



TECHNICAL PAPER 5

AGRICULTURE DEVELOPMENT



5 AGRICULTURE DEVELOPMENT

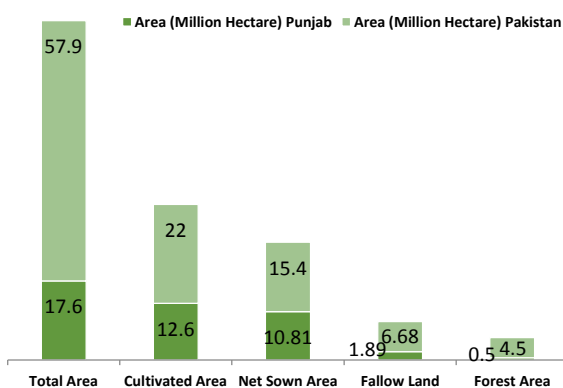
5.1 OVERVIEW

Agriculture is central to economic development and is rightly considered as a lifeline of the Pakistan's economy, contributing around 19.5% share to the GDP and providing employment to 42.3 % of the labor force. The agriculture sector is the main source of raw material to a variety of industries, which supply the end product after value addition. Thus, it plays a central role in national development, food security and poverty reduction. Similar to the national level, agriculture is also a very important sector at the provincial level and is the backbone of Punjab's economy.

"The agriculture sector of Punjab contributes 27% to the GDP of Punjab and generates 40% employment of Punjab's Labor force¹"

Figure 5.1 graphically presents the share of Punjab in agricultural sector, in comparison to the national level. It shows that Punjab has 12.6 (57 %) million hectare cultivated land out of the 22 million hectares of cultivated land of Pakistan.

Figure 5.1 Land Utilization 2015-16 (Million Hectares)



Source: Punjab Development Statistics (2015-16)²

The population of Punjab is increasing very rapidly. In 2017, about 110 million people lived in Punjab from which 69 million lived in rural areas. Majority of the population (70 percent) of Punjab is directly or indirectly linked with agriculture sector. So, Punjab needs to spatially re-define the agricultural zones for increased productivity and enhance incomes of real community based on latent spatial advantage.

For centuries, Punjab, the land of five rivers with its abundant resources of land, water and Labor has considered as "food basket for the region". The spatial strategy of the British was to develop the irrigation network and colonize the barren lands in Punjab. They constructed barrages and canals in the entire Punjab. After independence, the early focus of

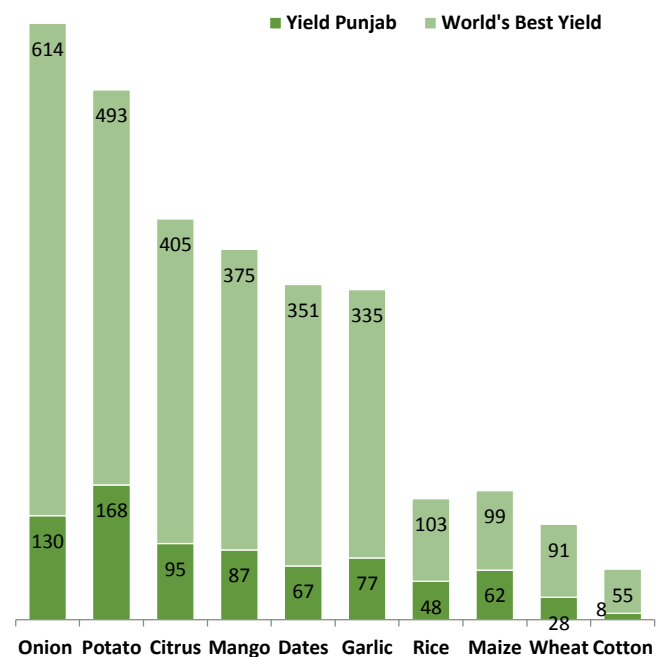
¹ Khalid Ikram, (2013) "Provincial Economic Development Performance, Challenges and Way Forward" Mimeo.

² BOS (2016), "Punjab Development Statistics" Punjab Bureau of Statistics, Lahore.

Punjab's economy was also on extending the water economy to new lands and improving agricultural productivity. However, afterwards 1970's "green revolution" no bigger achievement has been witnessed. The agriculture sector of the province can be safely described as under;

- **Subsistence level inward looking agriculture sector with low productivity levels.**
- **Locked in "low vale" cropping mix with little diversity**
 - **Inefficient markets and support system**

Figure 5.2 Yield Comparisons (Maund/Acre)



Source: FAO 2015-16³

5.1.1 Existing Agricultural Zone

The Province of Punjab is part of the river system that has historically been the breadbasket of the subcontinent. As evident from the map the province is divided into 5 major zones, based on the agricultural output given in figure.5. The agricultural output is based on the regional soil, climatic traits and the farmer's choices.

Mixed Cropping - Center of Province: This region is blessed with one of the best alluvial plains in Pakistan. The soil in this zone has the ability to sustain multiple crops in a single calendar year. The farmers of this region have multiple options for crop rotation. The combination of crops produced by a farmer depends on various factors including the proximity of urban areas, availability of inputs and market trends.

³ Food and Agriculture Organization of the United Nations. (2016). FAOSTAT Database. Rome, Italy: FAO. Retrieved January 30, 2018 from <http://faostat3.fao.org/home/E>



Arid Zone – Potohar Plateau: The area north of the Salt Range known as the Potohar Plateau is mostly arid, receiving no or little rainfall. This elevated land is mostly cultivated with wheat, maize and oil seeds as is permissible in this environment. The use of tube-wells and small dams allows for irrigation in small radiuses.

The Cotton Belt: This area comprising the southern half of the province is suitable for the production of Cotton crop in combination with the wheat crop. The relatively dry and hot climate of the region enables impressive cotton output and wheat is produced for sustenance.

The Thal Belt: The agricultural practices of the four divisions that fall under this region are Mianwali, Khushab, Bhakkar and Layyah. The natural inputs of the area allow for limited production of crops including: a variety of pulses and wheat for sustenance due to little rainfall.

The Rice Belt: The North Eastern to Central part of the Province, essentially areas around the GT Road Corridor are practicing the production of Rice in combination with Wheat. Rice consumption has culturally been on upward trend and the proximity to urban centers is a likely pull factor for its widespread production, furthermore the GT corridor is one of the major freight arteries of the province enabling the export of basmati rice.

These are the traditional zones based on the agro-ecological factors and historical agriculture practices.

“These zone need to be redefine on the basis of latent potential in terms of high value crops to enhance farmer income”

5.2 RESOURCE BASE OF AGRICULTURE PUNJAB THE FACTOR PRODUCTIVITY

5.2.1 Land

Punjab has 17.6 million hectares total land of which 12.67 million hectares (71%) is cultivated area. Total cropped area is 16.68 million hectares from which 55% used in rabi and 45 % used in kharif (figure 5.3). The major crops of Punjab are wheat, cotton, rice, sugarcane, grams and fodder. Different crops are cultivated in two seasons of Kharif and Rabi.

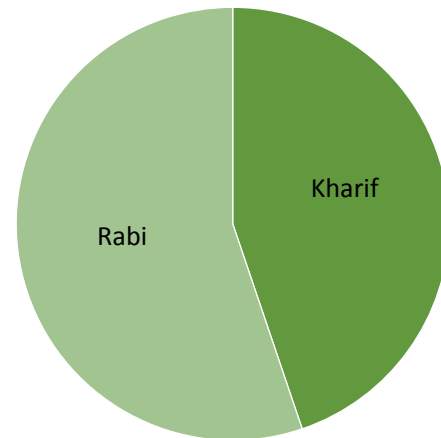
Need to Improve Efficiency in Land Use

In kharif season cotton, rice, fodder and sugarcane are sowed in major portions of Punjab. In Rabi season, major part of Punjab land is utilized for wheat crops. Only 18 percent land is used under the cultivation of gram (9%) and fodder (9%) crops. Wheat is the main staple food with a low cost of production compared with other vegetables, pulses and oilseed crops.

“There is a need to change the current crop mix for optimal utilization of land and increased efficiency. The crop mix currently followed does not generate the

potential profits and revenues because it produces low profit generating crops, like wheat, rice and sugarcane”

Figure 5.3 Area under crops for Kharif and Rabi Seasons in Punjab



Source: Punjab Development Statistics (2015-16)⁴

Landholding

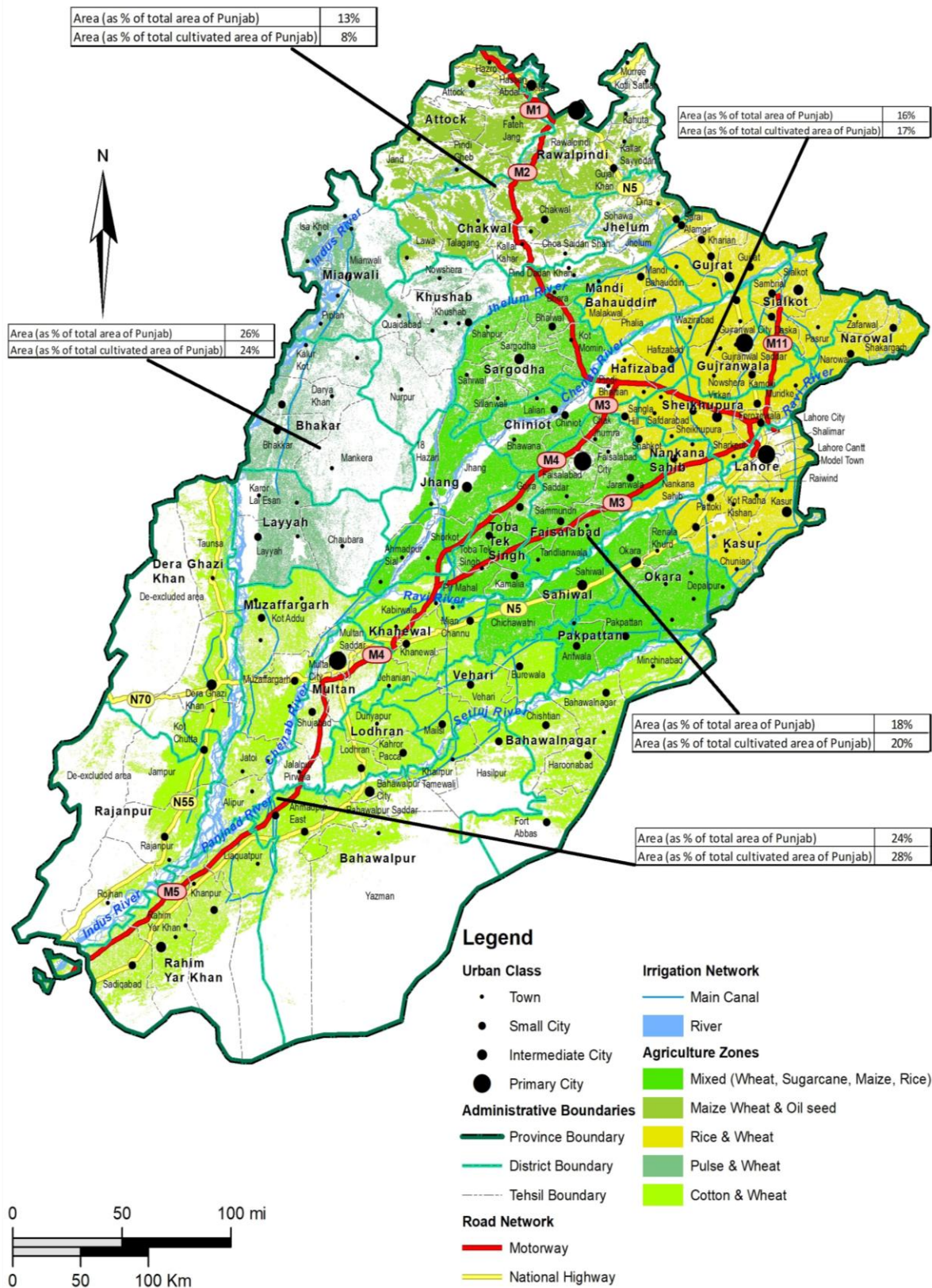
According to agriculture census 2000, farm distribution shows that majority of farmers are small farmers 85.4 % in 2000 and this number increased up to 91% in 2010 in Pakistan (figure 5.5). Small farmers hold 58% of total farm area. Only 2 % farmers are large farmers with a holding land of 22% of total farm area. One of the main reasons of low productivity in Pakistan is small land holding (less than the economic landholding 5 hectares). The small landholding has discouraged farmers for investment in land development, machinery and improving farm structure.

“But at the same time it is important that these “small farmers” shift to high value crops. This is the only solution to ensure their increased income and improve standard of life. This required specific and targeted interventions from the Government”

⁴ BOS (2016), “Punjab Development Statistics”. Lahore, Punjab.



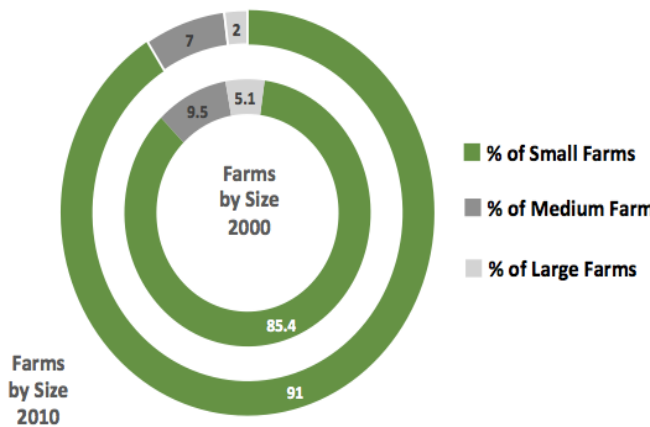
Figure 5.4 Agriculture Zones in Punjab



Source: Pakistan Agriculture Research Council



Figure 5.5 Land Holding in Punjab



Source: Agriculture Census 2010

Land Quality

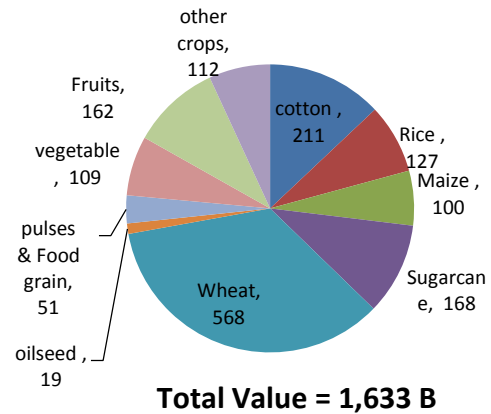
The Electrical conductivity (EC), Potassium (K), Organic Matter (OM), Phosphorus (p), Acidity condition (PH) and soil texture is measured to analyze the soil quality of districts of Punjab. The overall condition of soil has deteriorated over time to yield maximum output. The EC and PH conditions of soil are much better all over the Punjab. Most of the Punjab consists of loam and clay loam type of soil. The organic matter (OM) is very low all over the Punjab (figure 5.8). Most of the land of Punjab has poor OM. Similarly almost all the soil of Punjab has very poor potassium (K) and phosphorus (p) characteristics.

The present soil conditions in Punjab necessitate the use of fertilizer and organic matters for high crop yield. This calls for a comprehensive, targeted soil improvement strategy from the Government. The Government has taken many initiatives in this regard in the recent past that would have certainly help overcome the soil degradation issue.

Land Productivity

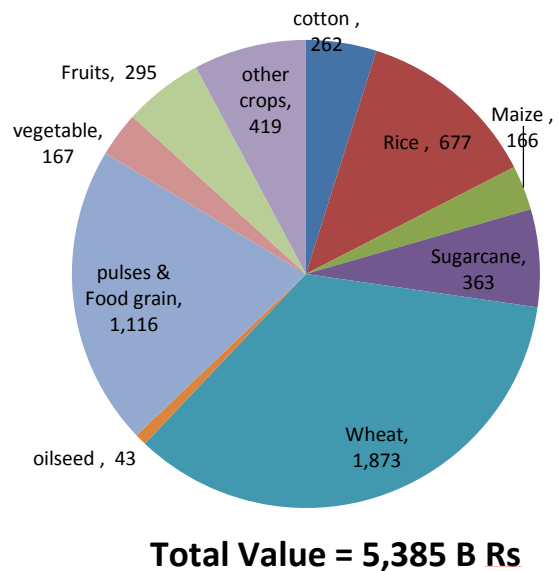
Currently the productivity of Punjab is extremely low for all crops as compared to the productivity level of those crops in the rest of the world. The total value generation of the current yield of all crops is estimated to be 1,633 billion rupees (figure 5.6) whereas if Punjab adopts progressive farmer's yield, this value could increase to 5,385 billion rupees as shown in figure 5.7.

