Pakistan took some serious measures and established Pakistan Tobacco Board (PTB) for the promotion of the cultivation, manufacture and export of tobacco and tobacco products as federal level public sector department under the Ministry of Commerce and Industry. Although there are 53 tobacco companies registered with Pakistan Tobacco Board (for list see Annexure-1), the cigarette market in Pakistan is highly concentrated as only two multinational companies controlling 98% of the market --- Pakistan Tobacco Company (a subsidiary of British American Tobacco) and Lakson Tobacco Company own by Philip Morris International and Khyber Tobacco Company. Pakistan Tobacco Company (PTC)³ and Philip-Morris Pakistan Limited (PMPKL)⁴ (Previously Lakson Tobacco Company) and Khyber Tobacco Company (established in 1971 by Samsons Group of Company) are important companies involved in FCV tobacco value Chains. PTC and PMPKL are also actively involved in the R&D of FCV tobacco, particularly

¹ The English word “*tobacco*” originates from the Spanish and Portuguese word “*tabaco*” [Wikipedia]. Tobacco is also believed to be most consumed lethal product in the world. It has ensnared most people across the globe. Besides, it is worth noting that it is extracted from tobacco plant which contains two highly addictive substances, i.e. nicotine and tar. It can be consumed in different forms which includes smoking, followed by chewing, dipping and sniffing [Daily Records dated 26th March, 2018 --- <http://www.thedailyrecords.com/2018-2019-2020-2021/world-famous-top-10-list/world-largest-tobacco-producing-countries-statistics/6876/>].

² Christopher Columbus discovered tobacco when he landed in America in 1492, but the earliest holy place carvings demonstrate that tobacco was being smoked in Central America as long before as 1000 BC (Hassan *et al.*, 2015).

³ Pakistan Tobacco Company began its operation in Pakistan in 1947 by taking over business from Imperial Tobacco Company of India. Currently, it is partner of British American Tobacco Company (BATC).

⁴ The Lakson Group is a Pakistani conglomerate company established in 1954 by Sultan Ali Lakhani, which is based in Karachi Pakistan. In March 2007, a major proportion of Lakson Tobacco Company was purchased over by Philip Morris International and the name of the organization was changed to Philip Morris International (PMI) in 2011.



distribution of tobacco seed to tobacco growers. To cater the quality needs of cigarettes for domestic use, the PTC explore the suitable soil and climatic conditions in the sub-mountainous regions of the country like Swabi, Mansehra, Buner, Dir districts of Khyber Pakhtunkhwa (KP) province. This institutional framework helped the country to attain self-sufficiency in tobacco in 1970. Currently, all types of tobacco are produced in the country, except a nominal quantity of very high-quality tobacco which is imported for the production of superior brands of cigarettes. Now tobacco is a valuable and reliable cash crop for thousands of the farmers of the country (Ali *et al.*, 2015).

Pakistan has now become one of the largest tobacco consuming countries in the world (Burki *et al.* 2013), According to Global Youth Tobacco Survey's (GYTS) Fact Sheet for Pakistan (2013), tobacco is consumed in many form including cigarettes and water pipes (shisha) and chewing of *gutka*, *naswar* and *paan*. Cigarettes account for most of smoked tobacco consumption in the country. Over 22 million adults aged ≥ 18 years are currently using some form of tobacco. Almost one-third of Pakistani men (32.4%) and 5.7% of women smoke tobacco and 15.9% of adult Pakistanis are daily smokers. Over 14% of surveyed youth aged 13-15 years in Karachi use some form of tobacco product. Overall 10.7% boys and girls - 13.3% of boys and 6.6% of girls - use any tobacco product. Slightly more than one-fifth (21%) of the students are exposed to tobacco smoke at home whereas 37.8% students are exposed to tobacco smoke inside enclosed public places. The access and availability of tobacco products is quite easy in Pakistan. Nearly 88% of cigarette smokers buy cigarettes from some store, shop, street vendor, kiosk, school canteen or pharmacy. Among current cigarette smokers who bought cigarettes, 49% were not prevented from buying them because of their age. The situation is also quite alarming to other cities of Pakistan like Islamabad, Lahore, Kasur, Quetta and Peshawar (Global Youth Tobacco Survey, 2014).

Tobacco holds economic significance in Pakistan economy in terms of valuable foreign exchange earned by exporting tobacco and the cigarettes. The cigarette industry contributes nearly 3.5% of total FBR revenues (amounting to more than Rs.114 billion in 2015-16⁵). It is a high value cash crop for the farmers especially of KP. There are more than 75 thousand tobacco growers in Pakistan, of which more than 45 thousand growers are present in KP.

1.1. Tobacco Production in Pakistan

In Pakistan, tobacco cultivation occupies a relatively small area of 47.7 thousand ha which comprises of 0.21% of the total cropped area in the country. Total tobacco leaves (unprocessed) production in the country is 113.4 thousand tonnes annually. KP and Punjab are the major tobacco producing provinces in the country. The highest tobacco yield is in KP followed by Sind. Punjab and Balochistan have relatively low tobacco leave per ha yield. The contribution of tobacco in total cropped area is also highest in KP followed by Balochistan (Table 1).

⁵ Source: Pakistan Today, March 28th 2019 by Ahmad Ahmadani, "Senate Bodies Recommendations on Tobacco Tax Collection Opposed" [<https://profit.pakistantoday.com.pk/2019/03/28/senate-bodys-recommendations-on-tobacco-tax-collection-opposed/>]



Table 1: Tobacco cultivation and its share in total cropped area by province in Pakistan, 2016

Province	Area (000 ha)	Share in area (%)	Production (000 t)	Share in production (%)	Yield (kg/ha)	Share in total cropped area (%)
Punjab	16.6	34.8	26.5	23.4	1596	0.10
Sind	0.1	0.2	0.2	0.2	2000	0.00
KP	30.0	62.9	85.2	75.1	2840	1.60
Balochistan	1.0	2.1	1.5	1.3	1500	0.09
Pakistan	47.7	100.0	113.4	100	2377	0.21

Source: MNFS&R (2017)

During 2000-16, the production of tobacco in Pakistan has increased at a rate of 1.90% per annum mainly because of the improvement in per ha yield (at 1.64% per annum) as area under the crop expanded at 0.26% per annum (Table 2). In KP where 63% of total tobacco area lies, the growth in tobacco area during 2000-16 was highest at a rate of 0.63% per annum, while in Punjab which contributes about 32% of the total tobacco area, growth in tobacco area was on a declining trend. The tobacco area in Balochistan is also declining from a very small base, while in Sind it is increasing also from a very small base. The highest growth in tobacco production also came from KP at 2.03% followed by Punjab and Sindh (Table 2). The highest growth in per ha tobacco yield was in Punjab.

The cigarette manufacturing during 2016 has reached to over 60 billion cigarettes in the country. Surprising, however, despite the highest growth in tobacco production during 2001-16 in KP, where most of the cigarettes factories lie, the cigarettes manufacturing in the country improved at a rate of 0.64%. So we can conclude that despite a good performance of the tobacco production, the cigarette manufacturing did not improve very much during the 2000 period. Partly, as explained latter, it may be due to high taxation on cigarette manufacturing in the country.

Table 2: Trends in Area and Production of Tobacco by Provinces in Pakistan

Years	Area under tobacco (000 Ha)					Production of tobacco (000 tonnes)					Pak. Cig. production (Bil. Cig)
	Punj	Sindh	KP.	Bal.	Pak.	Punj.	Sindh	K.P.	Bal.	Pak.	
2000-01	17.7	0.2	26.5	1.2	45.6	22.0	0.2	61.2	1.7	85.1	58.26
2001-02	18.5	0.1	29.8	1.0	49.4	22.9	0.2	69.9	1.5	94.5	55.10
2002-03	18.0	0.1	27.2	1.3	46.6	21.9	0.1	64.3	1.9	88.2	49.37
2003-04	17.1	0.1	27.0	1.4	45.6	21.1	0.2	62.9	2.0	86.2	55.40
2004-05	16.6	0.1	32.2	1.6	50.5	20.6	0.2	77.3	2.4	100.5	61.10
2005-06	17.7	0.1	36.5	2.1	56.4	21.6	0.1	87.9	3.0	112.6	64.14
2006-07	17.6	0.1	30.8	2.4	50.9	21.5	0.2	78.2	3.4	103.3	65.98
2007-08	16.6	0.3	32.7	1.8	51.4	19.9	0.4	84.9	2.6	107.8	67.45
2008-09	16.3	0.4	31.1	1.9	49.7	20.0	0.5	81.7	2.7	104.9	75.61
2009-10	17.8	0.2	36.2	1.6	55.8	23.4	0.3	94.1	1.5	119.3	65.29
2010-11	17.2	0.1	32.5	1.5	51.3	22.2	0.2	78.2	2.2	102.8	65.40
2011-12	15.4	0.1	28.8	1.5	45.8	20.4	0.2	75.1	2.2	97.9	61.95
2012-13	16.6	0.1	31.8	1.3	49.8	22.8	0.2	83.4	1.9	108.3	67.38
2013-14	17.5	0.2	30.1	1.3	49.1	27.0	0.2	100.8	1.9	129.9	64.48



2014-15	17.9	0.1	34.5	1.3	53.8	28.6	0.2	89.2	1.9	119.9	62.67
2015-16	18.3	0.2	30.5	1.0	50.0	32.0	0.2	85.2	1.4	118.8	53.52
2016-17	16.6	0.1	30.0	1.0	47.7	26.5	0.2	85.2	1.5	113.4	60.51
Annual Growth (%)	-0.22	0.58	0.63	-1.16	0.27	1.75	1.46	2.03	-1.23	1.90	0.62^{ns}

Source: MNFS&R (2017)

Cigarettes production is taken from FBS (2018).

Note: Punj=Punjab; KP=Khyber Paktoonkhwa; Bal=Balochistan; Pak=Pakistan; Bil=Billion.

1.2. Types of Tobacco Grown in Pakistan

In Pakistan, the major tobacco varieties grown are Flue Cured Virginia (FCV) (*Nicotiana tabacum L.*), Rustica (*Hooqqah*) and White *Patta* (WP) (Table 3). The FCV tobacco, mainly grown in KP, is the major tobacco type and have high economic significance for the growers as well as for the country because of its commercial use in cigarette manufacturing. Rustica and WP are the other major tobacco varieties grown in the country. Rustica, Dark Air Cured (DAC) and Kala *Patta* (Snuff) are the most planted varieties in Punjab, while White *Patta* (WP) and DAC are grown in Sindh and Balochistan provinces respectively. Except FCV, other tobacco varieties do not involve any industrial processing.

In 2017-18, the total area planted under FCV was nearly 24.53 thousand ha while its production was 68.17 thousand tonnes (Table 3). Because of tobacco industry patronage for tobacco production, the area under FCV has been on the rise during 2000-16 with an average growth rate of 1.32% per annum, while that of Rustica and WP are both on the declining trend. Similarly, production of FCV is on the rise while that of WP on the declining trend. If we estimate the growth in per ha yield after deducting the growth in area from that in production, we can see that yield of all the three major tobacco types are on the rise during the period (Table 3). The yield of FCV was about 0.64% per annum during the period, while as noted earlier, the growth in cigarette manufacturing was also about the same rate during the period.



Table 3: Trends in Area and Production of Tobacco by Types in Pakistan during 2001-18

Years	Area (Ha)						Production (Tonnes)					
	FCV	DAC	WP	Burley	Rustica	Total ¹	FCV	DAC	WP	Burley	Rustica	Total ¹
2001	21301	571	4990	257	18481	45600	51.0	1.2	9.7	0.6	23.4	85.7
2002	24570	751	4749	432	18898	49400	59.6	1.9	9.4	1.0	20.7	92.6
2003	20748	489	5469	933	18961	46600	51.3	1.4	10.8	2.2	22.6	88.3
2004	20660	355	5472	878	18235	45600	50.3	0.7	11.0	1.6	22.6	86.2
2005	26312	367	4929	943	17949	50500	65.8	0.9	9.9	1.6	22.6	100.8
2006	29227	535	6593	637	19408	56400	73.7	1.6	13.2	0.9	23.1	112.5
2007	25066	234	5266	446	19849	50861	65.8	0.8	11.6	0.8	24.3	103.2
2008	25808	301	6724	183	18382	51398	69.5	1.0	15.0	0.4	21.9	107.8
2009	26298	420	4818	100	18040	49676	71.3	1.4	25.8	0.2	6.2	105.0
2010	29530	795	7062	47	18366	55800	80.4	2.8	26.6	0.1	9.4	119.3
2011	26318	398	8839	46	15622	51223	65.2	1.2	19.3	0.1	17.0	102.8
2012	26082	481	3584	50	15694	45891	69.0	1.4	6.9	0.1	20.6	98.0
2013	29011	678	4690	42	15396	49817	88.4	2.4	13.0	0.1	16.6	120.5
2014	27413	1225	4341	57	16004	49040	90.2	4.4	16.8	0.2	18.4	129.9
2015	30765	925	5250	42	16822	53804	79.3	2.9	12.9	0.1	24.9	120.0
2016	29061	872	5278	40	17614	52865	72.3	2.1	11.7	0.1	29.3	115.5
2017	26121	599	3880	38	16609	47247	64.8	1.7	8.0	0.1	25.5	100.0
2018	24527	1367	1366	47	19025	46332	68.2	3.9	3.9	0.1	30.7	106.8
Annual Growth (%)	1.32	4.86	-3.12	-20.62	-0.78	0.16	2.06	6.31	-1.26	-19.56	0.71	1.50

¹The total here does not include some other minor varieties area and production, such as *Chelum*, *Naswar*, *Burley*, etc., thus does not reflect total tobacco area and production of the country.

Source: Pakistan Tobacco Board Website

A FCV tobacco variety has become a source of tax and valuable foreign exchange. Being a highly labour-intensive crop, it provides farm level employment to nearly 80 thousand people, about 50 thousand in cigarette factories and to one million in its production and marketing (Khan, 2016; PTB, 2014 & 2017). According to PTB, a work force of 350 thousand people is directly and indirectly employed in tobacco industry, which generates annual income of around Rs.300 billion and source of livelihood for 1.2 million people throughout the country. There are 75 thousand tobacco growers in Pakistan (Daily DAWN 16-12-2016; PTB Website). On average, 80-85 million kilograms of FCV is produced in KP every year.

1.3. Tobacco Trade from Pakistan

Pakistan was a net importer of tobacco in 1948 but became self-sufficient in tobacco production in 1969 --- mainly attributed to increase in productivity as a result of the adoption of new tobacco varieties distributed by the private tobacco companies, advanced methods of tobacco cultivation, and networking between industry, government, and tobacco farmers. In 2016, Pakistan has exported US\$10.9 million of tobacco and cigarettes. Over 90% of the export came from tobacco while 10% was contributed by the cigarettes. During 2001-16, the growths in the exports of quantities of both cigarettes and tobacco from the country are insignificant and highly variable suggesting that the industry failed to develop an established market internationally. While the tobacco export in value terms increased at a high rate of 8.9% per annum from a small base, such growth in cigarettes values is negative but



insignificant. Since 2011, the tobacco export in terms of quantities has been continuously on the declining trend, but this did not create much space for the export of cigarettes from the country (Table 4).

Table 4: Trends in tobacco and cigarette trade from Pakistan during 2001-16

Year	Tobacco		Cigarettes (including cigar)		Total value (Mil US\$)
	Quantity (000 ton)	Value (M. US\$)	Quantity (000 t)	Value (Mil, US\$)	
2001	4.06	7.46	0.038	0.459	7.919
2002	1.8	3.12	0.070	0.926	4.046
2003	4.11	4.99	0.074	0.790	5.78
2004	7.25	10.57	0.163	2.107	12.677
2005	6.55	10.25	0.062	1.031	11.281
2006	3.73	5.45	0.037	0.561	6.011
2007	5.27	8.72	0.037	0.675	9.395
2008	4.33	6.12	0.007	0.145	6.265
2009	4.62	11.48	0.015	0.311	11.791
2010	4.95	13.51	0.014	0.285	13.795
2011	9.57	30.07	0.050	1.163	31.233
2012	7.1	23.13	0.026	0.514	23.644
2013	8.06	23.93	0.078	1.538	25.468
2014	6.09	21.43	0.037	0.695	22.125
2015	3.22	10.26	0.027	0.528	10.788
2016	2.8	9.90	0.056	1.035	10.935
Growth rate (%)	1.83 ^{ns}	8.90	-4.05 ^{ns}	-0.35 ^{ns}	7.90

Source: FAOSTAT, Trade, Crops and Livestock Products <http://www.fao.org/faostat/en/#data/TP>

1.4. The Global Context

1.4.1. Global tobacco production

According to FAO-Stat, more than 6.50 million tonnes of tobacco was produced in the world in 2017. During 2001-2016, the tobacco global production and per ha yield increased at a rate of 0.72% and 0.86% per annum, while area under tobacco cultivation contracted slightly (Table 5). Globally, the annual growth in tobacco production is lower than the population growth implying that per availability of tobacco is decreasing overtime. The only source of growth in tobacco production during the period has been yield enhancement which also compensated the decline in area under tobacco cultivation to produce positive growth in tobacco production in the world.



Table 5: World Trends in Area and Production of Tobacco, 2001-2017

Years	Area (M. Ha)	Yield (Kg/ha)	Production (MI.Tonnes)
2001	3.828	1594.8	6.105
2002	3.884	1650.2	6.410
2003	3.791	1582.2	5.998
2004	3.892	1685.0	6.558
2005	3.973	1691.7	6.721
2006	3.828	1709.0	6.542
2007	3.634	1696.7	6.166
2008	3.794	1752.0	6.648
2009	3.932	1816.6	7.142
2010	3.949	1758.5	6.945
2011	4.217	1774.3	7.481
2012	4.170	1821.2	7.594
2013	4.249	1790.1	7.607
2014	4.014	1819.8	7.305
2015	3.738	1829.5	6.839
2016	3.564	1795.3	6.399
2017	3.528	1842.6	6.502
Av. Annual Growth (%)	-0.079	0.861	0.782

Source: FAOSTAT, Production, Crops <http://www.fao.org/faostat/en/#data/QC>

In 1970s, United States of America used to be the leading tobacco producer in the world, but later on, it has been taken over by other developing countries, like China, Brazil, India, Zimbabwe, etc. (Table 6). In 2016, Pakistan benefited to some extent in the tobacco market transfer from rich America to poor Asia and Africa as its contribution in the world production has increased from 1.39% in 2001 to 1.74% in 2016. Moreover, in tobacco producing countries, Pakistan's rank has improved from the 13th to the 8th position during the period. The per ha yield of tobacco is highest in UAE, Peru, and Laos and Pakistan yield though higher than the world average but still far lower than the top tobacco yielding countries (Table 6)

Table 6: Major tobacco producing countries of the world 2017

Production (Tonnes)			Area (ha)		Yield	
Rank	Country	Production	Country	Area	Country	Tonnes/ha
1	China	2391	China	1081	UAE	14.53
2	Brazil	881	India	468	Peru	9.88
3	India	800	Brazil	398	Laos	7.78
4	USA	322	Indonesia	186	Samoa	4.80
5	Zimbabwe	182	Zimbabwe	150	Oman	4.50
6	Indonesia	152	USA	130	Cyprus	4.32
7	Zambia	132	Tanzania	119	Uruguay	3.87
8	Pakistan	118	Turkey	95	Kazakhstan	3.44
9	Argentina	117	Mozambique	78	Spain	3.39
10	Tanzania	104	Zambia	73	South Africa	3.22
			Pakistan (18 th position)	49.7	Pakistan (31 st position)	2.37

Source: FAOSTAT, Production, Crops <http://www.fao.org/faostat/en/#data/QC>



1.4.2. World Scenario

Comparing tobacco production in Pakistan with the world, Pakistan contributes 1.41% and 3.81% in the world tobacco area and production, respectively while its share in world tobacco and cigarettes export is insignificant (Table 7). The tobacco yield in Pakistan during 2016 is about 28% higher than the world average, but significantly lower than the main tobacco producing countries in the world. Although farm gate prices of tobacco in Pakistan is lower than the world average creating an opportunity for export but also for foreign investment in tobacco processing, but Pakistan gets much lower prices for its exported tobacco than the world average export price partly perhaps because of its low quality. However, Pakistani cigarettes compete in international market in terms of quality as average export price of Pakistani cigarettes in 2016 was about 9% higher than the world average world export price. Pakistan gained this quality edge in export market overtime. In 2001, Pakistan was getting about 14% lower price than the world average. In tobacco, however, the situation did not change overtime.

Table 7: Comparison of world and Pakistan tobacco production and trade during 2016

Parameter	World	Pakistan	Share (%)
Area (000 ha)	3528	49.7	1.41
Production (000) ton	6502	117.8	1.81
Value of production (Million US\$)	16177	93.4	0.58
Yield (ton/ha)	1.84	2.37	128.50
Farm gate price (US\$/tonne)	2488	1642	31.87
Quantity of international trade of tobacco (000 ton)	2400	2.8	0.12
Value of international trade of tobacco (Million US\$)	11104	9.897	0.09
Export quantity of tobacco as % of tobacco production	37%	2%	-
Export value as % of production value of tobacco	69%	11%	-
Quantity of international trade of cigarettes (000 ton)	1412	56.0	0.004
Value of international trade of cigarettes (Million US\$)	23932	1.035	0,.004
Value of international trade of tobacco and cigarettes (Million US\$)	35036		
Average export prices of tobacco (US\$/tonne)	4627	3538	76.47
Average export price of cigarettes (US\$/tonne)	16949	18482	1.09

Source: FAOSTAT, Production, Crops <http://www.fao.org/faostat/en/#data/QC>

Source: FAOSTAT, Trade, Crops and Livestock Products <http://www.fao.org/faostat/en/#data/TP>

1.4.3. World tobacco trade and Pakistan

In 2016, the total world trade in tobacco and cigarettes (including cigar) has reached to about US\$35 billion up from US\$18.8 billion in 2001 with an average growth rate of 4.92% (Table 8). During this period, the growth in the export of cigarettes (quantities) is about 5 time higher



than the growth in tobacco export (quantities) implying that more processed product of tobacco, i.e., cigarettes, are being sold in international market.

Both the export of cigarettes and tobacco (in value terms) grew at much higher rates than the corresponding rates in their quantities implying that the prices of tobacco and its products are increasing overtime. The high growth in the value of cigarettes and tobacco may not suggest corresponding increase in their demand, rather it may be due to the increase in government taxes and duties before export in response to address general public concerns of injurious impact of smoking on consumers' health as well as on the environments.

During 2001-2016, the growth in the value of raw material tobacco is higher than that in cigarettes suggesting that the margin cigarettes manufacturing for export based on imported raw material may have reduced overtime. The ratio in the value of export of tobacco in the total value of tobacco and cigarettes export remained between 30-35% during the period (Table 8).

