

# ***Punjab***

## ***Agriculture Profile***



**Agriculture Department**



**Government of Punjab**

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# ***INTRODUCTION***





## 1.0 Introduction

With a population of around 200 million, Pakistan is the 6th most populous country and the 43rd largest economy in the world. In the current global economic scene, Pakistan is being seen as the top emerging market economy in South Asia that is progressing towards a more advanced stage through rapid growth and industrialization.



Pakistan is being classified as one of the Next Eleven (N-11) countries that have the potential to become one of the world's large economies in the 21st century. Economic growth of the country has been on a rise during recent years; being 4.0% in 2014 and 4.2% in 2015. The IMF projects that the growth trend will continue and reach 5.2% by the year 2020.

The World Bank projects that by 2018, Pakistan's economic growth will increase to 5.4% due to greater inflow of foreign investment from China-Pakistan Economic Corridor (CPEC). The present government is fully committed to capitalize on the emerging growth trend and is working diligently to implement all the necessary steps to mobilize private sector investment.

Abundant availability of natural resources, strengthened macroeconomic outlook, improved law and order, availability of low-cost labor and facilitative government policies; all constitute an attractive proposition to foreign and local investors to consider Pakistan a favorite destination for investment.

Pakistan is an agriculture-based economy. Agriculture accounts for 20.9% of the GDP and provides livelihood to 43.5% of the rural population. Agriculture GDP is derived from four major subsectors. Livestock is the biggest contributor to GDP accounting for 56.3% of the total value (2014-15). Crops is the second largest subsector accounting for 39.6%; followed by two smaller subsectors, Fishing and Forestry, respectively accounting for 2.1% and 2.0% shares.



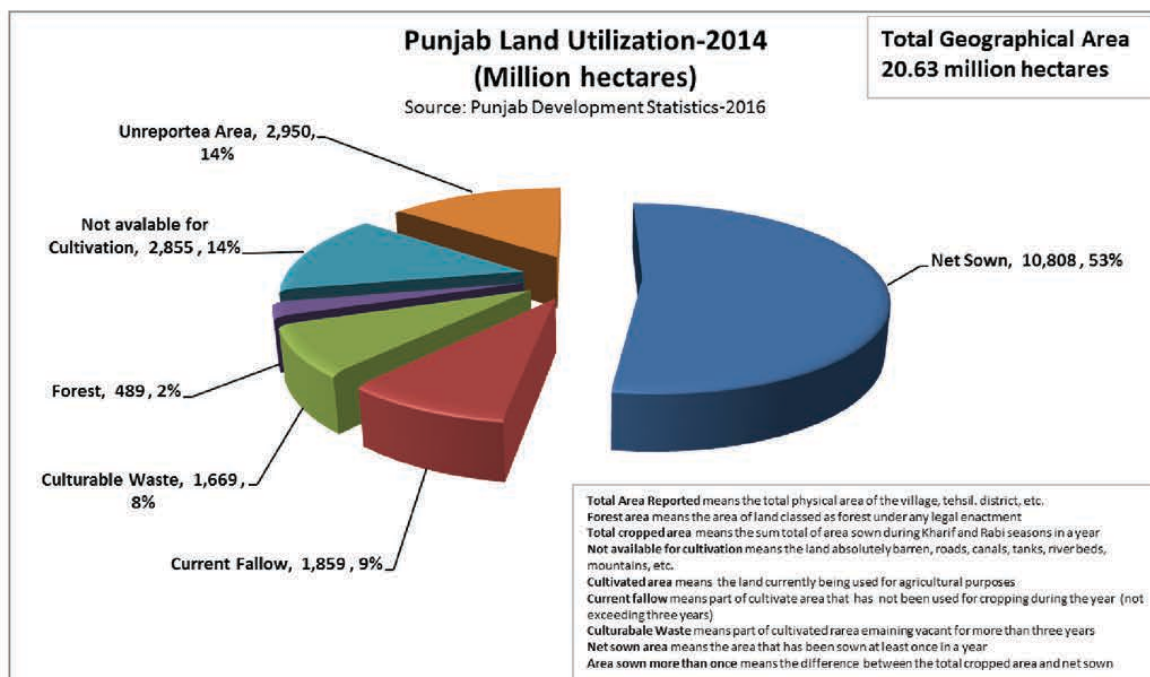
## 2.0 Agriculture in Punjab

Punjab is the largest province of Pakistan with respect to population and its contribution to national agricultural production. Agriculture holds a key position in the economy of Punjab. It has 21% share in GDP and provides employment to 47% workforce. The sector acts as source of raw materials for country's major industries; textile, leather, rice processing, edible oil, sugar and various food processing industries. Agriculture-based products account for around three fourth of country's total exports of which about 60% share is contributed by Punjab. Over years, Agriculture sector has maintained a satisfactory growth to effectively cope with the challenge of ensuring food security for the country's growing population.

Punjab has a total geographical area of 20.63 million hectares that is 25.9% of the country's total area making Punjab the second largest province in this regard. Land utilization status is available for 86% of the total area; whereas 14% area remains unreported.

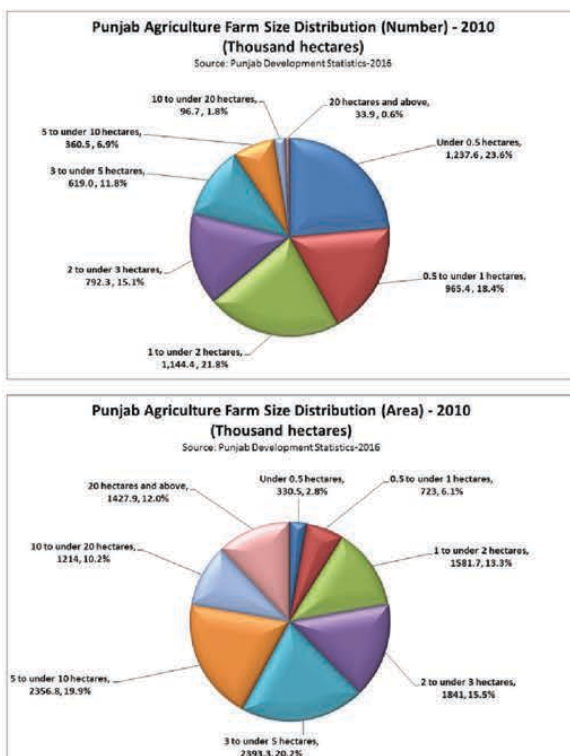
Another 14% of the total area is not available for cultivation due to either being completely barren or presence of roads, villages, houses, canals, tanks, river beds, mountains, sand dunes, etc. That leaves 72% of the land that is reported as the area available for cultivation. Punjab has 10.81 million hectares (53%) as the net sown area; the area that is cultivated at least once in a year. 9% land exists as current fallow which is the land that is not used for cropping during a year (duration not exceeding three years).

8% land exists as culturable waste which represents the part of the cultivated area that remains vacant for more than three years. Total cropped area is more than the net sown area since land is used during two seasons; Rabi (October to March) and Kharif (April to September).



As per the Census of Agriculture 2010, there were 5,249,800 agriculture farms in Punjab. Majority of these farms were very small. 42% of the farms fell in the category having an area of less than one hectare. The share of the area of these farms in the total farm area was only 8.9%.

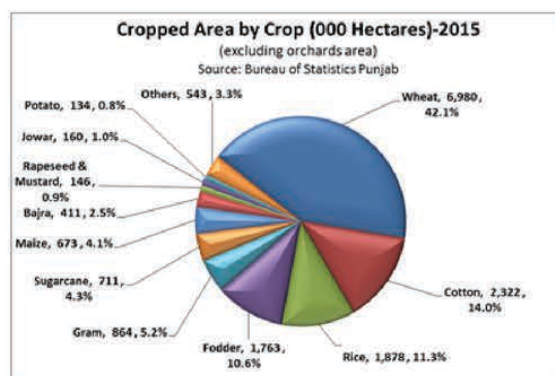
Around half of the total number of farms fell in the range of one hectare to under 10 hectares. Share of the area occupied by these farms in the total farm area was 68.9%. Share of the farms with size of 10 hectare and above was only 2.4% in terms of number of farms; however the share of the area of these farms was 22.2% of the total farm area.



In 2014, Punjab's total cropped area (excluding orchards) was 16.68 million hectares; indicating that 5.87 million hectares (54% of the sown area) was sown more than once during the year. Wheat claims the maximum share of the cropped area. In 2015, 42% of the cropped area was used for wheat.

It was followed by cotton and rice that respectively claimed 14% and 11.3% of Punjab's total cropped area.

Overall, two third of the total cropped area of Punjab was used by the three largest crops; wheat, cotton and rice. Fodder is another large produce of Punjab which derives its importance to fulfill the need to feed the large livestock population of the province. 10.6% share of the cropped area was claimed by fodder. Maize and sugarcane are the two other main crops that claimed 4.1% and 4.3% shares of the total cropped area. Higher value crops like oilseeds, pulses and vegetables are cropped on smaller areas. In 2014, the share of these crops in the total cropped area of the province was around 10%.





## *Punjab's Climate*

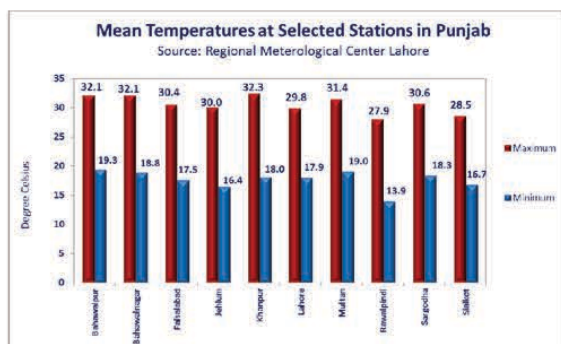




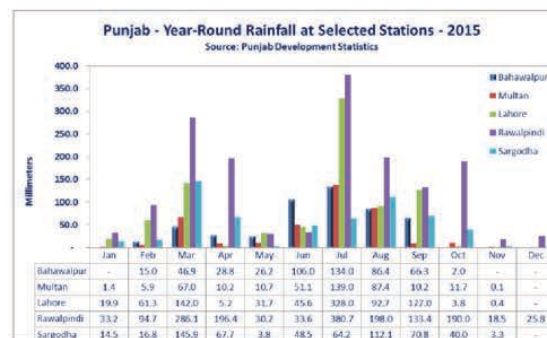
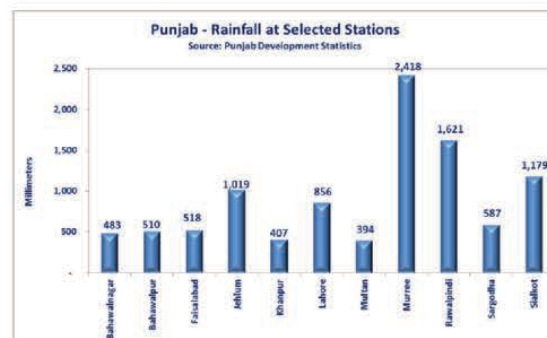
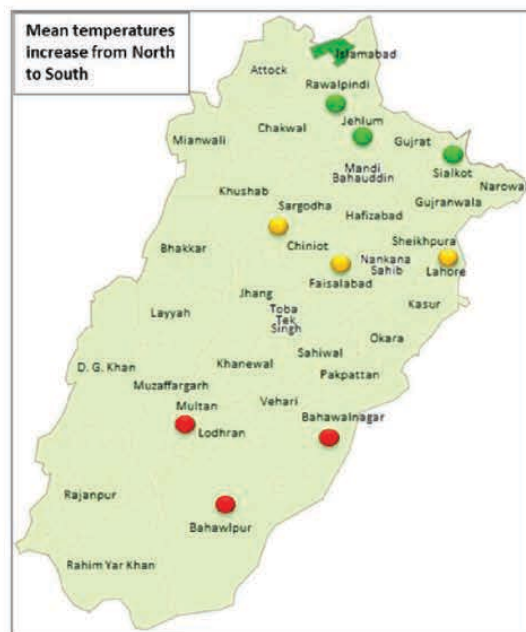
## 2.1 Punjab's Climate

Agriculture performance is directly linked with suitable climatic conditions. Punjab has different agro-climatic zones offering the diversity to cultivate different types of crops; corresponding to different temperatures and rain falls. Mean maximum and minimum temperatures in Punjab increase from north to south. Districts located in northern Punjab (e.g. Rawalpindi, Sialkot) have the lowest mean temperatures; the districts located in central Punjab (e.g. Lahore, Faisalabad) have relatively higher temperatures; whereas the districts located in southern Punjab (e.g. Multan, Bahawalnagar) have the highest temperatures in the province.

Contrary to mean temperatures, the average rainfall trend in Punjab decreases from north to south. Average rainfall in northern districts like Rawalpindi, Sialkot is the highest. It is lower in the districts in central Punjab; such as Lahore and Faisalabad; and it decreases further in southern districts like Multan and Bahawalpur.



Punjab is located in the monsoon region. The province experiences maximum rainfall during the month of July. August and March are other months which experience a higher rainfall compared to that in other months. November, December and January are the winter months during which there is the lowest rainfall in Punjab.



# ***Agriculture Inputs Seeds***



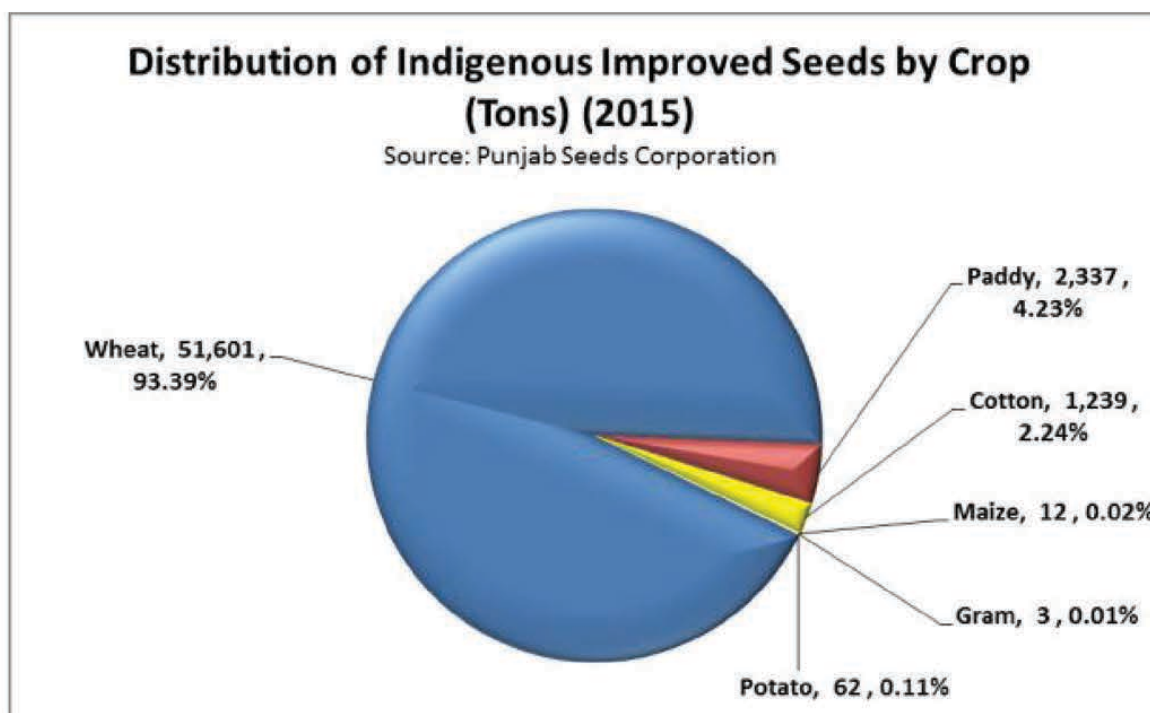
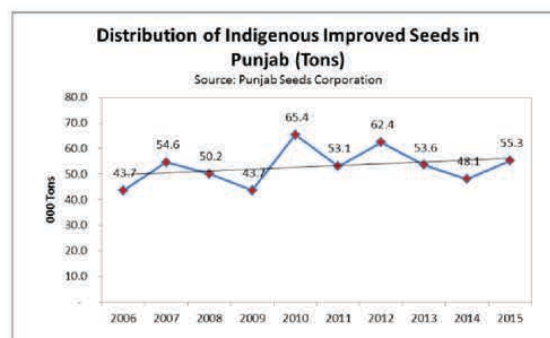
## 2.2 Agriculture Inputs

### 2.2.1 Seeds

Seed is the most important agricultural input directly effecting yields. Use of improved and certified seed is very important for attaining higher agricultural productivity.

In 2015, distribution of indigenous improved seeds was limited to 55,300 tons which is quite low. Local production of improved seeds has followed an inconsistent trend in the past; with an overall increase of 26% during the ten year period from 2006 to 2015.

The main focus of improved seeds production in Punjab has been the wheat crop; which constituted 93.4% of the total local seed production in the province. Rice and Cotton respectively were the second and third largest produced seeds claiming 4.2% and 2.2% shares of the total improved seeds production.





