The Urban Unit

Urban Sector Planning & Management Services Unit (Pvt.) Ltd.

Agricultre Development Plan

Sahiwal Division

METHODOLOGY

01

Spatial Analysis

Mapping of agricultural data like crop zoning, Spatial decision support systems, and Remote Sensing

02

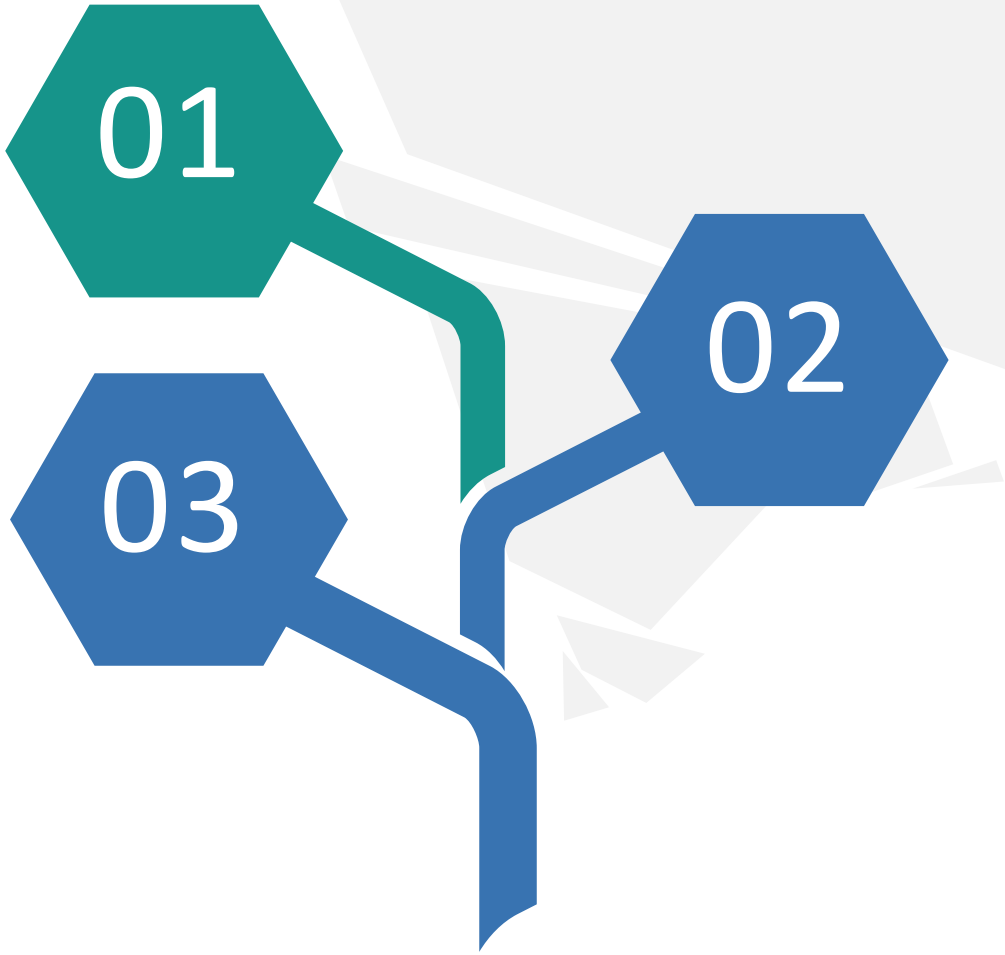
Quantitative/Qualitative Analysis

Field Data Collection: Preliminary meetings, Stakeholders Consultations, Desk Research

03

Report Writing

A compilation of the regional development plan of the Agriculture and Livestock sector



STAKEHOLDER CONSULTATIONS











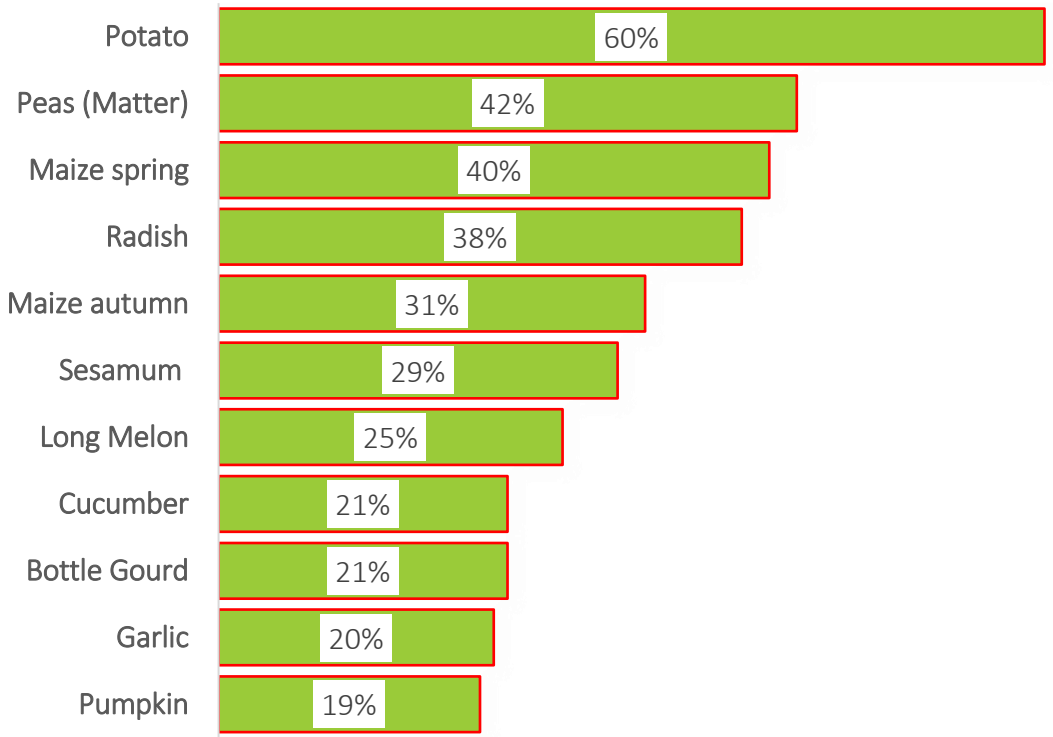

SAHIWAL DIVISION PROFILE

AGRICULTURAL POTENTIAL OF SAHIWAL DIVISION

The division is a major producer of high value added crops

The average yields of some high-value-added crops is better than Punjab's average

Production contribution as a percentage of Punjab's total



Average yield comparisons with Punjab

1.3x
Sesame

1.25X Sahiwal Division
1.76X Sahiwal District
Matter

1.5x
Tinda

Source: Crop Reporting Service (CRS)

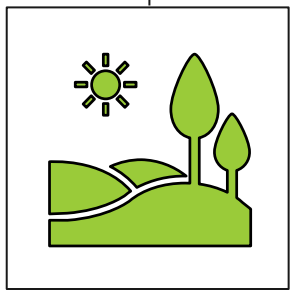
SAHIWAL DIVISON AGRICULTURE PROFILE

Total Reported Area (Sahiwal Division)

2,553,980 acres

Total Cultivated Area (Sahiwal Division)

2,104,440 acres



Contiguous Urban Development in Sahiwal District	Total
1995-2005	33%
2005-2015	44%

Annual Area Growth Rate in Sahiwal District	Total
1995-2005	2.92%
2005-2015	3.70%
1995-2015	3.31%

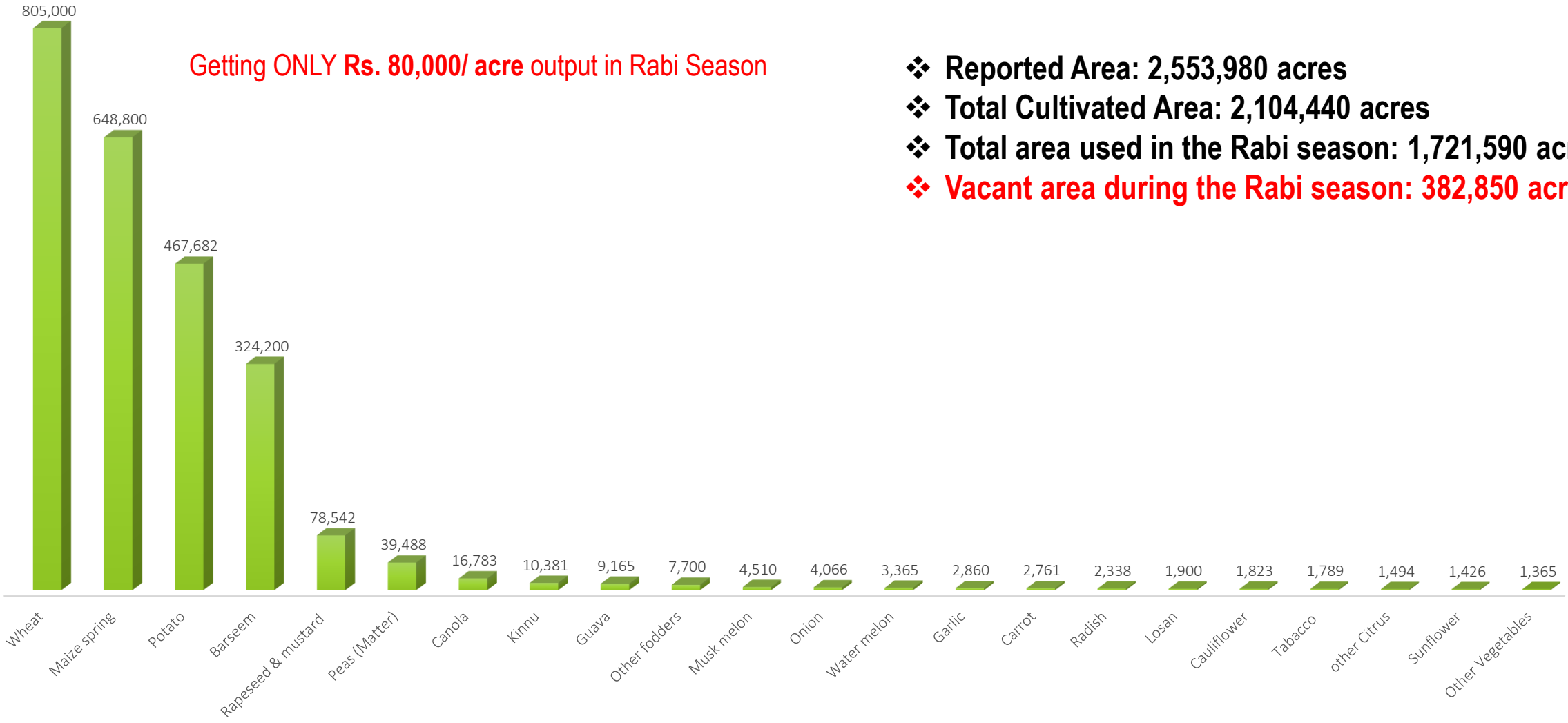
Employment by Sector (%) (Agriculture)	Total
SAHIWAL	42.8
OKARA	51.6
PAKPATTAN	52.3

Source: PDS 2022/Urban Unit/ LFS 2021

CROPPING PATTERN (RABI & KHARIF)

CROPPING PATTERN (RABI SEASON)

Getting ONLY **Rs. 80,000/ acre** output in Rabi Season



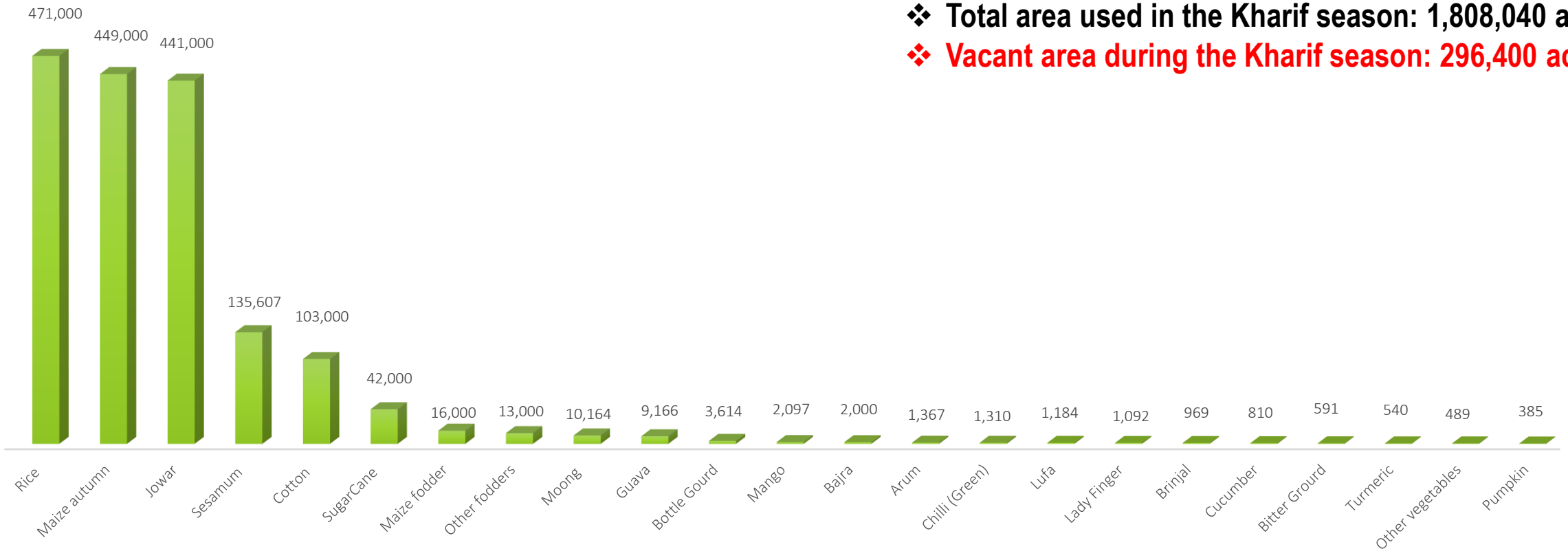
- **Reported Area: 2,553,980 acres**
- **Total Cultivated Area: 2,104,440 acres**
- **Total area used in the Rabi season: 1,721,590 acres**
- **Vacant area during the Rabi season: 382,850 acres**

Source: Crop Reporting Service (CRS)

CROPPING PATTERN (KHARIF SEASON)

Getting ONLY **Rs.135,000 / acre** output in Kharif Season

- **Reported Area: 2,553,980 acres**
- **Total Cultivated Area: 2,104,440 acres**
- **Total area used in the Kharif season: 1,808,040 acres**
- **Vacant area during the Kharif season: 296,400 acres**



Source: Crop Reporting Service (CRS)

ISSUES & CHALLENGES

AGRICULTURAL PROBLEMS IN SAHIWAL DIVISION

LIMITED SUPPLY OF IMPROVED SEEDS: THE REGION SUFFERS FROM A LACK OF CERTIFIED AND HIGH-YIELDING SEED VARIETIES OF POTATO AND MAIZE, HINDERING THE ADOPTION OF IMPROVED AGRICULTURAL PRACTICES.