Table 8: Trends in global trade in tobacco and cigarettes during 2001-161

Year	Tobacco		Cigarettes (including cigar)		Total value (M. US\$)
	Quantity (000 tonnes)	Value (M. US\$)	Quantity (000 tonnes)	Value (M. US\$)	
2001	2192	5839.3	930.8	13029.2	18868.5
2002	2103	5359.7	950.5	13180.9	18540.6
2003	2186	5958.9	883.2	13595.1	19554.0
2004	2477	6908.6	935.6	14546.9	21455.5
2005	2440	7125.3	1083.8	16463.4	23588.7
2006	2446	7505.0	1057.5	17007.4	24512.4
2007	2623	8569.0	1035.8	18241.4	26810.4
2008	2649	10163.8	1114.0	20157.6	30321.4
2009	2637	11160.6	1054.5	19156.3	30316.9
2010	2475	11101.1	1056.9	19384.0	30485.1
2011	2464	11242.8	1153.6	22610.3	33853.1
2012	2642	12156.8	1194.0	21967.4	34124.2
2013	2597	12694.2	1234.0	22749.5	35443.7
2014	2370	11859.0	1405.0	26002.5	37861.5
2015	2261	10921.3	1332.5	22890.2	33811.5
2016	2400	11103.6	1412.0	23932.4	35036.0
Growth rate (%)	0.59	5.67	2.85	4.56	4.92

Source: FAOSTAT, Trade, Crops and Livestock Products <http://www.fao.org/faostat/en/#data/TP>

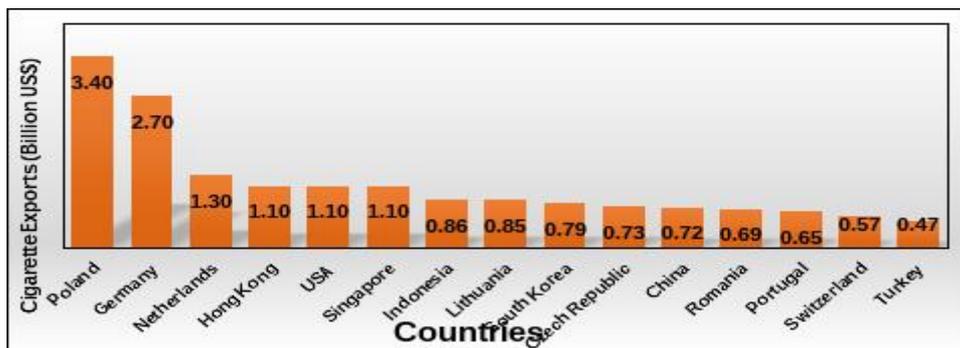
As analysed earlier, the growth in the export of tobacco and cigarettes from Pakistan (in terms of quantities) is insignificant compared to the world average, thus the country did not benefit from the booming tobacco and cigarettes market during 2000s, although it exported high quality cigarettes at high price during the period (Table 20). The country also did not change its export structure by continuing exporting mainly raw materials (tobacco) compared to the world where the share of tobacco in total export is almost one third. It will be interesting to



study why cigarettes manufacturing industry in Pakistan did not benefit from the low-cost tobacco availability at the farm gate and could increase the proportion of cigarettes to tobacco in export.

On trade side, the top 15 countries that exported the highest dollar value worth of tobacco cigarettes during 2018 in decreasing order are given in Figure-2 below. Pakistan has to compete with very sophisticated cigarettes exporters in the world, like Poland, Germany, Netherland, etc.

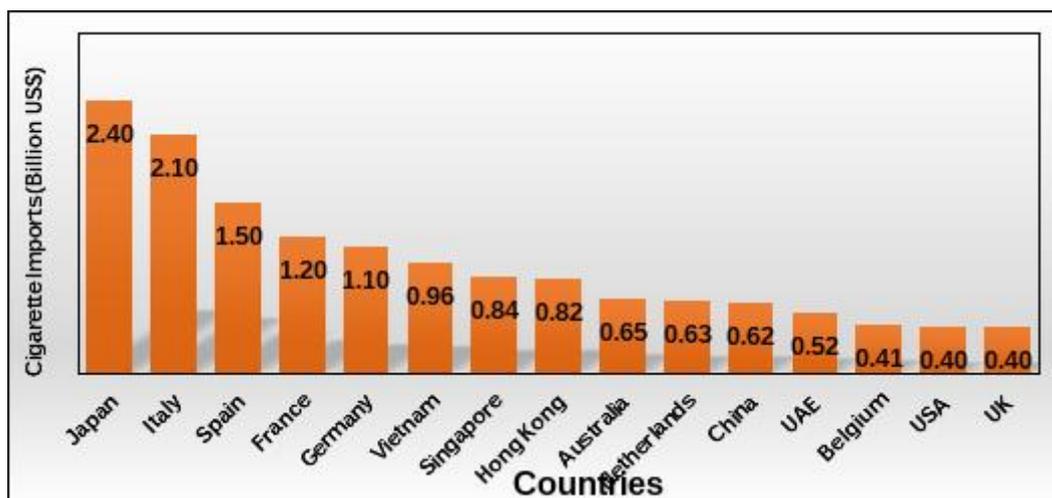
Figure 1: Top fifteen tobacco cigarettes exporting countries in the world, 2018



Source: [<http://www.worldstopexports.com/tobacco-cigarettes-exports-country/>].

The top 15 countries that imported the highest dollar value worth of cigarettes during 2018 are given in Figure-3 below. Japan, Italy, Spain, France and Germany are the major importers of cigarettes in the country. These may be high-end markets for the cigarettes where our high-quality cigarettes can be exported. But Pakistan should also exploit markets in our neighborhood like Vietnam, Singapore, Hong Kong, China and UAE.

Figure 2: Top fifteen tobacco cigarettes importing countries in the world, 2018



Source: [<http://www.worldstopexports.com/tobacco-cigarettes-imports-by-country/>].



1.4.4. World tobacco consumption and Pakistan

About 5.7 trillion cigarettes were smoked worldwide in 2016. Although overall consumption of cigarettes has declined slightly over the past few years, the future path of global tobacco control is still uncertain. Despite the rhetorical commitment of tobacco industry toward a smoke-free world, all major tobacco companies continue to aggressively advertise cigarettes and vigorous fight tobacco control efforts around the world. The significant reductions in smoking rates in the United Kingdom, Australia, Brazil and other countries that have implemented the most advanced tobacco control laws globally are almost entirely offset by the increasing consumption in many countries with weaker tobacco control regulations [<https://tobaccoatlas.org/topic/consumption/>].

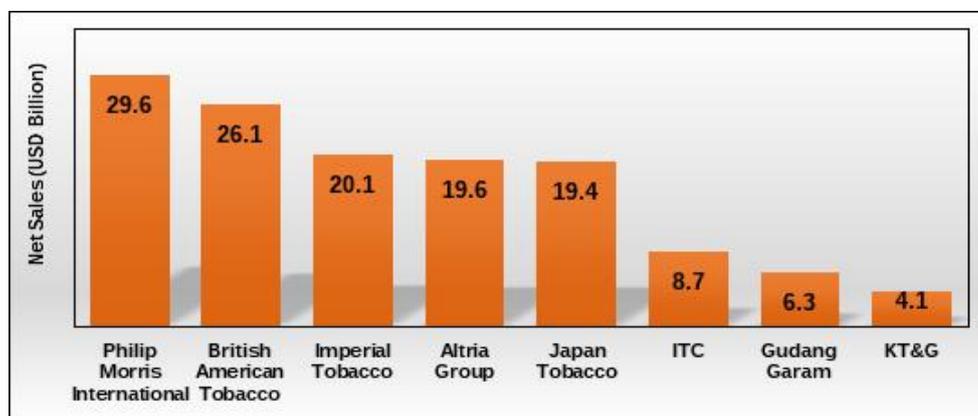
Cigarette consumption is predicted to increase in many low- and medium – HDI countries due to dynamic economic development and continued population growth. For example, the number of tobacco smokers is set to increase by 24 million in Indonesia and by 7 million in Nigeria from 2015 to 2025. China, where people smoke more than 40% of all cigarettes globally, remain a challenge. Although cigarette use in China has begun to decline, half of Chinese adult males continue to smoke cigarettes. Without appropriate prevention policies, the world will lose a billion lives in century due to tobacco smoking [<https://tobaccoatlas.org/topic/consumption/>].

During 2016, the world average per capita annual consumption of cigarettes among people of aged above 14 years falls at 1083 cigarettes. Among 182 countries of the world, the highest cigarette smoking prevails in countries like Andorra, Luxembourg, Belarus, Hong Kong and North Macedonia, while lowest consumption can be observed in countries like India, Antigua & Barbuda, Ghana, Mauritania, Guinea-Bissau and Brunei. Though Pakistan falls in low cigarette consumption group, but its average cigarette consumption of 363.2 is much higher than that in India at 89.3 (Annexure-2).

1.4.5. Tobacco Companies

The world largest tobacco companies based on their net annual sales in 2018 is given in Figure 4.

Figure 3: Leading tobacco companies in the world, based on net sales (Billion US\$)



Source: <https://www.statista.com/statistics/259204/leading-10-tobacco-companies-worldwide-based-on-net-sales>



Figure 4. Top world tobacco companies

1.5. The Problem Statement

From the discussion in the previous sections, it clearly emerges that tobacco production and cigarette manufacturing are economically important activities in Pakistan. The yield per ha of the crop in Pakistan is higher than the world average, although it is far lower than the major tobacco producing countries of the world. The growth in tobacco production in Pakistan is mainly driven by per ha yield. Pakistan overtime has gained its position in the global tobacco production, although it remains an insignificant player in the world tobacco and cigarette export markets. While the world is shifting from the export of tobacco as a raw material towards exporting the manufactured item of cigarettes, Pakistan continues exporting mainly tobacco although tobacco export quantities have stagnated overtime. Pakistan cigarette industry could not benefit from the internationally expanding export market for cigarettes as it exports an infinitesimal quantity of cigarettes which are almost stagnant overtime with intra-period wide variation suggesting that Pakistan cigarettes industry failed to establish its market internationally. However, Pakistan earns higher prices for its tobacco and cigarette exports than the world average export prices for these commodities indicating Pakistan tobacco industry do have quality edge over the international market.

The above conclusions from the macro-data analysis suggest that tobacco industry in Pakistan has done relatively well in the domestic market but failed to harness opportunities emerging in the international market. It looks shy of reaching out to a vast international cigarette market. It fails to process all the tobacco supplies available in the country for processing thus the country has to export raw material tobacco as such. Looking the importance of the tobacco industry for the farming community, government exchequer, potential foreign exchange earnings, and employment generation, the Planning Commission has decided to launch this study to improve the competitiveness of the industry in the domestic and international market by evaluating the whole tobacco value chain, identifying the gaps and potential, and suggesting viable interventions along the value along with policy and strategic measures to adopt these interventions.



2. GOALS AND OBJECTIVES

The overall goal of this study is to contribute to the “*Cluster Development Based Agriculture Transformation Plan – under Vision 2025*” for tobacco industry to make the tobacco industry more competitive nationally and internationally. The specific objectives of the study are:

1. To identify the major tobacco cluster(s) in Pakistan;
2. To characterize and conduct SWOT analysis of the identified tobacco cluster(s) in Pakistan;
3. To identify technological, institutional, infrastructure and policy gaps in tobacco cluster(s) in Pakistan;
4. To assess the potentials in major tobacco production cluster(s);
5. To suggest technological, institutional, infrastructure and policy interventions to achieve the cluster potentials;
6. To conduct economic and social feasibility analysis/impact of the suggested interventions in Pakistan.



3. METHODOLOGY

The data and information related to the characteristics, gaps, potentials and needed interventions to meet the gaps in FCV tobacco clusters were collected from the following sources:

- a) *Micro and macro data* --- the required micro, macro and global data sets were gathered from various published and unpublished reports, estimates from various government organization and the available information from different websites through internet. More specifically, for the study in hand, the data were gathered from Agricultural Statistics of Pakistan, Pakistan Economic Survey, FAOSTAT, Pakistan Tobacco Board's website, Development Statistics of Khyber Pakhtunkhwa, etc. ([Annexure-10](#)).
- b) *Stakeholders' consultation* --- the primary information was collected through personally visiting the FCV tobacco growing cluster districts, having meetings/ consultations/discussion with key informants, tobacco growers, representatives of different tobacco processing companies, farmers' representatives in Pakistan Tobacco Board etc. For this purpose, a checklist of questions and queries was developed before visiting the study area.
- c) *Literature Review* --- the literature pertaining to agricultural value chains, cluster-based value chains development and particularly the studies conducted in Pakistan were gathered from personal linkages, visiting websites of various institutions and organizations and consulting the journal articles, reports and books available. A separate section is written after studying the gathered literature.

The following generic parameters and indicators are used while collecting the data:

- Global context of the tobacco sector and Pakistan's position;
- Production potentials, issues and challenges for the development of FCV tobacco cluster in Pakistan;
- Cost of production, harvesting, post-harvest processing of tobacco leaf, marketing of tobacco;
- Issues and constraints related to production, harvesting, curing and marketing of tobacco leaf in the cluster;

The above acquired data sets were then used to identify tobacco clusters in the country; characterizing the clusters from different perspectives; identifying the strengths, weaknesses, opportunities and threats (SWOT) at different stages of the value chain; ascertaining the issues, problems and constraints faced by different stakeholders; identifying the potentials for improving the overall productivity of the cluster etc. Lastly, the economic feasibility analysis of various interventions for improving the overall performance of the clusters was also conducted. Based on the results of the analysis conducted on these aspects, various suggestions and recommendations were made.



4. REVIEW OF LITERATURE

Although, one study on tobacco value chains is already available --- conducted by Agricultural and Microfinance Department of the State Bank of Pakistan (State Bank of Pakistan, undated) ---, but this study differs with the earlier study that it adopts the cluster-based approach which allows to carry out the analysis at regional level.

4.1. Tobacco Farming in Pakistan

Muhammad (1991) carried out economic analysis of tobacco production in Mansehra District of Khyber Pakhtunkhwa. He reported that tobacco is regularly cultivated in Mansehra since 1966-67 when average tobacco yield was around 1200 kg/ha. Tobacco farming has significantly contributed in improving the socioeconomic conditions of its growers. Continued efforts to enhance tobacco yields have improved it to 2000 kg/ha in 1991. A 66.7% increase in tobacco yields provided Rs.13600/ha as extra income to the farmers.

Bhatti (1992) analysed tobacco marketing in Swabi district. He estimated cost per barn of one acre as Rs.466, in which firewood cost constituted about 43% of the total cost of curing. In the order of importance, wages of curing labor and workers engaged in grading and bales making were about 10% and 9% respectively. Curing is an extremely important stage in tobacco production as any short coming in curing results in lowering returns to farmers as well as loss to the society. He suggested that the companies and tobacco board should construct their barns and take only the green leaf from growers. This may not only help the companies to get the required quality grades but also reduce the cost and hence increase the net revenue to the farmers.

Iqbal (1998) estimated the tobacco cost of production as Rs.27418/ha, curing and marketing as Rs.31629/ha. He found that land rent, fertilizers and farm yard manure as major cost items of tobacco before curing, whereas firewood, curer wages, unloading, grading and picking as the major components in curing and marketing costs.

Shah (1998) estimated cost and revenue of FCV tobacco production in District Mansehra. He estimated cost of production, curing and marketing as Rs.22711/acre with a composition of curing and marketing costs as 49.2%, production cost as 48% and 2.71% attributed to nursery raising cost. The cost of FCV tobacco production was Rs.10910/acre and the collective share of fertilizer and land rent share was 32%. The combined cost of curing and marketing was Rs.11185/acre, in which firewood constitutes 31%. The average yield per acre was estimated at 1080 kg and output price as Rs.35.30/kg. The gross and net revenues were Rs.39324/acre and Rs.16613/acre, respectively.

Noor (2004) in his report on export of tobacco and its product from Pakistan stated that average production of tobacco (1998-1999 to 2002-2003) was 73.5 thousand tonnes while growers had the potential to produce 111.50 thousand tonnes. On the other hand, the domestic FCV tobacco requirement are 45-50 thousand tonnes --- leaving exportable surpluses of around 30-40 thousand tonnes of FCV tobacco. Under the small share of



Pakistan in world tobacco production and trade, harnessing the above-described potentials can make Pakistan an important tobacco producing and exporting country of the world.

Faraz (2004) reported that tobacco is high cost and labor-intensive crop. High cost of production per ha is due to the high costs of fertilizers, insecticides and firewood. The cost of production of FCV tobacco was over Rs. 100,000/ha during the study period.

In a study on tobacco production and marketing in District Mansehra, Khan (2005) estimated the cost of production as Rs.124473/ha. The labour, material, land rent and miscellaneous groups components constituted 36%, 30%, 30% and 4% of total cost, respectively. He also compared cost and returns of producing tobacco with other crops like potato, tomato, onion and wheat. Among all these crops, tobacco is relatively costly to produce, and crops like onion and tomato fall close to it. On the other hand, returns to investment in tobacco were relatively lowest as compare to other crops. He recommended that standard educational and transportation facilities should be provided to the farmers and government should take steps to reduce or at least maintain the price of NPK fertilizers. He recommended that a good marketing system should be established with the strong influence of public sector to safeguard rights of both the farmers and tobacco companies. He also noted various tobacco production problems in decreasing order as incidence of pests and diseases, frequent happening of natural calamities, difficulties in finding skilled labor, shortage of fuel wood and high prices of various purchased inputs.

In a study on economics of tobacco production in Swabi district by Qamar *et al.* (2006), the cost composition analysis revealed that curing and binding is the major cost component in tobacco farming. Its underlying reason described in the study was high cost of fuel wood as nearly 3.2 tonnes/acre of firewood used for curing tobacco leaves. This clearly indicates that availability of cheap firewood is one of the major production constraints in tobacco farming in the area. He also estimated cost of production of tobacco as Rs.24081/acre with shares of various groups in decreasing order as curing and binding followed by chemicals (fertilizer and pesticides), cultural practices, nursery raising, tillage practices and marketing as about 68%, 16%, 5.5%, 4.2%, 4.1%, and 2.6%, respectively. The net-income per acre was estimated as Rs.29065. In this way, the returns to per rupee investment came to be Rs.1.21.

Shehzad (2006) estimated cost of producing tobacco in Swabi district as Rs.253814/acre. The major cost items in decreasing orders are firewood cost followed by miscellaneous, curer charges in curing, grinding and bales making, picking of leaves, transportation from field to barn, stringing of leaves, loading/unloading charges and transport from barn to field with their respective shares as 43.1%, 14.9%, 9.6%, 9.3%, 6.3%, 4.6%, 4.5%, 3.2%, 3.1% and 1.4%.

Hussain *et al.* (2010) conducted a study on impact of major farm inputs on tobacco productivity and analysed that area and fertilizer had greater impact on tobacco productivity. Increase in 1 ha area can increase tobacco production by 2.47 tonnes and 1% increase in fertilizers can increase 0.05 tonnes tobacco production. They suggested that the Government should take step to increase area under tobacco cultivation.

Rehman-ur *et al.* (2011) conducted a study on cost and net returns of tobacco production in District Swabi using data of 80 households. The average area per household in the study area



was 5.28 acres. The study estimated average cost of production of tobacco, curing + marketing costs, and net-incomes. In cost of production the costliest item was fuel and curer. They also estimated profit or revenue function, which revealed that if price of tobacco increased by one rupee it would increase the profit by Rs.2.25, one-kilogram. Increase in output shall enhance farm profits by Rs.3.43, whereas one-rupee increase in cost of production shall reduce farm profits by Rs.0.2389. This implies that yield enhancement coupled with increase in procurement prices can significantly increase farm profits.

Khan (2011) in a study on tobacco farming in Pakistan reported that tobacco is employing more than 10 million people. Tobacco sector collected a lot of revenue for the Government in the form of cess, excise duty and sales tax. He said that KP is the main tobacco producing area in the country having 33.33 ha area that is 63.74% of the total tobacco area and production 86.9 tonnes that is 78.52% of total tobacco production in the country. He estimated the cost of production of tobacco as Rs.92.05 per Kg. He suggested that by discouraging the unlawful trade in the country will be expected to increase the revenue from Rs.8-10 billion per annum.

Ataf (2014) carried out an economic analysis of 139 FCV growers from Swabi, Mardan and Charsadda districts. She estimated the mean age of the farmers as 44-year, farming experience as 24 years and mean education as about 7 years of formal schooling. The mean farm area of FCV tobacco growers as 8.1 acres, composed of 4.3 acres as owned land, while remaining was acquired on rental and/or shared cropping bases. The mean cost of FCV cultivation was estimated as Rs.129214/acre (i.e. Rs.116/kg), gross value of output as Rs.139380/acre leaving net income as Rs.6574/acre (or 7.87%). This rate of returns is much lower than the rates offered by many banks, National Savings Centers and private investors. The study concludes that despite offering a regular increase in the purchase prices of FCV and other tobacco varieties by Pakistan Tobacco Board, the increments does not fully compensate the costs incurred. In the absence of improved production and curing technologies, the farmers seems tried increase their income from tobacco farming by area expansion. Therefore, to improve the situation, her suggested measures were: a) PTB should duly consider the rate of increase in prices of various inputs, prices/profitability of competing crops and the inflation rate; b) PTB should pay urgent attention for investing into tobacco R&D; c) technical guidance about grading and for better curing methods is also need of the time; d) PTB should search for the use of cheaper energy alternatives of improved curing methods so that higher proportion of better quality tobacco leaf is produced from the area; e) the representatives Tobacco Growers Association should play more active role while deciding the prices in the Price and Grade Revision Committee meetings and the grades should be widely publicized in the electronic and print media for the farming community.

Ali *et al.* (2014) studied the acreage response of Flue Cured Virginia tobacco in its three major growing districts in Khyber Pakhtunkhwa. The time series data used in this study was pertained to 1971 to 2011. The Auto Regressive Distributed Lag (ARDL) model for co-integration was used to estimate the short-run and long-run elasticities. The study found a long-run price elasticity of 0.33, thereby revealing that FCV acreage response to its own price is relatively inelastic. The short-run acreage response was also low (0.13), and therefore, relatively more price inelastic. This implies that price policy could not be solely used as the



only instrument for increasing area under FCV tobacco in the study area. The results also show that area under maize crop negatively affect the area under FCV, thereby indicating that maize crop could be considered as competing crop to FCV cultivation in the study area. These results could help the policy makers of Pakistan in identifying important determinants of acreage response of FCV tobacco crop in Khyber Pakhtunkhwa.