# Fertilizer

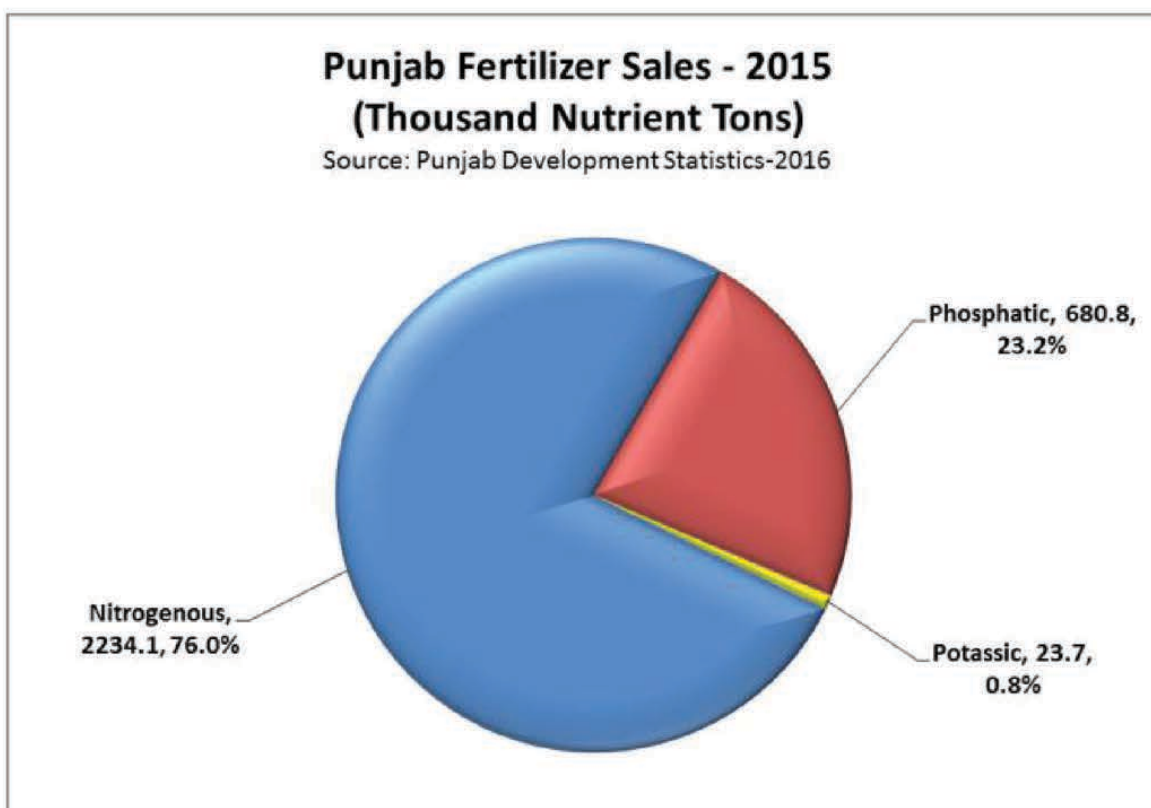


### 2.2.2 Fertilizer

Intensive cultivation is leading to depletion of essential plant nutrients from the soil which makes fertilizer the most important agriculture input. Productivity is directly related to optimal use of different types of required fertilizers. Fertilizer is an expensive input and constitutes a major portion of total farming cost.

100% soils of Punjab are deficient in nitrogen; 80-90% deficient in phosphorus and 30% deficient in potassium (Economic Survey of Pakistan 2015-16). Corresponding to this demand, the nitrogenous fertilizers are consumed in the highest quantities.

In 2015, nitrogenous fertilizers held a share of 76% of the total sales of fertilizers in Punjab; 23% share was that of phosphatic fertilizers and the balance that of potassic fertilizers.



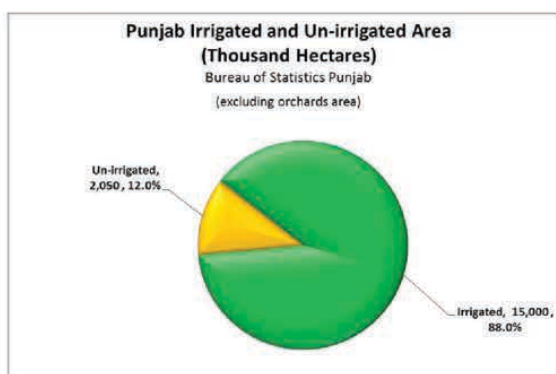
# *Irrigation*





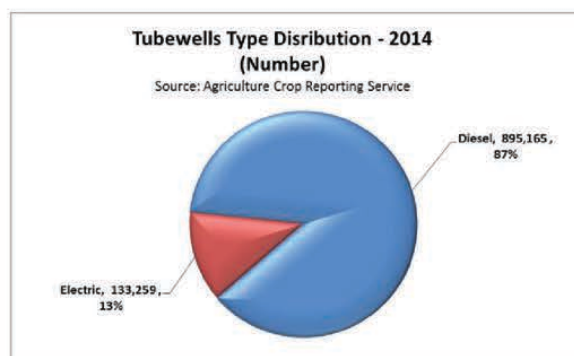
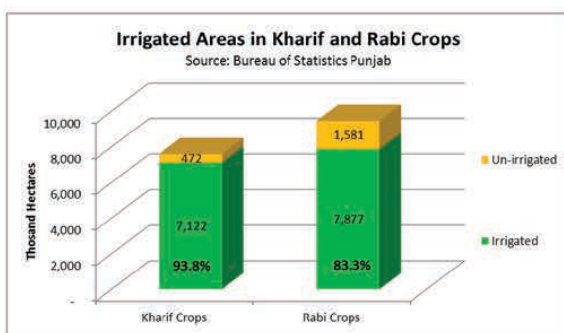
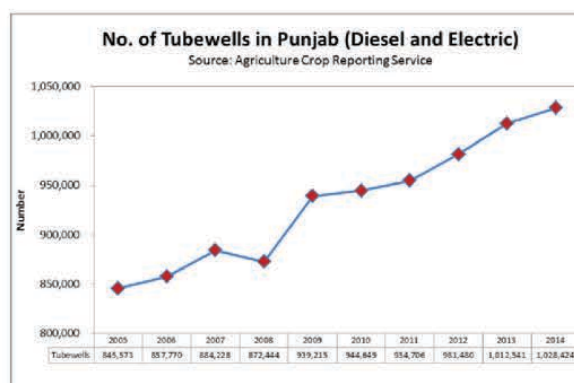
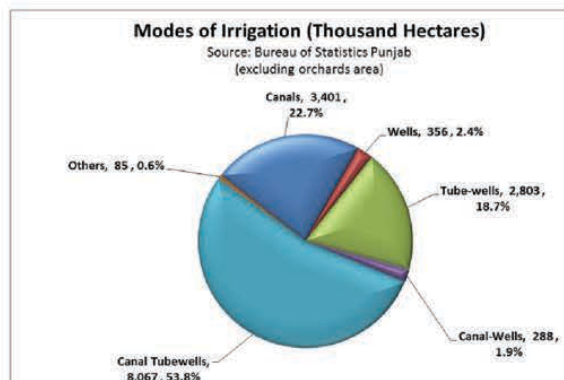
## 2.3 Irrigation

88% of the total area (15,000 hectares) in Punjab is irrigated whereas 12% (2,050 hectares) is un-irrigated; depending on natural rainfall. Shares of irrigated areas are different for two cropping seasons. For Kharif crops, 93.8% area is irrigated; whereas for Rabi crops, 83.3% is irrigated.



The Punjab agriculture uses multiple modes of irrigation. 22.7% sown area is irrigated by canals and 18.7% by tubewells; while the largest portion of 53.8% uses both modes of irrigation. Use of wells and other modes is less common.

87% of the tubewells in Punjab are powered by diesel and the balance 13% by electricity.



Number of tubewells in Punjab has grown over the years. In 2004, total number of tubewells in the province was 845,573 that grew to 1,028,424 in 2014; representing an overall growth of 21.6% and an average annual growth rate of 2.4%.

# ***Plant Protection***

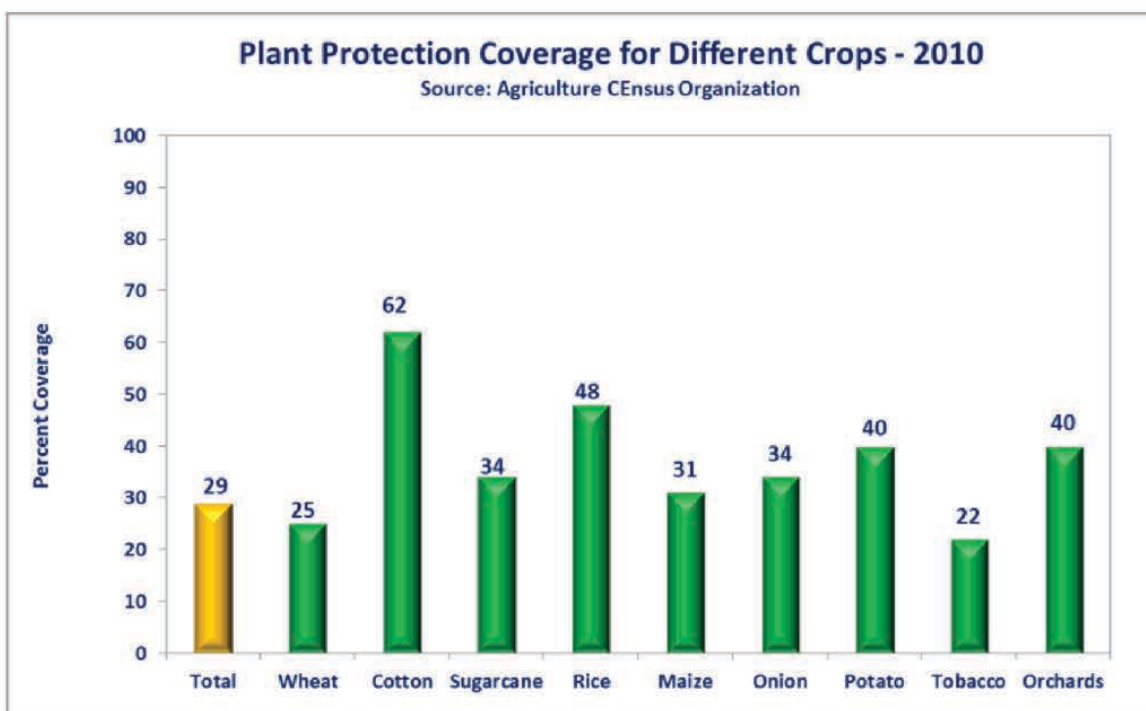


## 2.4 Plant Protection

Plant protection measures are adopted by the farmers of Punjab to increase their production yields.

Total plant protection coverage for all the crops was 29% in 2010 which shows the potential for improvement.

The extent of coverage differs for different crops. The highest coverage is practiced for cotton where in 2010, 62% of the crop was protected. Rice was the next highest with 48% coverage; followed by potato with 40% coverage. Wheat is the largest crop; however it had the lowest plant protection coverage of 25%.





# ***Agriculture Machinery***



## 2.5 Agriculture Machinery

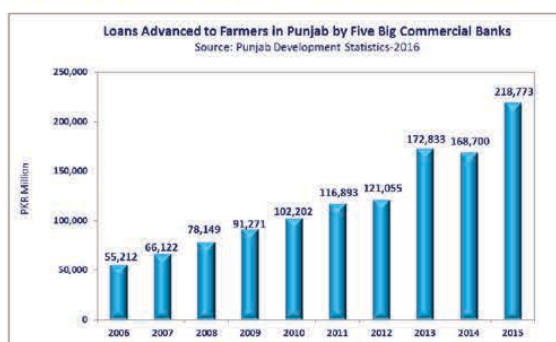
Higher agricultural productivity is closely linked with the use of modern machinery. Use of agriculture machinery in Punjab has been increasing during the past decades. In 2014, the province was using 442,931 tractors, 140,133 threshers and 31,609 reapers/harvesters.

Agriculture Machinery	No. (2014)
Tractors	442,931
Threshers	140,133
Self-Propelled Combined Harvesters	5,826
Tractor Drawn Combined Harvesters	383
Tractor Mounted Reapers/Harvesters	31,609
Cutter/Binders	4,077

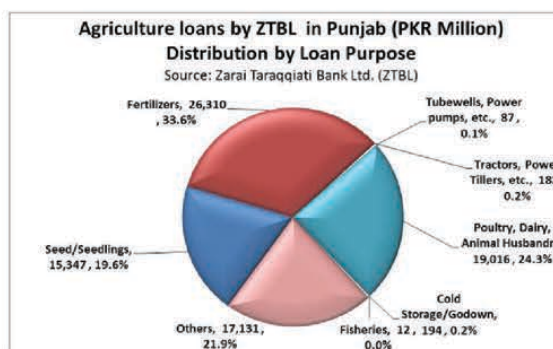
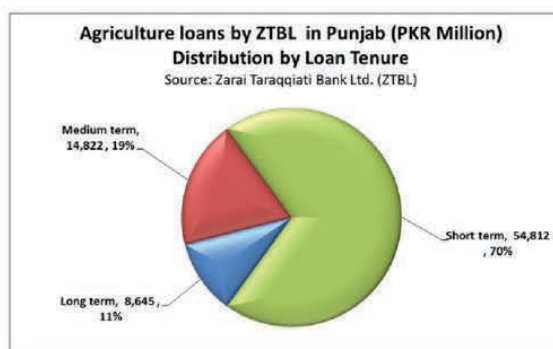
## 2.6 Agriculture Credit

Agriculture credit is available to farmers through large commercial banks and a specialized bank, Zarai Taraqqiati Bank Limited (ZTBL); which only lends money to agriculture sector. In view of government's priority for agriculture growth, allocation for agriculture credit has been increasing over the years.

The loans advanced to farmers through five large commercial banks increased by 296% from PKR 55.2 billion in 2006 to PKR 218.77 billion in 2015; at an average annual growth rate of 33%.



During 2015, total loans advanced to farmers by ZTBL amounted to PKR 78.28 billion. 70% of these loans were short term, 19% medium term and 11% long term. One third of the total advances were made for fertilizers and 19.6% for seeds. About one fourth of this credit was received by poultry/dairy sectors. Share of credit for activities like installing tubewells, buying tractors and establishing storage/godowns remained very small.



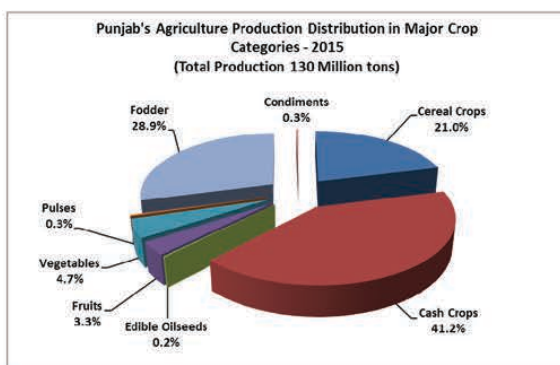
# ***Agriculture Production of Punjab***





### 3.0 Agriculture Production of Punjab

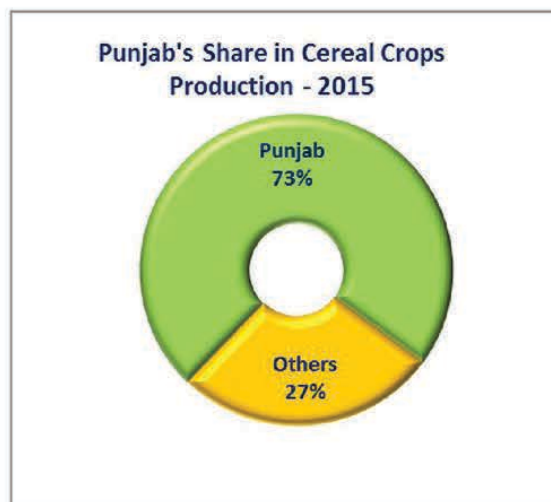
The agriculture sector of Punjab is well diversified producing all types of agricultural crops. The province contributes more than half of the total national production in most of the agriculture commodity groups. Punjab's total agricultural production in 2015 was 130 million tons which accounted for 74% of the total national agricultural production of 176 million tons.