Figure 5.6 Crop Value at Current Yield (Billion Rs.)



Source: Agriculture Marketing Information System

Figure 5.7 Crop Value at Progressive Farmer Yield



Source: Agriculture Marketing Information System

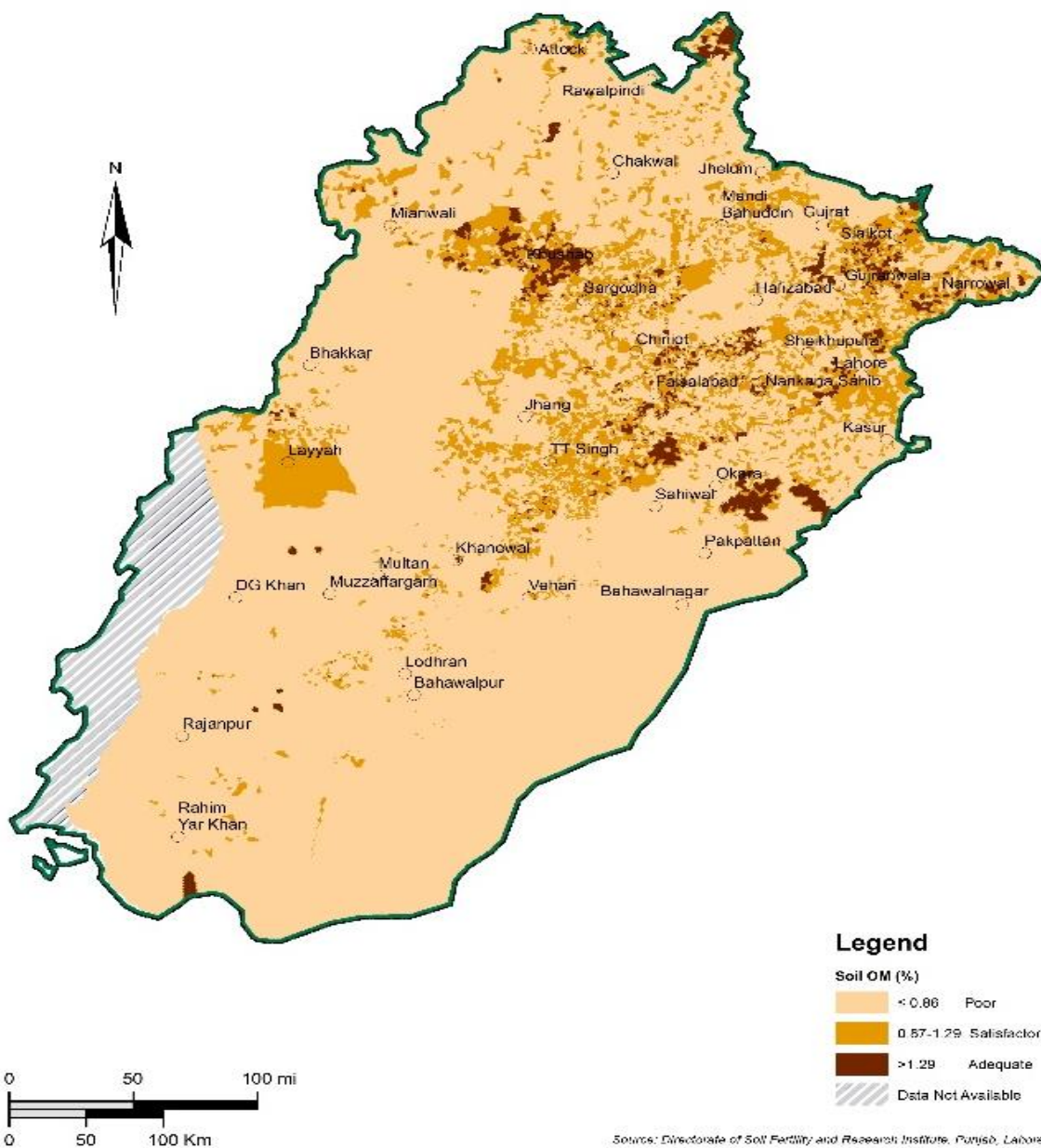


Strengthening Markets for Agricultural and Rural Transformation in Punjab

The production of agricultural goods in Pakistan can be linked to the Punjab province, which to this date is considered the agrarian hub of Pakistan. However, when compared to its regional competitors like the Indian Punjab, it has been lagging in productivity. This sluggish performance can be attributed to the governments policies implemented in the early 1960's. There were unplanned subsidiaries implemented undermining the potential of the agricultural sector, resulting in an increase in import prices and making them even more expensive in the international market.

To curb the diminishing potential of the agricultural sector, the World Bank and Punjab government introduced an integrated policy: The SMART Punjab policy. The developmental objective of the policy is to increase productivity of the crops as well as livestock farmers, improve their resilience towards climate and foster agribusiness development in the province. The program also aligns with the objectives of the World Bank in order to develop private sector development and inclusion aiming at ending poverty and promoting prosperity. Under this policy market reforms and smart public investments were also in cooperated in

Figure 5.8: Soil quality in Punjab



Source: Directorate of Soil Fertility and Research Institute Lahore



5.2.2 Water

Water is essential for irrigation in agricultural production and has been a hot issue in recent times, not only in Pakistan, but also all over the world as the shortage of water can affect the national economy very badly. Pakistan has one of the largest irrigation systems in the world with more than fifty million acres of irrigated land. Punjab harbors the major portion of the available irrigation system of Pakistan as 13 out of 18 barrages are situated in Punjab and about 98 % of total tubewells of Pakistan are situated in Punjab.

Pakistan, on average, received 150 MAF of water every year in its river system of which only 56 MAF (37%) is diverted to the Punjab for its use (Table 5.1). Punjab agriculture irrigation system receives 92 % of this water amounting to 51.2 MAF of which 22.9 MAF are lost in the canal system, with net availability at farm gate of 28.3 MAF. This is further augmented by tube well pumpage of 49 MAF leading to total availability at the farm gate of 77.2 MAF. Another 21.3 MAF is lost in obsolete flood irrigation application and only 55.9 million acre feet actually reaches the crop roots. In other words 56% of the gross water available is used for crop production in the Punjab. It is important that the 21.3 MAF loss of water due to flood irrigation can be minimized by introducing efficient water technologies at the farm level and reduce the 22.9 MAF water lost in the canal system to generate water availability for up to 15 million acres of new farm land in the Punjab.

“Total share of Punjab is 55 MAF out of which 33 MAF reaches at farm levels for agriculture purpose”

Table 5.1 Budget of Agriculture Water

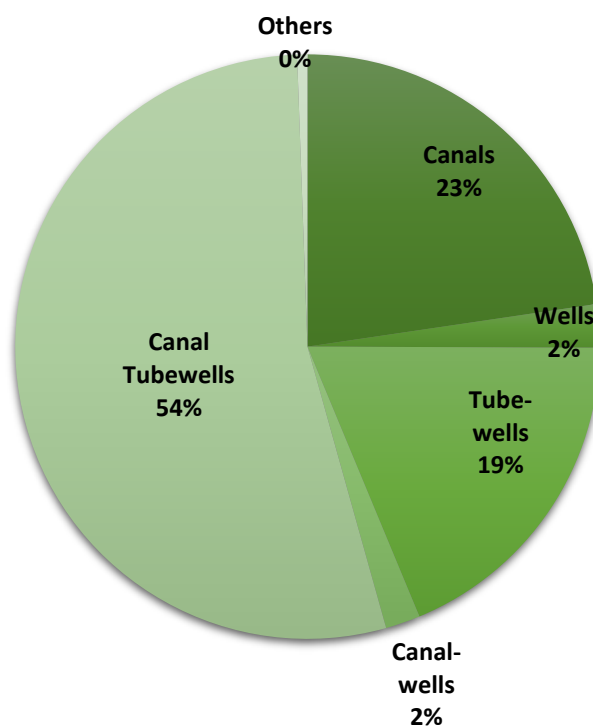
Indus Basin Irrigation system	Pakistan	Punjab
Average Annual flow (MAF)	149.35	55.94
Losses in Sea (MAF)	35	-
Diversion to Canal irrigation system (MAF)	114.35	55.94
Water use by Agriculture sector	91.6 %	91.6 %
Canal Diversion for Agriculture (MAF)	104.85	51.24
For Civil Canal (MAF)	3	-
After Civil Canal Agri. Water (MAF)	101.84	51.24
Pumpage from Ground Water during 2013-14 (MAF)	50.2	49
Gross water Availability for Agriculture (canal + Tube well)	152.04	100.24
Gross Water Availability per acre before losses (Feet) (MAF/Million Acres)	2.9	3.4

Water Conveyance Losses in Canals (MAF)	45.52 (44.69 %)	22.89 (44.69 %)
Net Water Availability at Farm (MAF)	106.52	77.18
Field Application losses	26.63 (25 %)	21.3 (25 %)
Net Irrigated Water Available for Crops (MAF)	79.89	55.88
Water Efficiency (Gross Water availability for Agri./ Net Irrigated Water Available for Crops)	52.54%	55.75%
Net Water Availability per acre after losses (Feet)	1.51	1.94

Source: Punjab Irrigation Department (2013-14)

Punjab has total area sown of 16.93 million hectares from which 14.89 million hectares is irrigated. Most of the area (77%) is irrigated by canal and tube well. Mode of irrigation in Punjab is given below in figure 5.9.

Figure 5.9 Mode of Irrigation (2015-16)



Source: Punjab Development Statistics (2014-15)

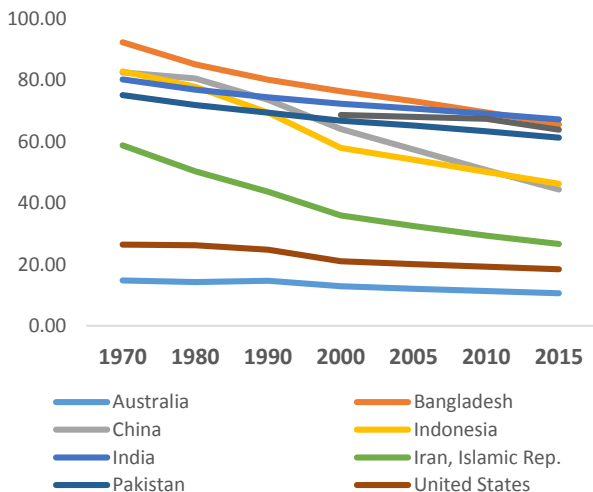


Water efficiency needs to be further prioritized in Punjab in order to meet international standards. There is inefficiency in canal system as shown in figure 5.11 which cause improper distribution of water. R&D investment needs to be done in ways of maximizing water efficiency. Crops with high yield and low water usage should be preferred. More importantly, it is essential to spatially conserve water in order to provide irrigation to areas, which require more water. The water tax laws also need to be reconsidered since they are unchanged from colonial times.

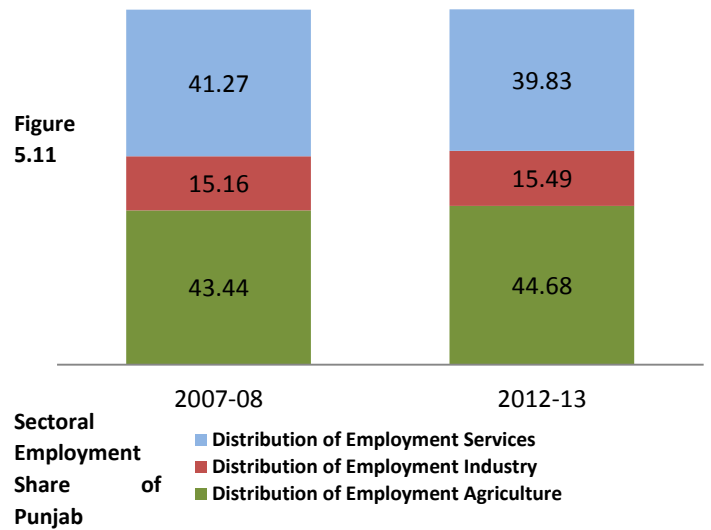
5.2.3 Labour Force

Human capital has very important role in economic development. Skilled and educated human capital has significantly positive impact on productivity and economic growth. In case of Pakistan and specially Punjab, majority of population live in rural areas. It is clear from the figure that 63.7 % of total population lives in rural areas in Punjab while these values are very low in developed countries like Australia and United States of America shown in figure 5.10. In Australia only 10 % of total population lives in rural areas and 18.38 % in USA. The population of Punjab is increasing very rapidly. In 2016, about 102 million people lived in Punjab from which 69 million live in rural areas. The rural population is increasing more rapidly than the urban population. So, agriculture strategy is very important by targeting huge proportion of population for increase economic growth and living standards of rural areas. Agriculture based countries like Pakistan, Bangladesh and India employ large proportion of labor force from agriculture sector (figure 5.13). Developed countries like Australia have more focus on industrial and services sector

Figure 5.10 Rural Population Percentage of Total Population (2015)



Source: FAO 2015-16



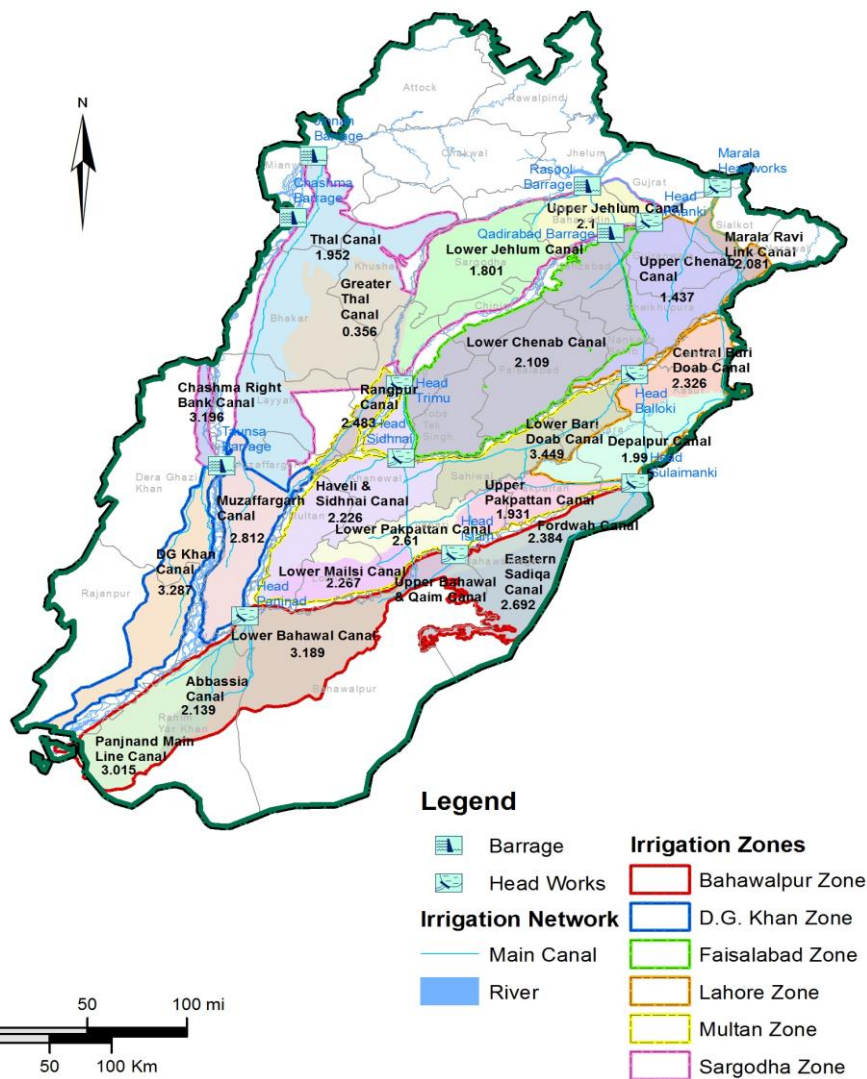
Source: Punjab Development Statistics (2014-15)



Pakistan National Water Policy

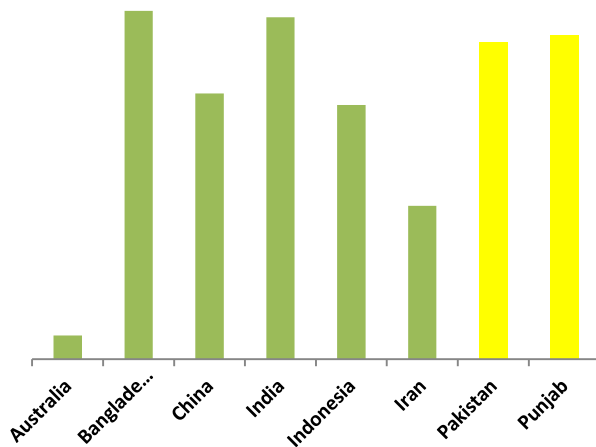
Pakistan is heading towards the situation of water shortage with every decade. The growing population of the country is only accelerating this process, and also causing a threat of food insecurity. "Per capita surface water availability has declined from 5,260 cubic meters per year in 1951 to around 1,000 cubic meters in 2016. This quantity is likely to further drop to about 860 cubic meters by 2025 marking our transition from a "water stressed" to a "water scarce" country." This situation is alarming and calls for a rapid development and management of the country's water resources. Agriculture is one of the largest consumers of water. It is estimated that up to 95% of all surface and ground water is utilized for irrigation. "Hisaar Foundation" released research findings stating a huge potential for water to reach unirrigated areas if proper canal management is done. Improved water quality, equal distribution, modern irrigation networks and smart metering should be adopted to cope with major issues of water losses.