Ali *et al.* (2015) investigated the significance of tobacco industry for Pakistan's economy. Besides making notable contribution to national exchequer in the form of taxes, duties and foreign exchange earnings, tobacco industry is the only industry in the country which makes prompt payments to its growers for their crop. Moreover, tobacco is the only crop of Pakistan whole yield is above the world average and matches with per ha yield of American and other developed countries around the globe.

4.2. Tobacco Demand and Prices

Extensive research from a number of countries revealed an inverse relationship between tobacco prices and its consumption. This implies that low or falling cigarettes prices can significantly encourage smoking, particularly low-income segments of the society, while rising prices shall certainly reduce smoking. Pakistan is no exception to it. In a recent study by Burki *et al.* (2013) reported that it in Pakistan, a 10% increase in average cigarette prices will lead to an almost 5% reduction in cigarette consumption. Secondly, the rising income leads to significantly more smoking --- consistent with the existing empirical evidence for most low- and middle-income countries. An important finding of this study was that a uniform specific tax accounts for 70% of average cigarette price could reduce overall cigarette consumption by 7.5% along with increase in tax revenues by Rs.27.2 billion plus 0.5 million adult cigarette smokers quit smoking and 0.725 million youth prevent smoking.

4.3. Tobacco Value Chain – Review of Available Literature

According to Nhorido (2013) tobacco is a major export crop of Zimbabwe. FCV is one of the few economically viable crop for Zimbabwe after maize and cotton. The number of FCV tobacco growers has been significantly increased over time leading to significant increase in tobacco production overtime. A value chain analysis into the key stakeholders revealed that the industry is more dominated by the contracting companies procuring tobacco from the buyers at the auction floors as well as through contracting with farmers with non-significant difference in prices. These companies are vertically integrated with processing and cigarettes manufacturing companies making a vertically integrated tobacco value chain. Contract farming was found more cost effective than non-contract farming. The average yield of contracting farmers, attributed to better access to inputs and crop management guidelines, was significantly higher than the non-contracting farmers. The study recommends the promotion of tobacco contract farming. However, the study also recommends that the policy makers should help upgrade locals to participate into the most profitable stages of the value chains through the indigenization programs to enable locals to participate in high value



functions of the value chain which are contracting, processing through to cigarette manufacturing.

Prowse and Moyer-Lee (2013) conducted a value chains analysis of smallholders Burley tobacco production in Malawi for 2003-04 and 2009-10 season. The comparison shows smallholder profits in 2003-04, were limited by two main factors: a cartel of leaf merchants at auction and inefficient marketing arrangements. In 2009-10, there was greater competition at auction, improvements in marketing, tighter state regulation (including minimum prices) and much contract farming. The paper concludes by reflecting on aspects of the political of the tobacco industry at national and global levels.

State Bank of Pakistan (undated) in its study on “Tobacco Value Chain in Pakistan” found that the value chain is heavily taxed and regulated, yet it has increasing margins but if some of the taxes collected are diverted to its development, it would result in far reaching impact on the overall development, as it has all the potential to grow. Commercial lending through banks has similar difficulties as in any other agricultural value chains in the country. Contract farming in the value chain is already in place and almost 90% of the growers undertake such contracts. As majority of the growers produce and cure on rented land and barns, financial institutions have to develop products to finance crop inputs, barn construction, improvement, and repairs, warehousing facilities establishment and export against rental land agreement and contract with the buying companies as a requirement to support the value chain.

4.4. Global Compliances

At global level, there have been momentous events in tobacco control since the first edition of Tobacco Control was launched in 1992. These include increased global awareness of harmfulness of tobacco and the WHO Framework Convention on Tobacco Control (WHO FCTC)⁶. The WHO FCTC represents the most momentous milestone. It was the first treaty negotiated under the auspices of the WHO and entered into force in 2005. It is one of the most rapidly embraced UN treaties and represents a paradigm shift in developing a regulatory strategy to address addictive substances. In contrast to previous drug control treaties, the WHO FCTC asserted the importance of demand reduction strategies as well as supply issues and thus established a framework for an integrated multi-sectoral response to a grave public health issue (Mackay *et al.*, 2012).

The WHO’s FCTC was the world’s 1st public health treaty, called for the governments to adopt comprehensive policies to curb tobacco use. Pakistan signed the FCTC on 18th May 2004 and ratified it later on 3rd November 2004. Pakistan’s participation in the FCTC has resulted in some advances in tobacco control policy, mostly through increasingly strong Statutory Rules and Orders (SROs). The country’s smoke-free policy has been significantly strengthened in 2009 by the rolling back of an SRO that had allowed for the creation of designated smoking areas. But the enforcement remained weak and compliance continued to be low. Textual warning labels were used for decades and made stronger and more specific over time. In 2010, an SRO replaced the text warning with a rotating, graphic warning label that is required

⁶ World Lung Foundation, New York, New York, USA.



to cover 40% of the front and back of the cigarette packs. The 2002 ordinance restricted but did not comprehensively banned a variety of tobacco product advertising, while 2009 SRO prohibited some promotional activities. In 2011, legislation requiring minimum pack sizes was implemented. It is worth mentioning here that Pakistan has a national agency for tobacco control and tobacco prevention is a national objective, but the agency is suffering from limited staff and resources (Burki *et al.*, 2013).

Despite the unparalleled successes witnessed over the past 30 years in tobacco control, tobacco industry attempts to impede tobacco regulation the development and implementation of effective tobacco control legislation, the undermining of scientific evidence and the introduction of disingenuous Corporate Social Responsibility (CSR) programs. These practices represent a fraction of the array of strategies that tobacco industry continuously uses to impair public health in countries vulnerable to industry exploitation (Mackay *et al.*, 2012).

WHO and public health advocates consider the tobacco industry vector a Non-Communicable Diseases (NCD) emergency which requires coordinated and decisive action. WHO has made the interference of the tobacco industry with public health theme of the 2012 World No Tobacco Day and the 4th Edition of the Tobacco Atlas (2012) will expose legal challenges by the tobacco industry as well as the industry's "undue influence" in countries (Mackay *et al.*, 2012).

4.5. National Policies

In Pakistan, the most effective way considered to reduce tobacco use is to raise tobacco prices through tax increase and ensuring that the tax increases are reflected in prices. Higher prices discourage smoking in general and youth in particular from initiating cigarette smoking and encourage current smokers to quit. Pakistan modified its tobacco excise tax system in 2013. It is now a two-tiered specific excise tax structure for cigarettes. For a pack of 20 cigarettes, the lower and upper tier amounts to Rs.17.6, and Rs.46.50 per pack, respectively. This tax system simplified the more complex, mixed, three-tiered system. However, a large price gap remained between economy and mid-price segments as a group versus premium cigarettes (Burki *et al.*, 2013).

The year 2017 was a challenging year for legitimate tobacco industry of Pakistan. The first half of the year was severely impacted by the carry over impact of consumer down trading to cheap duty evaded cigarettes keeping with the trend of recent years. On the other hand, as per FBR's press release dated 31st January 2018 and an independent retail audit at the end of 2016, the market share of cigarette trade in Pakistan stood at 40%. Illicit trade of cigarettes was a major issue hampering government's revenue targets from the tobacco industry. At the start of 2017, the FBR setup an Inland Revenue Enforcement Network (IREN) to combat this menace (PTC, 2017).

In recognition of these negative factors, the government introduced tax and policy reforms through the Finance Act in the federal budget 2017-18. As a result, the legitimate industry revisited its portfolio price in the [second half of 2017](#) in line with the new fiscal measures. This strategies intervention reduced the stretch faced by consumer and narrowed the price gap



between duty paid and duty non-paid cigarettes. In the 2nd half of the year, IREN further enhanced its enforcement actions across the country. As quoted by FBR, vide its press release dated 31st January 2018, a lot of successful raids and activities were conducted in 2017. Around 1.63 billion non-duty paid cigarettes sticks and raw material were seized that had caused a loss of PKR.2.7 billion to the national exchequer. Government's fiscal intervention and enforcement measures had resulted in a revival of government revenues from tobacco industry and somewhat stabilized the legitimate tobacco industry. Market share of the illicit sector came down to 34.7% as on December 31st 2017 resulted in government revenues going up by PKR 5 billion in the second half of 2017 compared to that same period in 2016 (PTC, 2017).

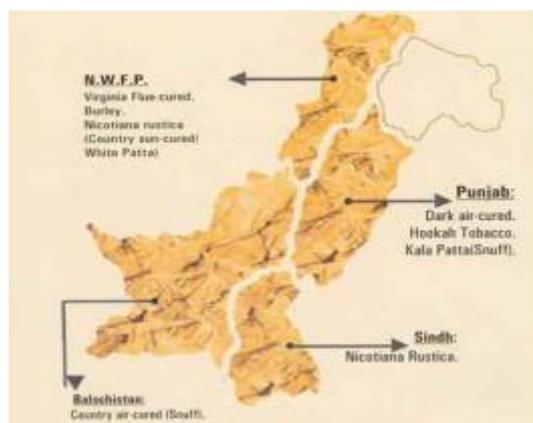


5. CLUSTER IDENTIFICATION AND CHARACTERIZATION

5.1. Cluster Identification

In this study we defined cluster based on the tobacco types which are more relevant for processing industry. As discussed earlier, different types of tobaccos are grown in the country but only FCV is the only type used for industrial cigarette processing. Other types such as Rustica, DAC and Kala *Patta* (Snuff) are scattered throughout Punjab, WP grown throughout Sindh, and DAC is spread throughout Balochistan, thus do not make any concentrated regional cluster. Except FCV, other tobacco varieties also do not involve any industrial processing. Therefore, we decided to select the FCV mainly grown in KP as a cluster product. The soil and agro-climatic conditions of northern KP are best suited to produce the FCV (Figure 7).

Figure 4: Tobacco production by its types in different provinces of Pakistan



[Source: PTB, 2010. Tobacco growing areas and its types grown in different provinces of Pakistan \(www.ptb.gov.pk\)](http://www.ptb.gov.pk)

In 2017-18, the total area planted under FCV was nearly 24.53 thousand ha (Table 3) spread over the seven plain districts of KP and defunct FATA, i.e. Swabi, Charsadda, Mardan, Mansehra, Nowshera, Buner, and Malakand Agency. The cluster covers about 80% of the total FCV area in KP. However, we took highest tobacco concentrated districts of Swabi, Charsada, and Mardan as tobacco FCV cluster with most concentrated tehsil of Swabi and Mardan as focal point of the cluster.



5.2. Characterization of FCV Tobacco Cluster

5.2.1. Farming Profile of Swabi, Mardan and Charsadda Districts

Geographically, Mardan is the largest district in the cluster while Charsadda is the smallest. However, the total number of farming households is highest in Swabi followed by Mardan and Charsadda. The agriculture sector in the whole FCV tobacco cluster is small sized farming (i.e. upto 12.5 acres). According to Agriculture Census 2010, about 70% of the farming households in the area are of marginal sized (upto 5 acres) while only 13% are small farmers (>5 to 12.5 acres). Only 2% of farming households have more than 12.5 acres of land. The average farm size in these districts is nearly 3 acres (Agriculture Census 2010).

5.2.2. Characterization of FCV Tobacco Growing Cluster

In Table 9 below, the FCV tobacco growing cluster of KP has been extensively characterized from large number of perspectives. The underlying objective is to comprehend the entire profile of the end-to-end value chain, as a background before suggesting various improvements in it. The aspects covered include areas like: cluster districts, cluster products, product features, cluster focal points, size of the cluster in terms of number of farmers, other socioeconomic and environmental conditions, varieties planted and crop management practices followed, curing practices and costs involved, transport and marketing, R&D infrastructure, export, supply chain, certification, socioeconomic networking, subsidies, incentives, facilities, gender and socio-economic networks.

Table 9: Characterization of FCV Tobacco Cluster, Khyber Pakhtunkhwa

	Salient Features	Description
1.	Cluster districts	Swabi, Charsadda, Mardan
2.	Cluster products	<ul style="list-style-type: none"> • Cigarettes of different qualities and brands produced • Export quality cigarette tobacco
3.	Cluster focal points	<ul style="list-style-type: none"> • Swabi and Mardan
3a.	Cluster area (000 ha)	<ul style="list-style-type: none"> • Mardan (3.247 thousand ha) • Swabi (16.383 thousand ha)
3b.	Cluster production	<ul style="list-style-type: none"> • Mardan (8.440 thousand tonnes) • Swabi (40.370 thousand tonnes)
4.	Focal point	
4a.	Area (000 ha)	<ul style="list-style-type: none"> • 10.522 – Takhtbai/Jamal garhi and Shergargh area of Mardan and Firdousabad/Charbagh and Yar Hussain area of Swabi
4b.	Production (000 t)	30,00 - Takhtbai/Jamal garhi and Shergargh area of Mardan and Firdousabad/Charbagh and Yar Hussain area of Swabi
4c.	Yield (tonnes/ha)	2.85



4d.	Percentage of the crop area that lies in the cluster	70
4e.	Percentage of the total cropped area in the cluster	4.92
4f.	Tobacco growers that grow tobacco in the area (%)	85
5.	Geographical and Environmental Factors	<ul style="list-style-type: none"> • Mainly loamy soils • Flat plains • 33°56'N 71°59'E to 34°20'2'N 73°12'5'E • Cluster belongs to Agro-Ecological Zone - C (AEZ-C) • Climate is warm sub-humid • Average rainfall 450-470 mm <ul style="list-style-type: none"> ○ <i>Rabi</i> season 250-400 mm ○ <i>Kharif</i> season 200-300 mm
6.	Tobacco growers	<ul style="list-style-type: none"> • Marginal (<2 ha)=85.2%; Small (2-5 ha)=12.8%; Medium to large (>5 ha)=2% • Literacy rate = 40% • Mostly family labor used. Hired labor at transplanting, harvesting and curing • Representatives of Tobacco Growers Association participate in PTB meetings
7.	Product features	<ul style="list-style-type: none"> • Filler tobacco of Swabi, Mardan and Charsadda <ul style="list-style-type: none"> ○ Nicotine (1.3%-2.5%); reducing sugar (9%-16%); Chloride (0.75%-0.90%) • Semi-filler tobacco of sub-mountainous areas <ul style="list-style-type: none"> ○ Nicotine (1.3%-2.8%); Reducing sugar (12%-18%); Chloride (0.6%- 0.8%) ○ Firm leaf structure
8.	Tobacco varieties' features	<ul style="list-style-type: none"> • Old commercial - Speight G-28; Speight G-126; K-399; NC-606; • Hybrid varieties: K-399, CC-901; PVH-2310, PVH-2261, PVH-2233 (For the details about these varieties, see Annexure-3)
9.	Nursery raising and its transplanting	<ul style="list-style-type: none"> • The seed distribution from the contracting companies in November • One packet seed (6-8 grams⁷) for one ha plantation. • Nursery plantation takes place from mid-November to December months • Nursery plot size for 1 packet = 20' × 5' • Nursery planted in low tunnels to protect it from frost • Nursery transplanting in March • Nursery plant height= 6 inches • Plant × Plant distance = 1.5 – 2.0 feet • Row × Row distance = 3 feet • Plant mortality/missing plantation = 10% • Plant population = 7000 per acre • Recommended plant population = 7200 • Nursery transplanting charges = Rs.5000 per ha • Labor required for nursery transplanting = 2 man-days/ac. • Mostly family labor is used for nursery transplanting
10.	Inputs management practices	<ul style="list-style-type: none"> • NPK @ 400 kg/ha + 50 kg potash/ha • Rs.3350/bag of 50-kg of NPK was charged • One rotavator ploughing @ Rs.1200/hour [5 hrs./ha] • 4-5 cultivator ploughings @ Rs.1200/hour [1.6 hrs./ha]

⁷ In *N. tabacum* the average weight of the seed is 0.08 to 0.09 mg and there are 11,000 - 12,000 seeds per gram.



		<ul style="list-style-type: none"> • Furrow making @ Rs.1200/hour [2.5 hour/ha] • Farm Yard Manure @ Rs.6000/trolley [1 trolley/ha] • Total irrigations = 16-20; canal charges @ Rs.800/acre • 3-4 sprays for plant protection @ Rs.3000 – Rs.4000/acre • Earthing-up @ Rs.1200/day [2 days/acre] • Land rent =Rs.70000 to Rs.80000 per acre per annum • Shortage in labor availability position, especially for planting and harvesting.
11.	Harvesting/Leaf plucking	<ul style="list-style-type: none"> • Manual harvesting with sorting by leaf position • On average 24-25 leaves per plant <ul style="list-style-type: none"> ○ Top 6 leaves – top quality but less weight ○ Middle 12-13 leaves – average quality but good weight ○ Bottom 6 leaves – low quality but good weight • Harvesting charges = Rs.20/kilogram • The tobacco companies generally procure tobacco leaf @ 2100 kg per seed packet delivered.
12.	Leaf Curing	<ul style="list-style-type: none"> • One barn/ha is used for tobacco leaf curing • 350 kilogram of tobacco is cured per round • 8-9 rounds/ha of curing takes place in one season • New kiln construction cost = Rs.150,000/= per kiln • Kiln repair cost = Rs.4000/season • Leaf picking charges per round=Rs.2000/= • Leaf transport to kiln=Rs.1500/= • Ropes & tie expenses=Rs.1600/= • Leaf loading to the kiln=Rs.500/= • Firewood used for curing is called “<i>palosa</i>” & “<i>kikar</i>” • Fire wood = 1250-1500 kilogram @ Rs.600/40-kg • Curer or fireman = Rs.4000/= per round • Curing supervisor = Rs.10000/= per round • Leaf unloading charges=Rs.2000/= per round • Grading/sorting/bundling=Rs.2000/= per round
13.	Tobacco transport	<ul style="list-style-type: none"> • Mode of transport used = Suzuki pick-ups / vans • Transport charges=Rs.1500-2000 per trip. • Average load taken = 750 – 1000 kilogram per trip
14.	Cured tobacco leaf marketing	<ul style="list-style-type: none"> • 53 tobacco companies, processors and dealers formally purchase tobacco leaf • Total demand placed in 2018 = 49.675 thousand tonnes • Almost half of the produced leaf is formally purchased and remaining is left for informal traders • All formal leaf buying takes place based on pre-set 17 grades which are strictly followed (Annexure-4). • Every year, the tobacco procurement prices for every grade of FCV, DAC, WP and Burley leaves are set in the meeting organized by PTB. • Pakistan Tobacco Company, Nowshera; Philip Morris (Pak) Limited Nowshera; Samson’s Re-drying and Processing Company, Mardan; and Khyber Tobacco Company Mardan are lead buyers.
15.	New Technologies/ Infrastructure	<ul style="list-style-type: none"> • PTB has constituted R&D Committee comprising officer/scientists from the Board, Agriculture Department, Research Organizations, MNFS&R, managers of tobacco companies and representatives of tobacco growers’ associations. • Under PTB, tobacco research is carried out at: <ul style="list-style-type: none"> ○ Tobacco Research Station, Mardan (FCV & Rustica) ○ Tobacco Research Station, Swat (Burley) ○ Tobacco Research Sub-station, Mansehra (FCV) ○ Tobacco Research Sub-Station, Kunjah, Gujrat (DAC, Virginia and <i>Huqqah</i>)



		<ul style="list-style-type: none"> ○ Tobacco Research Sub-station, Okara (DAC, <i>Huqqah</i>) ○ Tobacco Model Farms at Buner, (Hazro) Attock, Dadu, Pishin, Jampur. ○ At present PTC is funding R&D activities ● Cess fund is used for financing research activities at PTB. ● The PTC and PM tobacco conduct tobacco R&D out of their company funds. ● PTC and PM plant experiments in above mentioned research stations/sub-stations. ● On development side, the following set up exists: <ul style="list-style-type: none"> ○ Director (Development) = 1 ○ Deputy Director (Development) = 1 ○ Assistant Director (Development) = 19 ○ Field days, tobacco workshops, T&V programs, 1500-2000 model plots/nurseries annually ● Well organized distribution system for seed, fertilizer & plant protection chemicals ● Upgradation of curing method for quality grade out-turn: <ul style="list-style-type: none"> ○ Introduction of 1000 Turbo-Barns (reduces curing cost by 13-20%; initial cost Rs.0.2 million/barn) has been introduced by PTC. ● Loose Leaf Barn Technology (Electric Based, load shedding issues)
16.	Export	<ul style="list-style-type: none"> ● Pakistan exports cigarettes as well as cigarette tobacco ● Tobacco exported in 2017-18, : <ul style="list-style-type: none"> ○ Total Qty. of tobacco exported=10.92 thousand tonnes ○ Total value of tobacco exported = US\$ 23.88 million ○ Countries imported Pakistani tobacco= 22 ○ Switzerland, UAE and Netherlands are our lead buyers ● Cigarettes were exported till 2015-16. Saudi Arabia, UAE and Vietnam were major importer of Pakistani cigarettes. ● No cigarette stick was exported during 2017-18. ● Large quantities of unofficial/illegal trade in cigarettes and tobacco has been reported in newspapers.
17.	Supply Chain	<ul style="list-style-type: none"> ● Almost all FCV tobacco growers are contract farmers of some tobacco company or processors ● Almost half of the total production in the area is formal purchased and remaining half rejected by the formal sector goes to informal sector. ● The farming community faces substantial loss, when a notable proportion of their produce is rejected. ● The rejected leaf is purchased by the small traders at low prices and sold to small sized tobacco companies involved in manufacturing localized brands. ● Quality of tobacco is hindered by: <ul style="list-style-type: none"> ○ Inappropriate picking of leaf at harvesting ○ Issues in grading (mixing) before and after curing ○ Old fashioned tobacco curing technology and kilns ● Large cuts and classification in lower grades of the produce at procurement depots
18.	Certifications	<ul style="list-style-type: none"> ● No use of child labor at any stage of tobacco production ● Almost all the seed used in tobacco production is certified. ● Recommended level of use of critical inputs (seed, plant population, fertilizer, pesticides) ● Strict vigilance of PTB for quality leaf production and processing stages in the area. ● Internationally certified processing technology used for tobacco leaf processing at leading tobacco companies like PTC, Philip-Morris, Khyber Tobacco.
19.	Socioeconomic networking,	<ul style="list-style-type: none"> ● Knowledge/experience sharing networking via trainings, farmer field days, workshops, demonstration plots, etc. through PTB extension team