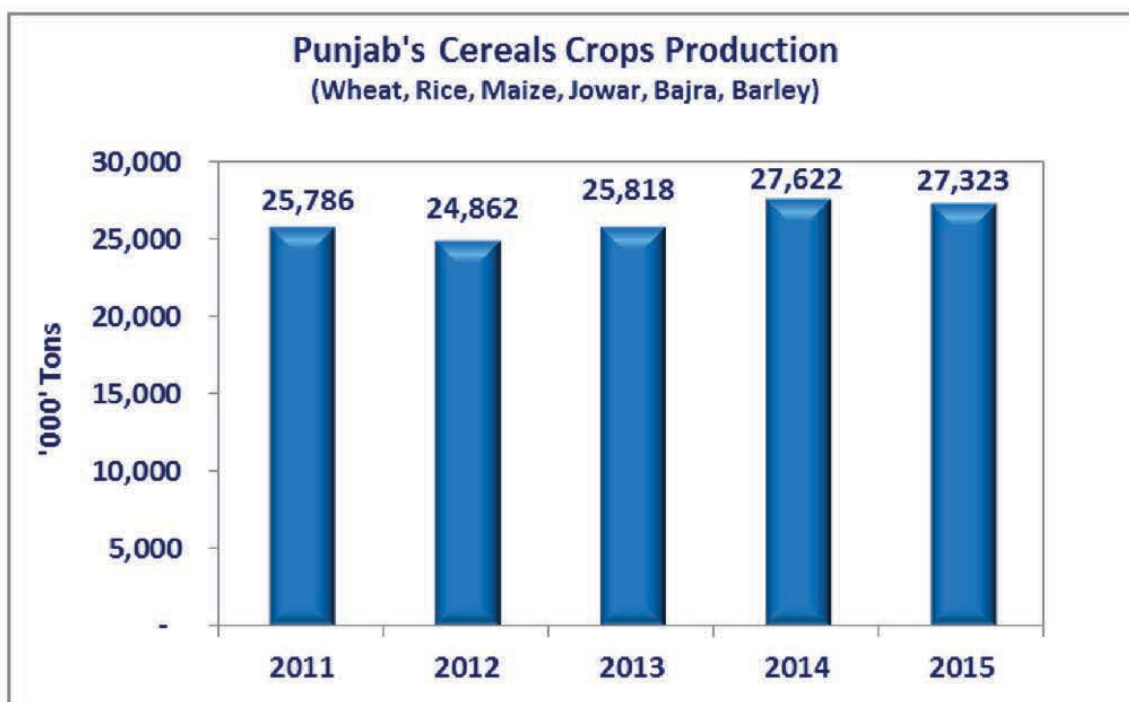
Cash crops constituted the largest share of 41% of the total agriculture production. 29% of the total production was constituted by fodder crops; to feed the large livestock population of the province. Cereal crops accounted for 21% of the total agriculture production. Higher value added crops including fruits, vegetables, condiments, pulses and oilseeds, together, accounted for around 9% of the Punjab's total agriculture production.

#### 3.1 Cereal Crops

Punjab produced 27.3 million tons of cereal crops in 2015. The production grew by 6% during the five years from 25.78 million tons in 2011 to 27.32 million tons in 2015. The province contributed 73% share of the total national production of cereal crops in 2015. It included 19.28 million tons of wheat, 3.65 million tons of rice and 4.02 million tons of maize. Punjab contributed 77% of national wheat production, 52% of national rice production and 81% of national maize production.

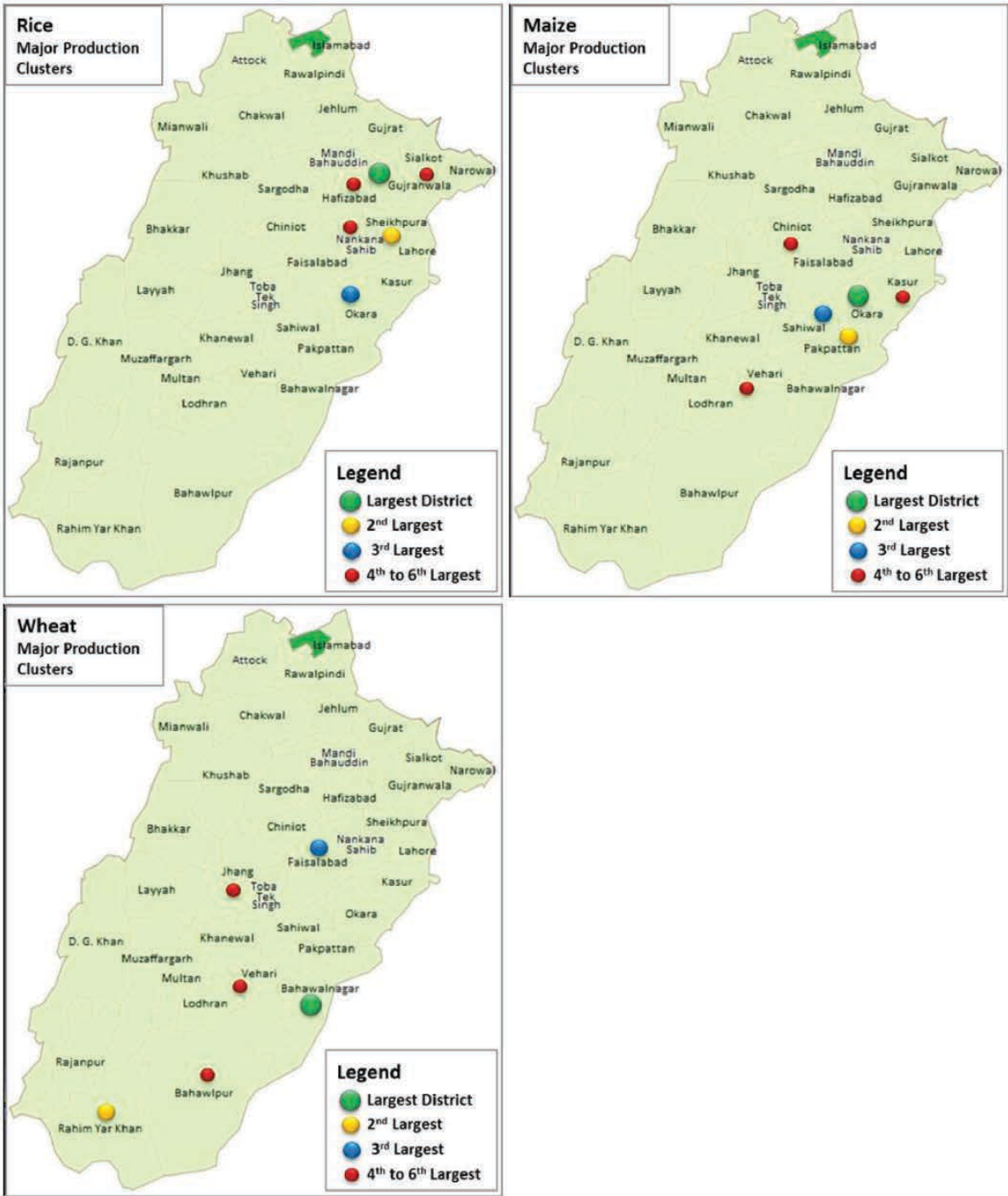


1 Includes, cereal crops, cash crops, edible oilseeds, fruits, vegetables (including potato and tomato), condiments, pulses and fodder crops



Major production clusters of wheat exist in southern Punjab due to large cultivation areas available in those larger districts. Bahawalnagar is the largest wheat producing district contributing 5.5% of province's total production. It was followed by Rahimyar Khan and Faisalabad that respectively accounted for 5.0% and 4.8% shares. For rice, district Gujranwala is the largest district that supplied 14.2% of the province's total rice production in 2014. Sheikhupura and Okara were the two next largest rice producing districts accounting for 10.1% and 9.2% shares of the total rice production of Punjab.

Okara, Pakpattan and Sahiwal are respectively the first, second and third largest maize producing districts; respectively accounting for 19.2%, 19.1% and 14.2% shares of the provincial maize production in 2014. Largest production clusters of Jowar is in district Rawalpindi whereas Bajra and Barley are produced in the largest quantities in districts Gujrat and Layyah respectively.



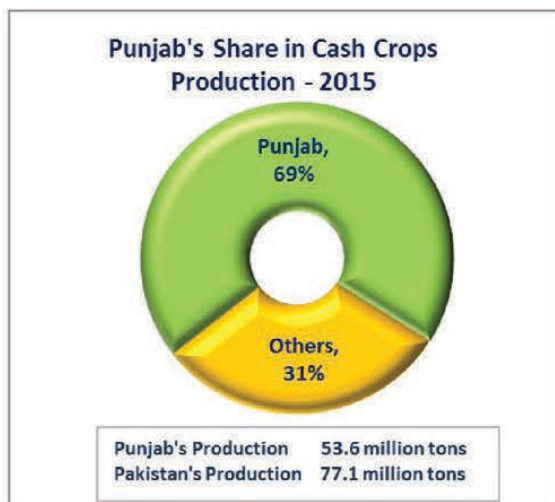
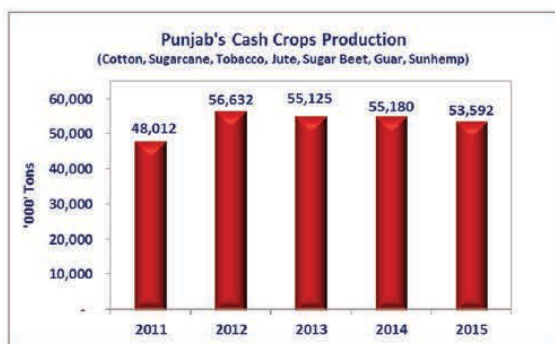


## *Cash Crops*



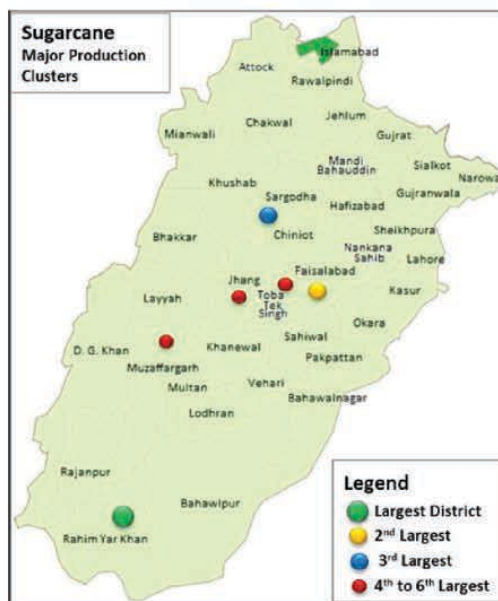
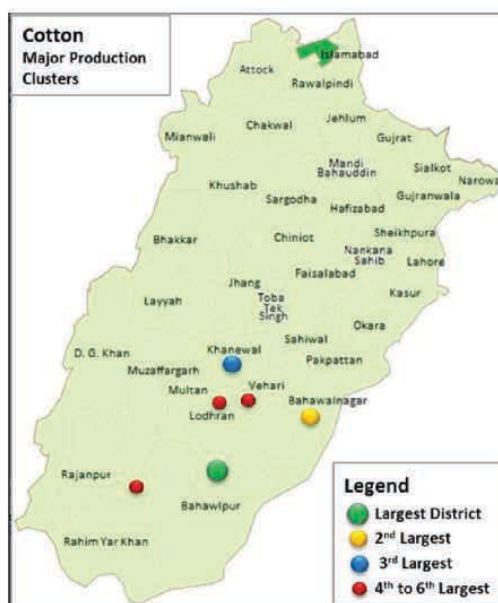
### 3.2 Cash Crops

Punjab is the leading producer of cash crops. In 2015, it produced 53.6 million tons of cash crops accounting for 69% share of the total national production. Overall increase in production from 2011 to 2015 was 11.6%; when the production increased from 48 million tons to 53.6 million tons. Punjab's total cash crops production was constituted by 10.3 million tons of cotton and 41 million tons of sugarcane; respectively accounting for 73.6% and 65.3% shares of the national productions of the two crops.



Bahawalpur is the largest cotton producing district accounting for 12.6% of province's total production in 2014. It was followed by Bahawalnagar and Khanewal as the second and third largest cotton producing districts; respectively holding 11.9% and 10.9% shares of total provincial production.

For sugarcane, Rahimyar Khan is the largest district that in 2014, contributed 22.5% of the Punjab's total production. It was followed by Faisalabad and Sargodha that respectively accounted for 12.7% and 7.6% shares of total sugarcane production in the province. Rajanpur was the largest tobacco producing district; whereas district Bhakkar was the largest producer of Sugar beet and Guar. For Sun hemp, Muzaffargarh held the largest share in the total provincial production.



## ***Edible Oilseeds***



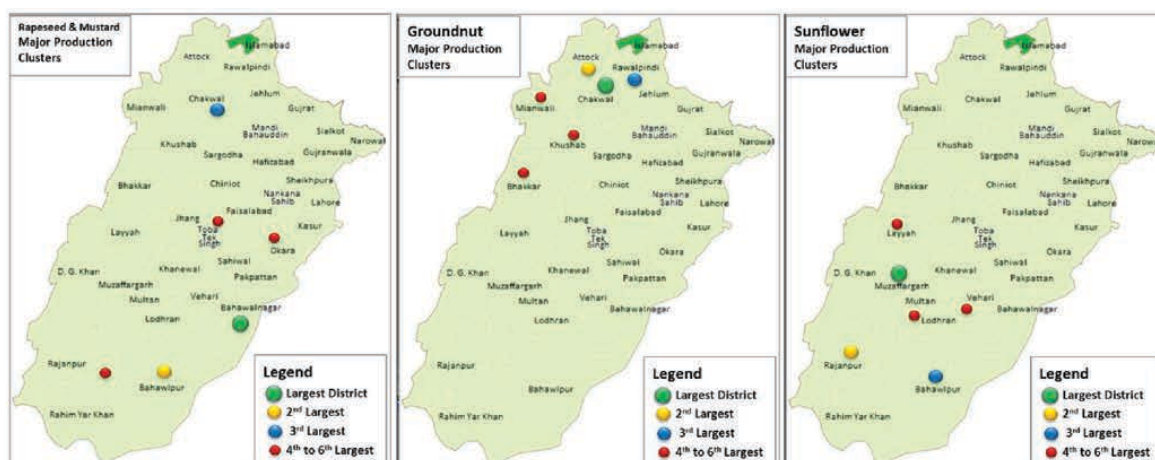
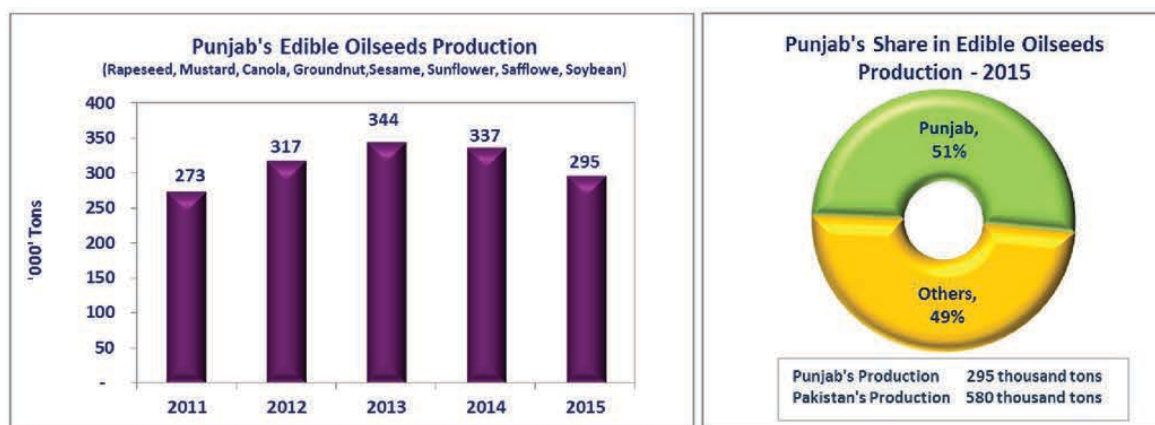


### 3.3 Edible Oilseeds

Punjab is the largest producer of edible oilseeds. The provincial production increased from 0.27 million tons in 2011 to 0.34 million tons in 2013 and followed a declining trend in the next two years; dropping to 0.29 million tons in 2015. Overall increase during the five year period from 2011 to 2015 was 8%. Punjab claimed 51% of the total edible oilseeds production in 2015. Main contributors to Punjab's edible oilseeds production were 0.13 million tons of rapeseed and mustard in which Punjab claimed 60% share of national production.

Different types of oilseeds are produced in different areas of Punjab.

The two largest rapeseed/mustard producing districts are from southern Punjab with Bahawalnagar contributing 15.7% and Bahawalpur 13.6% share. Chakwal was the third largest rapeseed/mustard producing districts accounting for 10.7% share. Groundnut production is concentrated in the northern Punjab with Chakwal accounting for 49.6% share. Attock and Rawalpindi respectively supplied 32% and 11% of Punjab's total groundnut production in 2014. Sunflower production is clustered in southern Punjab with Muzaffargarh being the largest district that accounted for 26% of the total production. It was followed by Rajanpur and Bahawalpur. For Sesame, district Kasur is the largest producer that contributed 10.6% share to Punjab's total production in 2015.