UNCERTIFIED AND PREMATURE SEEDS: THE PREVALENT SALE OF UNCERTIFIED AND PREMATURE SEEDS, FACILITATED BY LAX INSPECTION PROCEDURES, LEADS TO POOR CROP YIELDS AND POTENTIAL DISEASE SPREAD.

PEST AND DISEASE PREVALENCE: PEST AND DISEASE OUTBREAKS SIGNIFICANTLY IMPACT CROP PRODUCTION E.G., POTATO AND MAIZE CROPS IN THE REGION. R&D LIMITATIONS AND IMPROPER PESTICIDE USE AGGRAVATE THE PROBLEM.

SEED MULTIPLICATION DEFICIENCIES: LACK OF INFRASTRUCTURE AND FACILITIES DELAY EFFICIENT SEED MULTIPLICATION AND DISTRIBUTION, LIMITING ACCESS TO QUALITY SEEDS.

GENETIC PURITY CONCERNS: INADEQUATE MONITORING AND ENFORCEMENT OF QUALITY STANDARDS CONTRIBUTE TO GENETIC IMPURITY IN SEEDS, LEADING TO COMPROMISED CROP PERFORMANCE.

AGRICULTURAL PROBLEMS IN SAHIWAL DIVISION

POST-HARVEST LOSSES: INADEQUATE MACHINERY FOR HARVESTING, THRESHING, AND PROCESSING LEADS TO SIGNIFICANT POST-HARVEST LOSSES, PARTICULARLY IN SESAME AND MAIZE.

KNOWLEDGE GAP: LACK OF SPECIALIZED EXTENSION SERVICES FOR MAIZE AND POTATO FARMERS IMPEDES ADOPTION OF BEST PRACTICES AND TECHNOLOGICAL ADVANCEMENTS, HINDERING YIELD OPTIMIZATION.

WATER SUSTAINABILITY: OVERRELIANCE ON GROUNDWATER FOR IRRIGATION THREATENS LONG-TERM WATER SECURITY AND NECESSITATES SUSTAINABLE WATER MANAGEMENT PRACTICES.

VALUE CHAIN GAPS: ABSENCE OF PROCESSING AND VALUE-ADDITION FACILITIES FOR MAIZE AND POTATOES LIMITS INCOME POTENTIAL.

EXPORT BOTTLENECKS: LACK OF STRUCTURED EXPORT MECHANISMS FOR MAIZE RESTRICTS ACCESS TO INTERNATIONAL MARKETS AND INCOME GENERATION OPPORTUNITIES

AGRICULTURAL PROBLEMS IN SAHIWAL DIVISION

Storage Constraints*:*

Insufficient cold storage facilities in Pakpatan lead to post-harvest losses of perishable produce like potatoes and vegetables.

Pea Cultivation Challenges*:*

Improper germination and climate change susceptibility hinder pea yields and quality.

Limited Tunnel Farming Adoption:

High costs and knowledge gaps among farmers impede the uptake of tunnel vegetable cultivation.

Potato Virus Y:

This viral disease poses a significant threat to potato production in the region.

Irrigation Water Quality:

Drainage water contamination with salts and toxins adversely affects soil health, vegetable growth, and poses risks to crop yields and human health. Proper drainage systems are crucial to mitigate these negative impacts.

CONTINUED

QUALITY SEED ISSUES

Lack of Germplasm and Seed Copying: The region faces a shortage of germplasm for seed production, and as a consequence, seed producers often resort to copying existing seeds. This practice undermines the quality and genetic diversity of the available seeds, negatively impacting crop productivity.

Seed Theft: The problem of seed theft is prevalent in the region, leading to the unauthorized and uncontrolled distribution of seeds. This illegal practice not only undermines the intellectual property rights of seed producers but also contributes to the availability of uncertified and low-quality seeds in the market, negatively impacting crop productivity.

Inadequate Seed Storage Facilities: The absence of proper seed storage infrastructure, such as seed banks, hampers the preservation and availability of high-quality seeds. This lack of storage facilities contributes to a diminished supply of reliable seeds, ultimately affecting agricultural productivity.

Heavy Reliance on Imported Seeds: The Rawalpindi Division heavily depends on imported seeds, which introduces challenges related to quality control, adaptability, and cost. The reliance on imported seeds limits the region's self-sufficiency and hampers efforts to develop and promote locally adapted seed varieties.

INPUT CONSTRAINTS

Low-Quality Inputs: The region faces challenges related to the availability of low-quality inputs, which adversely affect agricultural productivity.

High Prices and Non-availability: Inputs required for farming, such as seeds and fertilizers, are either unavailable or obtained at exorbitant prices, creating obstacles for farmers.

Lack of Advisory Services: Farmers lack access to proper guidance and advice regarding the appropriate inputs needed for specific crops and regions, hindering effective decision-making.

Absence of Quality Inspection and Price Control: There is a lack of mechanisms for inspecting the quality of inputs and controlling their prices, resulting in uncertainties and potential exploitation in the market.

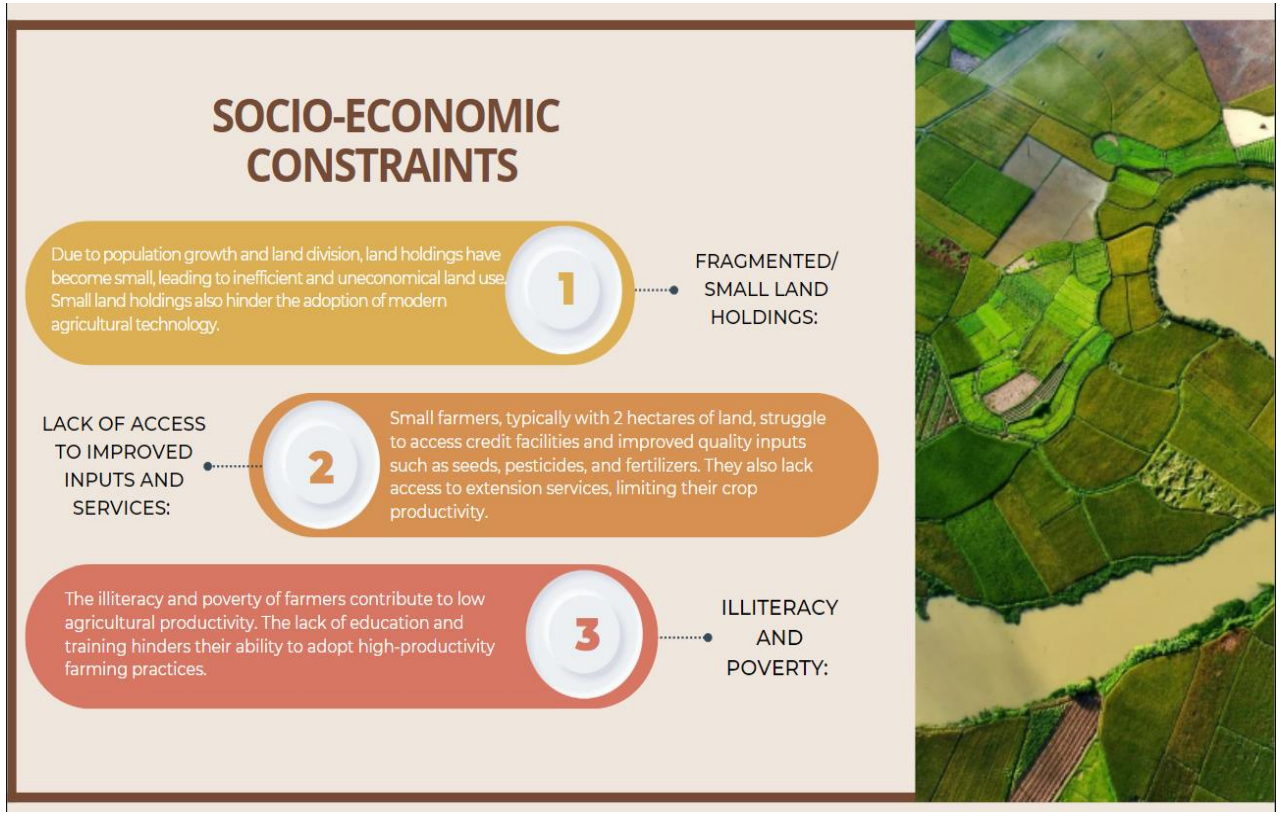
CONTINUED

CONSTRAINTS OF TRADITIONAL AGRICULTURAL TECHNOLOGY ADOPTION

Limited Awareness and Poverty of Farmers: Farmers in the Rawalpindi Division lack awareness and access to modern agricultural technology, which hinders their land productivity. The adoption of advanced practices is additionally impeded by small landholdings and poverty.

Insufficient Upscaling of Modern Agricultural Technologies: Despite the proven benefits, the adoption of modern agricultural technologies remains limited due to various factors, including financial constraints, lack of access, and inadequate guidance. Small farmers face challenges in adopting new technologies and often lack comprehensive knowledge and training. Therefore, there is a need for proper education to encourage the adoption of modern agricultural practices.

SOCIO-ECONOMIC CONSTRAINTS



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INSTITUTIONAL CONSTRAINTS

Lack Of Promotion And Monitoring: Extension workers often face limited opportunities for professional growth, with outdated promotion systems in place. Moreover, there is a lack of effective monitoring mechanisms to assess the performance and impact of extension services.

Lack Of Integration Among Departments: The coordination and integration among different agricultural departments are insufficient. This lack of collaboration hinders the seamless flow of information, resources, and services required for agricultural development in the Rawalpindi Division.

POLICY CONSTRAINTS

Lack Of Policy Integration: There is a lack of integration between policies and the specific needs of the agriculture sector in the region. This results in a mismatch between policy objectives and their effective implementation.

Non-implementation Of Targets And Goals: Although agricultural policies often include targets and goals, their implementation is often inadequate, resulting in a failure to address critical issues. For instance, the subsidy requirement for a specific regional crop with a comparative advantage should be based on the needs of the farmer, which is often overlooked.

CONTINUED

INSTITUTIONAL CONSTRAINTS

Insufficient Institutional Seed Production Capacity: Public sector seed production institutes in the Rawalpindi division face limitations in seed production capacity due to financial, human resource, and infrastructural challenges.

Inadequate Agricultural Research And Extension: The pace of technological advancement in agricultural yields per hectare has been slow in recent decades, compared to the 1960s and 1970s. Research institutes have not effectively contributed to developing new varieties or improving water utilization practices. Lack of coordination between research and extension organizations hinders the dissemination of improved inputs, technologies, and practices to farmers, who continue to rely on inefficient traditional methods.

Absence Of Specialized Extension Services: There is a lack of dedicated extension services specifically tailored for agriculture in the region. Farmers do not have access to specialized guidance and support to enhance their agricultural practices.

Overburdened Extension Workers: Extension workers often have additional duties that divert their focus from their primary responsibilities. This overburdening prevents them from carrying out their core duties effectively, impacting the delivery of crucial agricultural information and assistance.

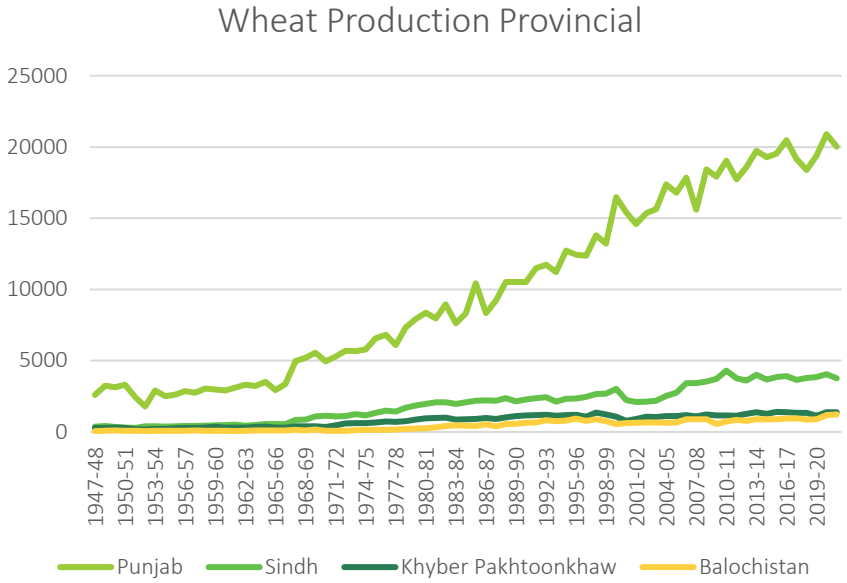
Ineffectiveness Of Agricultural Education & Training: Insufficient education and training opportunities for farmers result in low agricultural productivity. Inactive and ineffective agriculture extension services fail to provide guidance on modern and improved agriculture practices, irrigation management, and soil health strategies. Farmers lack training on innovative techniques and strategies for enhancing land productivity, and the transfer of knowledge from progressive farmers to others is limited.