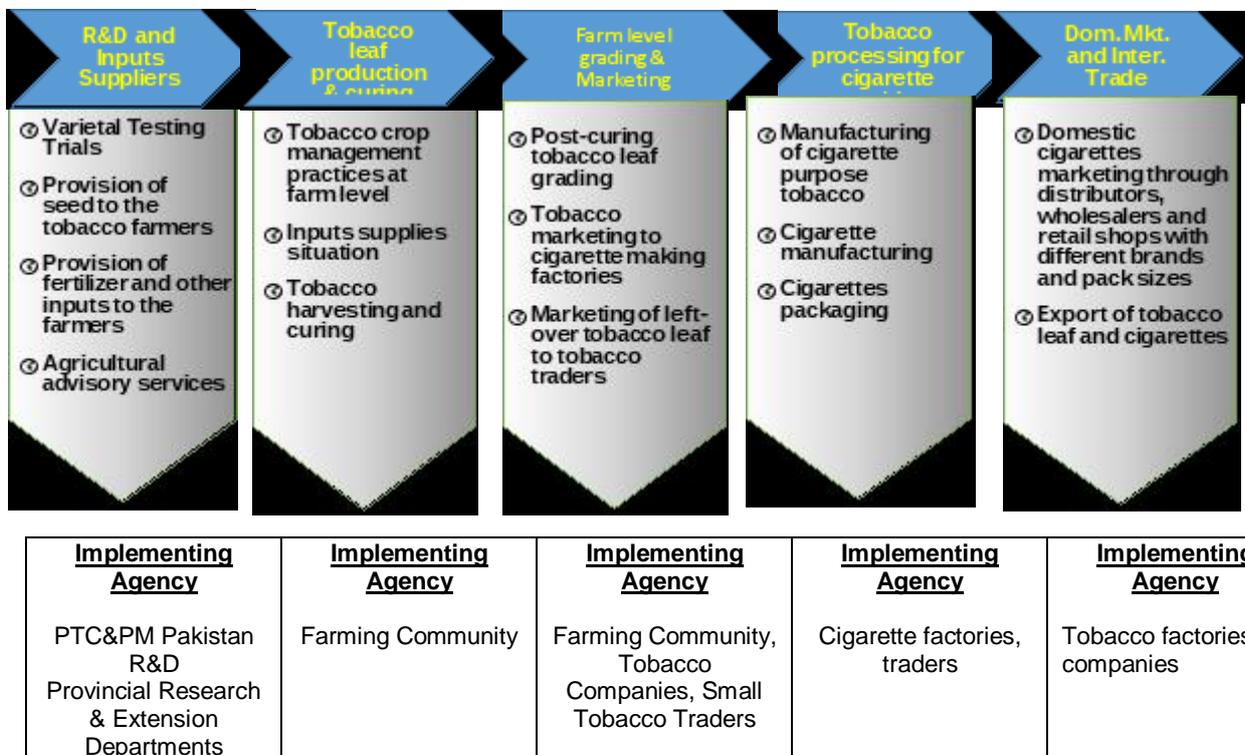


	gender involvement	<ul style="list-style-type: none"> Mostly family labor (including family females but not girls) is used during tobacco crop management, so gender involvement is there. It is not custom to allow family females to work on others' farms.
20.	Subsidies/incentives/ facilities	<ul style="list-style-type: none"> Tobacco production through contract farming is taking place under win-win production environment for both parties Every year some increase in tobacco procurement prices is offered by PTB on regular basis Seed, fertilizers, pesticides are provided to contract growers at subsidized rates At present, despite various issues, no other crop in the area is as profitable as FCV tobacco Knowledge sharing opportunities provided to the growers through farmers' field days, demonstration plots and advisory services through PTB extension team
21.	Socioeconomic networks	<ul style="list-style-type: none"> Tobacco growers' association Kissan Board, Kissan Coordination C <i>Anjuman-e-Kashtkaran</i> Khyber Pakhtunkhwa Civil Society Organizations

5.3. Conceptualizing Tobacco Value Chain

Turning to FCV tobacco value chain in KP, a number of stakeholder groups are involved in it (Figure-10). It starts from R&D activities of PTC and ends at its distribution in the domestic and international markets. During the informal field visit to the study area, all the end-to-end stakeholders involved in FCV value chains were addressed to varied extents.

Figure 5: FCV tobacco value chain, Pakistan





5.4. SWOT Analysis

The strength, weakness, opportunity and threat (SWOT) analysis is an extremely useful tool for understanding and decision making for all sorts of situations in business and organizations. During the visit to the target FVC tobacco cluster, the focus group discussions were carried out with the farmers and other stakeholder involved in tobacco value chain. Table 7 below presents SWOT analysis from the perspectives like Environment/Climate Change, Inputs Supplies, Cluster Interactions, Production Management Practices, Transportation, Marketing, Processing and Trade/ Exports.

From the environment/climate change perspective, the target FCV tobacco cluster possesses strengths like soils well suited to tobacco production along with sufficient irrigation water availability. However, tobacco crop often face the problems like incidence of frost, diseases and insect attacks. Since considerable stakes of tobacco companies are involved in the area, therefore, these companies closely monitor the crop during the season. The improper disposal of the by-products of tobacco crop and loss of biodiversity due to intensive use of insecticides are serious environmental threats reported by the farmers of the area (Table 7).

Regarding inputs' availability/supplies, the supplies of critical inputs (balanced fertilizers and insecticides) is ensured from the tobacco companies operating in the area. However, monopoly of few companies is not allowing a strong competition from the buyers – a weakness of our cluster. Considerable opportunities exist in mechanizing various farm operations, as the area is facing labor shortages are various crop management stage and harvesting. It is worth mentioning here that no serious threats exist in the area from the inputs supplies side (Table 7).

Considering cluster interactions --- as more than 30 FCV tobacco growers are involved in tobacco production, they have formed Tobacco Growers' Association. The representatives of this association are present in various meetings organized by Pakistan Tobacco Board (PTB) from time to time. Despite all that, the non-availability of due yearly increase in the tobacco procurement prices and non-buying of considerable proportion of leaf by the companies is a serious weakness of the cluster interaction. On the other hand, considerable opportunities for the development of tobacco cluster exist in areas like graded-harvesting of tobacco leaf and shifting to more efficient curing methods like Turbo Barn and Electric Based Loose Leaf Barn technologies. No serious threats were reported by the farmers about cluster interaction (Table 7).

Turning to production management practices, the strengths pertained to availability of advisory services from the tobacco companies, majority of the farmers operating a manageable of one-ha per farm and strong vigilance from companies are worth mentioning. However, the absence of any other more profitable alternate crop except some vegetables and non-realization of farmers about the importance of applying balanced fertilizers and potash for better leaf quality are serious weaknesses need to be addressed at the earliest. Therefore, considerable opportunities exists in providing low cost soil testing facilities to the farmers and demonstrating the impacts of using potash on leaf quality. Increased incidence of general health problems (due to non-practicing safety measures during spraying) and chest related diseases during



curing and handling cured leaf are serious threats reported in the area. Tobacco companies do not offer any medical coverage (e.g. dispensaries or free consultation of the qualified Doctors on panel etc.) to the farmers (Table 7).

About transport facilities, no transport related problem, except high transport charges, was reported by the tobacco farmers of the area (Table 7).

Table 10: SWOT Analysis of FCV Tobacco Value Chain in Pakistan

Parameters	Strengths	Weaknesses	Opportunities	Threats
Environment/ Climate Change	<ul style="list-style-type: none"> Loamy soils, sufficient canal water supplies and comparative advantage 	<ul style="list-style-type: none"> Frequent frost incidence, insect/disease attacks, results in crop failures 	<ul style="list-style-type: none"> Strict follow-up of the production guidelines provided by leading tobacco companies to the farming community 	<ul style="list-style-type: none"> Loss of biodiversity due to intensive use of harmful chemicals Environmental pollution due to pesticide use Improper disposal of tobacco wastes (leave & other plant parts) can cause environment pollution
Inputs Supplies	<ul style="list-style-type: none"> Ensured inputs supplies from the tobacco companies due to contract farming 	<ul style="list-style-type: none"> Monopoly of few tobacco companies on seed supply Boundedness of selling output to the contracting tobacco companies. The rejected tobacco leaves do not fetch appropriate price outside. 	<ul style="list-style-type: none"> Introduction of mechanization in farm operations 	<ul style="list-style-type: none"> No threats observed
Cluster Interactions	<ul style="list-style-type: none"> More than 30 thousands FCV tobacco growers have good interaction forum Tobacco Growers' Association is another forum. Strong existing cluster gives comparative advantage 	<ul style="list-style-type: none"> Increased frustration of farmers when their cured leaf do not appropriate price 	<ul style="list-style-type: none"> The existing Farmers Association can be used to improve curing efficiency Trainings on grading of harvested and cured leaves. 	<ul style="list-style-type: none"> No threats observed
Production Management Practices	<ul style="list-style-type: none"> Expertise and advisory services available from 	<ul style="list-style-type: none"> Absence of any other more profitable alternate crop 	<ul style="list-style-type: none"> Provision of low cost soil testing facilities for tobacco 	<ul style="list-style-type: none"> Carelessness of farmers while applying insecticides and pesticides cause health problems.



	<p>leading tobacco companies</p> <ul style="list-style-type: none"> Reasonably manageable size of the business given to the tobacco farmers Strong vigilance on crop management practices for quality control 	<p>except some vegetables</p> <ul style="list-style-type: none"> Less knowledge about the impacts of using potash on quality of tobacco leaf Less knowledge about the importance of using balanced fertilizer doses in tobacco cultivation 	<p>growing fields/parcels.</p> <ul style="list-style-type: none"> Demonstrating the impacts of using recommended quantities of potash on leaf quality. Existing modules on soil fertility management in the Agriculture Department 	<ul style="list-style-type: none"> Health issues to the labor force engaged at curing, post-curing grading and packaging stages
Transportation	<ul style="list-style-type: none"> Easy availability of transport facilities, especially Suzuki pick-up No quality damage during transport 	<ul style="list-style-type: none"> Nothing noticed 	<ul style="list-style-type: none"> Nothing noticed 	<ul style="list-style-type: none"> Nothing noticed
Marketing	<ul style="list-style-type: none"> Production and marketing/procurement system well in place Loyalty of producers and companies to each other. 	<ul style="list-style-type: none"> High exploitation of local traders on unsold tobacco Large gaps in prices of different cigarettes brands of same company. Monopoly of few tobacco companies in production and marketing. 	<ul style="list-style-type: none"> Improvement in the transparency of grading at sale depot. 	<ul style="list-style-type: none"> Increased entry of global brands reduces domestic market opportunities Increasing rate of smuggling of imported cigarettes affect domestic marketing Counterfeit products of big brands
Trade/Export	<ul style="list-style-type: none"> Consistent quality management of whole products range 	<ul style="list-style-type: none"> Rising costs of production (high inflation, rising oil prices and energy costs) 	<ul style="list-style-type: none"> Early introduction of alternative products like e-cigarettes and chewable gums Fast increase in dollar value 	<ul style="list-style-type: none"> Declining international market due to gradual losing international competitiveness Growing anti-smoking laws/movements/initiatives /policy measures
Tobacco Processing for Cigarettes	<ul style="list-style-type: none"> Consumers' long-time stickiness to 	<ul style="list-style-type: none"> Old fashioned curing technology 	<ul style="list-style-type: none"> Availability of modern curing technology 	<ul style="list-style-type: none"> Increasing material costs due inflation, high taxes and duties



Making Purposes	different brands of various companies		<ul style="list-style-type: none"> • Production of medium to low-Tar cigarettes at affordable prices 	
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Taking up tobacco marketing, the presence of a well-organized production and marketing (grades based) system is an obvious strength of the cluster. Secondly, both the producers (sellers) and companies (buyers) are trustworthy. The only weakness of the cluster is that the farmers' have to sell the left-over of the tobacco leaf to the local traders at very low prices. Secondly, the price difference among high, medium and low-quality grade leaves is much narrow than the price difference among prices of different brands of the cigarettes of the same company. In other words, the companies are not paying due share to farmers producing very high-quality tobacco. On the opportunities side, controlling the malpractices carried out by the companies' staff during grading the tobacco leaf can significantly encourage farmers' to produce quality tobacco in the area. Finally, very high rate of smuggling of cigarettes leave little space for the tobacco company to carry out business on healthy competition based. The counterfeit products of big brads are also produced by various companies, which is illegal and must be controlled at the earliest (Table 7).

Considering Pakistan's trade/exports in tobacco and cigarettes, it is worth mentioning here that overtime, the export of manufactured cigarettes is falling very sharply. During 2017-18, the country was able to export on cigarette tobacco rather than the cigarettes also. The companies are of the view that rice cost of production attributed to various factors is the prime weakness of Pakistan's export competitiveness in tobacco & cigarettes' exports. However, considerable scope exists in area like introducing light cigarettes, e-cigarettes and chewable gums. The recent significant fall in rupee value against dollar also offered considerable opportunities for enhancing exports of both the cigarettes and the tobacco. It is worth mentioning here that growing anti-smoking rules/regulations/movements/initiatives/policy measures are serious threats in promoting international trade in tobacco and the cigarettes (Table 7).

Finally, considering tobacco processing for cigarettes making, no information about the cigarettes purpose tobacco manufacturing technology used by various tobacco companies in Pakistan is available. There is a need to conduct such study for comparing the production efficiency of the processing plants used in Pakistan with the plants used in other countries of the world. As considerable developments in manufacturing technology is taking place in every area, therefore, the tobacco companies may consider upgrading their processing plants for reducing the production costs of manufacturing tobacco used for filling in cigarettes.



6. CHALLENGES FACED BY THE CLUSTER

6.1. Lack of Substantial Research

Despite tobacco sector being of immense importance for the farming community, tobacco industry, government exchequer, and foreign exchange earnings, there is no proper dedicated tobacco research organization in the country in the public and private sector to take up the tobacco issues along the whole value chain. The existing tobacco research is mainly focused on varietal adaptation. But the long-term impact of tobacco cultivation on agriculture resources such as land, labor, and water has been completely ignored by the privately owned research system. Therefore, collaboration between private and public research system is needed to undertake the sustainability research issues. Moreover, more intensive campaign on improving farm management practices such as noted earlier may be launched.

6.2. Survival Against Anti-Smoking Campaigns

Since Pakistan has become a signatory of the WHO's Framework Convention on Tobacco Control (FCTC) in 2004, it has adopted a number of measures such as printing of warning texts on cigarette packets, introduction graphic warning labels covering 40% of the front and back of the cigarette packs, introduction of minimum pack sizes and increase in taxes & duties on cigarettes (to make the cigarettes expensive for the consumers).

Secondly, in 2013, a two-tiered specific excise tax structure for the cigarettes was implemented. The Federal Board of Revenue (FBR) attempted to retain third tier of Federal Excise Duty (FED) on cigarettes in 2018-19 following increase in FED from this item and non-stop actions against the non-duty paid cigarettes in 2017-18. On May 2019, increase taxes on cigarettes (as health tax) was also introduced in the budget. It will result increase in cigarette prices by Rs.10/pack. The third tier shall result in production of high priced cigarettes plus increase in excise duty collection.

These measures to reduce tobacco demand, according to tobacco industry and industry front groups such as the International Tobacco Growers' Association (ITGA), are one sided measures without looking its impact on other economic parameters of the country like poverty. They claim that these will cause poverty in tobacco producing regions and small farmers have to face desperate situation who they claim have no alternative other than to grow the crop. It is claimed that these tobacco control measures could lead to increase in illicit trade as well as pressure on prices.

The evidence, however, showed that the impact of tobacco control measures on tobacco farmers is minimal in the countries where most of the tobacco production is domestically



consumed⁸. In Pakistan, despite the fact that excise taxes account for 70% or more of the retail prices, the demand for cigarettes and other tobacco products is almost stagnant. Even high taxes do not impact small farmers, nevertheless these taxes have definitely induced illicit cigarette trade. The presence of a large illicit sector reflects huge amount of revenue lost by the Government due to weak enforcement.

If taxes and duties are regulated in a manner to reduce illicit trade in the country, it can produce a space for cigarette export, which is currently insignificant. This will create huge additional income and employment to farmers as well as generate foreign exchange for the country. Thus these measures if designed in collaboration with the industry can be an opportunity for the industry, farmers as well as for the government.

6.3. Instable Exports of Cigarettes and Tobacco

As already shown in Table 4, Pakistan mainly export tobacco rather than value added product cigarettes. Moreover, the export of both the items is not stable suggesting that Pakistan failed to established reliable market(s) for the export of these products. Pakistan need to carefully identify the gaps to be filled to make the country competitive in the export of especially cigarettes. To the best knowledge of the author, no study on the export competitiveness of FCV tobacco and cigarettes has been conducted in Pakistan

6.4. Improved Management Practices

In FCV tobacco cluster, the improved seed and inputs are supplied by the tobacco companies and management practices followed by tobacco growers are grossly supervised by the companies' technical field staff. However, still there are a number of areas in crop management, which needs urgent attention. These include, use of optimum quantities of various crop inputs, timeliness of various crop management operations, harvesting/plucking of tobacco leaves at their optimum maturity time, pre- & post-curing grading of tobacco leave. Moreover, there is a strong need for increasing farmers' visit to demonstration plots and participation in farmers' field days.

6.5. Switching from Conventional to Turbo Barn Curing Method

Curing tobacco is a complex procedure because of the differences in types of tobacco (body, stalk position, moisture contents, etc.), curing facilities and weather conditions. It is difficult to use a set curing schedule because of the different maturity schedule of each tobacco field and complicated and sophisticated process of curing which may vary under different maturity, humidity and temperature situation of the filed as well as airflow capacity of the barn. The harvested leaves must be kept alive during the yellowing period so that desirable chemical

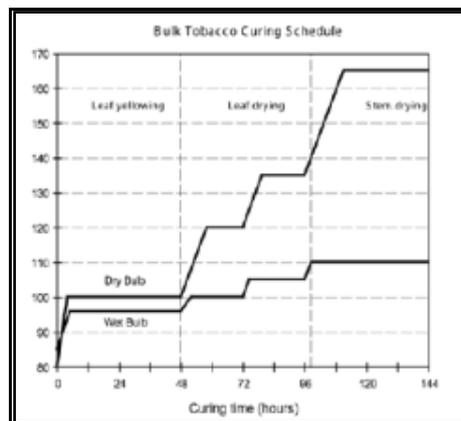
⁸ November 17th 2017 [<https://tobaccoplaybook.net/en/015-tobacco-growers.html>].



color changes can occur. At the same time, sufficient drying must take place, so that when yellowing is completed, the leaves will be thoroughly wilted. After the leaves reach the desired yellow color, the temperature should be raised to kill the tissue and stop further chemical and color changes. If the leaves are killed too early by drying too fast through high temperature, the color will remain green. After the desired color (lemon-orange) is achieved, the remainder of the cure is merely a matter of drying the leaves and stems to preserve the color. Tobacco producers may follow different temperature and humidity schedules and still obtain a satisfactory tobacco curing. The exact temperature schedule is not critical as long as it is within reasonable limits (David Reed, undated).

Uniformity in filling the barn has a substantial impact on air movement through the barn. To obtain optimum curing efficiency, barn filling rates must be compatible with the airflow capacity of the barn. With development of box loader systems and load cells to weigh tobacco, growers have been able to realize improved curing efficiency resulting from more uniformly filled barns. Traditionally tobacco is cured solely by using dry-bulb temperature or the thermostat-setting controlling the burner. A relatively few growers have made use of a wet-bulb thermometer. The dry-bulb thermometer measures air temperature within the barn and is controlled by the thermostat on the burner. In contrast, the wet-bulb thermometer measures the temperature of the leaf tissue and is controlled by the amount of ventilation or the size of the damper opening. The difference between the dry-bulb and wet-bulb temperatures determines the relative humidity within the barn and therefore, the amount of drying that occurs. Maintaining a high wet-bulb temperature within each stage of curing will reduce ventilation and thus increase curing efficiency. The tobacco curing schedule graph given below (Figure-12) is helpful for better understanding of tobacco curing efficiency (David Reed, undated).

Figure 6: Three important stages in tobacco leaf curing process



In the study area, at present, on average, the farmers have 1 barn per ha. Majority of the farmers have old fashioned barns, which they have to repair well before the start of curing season every year. The Turbo Barns technology has been recently introduced by Pakistan Tobacco Company by constructing 400 such barns in the area and there are news that this



number is increased to nearly 2000. On average, these barns result in cost saving (i.e. by wood saving⁹) by 10 percent. The Economic Feasibility of turbo barn is given in Annexure-5.

⁹ In KP, almost 3 kilograms of wood is used to cure 1 kilogram of tobacco leaf, whereas in Brazil, 2.5 kilograms of wood is used to cure 1 kilogram of tobacco leaf. Saving special curing purpose wood will not only save farmers' curing costs, it will also lessen pressure on our forests along with lowering environmental implications. It is worth mentioning here that this special & expensive wood used for curing is supplied from the forests of Sargodha region.



7. CLUSTER DEVELOPMENT POTENTIAL

7.1. Improvement in Research

The PTC is carrying out tobacco R&D activities. In the case of FCV tobacco cluster of KP, contrary to other field crops, the seed supplying system is almost fully in the hands of two major tobacco companies operating through a well-established input supplying and output procurement system. These companies import tobacco seed from abroad, test it at progressive farmers' fields and their own stations and then provide to the farmers. This system can be used to efficiently and quickly introduce any new tobacco varieties to the farmers.

In addition, the PTB has established a well-organized extension and development service for tobacco growers by deploying one Deputy Director (Development), one Assist. Director (Development), and 19 Assist. Development Officers. Moreover, the frontline companies like PTC and Philips Morris Pakistan also have their own development/extension staff. This infrastructure can effectively be used to demonstrate improved crop management practice, launch any campaign for this purpose, and build capacity of farmers to adopt these practices.

7.2. Adoption of Improved Crop Management

Considerable space for improvements in the nursery growing and crop management practices has been observed during the farmer fields' survey. Some important ones noticed were large variations in the nursery age at transplanting time, nursery transplanting time, non-application of right doses of fertilizers (particularly potash) with regular monitoring of soil fertility, and weeds control, etc. Some issues in levelling of tobacco fields which causes uneven distribution of water in the field were also noticed. If these factors are addressed, a notably high growth rate in tobacco yield per ha can be achieved. With the consultation of stakeholders, we estimated her that by launching a rigorous extension campaign, demonstration of improved technologies, and capacity building of farmers, farm-level productivity can be enhanced by at least 7.5% in four years, or 1.25% in four years.

The question is where to absorb the additional tobacco produced? We believe despite per capita demand remained stagnant as is the case in the past, the whole increase in supply will be absorbed due to the increase in population. However, if the tax policies are kept rational, as will be discussed in the next section, there is a potential to enhance export of cigarettes by at least 30% of the total additional supply.