Figure 5.12 Canal command area & withdrawal in Punjab



Source: Punjab Development Statistics (2015-16)

Figure 5.13 Employment share in Agriculture (%)



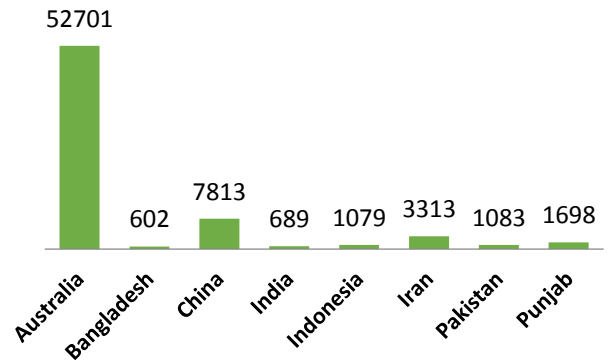
Source: United States Department of Agriculture (2016)

Pakistan is far away in terms of agriculture value added per worker as compared to developed countries as shown in figure 5.14. Australia is earning US \$ 52701 from one worker in agriculture sector. Agriculture value added per worker in Pakistan is only US \$ 1083. There is a need for increased crop productivity to compete with the developed countries. Moreover, there is a need to shift the surplus labor from agriculture into the industrial sector to facilitate backwards linkages with agriculture and to increase land per worker as well as worker productivity.

“Increased worker Productivity and the absence of surplus labor encourage efficiency and increase productivity”

In the face of increasing population and rapidly decreasing land per person; it is imperative to maximize worker productivity by changing our outlook on agriculture. The first step is to provide additional employment opportunities to surplus Labour in the services and manufacturing sectors. Moreover, land should be utilized properly by the introduction of high value added crops in order that the declining land per person can provide a much higher income than before. Per acre yield has to meet the growing population or the agriculture sector will continue its steep decline. Land utilization will only reach maximum efficiency if spatial planning of cultivation is carried out with a focus on competitive advantage rather than subsistence. The end goal is to maximize productivity through high value added goods for export which will also offset the balance of payments. Spatial planning and planned use of the land also includes ensuring future fertility of the agricultural land.

Figure 5.14 Agriculture value added per worker (US\$)



Source: FAO Statistics (2015)

5.3 AGRICULTURE CLUSTERING- TRANSFORMATION FROM LOW VALUE CROPS TO HIGH VALUE CROPS

The mainstay of Punjab’s economy is agriculture. However like a large number of other developing nations, Punjab is also facing an uneven spatial pattern of economy (Burki and Khan, 2010⁵; Chaudhry et al., 2006⁶; Ahmad, 2011). The issue of spatial disparity rose when productivity based sectoral approaches came into conflict with actual spatial development (Atash, 1988)⁷. Because of this inconsistency, a severe inequality of growth shaped in Pakistan (Kalantari, 1998⁸; UPARCI, 1991). In reality all national policies are probably going to have some affect upon agriculture division. Government of Punjab, with the mission of development of the economy of the province, has taken many steps to improve the economic growth. Agriculture sector is one of the most important sectors of economy of Punjab; increase in agricultural productivity will make massive contribution to increasing the growth rate of Punjab’s economy. However, there is no spatial lens through which development projects can be assessed and evaluated for the targeted economic growth. Therefore, the Punjab Spatial Strategy focus on the potential of economic growth in agriculture of province.

The land, water and labour efficiency also has a significantly positive correlation with spatial planning. It is very essential

⁵ Burki, A.A and Khan, M.A. (2010) “Spatial inequality and geographic concentration of manufacturing industries in Pakistan” *Pakistan Society of Development Economists*, Islamabad, Pakistan. 2010.

⁶ Chaudhry, I.S., Malik, S and Ashraf, M. 2006. Rural Poverty in Pakistan, Some Related Concepts, Issues and Empirical Analysis. *Pakistan Economics and Social Review*. 44(2): 259-276.

⁷ Atash, F. 1988. *Agricultural Policies and Regional Disparities in the Third World; the case of Iran*. *J. Plan. Edu. Rev.*, 2: 99-106.

⁸ Kalantari, K., 1998. *Identification of Backward Regions in Iran*. *Geog. Res.* 48: 120- 131.



to identify the potential areas for each crop and to make a cluster for efficient use of resources like land, labor, water, inputs and supports services.

"It is time to shift crop-mix pattern from low value crops to high value crops by identifying potential areas of those crops and provision of all facilities and support system for each crop in cluster particular to their needs"

It will increase efficiency in system and facilitate government to easily the system manage (management of inputs, extension services, technology, R & D and providing subsidy).

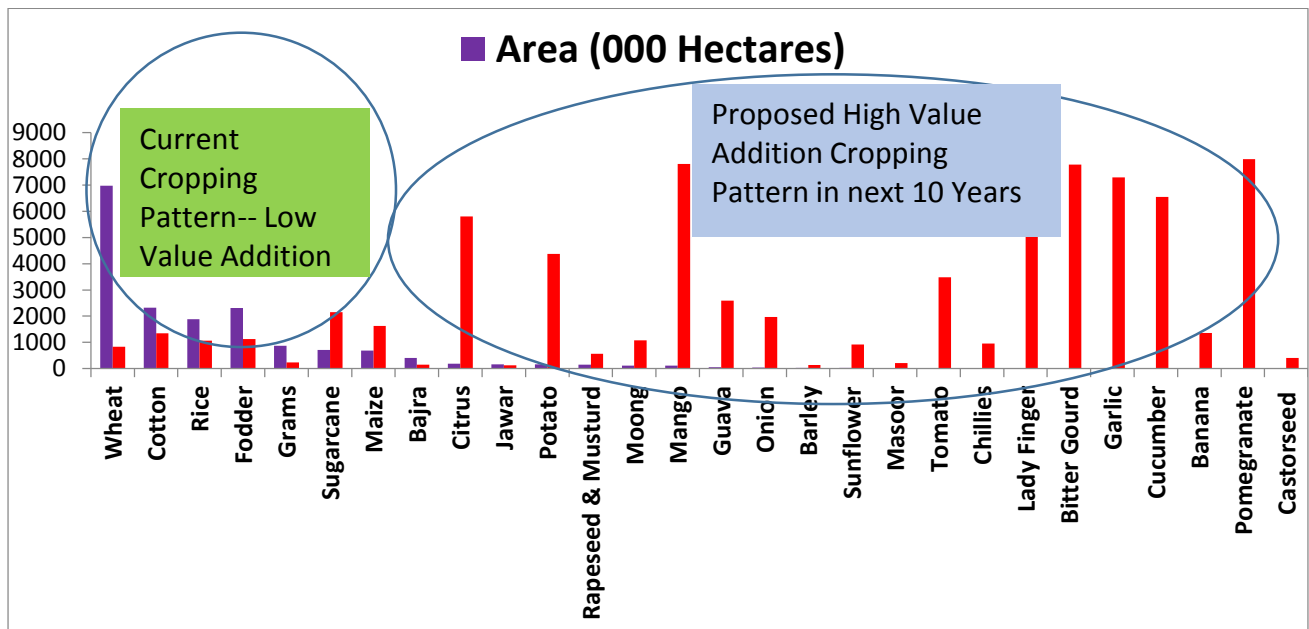
Figure 5.16 illustrates current cropping pattern of Punjab. In Rabi season, most farmers grow wheat crop whereas in Kharif season, crops like sugarcane, maize and rice are grown on majority areas of Punjab's Agricultural land. However, the focus remains limited on high value vegetable and fruits in Punjab. There is a need to produce high value crops like fruits and vegetables for efficient use of land. The following figure shows two scenarios comparing income generation from current crop mix and transformed crop mix.

"Total estimated income from current crop mix is 660 billion rupees whereas if the fruits and vegetables area is increased from 5% to 15%, this income increases to 1020 billion rupees"

(figure 5.16)"

Figure (5.15) below explain that vegetables like onion, potato, tomato and garlic and fruits like citrus and mango etc are generation more returns from land as compare to traditional crops like wheat, sugarcane and rice etc. so there is need to change our cropping pattern from low value crops to high value crops identifying in below table, So that farmer income is increased and agriculture sector may flourish. Now there is an utter need to make clusters of these high value crops in the areas where we have comparative advantage with respect to yield and productivity as well as suitable ecological conditions. Government should give specialize support system and improve technology for the high value crops so that the overall production is increased with minimal utilization of input factors such as land, water and labor.

Figure 5.15 Transformation From Low Value Added To High Value Added Crops

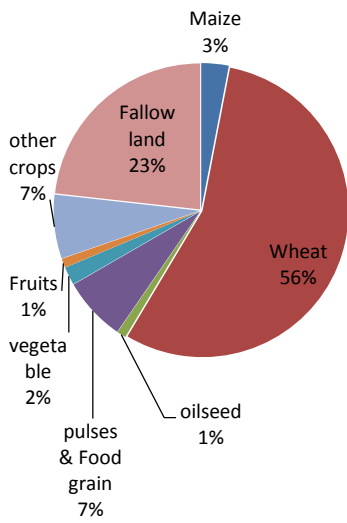


Source: The Urban Unit calculations based on AMIS data

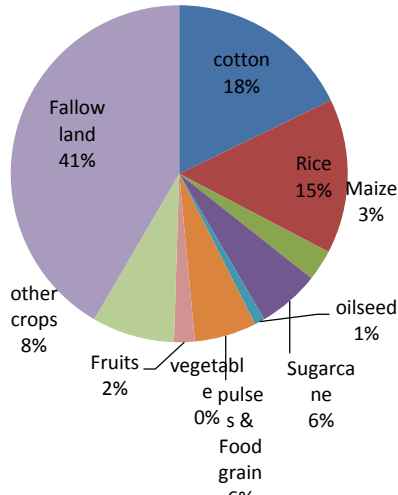
Figure 5.16 Current Status: Agricultural Land Use & Profitability (Cropping Mix Change Scenario)



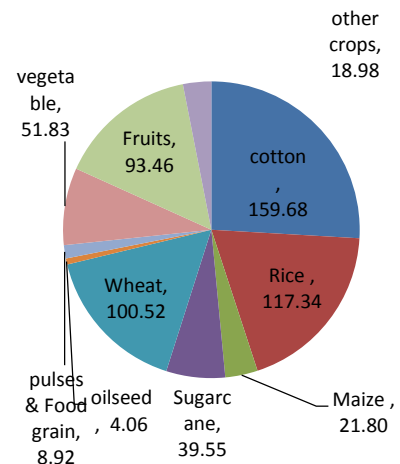
% Area by Crop (Rabi)



% Area by Crop (Kharif)



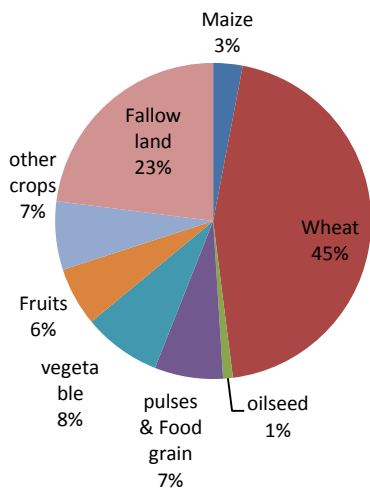
Income (Billions Rs.)



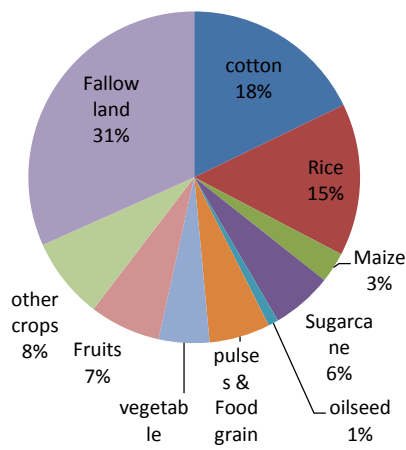
Total Estimated Income at Current Crop Mix = 660 B Rs.

Transformation: Agricultural Land Use & Profitability

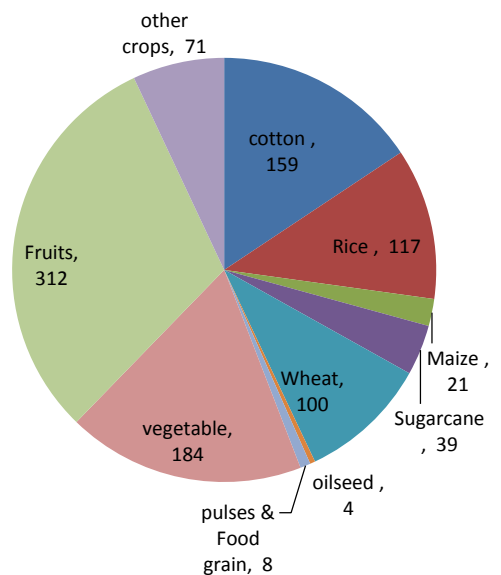
% Area by Crop (Rabi)



% Area by Crop (Kharif)



Income (Billions Rs.)



Total Estimated Income at Transformation Crop Mix = 1020 B Rs.

Source: Agriculture Marketing Information System



National Food Security 2018

Achieving food and nutritional security for its population has always been a high priority for Pakistan's government since its inception. Despite making a significant progress in food production, food security has remained a challenge for the country. The policy's main aim is to increase food availability, its utilization and most importantly, ensure its stability at all levels. Pakistan's agriculture sector has been facing a number of challenges over the last decade, such as low rates of technical innovation, low productivity, and climate change are to name a few. The National Food Security 2018 aims to achieve agricultural growth, improved value addition methods, harvesting on untapped land and legislate food safety and regulatory laws. The policy also intends to remove subsidiary on crops that are available on cheaper rates internationally; promote crops for import substitution; strengthen seed corporations; ensure availability of fertilizers at affordable prices and promote the use of bio-fertilizers .etc.

5.3.1 Policy Focus Areas

In order to achieve the envisioned economic growth (8% at least) for Punjab, the agriculture sector would require structural transformation involving;

- ***From subsistence level agriculture to high value-added export oriented agriculture***
- ***Development of crops zone by providing specialized support system and low productivity to high productivity (Lessening the productivity gap in all crops)***
- ***Low profit to high profit cropping pattern (change in agriculture mix)***
- ***Wasteful use of water to efficient use of water***
- ***Low labor force productivity to high labor force productivity***
- ***Expand network of in R&D (research institutes and agriculture universities) to drive innovation in agriculture sector***
- ***Ensuring food security and freedom from hunger***
- ***Transform domestic markets***
- ***Capture global value chain especially China***

Following the above stated strategy we could efficiently develop our agriculture sector which in result will increase the income of the farmer, improve their standard of living and bring overall development in the rural areas.

Basically the main focus would be on the high value crops in this strategy. First of all, clusters of specified crops will be made and the second step would be to train the farmers specifically for the efficient production of those crops as well as ensure the provisions of the approved quality seeds of the crops relating to the above mentioned clusters. We need to ensure the timely provisions of other inputs like water, fertilizers and pesticides. Moreover, authorities should invest on farmer's skill development and training to update them with latest tools and innovated technology. There is need to establish special research institutions specific for the clusters of crops in the specific areas where extensive research is carried out in the relation to the crop and extension workers are given training specific to those crops in order to provide best guidelines to the farmers.