# Pulses





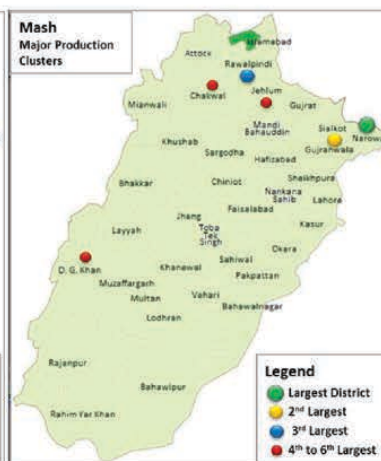
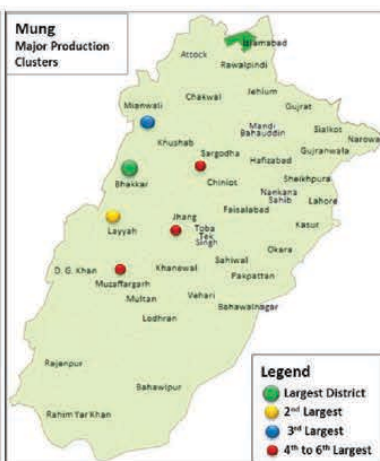
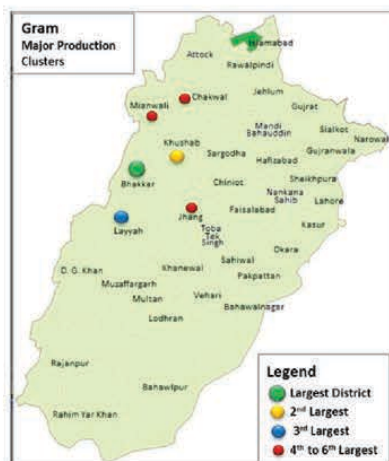
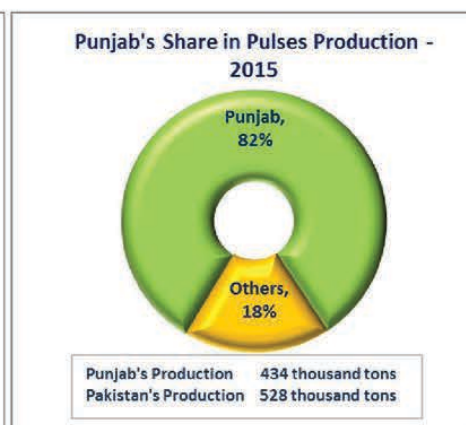
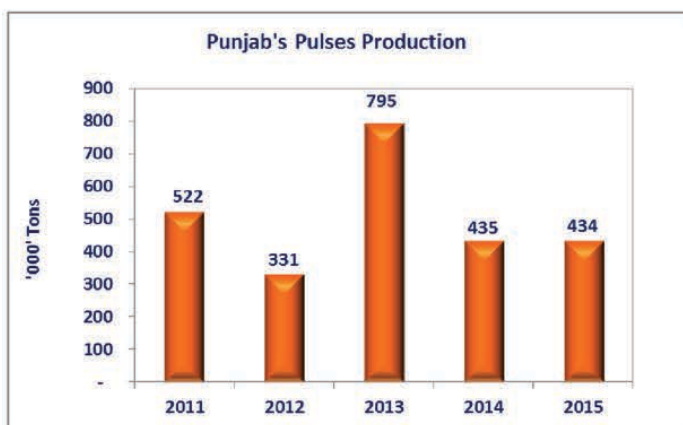
### 3.4 Pulses

Punjab holds the largest share in national pulses production. In 2015, the province's total production was 0.43 million tons that accounted for 82% share of national production. Pulses production trend during past five years has not been very consistent. The production touched the peak of 0.79 million tons in 2013; following which it dropped to 0.43 million tons in 2015. Major share of Punjab's total pulses production was contributed by 0.32 million tons of grams.

Pulses cultivation is mostly concentrated in western districts of Punjab. Gram is the fifth largest crop in terms of total cropped area of the province. In 2014, 84% of the total gram production was contributed only by three districts.

Bhakkar was the largest gram producing district that contributed 43% share; whereas Khushab and Layyah respectively accounted for 30% and 11% shares of the total provincial production.

Bhakkar was also the largest producer of Mung accounting for 52.8% share. Layyah was the second largest and Mianwali the third largest producer accounting for 19.3% and 13.9% shares of province's total Mung production. Mash production is concentrated in northern Punjab with Narowal being the largest producer. In 2014, Narowal accounted for 34.8% of the total Mash production of Punjab. It was followed by Sialkot and Rawalpindi; accounting for 23% and 17% shares respectively. For Masoor, Rawalpindi is the largest and Chakwal the second largest producer.





# *Horticulture*



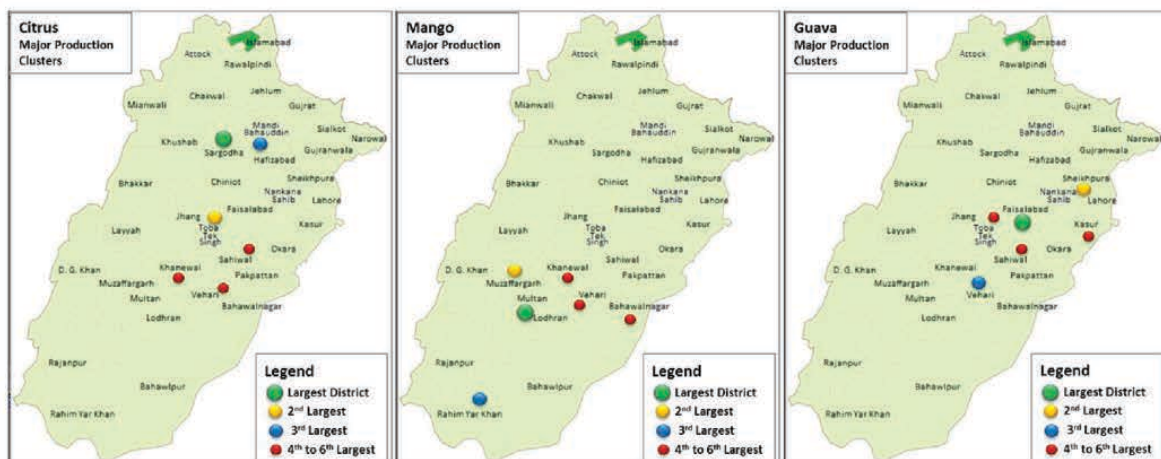
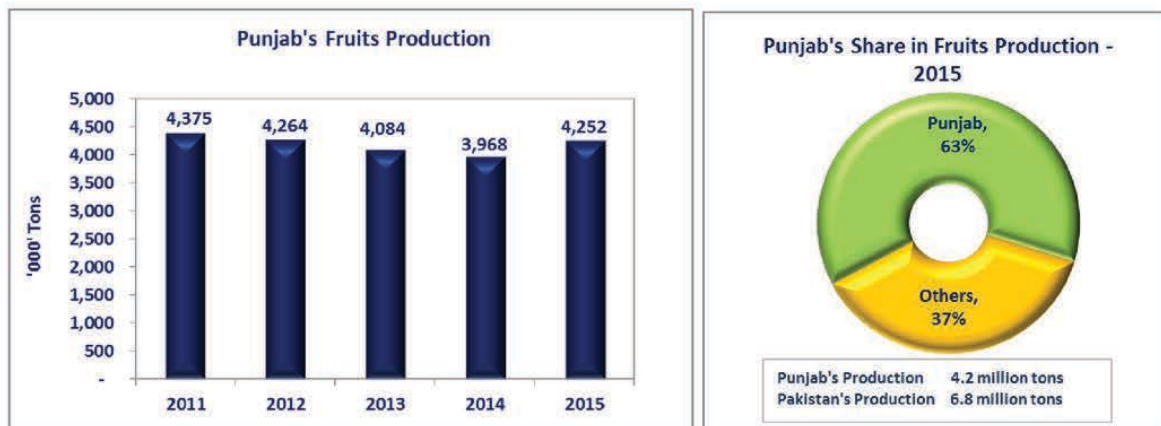
### 3.5 Horticulture

Punjab is also the largest contributor in national horticultural production. Total horticulture production (fruits, vegetables, condiments) of the province in 2015 was 10.7 million tons which was 68.3% of the total national production of 15.7 million tons. Punjab was the largest province in fruits and vegetables production with 63% and 78% shares respectively; whereas in condiments, it had a smaller share of 19%.

Punjab produced 4.25 million tons of fruit in 2015. The production dropped from 4.37

million tons in 2011 to 3.97 million tons in 2014 and then increased in the following year. During the five year period from 2011 to 2015, Punjab's fruit production showed a slight decrease of 3%.

Mango and citrus were the two major contributors in the total fruit production. Punjab produced 1.3 million tons mango in 2015 which accounted for 77% of the national production. Punjab's citrus production was 2.3 million tons which was 97% of Pakistan's total production.



2 Include onion, garlic, coriander, chilies and turmeric

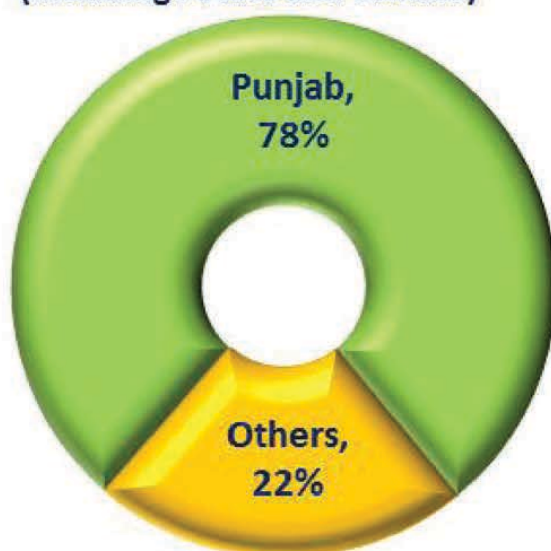


Major production clusters of citrus lie in central Punjab. Sargodha is the largest citrus producing district; accounting for 48% of Punjab's total production in 2014. It was followed by districts Toba Tek Singh and Mandi Bahuddin that respectively accounted for 9.8% and 7.9% shares of the total provincial citrus production. Mango production is clustered in the southern districts of Punjab. District Multan is the largest mango producer that accounted for 34% of the total provincial mango production in 2014. Muzaffargarh and Rahimyar Khan were the second and third largest mango producing districts that accounted for 18.6% and 18.1% shares of the total production respectively.

For guava, Faisalabad is the largest district that accounted for 10.6% share of province's total production in 2014. It was followed by Sheikhpura and Vehari; accounting for 9.9% and 7.6% shares of Punjab's total guava production. Pomegranate is another important fruit of Punjab for which Muzaffargarh is the largest and Multan the second largest producer. Banana is grown in small quantities in Rahimyar Khan, Sahiwal and Khanewal.

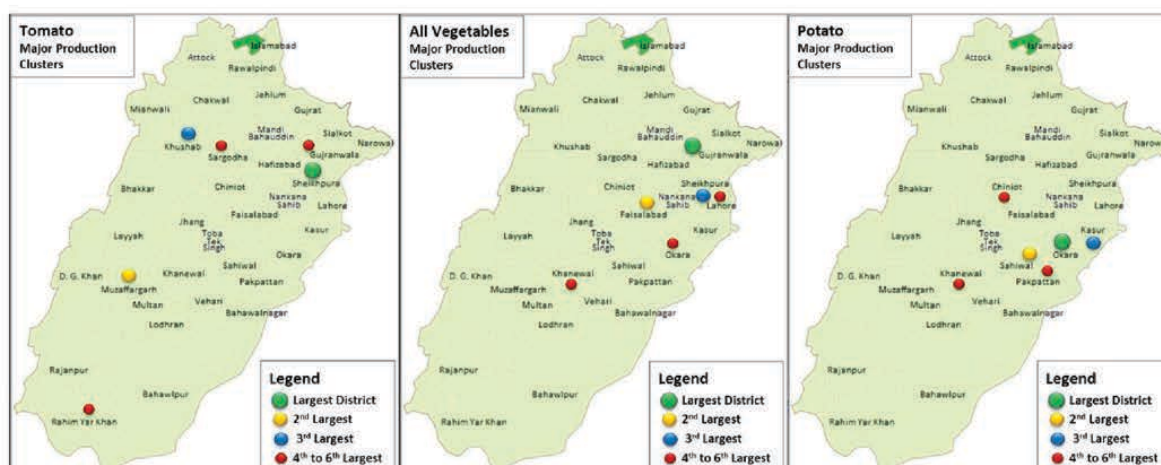
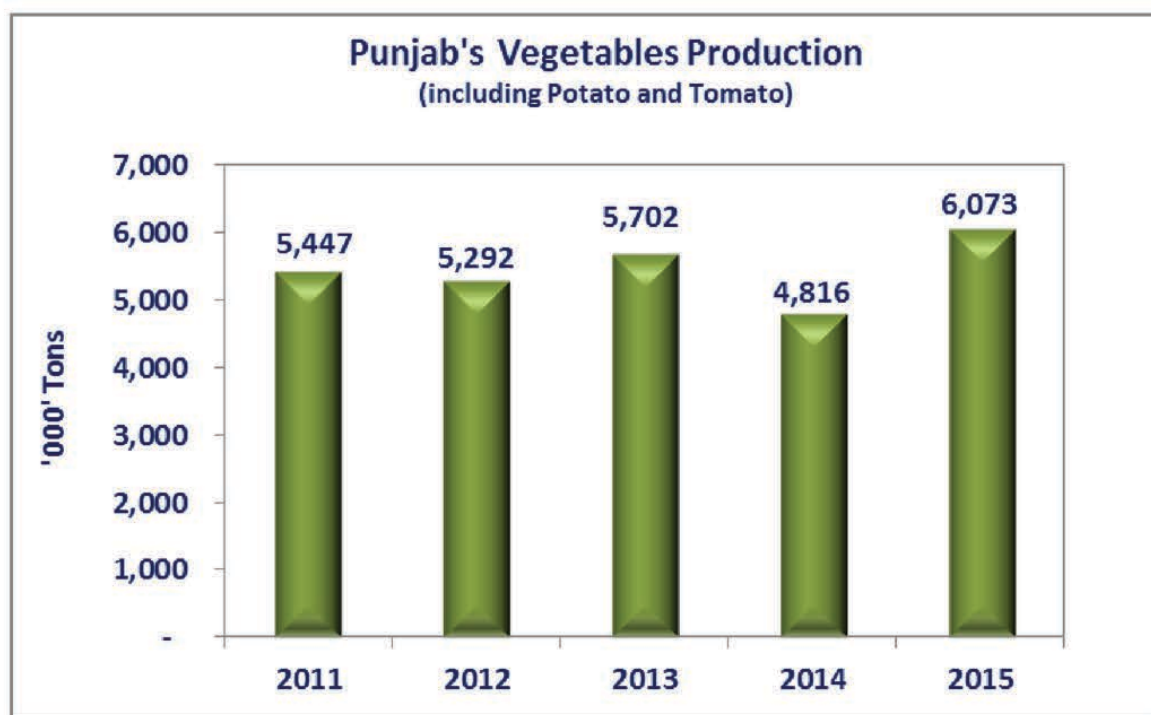
Punjab's vegetable production in 2015 was 6.1 million tons (including potato and tomato) which was 11.5% higher than the production in 2011. Major share of vegetable production was contributed by potato with a production of 4.0 million tons; accounting for 97% of the national potato production. In some horticulture commodities, Punjab is a smaller producer; such as onion, tomato and chillies; where in 2014 - 15, the province held 18.1%, 16.6% and 6.7% shares in the total national production respectively.

### Punjab's Share in Vegetables Production - 2015 (including Potato and Tomato)



<b>Punjab's Production</b>	<b>6.1 million tons</b>
<b>Pakistan's Production</b>	<b>7.8 million tons</b>





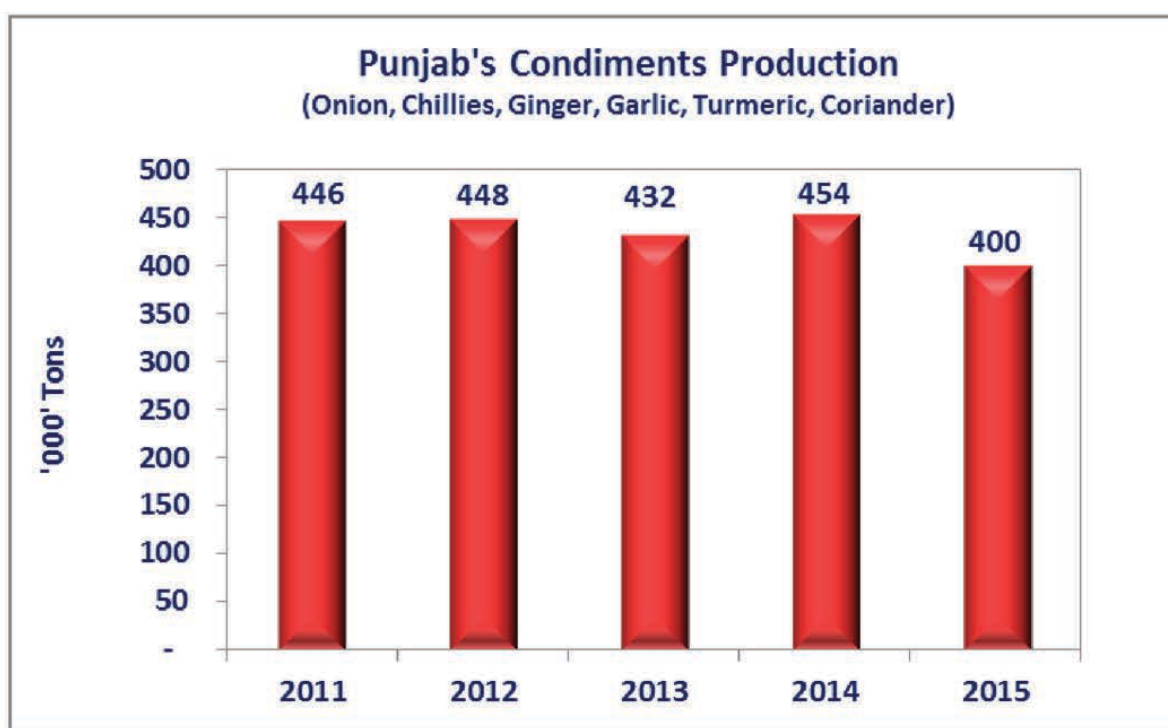
Potato cultivation is done in the eastern belt of the province that extends from central to southern part.