7.3. Improvement in Leaf Harvesting Method

Tobacco is generally harvested in one of the two ways. In the oldest method, the entire plant is harvested once by cutting off the stalk at the ground with a sickle. In 19th century, the second method of tobacco harvesting method was evolved. By this method, individual leaves are pulled off the stalk as they ripen. The tobacco leaves ripen from the ground upward, hence the tobacco plant leaves may be pulled several different times before the tobacco plant is entirely harvested. Therefore, as the plants grow, they require topping and suckering. “Topping” is the removal of tobacco flowers while “suckering” is the pruning out of leaves that are otherwise productive. Both procedures ensure that as much of the plant’s energy as possible focuses on producing the large leaves that are harvested and sold. “Cropping”, “Pulling” and “Priming” are terms used for removing mature leaves from tobacco plants. Leaves are cropped as they ripen, from the bottom to the top of the stalk. The first crop at the very of the stalks are called “sand lugs” as they are often against the ground and are coated with dirt splashed up when it rains (Department of Agriculture, Forestry and Fisheries, South Africa, 2015).

At present tobacco leaf harvesting is done by plucking with sorting by the leaf position on the plant. On average, 24-25 leaves are present per plant, of which upper 6 leaves are top quality but less in weight. The middle 12-13 leaves are of average quality but good in weight. The bottom 6 leaves are of low quality but also good in weight. Regarding price, it is maximum at the lower-middle stalk position and decreases in both the upper and lower directions. While harvesting, the plucked leaves are placed in different baskets according to the leaf position. Since, the harvesting charges are based on quantity of leaf plucked, therefore, the labor cares less in post-pluck grading. However, if the harvesting charges are made according the quality of leaf plucked, the charges will be increased from the prevailing rate at around Rs.8/kg around Rs.10/kg. Paying tobacco leaf plucked by leaf position can further improve the percentage of the quality tobacco leaf from 69.5% to 74.5%, or by at least 5%, which correspondingly will improve the returns of the farmers while marketing. Thus, by combining the training of leaf harvesting labor along with changing the harvesting payment method can result enhancing farmers’ income by improving its price.

7.4. Shifting to Turbo Barn Curing Method

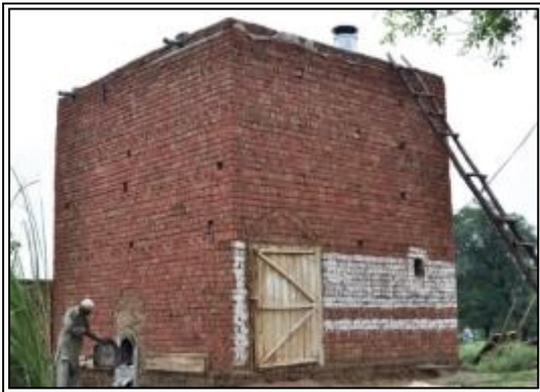
There are more than 28 thousand tobacco furnaces/barns are present in Pakistan and in each one the curing process is carried out from 8 to 12 times per season. One curing round takes 7-8 days and consume about 20 maunds of fuel per round, costing the farmers about Rs.112 thousand rupees per acre. Moreover, the health and other hazards to human life in conventional curing needs urgent attention of the relevant quarters.

To solve this decades long issue of the FCV tobacco cluster, our discussions with stakeholders suggest that Pakistan Tobacco Company in 2015 introduced Turbo Barns on experimental basis in Mansehra, Mardan and Swabi districts of KP. In the turbo-barn or rocket barn curing method, some mechanical operational changes have been introduced to regulate the temperature and air movement compared to the convention system of curing tobacco. Air drift



and heat are the key factors for an accurate curing process of FCV tobacco leaves. Secondly, on average, the new curing method consumes 20% less fuel wood compared to the conventional method, which could be further lessened by better managing fire and regulating temperature during curing process. Thirdly, in the new curing method, the duration of curing process is reduced from seven to six days, further helping the farmers to avoid delay in leaf harvesting which occurs due to non-availability of curing space in various cases. Delayed harvesting normally causes poor yield and low quality leaf as well as leaf losses in fields. Keeping in view the huge costs involved in the construction and installing the new system as well as non-availability of curing expertise with the new system, the farmers may hesitate to adopt the new technology at the initial stages. However, the relative benefits in terms of costs reduction and increased availability of good quality cured leaf – leading to more returns per ha – shall ultimately be able to convince the farmers to adopt new curing method provided finance are arranged and the capacity of the barn-operators is improved. Hence, the early switch over from the conventional way of curing to the new method is a long awaited challenge the FCV cluster of KP faces.

Figure 7: An inner and outer view of newly introduced Turbo barn on a farm in KP





8. CLUSTER DEVELOPMENT PLAN, AND STRATEGIES

8.1. Plan

It has been envisaged that despite the fact that tobacco FCV cluster of KP is already operating under the able guidance of the extension teams of various tobacco companies, particularly the Pakistan Tobacco Company and Philip Morris Pakistan. However, there is considerable space for improvements in the overall productivity of the cluster. During the farmers' fields survey, following plan along with targets were fixed for the five-year development project for FCV tobacco cluster in KP:

1. Increase per ha yield by 7.5% per annum through the introduction of improved varieties and management practices;
2. Enhancing the percentage of quality leaves from 69.5% to 74.5% through improvement harvesting practices.
3. Hundred percent shifting of convention technology of tobacco curing to modern turbo-barn technology.

8.2. Policies

To transform the tobacco from a domestically-oriented to an internationally competitive sector, Pakistani government has to give a fair treatment to the sector. In fact, improving its internationally orientation can not only bring additional revenue to exchequer and valuable foreign exchange in the country, but also reduce its unfavorable impact on the local population and the environment. Policies makers have to think how to bring most of its manufactured product, cigarettes, into the international market rather than selling raw tobacco.

Current tax policies in Pakistan simply discourage the export of cigarette into international market because its domestic prices after the tax and duties become higher than the international prices, and there is no discrimination of tax on cigarettes sold in the domestic or international market. On the other hand, tax or control on tobacco export is not as high as on cigarette, thus encouraging the export of tobacco. This also makes the tobacco prices high for the domestic cigarettes manufacturers and make them uncompetitive in international market.

To make the tobacco sector an effective contributor to national economy, the sector must be given a fair treatment. For this, **First** of all the illicit cigarette trade within the country has to be stopped so the industry is forced to look international markets rather than find an easy illicit domestic market. The three-tier tax system is a welcome move by the government but it should be implemented in letter and spirit. The money allocated for peoples' health should be transparently invested. **Second**, the tax and duties on cigarettes should be such that its prices in the domestic markets remain lower than the international market so that there is incentive for the manufacturer to export cigarettes. **Third**, tax policies should discourage the export of tobacco as raw material so that its value addition can be encouraged within the country.



Fourth, government need to hold hand of the industry to improve export by providing it the subsidized gas and electricity equal to the proportion (or some fraction of it) of their produce which is sold in international market. **Fifth**, technological gaps in tobacco processing, such as in tobacco curing, etc. need to be resolved through private and public partnerships. **Sixth**, a strong R&D system in public and private collaboration should address the long-term issue of tobacco production and its processing on health and resource degradation. Treating the sector as a contributor in national economy, rather than using it as a source of cow to suck taxes, may help not only farmers, industrialist, and government alike as well as benefit the environment.

8.3. Strategies

8.3.1. Improvement in Tobacco Research

Despite tobacco sector being of immense importance for the farming community, tobacco industry, government exchequer, and foreign exchange earnings, there is no proper dedicated tobacco research organization in the country in the public and private sector. A full fledged National Tobacco Research Institute (NTRI) will be established in KP. The funds for the establishment of NTRI will come from the tobacco cess collected from the tobacco industry but currently not being utilized for tobacco research. The center will be controlled and run by the Board of Directors taken from the private sector along the whole tobacco value chain.

The NTRI will take up research issues along the whole value chain, not just varietal adaptability trials. It will collect tobacco germplasm from different eco-region of the world, buy varieties/hybrids for public use, collect and disseminate information to appropriate stakeholders the information about the emerging quality standards, emerging and disappearing international markets, new technologies along the value chain. It will also test, adapt, and develop new improved technologies about tobacco and cigarette production, processing, packaging, marketing, etc. and disseminate these to appropriate stakeholders. In collaboration with the public-sector research system, the NTRI will also undertake the long-term sustainability issues like impacts of tobacco cultivation on agriculture resources like land, water, and human resources and develop mitigate strategies for these.

8.3.2. Improved Crop Management Practices

As already mentioned, that there are a number of tobacco crop management practices, where farmers' capacity can be improved. As this is a continuous process and two big tobacco companies are already putting considerable efforts in it. However, some more can be done by partnering with provincial agricultural extension department. In the past, the annual growth in FCV tobacco yield between 2001 and 2016 was observed at 0.64 percent (Table 2). *It has been assumed that correcting such problems and closing the yield gaps among farmers (through capacity building, establishing of Farmers Entrepreneur Groups, and providing experience sharing forums) can easily add the average yield growth @ 1.25 percent per annum, which looking at the potentials and available technologies is not very high and can be achieved.*



8.3.3. Promotion of Cigarette Export

As discussed earlier, policy measure such as keeping the taxes and duties on cigarettes such that domestic prices remain lower than the international prices, and illicit trade within the country and export of raw material tobacco are discouraged, it will create a space for international export of cigarettes. This value addition activity will create more employment in the country, generate additional revenue to the government and earn foreign exchange for the country. Additional, it is suggested that incentives should be provided to those firms who increases the export share of their produce, and exporters should be linked with international markets by providing information about emerging technologies, changing standards, and emerging or disappearing markets. It is suggested that the cost of gas and electricity may be reduced related to the percentage of the cigarette export. It is estimated that this will need US\$1000 per tonne of cigarette export subsidy.

8.3.4. Improvement in Tobacco Harvesting Method

In the target cluster, tobacco leaf harvesting takes place by family and hired labor. As the harvesting charges are made in terms of quantity of leaf plucked, therefore, the labor takes less care about observing priming stage of the leaf before plucking and its post-pluck grading. Paying by leaf quantity picked by leaf position can further improve the returns of the farmers through better curing and obtaining better prices while marketing. *During the field visit, it has been envisaged that on average, it will increase the harvesting cost to the farmers from US\$176.2 per ha to US\$219.1 or 24.3%. However, this will increase at least 5% of the top quality leaves in the harvested tobacco lot which will improve its price by 5% on the average.*

8.3.5. Switching to Turbo Barn Curing Method

Turbo barn curing is the newly introduced method by the Pakistan Tobacco Company in the FCV tobacco cluster on experimental basis. This method is not only fuel wood saving, it also requires less time per round and better curing results in terms of achieving higher proportion of better grade tobacco leaves. Indirectly, it also helps avoiding delay in tobacco leaf plucking as barns are one-day early vacated to fill for next curing. For achieving faster diffusion of this new curing method in the cluster, project based financial support (@20% subsidy on the fixed cost) plus technical and training related support from PTC can bring the desired results of harnessing comparative advantage and export competitiveness in tobacco & cigarettes.



9. FEASIBILITY OF CLUSTER UPGRADATION PROGRAMS

Three main interventions suggested to be introduced to upgrade the tobacco clusters are:

1. Adoption of improved tobacco production management practices
2. Improved harvesting method
3. Switching to Turbo Barn Curing Method

This section explains these interventions and estimates the returns and associated costs, and overall economic viability of the introduced interventions. At the end, the benefits of policy shift of encouraging the export of processed products rather raw tobacco is quantified. The benefits in terms of technology outcomes are also explained.

9.1. Baseline Status or Prevailing Situation

The baseline status of the sample tobacco cluster in Swabi and Mardan districts has been shown Table 10. At present, around 30 thousand tonnes of tobacco leaf is produced in the cluster area. At the default rate of annual growth of 0.86%, the production level shall reach to the level of 31.215 thousand tonnes after 5 years from now. Similarly, by valuing the flow of this supplies at current price level, it is estimated that the value of expected tobacco supplies shall increase from US\$74.826 Million to US\$77.064 Million by 5th year (Table 11).

Table 11: Baseline Status of the Sample FCV Tobacco Cluster in Swabi and Mardan Districts

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Area under cultivation in focal point (ha)	10,522						
2.	Total production in the focal point area (t)	30,000						
3.	Baseline yield (tonnes/ha)	2.85	0.021	2.87	2.89	2.91	2.94	2.96
4.	Annual yield growth without intervention (%) [Taken from the report]	0.86%						
5.	Annual expected arrival of production (t) at companies' depots without intervention		221.77	30,227	30,454	30,670	30,897	31,215
6.	Total value of FCV tobacco produced in the cluster (Million US\$)	2475.91		74.826	85.380	75.937	76.498	77.064



9.2. Interventions and Associated Benefits

9.2.1. Intervention-1: Adoption of Improved Management Practices

The second intervention pertains to the adoption and diffusion of improved management practices, the implementation responsibility falls on the tobacco companies operating in the area as well as provincial department of Agricultural Extension. As almost entire FCV tobacco area is cultivated on contract-farming basis, by which seed, fertilizers and insecticides/pesticides are provided by the companies as well as the advisory services. For the intervention under consideration, the farming community in the in the cluster needs to be more educated through providing them pamphlets, establishing planting demonstration plots, organizing farmers' field days, etc. Successful adoption of these improved management practices shall result in 7.50% growth in yield during 5 years project period. The additional production achieved shall be around 2471.8 tonnes valuing US\$ 6.120 Million during 5th project year (Table 12).

Table 12: Yearly Stream of Returns due to Adoption of Improved Crop Management Practices

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Yield increased over five years	7.50%	1.88%		1.88%	3.75%	5.63%	7.50%
2.	Yield escalation due to adoption of improved management practices (tonnes/ha)				0.075	0.128	0.182	0.235
3.	Additional production attributed to yield improvement (t)				784.269	1346.769	1909.269	2471.769
4.	Expected value of additional yield due to yield improvement (Million US\$)				1.942	3.334	4.727	6.120

9.2.2. Intervention-2: Improved Leaf Priming Based Harvesting and Grading

Considering the third intervention pertaining to leaf priming based harvesting and immediate grading of harvested leaf, this intervention is aimed at realizing the farming community that instead of paying on quantity of leaf picked, the picking labour should be paid on the basis of quantity of leaf picked from top, mid and bottom leaf positions and these leaves must be further graded immediately according to the appearance/condition of the picked leaf. By this method, the picked leaf of different grades shall be placed in the barn at proper places and curing



strategy shall be devised accordingly. The necessary trainings/guidelines shall be provided to the leaf picking labor by the tobacco companies operating in the area.

The careful picking of tobacco leaves at its proper maturity stage will cost more time of the harvesters, thus farmers have to pay Rs.4500/acre more to picking labor as leaf grading allowance. All these efforts will improve the percentage of good quality leaves from 69.5% to 74.5%, which will be achieved in a gradual manner over the five years' period at a rate of 1.25% per annum. Not only more quantity of higher quality leaves will be achieved, but also they will fetch at least 4% higher price than the average price. On the other hand, the quantity of lower quality leaves will be decreased and they will fetch 10% lower price than the average price. As a result, by the 5th year of the project period, additional 1679.8 tonnes of better quality leaf shall be available, benefitting farming community in net to the tune of US\$0.079 Million (Table 13).

Table 13: Yearly Stream of Returns due to Adoption of Leaf Priming Based Harvesting & Grading

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Current leave harvest composition by upper, middle & lower quality levels is 69.5%, 17.6% & 12.9%, respectively (%)	69.50%						
2.	Improvement in leave harvest composition to new respective levels of 75%, 15% & 10%.	74.50%	1.25%		1.25%	2.50%	3.750%	5.00%
3.	Enhanced availability of quality leaf (t)				390.368	800.425	1230.234	1679.856
4.	Expected value of additional yield due to better leaf composition (Million US\$)				0.18	0.38	0.58	0.79

9.2.3. Intervention-3: Switching to Turbo Barn Curing Method

The fourth intervention deals with the paradigm shift in curing technology from conventional curing barns to Turbo barn method. This intervention involves relatively heavy investment of constructing new barns, which on the average costs Rs.0.20 Million per barn or US\$1851/barn¹⁰. The average life of the Turbo Barn is 10 years and one barn is sufficient for 2 ha. Assuming that all the farmers in the cluster shall shift to Turbo Barn method of curing,

¹⁰ It has been reported that in some areas, farmers have started installing the new piping systems and other gadgets with necessary repair/maintenance of the room in the existing barns. It costs them from about Rs.40 to Rs.50 thousand rupees (depending on the size of the room and the quality of the material used) only.



therefore, on average 20% of the cluster needed barns shall be constructed every year. Based on the life of the barn, the average depreciation cost shall be 20% per annum. By shifting the new curing method, more than 35.3 thousand tonnes of good quality tobacco shall be available to the farmers, which will fetch money amounting to US\$2.194 Million (Table 14).

Table 14: Yearly Stream of Returns Associated by Switching to Turbo Barn Curing Method

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Switching from conventional to Turbo Barn Curing Method (%)	100.00%	25.00%		25.00%	50.00%	75.00%	100.00%
2.	Total quantity of better quality leave obtained (tonnes)				7,964	16,489	25,589	35,277
3.	Average cost saved due to improved curing (US\$/tonne)	62.20			495,292	1,025,522	1,591,505	2,194,061
4.	Expected value of returns obtained from better quality tobacco (Mill. US\$)				0.495	1.026	1.592	2.194

9.3. Summary of the Benefits

Table-15 summarizes the yearly stream of benefits from the 4 interventions proposed for the development of FCV tobacco cluster in Khyber Pakhtunkhwa. A geometric progression in the total returns from the introduced can be observed. They start rising from only US\$3.419 Million for 2nd project year and reaches to US\$12.556 Million by the 5th year of the project --- nearly 3.7 times compared to 1st project year.

Table 15: Summary of Yearly Stream of Returns Related to the Introduced Interventions for the Development FCV Tobacco in Khyber Pakhtunkhwa

Sr. #	Items	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Intervention-I: Improved crop management		1.942	3.334	4.727	6.120
2.	Intervention-II: Priming based leaf harvesting		0.986	2.021	3.107	4.242
3.	Intervention-III: Shifting to Turbo Barn curing		0.495	1.026	1.592	2.194
4.	Total (Million US\$) =		3.419	6.376	9.422	12.556



9.4. Costs Associated with Proposed Interventions

This section is devoted the description of the cost-side of the proposed interventions for the overall development of FCV tobacco cluster in Khyber Pakhtunkhwa. All these costs shall be borne by the tobacco farmers, for access to financial lending institutions shall be arranged.

9.4.1. Intervention-1: Adoption & Diffusion of Improved Management Practices

For exploiting the productivity potential of the FCV tobacco grown in the area, the farmers shall be trained for adopting improved management practices, e.g. application of recommended balanced fertilizer nutrients based on soil fertility tests, observing recommended application of various inputs and management practices, adoption of recommended plant protection measures, etc. This involves costs in terms of higher inputs and labor time. It was estimated that per ha costs have increased from US\$372 to US\$ 435, i.e., an additional of US\$63 or 17.21 per annum which will be achieved in a gradual term. From farmers' perspectives, the yearly costs of adopting better orchard management practices. It can be observed that the associated costs shall start increasing from US\$0.17 Million from 2nd project year to US\$0.67 Million in 5th project year (Table 16).

Table 16: Yearly Stream of Costs due to Adoption-Diffusion of Improved Management Practices

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Original production cost (US\$/ha)	371.71	17.01%					
2.	Incremental cost attributed to better crop management ¹ (US\$/ha)	63	17.01					
3.	Annual percentage increase in cost (%)	4.25%			4.25%	8.51%	12.76%	17.01%
4.	Total additional costs of shifting to better crop management practices (Mill. US\$)				0.17	0.33	0.50	0.67

¹ For details about management costs, See Annexure 6.

9.4.2. Intervention-2: Improved Leaf Priming Based Harvesting and Grading

Uniform ripening of tobacco is essential for selling top-quality leaf. Under normal conditions, FCV tobacco ripens 1-4 leaves per week, therefore, a harvest rate of 2-4 per plant per week for 5-7 weeks is required. Several factors influence the maturity and harvest rate, of which application of recommended fertilizer doses and balance in NPK ratios is more important. Fully mature leaves cure easily and the quality, colour and weight are usually good. The best quality



cures occur when the tobacco is allowed to mature in the field. One general indicator of fully ripened mature leaves is a uniform pale green colour throughout the leaf when it is held up in sunlight. Premature tobacco is nearly impossible to cure under any condition (Sumner and Moore, 2015).

For the study in hand, it has been proposed that all the FCV tobacco growers shall learn and practice improved tobacco leaf harvesting practices during the project period. Adoption of improved harvesting practices involves the introduction of some monetary incentives to the harvesting labor along with training/educating them about identifying fully matured leaf before deciding to pluck it from the plant as well as regularly supervising tobacco harvesting. It has been estimated that such measures increase costs of harvesting component by more than 24%, which is recovered in the form of more weight and higher proportion of better quality tobacco achieved. Yearly distribution of costs needs to be incurred by farmers is given in Table 18. It can be observed that the associated costs shall start increasing from US\$0.011 Million from 1st project year to US\$ 0.11 Million in 5th project year (Table 17).

Table 17: Yearly Stream of Costs due to Adoption of Leaf Priming Based Harvesting & Grading

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Current tobacco harvesting cost (US\$/ha)	176.19						
2.	Incremental cost of adopting priming, grading, supervising based tobacco harvest method ¹ (US\$/ha)	43	24.32%					
3.	Annual percentage increase in cost (%)	6.08			6.08%	12.16%	18.24%	24.32%
4.	Total additional costs of shifting to priming based tobacco harvest method (Mill. US\$)			0.11	0.23	0.34	0.45	0.11

¹ For details about management costs, See Annexure 6.

9.4.3. Intervention-3: Switching to Turbo Barn Curing Method

Curing develops and preserves the potential quality, flavor and aroma of tobacco. Once the tobacco is in the curing barn, a concerted effort should be made to bring the tobacco to a brilliant colour (lemon orange). Once this desired colour is achieved, leaf is dried to preserve this colour. Leaf colour is very important as it indicates that certain chemical changes have taken place and it is used as an index of leaf quality. Actually, 75% of the market value of leaf is based on its colour (Sumner and Moore, 2015).



For the study in hand, it has been assumed that all the FCV tobacco growers shall shift to Turbo barn curing method during the project period. Diffusion of this curing method among tobacco growers involves financial support/partnership along with training/educating them about this curing method. It is worth mentioning here that this new curing method is also cost-effective by nearly 10% and it also increases the proportion improved quality cured leaf obtained. It has been estimated that the curing costs at cluster level shall declining right from the 1st year of the project (or paying back) to the extent US\$0.205 Million and shall increase to US\$0.822 Million (Table 18). In other words, switching to turbo barn curing is self-paying rather than net-costing to the farmers.