5.3.2 Proposed Agricultural Zones

The map (figure 5.17) below illustrates high value crop Zone in Punjab, depicting Northern Punjab districts of Attock, Rawalpindi and Chakwal favor a crop mix of Olives, Grapes, Pulses and Groundnut. The Western Zone with Districts including Gujrat, Narowal, Gujranwala can be classified as vegetable and rice Zone because of the fertile land for these crops. Central Punjab Districts of Sarghoda, Chiniot and Mandi Bahuddin may be determined as citrus zone for Punjab. The South-Western Districts of Multan, Kanewal and Muzaffargarh form a Mango, Date and Vegetable cluster. The Districts in the Eastern Zone comprising of Bhakkar, Layyah and DG Khan are suitable for Pulses, Barley and Dates. Bahawalpur, Rahim Yar Khan, Bahawalnagar and Ranjanpur in the Southern area can be termed as cotton, oilseed and sugarcane crop Zone. Potential agriculture crops zone on the basis of these area is showed in map given below (figure 5.17A). These zones are identified on the basis of comparative advantages in yield, production and agro-ecological conditions (yield and production maps are given below in box).

Achieving food security and population are the high priority goals for any Government. The key determinants of food security are availability, accessibility, utilization and stability. Pakistan has made significant progress in food production over the last several decades. However, food security has remained a key challenge due to high population growth, rapid urbanization, low purchasing power, high price fluctuations, erratic food production, and inefficient food distribution systems.

Presently, wheat and rice are the major crops consumed in Pakistan, with current consumption of wheat being 24 million tons and by 2047 it is predicted to be 34 million tons whereas its production was estimated to be 19.2 million tonnes in Punjab in 2015-16. The average yield of wheat in Punjab is stagnant at 2.79 tonnes /hectare (29 maund / acre). It shows that Pakistan need to increase wheat yield up to 3.75 tons/hectare (40 maund/acre). Similar to Wheat, Pakistan is at 11th number in the rice production crop but ranked at 43rd number by yield. Current rice consumption is 3.2 million tonnes and will reached up to 4.6 million tonnes by 2047. In



2015-16, Basmati rice production in Punjab stood at 2.3 million tons, depicting a staggering increase of 13.6% over previous year production, however the rice production was estimated at 1.3 million tons, showing decline of 7.93%. In addition to these major crops, Pakistan needs exponential growth in the production of fruits, vegetables and pulses to lower their domestic prices and enhance accessibility of these products to meet future food demand and even improve their exportability. A strategic approach demands that the agricultural sector in Punjab implements scientific

reforms based on extensive research and development to improve agricultural yield and productivity.

"The area of wheat need to be reduced substantially to give way to high value crops. But the same time, the wheat productivity need to enhance exponentially at least at international standards to ensure food security"

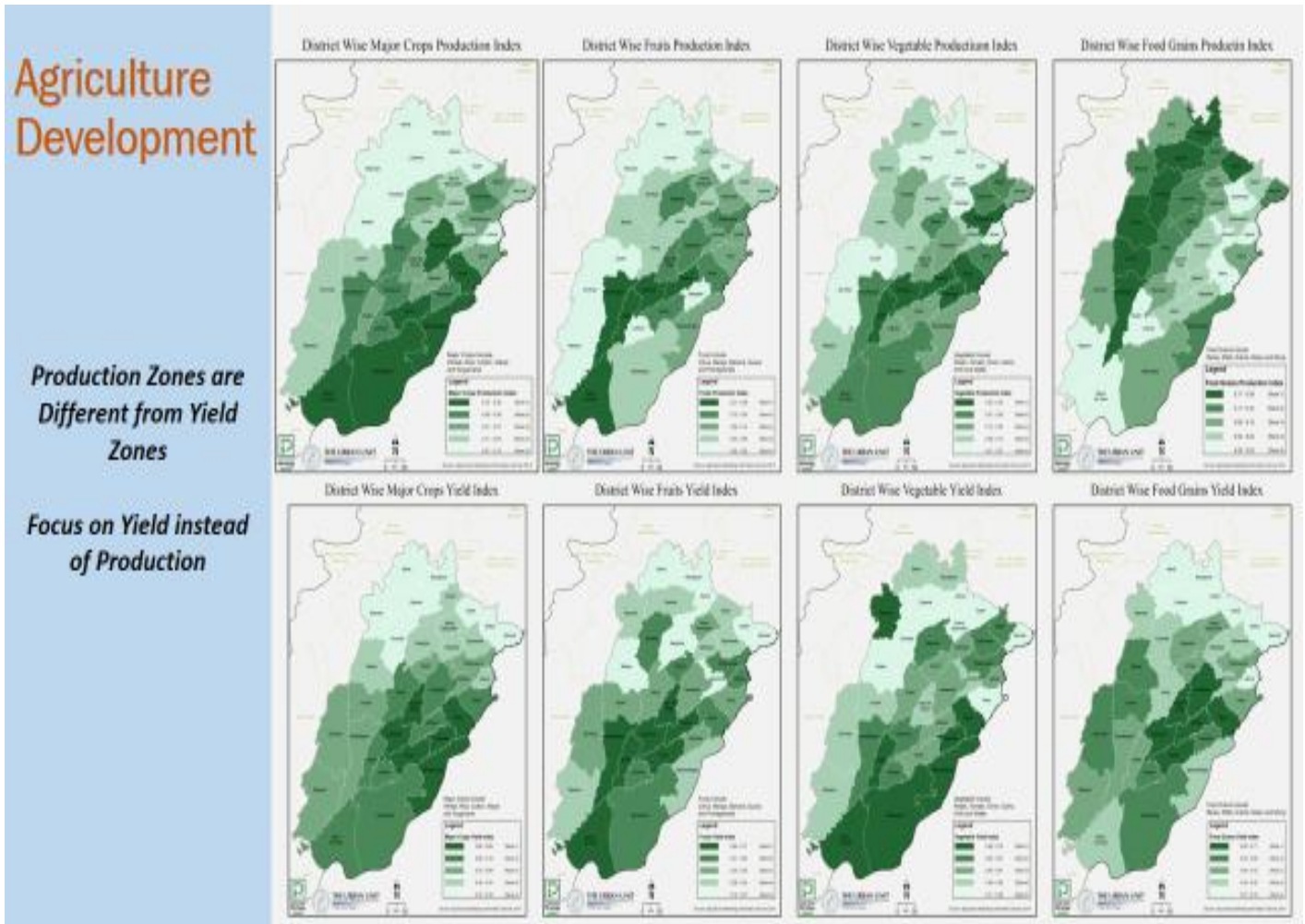
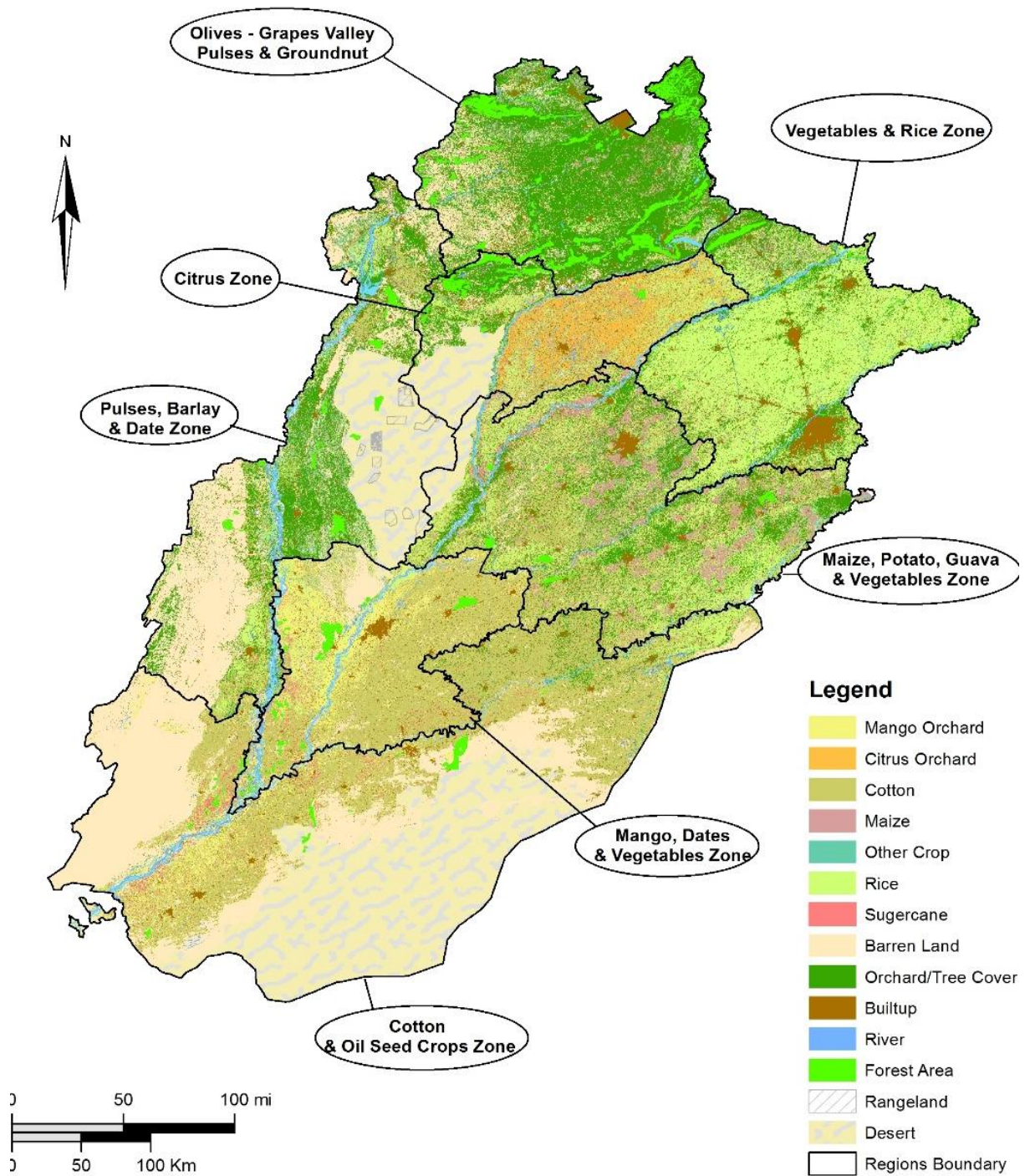




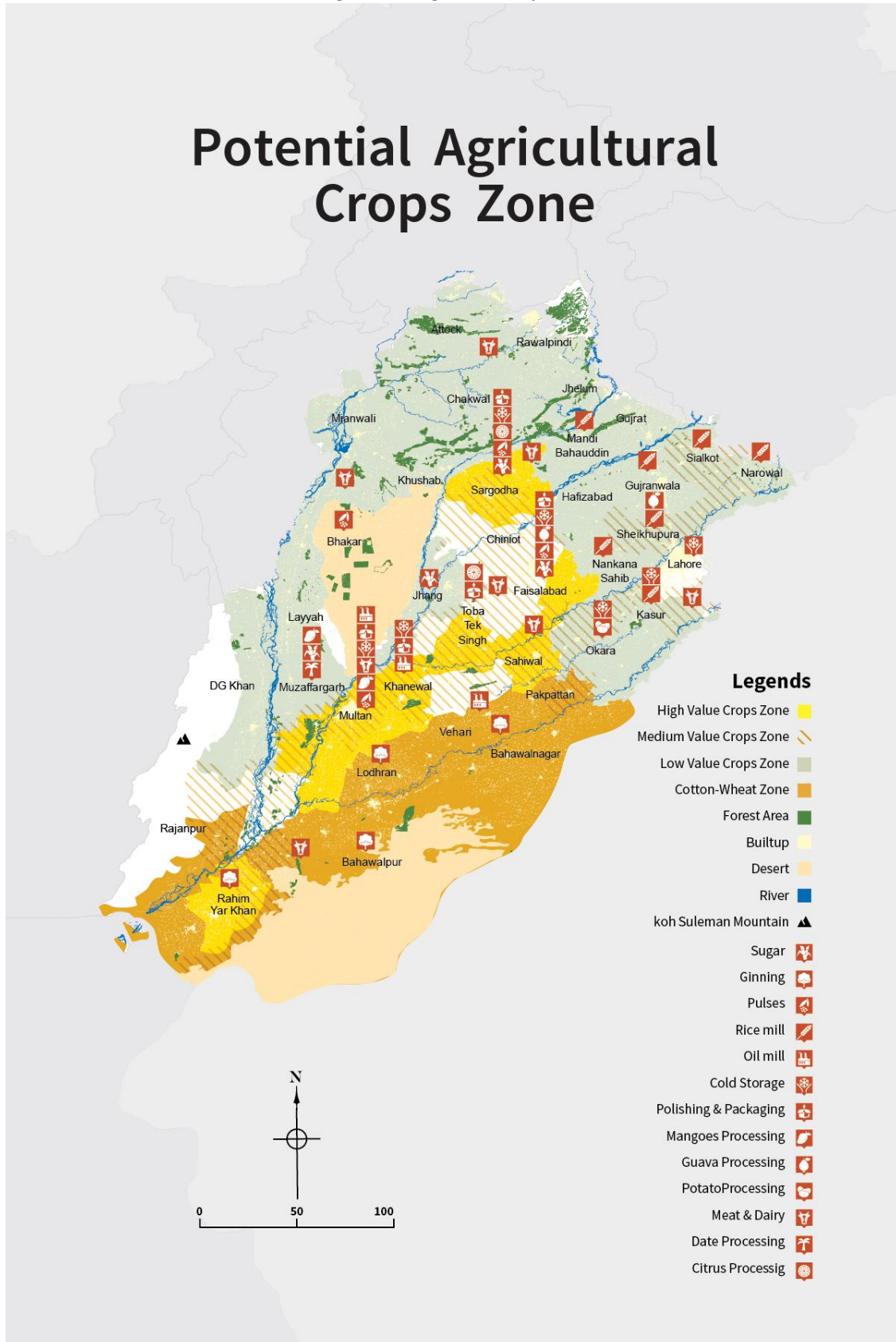
Figure 5.17 High Value Crop Zone



Source: Urban Unit, Own Calculation



Figure 5.17 High Value Crop Zone



Source: Urban Unit, Own Calculation



Table 5.2 Proposed Agricultural Transformation Plan For Punjab

Proposed Zone (Based on Crops)	Districts in Zone	Total Cultivated Area of Districts (hectares)	%age Area under these Crops	Proposed Area by 2027 (%)	Proposed Area by 2037 (%)	Proposed Area by 2047 (%)
Olive and Grapes valley, Pulses and Groundnut	Rawalpindi, Attock, Chakwal and Jhelum	994,000	9	12	18	25
Citrus and Vegetable Zone	Sargodha, MB Din and Khushab	1,194,000	9	12	18	25
Vegetable, Guava and Rice Zone	Gujranwala, Gujrat, Hafizabad, Narowal, Sialkot, Lahore, Kasur, Nankana Sahib and Sheikhpura	2,157,000	52	55	60	70
Maize, Potato, Guava, Fodder and Vegetable Zone	Sahiwal, Okara, Pakpattan, Faisalabad, Chiniot, Jhang, Toba Tek Singh	2,276,000	32	38	45	60
Mango, Date and Vegetable Zone	Multan, Khanewal and Muzaffargarh	1,087,000	7	10	20	40
Cotton, Banana and Oilseed crops zone	Bahawalpur, Bahawalnagar, Rahim Yar Khan, Rajanpur, Lodhran and Vehari	2,754,000	46	50	60	70
Pulses, Barley and Date zone	DG Khan, Layyah, Bhakkar and Mianwali	2,097,000	29	35	45	60

Source: Urban Unit, Own Calculation

Citrus Zone (Example)

If we look at the production of Sargodha as an example, currently Sargodha district is producing 48% of the total production of citrus in Punjab despite the fact that only 18% area of it is used for the production of citrus whereas 44% of area is used for the production of wheat crop. As shown in Table 5.4, if the area under wheat crop is reduced by 30% in the areas and the land is utilized for the citrus production, it will increase overall revenue by 80 billion rupees. The cropping mix in the other districts/zones must also be designed in such a way that it should improve the production with minimum utilization of resources. This will not only improve the production but will also facilitate the Government to optimize resource utilization. Furthermore, there is need to provide better accessibility to domestic and international markets. In addition, post-harvest factors such as picking, transportation, washing, grading, shipping etc. of the products must be facilitated and managed efficiently so that the post-harvest losses are reduced. Cold storage must

be provided through well-equipped warehousing. There is need to focus on the improvement of value addition processes of citrus, by establishing latest industries, which are capable of improved processing of citrus, and its by-products. This will increase the high value productivity and sale in the domestic as well as international market, which will in turn increase the farmer's income.