**Okara is the largest potato producing district that accounted for 33.4% of the total provincial production in 2014.**

It was followed by Sahiwal and Kasur that respectively held 15.5% and 12.6% shares of the total production. Vegetables cluster (other than potato) exist in central Punjab.

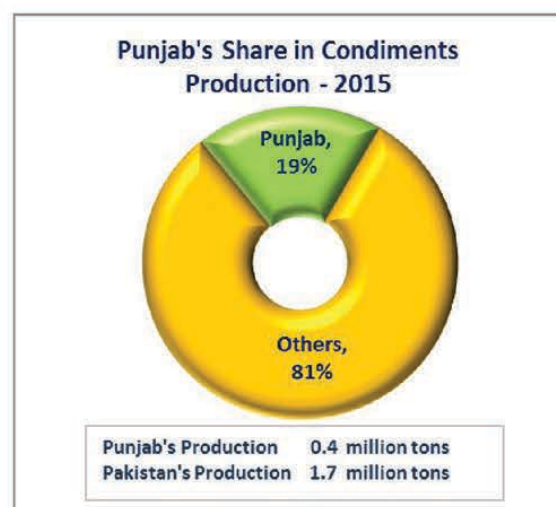
The condiments production of Punjab was 0.4 million tons in 2015 which was 10% lower than the production in 2011. Punjab's share in national condiments production was 19%. Onion was the largest contributor in condiments with production of 0.3 million tons.

Punjab's share in national onion production was 18%. However, in some other condiments, Punjab claimed a much larger share; for example in case of turmeric, Punjab held a share of 93% of the total national production.



**Gujranwala is the largest vegetable producing district that accounted for 8.9% share of province's total vegetable production.**

Faisalabad and Sheikhupura were the second and third largest producers each holding 7.7% shares in total production. For tomato, Sheikhupura was the largest producer with 16% share in 2014. It was followed by Muzaffargarh and Khushab with 15% and 14% shares in Punjab's total tomato production.



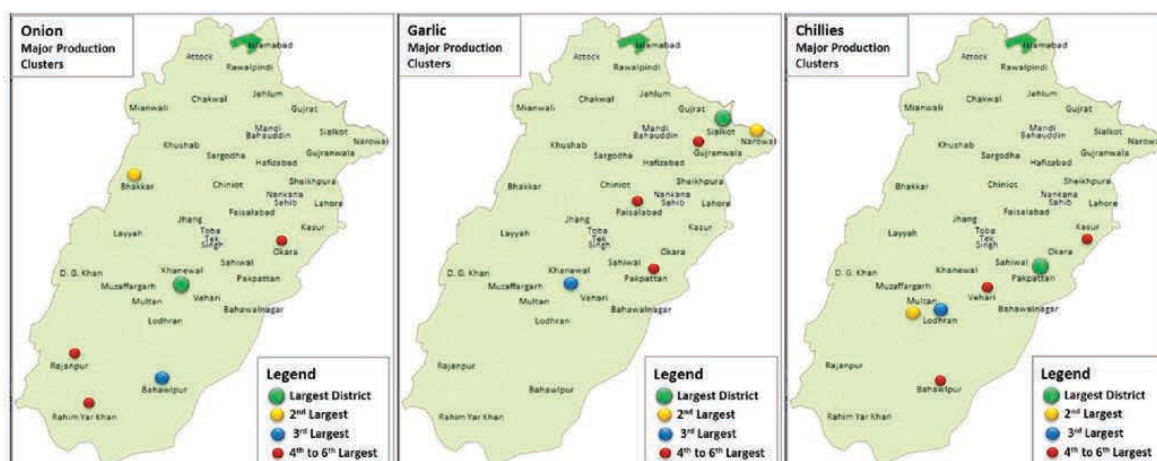
Condiments production in Punjab exists in scattered form. Onion is produced in all districts of Punjab.

Khanewal is the largest onion producing district that accounted for 9.5% share of production in 2014. It was followed by Bhakkar and Bahawalpur that accounted for 7.1% and 6.9% shares respectively.

Garlic is also cultivated in all districts of Punjab with major clusters in northern Punjab. Sialkot is the largest produce that contributed 11% of total provincial garlic production. Narowal and Khanewal were the second and third largest garlic producing districts; that held 9.4% and 8.4% shares respectively.

Pakpattan is the largest chillies producing district in Punjab; followed by Multan and Lodhran. In 2014, the shares of the top three chillies producing districts in Punjab were 14%, 13% and 6.9% respectively.

Turmeric production in Punjab is very concentrated; with Sheikhupura contributing 85% and Okara 14% share of the total production. Coriander is cultivated in all districts of Punjab with Faisalabad contributing the highest share of 16% in provincial production in 2014.





## *Fodder Crops*

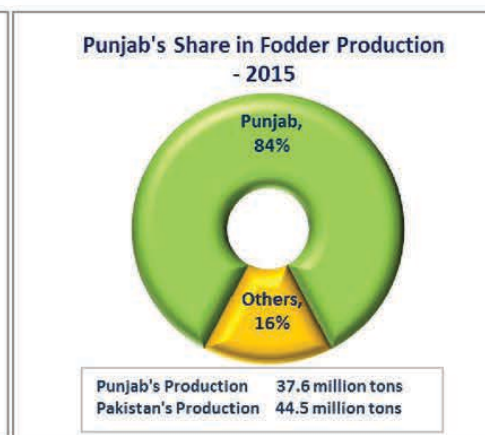
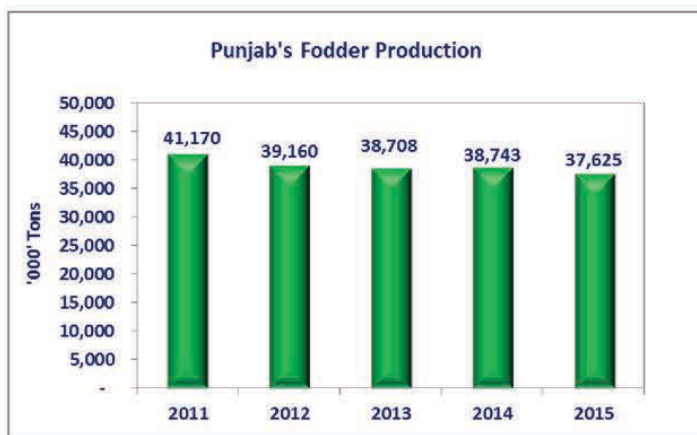
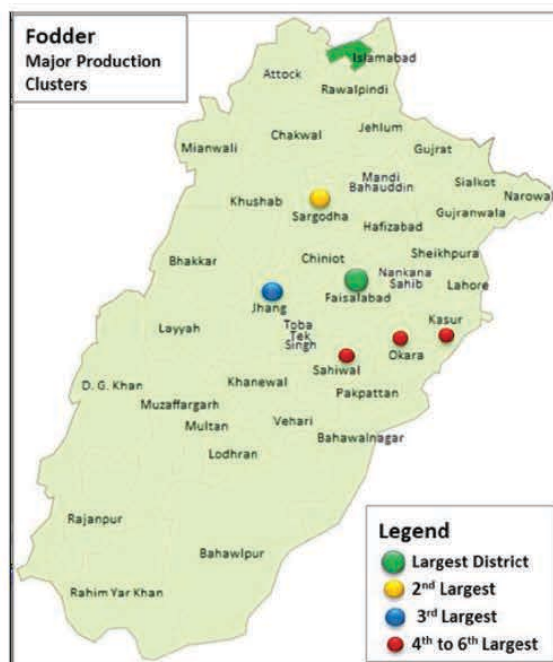


### 3.6 Fodder Crops

Fodder production of Punjab decreased from 41.1 million tons in 2011 to 37.6 million tons in 2015; an overall drop of 9%. Punjab accounted for 84% of national fodder production.

Fodder production is carried out in all districts of Punjab with its largest clusters located in central Punjab. Faisalabad is the largest fodder producing district accounting for 8.7% of the total provincial production.

Sargodha and Jhang are the second and third largest fodder producing districts with respective shares of 8.1% and 6.0%.



# ***Importance of Non-Traditional Agriculture***



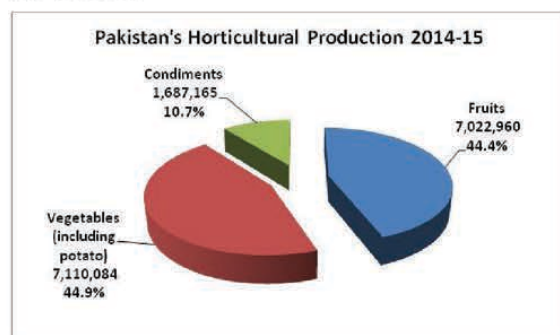


## 4.0 Importance of Non-Traditional Agriculture

Traditionally, agriculture development has been focused around major cereal and cash crops since they constitute a bigger share of the total value and they enjoy an added importance due to their higher relevance in ensuring food security. As a result, the non-traditional sectors of fruit, vegetables, condiments, flowers, pulses and oilseeds have not been able to get their due attention; in spite of their higher value addition and profitability potential for the farmers and for other stakeholders at different links of these value chains.

### 4.1 Punjab's Horticulture Sector

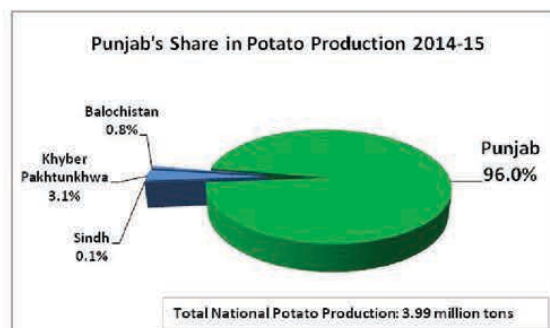
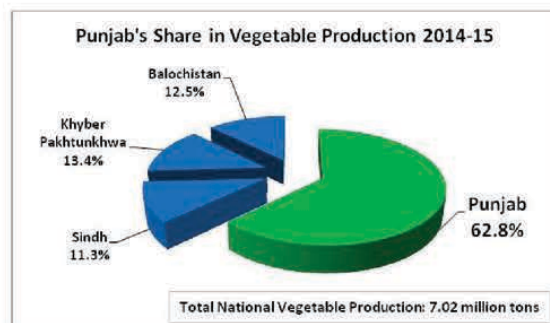
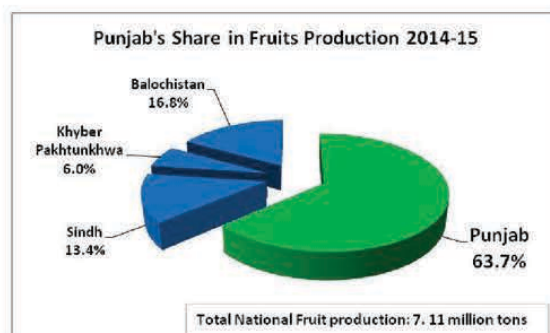
Pakistan's horticulture basket is diverse containing large variety of fruits, vegetables and condiments. Pakistan's total horticultural production in 2014-15 was 15.84 million tons from a total cultivated area of 1.46 million hectares. Fruits accounted for 44.4% whereas vegetables accounted for 44.9% of the total national horticultural production. The vegetables included potato as the largest product accounting for 56% of the total vegetables production. Condiments accounted for 10.7% of the total national horticultural production.



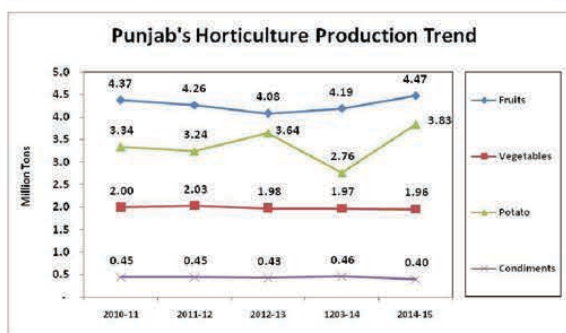
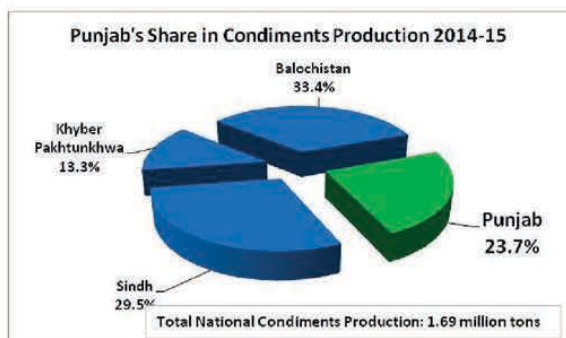
Punjab is the major contributor in most of the horticulture product categories. In 2015, Punjab's total horticultural production was 10.67 million tons which accounted for 67.4% of the total national production. 63.7% of the national fruit production was contributed by Punjab.

Citrus and mango are the two main contributors in Punjab's total fruit production.

Punjab's share in national vegetable production (excluding potatoes) was 62.8%. Punjab enjoys a monopolistic position in potato production by producing 3.83 million tons and claiming 96% share in the total national production in 2014-15. In condiments, Punjab is a relatively smaller player; producing 0.4 million tons to contribute 23.7% to the national condiments basket.



During the five year period from 2011 to 2015, the horticultural production of Punjab has almost been stable. There was a small increase of 2.3% in fruit production; whereas potato production increased by 14.8%. There was a drop of 2.3% in vegetables production and decrease of 10.3% in condiments production during the five year period being considered.

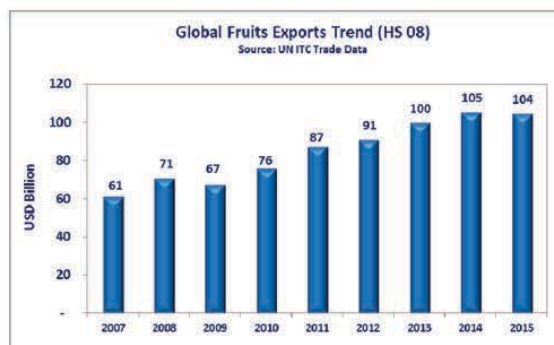


## 4.2 Market Potential of Horticulture Sector

Horticulture sector offers attractive growth opportunities in local and export markets. Local market is very large comprising of 200 million people. Increasing disposable incomes and growing health awareness is leading to an increase in per capita consumption of fruits, vegetables and their associated products. In addition, there is a large and growing export market that offers huge opportunities.

### 4.2.1 Fruits Export Market Potential

Total global export market of fruits in 2016 was USD 108 billion which grew by 77% during the ten year period from 2007 to 2016; at an average annual growth rate of 8.5%



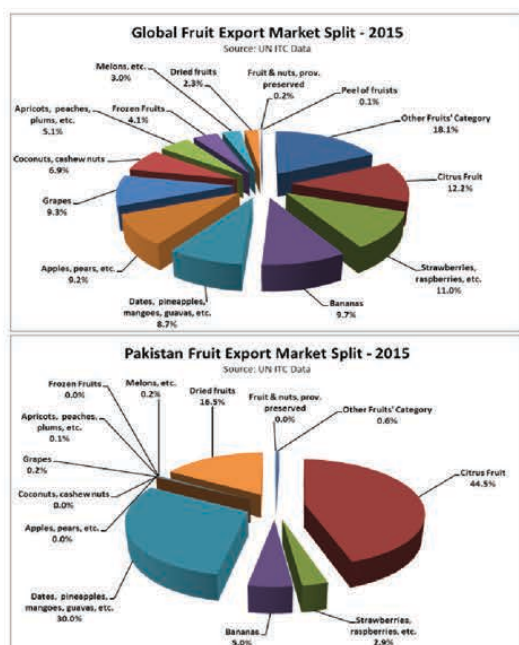
Pakistan's fruits exports also witnessed a growth during this period and the exports increased from USD 125 million in 2007 to reach USD 415 million in 2015. Overall growth in Pakistani exports was 233% that translated into an annual growth rate of 26%. However, in spite of this, Pakistan was able to capture only 0.40% of the international market and was ranked as the 38th in the row of fruit exporting countries. The performance will be rated suboptimal, when evaluated in the context of the overall potential of Pakistan's fruit sector.