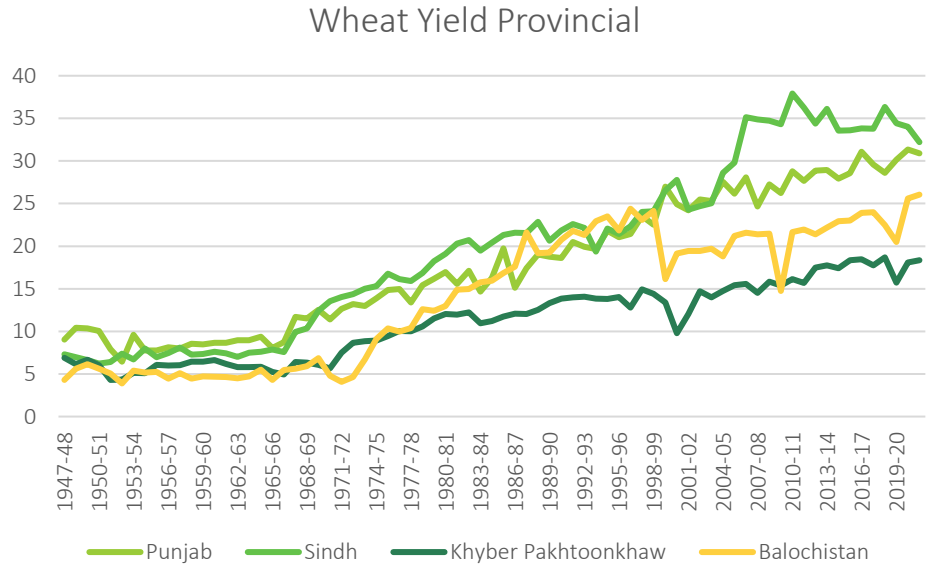
Inadequate Credit Facilities: Limited access to loans, high-interest rates, and untimely availability of credit negatively impact crop productivity. The lack of dependable credit options prevents farmers, especially those with low incomes, from purchasing quality agricultural inputs, leading to lower crop yields.

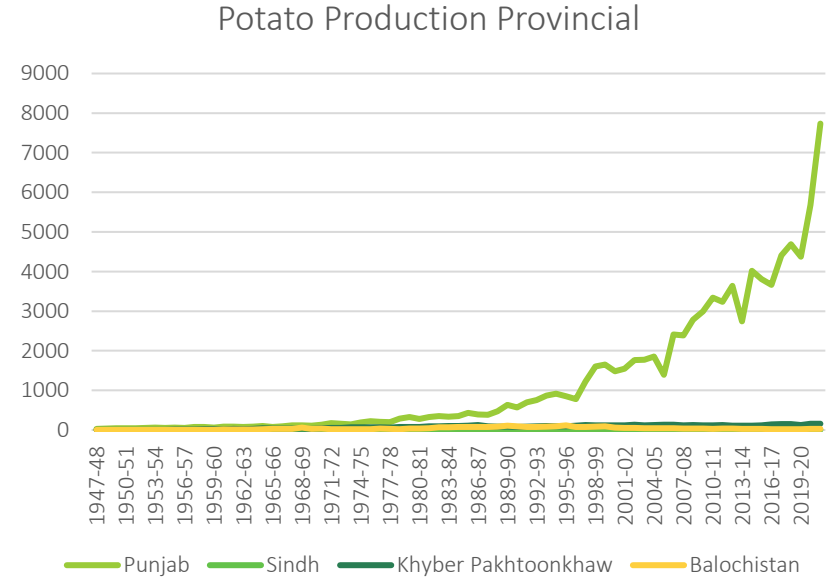
Insufficient Capacity Building: There is a lack of initiatives for capacity building within agricultural institutions. The absence of training and skill development programs prevents extension workers from gaining the necessary knowledge and expertise to provide up-to-date and internationally relevant guidance.

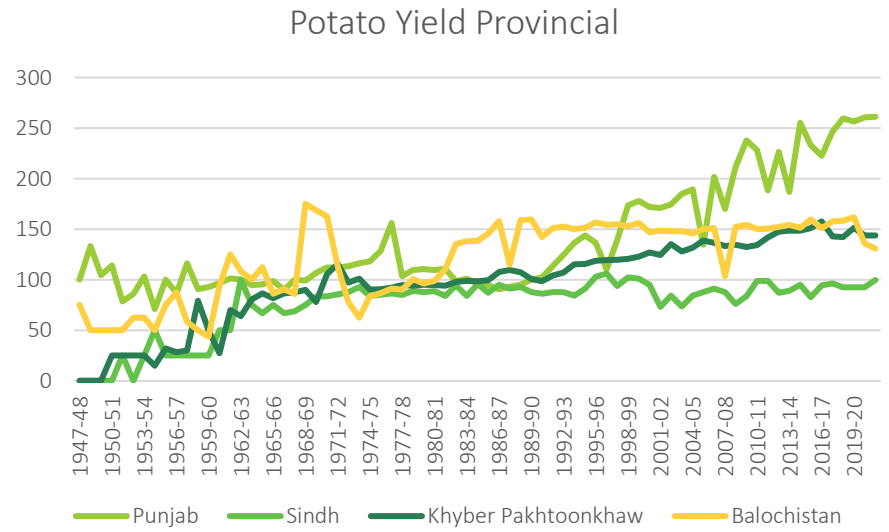
SITUATION ANALYSIS

CHALLENGES AND CONCERNS IN THE AGRICULTURE SECTOR'S GROWTH AND DEVELOPMENT









Crop production in the value chain has stagnated since 2007-2008, and yields are decreasing.

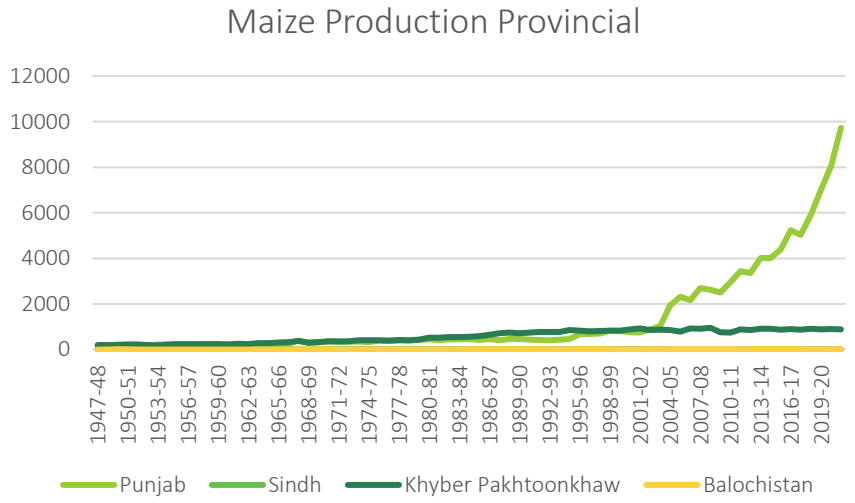
The demand for crops is increasing, but the industry is struggling to keep up with per capita requirements.

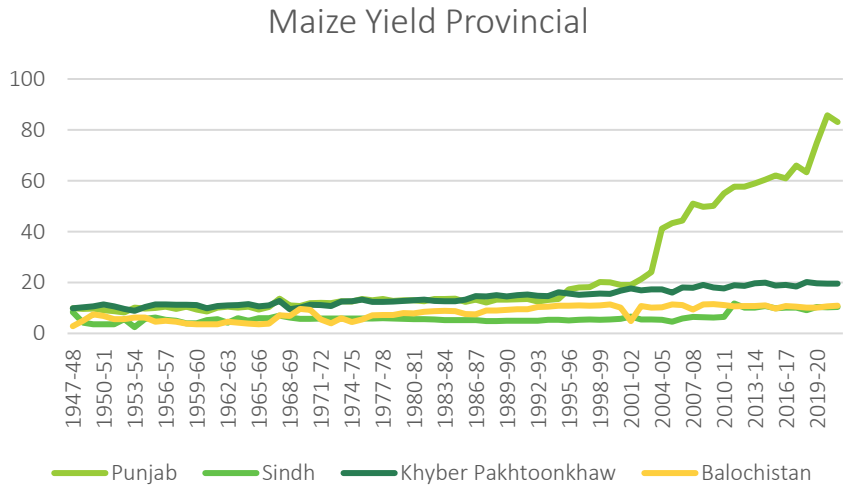
The region's share of exports is increasing, causing a lag in the domestic market.

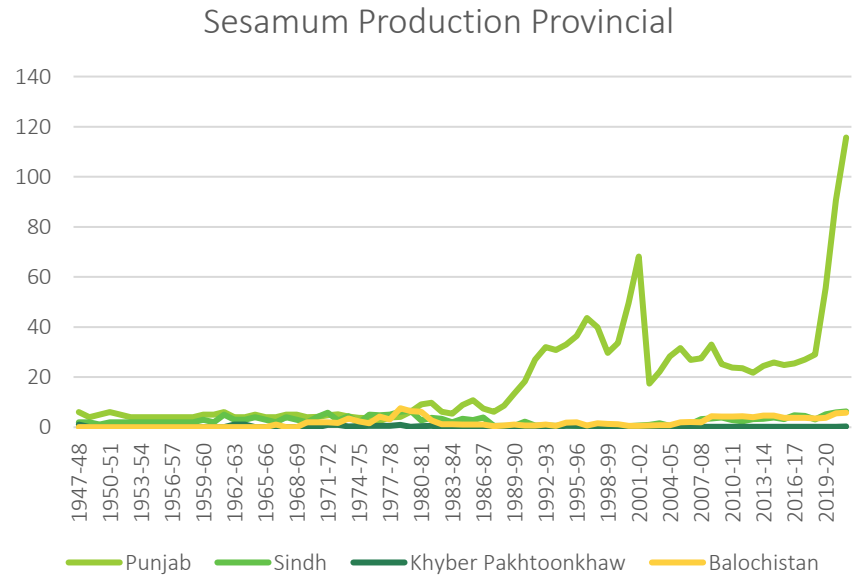
The agricultural process lacks value addition.

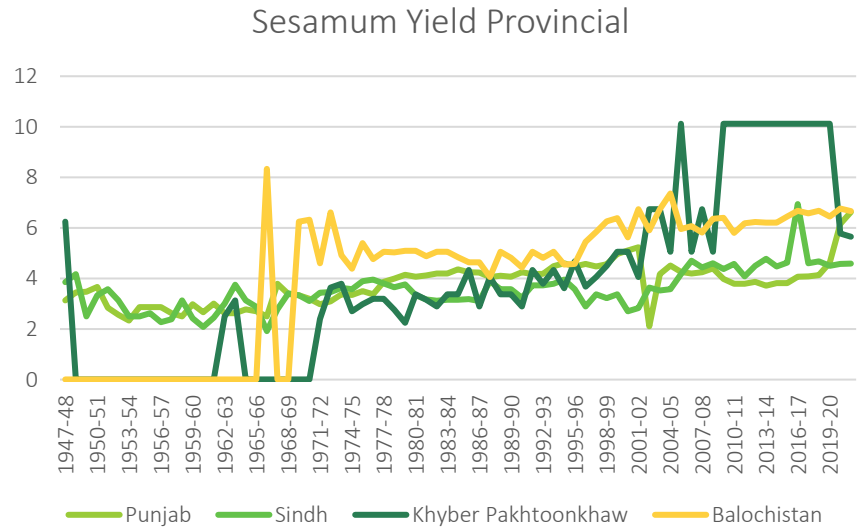
Source: AMIS

CHALLENGES AND CONCERNS IN THE AGRICULTURE SECTOR'S GROWTH AND DEVELOPMENT







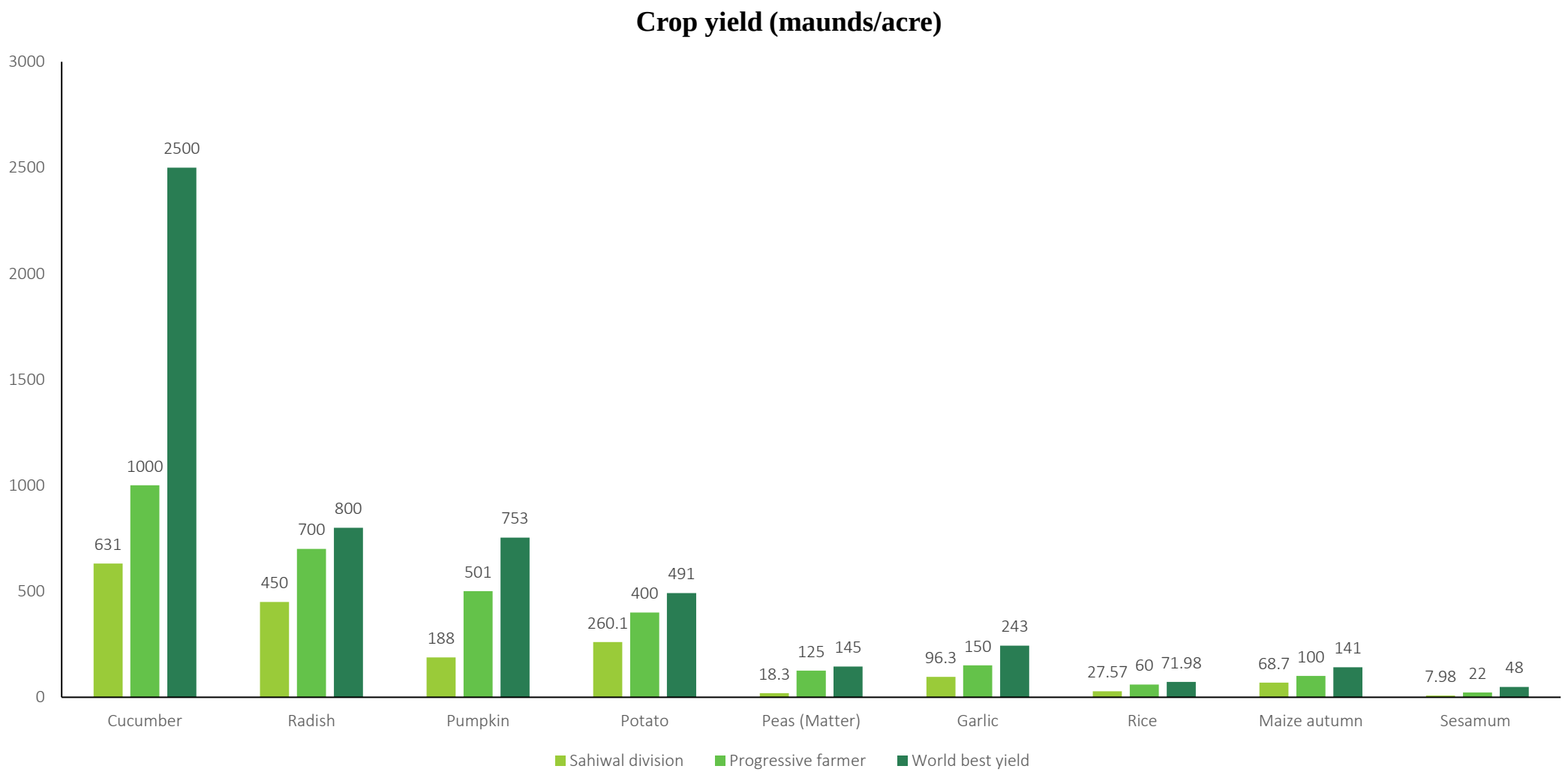


The yield of maize and sesamum crops is decreasing due to low quality seed, disease outbreaks and pesticide attacks.