Figure 5.18 of Sargodha district shows the mouza of where citrus is produced and the potential where it can be produced to improve the production. We need to plan the production at the mouza level for the efficient use of land

Mango Zone (Example)

Multan district is famous for the production of mangoes, which produces about 33.9% of the total production of Punjab (table 5.5). Despite the fact that it has a comparative advantage in mangoes, about 60% area of Multan is occupied for the production of wheat whereas 10% area is used for the production of mangoes. If only 20% of the wheat land area is

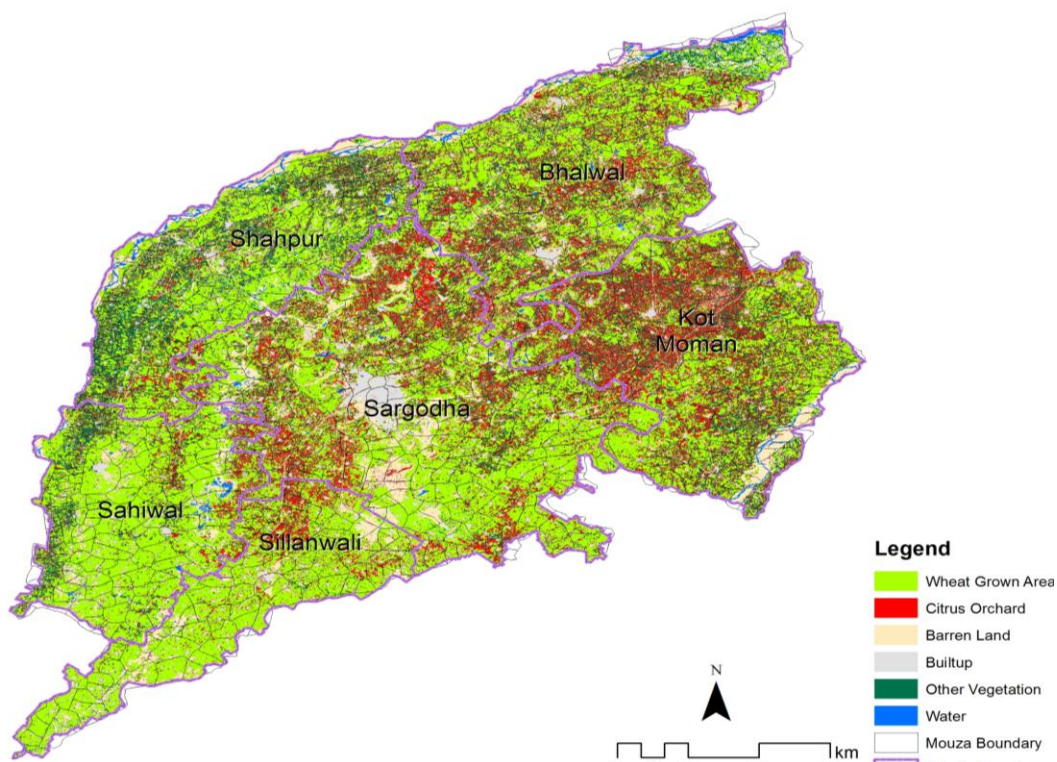


used for the production of mangoes, revenue may increase by 6 Billion rupees approximately. There is need to develop Multan district as a mango zone and ensure the provision of the best quality seed to the farmer in the area. As mango research institute may be established along with the special support system and technology to maximize the production and supply to domestic and international markets.

Table 5.2 shows proposed agriculture transformation plan of Punjab. The changes to be implemented till 2047 in current cropping mix has been given in table 5.2. Crops such as olive and groundnut only uses 9 % of the total cultivated area of Rawalpindi, Attock, Chakwal and Jhelum. It is proposed that this area of 9% must be increased to 25% of the total cultivated area of these districts by the year 2047. Likewise the total cultivated area in the identified citrus zone must be increased from 9% to 25% for citrus and vegetables.



Figure 5.18 Citrus grown area in Sargodha District



Source: Urban Unit, Own Calculation

Table 5.3 Top Citrus Producing Districts

Districts	Production of Districts (Tons)	% of Total Punjab Production in this district	Yield (M/A)
Sargodha	1011783	48.23	112
Toba Tek Singh	205991	9.82	176
M.B. Din	166736	7.95	170
Khanewal	97188	4.63	137
Sahiwal	95834	4.57	127
Vehari	78330	3.73	108
Bahawalpur	56332	2.69	85
Multan	55492	2.65	97
Okara	51380	2.45	100
Layyah	42208	2.01	96
Faisalabad	32860	1.57	88
Bahawalnagar	32300	1.54	97
Mianwali	22439	1.07	135
Khushab	11714	0.56	118
Punjab	2097698	100	95

Source: Agriculture Marketing Information System

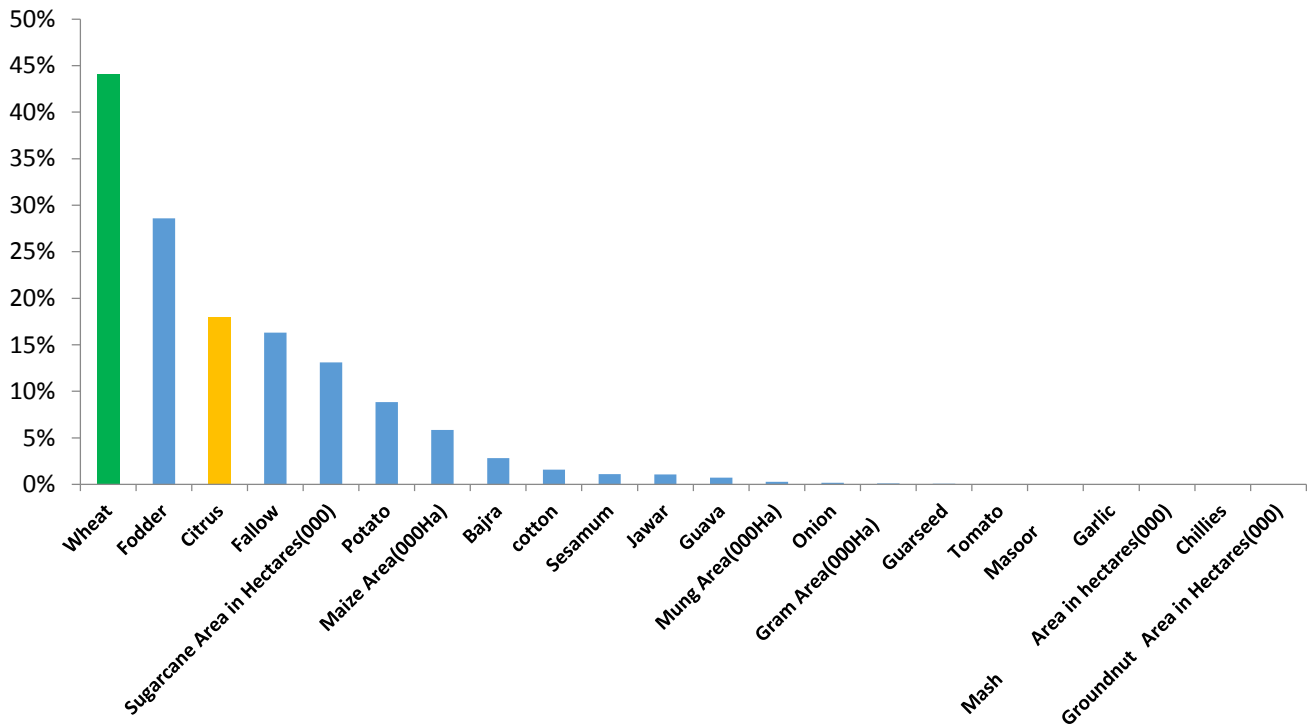


Table 5.4 Comparison of Wheat and Citrus Crops

Crops	Current area (ha)	Proposed area (ha)	Value decrease (B Rs)	Value increase (B Rs)
Wheat	221,000 (44%)	75,000 (14%)	13	
Citrus	90,644 (18%)	236,644 (48%)		93

Source: The Urban Unit calculations based on AMIS data

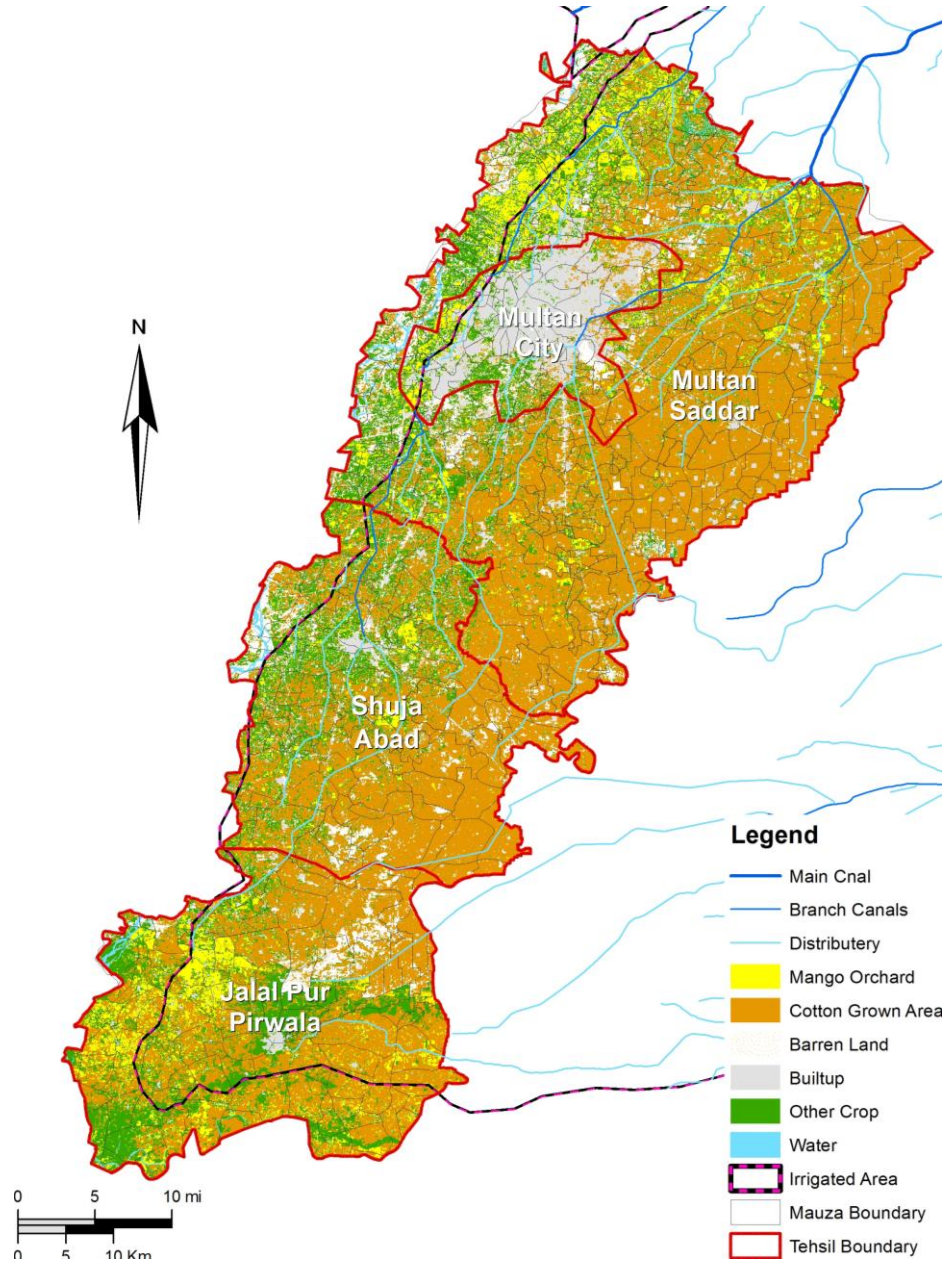
Figure 5.19 Cropping Pattern of Sargodha (Percentage of Total Cultivated Area)



Source: Agriculture Marketing Information System



Figure 5.20 Mango Grown Areas In Multan District



Source: Urban Unit, Own Calculation



Table 5.5 Top Mango producing districts in Multan

Districts	Production of Districts (Tons)	% of Total Punjab Production in this district	Yield (M/A)
Multan	425303.1	33.97	137
M. Garh	232703.6	18.59	123
Rahimyar Khan	226559.7	18.10	94
Khanewal	175126.9	13.99	128
Bahawalpur	44999	3.59	104
Vehari	30083.6	2.40	121
Jhang	18341.3	1.46	125
Sahiwal	16124.2	1.29	84
Okara	13831.6	1.10	113
Bahawalnagar	13819.7	1.10	98
Rajanpur	9853.7	0.79	102
Lodhran	4781	0.38	119
Layyah	1792	0.14	114
Punjab	1251967	100	87.9

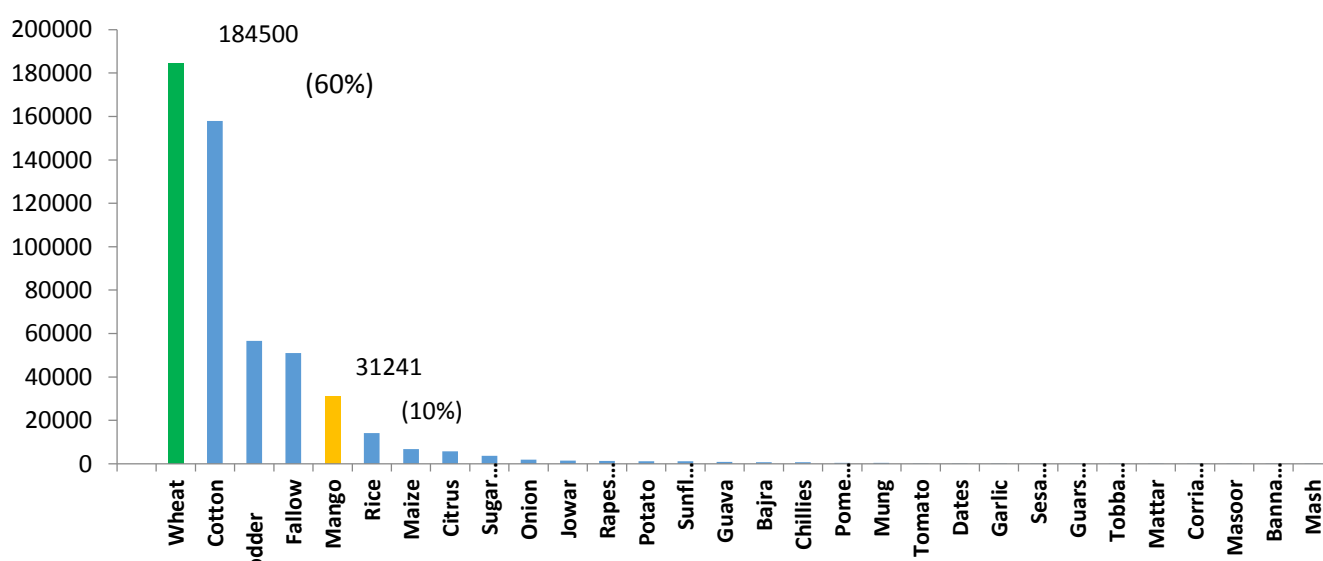
Source: Agriculture Marketing Information System

Table 5.6 Comparison of Wheat and Mango crops

Crops	Current area (ha)	Proposed area (ha)	Value decrease (B Rs)	Value increase (B Rs)
Wheat	184,500 (60%)	122,900 (40%)	0.31	
Mango	3,1241 (10%)	92,841 (30%)		6.2

Source: The Urban Unit calculations based on AMIS data

Figure 5.21 Cropping Pattern Of Multan (Area in Hectares)



Source: Agriculture Marketing Information System

5.3.3 Policy option and support system for high value crops zones

Subsistence level agriculture is hamstrung by low productivity of crops. With the exception of wheat,



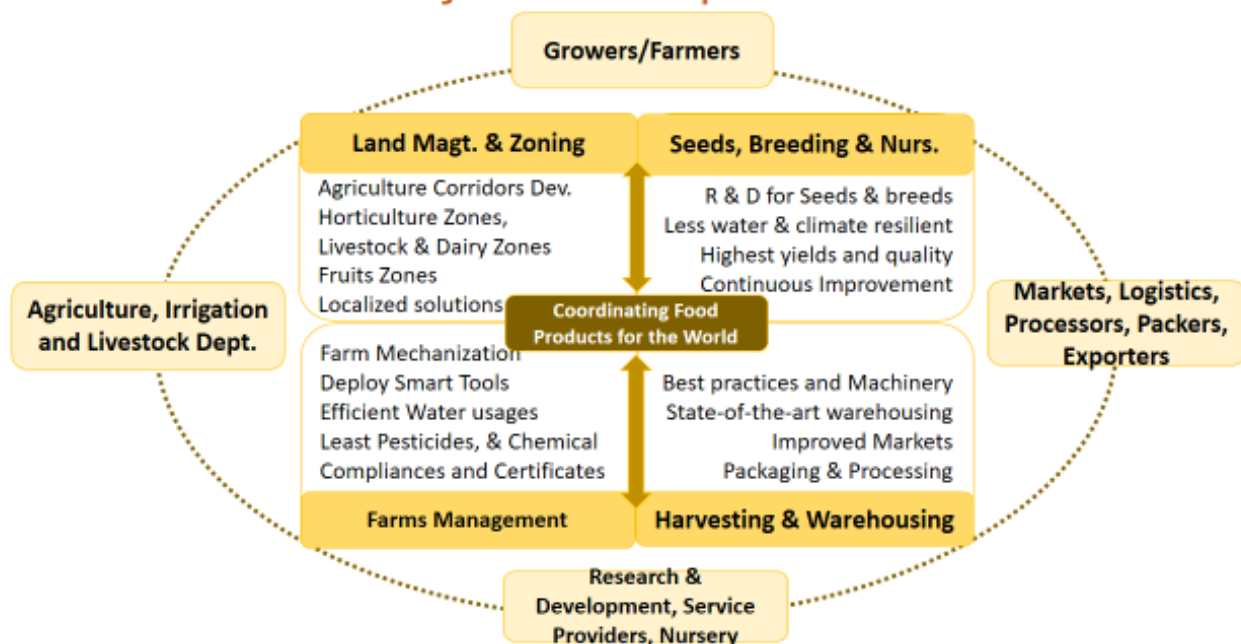
Sugarcane, Rice and Maize (that are heavily subsidized in shape of high support prices) the productivity of all other minor crops, vegetables, fruits, food grains and oil seed crops in Punjab has been stagnant and declining since 1950. Apart from the growth in a few crops, Punjab considerably lags behind in productivity of all types of crops and livestock compared to other leading countries of the world.