Table 18: Yearly Stream of Costs Associated by Switching to Turbo Barn Curing Method

Sr. #	Items	Inputs	Increment	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Current tobacco curing cost (US\$/ha)	1123.81						
2.	Incremental cost of switching to Turbo Barn curing method ¹ (%)	78	6.9%		25.00%	50.00%	75.00%	100.00%
3.					-1.74%	-3.47%	-5.21%	-6.95%
4.	Total additional costs of shifting to Turn barn curing method (Million US\$)				-0.205	-0.411	-0.616	-0.822

¹ For details about management costs, See Annexure 6.

9.5. Summary of the Costs

Table-19 summarizes the yearly stream of costs related to the four proposed interventions for the development of FCV tobacco cluster in Khyber Pakhtunkhwa. A progression in the total costs associated with the interventions can be observed. The costs incurred shall start from the second year as first year is spent on capacity building and preparing stakeholders for advanced management practices. The total cost of all interventions shall begin from US\$0.078 Million for 2nd project year and shall reach to US\$0.295 Million by the 5th year of the project.

Table 19: Summary of Yearly Stream of Costs Related to the Introduced Interventions for the Development FCV Tobacco in Khyber Pakhtunkhwa

Sr. #	Items	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Intervention-II: Improved crop management		0.17	0.33	0.50	0.67
2.	Intervention-III: Priming based leaf harvesting		0.11	0.23	0.34	0.45
3.	Intervention-VI: Shifting to Turbo Barns		-0.205	-0.411	-0.616	-0.822
	Total (Million US\$) =		0.074	0.147	0.221	0.295

¹ For details about management costs, See Annexure 6.



9.6. Net-Economic Benefits

Table 20 pertains to the yearly stream of net-economic benefits after offsetting the direct value chains costs incurred for the development FCV tobacco cluster in Khyber Pakhtunkhwa.

Table 20: Stream of Net-Economic Benefits after Offsetting the Direct Value Chains Costs

Sr. #	Items	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Total expected gross returns from cluster development interventions (Million US\$)		2.617	4.732	6.894	9.104
2.	Costs to be incurred on cluster development interventions (Million US\$)		0.295	0.295	0.295	0.295
3.	Net Economic Benefits (Million US\$)		2.543	4.584	6.673	8.810

9.7. Investments for Cluster Development

In order to improve the sample tobacco cluster, public investment under project approach is needed. The areas of investments consist of: i) investment in FCV tobacco research and development (R&D) in the cluster, which shall be made by the cigarette tobacco industry through tobacco cess funds. We assume US\$1.5 million for the construction of the National Tobacco Research Center, while US\$0.75 for the operation of the center; ii) farmers' capacity building in crop management, especially in priming based harvesting and improved curing to be incurred by the public sector under the project approach; iii) tobacco industry's investment on construction of new more fuel-efficient turbo-barns by sharing 80% of the total cost by the farmers, which shall be provided through one year interest free concessional loans, while 20% of the cost will be subsidized by the government and, v) government investment as interest-free one-year concessional loans to the farmers. It can be observed that the total costs in 5-years shall be US\$17.58 Million (Table 21).

Table 21: Public and Private Investments Needed for FCV Tobacco Cluster Development in KP

Sr. #	Items	Inputs	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Tobacco industry's investment on its R&D (Million US\$)	5.000	1.500	0.750	0.750	0.750	0.750
2.	Farmers' capacity building in crop management especially harvesting & curing (Million US\$)	1.715	0.429	0.429	0.429	0.429	-
3.	Investment on shifting from conventional curing to turbo-barn	9.743	2.436	2.436	2.436	2.436	-



	curing method @ 50% of new barn construction cost (Million US\$) ¹						
4.	Investment as interest free loans (M.US\$)	1.120	0.280	0.280	0.280	0.280	-
5.	Total investment (Million US\$)	17.578	4.644	3.894	3.894	3.894	0.750

- 1 This cost shall be recovered from farmers in easy installments in 5 years and it shall be interest free.

9.8. Source and Type of the Investment

Out of the total investment of 17.58, the government has to provide US\$5.78 million (32%), while the remaining investment US\$11.79 (68%) will come from the private sector mainly in building the turbo-barn at 20% subsidy. The government will provide the 20% subsidy on turbo-barn, one-year interest free loan for the construction of these barns, establishment of National Tobacco Research Center from the tobacco cess fund, and capacity building of farmers especially for quality-based harvesting, and turbo-operators.

About 38% of the total investment will be required at the production level, while 62% for the processing level of the value chain. Pls. not that the above costs, investments, and benefits do not include the costs (and benefit) on the policy to shift tobacco export to cigarette export.

9.9. Economic Viability

In Table 22, the discounted value of stream of investments incurred under project approach and the net-benefits achieved by the farming and non-farm business community are estimated on yearly basis. The total net-benefit accrued after deducting all costs and investments on the proposed interventions is US\$5.532 Million, whose net-present value (NPV) as US\$2.476 Million. At the discount rate of 8.50% per annum, the Internal Rate of Returns (IRR) for the tobacco cluster development in Khyber Pakhtunkhwa has been estimated as 21.24 percent - -- clearly indicating it an economically viable project, thus implies that it is clearly worth investing into the cluster for the uplift of the tobacco production in the area through various proposed farm, domestic and international marketing level investments.

Table 22: Net-Present Value of and Internal Rate of Returns of Costs and Returns Incurred

Sr. #	Items	Inputs	Year-1	Year-2	Year-3	Year-4	Year-5
1.	Overall net-benefit after deducting all costs and investments incurred in the cluster from the stream of benefits (Million US\$)	5.032	-4.144	-1.601	0.440	2.528	7.810
2.	Discount rate	8.5%					
3.	Net-Present Value (Million US\$)	2.183					
4.	Internal Rate of Returns (%)	20.36%					



9.10. Policy Intervention

So far we have considered only the technological intervention. In tobacco policy can also play an important role in improving the competitiveness of the tobacco sector in the country. As noted above, most of the export from Pakistan is in tobacco raw material form, while very little is exported in processed cigarette form. This deprives the country not only lots of foreign exchange earnings, but also cost lots of skilled jobs. It is therefore suggested that the export of tobacco should be discouraged while that of cigarettes be encouraged.

It is estimated that if only 20% of the tobacco export is converted into cigarette export, the country can earn additionally US\$4.2 Million. Even if US\$5000 per tonne export rebate is provided, the country can still save US\$2.8 million (Table 23). It will also generate hundreds of skilled job in cigarette manufacturing in the country. More importantly, incentive for cigarette export may ultimately reduce the cigarette supply within the country, which is not only good for the environment but also for the health of the people. The export rebate suggested here, in fact, can be recovered by imposing export duty on tobacco export. But the whole scheme of import-export duties and rebate should be worked out in consultation with the industry and traders.

Table 23: The impact of substituting tobacco export with cigarette export in Pakistan

Items	Value
Current tobacco export from Pakistan (000 tonne)	2.8
Value of tobacco export from Pakistan (M. US\$)	9.9
Price of tobacco export from Pakistan (US\$/tonne)	3536
Current cigarette export from Pakistan (000 tonne)	0.056
Value of cigarette export from Pakistan (M. US\$)	1.035
Price of cigarette export from Pakistan	18482
Reduction in tobacco export and made available for domestic cigarette production (%)	10%
Additional tobacco available for cigarette production due to its reduced export (000Tonne)	0.280
Increase in tobacco export (%) (assuming one to one dried tobacco to cigarette conversion factor)	500%
Additional value generation due to the shift of the policy	4.185
Cost on subsidy on export @1000US\$/tonne (M. US\$)	1.4
Savings to the sector	2.785

9.11. Technological and Product Outcomes

From the entire description in the Sections 13 to 15, three technological outcomes emerge, i.e. regular introduction of pre-tested improved FCV tobacco varieties, shifting to priming based (i.e. leaf position on the plant & plucking it at its optimum maturity time) tobacco harvesting, and shifting to Turbo barn curing methods. These three technologies are utmost necessary for increasing farmers' returns from tobacco farming as well as overall FCV tobacco



cluster development in Khyber Pakhtunkhwa. To address the issues of environment and sustainability of tobacco production, National Tobacco Research Center should be established from the cess funds being collected by the government. Since, cigarette is the only value added product of FCV tobacco, therefore, no specific product outcome is suggested categorically. On the policy side, government should work with the private sector to work out optimum tax and export taxes and duties that can promote cigarette export and discourage tobacco export. This will not only enhance foreign exchange earning but also create new jobs and save the health of the people and environment of the country.



10. RECOMMENDATIONS FOR THE DEVELOPMENT OF FCV TOBACCO CLUSTER

10.1. Recommendations for PTB

It is worth mentioning here that PTB is providing a number of services to the tobacco farming community (Annexure-7). For implementing the interventions proposed in Sections 13 and 14, some policy decisions delineated below are proposed to be taken by PTB:

- As per program, the companies place their tobacco purchasing demands before the month of October. During 2018, the total FCV tobacco demand placed by registered tobacco companies was 47.89 thousand tonnes vis-à-vis the total production of more than 85 tonnes. This implies that about 56 percent of the total production in the area was formally procured by the companies. On the other hand, the sales record of the study area farmers shows that nearly 70% of high quality grade tobacco was available with the farmers. This over availability of nearly 15% top quality tobacco than the demand creates problems for the farmers and finally rendering them to sell it to the local traders at very low prices (rather at throw away prices). This is clearly a significant loss to the farming community. Moreover, it also discourages the farmers for early switching to improved crop management, harvesting and curing practices. *It is, therefore, recommended that PTB should increase the percentage of total demand from the companies to at least 70%, so that the window for the local traders exploiting farmer should be closed down.*
- During the informal discussion with the farmers, it came out that overtime, no notable changes in tobacco crop management practices has been introduced to the farmers. The only chance came in the last 5-10 years is change in varieties of tobacco seed. All the OPV and Hybrids of FCV tobacco are imported, but tested for adaptability in Pakistan. In other words, the research agenda of these stations/sub-stations is more of adaptive research in nature rather than strategic research for devising varieties & crop management practices in accordance to farmers' socio-economic, physical, ecological and environmental conditions. *PTB is, therefore, recommended to make a gradual shift in the research agenda of these research stations/sub-stations towards strategic research for devising own technologies. Special funds from various sources (e.g. tobacco cess) are proposed to be diverted for this purpose.*
- At present, majority of the farmers plant tobacco at one ha of land per farm by getting one packet of tobacco seed from any of the two tobacco companies, whereas they can more benefit in terms of economies of scale by expanding their tobacco area by adopting improved management practices, harvesting and curing methods. *Since, PTB functions as the regulatory authority in FCV tobacco production, a policy decision is required to*



push the companies for encouraging farmers to grow at least 2 ha of FCV to increase their returns from tobacco value chains improvement efforts.

10.2. Recommendations for Tobacco Companies

Nearly 10 tobacco companies listed in Annexure-1 are relatively more active in the tobacco processing business in the area, the following recommendations are put forward for the development of FCV tobacco cluster in Khyber Pakhtunkhwa.

- The farmers of the study area generally complain about various malpractices from the staff deputed at the sales depots during the tobacco procurement seasons. The most common practice is the classification of higher grade leaf into lower grades and charging higher cuts for various faults in the cured tobacco leaf brought for sales. It is good practices that the grade based specifications are properly displayed at the sales depots, but transparently practicing these is serious complaint from the farmers. In order to solve the issue, *it is suggested to depute one representative of tobacco farmers' organization at each purchase depots during the procurement season. His services should be paid from the tobacco cess money for the services rendered by him.*
- Since the average farm size in the tobacco cluster is around 3 acres, and this size farmers cannot afford to have their own farm machinery. On the other hand, a serious labor shortage happens at the time of land preparation, transplanting and harvesting stages of tobacco. *Therefore, the major tobacco companies of the area are suggested to join hands in establishing farm machinery services centers in the area.*

10.3. Farmers' Capacity Building

Continued capacity building of tobacco farmers is necessary for sustaining the attained productivity levels and upward shifting of yield frontiers. It is proposed that leading tobacco companies should also provide opportunities by arranging trips of the progressive farmers to the countries at the frontline in the tobacco production and its value chains. Similarly, the foreign experts in tobacco production and value chains should be invited to visit Pakistan for suggesting where the improvements are needed. *In other words, experience sharing opportunities should be provided the progressive farmers of the area to have its trickledown effect to common farmers.*

10.4. Involvement of Provincial Agricultural Extension Department

The provincial Department of Agricultural Extension is suggested to be more actively involved in providing their departmental services to the farmers, particularly the availability of quality inputs and disease surveillance.



11. References

- Ahmed, S. and F. Mohammad, 2017. "Heritability Estimates and Correction Analysis for Production Traits in FCV Tobacco", *Sarhad Journal of Agriculture*, 33(2): 212-219.
- Ali, S., Q. Altaf and U. Farooq, 2014. "Acreage Response of Flue Cured Virginia Tobacco in Khyber Pakhtunkhwa", *Pakistan Journal of Agricultural Research*, 27(3): 217-225.
- Ali, N., A. Jaffar, M. Anwer, S.M.R. Zaidi and N. Ali., 2015. "The Economic Analysis of Tobacco Industry: A Case Study of Tobacco Production in Pakistan", *International Journal of Research*, 2(3), March 2015: 88-99.
- Altaf, Qurat-ul-Ain, 2014. "Economic Analysis of Flue Cured Virginia Tobacco Production in Khyber Pakhtunkhwa", Unpublished M.Phil. Thesis, Department of Applied Economics, PARC Institute of Advanced Studies in Agriculture, National Agricultural Research Center, Islamabad Affiliated with Agriculture University, Peshawar.
- Bhatti, A.M., 1992. "Marketing of Tobacco in Swabi District". Unpublished M.Sc. (Hons) Thesis, Department of Agricultural Economics, University of Agriculture Peshawar.
- Burki, S.J., A.G. Pasha, H.A. Pasha, R. John, P. Jha, A.A. Baloch, G.N. Kamboh, R. Cherukupalli and F.J. Chaloupka, 2013. "The Economics of Tobacco and Tobacco Taxation in Pakistan", International Union against Tuberculosis and Lung Disease (The Union), 68 Boulevard Saint Michel, 75006 Paris, France.
- Daily Records, 2018. "Top Ten Largest Tobacco Producing Countries in the World", The Daily Records dated March 26th, 2018.
- DAWN, 2018. "Swabi's Tobacco Growers are Turing to Vegetable Farming", Daily DAWN dated May 30th 2018.
- Department of Agriculture, Forestry and Fisheries, Republic of South Africa, 2015. "Production Guidelines – Tobacco", Department of Agriculture, Forestry and Fisheries, Republic of South Africa.
- FAOSTAT (Food and Agriculture Organization Statistics) Production, Crops <http://www.fao.org/faostat/en/#data/QC>
- FAOSTAT, (Food and Agriculture Organization Statistics). 2020. Trade, Crops and Livestock Products <http://www.fao.org/faostat/en/#data/TP>
- Faraz, K., 2004. "Cash crop Cultivation". The Daily Dawn Lahore. Dated 12. 10. 2004.
- GYTS (Global Youth Tobacco Survey), 2014. "Global Youth Tobacco Survey Fact Sheet, Pakistan, 2013", Ministry of National Health Services, Regulation and Coordination, Government of Pakistan, World Health Organization, Department of Health and Human Services, USA and Center for Disease Control and Prevention (CDC), Last updated on 10th September 2014.
- Hassan, M.M., M.M. Parvin and S.I. Rasmi, 2015. "Farmers' Profitability of Tobacco Cultivation at Rangpur District in the Socioeconomic Context of Bangladesh: An Empirical Analysis", *American Journal of Economics, Finance and Management*, 1(2): 10-18.
- Hussain, A., N.R. Khattak and N. Mohammad, 2010. "Impact of Major Farm Inputs on Tobacco Productivity in Pakistan: An Econometric Analysis (1960-2006)", *Sarhad Journal of Agriculture*, 26(1): 93-96.
- Iqbal, J., 1998. "Economics of Tobacco Production: A Case Study of *Nicotiana Tobaccum*". Unpublished M.Sc. Thesis, Department of Agricultural Economics, Khyber Pakhtunkhwa University of Agriculture Peshawar.



- Khan, F.A.M., 2005. "Analysis of FCV Tobacco Production and its Marketing in District Mansehra", Unpublished M.Sc. (Hons.) Thesis, Department of Extension Education, Khyber Pakhtunkhwa Agricultural University Peshawar.
- Khan, A.S., 2011. "Tobacco Farming in Pakistan", *Pakistan journal of Agricultural Economics*, 7:pp. 97-122.
- Khan, M.Z., 2016. "Shrinking Tobacco Cultivation", Daily DAWN dated 19th December, 2016 [<https://www.dawn.com/news/1303060>].
- Lambert, A., J.D. Sargent, S.A. Glantz and P.M. Ling, 2004. "How Philip Morris Unlocked the Japanese Cigarette Market: Lessons from Global Tobacco Control", *Tobacco Control*, 13(4): 379-387.
- Mackay, J.M., D.W. Bettcher, R. Minhas and K. Schotte, 2012. "Successes and New Emerging Challenges in Tobacco Control: Addressing the Vector", (Editorial), *Tobacco Control*, 21(2): 77-79 (March 2012).
- Muhammad, S., 1991. "Economics of Tobacco Production in District Mansehra", Unpublished M.Sc. (Hons) Thesis, Department of Agricultural Economics, Khyber Pakhtunkhwa University of Agriculture Peshawar.
- Nhorido, E.P., 2013. "A Value Chain Analysis of Flue Cured Virginia Leaf Tobacco in Zimbabwe", Unpublished M.Sc. (Hons) Thesis in Agriculture and Applied Economics, Department of Agricultural Economics and Extension, Faculty of Agriculture, University of Zimbabwe: June 2013.
- Noor, R.S., 2004. "Exports of Tobacco and its Products from Pakistan", Pakistan Tobacco Board, Ministry of Commerce, Government of Pakistan. 23:pp. 6-9.
- Pakistan Tobacco Board, 2016. "Economic Significance of Tobacco", PTB Website and Daily DAWN dated December 19th 2016.
- Pakistan Tobacco Board, 2017. "Tobacco Statistical Bulletin", Volume 40-41, Pakistan Tobacco Board, Ministry of Commerce, Government of Pakistan.
- Prowse, M.P. and Jason, Moyer-Lee, 2013. "A Comparative Value Chain Analysis of Smallholder Burley Tobacco Production in Malawi – 2003/04 and 2009/10", *Journal of Agriculture Change*, 14(3): 323-346.
- PTC, 2017. "Annual Report, 2017", Pakistan Tobacco Company, Limited.
- Qamar, W., N.P. Khan, M. Ashfaq, M.F. Ahmed and M. Idrees, 2006. "Economics of Tobacco Production in District Swabi". *Journal of Agricultural and Biological Sciences*, 1(3) September: pp. 30-35.
- Reed, D.T., undated. "Curing Tobacco", [https://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/436/436-048/PDF_61-64CuringTobacco.pdf].
- Reelandt, T. and P. den Hertog, 1999. "Cluster Analysis and Cluster-Based Policy Making in OECD Countries: An Introduction to the Theme", Chapter-1 in OECD, Boosting Innovation: The Cluster Approach, Paris: OECD, pp. 9-23.
- Rehman-ur, Q.L. M. Sajjad, N. Khan, Shahenshah and M. Nazir, 2011. "Costs and Net Returns of Tobacco production in District Swabi", *Interdisciplinary Journal of Contemporary Research in Business*, 3(8): pp. 160-171.
- Shah, S.H., 1998. "Cost and Revenue of FCV Tobacco Production in District Mansehra". Unpublished M.Sc. (Hons) Thesis, Department of Agricultural Economics. Khyber Pakhtunkhwa University of Agriculture Peshawar.



- Shehzad, N., 2006. "An Investigation in to Tobacco Marketing in District Swabi". Unpublished M.Sc. (Hons.) Thesis, Department of Agricultural Economics, Khyber Pakhtunkhwa University of Agriculture Peshawar.
- Slater, S.J., F.J. Chaloupka, M. Wakefield, L.D. Hohnston and P.M. O'Mallye, 2007. "The Impact of Retail Cigarette Marketing Practices on Youth Smoking Uptake", *Archives of Pediatrics and Adolescent Medicine*, 161(5): 440-445.
- State Bank of Pakistan, (undated). "Tobacco Value Chain in Pakistan", Agricultural and Microfinance Department, State Bank of Pakistan [www.sbp.org.pk].
- Sumner, P.E. and J.M. Moore, 2015. "Harvesting and Curing Flue Cured Tobacco", College of Agricultural and Environmental Sciences & Family and Consumer Sciences, Cooperative Extension, University of Georgia, USA.
- United Nations Industrial Development Organization (UNIDO), 2002. "*Industrial Development Report, 2002-03*", Vienna: United Nations.
- WHO (World Health Organization), 2012. "Tobacco Industry Exploitation of Trade and Investment Agreements" Chapter-2 in "*Confronting Tobacco Epidemic in a New Era of Trade and Investment Liberalization*", World Health Organization: p. 83.
- World Bank, 1999. "Curbing the Epidemics: Governments and the Economics of Tobacco Control", Series: Development in Practice. Washington DC: The World Bank.
- Zhong, F. and E. Yano, 2007. British American Tobacco's Tactics during China's Accession to the World Trade Organization", *Tobacco Control*, 16(2): 133-137.



12. Annexure

Annexure-1: List of tobacco companies and dealers placed formal demands (million kg.) to PTB for procurement in year 2018.