International fruits export market comprises of many segments. Citrus, strawberries, bananas mangoes/dates, apples and grapes represent larger market segments.



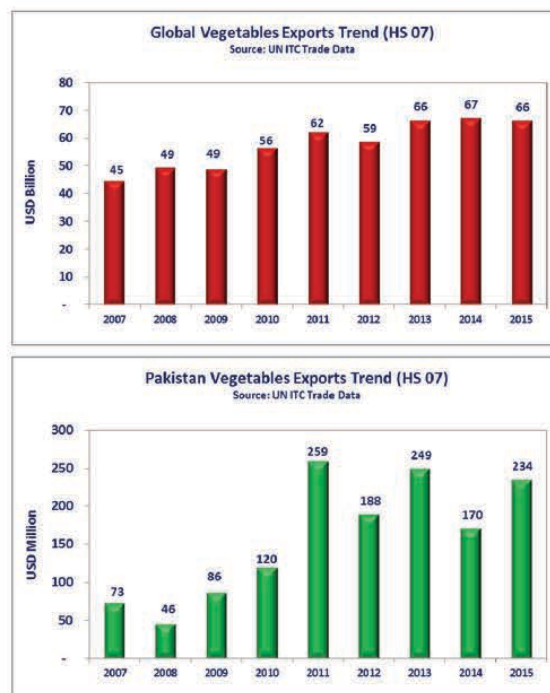
Compared to the international distribution of exports, Pakistani export split is dominated by citrus, mangoes and dates with smaller shares taken by bananas and strawberries. Dried fruits also represent another important category. The importer profile is well diversified for the larger categories of mango and citrus whereas exports of fruits like strawberries and bananas are mainly destined for Afghanistan. Although, this is aligned with the profile of Pakistani fruit sectors but there still remains a lot of room to increase exports.

Pakistan had a share of 1.46% of global citrus market and 1.38% of the global mango and dates market. The local fruit sector has potential to increase these market shares. In addition, there is potential to have exports in sectors which have a large international market but Pakistan does not have a notable presence. Pakistan can also increase its presence in value added sectors of dried fruits and frozen fruits; especially for mango.



#### 4.2.2 Vegetables Export Market Potential

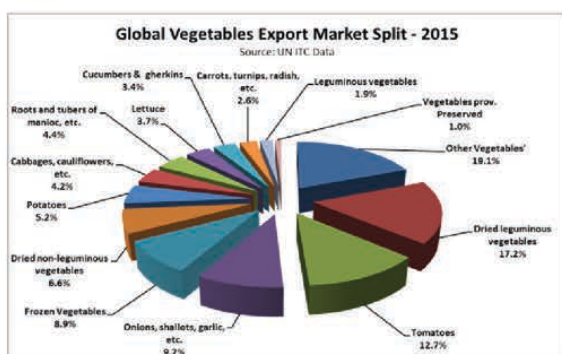
Global export market of vegetables is smaller than that of fruits. In 2015, the world exported USD 66 billion worth of vegetables in its various forms. Market grew by 48% during the period from 2007 to 2015 which translated into an average yearly growth rate of 5.4%.



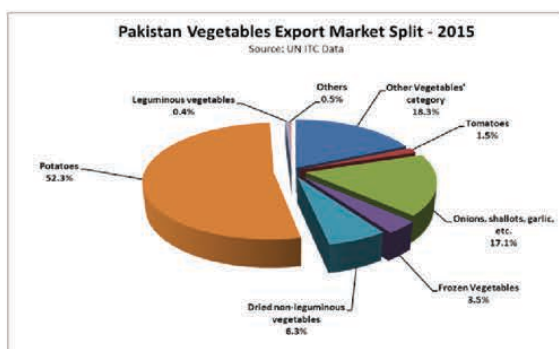
Though not very consistently, but the overall trend of vegetables exports of Pakistan remained positive; increasing from USD 73 million in 2007 to USD 234 million in 2015. This represented an overall increase of 222% and an average annual increase of 25%. Pakistan increased its share of international market from 0.16% in 2007 to 0.35% in 2015. This high growth was made possible in spite of the constraints due to weak macroeconomic indicators and instability in the country. With improved macroeconomic and stable security situation, the growth potential has increased manifold and stage is set for Pakistan to gain its due share in the international vegetables export market.



Pakistan's current vegetables export profile is dominated by 52% share of potatoes. Pakistan had a share of 3.6% of the international export market of potatoes. Afghanistan was the main buyer which imported more than half of the total potatoes exported by Pakistan. Afghanistan will still continue to be an important market of Pakistani horticulture exports in the coming years as well. Onions constituted the second largest share of Pakistani vegetables exports.



Pakistan has huge potential to increase its exports in other categories such as tomatoes, carrots, turnips, cabbages, etc. In addition the value added dehydrated vegetables constitute 24% of the total global vegetable exports. However, Pakistan's share of dehydrated vegetables in its total exports is only about 6%, mainly constrained by limited production capacity. This makes it a potential product that should be focused to expedite Pakistan's vegetables export growth.

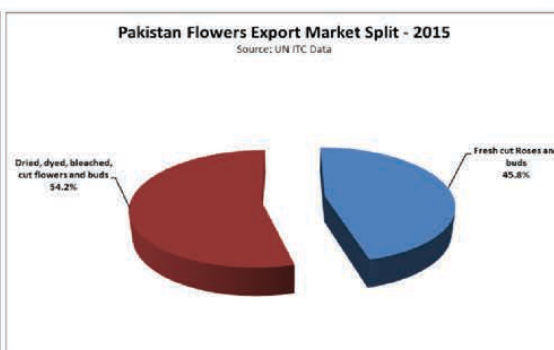
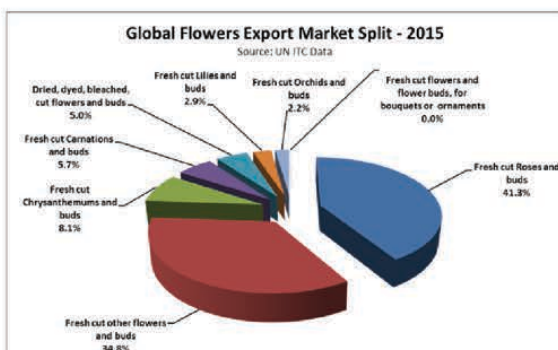
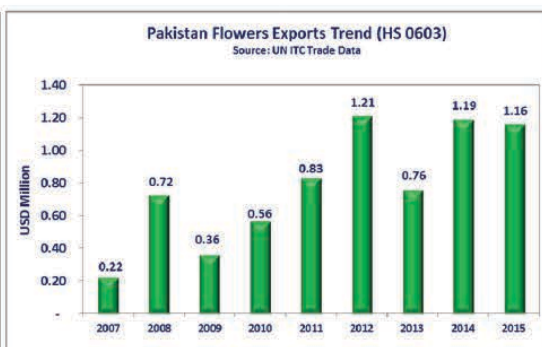
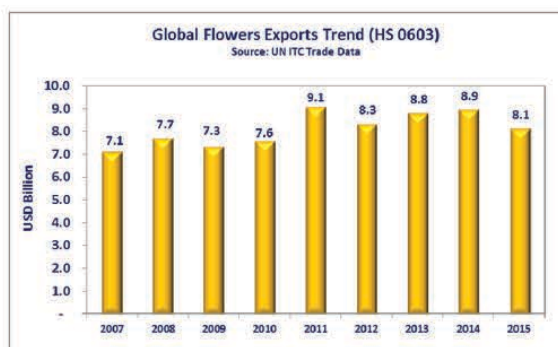


#### 4.2.3 Flowers Market Potential

Fresh cut flowers have a large export market. Total global export market in 2015 was USD 8.1 billion that grew from USD 7.1 billion in 2007; representing an overall increase of 14% and an average annual increase of 1.6%. Pakistan has a small presence in flowers export market. In 2015, Pakistan exported USD 1.16 million worth of flowers that grew from USD 0.22 million in 2007. Pakistan was ranked 54th in the row of exporters with a meager market share of 0.01%; way below the country's actual flowers export potential.

Fresh cut rose has the largest export market accounting for 41% share. Other flowers like chrysanthemum, carnation, lilies and orchids held smaller shares.

The category of 'other flowers' was the second largest category after roses. Pakistan's exports were only in two categories. Fresh cut roses accounted for 45% of country's total flower exports while the balance was accounted for by dried, bleached, etc. flowers. In spite of presence of diverse agro-climatic zones, availability of land and cultivation skills, Pakistan has not been able to create a notable presence in most of the flowers export categories. The sector offers immense potential to penetrate into this growing market; by developing the local floriculture sector in line with the requirements of international export markets. Punjab can play a key role to increase flower exports of Pakistan since the province has the country's largest floriculture cluster; located in a town near Lahore.



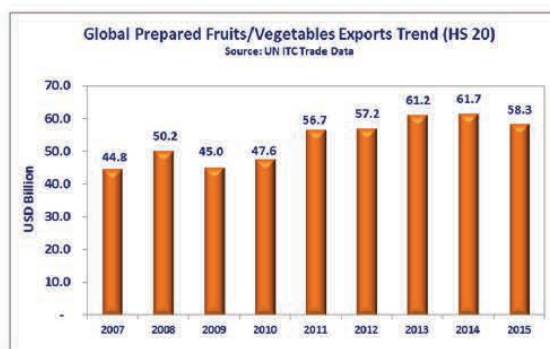
#### 4.2.4 Preparations of Fruits, Vegetables and Other Horticulture Products

Fruits, vegetables and other horticulture products are processed to make value added products like pulps, purees, pastes, concentrates, juices, jams, jellies, preserved fruits and vegetables, etc. Such products have a large international market.

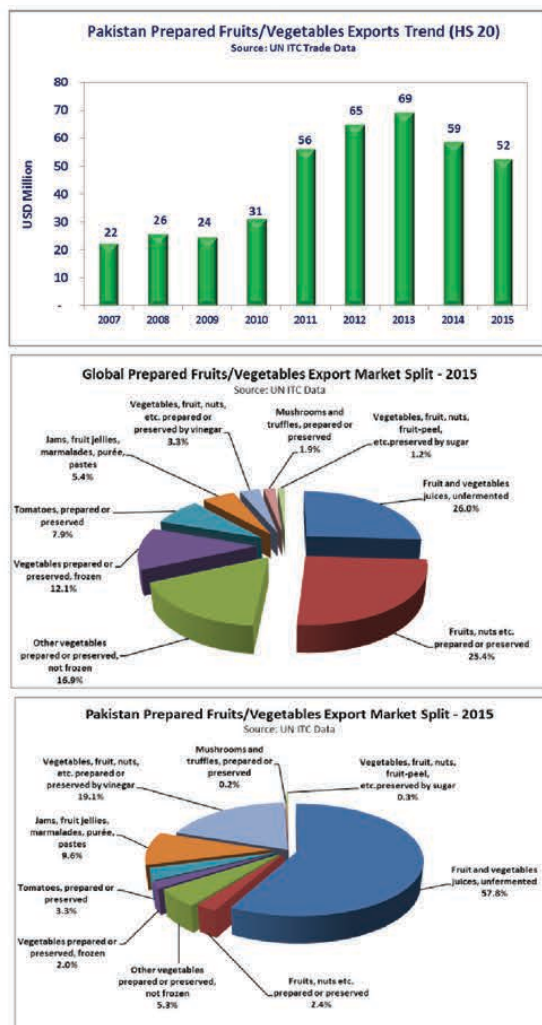
In 2015, total export market of preparations of horticultural products was USD 58.3 billion that grew from USD 44.8 billion in 2007. This represents an overall growth of 30% and an average annual growth rate of 3.4%. Pakistan's exports of these products were USD 69 million in 2013 that dropped to USD 52 million in 2015. Overall growth rate during the period from 2007 to 2015 was 134% that means an average annual growth rate of 15%.

Although Pakistan managed to grow at a higher rate than the growth of the overall international market, still Pakistan could manage to increase its market share only to 0.1%. Pakistan's ranking was 65th in the row of countries exporting preparations of fruits, vegetables and other horticulture products. Considering that Pakistan is a large producer of fruits, vegetables and other horticultural products, this performance should be rated way below potential.

The market of preparation of horticultural products is divided into nine segments. Fruits and vegetables juices represent the largest category accounting for 26% share of the total exports under this category. However, in case of Pakistan's exports, this category accounts for 58% of the total exports. Pakistan has a smaller presence in the next two large categories of prepared/preserved fruits and vegetables. Pakistan's second largest market segment in this product is that of fruits/vegetables preserved in vinegar. It accounted for 19% of the Pakistan's total exports whereas in case of global exports, it accounted for 3% of the total. Insignificant presence of Pakistan in most of the market segments is an opportunity for the local industry to focus on those areas to increase exports.







#### 4.3.1 Oilseeds Market Potential

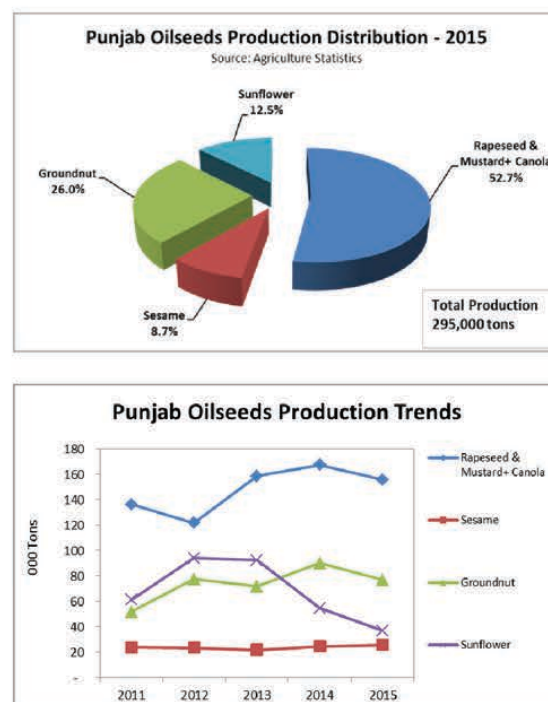
Pakistan is a large market of over 200 million people who need edible oil as one of their basic food items. Pakistan produces a small share of its edible oil requirements by processing the locally grown oilseeds. The local oilseeds production meets only a smaller fraction of the raw material requirements of the processing oil extraction industry. Major share of the oilseeds processed in Pakistan is from imported sources.

In spite of this, the local processing sector cannot produce oil to meet the local demand and the country has to import edible oil also. Thus, oilseeds and the processed edible oil remain as the two major import items of Pakistan. In 2015, Pakistan's total imports of oilseeds were 1.16 million tons with an import bill of USD 785 million. During the same year, local oilseeds production was 0.58 million tons; which indicates that the country meets about two third of its oilseeds needs through imports. Thus, there is a huge potential to substitute these imports by increasing the local production of oilseeds.

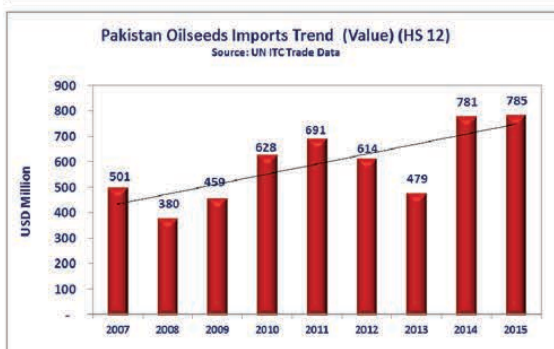
During the period from 2007 to 2015, Pakistan's oilseeds imports grew by 8% in quantity terms (0.9% per year) and 56% in value terms (6% per year). This is an indicator of the growing demand of oilseeds to meet the edible oil needs of the country.

### 4.3 Punjab Oilseeds Sector

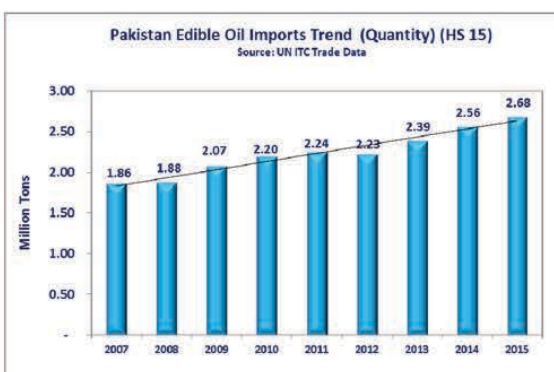
In 2015, Punjab held 51% share of the total national oilseeds production. 52.7% of this production was contributed by rapeseed & mustard (including canola); followed by 26% share of groundnut. Sesame and sunflower were smaller contributors. Punjab held 67%, 89% and 75% shares of national rapeseed/mustard, groundnut and sesame productions respectively. Overall production growth rates were positive for Rapeseed/mustard, groundnut and sesame that respectively grew by 14.1%, 48.8% and 8.4% from 2011 to 2015; however, the sunflower production dropped by 39%.