Additionally, the upward trend in their international market share has significantly impacted on domestic prices because yield is stagnant.

Source: AMIS

PRODUCTIVITY GAP



Potential yield could be increased as of progressive farmers (who are getting higher yield than average yield)

CURRENT IMPACT OF CLIMATE CHANGE

Crop Failures

Rising temperatures and changing rainfall patterns have led to crop failures and reduced yields. Extreme weather events such as droughts and floods have also had a negative impact on agricultural production.

Water Scarcity

The monsoon patterns, which are a critical source of water for the agriculture, have been shifted and delayed, resulting in water scarcity for irrigation and crop growth.

Soil Degradation

Due to the changing climate, the soil health is affected, leading to soil degradation and reduced fertility.

Economic losses: The above-mentioned issues have resulted in economic losses for farmers and have a negative impact on the livelihoods of people dependent on agriculture

ASSESSING THE VULNERABILITY OF AGRICULTURE

Exposure Index

- Annual temperature
- Annual Rainfall
- Floods

Sensitivity Index

- Population in administrative jurisdiction
- Farm size
- Crop diversification
- Agroforestry potential
- Irrigated land
- Cultivated land

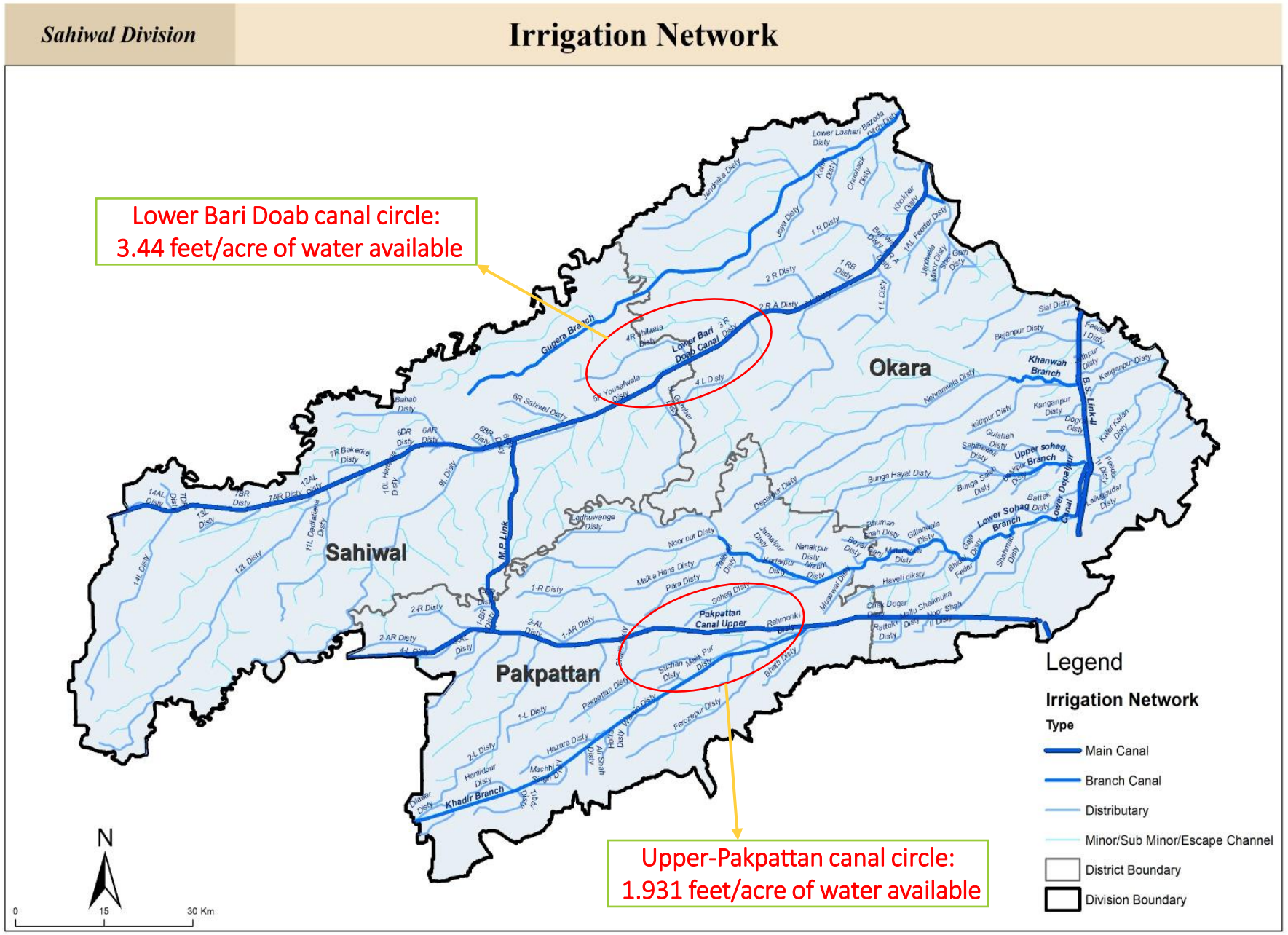
Adaptive Capacity

- Natural capital: Groundwater availability, Land productivity
- Physical capital: Access to the power supply, Agricultural machinery ownership, Access to transport networks
- Human capital: Literacy level, Health attainment
- Financial capital: Livelihhods diversification, Access to credit, Livestock ownership
- Social capital: Access to cooperative societies, Means of social support, Local committees access

Indicators	Sahiwal	Okara	Pakpattan
Exposure Index	(0.20 - 0.39)	(0.40 - 0.59)	(0.60 - 0.79)
	Low Exposure	Low Exposure	Low Exposure
Sensitivity Index	(0.40 – 0.59)	(0.20 – 0.39)	(0.20 – 0.39)
	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Adaptive Capacity Index	(0.20 – 0.39)	(0.40 - 0.59)	(0.00 - 0.19)
	Low adaptive capacity	Moderate Adaptive capacity	Very Low Adaptive capacity
Vulnerability index	(0.40 - 0.59)	(0.20 - 0.39)	(0.40 - 0.59)
	Moderate Vulnerability	Low Vulnerability	Moderate Vulnerability

Source: (Nadeem et al., 2022)

IRRIGATION NETWORK IN SAHIWAL DIVISION



Surface Water Availability in the Division

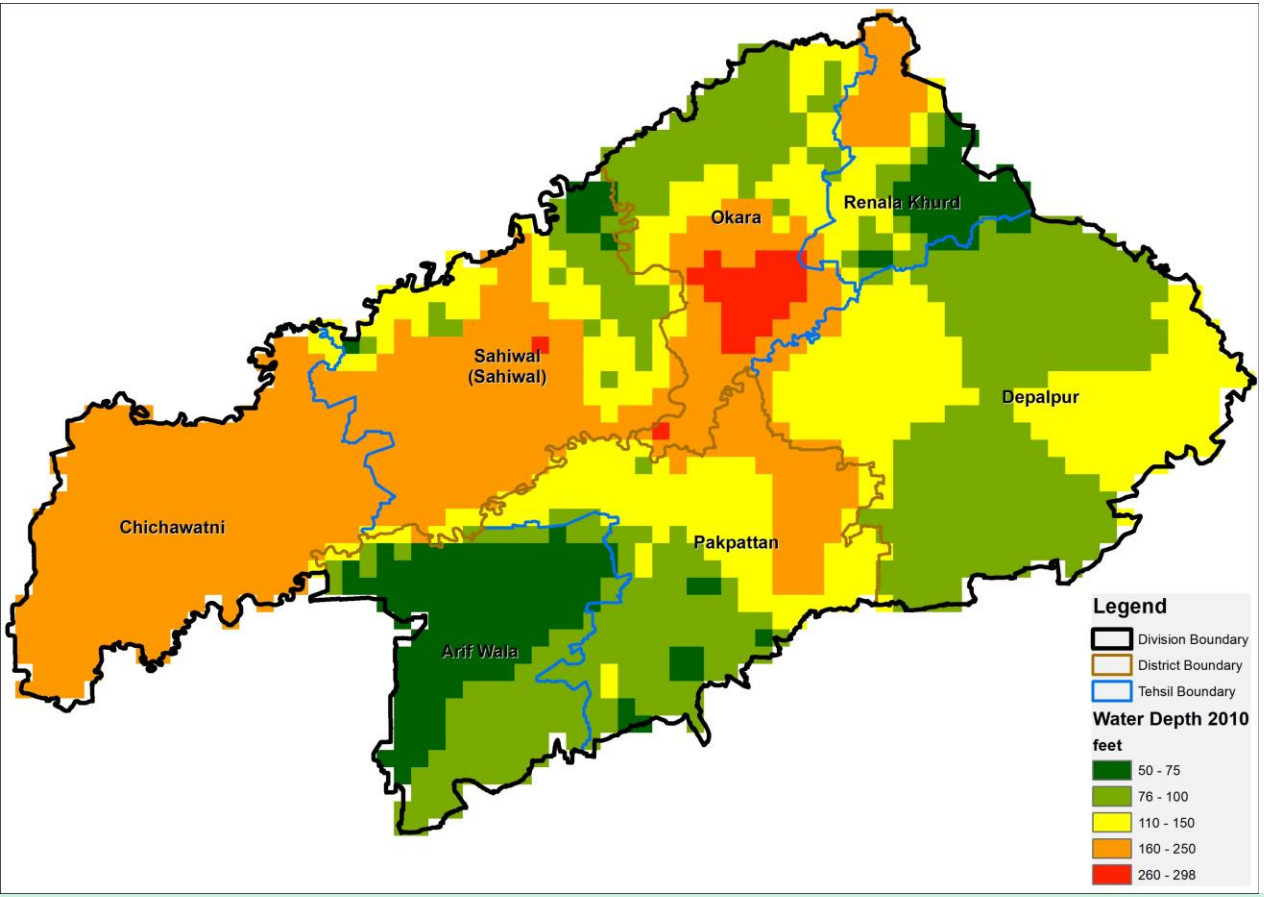
- **Sahiwal division gets 2.68 feet/acre of surface water which is lower than the Punjab average of 2.7 feet/acre.**

- There is a severe problem of surface water quality in the region due to the mixing of drain water in canals.
- Water quality significantly affects the growth of potato and vegetable crops.
- Timely water supply is unavailable, causing negative impacts and causes of extensive use of groundwater.
- Farmers at the tail end of irrigation systems are particularly affected.

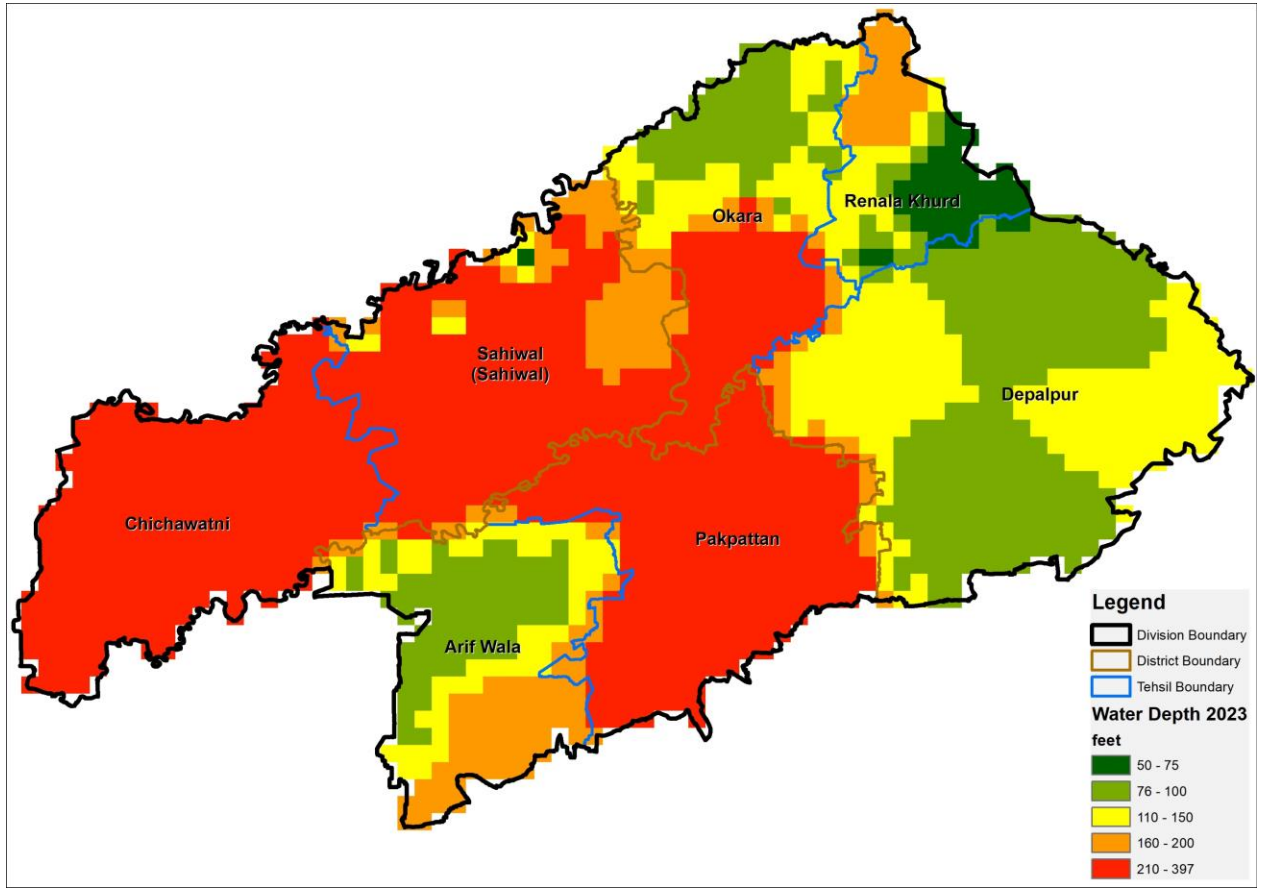
Source: Collected Questionnaire data taken from Agriculture/Irrigation Department

GROUND WATER ANALYSIS IN THE SAHIWAL DIVISION

Ground Water Depth (2010)



Ground Water Depth (2023)



Sahiwal division falls within the mix cropping zone, primarily relying on canals and groundwater for its water supply. The extensive use of groundwater significantly affects the reservoirs, which are depleting rapidly. Moreover, there is a risk of exacerbating water scarcity by obtaining three crops in a year, leading to the rapid depletion of groundwater resources.