Sr. No.	Name of the Tobacco Company	FCV	Dark Air Cured			White Patta	Burely	Total
			Gujrat	Okara	Total			
1.	Pakistan Tobacco Company, <i>Newshehra</i>	27.500	0.700	0.300	1.000	-	-	28.500
2.	Phillip Morris (Pak) Limited, <i>Newshehra</i>	7.870	-	-	-	-	-	7.870
3.	Samsons Re-Drying & Processing Company	2.130	-	-	-	0.070	-	2.200
4.	Khyber Tobacco Company, <i>Mardan</i>	1.800	-	0.100	0.100	0.160	-	2.060
5.	Pak Hills Thresh+Redrying (Pvt) Ltd., <i>Swabi</i>	1.000	-	-	-	-	-	1.000
6.	National Tobacco Industries	0.800	0.100	-	0.100	-	-	0.900
7.	Universal Tobacco Company	0.650	-	-	-	0.020	-	0.670
8.	Walton Tobacco Company, <i>Mirpur, AJK</i>	0.470	-	-	-	0.050	-	0.520
9.	Souvenir Tobacco Company, <i>Mardan</i>	0.500	-	-	-	-	-	0.500
10.	Paramount Tobacco Company	0.400	-	-	-	0.020	-	0.420
11.	Imran Tobacco Company	0.400	-	-	-	-	-	0.400
12.	Tobacco Village (Pvt.) Limited	0.350	-	-	-	-	-	0.350
13.	Bacha Enterprises, <i>Swabi</i>	0.300	-	-	-	-	0.050	0.350
14.	Ashraf Tobacco Dealer	0.300	-	-	-	-	-	0.300
15.	Progressive Tobacco Dealers	0.300	-	-	-	-	-	0.300
16.	Sarhad Cigarette Industries, <i>Swabi</i>	0.300	-	-	-	-	-	0.300
17.	Star Tobacco Traders	0.250	-	-	-	-	-	0.250
18.	Zarif Khan Tobacco Dealer	0.250	-	-	-	-	-	0.250
19.	Emad & Co Commission Agents	0.250	-	-	-	-	-	0.250
20.	Falcon Cigarette Industries.	0.205	-	-	-	0.020	-	0.225
21.	International Cigarette Industries	0.200	-	-	-	-	0.010	0.210
22.	Rehman Brothers, Tobacco Commission	0.200	-	-	-	-	-	0.200
23.	Zaman Tobacco Dealer	0.200	-	-	-	-	-	0.200
24.	Jamal Tobacco Dealer	0.150	-	-	-	-	-	0.150
25.	Malook and Co Tobacco Dealer	0.130	-	-	-	-	-	0.130
26.	Rehman Tobacco Dealer, <i>Mardan</i>	0.120	-	-	-	-	-	0.120
27.	Wattan Tobacco Company, <i>Bhimber, AJK</i>	0.100	-	-	-	0.010	-	0.110
28.	Indus Tobacco Company	0.100	-	-	-	-	-	0.100
29.	Pak International Tobacco Company, <i>Swabi</i>	0.100	-	-	-	-	-	0.100
30.	Javed & Co.	0.100	-	-	-	-	-	0.100
31.	Frontier Leaf Tobacco, <i>Swabi</i>	0.050	0.015	0.010	0.025	-	-	0.075
32.	New Farooq Products	-	-	-	-	0.050	-	0.050
33.	Gul Tobacco Traders	0.050	-	-	-	-	-	0.050
34.	Muhammad Israr & Co.	0.035	-	-	-	-	-	0.035
35.	Atta-ur-Rehman & Co.	0.030	-	-	-	-	-	0.030
36.	International Tobacco Suppliers	0.040	-	-	-	-	-	0.040
37.	Rafiq Ullah Scrap & Tobacco Dealer	0.020	-	-	-	0.010	-	0.030
38.	Zulfiqar & Co.	0.030	-	-	-	-	-	0.030
39.	Malak Tobacco Company Limited	0.025	-	-	-	-	-	0.025
40.	Haji Muhammad Ayaz	0.025	-	-	-	-	-	0.025
41.	Haroon Products	-	-	-	-	0.025	-	0.025
42.	Khan & Co, <i>Mardan</i>	0.020	-	-	-	-	-	0.020
43.	Pakhtunkhwa Tobacco Dealer	0.020	-	-	-	-	-	0.020
44.	Four Star Tobacco Commission Agent	0.020	-	-	-	-	-	0.020



45.	Ghous Ali Enterprises	-				0.020		0.020
46.	Khalid & Co	0.020	-	-	-	-	-	0.020
47.	Saleem & Co	0.020	-	-	-	-	-	0.020
48.	Mammon Tobacco Company	0.020	-	-	-	-	-	0.020
49.	Sabz Ali & Co	0.020	-	-	-	-	-	0.020
50.	Abdul Samad & Co	0.020	-	-	-	-	-	0.020
51.	Rustam Chewing Tobacco	-	-	-	-	0.015	-	0.015
52.	Mehran Tobacco Products	-	-	-	-	0.015	-	0.015
53.	Baba Maluk Chewing Tobacco Products	-	-	-	-	0.015	-	0.015
	Total=	47.890	0.815	0.410	1.225	0.500	0.060	49.675

Source: Pakistan Tobacco Board, website.



Annexure – 2. Annual Cigarette Consumption per Person Smoking Aged 14 Years and Above (#)

Rank	Country	Annual Consump. (Nos.)	Rank	Country	Annual Consump. (Nos.)	Rank	Country	Annual Consump. (Nos.)
1.	Andorra	6398.3	62.	Finland	1098.8	123.	Ivory Coast	352.7
2.	Luxembourg	6330.9	63.	France	1089.9	124.	Colombia	351.4
3.	Belarus	2911.3	64.	Vanuatu	1069.2	125.	Angola	340.2
4.	Hong Kong	2910.9	65.	Vietnam	1049.6	126.	Sudan	339.9
5.	North Macedonia	2784.9	66.	Algeria	1046.7	127.	Brazil	333.5
6.	Albania	2491.6	67.	Canada	1021.3	128.	Equatorial Guinea	328.2
7.	Belgium	2440.9	68.	Qatar	1020.3	129.	Nicaragua	327.8
8.	Czech Republic	2427.9	69.	United States	1016.6	130.	Libya	327.2
9.	Jordan	2306.1	70.	North Korea	993.3	131.	Mexico	327.1
10.	Russia	2295.0	71.	Tonga	986.9	132.	Mali	316.9
11.	Syria	2291.7	72.	Ireland	976.5	133.	Guinea	316.0
12.	Slovenia	2236.5	73.	Turkmenistan	962.1	134.	Jamaica	312.5
13.	Greece	2078.6	74.	Iran	936.5	135.	Afghanistan	311.6
14.	Hungary	2060.3	75.	Australia	917.0	136.	Namibia	298.4
15.	China	2043.0	76.	Uruguay	899.4	137.	Bolivia	291.6
16.	Lebanon	2037.5	77.	Singapore	851.2	138.	Chad	279.3
17.	Armenia	1985.7	78.	Iceland	848.1	139.	Barbados	277.5
18.	Mongolia	1982.5	79.	Thailand	837.4	140.	Oman	271.1
19.	Cyprus	1961.4	80.	United Kingdom	827.7	141.	Kenya	264.4
20.	Austria	1927.0	81.	Laos	814.6	142.	St. Vincent & Grenadines	259.6
21.	Georgia	1917.7	82.	Djibouti	785.5	143.	Sri Lanka	254.6
22.	Serbia	1898.6	83.	Chile	769.3	144.	Gambia	249.1
23.	Ukraine	1849.4	84.	UAE	748.5	145.	Malawi	241.1
24.	Kazakhstan	1800.9	85.	Bangladesh	744.1	146.	Burundi	239.4
25.	Turkey	1770.7	86.	Cambodia	726.2	147.	Cuba	233.5
26.	Bosnia Herzegovina	1767.2	87.	Sweden	716.2	148.	Myanmar	226.5
27.	Estonia	1759.9	88.	New Zealand	685.1	149.	Panama	219.3
28.	Bulgaria	1757.3	89.	Trinidad & Tobago	682.5	150.	Dominican Republic	218.9
29.	Moldova	1747.2	90.	Morocco	682.3	151.	Central African Rep.	213.2
30.	Papua New Guinea	1689.3	91.	Comoros	585.4	152.	El Salvador	206.7
31.	Indonesia	1675.5	92.	Maldives	560.9	153.	Benin	204.0
32.	South Korea	1667.4	93.	St. Lucia	553.9	154.	Somalia	198.5
33.	Germany	1599.5	94.	Norway	552.8	155.	Uganda	195.7
34.	Japan	1583.2	95.	Seychelles	543.6	156.	Congo	195.2
35.	Tunisia	1580.0	96.	Mauritius	542.5	157.	Tanzania	181.8
36.	Croatia	1578.9	97.	Kyrgyzstan	519.6	158.	Cameroon	171.0
37.	Malta	1527.9	98.	Suriname	511.7	159.	Belize	168.6
38.	Azerbaijan	1525.6	99.	Nepal	511.6	160.	Nigeria	162.5
39.	Slovakia	1500.9	100.	South Africa	509.6	161.	Grenada	158.2
40.	Spain	1499.0	101.	Mozambique	501.9	162.	Liberia	154.4
41.	Italy	1493.3	102.	Uzbekistan	495.9	163.	Dominica	147.4
42.	Switzerland	1489.8	103.	Fiji	491.1	164.	Togo	147.3
43.	Samoa	1470.6	104.	Honduras	469.8	165.	Zambia	145.4
44.	Netherlands	1459.9	105.	Sierra Leone	468.6	166.	Haiti	143.0
45.	Egypt	1449.4	106.	Gabon	451.2	167.	Eritrea	132.3
46.	Solomon Islands	1419.1	107.	Lesotho	448.0	168.	Dem. Rep. of Congo	128.0



47.	Kuwait	1412.7	108.	Malaysia	441.2	169.	Zimbabwe	122.9
48.	Kiribati	1396.0	109.	Bahamas	438.6	170.	Niger	118.8
49.	Poland	1363.1	110.	Botswana	433.5	171.	Ethiopia	115.3
50.	Saudi Arabia	1341.0	111.	Yemen	423.8	172.	Guatemala	111.8
51.	Denmark	1298.0	112.	Costa Rica	411.4	173.	Peru	97.7
52.	Lithuania	1292.0	113.	Burkina Faso	408.1	174.	Rwanda	94.0
53.	Israel	1280.7	114.	Madagascar	404.2	175.	Ecuador	93.5
54.	Romania	1204.3	115.	Cape Verde	397.1	176.	Swaziland	91.7
55.	Latvia	1189.1	116.	Venezuela	396.2	177.	India	89.3
56.	Iraq	1184.4	117.	Paraguay	384.5	178.	Antigua & Barbuda	89.2
57.	Argentina	1176.1	118.	South Sudan	383.7	179.	Ghana	40.5
58.	Portugal	1133.4	119.	Pakistan	363.2	180.	Mauritania	30.3
59.	Philippines	1132.2	120.	Tajikistan	361.1	181.	Guinea-Bissau	25.3
60.	Bahrain	1101.5	121.	Senegal	359.4	182.	Brunei	9.7
61.	Montenegro	1100.8	122.	Guyana	359.1		World Average	1083.0

Source: https://en.wikipedia.org/wiki/List_of_countries_by_cigarette_consumption_per_capita



Annexure – 3. Flue Cured Virginia Varieties Grown by Farmers in Khyber Pakhtunkhwa¹¹

A. Old Commercial:

- **Speight G-28** --- Modest yield and medium quality leaves; medium to late in maturity; low in nicotine contents; plants are shorter than other varieties; bear up to 25 leaves per plant; moderately resistant to Black Shank-Races and Granville Wilt; Resistant to Fusarium wilt and Root Knot Nematode; Susceptible to Tobacco Mosaic Virus.
- **Speight G-126** --- Moderate yield with inferior cured leaf quality; late maturing than most of the varieties; grade-index=80; plant height=33 inches; leaves per plant=17; days to flower=79; reducing sugar=11.1.
- **K-399** --- Relatively late maturing; grade-index=80; plant height=41 inches; leaves per plant=17.8; days to flower=63; moderately resistant to Black Shank-Races 0 & 1; Susceptible to Tobacco Mosaic Virus; moderately resistant to Granville Wilt; Resistant to Root Knot Nematode; Susceptible to Potato Virus Y.
- **NC-606** --- Produces 30 good quality leaves per plant; taller plants with longer internodal length; highly resistant to Blank Shank and Granville Wilt; Resistant to common races of Root Knot Nematode.

B. New Commercial:

- **CC-901** --- Relatively late maturing; grade-index=81; plant height=41 inches; leaves per plant=18.1; days to flower=63; highly resistant to Black Shank-Race 0; moderately resistant to Black Shank-Race 1; Resistant to Tobacco Mosaic Virus; moderately resistant to Granville Wilt; Resistant to Root Knot Nematode; Susceptible to Potato Virus Y.
- **PVH-2310** --- Shorter growing season or early maturing; resistant to PVY, tobacco mosaic virus, Black Shank (races 0, 1 and 3), southern root knot nematodes; susceptible to black root rot, powdery mildew and blue mold; produces excellent yields, leaves of high quality tobacco and easy to cure.

¹¹ Source: Ahmed and Mohammad (2017)



Annexure – 4. General and Broad Specifications of Tobacco Leaf in Pakistan

Specifications	FCV (Plain Areas)	FCV (Sub-Mountainous Areas)	Burley (Air Cured)	White <i>Patta</i> (Sun-Cured)	Dark Air Cured
Nicotine (%)	1.30 to 2.50	1.30 to 2.80	2.50	3.50	0.8 to 1.2
Reducing Sugar (%)	9.00 to 16.00	12.00 to 18.00	4.50	2.70	1.0 to 3.0
Chloride (%)	0.75 to 0.90	0.60 to 0.80	1.00	0.90	0.5 to 2.0
Texture		Medium to open grained, firm leaf structure			
Colour		Lemon, light orange, orange, deep orange.			

Source: Pakistan Tobacco Board.



Annexure – 5. Grades Used for Procuring Tobacco Leaves from the Farmers

Annexure 5A. Flue Cured Virginia (FCV)

Grade	Description
BR (Bottom Ripe)	Primings and Lugs of thin body with open leaf, structure and moderate orange colour. Medium to heavy blemishes/spots up to 40%, Length not less than 14 inches.
BM (Bottom Mature)	Lugs with pale yellow to weak lemon colour with tendency towards immaturity. Sporting and blemishes upto 15%. No injury, length not less than 12 inches.
BD (Bottom Damaged)	Leaf from Bottom Plant Position. Mature, weak to moderate colour intensity, thin to medium bodied with firm leaf structure, dry to lean oil with moderate sponging and curing faults, poor to medium cutting quality.
MR (Middle Ripe)	Medium to fleshy bodied cutters and leaf; mature moderate orange colour, open leaf structure and good grains. Oily in nature, Blemishes/spots upto 30%, length not less than 16 inches.
MM (Middle Mature)	Medium to fleshy bodied cutters and leaf; mature moderate orange colour, with firm leaf structure and grains, Blemishes/spots upto 20%. No injury, length not less than 16 inches.
ML (Middle Light)	Cutter and leaf with pale yellow to weak lemon colour, with tendency towards immaturity, Spotting and blemishes upto 15%. O injury, length not less than 16 inches.
MD (Middle Damaged)	Leaf from middle plant position. Mature, weak to moderate colour intensity, thin to medium bodied with firm leaf structure, lean to medium in oil with moderate sponging and curing fault. Poor to medium cutting quality.
TR (Top Ripe)	Fleshy to heavy bodied Tips, ripe to over ripe, deep orange colour, open leaf texture with good grain an rich in oil. Medium to heavy blemishes/spots upto 20%, length not less than 12 inches.
TM (Top Mature)	Fleshy to heavy bodied ups, moderate orange/lemon colour, firm to open leaf structure and only. Sporting blemishes not more than 14%. No injury.
TL (Top Light)	Tips with pale yellow to weak lemon colour, with tendency towards immaturity. Spotting and blemishes upto 10%. No injury, Length not less than 12 inches.
TD (Top damaged)	Leaf from all plant position, Mature, weak to moderate colour intensity, moderate to fleshy bodied with firm leaf structure, lean to medium in oil with moderate sponging and curing faults. Poor to medium cutting quality.
IL (Immature Light)	Leaf from all plant position, lemon to yellow in colour with improving green in vein, midrib and adjacent Lamina. No injury, length not less than 12 inches.
NDM (Non-Descript Middle)	Ripe and over leaf from middle and top plant positions, which do not meet the minimum specifications of other grades, heavy spotting and sponging, perished leaf is excluded, injury level upto 10%, length not < 9 inches.
NDB (Non-Descript Bottom)	Leaf from all plant position, which do not meet the minimum specifications of other grades, heavy spotting and sponging. Perished leaf is excluded, injury level upto 20%, length not less than 9 inches.
K (Variegated)	Leaf from all plant position, of which 50% or more of its surface is grayish, mottled, bleached, caramelized scaled or sun baked injury level upto 2%, length not less than 12 inches.
G (Green)	Leaf from all plant positions, with improving green tinge, heavy spotting and sponging. Heavy in texture. No injury, length not less than 9 inches.



Annexure 5B. White Patta (WP)

Grade	Description
WP-1	Small thin yellowish-white leaf without any blemish and green spot.
WP-2	Medium size, light body; yellowish-white leaf with 5 percent blemish without any green.
WP-3	Medium size; light to medium body; light yellowish brown in colour; 10 percent blemish and running green permissible.
WP-4	Medium size; medium body; light brown to colour; 15 percent blemish and running green permissible.
WP-5	Medium to large size; medium to heavy body medium brown in colour with 25% blemish and improving green and dead green or Naswari leaf not permissible.

Annexure 5C. Dark Air-Cured (DAC)

Grade	Description
DAC-1 (Bottom Mature)	Mature and sound bottom leaf comprising of priming's and lugs, thin to medium bodied, brown coloured, uniform texture injury not more than twenty percent.
DAC-2 (Bottom Light)	Leaf from the lowest plant position (flyings and primings), thin light coloured, moderate sponging, injury and more than twenty percent.
AC-3 (Middle Mature)	Mature long leaf comprising of cutters and 'Leaf' from middle portion of the plant, good bodied, medium texture, shining brown colour, good aroma. Injury not to exceed ten percent
DAC-4 (Middle Light)	Cutters and 'Leaf' from middle portion of the plant medium bodied and texture, dark brown colour with medium aroma. Injury not more than twenty percent.
DAC-5 (Top Mature)	Mature 'Top' heavy bodied, good brown colour, good aroma. Injury not to exceed ten percent.
DAC-6 (Top Light)	Tip leaf, light to medium bodied, brown colour and medium aroma. Injury not to exceed ten percent.
DAC-7 (Non-Descript)	Mixed grade from all plant positions having greenish tinge, dull colour, excessive sponging, not falling in the above grades. This grade excludes mouldy, soiled and perished leaf and suckers.



Annexure 5D. Barley (BY)

Grade	Description
BYF	Bottom 3-4 leaves, Tissue to thin bodied, mature to ripe, Firm to porous, buff to tan in colour, weak to pale colour intensity, injury not more than 20%
BYBL	Immature to mature ligs, thin bodied, close to firm leaf structure, buff in colour, moderate to dull colour intensity, and injury not exceeding 10%.
BYBM	Mature to ripe lugs, thin to medium bodied, firm to open leaf structure, buff to tan in colour, moderate colour intensity and injury not exceeding 15%.
BYBR	Ripe lugs, thin bodied, open to grainy leaf structure, light tan to tan in colour, intensity, injury not more than 20%.
BYML	Immature to mature cutters and leaf, medium to fleshy bodied close to firm leaf structure, buff in colour with moderate colour intensity and not exceeding 10%.
BYMM	Mature cutters and leaf, medium to fleshy bodied, firm to open leaf structure, buff to tan in colour with moderate colour intensity and injury not exceeding 15%
BYMR	Ripe cutters and leaf medium bodied, open to grainy leaf structure, tan in colour with strong colour intensity, injury not more than 20%.
BYTL	Immature to mature ups; Close to firm leaf structure. Medium to fleshy bodied, buff in colour, moderate to dull colour intensity and injury not exceeding 10%.
BYTM	Mature tips, firm leaf structure, light tan to tan in colour with moderate to strong colour intensity, injury not exceeding 15%.
BYTR	Ripe tips, medium to heavy bodied, open to grainy leaf structure, tan in colour intensity, injury not more than 20%.
BYNL	Thin to medium bodied leaf from all plant positions having a light buff to buff colour and moderate to dull colour intensity, which do not meet the minimum specifications of any other grade, injury not more than 30%.
BYND	Thin to medium bodied leaf from all plant positions having tan to dark tan to reddish colour and deep to moderate colour intensity, injury not more than 30%.
BYCL	Immature to unripe leaf from all plant position, medium to fleshy bodied, light buff to buff in colour having running green along the veins, firm to close body structure, moderate colour intensity.
BYGF	Immature to unripe leaf from all plant position, closed to tight grain and slick, dark tan to reddish tan in colour, medium to fleshy bodied, variegated having greenish shade in lamina and midrib, moderate colour intensity.

Source: Pakistan Tobacco Board.