The poverty of the farmers and rural areas is also due to the prevalent the inefficient market system that does not provide adequate prices to the small farmers due to bad governance gap between farm price and market price (middle man role) use are other reasons of poor performance in this sector. In addition to increasing productivity, the development of agricultural products' value chains is critical to fostering sustainable growth in the agriculture sector. Accelerated growth in high-value agriculture will be achieved on a sustained basis if the markets work better and ensure a fair Price to farmers, and utilize surpluses for processing and packaging into value-added products for local and export markets. So there is a need of a coordinator department for each crop to control the whole value chain and provide all the required soft and hard interventions to promote the crop at an international level.

Policy Focus Areas

- *Seeding and Nursing infrastructure for particular crop zone/s with the help of private sector*
- *Specialized extension service training for specific crops*
- *Availability of subsidized fertilizers for small farmers*
- *Optimize water utilization by introducing high end technologies*
- *Extensive farmer training on better techniques and solutions*
- *Awareness and advocacy at mass scale for farmers on new cropping patterns*
- *Initiate short term credit loaning of up to 3 years for farmers for smooth transition to new cropping mix*
- *Provide better logistical Infrastructure like storage and transportation to agriculture sector*
- *Institutional framework and policy reforms in marketing system*
- *Specialized Research and Development initiatives for each zone*

WAY FORWARD: Position Punjab as a Food products for World





5.3.4 Agriculture Sector Opportunities in the context of China-Pakistan Economic Corridor

The Pak China Economic Corridor (CPEC) presents vast opportunities for the Punjab province especially in agriculture. China which had an impressive average GDP growth rate of 10% over last three decades has experienced its lowest rate of 6.9% in 2015. The government in order to maintain its growth is undertaking investments and economics opportunities. With increased connectivity as a result of OBOR (One Belt One Road), China will be able to stimulate trade relations with ASEAN, Central Asian and European countries, which will spur a demand for China's goods and services. The major areas of collaboration in agricultural development is targeting the agricultural up gradation of the areas adjoining CPEC; thus, resulting in the more efficient use of resources. Moreover, improved cooperation in agriculture can take place involving technical exchange and areas regarding pre and post-harvest with the accessibility to market. China and Pakistan have potential for symbiotic trade relations, whereby China can take advantage of the low-cost production resources available in Pakistan. Similarly, Pakistan can benefit from the technology and financing that China has to offer. Moreover, china offers a huge market of imported food products. Its food imports have been increasing at an average rate of 15% per annum and in 2012, China surpassed USA to become world's largest importer of agricultural products. China's agriculture imports mostly include oils, grains, sugar, cotton, fruits, vegetables, meat and hides, therefore Pakistan has a lot to offer and has revealed comparison advantage in export of these crops. Through systematic interventions in the trade policy; we can provide china with lower rates as compared to other countries thereby securing a substantial part in the Chinese agricultural imports. Pakistan being an agricultural economy has the bulk of export basket contingent on agriculture. The most dominant exports of Pakistan are cereals earning \$1,942 million, which is almost half of the over-all agro and agro-processed export earnings. The second highest category is edible fruit, nuts and fruit peels, with a value of \$415 million, accounting for 10% of the total earnings. Citrus fruit has the highest export value in 2015, followed by fresh or dried dates. A variety of agricultural and agri-processed

products are imported by China, ranging from oil seeds to preparations of fruit, vegetable and flour. The foremost import category in Chinese imports is oil seeds, which constitute \$40 billion in import expenditure, constituting 53% of total agricultural imports of China. Thus, it a potential high yield crop for Pakistan. Rice is also a high value crop as its demand in the international market keeps growing and Pakistan is among the top five exporters to the world. The top export destination for Pakistan's rice is Kenya, where rice worth \$0.21 billion was exported in 2015. In the international trade for fruits, Pakistan exports US\$ 415 million worth of fruits to the world. The main exports within fruits are citrus (fresh or dried), dates and guavas, mangoes. Export of citrus fruit, consisting of mandarins, grapefruit, lemons and oranges, to the world amounted to US\$ 0.18 billion in 2015. Citrus fruit constituted 45% of Pakistan's total fruit exports to the world. The exports of citrus to the world have grown at an average annual rate of 5% in the years 2012 to 2016. Pakistan's exports of guavas, mangoes and mangos teens to the world have gone up from 2003 to 2015. In 2003, exports to the world stood at US\$ 22 million, which increased almost two-fold by 2013, and amounted to US\$ 41 million. Therefore, rice, vegetables, oil seeds and sugar cane have proven to be high value yields while other can be categorized as low value yields which are highly subsidized by the government thus high price have hindered them to secure a substantial part in the Pakistani's exports to the world.

5.3.5 Indicative Targets

The main object of this section is Increase Punjab's agricultural GDP from current 25 billion dollars upto 200 billion dollars in next 30 Years in phased manner through strategic interventions. So it is needed to divide Punjab's cultivated area among high value crops zones. The area under high value crops be increased in a way that result the overall growth in Punjab and also improve the standard of living of the farmers. Secondly by providing latest technology and specialized support system in these zones, efficiency and productivity of land, labor and water would increase.

Table 5.7 Indicative Targets

Goals	Policy Thrusts	Actions
Development of crops zones	Development of crops zone by providing specialized support system	<ul style="list-style-type: none"> • 5 zones are supported by 2027 • 15 zones are supported by 2037 • 25 zones are supported by 2047
Increase farm productivity	Lessing the productivity gap in all crops	<ul style="list-style-type: none"> • Comparable to the progressive framers by 2027 • Comparable to best in region by 2037 • Comparable to world best by 2047
Efficient use of ground and surface water	Water management and increase water efficiency	<ul style="list-style-type: none"> • Reduction of system water losses from 52% to 25 % by 2027 • Increase water storage capacity • Replenishment of water table



High value crops	Increase production of high value export oriented crops	<ul style="list-style-type: none"> Increased area under high value crops from 6% to 25% Value addition (increase share of processed fruits and vegetables from 8 % to 50% in total export of fruits and vegetables) Capture global value chain by increasing agriculture exports from 6 billion dollars to 50 billion dollars
Increase labor productivity	Skill enhancement and adaption of modern practices at farm land	<ul style="list-style-type: none"> Cluster specific skill training and development Enhancing technical and technological capacity of farm labor Increase labor efficiency
Investment in R & D	Institutionalization of R & D and its availability to small farmers	<ul style="list-style-type: none"> Enhance scientific research Increase expenditure on R & D from 0.18 % of Agri. GDP to 2 % of Agri. GDP
Transforming domestic markets	Institutional framework and policy reforms	<ul style="list-style-type: none"> Institutional reforms for increasing market efficiency Addressing Farm to market economic inefficiencies.
Increase cultivated Land from Uncultivated land	Improvement in irrigation system and methods	<ul style="list-style-type: none"> Increase 1.6 million acres in each decade

Source: The Urban Unit calculations

5.4 Livestock

Livestock sector contributes around 11% in total GDP of Pakistan and its share in agriculture is around 59%. The growth rate of livestock is 3.76 in 2017-18 as compared to 2.99 in last year⁹. Livestock products contribute almost 13% to the foreign exchange. It is the most important source of the livelihood of rural population; earnings of 30 to 35 million farmers are dependent on livestock¹⁰. Currently, gross value addition of livestock is PKR 1,172 billion while its share in exports is almost 56%¹¹. According to FAO Statistics, Pakistan ranks at 2nd in buffalo population in the world and ranks 4th in total Livestock population. Moreover Pakistan stands at rank 12th in cattle milk production and at 4th in goat population¹².

Punjab being the largest province of the country also houses the largest share of livestock population. Province has 49% of Pakistan's cattle, 65% of the buffaloes, 24% of the sheep, and 37% of the goats. Similarly, in terms of the value of products, Punjab is producing 62% of milk, 43% of beef, 32% of mutton and 75 % of poultry of Pakistan¹³.

According to FAO, Livestock production has grown faster than agricultural production in most developing countries, and this trend is likely to continue with growth rates over the next 20 years estimated at 4.5 percent per annum¹⁴. In Pakistan, the latest available report of the livestock census was of 2006's census. According to this report, the population of sheep was 6,360,952, goats was 19,754,126, cows was 4,361,140 and buffaloes was 17,663,050. These numbers have grown to 7,321,096, 27,417,175, 14,361,140

and 25,220,071 for sheep, goats, cows and buffaloes respectively in 2017-18, as per Economic Survey of Pakistan (2018). This shows a growth of 15% in sheep, 39% in goat, 57% in cows 43% in buffaloes' population from 2006 to 2018¹⁵. Growth of Punjab livestock sector could, further, be assessed by considering the facts that more than 90% poultry processing industry are setup in Punjab which is success story as more than 11 % growth rate reported in poultry sector¹⁶.

The spatial representation of the livestock population is shown in the figure 5.22 which is based on Livestock census 2006. The districts with dark brown color have higher concentration of livestock including cows, buffaloes, sheep and goats. Bahawalpur, Rahim Yar Khan, Bahawalnagar, Dera Ghazi Khan, Jhang and Sargodha are all districts, which have a large number of livestock whereas Jhelum, Rawalpindi, Gujrat, Sialkot and Narowal have lower concentration of livestock population. Moreover, individual livestock percentage of cow, buffaloes, sheep and goats has been shown on each district on the map in the form of bar charts. These bar charts clearly depict which districts have either of more population of cow, buffaloes, sheep and goats.

The livestock sector not only supports the agriculture sector but also the processing industry and services sectors in terms of meat and dairy processing, leather, tanneries and wholesale and retail sub-sectors. However, despite having such vast share in the provincial and national economy, this sector could not be developed as per its optimal potential. For instance, livestock productivity, preventive health standards and quality are far below world benchmarks. The reasons are not only linked with the genetic potential of the breeds but with wider market distortions as well.

The milk and meat prices of Pakistan are not competitive globally due to high input and low output model. This vicious model cannot be corrected unless government focus also to develop animal by-product industry viz., tanneries, skin/hide, processing and packing of offal, hooves, horns, blood

⁹ Government of Pakistan (2018). "Economic Survey of Pakistan 2018". Islamabad: Economic Advisory Wing, Ministry of Finance.

¹⁰ Livestock Department, GoPb (2017). "Livestock Sector Punjab". Retrieved from the official website of the Livestock Department: http://www.livestockpunjab.gov.pk/dashboard/sector_punjab

¹¹ Ibid

¹² Food and Agricultural Organization (FAO), UN. Accessed from <http://www.fao.org/docrep/V8180T/v8180T0a.htm>

¹³ Livestock Department, GoPb (2017), *op.cit.*

¹⁴ Ibid

¹⁵ Livestock Department's estimates based on projection of Government of Pakistan (2018), *op. cit.*

¹⁶ Livestock Department, Government of Punjab



and value addition to milk & meat. There is also a dire need to develop business linkages with all stake holders across the supply chain which will act as a pull factor for improved productivity and exports. This cannot be possible until the livestock sector may also be developed as an industry. Keeping in view the livestock share in national and provincial GDP and diversified export potential, especially halal meat, it is of paramount importance to focus on livestock sector which is, unfortunately, always remained neglected.

The above map 5.23 shows Total Milk Production (Million Liters/Yr) in all districts of Punjab. The districts with dark brown color have higher production of milk including Cow milk, Buffaloes milk and Goat milk. Bahawalpur, Bahawalnagar, Kasur, Faisalabad, Jhang, Muzzafarghard the districts which produce more milk as compared to other districts whereas Lodhran, Dera Ghazi Khan, Rajanpur, Khushab and Mianwali have lower production of milk. Moreover, Average Milk Yield (Liters/Day) of Cow, Buffaloes, and Goats has been shown on each district on the map in the form of bar charts. These bar charts clearly depict which districts have more yield of milk as compared to other districts.

Similarly, production and Consumption gap of milk has been shown in the following table. Per capita annual milk consumption of Punjab is higher than the per capita

consumption of Pakistan; 98.7 and 77.6 liters per year respectively. Moreover, per day consumption of milk is lower than the production and Punjab has more potential to meet the milk necessities of the country but there is a need to improve marketing channels to make efficient use of this milk, as 95% of the milk does not enter into the organized marketing channel

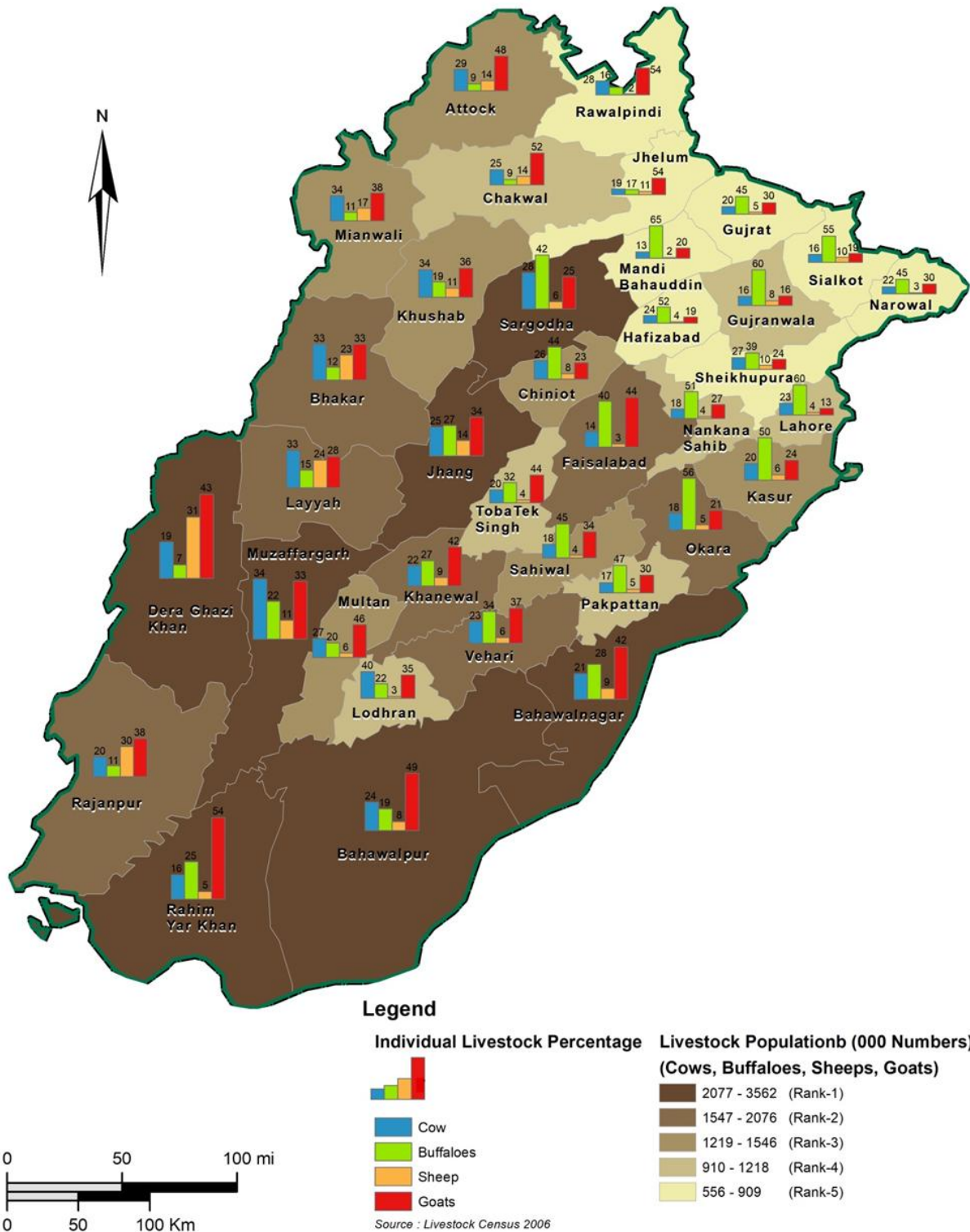
Table 5.8 Production and Consumption Gap of milk