Source: Collected Questionnaire data taken from Agriculture/Irrigation Department

GROUND WATER DEPTH IN THE SAHIWAL DIVISION

District	Ground Water dept(ft) in 2010	Ground Water dept(ft) in present time
Okara	150	280
Sahiwal	210	235
Pakpattan	110	180
Average of Division	**157**	**232**

The groundwater depths have generally increased across the districts, indicating a decrease in water levels over the specified period.

Source: Collected Questionnaire data taken from Agriculture/Irrigation Department

FARM MECHANIZATION PROBLEMS

- Farm machinery have large turning radius
- Small and scattered land holding
- Lack of repair and maintenance facilities
- Lack of coordination and collaboration between stakeholders in the agricultural sector
- Lack of availability and access to modern agricultural machinery
- Outdated and inefficient machinery leading to low yields and poor quality produce
- Lack of awareness and training on proper use and maintenance of machinery
- Fuel Affordability
- Lack of government support and incentives for investment in modern machinery

MECHANIZATION GAP IN PUNJAB

Implement	Applicability	Punjab (Per 10,000 acres)	Indian Punjab (Per 10,000 acres)	Existing Coverage As % of Indian Punjab
Tractors	All Crops	140	295	47%
Chisel Plow	Cotton Sugarcane	2	28	8%
Cultivator	All Crops	102	224	46%
Disc Harrow	All Crops	5	118	4%
Rotavator	All Crops	14	155	9%
Seed Drill	Wheat	21	124	17%
Ridger cum Fertilizer	Sugarcane Cotton	22	56	38%

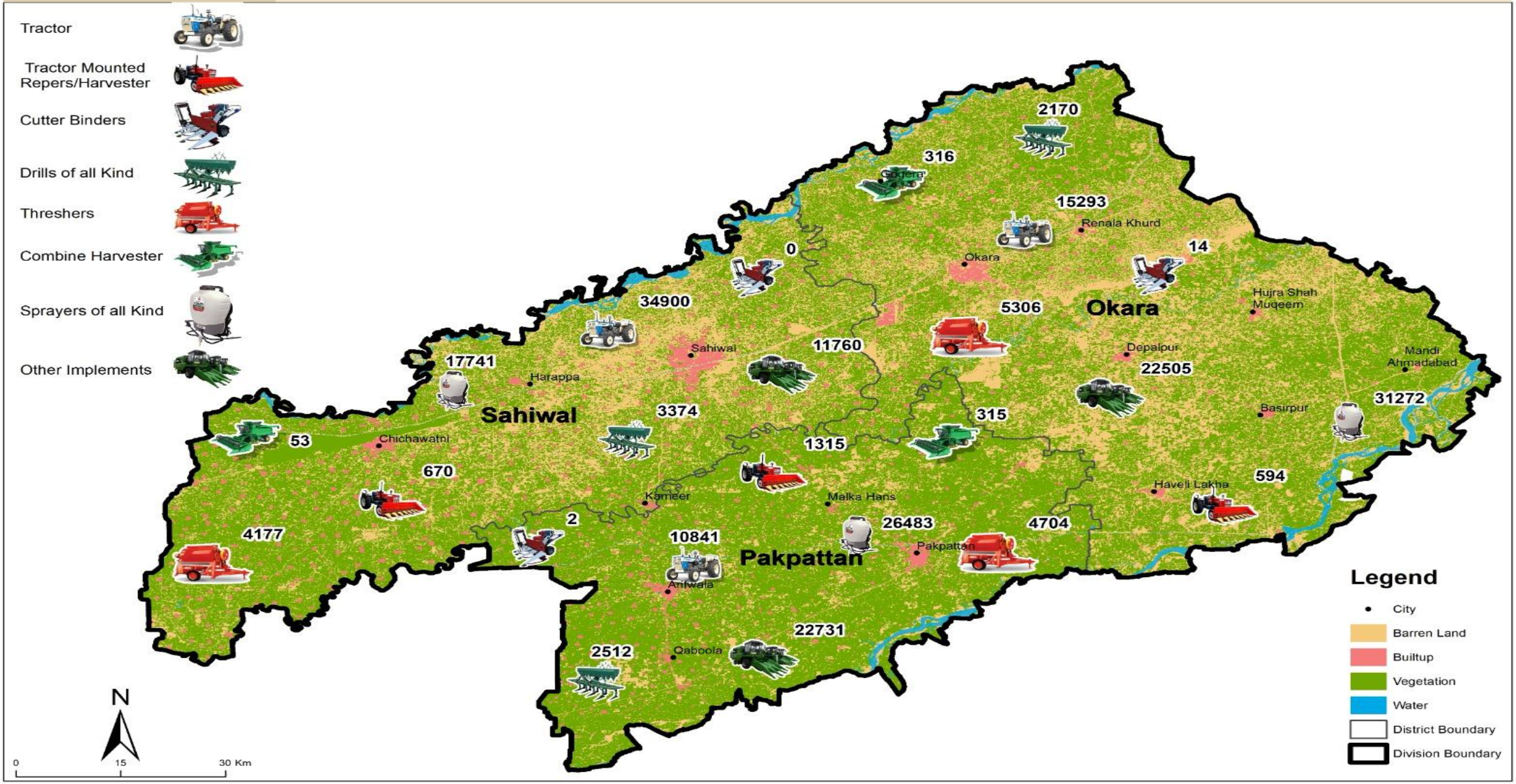
AVAILABILITY OF MACHINERY IN SAHIWAL

Agriculture Machinery	(Farmers/Machine)	Acres / Machine
Threshers	25	140
Self Propelled Combine Harvester	522	2,898
Tractor Mounted Reapers/Harvester	138	769
Cutter Binders	22304	123,909
Sprayers of all Kind	5	26
Drills of all Kind	44	246
Other Implements	6	35
Tractor	6	32

Need to deploy smart tools and service centers in each crop zone to promote Mechanization

Sahiwal Division

Farm Mechanisation



MARKET EFFICIENCIES

DIFFERENCE BETWEEN FARMGATE, RETAIL & WHOLESALE PRICES OF ESSENTIAL FOOD COMMODITIES

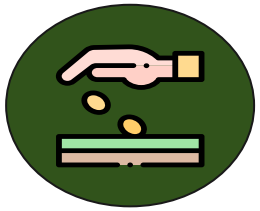
Commodity	Farm gate price (PKR/kg)	Wholesale Market (PKR/kg)	Retail Price (PKR/kg)
Onion	40	80-90	110-140
Garlic	160	350-450	500-650
Potato	25	45-60	65-85
Tinda	33	80-100	120-150

MARKET SYSTEM

The Market System of the division is inefficient (Lack of R&D)

ISOLATED MARKETS

The markets are located in isolation and are not in-reach of the farmers



PROFIT MARGINS

Role of Middle man has reduced the profit margin of the Farmer

STORAGE CAPACITY

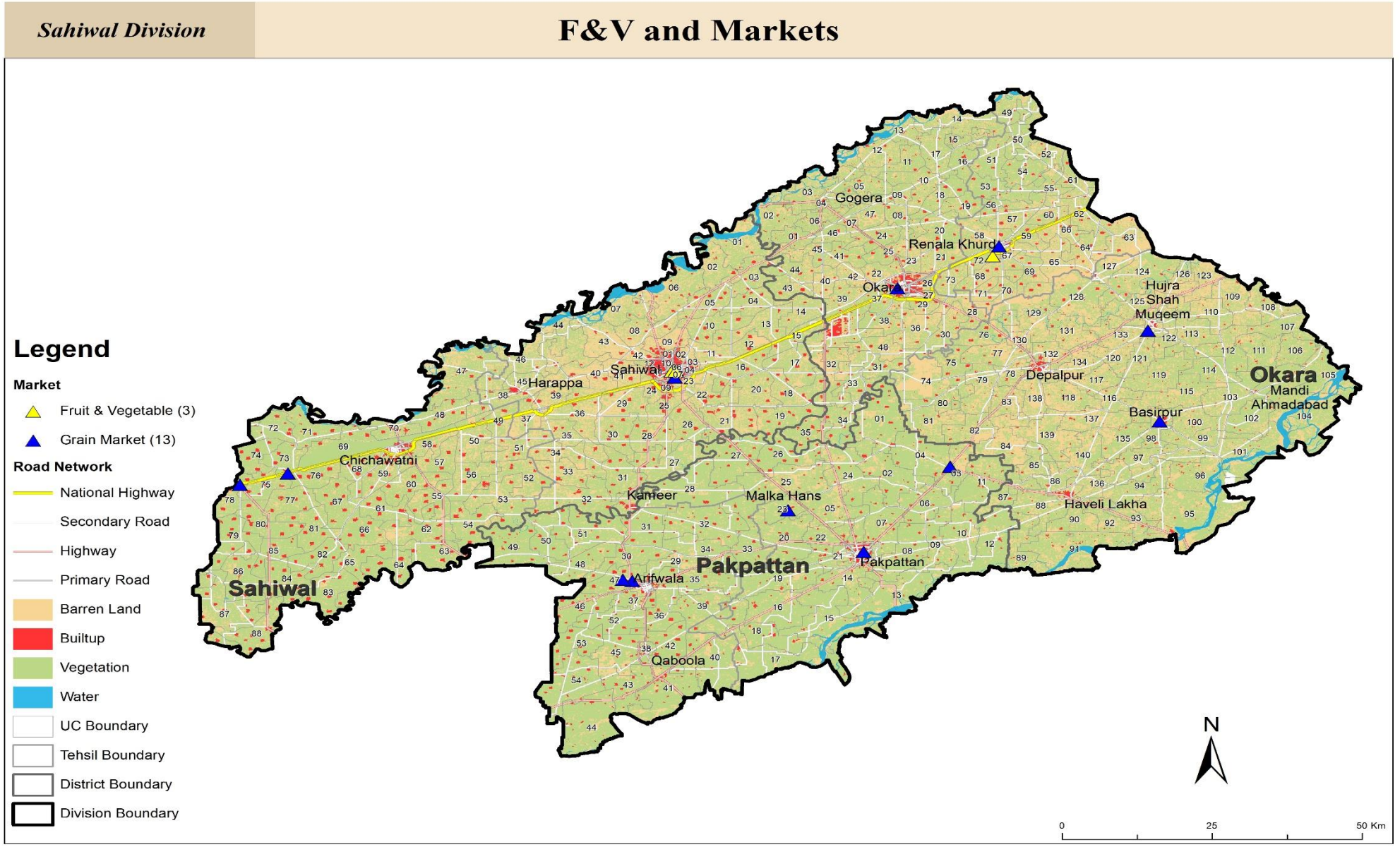
The storage capacity is either non existent or very costly

Mostly inefficiency exists in perishable commodities since there is no proper storage capacity in markets and the existing storage capacity is very costly.