Annexure – 6. Economic Feasibility of Investing in Turbo Barn Curing in Khyber Pakhtunkhwa

I. Tobacco Nursery Preparation

Sr. #	Items	Units	Quantity (#)	Year-1	Year-2	Year-3	Year-4	----	Year-10
	Av. Tobacco curing capacity/barn/ season	1500 to 2500 kg		-	-	-	-	-	-
	Operational period in a season	days	80 to 100						
	Average life of the barn	years	10						
				Year-1	Year-2	Year-3	Year-4	----	Year-10
1.	Revenues								
i.	Average quantity of green leaf	Kg.	7500	7500	7500	7500	7500	7500	7500
ii.	Average price of green leaf	Rs./kg	16	16	16	16	16	16	16
iii.	Average value of green leaf	Rs.	120,000	120,000	120,000	120,000	120,000	120,000	120,000
i.	Average quantity of cured leaf	Kg.	2,500	2,500	2,500	2,500	2,500	2,500	2,500
ii.	Average price of cured tobacco	Rs./kg	120	120	120	120	120	120	120
iii.	Gross value of output processed	Rs.		300,000	300,000	300,000	300,000	300,000	300,000
	Sub-Total =			300,000	300,000	300,000	300,000	300,000	300,000
2.	Fixed Costs								
i.	Land for barn (16.5'×16.5' room)	Rs.	6,250	6,250	-	-	-	-	-
ii.	Store for tobacco leaves (33.0'×16.5' room)	Rs.	12,500	12,500	-	-	-	-	-
i.	Barn room construction costs	Rs.	100,000	100,000	-	-	-	-	-
ii.	Costs on items like pipes, burner, blowers, shelves, various types of thermo- and other meters, etc.	Rs.	80,000	80,000	-	-	-	-	-
iii.	Other miscellaneous costs	Rs.	20,000	20,000	-	-	-	-	-
	Sub-Total=			218,750	0.00	0.00	0.00	0.00	0.00
	Annual depreciation @ 10 year life		20,000	21,875	21,875	21,875	21,875	21,875	21,875
	Variable costs								
i.	Firewood cost	Rs.	100,800	100,800	100,800	100,800	100,800	100,800	100,800
ii.	Leaf carriage to barn	Rs.	2,000	2,000	2,000	2,000	2,000	2,000	2,000
iii.	Tying sticks & leaf arranging in barn	Rs.	4,000	4,000	4,000	4,000	4,000	4,000	4,000
iv.	Labor for leaf loading in barn	Rs.	2,000	2,000	2,000	2,000	2,000	2,000	2,000
v.	Fireman charges	Rs.	5,000	5,000	5,000	5,000	5,000	5,000	5,000
vi.	Curing supervisor charges	Rs.	10,000	10,000	10,000	10,000	10,000	10,000	10,000
vii.	Unloading from barn and transport to shed	Rs.	2,500	2,500	2,500	2,500	2,500	2,500	2,500
viii.	Cured leaf grading/sorting	Rs.	2,500	2,500	2,500	2,500	2,500	2,500	2,500
	Sub-Total=	Rs.	128,800	128,800	128,800	128,800	128,800	128,800	128,800
	Total cost	Rs.	347,550	347,550	150,675	150,675	150,675	150,675	150,675
	Green leaf cost	Rs.	120,000	120,000	120,000	120,000	120,000	120,000	120,000
	Overall Net-Benefit	Rs.	96,375	-167,550	29,325	29,325	29,325	29,325	29,325
	Discount Rate	%	8.50%						
	Net Present Value	Rs.	179,442						
	Internal Rate of Returns	%	10.20%						
i.	Average curing cost/kg	Rs./kg	-	60.27	60.27	60.27	60.27	60.27	60.27
ii.	Commercial curing rate charged	Rs./kg	85.00	85.00	85.00	85.00	85.00	85.00	85.00
iii.	Returns per kg of cured leaf	Rs./kg	-	24.73	24.73	24.73	24.73	24.73	24.73



iv.	Mean annual income	Rs.	-	-135,050	61,825	61,825	61,825	61,825	61,825
v.	- Returns per rupee invested (%)	Rs.	421,375						



Annexure – 7. Cost of Production of FCV Tobacco in Khyber Pakhtunkhwa

I. Tobacco Nursery Preparation

Sr. #	Items	Units	Quantity (#)	Price per Unit (Rs.)	Total Cost (Conventional Method)	Total Cost (Improved Method)	Difference (If any)
	Nursery Area (Marla per Acre)	Marla	5.00	-	-	-	-
1.	Seedbed Preparation:						
i.	- Ploughing with cultivator	Nos.	4.00	37.50	150.00	150.00	0.00
ii.	- Plankings	Nos.	2.00	18.75	37.50	37.50	0.00
iii.	- Polythene sheet ¹	Meters	50.00	30.00	750.00	750.00	0.00
iv.	- Seed Packets ²	Packets	0.40	8000.00	3200.00	3200.00	0.00
v.	- Iron rods ³ , etc.	Nos.	15.00	100.00	150.00	150.00	0.00
	Sub-Total=				4287.50	4287.50	0.00
2.	FYM & Fertilizer Application						
i.	- Farm Yard Manure Application	Trolleys	0.25	2000.00	500.00	500.00	0.00
ii.	- DAP	Kilogram	5.00	70.00	350.00	350.00	0.00
iii.	- Urea	Kilogram	5.00	40.00	200.00	200.00	0.00
iv.	- Ammonium Nitrate	Kilogram	5.00	36.00	180.00	180.00	0.00
v.	- Chemical application (Nos.)	Nos.	4.00	250.00	1000.00	1000.00	0.00
	Sub-Total=				2230.00	2230.00	0.00
3.	Labour use						
i.	- Bed Making (level, sticking)	Man-days	1.00	500.00	500.00	500.00	0.00
ii.	-Sprinkle irrigation (for 3 months)	Man-days	2.00	500.00	1000.00	1000.00	0.00
iii.	-Weeding & thinning (4 round)	Man-days	1.00	500.00	500.00	500.00	0.00
iv.	-Chemical application (3-4 times)	Man-days	1.00	500.00	500.00	500.00	0.00
	Sub-Total=	Man-days	5.00	500.00	2500.00	2500.00	0.00
	Total =				9017.50	9017.50	0.00

¹ 2 years life assumed.

² One packet is sufficient for planting 2.50 acres.

³ 10 years life assumed.



II. Tobacco Crop Production

Sr. #	Items	Units	Quantity (#)	Price per Unit (Rs.)	Total Cost (Conventional Method)	Total Cost (Improved Method)	Difference (If any)
1.	Seedbed Preparation:						
i.	Deep ploughing/Rotavator ¹	Nos.	0.40	1200.00	480.00	480.00	0.00
ii.	Ploughing with cultivator	Nos.	4.00	1000.00	4000.00	4000.00	0.00
iii.	- Plankings	Nos.	2.00	600.00	1200.00	1200.00	0.00
iv.	- Ridges making with tractor	Hours	0.84	1500.00	1260.00	1260.00	0.00
	Sub-Total=				6940.00	6940.00	0.00
2.	FYM & Fertilizer Application						
i.	- Farm Yard Manure Applied ²	Trolleys	2.00	2000.00	4000.00	4000.00	0.00
ii.	- NPK	Bags	2.00	2700.00	3780.00	3780.00	0.00
iii.	- DAP	Bags	1.00	3400.00	0.00	3400	3400.00
iv.	- Urea	Bags	1.00	2000.00	2000.00	2000.00	0.00
v.	- Ammonium Nitrate	Bags	1.00	1800.00	1800.00	1800.00	0.00
vi.	- Potash	Bags	1.00	2800.00	1960.00	4200.00	2240.00
vii.	- Chemical application (Nos.)	Nos.	3.00	1500.00	4500.00	4500.00	0.00
	Sub-Total=				18040.00	23680.00	5640.00
3.	Irrigation						
i.	Irrigation	Nos.	4.00	800.00	3200.00	3200.00	0.00
ii.	Canal water charges	Once	1.00	600.00	600.00	600.00	0.00
	Sub-Total=				3800.00	3800.00	0.00
4.	Labour use						
i.	Lining, Bund making, etc.	Man-days	1.00	500.00	500.00	500.00	0.00
ii.	Nursery Uprooting & Transplanting	Man-days	3.00	500.00	1500.00	1500.00	0.00
iii.	Missing plantation, gap filling, etc.	Man-days	0.50	500.00	250.00	250.00	0.00
iv.	Irrigation for three months	Man-days	4.00	500.00	2000.00	2000.00	0.00
v.	Cleaning water channels (2 times)	Man-days	1.00	500.00	500.00	500.00	0.00
vi.	Weeding, hoeing, thinning (2 rounds)	Man-days	3.00	500.00	1500.00	1500.00	0.00
vii.	Earthing-up (at least once)	Man-days	4.00	500.00	2000.00	2000.00	0.00
viii.	Chemical application (3 to 4 times)	Man-days	2.00	500.00	1000.00	1000.00	0.00
ix.	Topping & Suckering (Priming)	Man-days	2.00	500.00	1000.00	2000.00	0.00
	Sub-Total=	Man-days	20.50		10250.00	11250.00	0.00
	Total =				39030.00	45670.00	6640.00

¹ Once in three years is practiced in the area.

² Once applied in three years @ 6 trolleys per acre.



III. Curing, Grading and Bundling of Tobacco

Sr. #	Items	Units	Quantity (#)	Price per Unit (Rs.)	Total Cost (Conventional Method)	Total Cost (Improved Method)	Difference (If any)
i.	Picking of green leaves (8 rounds)	Man-days	25	500.00	12500.00	20000.00	4500.00
ii.	Grading/Sorting afterwards	Man-days	4	500.00	2000.00	1000.00	-1000.00
iii.	Harvesting Supervision Charges ¹	Rounds	8	500.00	4000.00	2000.00	-2000.00
iv.	Sticks for hanging	Maunds	2	1000.00	2000.00	2000.00	0.00
v.	Tying sticks and loading to barns	Man-days	8	500.00	4000.00	4000.00	0.00
vi.	Carriage, loading arranging in barns	Man-days	8	500.00	4000.00	4000.00	0.00
vii.	Firewood	Maunds	160	700.00	112000.00	100800.00	-11200.00
viii.	Ropes, bags, <i>sutli</i> for baling		1	1000.00	1000.00	1500.00	500.00
ix.	Curing supervisor charges per season	No.	1	10000.00	10000.00	10000.00	0.00
x.	Fireman charges per season	No.	1	5000.00	5000.00	7500.00	0.00
xi.	Unloading from barn	Man-days	5	500.00	2500.00	2500.00	0.00
xii.	Grading/Sorting and bundling	Man-days	5	500.00	2500.00	2500.00	0.00
xiii.	Barn Depreciation/ Annual Repair		1	5000.00	5000.00	7500.00	2500.00
	Sub-Total=				166500.00	162800.00	-3700.00

¹ @ Rs.500/ha per round.



IV. Summary of Cost Composition

Sr. #	Items	Units	Quantity (#)	Price per Unit (Rs.)	Total Cost (Conventional Method)	Total Cost (Improved Method)	Difference (If any)
i.	Nursery Production Cost (Rs./Acre)				9017.50	9017.50	0.00
ii.	Crop Production Cost (Rs./Acre)				39030.00	45670.00	6640.00
iii.	Curing Cost (Rs./Acre)				166500.00	162800.00	-3700.00
iv.	Transport Cost (Rs./Acre)				9600	9600	0.00
v.	Interest on capital @ 12.5% /annum				14009.22	14192.97	183.75
vi.	Land rent (for 6 months)				15000.00	15000.00	0.00
vii.	Cost of Production (Rs./Acre)				253156.72	256280.47	3123.75
viii.	Cost of Production (US\$/Ha)				5957.62	6031.13	
ix.	Net-Production (Kg/Ha)		1400	150	1250.00	1350.00	
x.	Price taken		184.97	120	180.83	173.75	
xi.	Gross Value (Rs./Ha)		246400	18000	264400.00	291080.02	
xii.	Net-Profit (Rs./Ha)				11243.28	34799.55	



Annexure – 8. Services of Pakistan Tobacco Board (PTB) and Tobacco Companies to the Tobacco Growers in Khyber Pakhtunkhwa

Pakistan Tobacco Board (PTB)

Pakistan Tobacco Board (PTB) is helping the tobacco growers by various means for the safety of their crops and interests. These are:

- Tobacco companies' requirements are announced every year in October vide national dailies for the information of the tobacco growers in order to execute their agreement with tobacco companies accordingly.
- Minimum indicated Prices (MIP) for tobacco grades are fixed every year but not less than the Weighted Average Prices of tobacco for the preceding year. This act does not allow retreat in tobacco grades prices.
- MIP are announced prior to sowing period of tobacco nursery and wheat. This gives very open option to growers to opt for the best suited crop to them.
- PTB Research & Development Staff are always at tobacco growers door steps for the solution of time needed problems.
- Print and radio media services are provided for the guidance of tobacco growers from the start of the tobacco seeds sowing, transplantation, de-suckering, picking and grading stages. Besides these informative moves, the growers are also guided for the better use of chemical fertilizers and sprays at various levels of plant life and on soil chemistry.
- "Spilled Over Leaf" SOL fund is used for the affectee of tobacco growers due to natural calamities.

Every year, more than 50 registered tobacco companies and dealers formally place their demand for tobacco procurement to Pakistan Tobacco Board (PTB) (Table 4). During 2018 procurement season, nearly 50 thousand tonnes (or 50 million kg) of tobacco leaf procurement was placed by these companies. Out of these, only three are registered with Karachi and Lahore Stock Exchanges. These three companies are, Pakistan Tobacco Company (PTC), Khyber Tobacco Company (KTC) and Philip-Morris Tobacco Company (PMPKL).

Pakistan Tobacco Company (PTC)

Pakistan Tobacco Company (PTC) is partner of British American Tobacco Company (BATC) that has a legacy spreading over 100 years. The BATC has its presence in more than 180 countries of the world. PTC began its operation in Pakistan in 1947 – immediately after partition – when it took over the business of the Imperial Tobacco Company of India which had been operational in the subcontinent since 1905. It is one of the biggest expense giver in the private segment in Pakistan. Amid 2015, PTC contributed over Rs.86 billion, an expansion of Rs.12.8 billion, 17% versus SPLY to Government incomes as Excise Duty, Sales Tax, Income Tax and Custom Obligations. This adds up to over Rs.268 million for every working day. More than one million individuals are financially subject to the business in Pakistan. Some



famous brands of PTC are Dunhill¹², Benson and Hedges¹³, John Player Gold Leaf¹⁴, Capstan, Pall Mall¹⁵, Gold Flake¹⁶ and Embassy¹⁷.

Besides doing tobacco business, PTC is also actively involved in extending various social services to the countrymen.

- Under the Corporate Social Responsibility (CSR) initiatives, PTC runs five Mobile Doctors' Units in Khyber Pakhtunkhwa province.
- PTC also established Learning Resource Centers (LRC) on in each Buner, Mansehra, Yar Hussain, Shergarh, Jehlum, Hasan Abdal and Akora Khattak Factor and in Akora Khattak Town (for women).
- Under Afforestation Initiative, PTC also planted more than 2.8 million saplings in Pakistan. More than 0.6 million trees are planted on the 153 kilometers of Motor Way (M-1) linking Peshawar to Islamabad.
- In 2014 floods, PTC has launched its emergency relief to the affected people. An Emergency Medical Camp Initiative was launched through deploying the Mobile Dispensary Units. Free medical assistance was provided to over 5000 flood hit people, while food packages and tents were delivered to more than 40 thousand flood affected people.

¹² Dunhill was formally launched in Pakistan in 2005. Dunhill is not only a brand for Pakistan but rather is a worldwide brand and has been in the market since 1907. It exists in the excellent fragment of brands of the organization.

¹³ This brand was launched in Pakistan in March 2003 and has since possessed the capacity to assemble solid brand unwaveringness among its buyers demonstrating fabulous year on year growth". Benson is not only a nearby brand but rather is a worldwide brand and has been in the market since 1873 when Richard Benson and William Hedges made an organization in the United Kingdom.

¹⁴ John Player Gold Leaf standout amongst the most unmistakable cigarette marks in the nation. John Player Gold Leaf has as of late been proclaimed the biggest Urban Brand in Pakistan, demolishing items over the F.M.C.G. spectrum. Gold Leaf is additionally an extraordinary neighborhood mark but rather has nearness internationally and began in 1877 by its originator, none other than John Player who later on made his business into an organization known as John Player and Sons. It now goes in close vicinity to the Premium Segment for the organization.

¹⁵ Capstan has a rich legacy, starting in Britain in the nineteenth century. The brand was made under the sponsorship of W.D. and H.O. WILLS at Bristol and London. The paper will later show how this brand has now increased remarkable piece of the overall industry inside the nation and is on the ascent, making it one of the main impetuses in the tobacco business furthermore in a route adding to the extensive benefits made in retreating or unsteady situations. This brand goes inside the Value for Money section.

¹⁶ Gold Flake has developed immensely as a brand since 2004, making it the biggest volume mark in Pakistan, and the second biggest brand in British American Tobacco's Asia Pacific area. The way to Gold Flake's prosperity has been its novel engagement plans which have fueled development over the years. This brand was viewed as a top notch section mark around the end of the nineteenth century. In spite of the fact that the steady changes in bundling and brand situating made the brand obtain a significant amount of wealth (VFM) portion. It was additionally made by W.D. and H.O. WILLS.

¹⁷ It is a main volume mark in Pakistan, and is most well known in Punjab where it appreciates a main position. Consulate was one of the main brands by the organization and has been in presence since. It is carefully fit for the nearby market and exists in the Value for Money section.



Philip Morris Pakistan Limited (PMPKL)

In March 2007, a major proportion of Lakson Tobacco Company Limited was purchased over by Phillip Morris International. The name of the organization was changed to Phillip Morris International (PMI) in 2011. PMI make and offer cigarettes for Pakistan's residential market. In tobacco value chain, this company runs tobacco leaf agronomy program in the tobacco developing regions of Khyber Pakhtunkhwa. More than 2500 people are its employing working in tobacco value chain and marketing of its tobacco based products. The principal national and international brands are Morven by Chesterfield, L&M, Red and White, Philip Morris, Marlboro¹⁸, K-2, Diplomat, Lark¹⁹, Merit²⁰, Muratti²¹ and Bond Street²².

The notable services offered by Philip Morris Pakistan Limited are as under:

- The Philip Morris Pakistan Limited (PMPKL) has established clean drinking water plants and installed hand pumps for benefiting more than 530 thousand people in Khyber Pakhtunkhwa.
- For Afforestation, PMPKL afforestation program provides more than 1 million saplings to the farmers every year.
- PMPKL has established rehabilitating schools in Mardan, Swabi, Charsadda, Sahiwal and Kotri, which benefit more than 3000 students.
- PMPKL has a number of Mobile Dispensary for providing medical services in the tobacco growing regions of Khyber Pakhtunkhwa.
- The Disaster Relief Program of PMPKL aims to provide immediate relief to communities affected by natural calamities in Pakistan.

Khyber Tobacco Company (KTC)

The KTC has been operational in Pakistan since 1954. Khyber Tobacco Company has accomplished the stature of business with its aspiring vision, higher caliber and cautious group and getting a charge out of the status of main few organizations of Pakistan in tobacco industry. The organization has broadened its operations around the globe, i.e. in parts of Eastern Europe, South and Western Africa, Central and South Asia and Middle East. Different brads offered by the company are: Gold Street (Premium and International); Classic (Special Flavor, Full Flavor, Menthol), Hero (International, Light, Menthol), Chance No.1 (Virginia Blend, Special Blend, Menthol), Virtue (Super Slims, Lights-Super Slims).

¹⁸ Marlboro is an American brand of cigarettes, currently owned and manufactured by Philip Morris USA within the United States, and by Philip Morris International outside the United States. Richmond, Virginia, is the location of the largest Marlboro cigarette manufacturing plant.

¹⁹ Lark is an American brand of cigarettes, currently owned and manufactured by Philip Morris USA in the United States. Outside the U.S., it is produced by Philip Morris International and Philip Morris Ukraine.

²⁰ Merit is an American brand of cigarettes, currently owned and manufactured by Philip Morris USA in the United States and Philip Morris International outside the United States.

²¹ Muratti is a brand of cigarettes, currently owned and manufactured by Philip Morris International. There are many different Muratti variants introduced over the years, and they were also sold as Ambassador, Ariston, Cabinet, Gentry, Iplic, Peer and Regent.

²² Bond Street is an international brand of cigarettes produced by Philip Morris International.



Annexure – 9. Telephone Directory of Pakistan Tobacco Board Officials

Sr. #	Name fo the Officer	Designation	Office	Mobile	E-Mail Address
1.	Mr. Syed Sohail Altaf	Chairman	091-9217151	-	chairman@ptb.gov.pk
2.	Mr. Atta-ullah	Secretary	091-9217245	0334-5659019	attaullah.moc@gmail.com
3.	Mr. Fakhuddin	PSO	091-9217473	0300-9174666	fakhruddinkhan46@yahoo.com
4.	Mr. Syed Asif Shah	Director (R&D)	091-9217152	0300-5394800	Syedasif.shah@hotmail.com
5.	Mr. M. Adnan Khan	DS (Admin)	091-9217416	0331-5020234	adnan.khan1556@gmail.com
6.	Dr. Qaizer Ahmad	Chief Statistical Officer	091-9217065	0333-9954708	qaizar63@gmail.com
7.	Mr. Dost Muhammad	DD (B&F)	091-9217065	0300-8177778	dostwazir4@gmail.com
8.	Mr. Adeel Hussain	DD (Marketing)	091-9217833	0300-7610814	
9.	Mr. Abdur Rehman	S/Administrator	091-9217437	0300-5874790	abdur_rehman1980@yahoo.com
10.	Mr. Kamal Khan	IAO	091-9219509	0334-8809316	admn.ptb882@gmail.com
11.	Mr. Shahid	Administrative Officer	-	0300-3786247	shahidza786@yahoo.com
12.	Mr. Awais Afridi	AD(PR)	091-9219508	0314-8151513	media.ptb.adpr@gmail.com
13.	Ms. Amina Arabab	Export Manager	091-9219503	0345-9045939	exportmanager@ptb.gov.pk
14.	Mr. Fazli Rabbi	PS to Chairman	091-9217151	0332-9147382	fazal6916@gmail.com
15.	Mr. Arshad Naveed	APS to Secretary	0919217245	0301-8887472	
16.	Mr. Mohsin Hussain Ch.	Director Zonal Office	042-99230435 042-35917806	0300-9468000	
17.	Mr. Sajid Ali Niazi	T&SO	091-9217155	0333-9168188	sajidaliniazi@gmail.com

Source: Pakistan Tobacco Board Website.



Annexure – 10. Sources of Micro and Macro Data Used in this Study

1. FAO-STAT [<http://www.fao.org>]
2. MNFS&R (Ministry of National Food Security and Research) Agricultural Statistics of Pakistan (provincial and district level statistics), Government of Pakistan, 2019. Agriculture Statistics of Pakistan, 2017-18. Economic Wing, Ministry of National Food Security and Research, Islamabad. [<http://www.mnfsr.gov.pk>]
3. Government of Pakistan. 2020. Pakistan Economic Survey, 2019. Pakistan Economic Survey, 2018-19. Economic Advisor's Wing, Finance Division, Government of Pakistan, Islamabad. [<http://www.finance.gov.pk>]
4. Pakistan Tobacco Board Website [<http://www.ptb.gov.pk>]
5. FAO STAT data on Production of Various Crops, Trade on Crop and Livestock Products [<http://www.fao.org/faostat/en/#data/TP>] [<http://www.fao.org/faostat/en/#data/QC>]
6. Various websites
[<http://www.worldstopexports.com/tobacco-cigarettes-exports-country/>]
[<https://www.tobaccoatlas.org/topic/consumption/>]
[<https://www.statista.com/statistics/259204/leading-10-tobacco-companies-worldwide-based-on-net-sales>]
Daily Records dated 26th March, 2018 --- [<http://www.thedailyrecords.com/2018-2019-2020-2021/world-famous-top-10-list/world/largest-tobacco-producing-countries-statistics/6876/>]



Annexure – 11. List of Tobacco Growers, Agricultural Officers and Other Officials Consulted

Sr. #	Name	Designation/Status	Address	Mobile
1.	Mr. Muhammad Idrees	Farmer	Village Julabad, Tehsil Tangi, Charsadda	-
2.	Mr. Fazal-e-Amin	Farmer	Village Julabad, Tehsil Tangi, Charsadda	-
3.	Mr. Abdul Qayym	Farmer	Village Julabad, Tehsil Tangi, Charsadda	-
4.	Mr. Sarwar Khan	Farmer	Village Aurangabad, District Swabi	-
5.	Mr. Khalid Khan	Farmer	Village Aurangabad, District Swabi	-
6.	Mr. Arafat Khan	Farmer	Village Aurangabad, District Swabi	-
7.	Mr. Muhammad Afzal	Farmer	District Swabi	-
8.	Mr. Jamshed Iqbal	Director, Agriculture Extension	District Swabi	-
9.	Mr. Zaheer Iqbal	Head of Leaf, Pakistan Tobacco Company Limited	Pakistan Tobacco Company Limited	0308-5209755
10.	Mr. Nisar Ali Shah	Director, SSRI, Tarnab, Peshawar	Social Sciences Research Institute, Tarnab, Peshawar	0332-5253913