Production and Consumption Gap of milk	Liters
Per Capita Consumption of Milk Per Year Pakistan	77.64
Per Capita Consumption of Milk Per Year Punjab	97.8
Per Capita Consumption Per Day in Punjab	25457553.6
Per Day Production of Milk in Punjab	74724532.4
Difference between Production and Consumption	49266978.8

Source: Livestock Census 2006



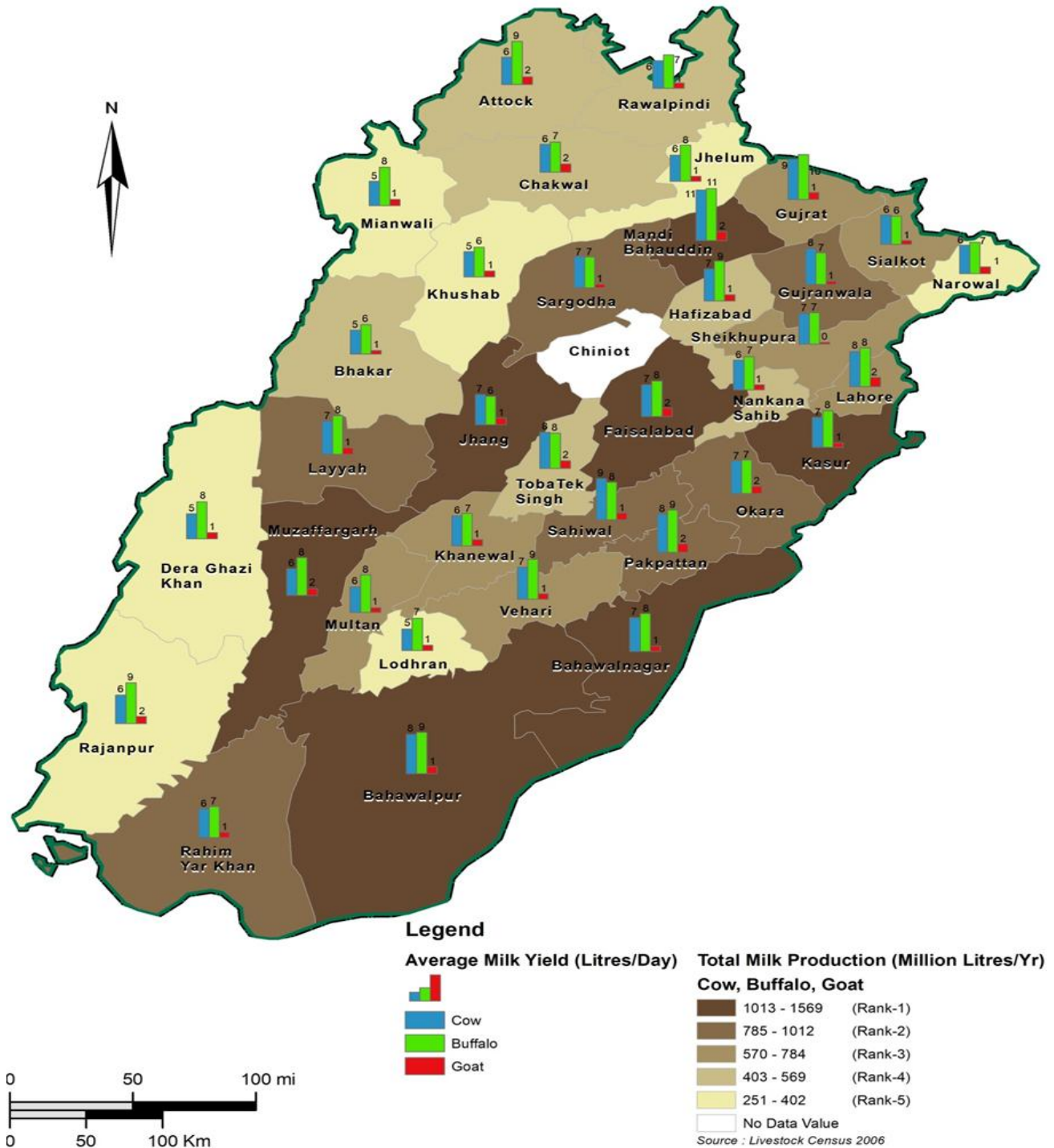
Figure 5.22 Livestock Population in Punjab



Source: Livestock Census 2006



Figure 5.23 Milk Production in Punjab



Source: Livestock Census 2006



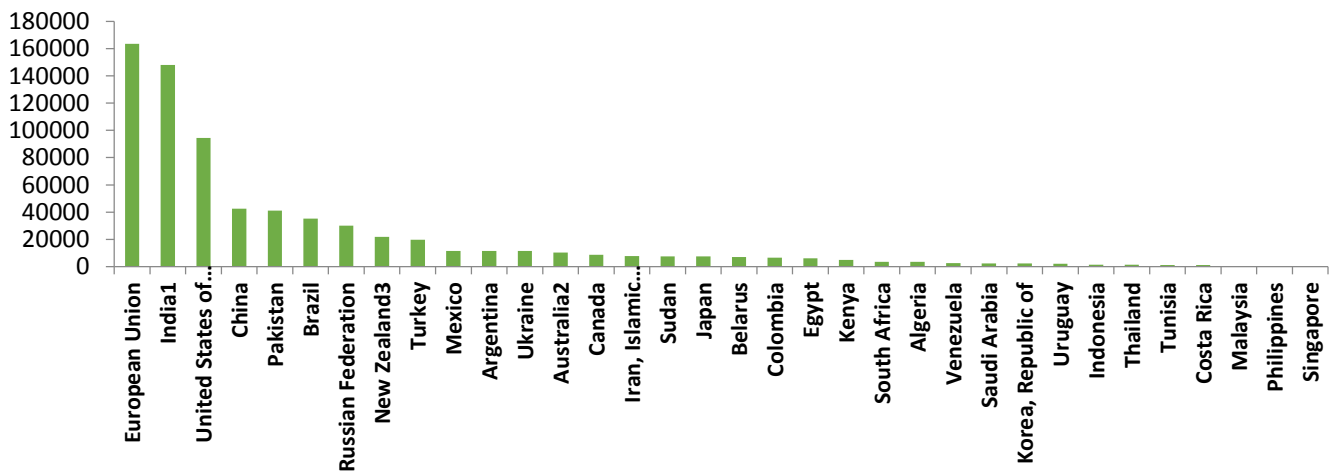
Production, Import and Export of Milk and Milk Products

International ranking regarding Production of milk and milk products (Thousand tons) of 34 countries has been shown in the following graph (figure 5.26). As per the ranking shown in the graph below, Pakistan stands at 4th position internationally in terms of milk and milk product whereas European Union is at the top and India ranks at 2nd position. According to the published report of FAO 2012 Malaysia, Philippines and Singapore stands at 32nd, 33rd and 34th rank respectively. Import of milk and milk products (Thousand tons) of 34 countries has been shown in the figure 5.26. As per the ranking shown in the figure 5.27 below, Pakistan stands at 19th position internationally in the import of milk and milk products whereas China is on the top among all importing countries whereas, Mexico ranks at 2nd position. Similarly, Ukraine, Uruguay and Argentina stand at 32nd, 33rd and 34th rank respectively. Import of milk and milk products (Thousand tons) of 34 countries has been shown in the following graph figure 5.27.

The international ranking of the Production of meat and meat products (Thousand tons) of 35 countries has been shown in the following graph figure 5.28. As per the following ranking, Pakistan stands at 16th position internationally in the production of meat and meat products whereas China is at the top and European Union ranks at 2nd position. According to the published report of FAO 2012 Cuba, Angola and Singapore stands at 33rd, 34th and 35th rank.

Import of meat and meat products (thousand tons) of 35 countries has been shown in the following graph figure 5.29 and figure 5.30. As per the following ranking, Pakistan stands at 31stth position internationally in the import of meat and meat products whereas China is on the top among all importing countries and Japan ranks at 2nd position. Similarly, Argentina, Nigeria and India stand at 33rd, 34th and 35th rank.

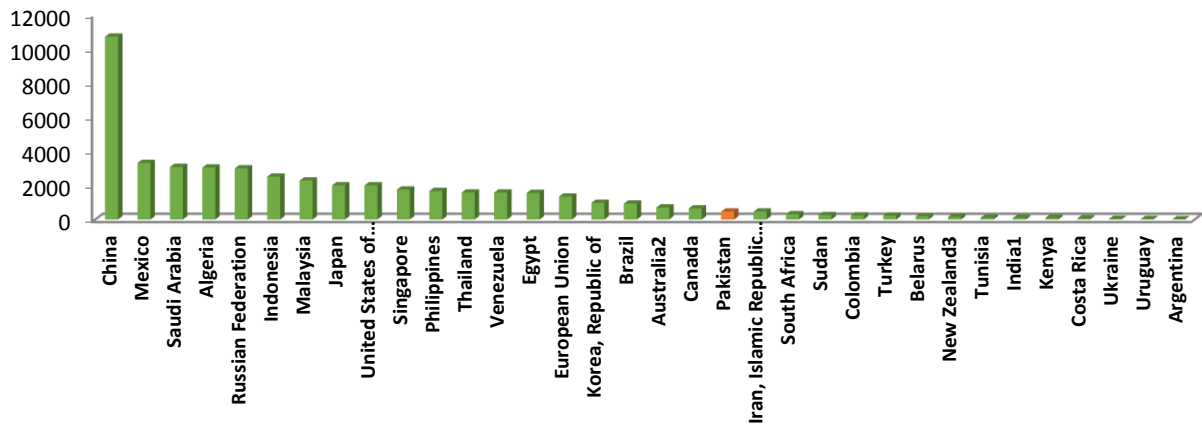
Figure 5.26 Production Milk and Milk Products (Thousand Tons, Milk Equivalent)



Source: FAOSTAT 2016

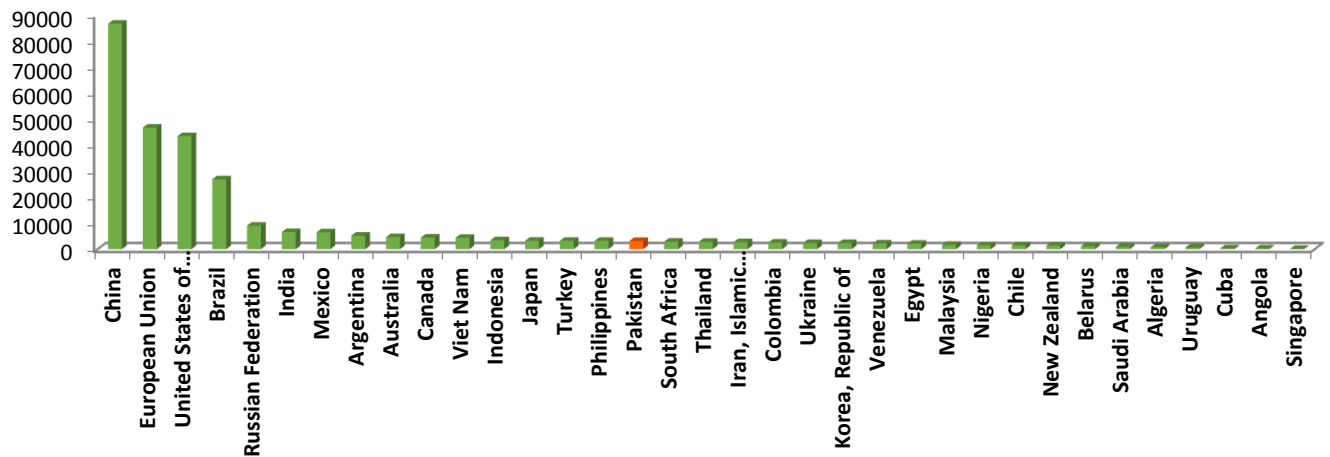


Figure 5.27 Imports Milk and Milk Products (Thousand Tons, Milk Equivalent)



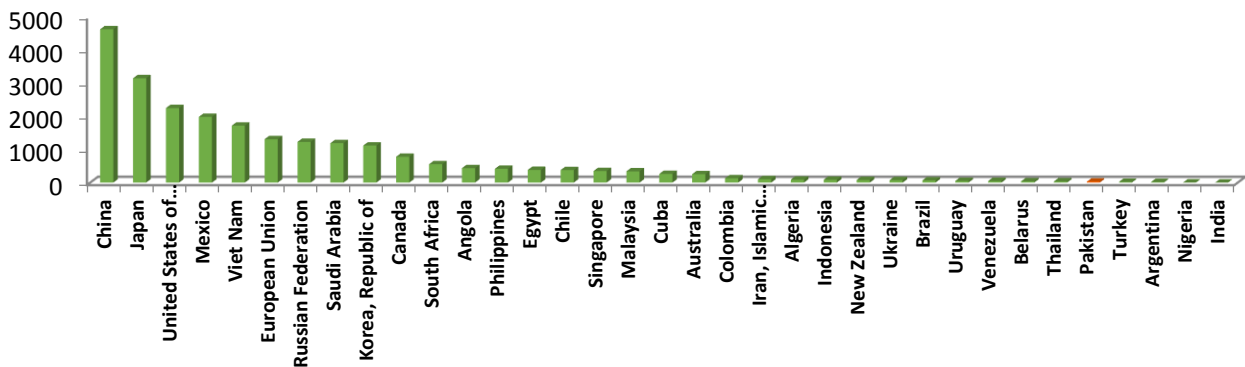
Source: FAOSTAT 2012

Figure 5.28 Production of Meat (Thousand Tons, Carcass Weight Equivalent)



Source: FAOSTAT 2012

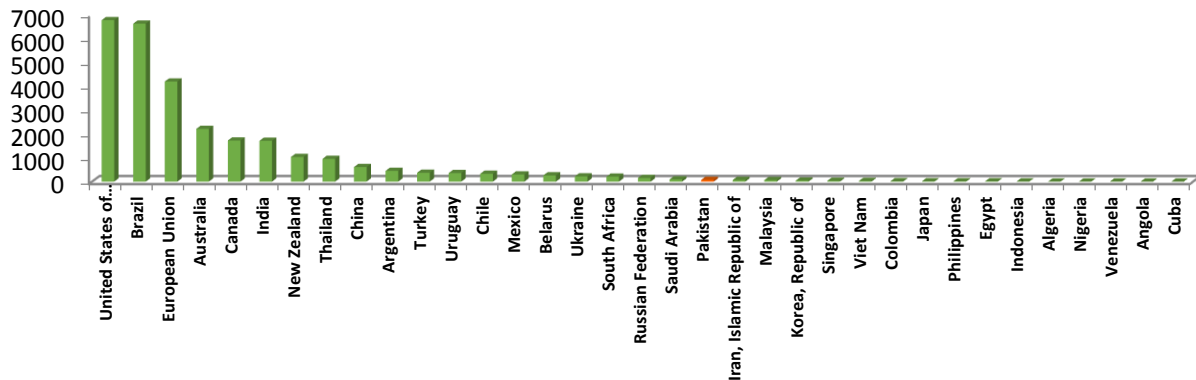
Figure 5.29 Import of Meat (Thousand Tons, Carcass Weight Equivalent)



Source: FAOSTAT 2012



Figure 5.30 Export of Meat (Thousand Tons, Carcass Weight Equivalent)



Source: FAOSTAT 2012

5.4.1 Issues and challenges

Sector major challenge are reluctant attitude towards adoption of innovations, out-dated mechanization practices, low productivity per animal, poor & expensive transportation system, less focus on commercialization & industrial approach, capacity building of farmers, veterinary institutes, missing of integrated approach between industry, field & research, absence of need base R&D, inadequate availability of credit to farmers particularly small farmers and salient issues/ challenges are deliberated in detail below:

Low productivity

Although Punjab is a major producer of livestock products, the average productivity of livestock is much lower as compared to world average. Inadequate availability of feed and fodder, poor breeding practices, poor management, poor husbandry practices, animal diseases, inadequate marketing and financial infrastructures, and unorganized marketing are the other major culprits for low productivity of livestock systems.