PREVIEW OF FRUITS & VEGETABLE MARKETS

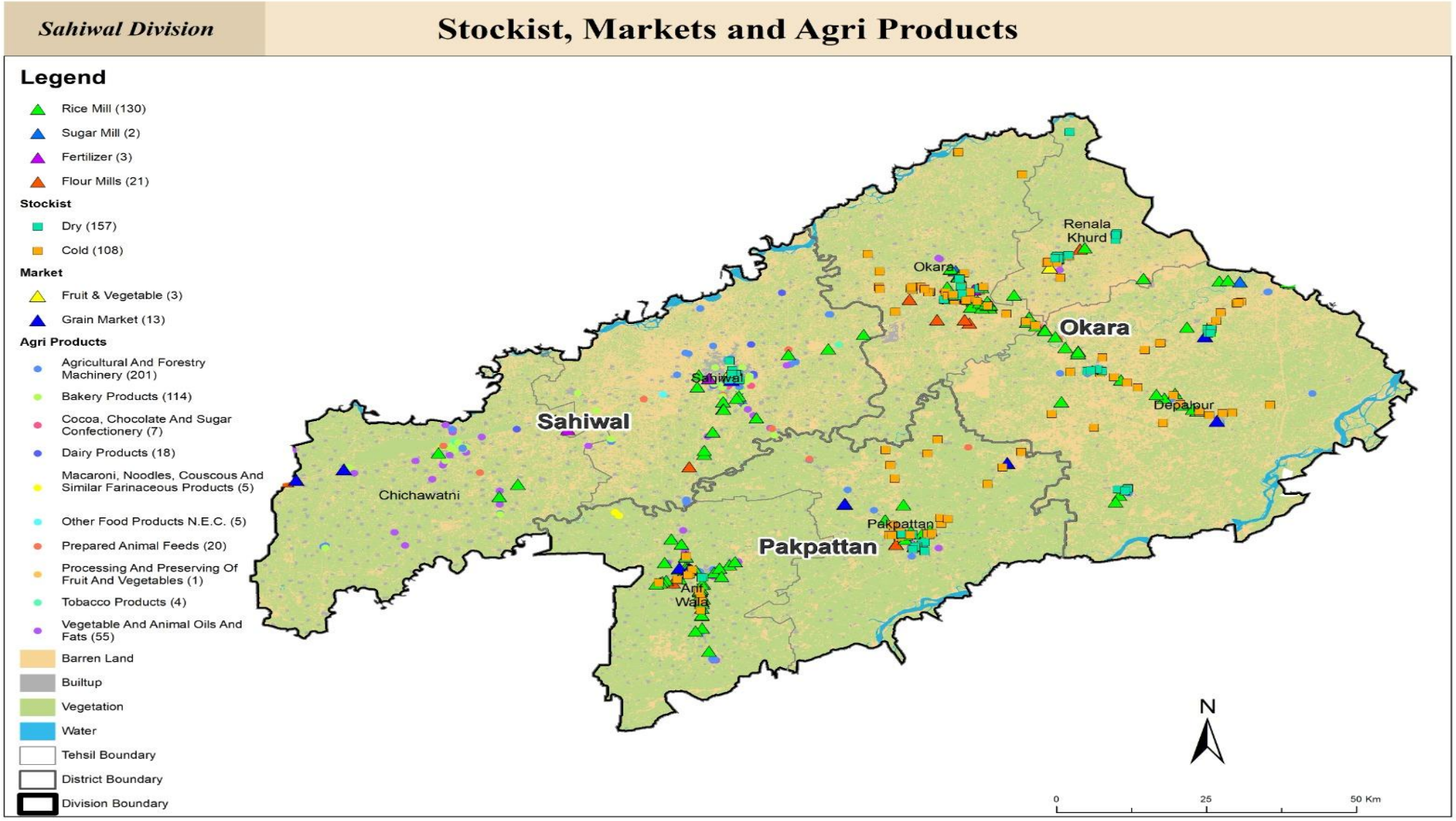
6 Fruits & Vegetables, 13 Grains market compatibility does not match. Therefore, the system needs more state-of-the-art storage and markets.

Model Market & State of Art Storage facilities need to be proposed



PREVIEW OF AGRO PRODUCTS IN THE SAHIWAL DIVISION

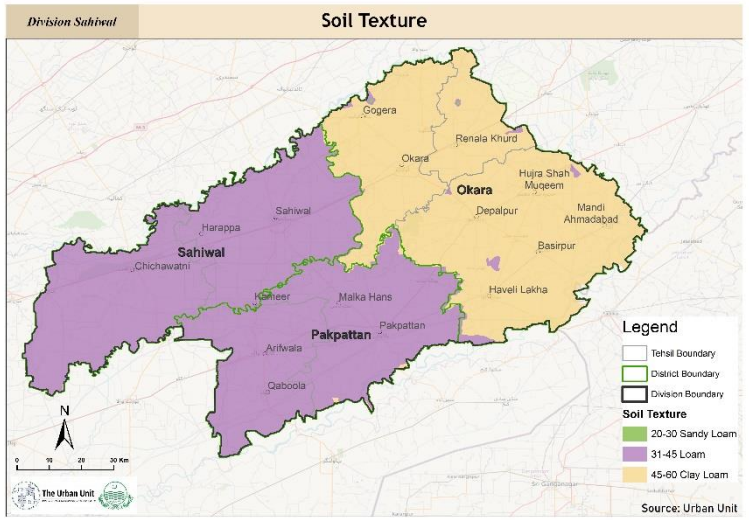
- **Low-value addition** in agricultural produce especially **in High-Value** Crops
- The agro-industrial units are not located in the **potential crop zones**
- Moreover, there are not **processing industry** for fruits & vegetables

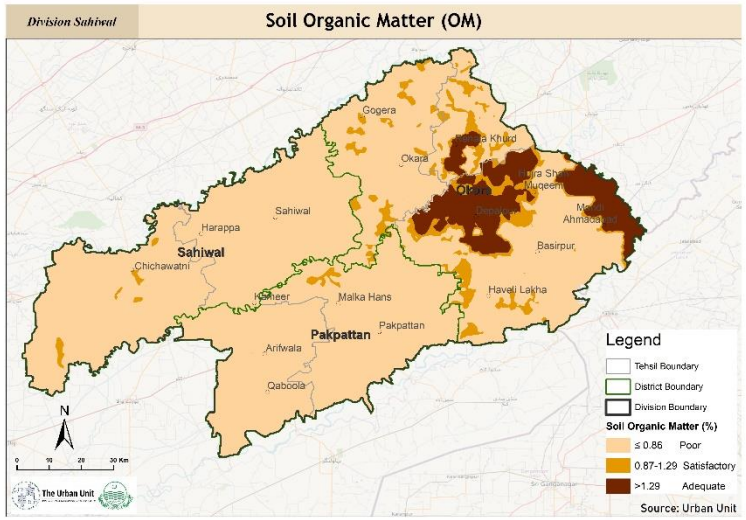


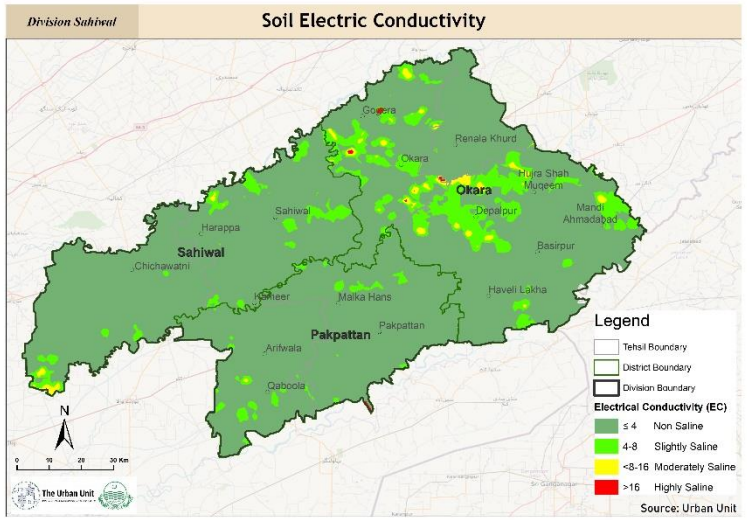
AGRO-ECOLOGICAL CONDITIONS

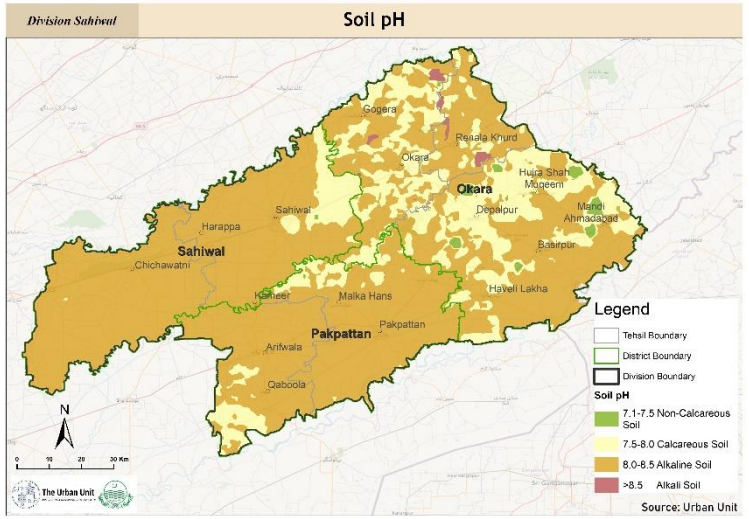
Crop zoning will be done on the basis of agro-ecological conditions, production, yield & value