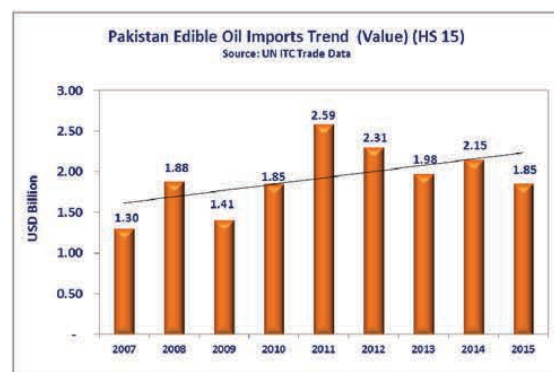




Growth in demand is also substantiated by looking at the imports of edible oil which increased consistently from 1.86 million tons in 2007 to 2.68 million tons in 2015; an overall increase of 44% and an average yearly increase of 4.9%. In value terms the increase was 42% overall and 4.7% per year. Palm oil was the main import item that accounted for 89% of the total edible oil imports; followed by Soya bean with 7% share.



Olive oil had a share of 0.4% in the total import value of Pakistan's edible oil imports. Olive oil imports grew from 1,837 tons in 2007 to 2,705 tons in 2015; representing an increase of 47%. In value terms this increase was 68% increasing from USD 4.4 million to USD 7.4 million during the same period. The growing demand of olive oil in the local market is a potential opportunity for investment whereby promotion of olive cultivation and oil extraction can help meet this growing demand through local sources. Punjab offers a promising potential for olive cultivation in its Pothwar region that provides ideal agro-climatic conditions for this crop.



## ***Punjab Agriculture Development – The Paradigm Shift***





## 5.0 Punjab Agriculture Development – The Paradigm Shift

Agriculture can play an enhanced role in quick and sustainable economic growth of Punjab. The sector derives this potential from presence of diverse agro-climatic conditions/zones, fertile soils, scope for increasing cropping intensity, large domestic market of 200 Million people, huge export market potential, increasing demand for high value foods, rapid urbanization and burgeoning middle class, enterprising farming community, growing regional trade opportunities through CPEC and the growing use of ICT in agriculture.

### 5.1 Agriculture Sector Challenges

Agriculture sector in Punjab has not been able to achieve an optimal performance level due to number of constraints. Climate change occurring globally directly affect agriculture performance. Changes in average temperatures, rainfall, climate extremes and atmospheric carbon dioxide levels have a direct effect on crop productivity. Changing climate also leads to changes in pests, diseases, etc. that poses new challenges to effective crop management. The final effect of these climate changes is reduced agriculture production which endangers food security; causing hunger and malnutrition.

### KEY CHALLENGES:

- Climate Change
- Malnutrition
- On- Farm Water Management in Agriculture
- Crop Diversification & High Value Agriculture
- Agriculture Value Chain
- Agriculture Marketing
- Agriculture Mechanization

Apart from the natural threats, the agriculture sector faces many other challenges stemming from lack of resources and use of ineffective crop management practices. Provision of required irrigation water to crops remains as one of the biggest challenges. Water availability is insufficient and the situation is exacerbated by its inefficient usage. Flood irrigation is the most commonly used method that is not efficient. Use of High efficiency Irrigation Systems (HIES) is not common due to lack of awareness and high initial costs; especially for the smaller farmers. Degree of mechanization in local agriculture is lower and farmers have to rely on old farming techniques; leading to lower crop productivities.

The main focus of the agriculture policies in the past has been on major crops. Crop diversification has not been a priority of the policy makers with the result that high value crops like fruits, vegetables, condiments, flowers, oilseeds and pulses have not received their due attention and have performed suboptimal. Along with the lack of crop diversification, there has been a lack of market diversification as well and no aggressive export marketing strategy has been adopted for agricultural products. The net result has been that overall; the sector has not been able to reach its fullest potential.



Production of high value added products offers options of increasing the profitability of farmers and other stakeholders in the value chain (washing/grading/packing of fresh fruits and vegetables, pulps/purees/pastes from fruits and vegetables, starches from wheat/maize/potato, parboiled rice, wheat gluten, essential oils from flowers/herbs, frozen/dehydrated fruits and vegetables, etc.). An enterprising policy has not been adopted to promote such value addition. Consumption of agriculture products has mostly been limited to their primary uses. Absence of a strong value addition industry has led to overall decrease in farmers' profitability due to reduced demand for their produce and high post-harvest losses.

Agriculture marketing has been a weak link of the value chain. There is lack of proper post-harvest practices. Sorting, grading, packing of produce is not carried out as per the required standards that leads to increased losses and lower selling prices. There are no storage facilities available to the farmers due to which they cannot hold back their produce; thereby forced to sell at lower prices offered by the market. Transport and communication infrastructure is weak which further adds to the losses.

Market committees in commodity markets are ineffective in implementing efficient market systems and protect the interest of the farmers.

## 5.2 Punjab Agriculture Development Vision

An integrated strategy, aimed at ensuring provision of adequate resources and removing critical growth barriers, can transform the sector from its current suboptimal to optimal level of performance. Government of Punjab is undertaking efforts to reposition agriculture as the engine of economic growth in the province by focusing on higher value added crops and implementing initiatives to improve productivity by promoting modern agricultural practices.

Punjab Agriculture Department, being the custodian of agriculture development in the province, is implementing this renewed vision of the government.

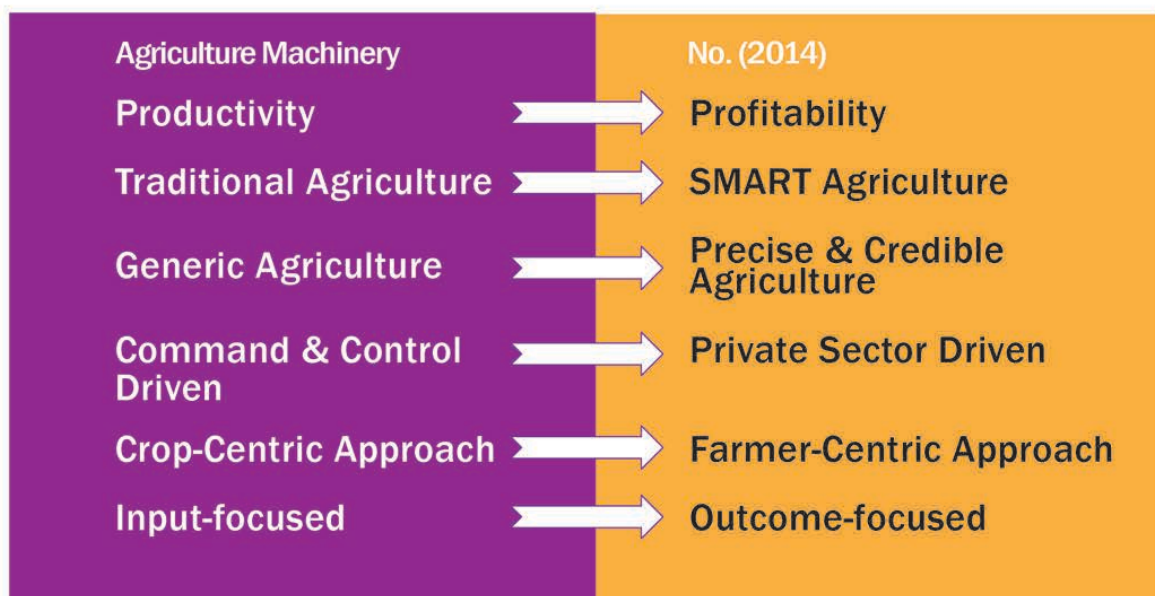
### 1.3.2.1 Agriculture Sector Vision

Government has documented its commitment to develop Punjab Agriculture Sector in a Vision Statement which is included in Punjab Agriculture Sector Development Plan 2015. The statement constitutes the main objectives and the key strategy pillars.

#### Punjab Agriculture Sector Vision

**"Transform Punjab's agriculture into a market-driven, diversified and sustainable sector through integrated technologies, transparency & value-for-money"**

The vision aims to bring about a paradigm shift in Punjab's agriculture from the traditional to smart agriculture, from food security to food business and from productivity to profitability.



The key factors driving this vision are product and market diversification, demand-driven approach, modernization, service delivery improvement and sustainability. The vision positions farmer as its prime client and the most important link of the agriculture value chain. Product diversification aims putting more focus on high value-added crops; fruits, vegetables, condiments, flowers, pulses and oilseeds.

In order to achieve the vision's objectives, activities have been planned around three key themes.

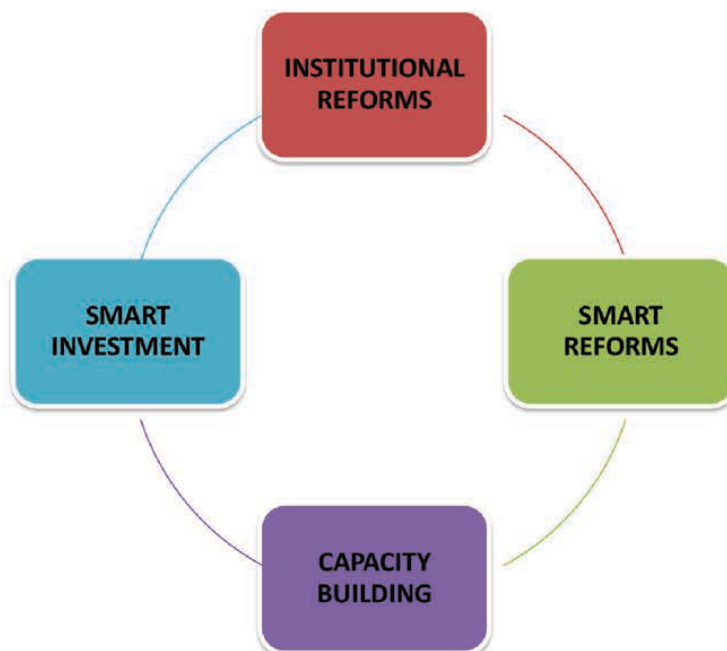
1. Enhanced productivity
2. ICT led farmer-centric service delivery
3. Private sector led growth

### Specific goals of the Agriculture Sector Development Plan are:

- Raise the growth rate of agriculture sector from existing 2.1% to 5%.
- Transform Agriculture Department into a strong ICT-led farmer-centric institution.
- Improve crop productivity (20% for wheat and sugarcane, 25% for cotton, 15% for rice and 10% for maize).
- Improve service delivery to farmers with 75% farmer access to evidence-based and diagnostic-driven extension services.
- Mobilize private investment of PKR 75 billion in Agriculture sector.



# HOW TO ACHIEVE?



The above-mentioned goals will be achieved by equipping the farmers with updated information to take intelligent decisions in production and marketing. Farmers' access to high quality and timely agricultural inputs will be facilitated. The interventions will be supported by a clear and conducive agriculture policy and an enabling agribusiness environment.

These targeted interventions will lead to increasing the volumes of better quality agricultural produce to be sold in local and export markets.

The strategy will help increase the incomes of small farmers to improve their living standards and increase their role in overall agricultural development. An important impact of this integrated strategy will be more efficient and sustainable use of natural resources that will help achieve environmental stability. As per the estimates of Agriculture department, improving productivity to the desired levels and making farmers more progressive carries a potential to create an impact of about PKR 1.6 trillion in the overall GDP.



### 5.3 Agriculture Sector Reforms

Government of Punjab is following a targeted reforms agenda to achieve the objectives set in the Agriculture Sector Development Plan. Most of these reforms have been included in the historic Khadim-e-Punjab Kissan Package (KPKP). The reforms are classified under four broad categories: Policy, Institutional, Legal/Regulatory and Market.

#### 5.3.1 Policy Reforms

##### Agriculture Policy:

In order to provide Punjab's agriculture a clear direction and to keep all the developmental efforts in unison, the Agriculture department, for the first time in history, is drafting an agriculture policy of the province. This is being done in coordination with the University of Agriculture Faisalabad.

##### Kissan Card:

Kissan Card is a PKR 2.5 billion scheme launched to provide direct cash subsidies to the farmers using ICT in a more transparent, speedy and targeted manner. The initiative plans to register all 5.2 million farmers in the province and disburse all future subsidies through Kissan Card. Registration of every farmer will create a complete database of all the farmers in the province that will help design more focused policies and development initiatives.

##### E-Vouchers for Fertilizer Subsidy:

Subsidy on Potash fertilizer is being provided directly to the farmer through digital inclusion. This will help increase awareness about the use of potash fertilizer and increase its usage to contribute towards the overall objective of productivity enhancement. Using modern mode of subsidy disbursement will also reduce subsidy management costs.

##### Fertilizer Subsidy:

PKR 14 billion are being spent to provide nitrogenous and phosphorus fertilizers at subsidized rates to the farmers. Increased off take of these fertilizers is contributing towards increasing farm productivity.

Following the registration of farmers, the subsidy will be provided to the farmers through Direct Benefit Transfer program.

##### Subsidy on Tube Wells:

Irrigation cost for the farmers is being reduced by 40% by waiving off General Sales Tax (GST) on the electricity cost for running tube wells. 2.5 million acres are benefiting from this intervention.

##### Subsidy on Pesticides:

Farmers' input cost is being reduced by waiving off GST on pesticides. PKR 2.5 billion are being spent on this scheme.

##### Developing Olive Valley in Pothwar Region:

Following the diversification agenda, cultivation of Olive, a high value crop, is being promoted in Pothwar region. Culturable marginal lands and sub- mountainous areas are being developed to increase local olive production and improve balance of payments by reduction in import of edible oils. PKR 1.8 billion is being spent on this initiative.

### 5.4 Institutional Reforms

#### Agricultural Commission:

A high level Agriculture Commission has been formed to provide strategic direction to Punjab's agriculture sector. The Commission have majority of members from private sector. It will develop, implement and monitor agriculture policy, facilitate private sector investment and ensure sustainable and equitable growth in agriculture sector.



### Empowerment of Kissan through Digital and Financial Inclusion:

The PKR 11 billion initiative is the first of its kind in the history of Punjab and is aimed at providing interest free credit to 600,000 small farmers, financial access to landless farmers and money transfers through branchless banking. The project will cover 2.5 million acres of agricultural land, provide smart phones to 600,000 farmers, provide digital advisory and extension services through mobile wallets, weather advisory, pesticide warning, and links with input suppliers, crop management calendar, commodity market prices and feedback to government. PKR 100 billion will be paid as interest-free credit (mark-up to be absorbed by Government of Punjab) (PKR 25,000 per acre for Rabi and PKR 40,000 per acre for Kharif crops). LRMIS and NADRA databases will be used for this purpose. The farmers will also get the facility of crop insurance through Prime Minister's Kissan Package.

### Research & Development Boards:

To promote specialized research and development for different crops, twenty four new R&D Boards will be established in the province. Focused research will open new avenues to help crop diversification and promote productivity and quality.

### Public Auction of Seeds:

To promote farmers' quick and easy access to promising varieties, Agriculture department has plans to publicly auction the hybrid and open-pollinated seeds to pre-qualified seed companies. This will collect additional revenues for the department and will help achieve higher productivities.

### Directorate of Agriculture Education:

To promote improved learning in Agriculture the department will establish a Directorate of Agricultural education.

### Digital Commodity Exchange:

Improved agricultural marketing will be ensured by establishing Punjab Digital Agriculture Commodity Exchange. With the involvement of farmers, importers, exporters, commodity financiers, consumers and chambers of commerce, the Exchange will establish, conduct, regulate and control trade of future commodity contracts. This will attract investment in future trading to offer new investment areas. Two main activities in this regard will be providing credit to landless farmers, share croppers and tenants and providing technical support at Tehsil level.

### GIS Mapping:

GIS mapping will be carried out to facilitate on-field data collection, sowing to harvest analysis, selection of prospective planting sites, determining irrigation requirements, identification of insects and pesticides requirements and assessing agriculture credit needs.

### High-tech Mechanization Service Centers:

The intervention will ensure availability of state-of-the-art farming machinery within districts to ensure timely service provision in deep rural pockets. 124 service centers will be set up at Tehsil level that will be equipped with heavy tractors, bulldozers, harvesters and other high-tech farm implements. The projected benefits of this scheme include addition of 53,000 acres of cultivated land, 10% increase in farmers' incomes, contribution of PKR 700 million to GDP, PKR 72 million profits for service providers and 1500 new jobs.

### Extension Service 2.0:

The scheme aims to modernize extension services for the farmers using ICT. Farmers will get expert advice on one click for improving the productivity of their farming. GIS mapping of all the farms will be carried out, farm lands will have the data tested from labs that will be used by the experts to provide focused advice to the farmers.