Low quality feed, fodder and scarcity of minerals, nutrients and quality water

The gap between the requirement and availability of feed and fodder for livestock is increasing primarily due to continuous decline of the area under fodder cultivation and reduced availability of crop residues as fodder. There is continuous shrinkage of common/ range lands leading to over grazing in the remaining grasslands.

Poor disease control, diagnostics, surveillance infrastructure

The preventable diseases of animals in Punjab are causing huge economic loss in terms of is in billions of rupees. The FMD alone causes loss of Rs. 8 billion a year. Mastitis reduces the milk productivity of animals up to 50 % with irreparable economic shock to the farmer. Losses from Hypodermises are

quite high. PPR makes losses up to Rs. 20.5 billion. Losses due to BQ are no less than Rs. 10 billion¹⁷.

Although some infrastructure exists for the disease testing but in the absence of a viable and robust surveillance infrastructure, the disease forecasting would not be possible. There is a need to establish an effective and integrated surveillance, vigilance, prevention and control mechanisms to protect the productivity and safety of all animals and an efficient forecasting and management information system on occurrence of diseases, particularly of epidemic and endemic nature. There is also lack of prompt collection and validation of animal disease information and creation of database that can help in launching of various disease control programmes.

Disease diagnostics is the area having a far-reaching impact if worked out properly as per the requirements of the farmers and the market. Unfortunately, due to absence of a livestock policy, directionless efforts did not produce intended results, leaving the deficiency of information regarding disease prevalence patterns, compromising the ability of strategic decision makers to take corrective measures well in time. It multiplied the curative cost to the breeder as well.

Shortage of vaccines

The area of vaccine production could not take off due to overwhelming focus on curative side of health management. This practice has culminated into huge economic losses, which if calculated would offset the cost of several vaccine production facilities in the country. Nonetheless, the shortage of vaccine is a major impediment to move towards eliminating the preventable diseases; to minimize the economic losses of diseases and to gain access to high end export markets.

The poor breeding services and genetic upheaval

The breeding services despite consuming major chunk of the budget did not produce desired results. Instead, they added to the distrust of the farmers due to off the mark outcomes.

¹⁷ Ibid.



The reasons are many, chiefly being the absence of a direction and linkage of breeding activities and goals with holistic development of the livestock sector.

The reckless introductions of exotic breeds and heavy inbreeding amongst local breeds have culminated into a genetic upheaval of biblical proportions.

Lack of demand driven applied research and underdeveloped extension services

There are state of the art laboratories with equipment, chemicals, kits and trained HR from best institutions of the world but they could not contribute to the sector as per their capabilities. Furthermore, the demand based applied research could not be promoted for certain reasons. There is need to identify the particular areas and species/ livestock production systems, on regional basis, of research for the next 10 years.

The extension services are there but these are in the rudimentary condition with much to do despite seeing sizeable chunk of budget. Extension workers are mostly ill-motivated with little incentive to work and bring about the change.

Poor value chains and lack of value addition

Currently, there is no value chains developed in the province, the private sector can play a pivotal role in this regard. But the contribution of corporate sector is very restricted in livestock sector, which is almost 1%. Whereas, the contribution of commercial sector in livestock sector is around 4% through informal channels¹⁸. For the high production & growth, informal sector should be diverted to formal system so that farmer can contribute in livestock sector with in form position. Similarly, due to poor value chain linkages, there is no value addition and processing of the meat and dairy products as per full potential.

Market distortions and no farm gate pricing

Currently, markets are not perfect and not playing their role. For instance, there is a price control mechanism for retail price of milk and meat. But there is no farm-gate price for milk to ensure the coverage the cost of production by the animal farmers (livestock producer). Middle men (milkman and corporate milk collectors) exploit the livestock producers by charging lower and differentiated prices from different areas. There must be different prices for the different milk quality (high-fat milk or low-fat milk) because of their difference in cost of production.

Lack of institutional coordination and overlapping mandates

There is lack of coherent livestock policy for the province and no coordination or collaboration mechanism for overlapping role of the institutions. Other than livestock department, there are number of departments and institution are linked directly or indirectly with the livestock sector, for instance,

local governments for slaughtering control, agriculture department for fodder production, forestry department for range land development, industries department for meat and dairy industries, Punjab Food Authority for quality control, Labs, testing and Certification bodies, federal government institutions like Export Development Fund, Trade Development Authority of Pakistan, Commerce Division for trade and export promotion and State Bank of Pakistan for credit policy. Even the role of other provinces is also involved in control of trans-boundary diseases. However, presently, no integrated institutional arrangement for collaboration.

Lack of bank credit for livestock

Bank loans to the agriculture sector have been on a rise for some years. In FY 13-14, banks exceeded their indicative agricultural lending target in Punjab. However, only a fraction of the said lending i.e. just 7% was given to the livestock sector even though livestock contributes 58% of agriculture sector¹⁹.

5.4.2 Way Forward for Livestock Sector

5.4.2.1 Objective

The overall goal of the livestock sector strategy for the Punjab is to contribute towards poverty alleviation and economic development of the province through provision of an enabling environment and support services for enhancing value addition, value chain development, enhancing exports and profitability of the livestock sector.

5.4.2.2 Policy actions for the promotion of livestock and dairy sector

To achieve sustainable development livestock, dairy and meat processing in Punjab the Punjab Spatial Strategy proposes the following major policy interventions:

Livestock, Dairy and Meat Zoning

Spatial zoning of the province for livestock production based on the locational advantages, nutritional values of soil, environmental and ecological conditions of each area shall be done. And particular support services shall be provided for feed, fodder, silage, breeding, nursing and disease control. The area specific coverage and results of extension services shall also be done

The above figure, for instance, shows the spatial representation, which show that in first phase, three zone for meat production, processing and value addition can be developed; (i) zone one comprising of the districts Rawalpindi, Mainwali, Chakwal, Sargodha, (ii) zone two comprising of the districts of Sargodha, Jhang, TT Singh, Faisalabad, and (iii) zone two comprising of the districts of Lahore, Sheikhpura Gujranwala, Gujrat, Sialkot, Kasur.

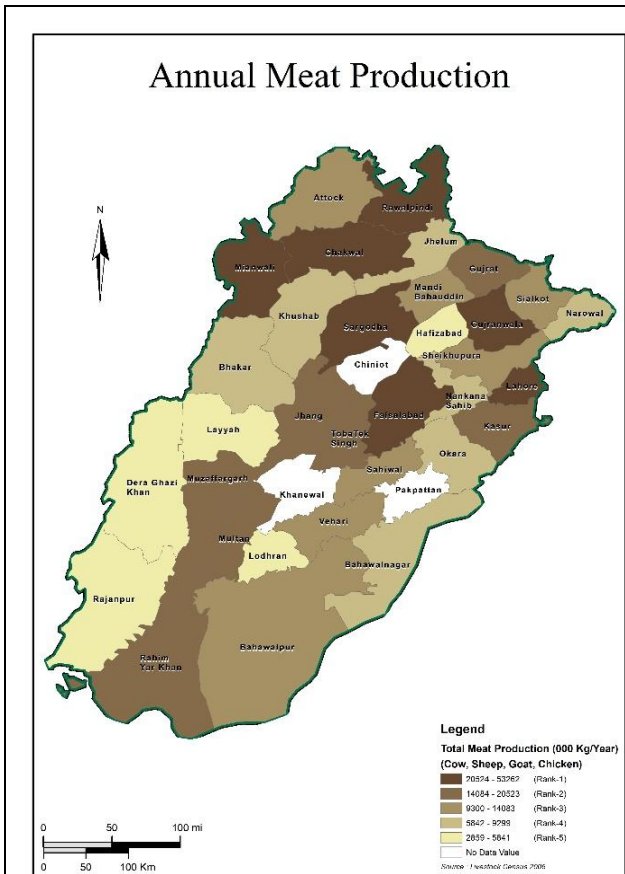
Similarly, for milk production and processing three zones can be developed on priority basis in first phase i.e. (i) Zone one comprising of the districts of Sahiwal, Pakpattan and TT

¹⁸ Livestock Department, Government of the Punjab

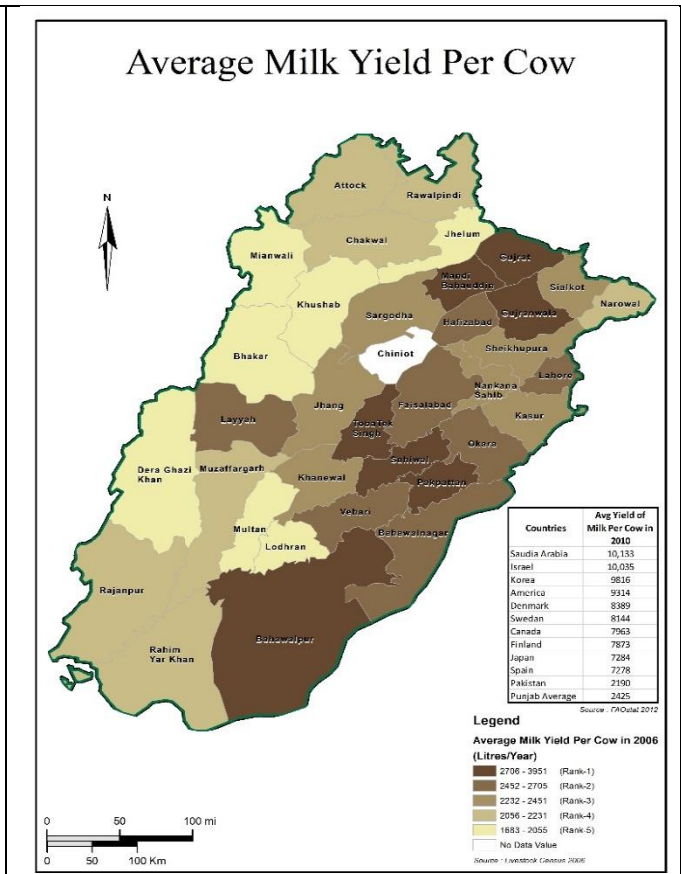
¹⁹ *ibid*



Singh, (ii) M.B. Din, Gujrat and Gujranwala, (iii) Zone three of Bahawalpur and Cholistan. These results can be further strengthened by study of nutritional values of soil, environmental and ecological conditions of each area before officially notifying these zones.



Source: The Urban Unit Analysis



Source: The Urban Unit Analysis



The table shows the mineral status of blood, soil and fodder conducted by different researchers.

ZONE	Districts	Deficiency in Blood	Deficiency in Soil	Deficiency in Fodder	Overall deficiency in the Blood of animals in the Zone	References
NORTHERN IRRIGATED ZONE	Lahore	Ca, P, Na, Fe	Na, K, Zn	--	Ca, P, Na, Fe, Mg, Cu, Co, Zn, Mn	Pasha and Farooq, 2009; Ali., 2008; Khan et.al., 2010; Fardousey.al., 2010; Khan et.al., 2013; Ahmad et.al.,2009; Ilyaset.al.,(Abstract); Khan et. al., 2012.
	Gujrat	--	--	Ca		
	Sialkot	Mg, Cu	--	--		
	Gujranwala	Na, Fe	K	P		
	M.B.Din	--	--	--		
	Hafizaabad	P, Na, Fe	--	--		
	Sargodha	Na, Mg, Cu, Co, Zn, Mn	Se, Na, Mg	Mg, Ca, Na, Mn, Fe, Se		
	Jhang	--	--	Co, Cu		
	Faisalabad	--	--	Mn, Zn, Cu, Co		
	Sheikhupura	Na, Fe	Na, K, Zn	--		
	Kasur	Na, Ca, P, Fe	Na, K, Zn, P	--		
	Okara	Na, P, Fe	Na, K,	Se		
	T. T. Singh	--	--	--		
Sahiwal	Na, Ca,, Fe	Na, K, Zn,	--			
Pakpatan	Fe	Na, K, Zn, P	--			
SOUTHERN IRRIGATED ZONE	Bahawalnagar	--	--	--	Mg, Zn, Se, Fe	Ali, 2008
	Vehari	--	--	--		
	Multan	Mg, Zn, Se, Fe	--	Ca		
	Lodhara	--	--	--		
	Khanewal	--	--	--		
	Bahawalpur	--	--	--		
R. Y. Khan	--	--	--			
ARID/BARANI ZONE	Mianwali	--	--	--	Ca, P, Na, K, Cl, Zn, Cu, Fe	Khan et.al., 2007; Ali., 2008; Pasha and Farooq 2009; Akhtaret.al., 2013; Khan., 2012; Khan, 2009.
	Chakwal	Ca, P, Na, K, Cl	--	Ca		
	Jhelum	Zn, Cu	--	P		
	Khushab	Na, Ca, Fe	K, Zn	--		
	Rawalpindi	--	--	Na		
	Bakhar	Ca	Ca	--		
	Layya	--	--	--		
	D.G.Khan	Zn	K, Zn, Mg	--		
	Muzafargrh	Na	Na, K, Zn,	--		
	Rajanpur	--	--	--		
Attock	--	--	--			

Source: U. Tahir, 2016 (Ph.D. dissertation)

Developing Markets and Supply Chains

Supply chain management in dairy, poultry and meat sector shall be improved and developed and market distortions be removed by implementing minimum farm-gate price for milk and meat producers. Capacity building of farmers (livestock producers) along with institutional capacity building to address the market gaps across value chain shall also be ensured. Similarly, the immediate implementation of the minimum pasteurization law in Pakistan will harm the small animal farmers. This should be implemented gradually in phases.

Framework for PPP

A framework that clearly defines the roles and manageable interests of the L&DD department and its potential partners in the public sector, private sector and academia in delivering the required actions and initiatives shall be devised to improve public private partnership.

Leveraging the CPEC as an opportunity

Livestock has great export potential for meat and meat by product to china. In last four years livestock has ensured massive vaccination against all prevalent diseases of livestock and efficient surveillance mechanism is laid down all over the Punjab. The epidemiological approach of department to eradicate FMD and other notifiable transboundary diseases is dully acknowledged and being monitored by FAO. Reviewing all these activities Federal government is going to be signed MoU on FMD free zone with China for start of trade regarding livestock & livestock product. There is need to strengthen the FMD free zones and may extended from Bahawalpur Division to other division. More over there is also required to establish processing units, modern abattoir, value addition techniques, feed and animal by product industry in these zones.

Integrated institutional coordination

A coherent livestock policy for better coordination or collaboration mechanism by removing overlapping role of the institutions shall be developed. As other than livestock department, there are number of departments and institution are linked directly or indirectly with the livestock



sector. Each department and institution will play its role in development of livestock, meat and dairy sector.

Shifting of Veterinary service provider to livestock Asset Manager – extension worker

Livestock Insurance: In next five years measure shall be taken regarding livestock insurance and flexible lending to livestock farmers on livestock as collateral for livestock production, processing and establishing meat / milk value chain from backgrounding to feedlot fattening, formation or pragmatic drive for dairy cooperatives, public partnership programs on dairy processing, value addition, silage/ hay making etc.

R&D for breeding, disease control and establishment of Disease-Free-Compartments

The steps shall be taken for eradication and control of OIE notified diseases through supply of free vaccination by Veterinary Research Institute, skill development of un-skilled dairy labour, need based R&D to exploit the potential of indigenous and cross breeds, and Disease Free Compartments (DFCs) shall also be established.

Earmarking Areas for livestock processing industries in Industrial Zones and Estates

A special area shall be earmarked in the Industrial estates and zones falling under the livestock zones for the establishment of diary and meat processing value chains. Disease Control compartments/ Zones (DCCs) and one model UC in each tehsil of Punjab as DCC notified by L&DD be clubbed with Industrial Zones as anchors for Agriculture & Livestock industrial transformation.

So the indicative key strategies for livestock sector are:

- *Exponential increase in yield of meat and dairy products by introducing modern livestock production mechanisms*
- *Better export orientation for livestock products*
- *Move towards high value added meat and dairy products*
- *Implementation of economically viable technologies for the livestock sector*
- *Institutionalize Research and Development apparatus for enhancing productivity and yield*