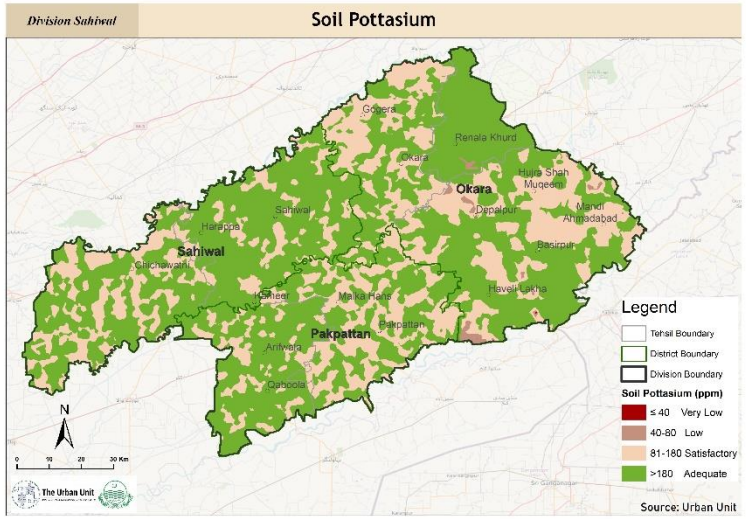
AGRO-ECOLOGICAL CONDITIONS

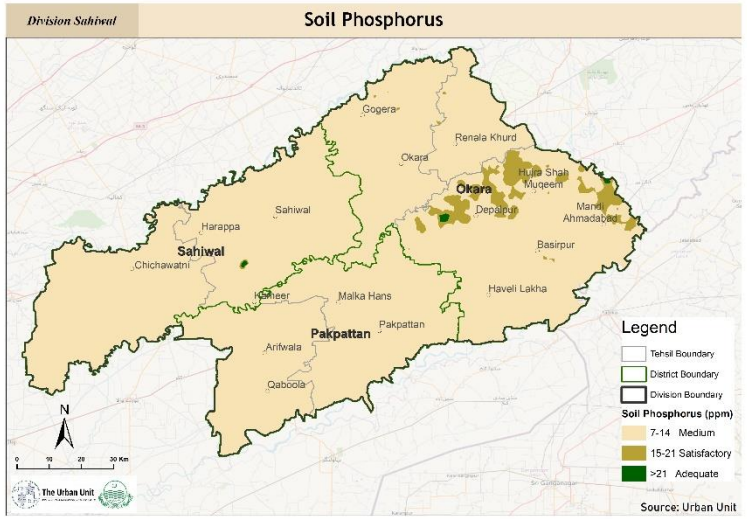




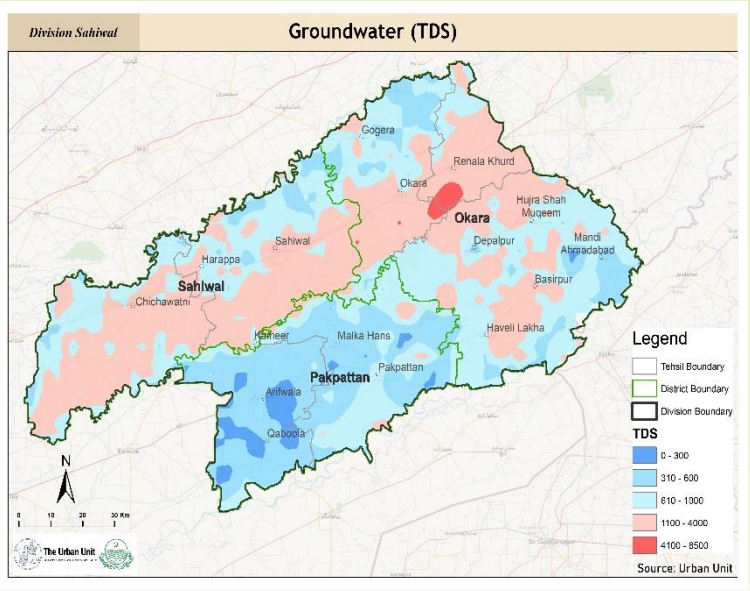


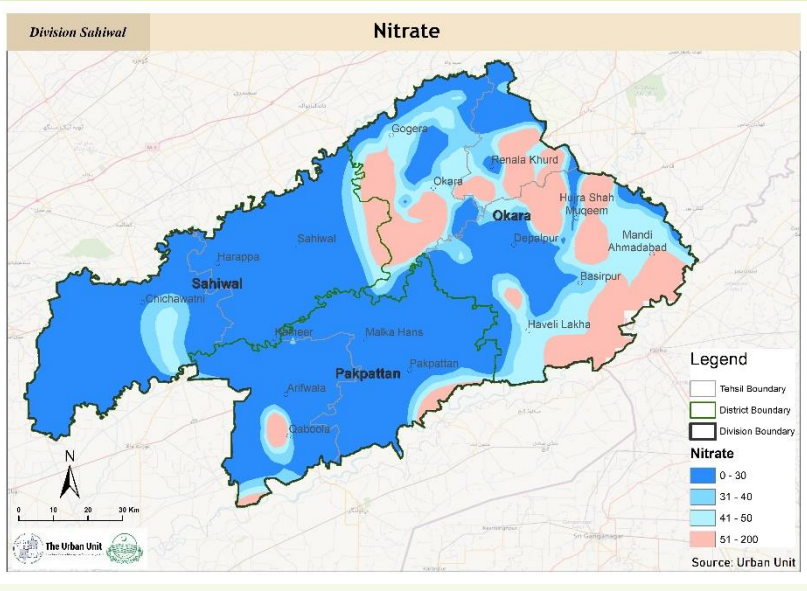


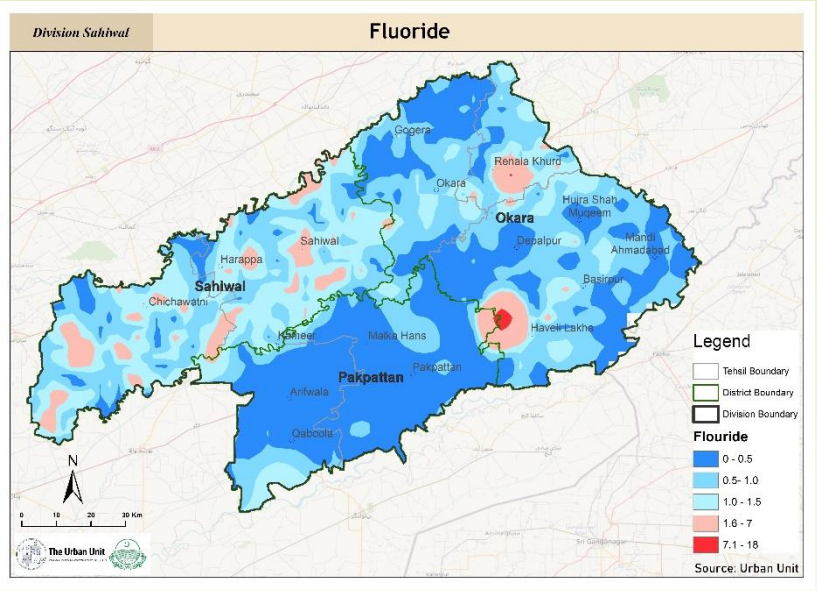


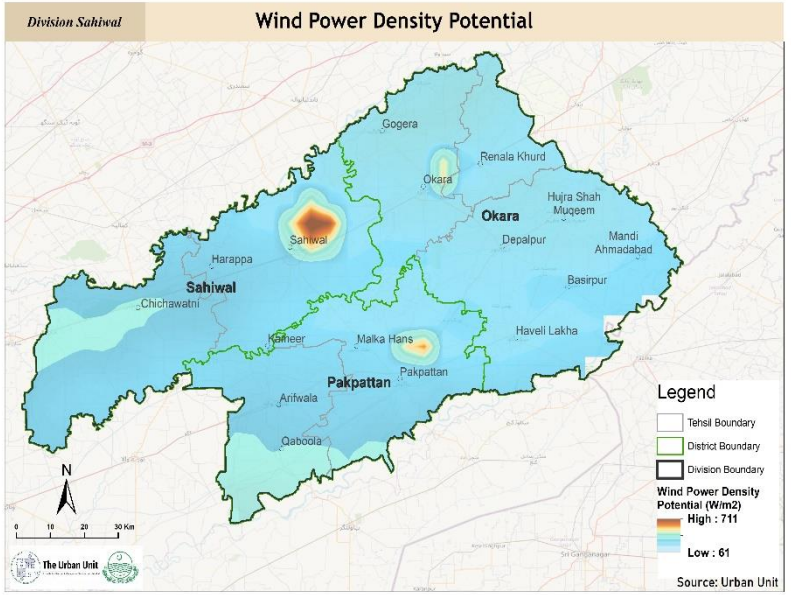


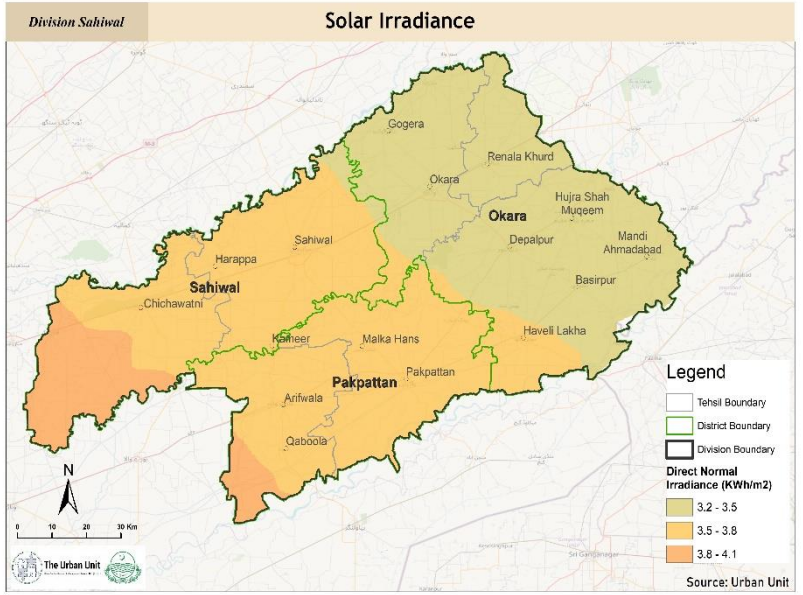
AGRO-ECOLOGICAL CONDITIONS









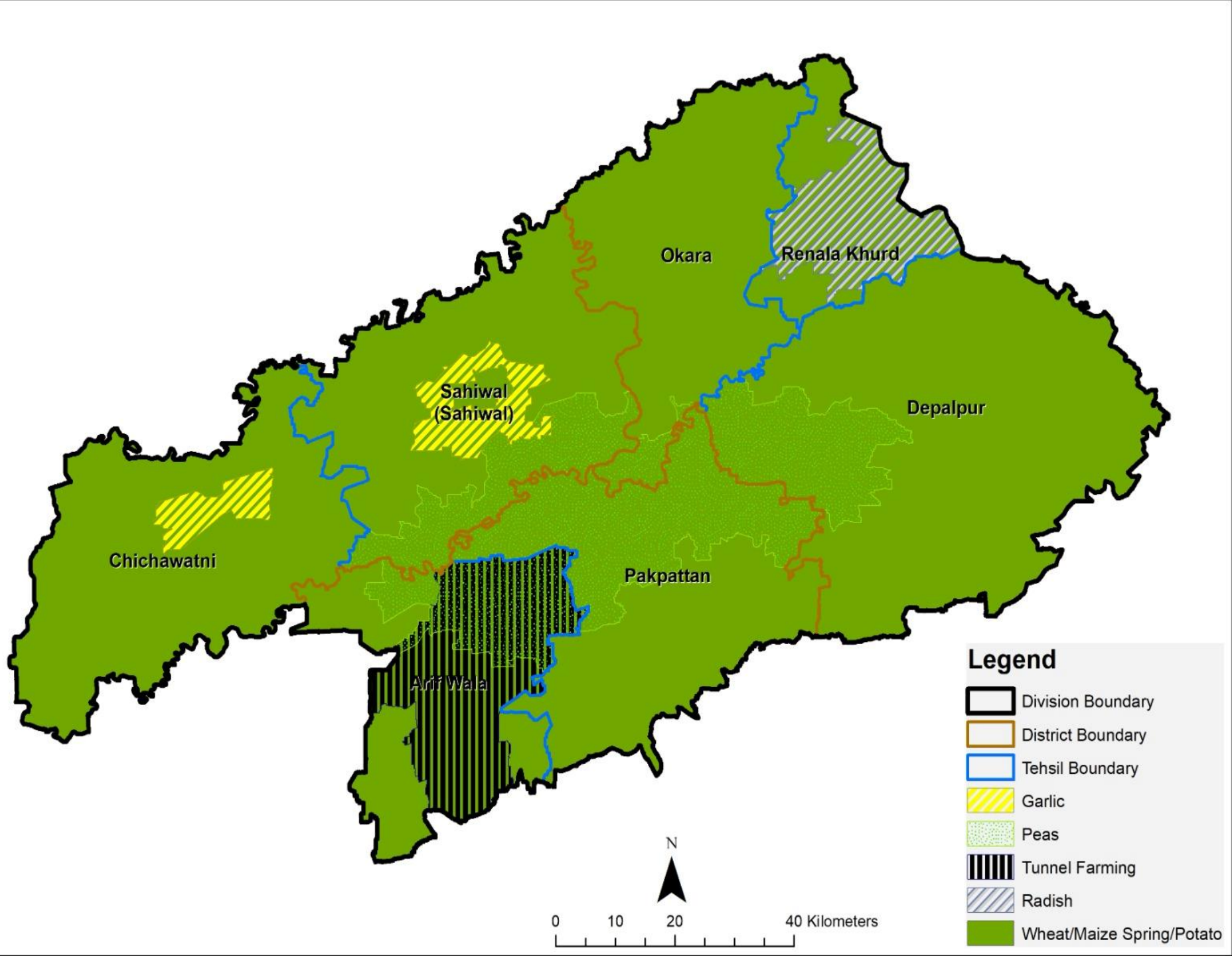


IDENTIFICATION OF POTENTIAL AREAS

SPATIAL CLUSTER/ZONE OF RECOMMENDED RABI CROPS

Current Contribution Rs. 451 Billion

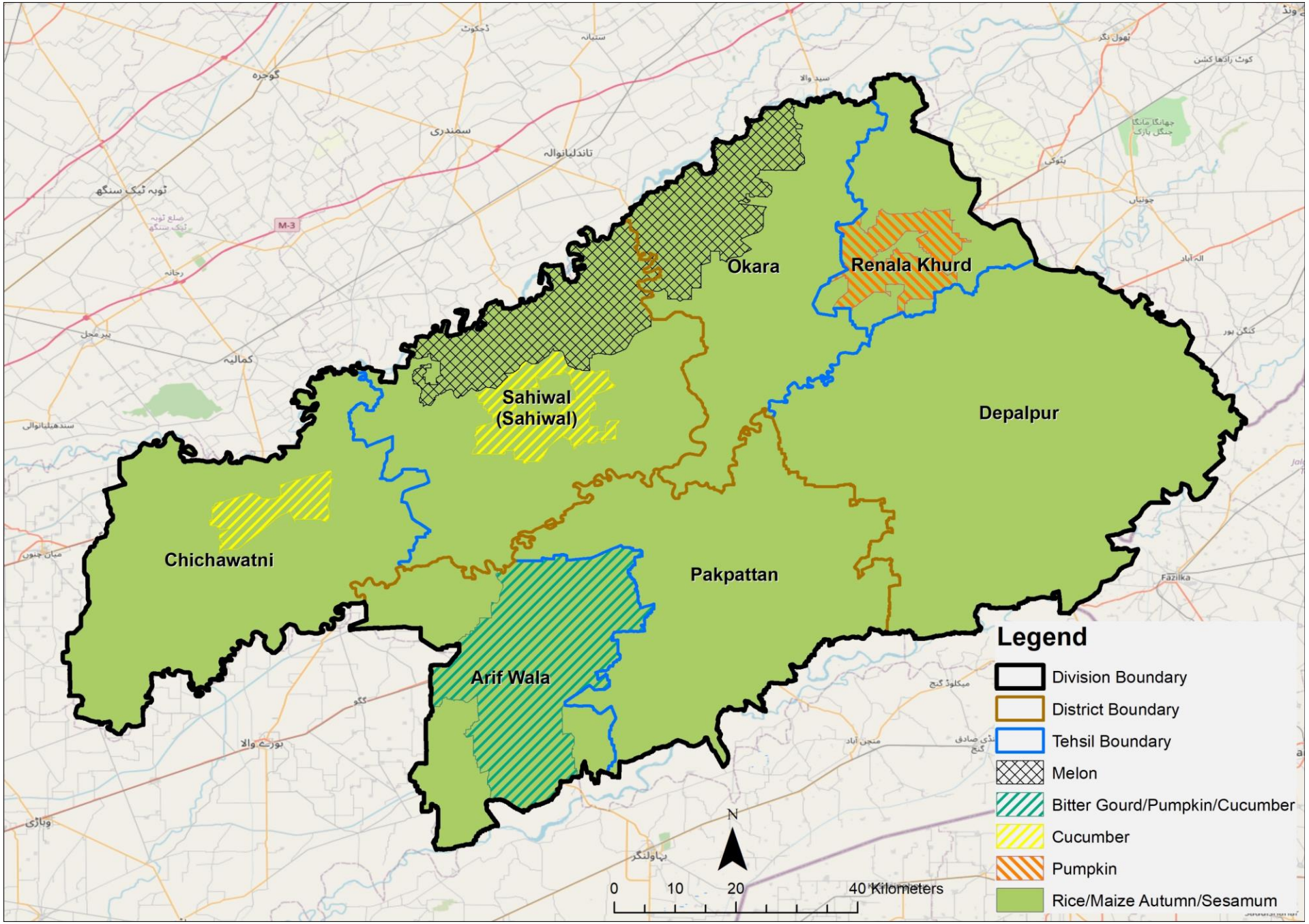
Potential: Rs. 840 Billion



SPATIAL CLUSTER/ZONE OF RECOMMENDED KHARIF CROPS

Current Contribution Rs. 451 Billion

Potential: Rs. 840 Billion



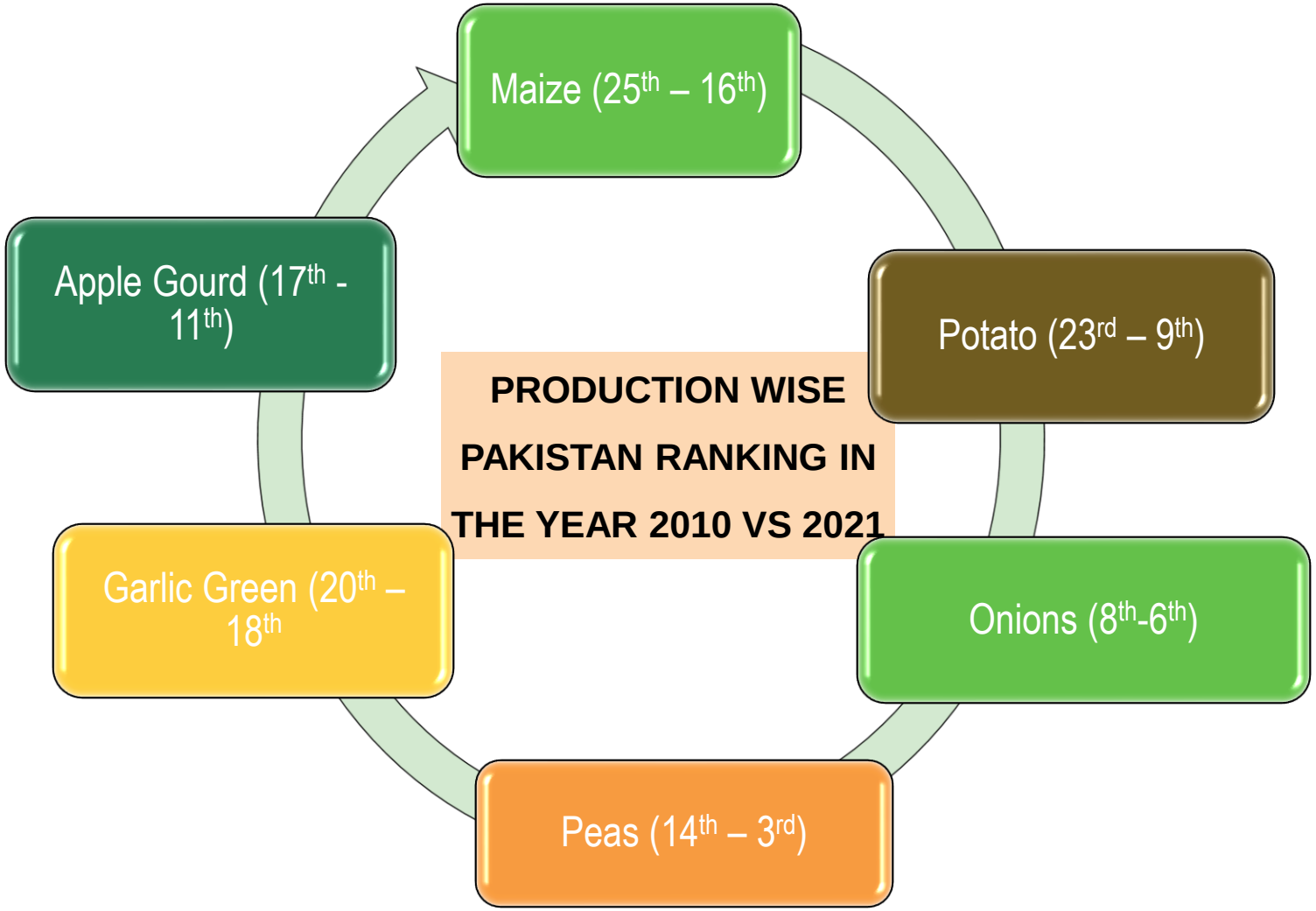
MAXIMIZING AGRICULTURE POTENTIAL

Efficient use of resources, to enhance productivity and generate value addition in agriculture and other sectors for the economic well-being of people especially rural communities