## 5.5 Legal/Regulatory Reforms

### Agriculture Produce Marketing Bill:

Government will transform its role into a regulator from that of an implementer. Agriculture marketing will be liberalized by establishing Punjab Agri-Marketing Regulatory Authority (PAMRA); with the responsibilities to regulate public, private markets, collection points, farmers, electronic marketing activities. Value addition equipment like graders, dryers, etc. will be provided with a subsidy.

### Plant Breeder's Rights Act:

The interests of the new variety plant breeders will be protected through this act; providing exclusive control of propagating material and harvested material to the breeder.

### Seed Act:

Seed Act will be implemented to ensure accurate labeling of standards for seeds and prevent sale of adulterated seeds.

### Accreditation of Labs:

The ongoing project aims to improve the quality of farming inputs (seeds, fertilizers, pesticides) through certification from accredited labs as per the international standards.

## 5.6 Marketing Reforms

### Supply Chain Improvement Program:

The program plans to implement capacity building interventions for farmers for quality awareness, developing infrastructure and provision of on-farm processing facilities.

### Punjab Irrigated Agriculture Productivity Improvement Project (PIPIP):

The project aims to improve the productivity of irrigation water, ensure production of high profitability crops, strengthen private sector delivery capacity and build capacity of stakeholders.

### Climate Smart Technology Package:

Use of drip irrigation system will be promoted to improve water productivity. Solar panels will be provided to promote environmental friendly energy and tunnel farming will be introduced to increase crop yield and diversification.

### Cotton Seed Reforms Project:

The project aims to transform seed industry into a professional industry by acquiring new climate smart seed technologies.



## *Investment Opportunities for Private Sector*



## 6.0 Investment Opportunities for Private Sector

Punjab's agriculture offers host of investment opportunities offering handsome returns to potential investors.

### 6.1 Value Addition Projects

Major shares of the agricultural commodities produced in Punjab are consumed in their primary forms and very little off-farm value addition is carried out. Application of appropriate value addition processes can increase the overall value of the crops and earn profits for potential investors.

#### 6.1.1 Fresh Fruits & Vegetables Pack Houses

In spite of the fact, that Punjab is a major horticulture producer, there are very few fresh fruits and vegetables pack houses in the province.

Major share of production is sold at the farm gate without any significant value addition. Activities like washing, sorting, grading, packing, etc. are carried out at limited scale; without following any recognized standards. Use of formal pack houses exists in case of fruits like citrus and mango; however limited only for selling in export markets. For local market, there is very limited use of such value added activities; either for fruits or vegetables. Resultantly, the farmer does not get maximum value from his crop due to high post-harvest losses and ineffective presentation to the customer.

Establishing formal pack houses for fruits and vegetables in the selected clusters thus emerges as an attractive investment opportunity. The proposed pack houses will meet the growing demand of high quality fruits and vegetables in urban markets of the country.

Absence of formal pack houses is a key constraint towards increasing the exports of fruits and vegetables. Having such facilities at strategically selected locations will help ensure a guaranteed supply of fresh produce for export markets; as per the demanded quality

standards; while fetching a higher unit price.

The locations for these pack houses will be spread across the whole of Punjab corresponding to different production clusters in the province. For mango, the key locations will be districts Multan, Muzaffargarh and Rahimyar Khan. In case of citrus, a large number of packing plants already exist in Sargodha/Bhalwal and new investment should be made only after carrying out a careful demand/supply gap analysis.

Pack houses for vegetables and condiments may be established in central Punjab in districts Lahore, Faisalabad, Sheikhpura, or in Southern Punjab in districts Multan, Khanewal, Muzaffargarh, etc.

#### 6.1.2 Vegetables and Fruits Dehydration

Dehydration is one of the oldest, economical and simple mean of extending the shelf life of fruits and vegetables by removing high water content in the fresh products by exposing them to high temperatures. Surplus horticultural produce available at cheaper rates at peak production time in the season can be preserved to be used during off season. The dehydrated-product is economical to produce/pack, and can be transported and stored in much lesser space and is stable at ordinary storage condition. With high quality dehydrated foods being prepared and an increased preference for instant and convenience foods, the demand for dehydrated fruits and vegetables is increasing with time. Dehydration may be carried out using solar or fuel-based dehydrators.

The dehydrated vegetables and fruits have defined local and international markets. Local spice manufacturers and institutions like army, airlines, etc. generate an ongoing demand for dehydrated vegetables. International market of dehydrated vegetables in 2015 was USD 15.4 billion; exhibiting an average growth rate of 11% per year over the past ten year period. Total global export market of dried fruits was USD 2.4 billion which grew at around





6% per annum over that period. Growing international markets of dehydrated horticultural products offers an attractive investment opportunity for local and foreign investors.

### 6.1.3 Fruits and Vegetables Pulping /Concentration

Fruits and vegetables are processed to produce intermediary products of pulps, purees, pastes and concentrates which are then used for making different consumer food products like, juices, drinks, sauces, ketchups, etc. Processing adds value to fruits and vegetables, reduces post-harvest losses by consuming the surplus production and thus contributes towards increasing the overall profitability of the farmer.

Processed products of fruits and vegetables have defined local and international markets. Citrus and mango are the two major fruits grown in Punjab. Citrus is processed to make Frozen Concentrated Kinnow Juice (FCKJ) and Frozen Concentrated Orange Juice (FCOJ). The two products are used by the local juice processing industry to make ready-to-drink citrus juice products.

The concentrated products are also exported to different countries in Europe and other regions. Mango is the other major fruit which is processed to produce mango pulp. Major share of mango pulp is consumed by the local juice processing sector whereas, a smaller share is exported, with high potential for growth in export. Apple is another high value fruit that is processed to make concentrate. Other fruits like guava, pomegranate, peach, apricot, etc. are also processed to produce corresponding pulps to meet the demand of the juice processing industry. In vegetables, tomato is most commonly processed commodity to produce tomato paste which is used for making tomato ketchup. Growing local and international markets, abundant availability of raw materials, sound technological knowhow and availability of skilled and cheap labor make

fruit and vegetable pulping an attractive investment opportunity for local and foreign investors.

### 6.1.4 Potato Flakes & Powder Manufacturing

Potato flakes and powder are the two value added products that are used as raw material for making different potato products; such as potato chips, fries, etc. Pakistan is a large potato producer with 96% of the production contributed by Punjab. Thus, there is abundant supply of raw material for producing these products. Potato flakes and powder have well defined markets in both local and international markets. There is currently no facility in Pakistan producing potato flakes or powder; which provides the potential investors the opportunity to become the market leader in Pakistan.

### 6.1.5 Individual Quick Frozen Vegetables and Fruits

Freezing is an effective method to increase the shelf life of vegetables and fruits. Fresh produce is prepared through peeling, slicing, dicing into small pieces which are then frozen using IQF (Individual Quick Freezing) technology. All kinds of vegetables and fruits may be converted into frozen products; however more commonly marketed ones include IQF peas, potatoes, carrots, spinach, okra, raspberries, strawberries, mango and assorted packs of more than one product.

Frozen vegetables and fruits have defined international markets; with exports of USD 5.8 billion of frozen vegetables and USD 4.2 billion of frozen fruits in 2015. Both the markets followed an increasing trend over the past years.

Currently, there are few producers of IQF products in Pakistan which offers a unique opportunity to invest and increase Pakistan's presence in international markets. Abundant availability of raw materials, growing export markets and availability of cheap labor constitute good investment rationale in this regard.



### 6.1.6 Fruits and Vegetables Canning

Canned fruits and vegetables represent another category of value added products of horticulture sector which has demand in the local and international markets. Fruits and vegetable are peeled, sliced and diced into smaller pieces and preserved through canning.

### 6.1.7 Edible Oil Extraction (Olive and others)

Extracting edible oils from oilseeds and from fruits like olive offer huge investment potential. Olive is specifically relevant in this regard due to government's current attention to promote this crop in Punjab. A plan for increasing olive cultivation in the Pothwar region of Punjab (a large plateau region in north-eastern part of the country) is being implemented that will supply raw material for extracting olive oil. The proposed planting area covers 15,100 acres, where around two million olive saplings will be planted under the five-year project running till 2020. Around 25% plantation target has already been achieved.

Local demand for olive oil is increasing day by day due to the changing eating habits of people of Pakistan which provides the rationale for investing in olive oil extraction facilities. Increased production of olive oil will help reduce Pakistan's import bill and may also become a source of generating export revenues in the coming years. Similarly, investing in oil extraction from other oilseeds grown in the country is an attractive opportunity.

### 6.1.8 Essential Oil Extraction

Essential oils are obtained from flowers, seeds, fruits, fruit peels, vegetables, leaves, stems, barks, wood, roots, and plant secretions; using steam distillation, cold pressing or solvent extraction methods. By virtue of its climatic diversity and excellent land quality, Punjab produces a large variety of flowers, herbs and other products that serve as raw material for producing essential oils. Demand for essential oils is mainly derived from cosmetic sector where it is used in soap, detergents, perfumes, lotions, etc. Some essential oils are also used as flavors and fragrances in food and pharmaceutical products. Essential oils have a

large international market. Though small, there is a demand for these products in the local market as well. Extraction of essential oils thus offers an attractive investment opportunity.

## 6.2 Cold Chain Projects

Developing cold chain infrastructure is imperative to increase shelf life, reduce post-harvest losses and maintain the quality of the fresh produce; thereby increasing the profitability of farmers and traders in the value chains of different horticultural products.

### 6.2.1 Traditional Cold Stores

Cold stores increase the shelf life of fruits and vegetables by storing them in an atmosphere of reduced temperature.

The province of Punjab has a network of traditional cold stores to serve this important need of the sector. However, with increasing horticulture production in Punjab, there is a corresponding increase in the demand for cold stores to store the perishable produce of the province. Establishing a traditional cold store entails a lower capital cost compared to other more sophisticated options.

All existing cold stores in Punjab have been established by private investors who are earning handsome profits from this business.

### 6.2.2 Controlled Atmosphere (CA) Stores

Controlled Atmosphere (CA) store is a more sophisticated option to increase the shelf life and maintain the quality of fruits and vegetables.

CA store offers a high value added service since along with temperature control; it also offers control of humidity and balance of different gases in the atmosphere of the stored products. Currently, there is no CA store in Punjab; although the technology is globally used successfully for storing high value fruits like apples.





CA store is a more capital-intensive investment option compared to the traditional cold store. Investment in CA store derives its rationale on the basis that the stored product will be sold at higher price to a higher quality conscious segment in local and international markets.

### 6.2.3 Refrigerated Transport

The shelf life and quality of fresh fruits and vegetables has to be maintained at all points from the farm to the final consumer. Refrigerated transport thus acts as a key link of the cold chain for horticultural products. This requirement exists not only for fresh fruits, vegetables and flowers, but also for many of their processed products (pulp, pastes, concentrates, frozen products, etc.) The need for refrigerated containers and vehicles is increasing with the increasing horticulture production in the province. The need is relevant from the perspective of both local and export markets. Investing in cold chain infrastructure offers a viable opportunity offering attractive returns to the investors.

## 6.3 Infrastructure Projects

### 6.3.1 Warehouse Facilities

The small farmers do not have the financial muscle to hold back their production and sell that during the time when the market prices become favorable. Such a situation reduces farmer's bargaining power and his profitability gets compromised. Establishing warehouses in rural areas and offering storage facilities to local farmers is a practical solution to this problem. In one scenario, the warehouses may be constructed by private sector investors and the facilities offered to the farmers on charged basis. The other scenario may be where the government invests in warehouse infrastructure and provides those to private sector operators. In either of the scenario, the government will retain the role of a regulator and a performance monitor.

### 6.3.2 Agriculture Inputs Projects

Agriculture growth is closely linked with adequate supply of quality inputs. It is thus very important to mobilize investment in this area.

### 6.3.3 Agriculture Seeds

Lack of availability of quality seeds is a direct constraint to productivity. A large share of seeds used in national agriculture is uncertified. The country imports a large share of its required supply of seeds. About three fourth of the local supply of seeds is provided by private sector (multinational and small local companies) and the balance by public sector organizations.

The situation indicates a demand-supply gap that can be capitalized upon by the interested investors to reap handsome profits. There is a high potential for vegetables seeds production; both to meet the local demand and for export markets. Improved regulation of seed markets and stronger incentives can encourage private sector investment.

### 6.3.4 Fertilizers

Major share of fertilizers demand of the national agriculture is met by the local production; with the shortfall being imported. Country's growing agriculture sector requires a matching corresponding investment in fertilizer sector to ensure achieving the improving productivity targets of the sector.

### 6.3.5 Pesticides

Raw materials for pesticides are imported and processing is carried out at local level to manufacture pesticides as per the desired recipes. Adulteration is the most critical issue in pesticides that directly affects the profitability of the farmers. Targeted investment in pesticides manufacturing can meet any existing demand-supply gap and also increase competition in the market to help improve the product quality. Investment is desirable in both processing as well as the manufacturing of basic chemicals.

### 6.3.6 Tractors and Farm Implements

Tractors, combine harvesters, horticulture and floriculture machinery, laser land levelers and other types of machinery are required to



develop/maintain a vibrant agriculture sector. The country has a strong manufacturing base of tractors and most of the farming machinery/implements. The sector requires investment in selective areas to meet any demand-supply gaps.

### 6.3.7 High Efficiency Irrigation Systems (HIES)

Use of high efficiency drip and sprinkler systems is limited only to a small fraction of total agriculture. Investment in this area, especially for high value crops like vegetables, is rewarding for the farmers in terms of increased productivity by reducing the irrigation cost and making irrigation more effective for the crop. Attracting private sector investment in this area has to be preceded by campaigns to increase awareness about the utility of HIES.

## 6.4 Farming

### 6.4.1 Corporate Farming

The province of Punjab is bestowed with variety of lands and climatic zones which makes it suitable for producing any agricultural crop. The local agriculture is characterized by lower productivity levels since majority of farms are small which do not have the capacity to apply modern agricultural management practices. This creates the opportunity to introduce corporate farming whereby agriculture can be carried out using professional agricultural practices to achieve higher yields, reduce post-harvest losses and efficient marketing of the produce. Government of Punjab has allocated land in different districts of the province to promote modern farming on Public-Private-Partnership (PPP) mode. Best use of this land can be made for production of high value crops like vegetables, oilseeds, seeds of major crops, organic farming products, etc. The venture may also producing high value crops specifically targeted for high end export markets.

### 6.4.2 Olives Cultivation

Government of Punjab is following an integrated strategy to promote Olives cultivation in the Pothwar region of Punjab. The government targets to plant around two million plants by 2020. About one fourth of this target has been achieved. Looking at the growing demand of olive fruit and olive oil in the local market, olives cultivation offers an attractive opportunity for private sector investors.

### 6.4.3 Off-Season Vegetables Farming

Vegetables represent a high value crop that has huge local and international market. Vegetables are commonly grown in their own season during the year. However, owing to the changing eating habits of the local population, there is a demand of all types of vegetables round the year. This is made possible by growing off-season vegetables in tunnels which protect the production from the harshness of the climate. The off-season vegetables are sold at higher prices due to their high demand and low supply during that particular season. Off-season farming activity can be increased by inviting investment in the area and export markets may also be targeted along with the local markets. Availability of land, climatic diversity, availability of technical knowhow and skilled labor and presence of huge local market provide a strong rationale about the project.

### 6.4.4 Oilseeds Cultivation

Oilseeds cultivation is a growing area in the local agriculture. The sector acts as the supplier of raw material for the local edible oil processing sector. Huge import bill of edible oil creates the rationale for increasing the local production of oilseeds. Along with increasing the overall cultivation of oilseeds, there is a lot of room to improve the yields by applying modern agricultural practices.



### 6.4.5 Certified Fruit Plant Nurseries

Most of the fruits plants provided by uncertified nurseries are diseased, carrying inherent genetic defects which become a source of infection for other plants also when planted. Low performance and the harmful effects of such plants become fully evident only at the maturity of the plant; when significant damage has been done. It is therefore important to establish nurseries to produce true-to-type and disease free Germplasm units. Significant demand for these units can be created for citrus and mango, the two existing fruits and peach, a potential fruit. Investment in this area will lead to increased life and productivity of orchards, improved quality of fruit that can fetch a higher market price; all translating into increased profitability of the farmers.

Routine flower cultivation for local markets may be carried out under normal atmospheric conditions; whereas for cultivating high value varieties for export markets, investment in greenhouses may also be required. In addition to selling as cut flowers, the other use of production will be as raw material for extracting essential oils.

### 6.4.6 Floriculture

Punjab has a significant share in the national production of cut flowers. Major share of this production is consumed in the local market. In 2015, the global export market of cut flowers was USD 7.9 billion. Pakistan's exports during the same year were USD 1.1 million which translated into a meager share of 0.01 percent which is way below the country's realizable export potential. With abundant availability of land, climatic diversity, existing floriculture base in Punjab, huge export market and availability of cheap farming labor, floriculture appears to be a very promising investment opportunity.





**Agriculture Department**



**Government of Punjab**