Growth Policy Areas (For Rural Transformation)

- From subsistence-level agriculture to **high-value-added export-oriented agriculture**
- Low productivity to **high productivity** (Lessening the productivity gap in all crops & livestock)
- Identify the potential areas for each crop and make **cluster/zone of each crop**
- Provide all **ancillary facilities** and **specialized support systems** for each crop in cluster/zone
- Gradually shift crop-mix pattern from **low-value crops to high-value crops** (identifying potential crops from high-value crops on a priority basis for the next five years)
- All Departments to coordinate and implement an **integrated action plan**

PAKISTAN RANKING IN THE WORLD (PRODUCTION)



The crop production ranking (especially horticultural crops) of Pakistan has been consistently increasing compared to the global ranking.

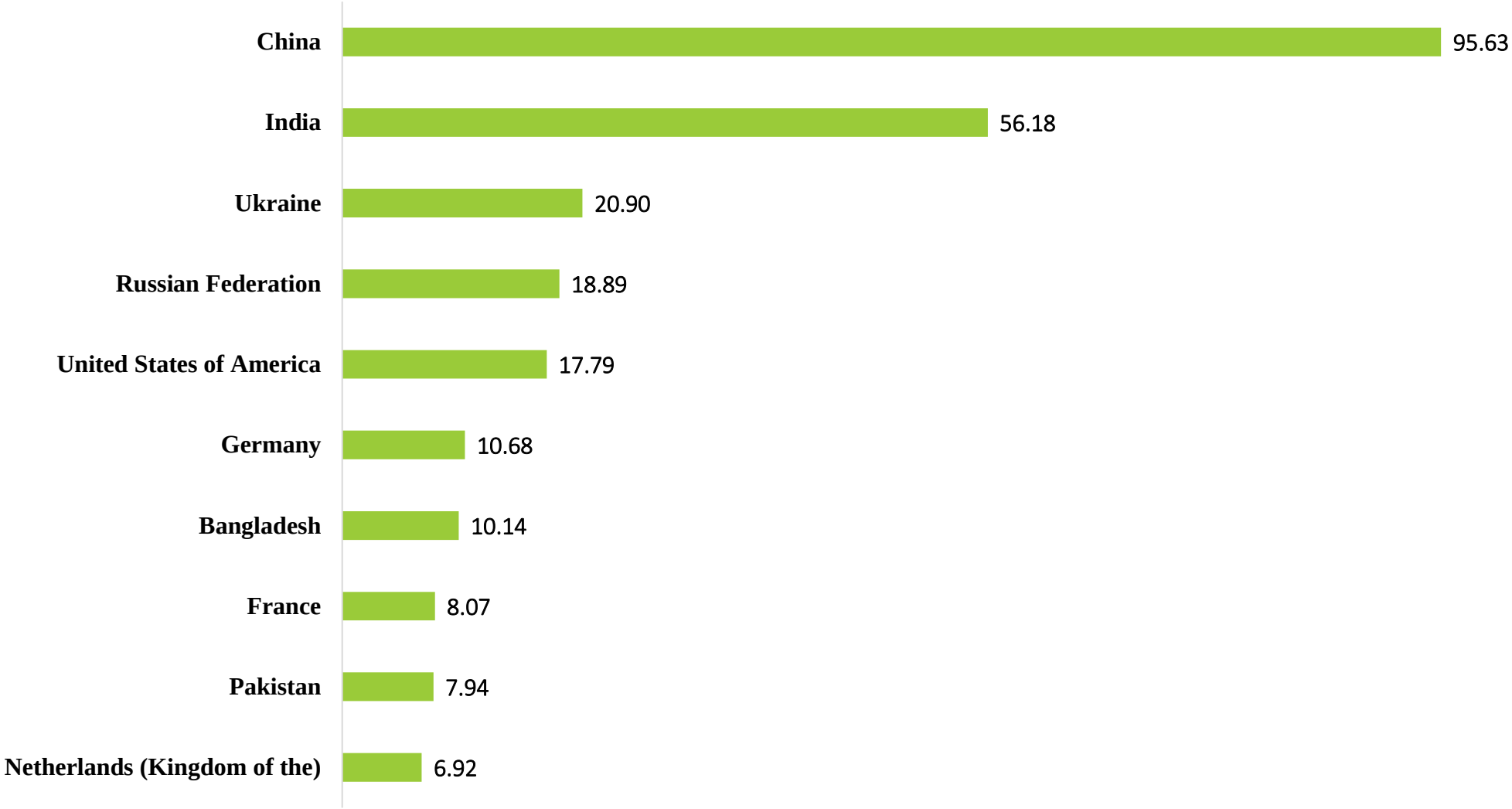
Source: FAO Stat

VALUE CHAIN ANALYSIS

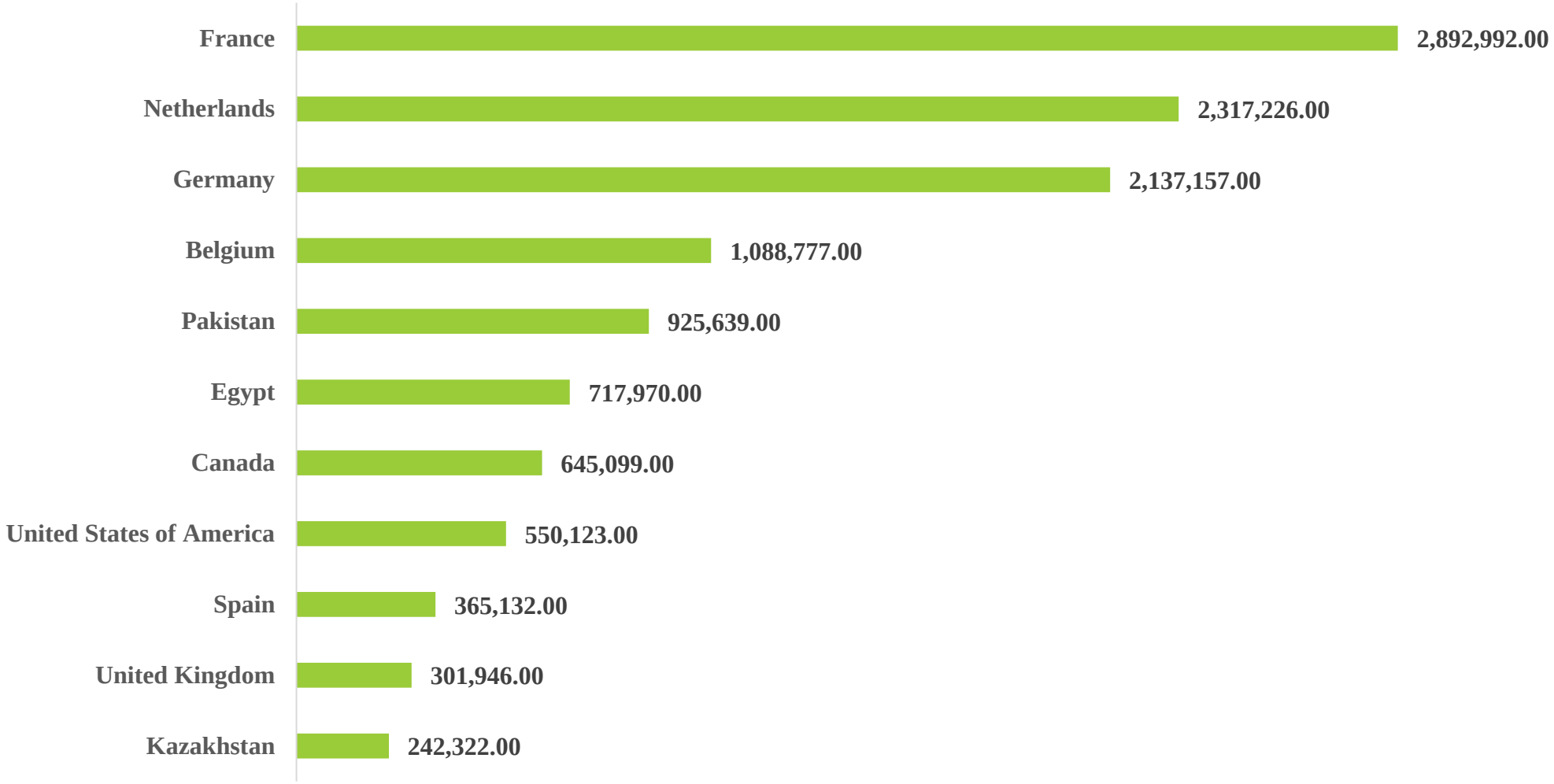
POTATO VALUE CHAIN

- Area, Production ,Yield Analysis
- Smallholder Farmer benefits
- Value Addition Analysis
- District Wise Yearly Area Contribution
- Value chain wise issues and recommendations

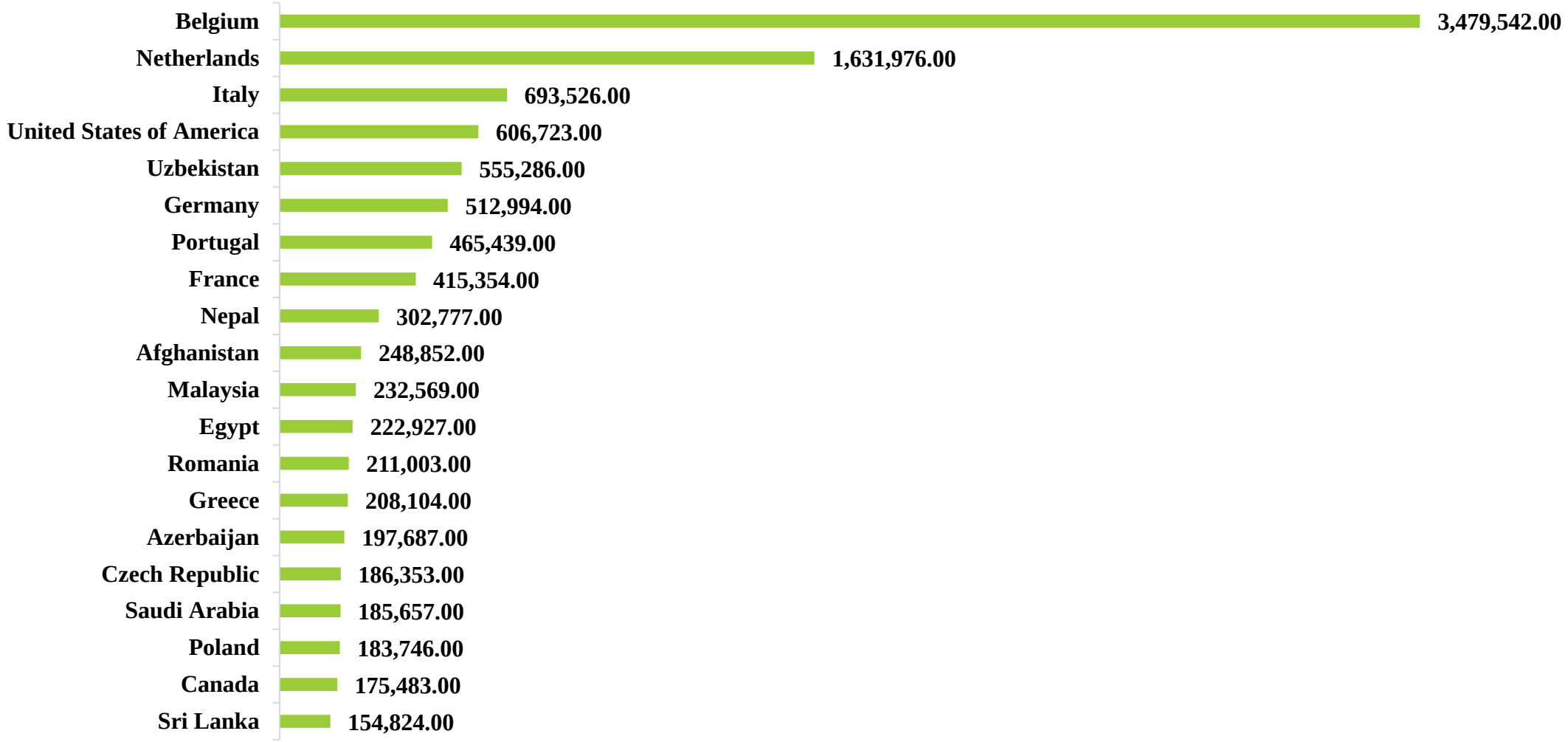
World Leading Potato Producing Countries (Million Tonnes)



World leading Potato Exporting Countries (Tons)

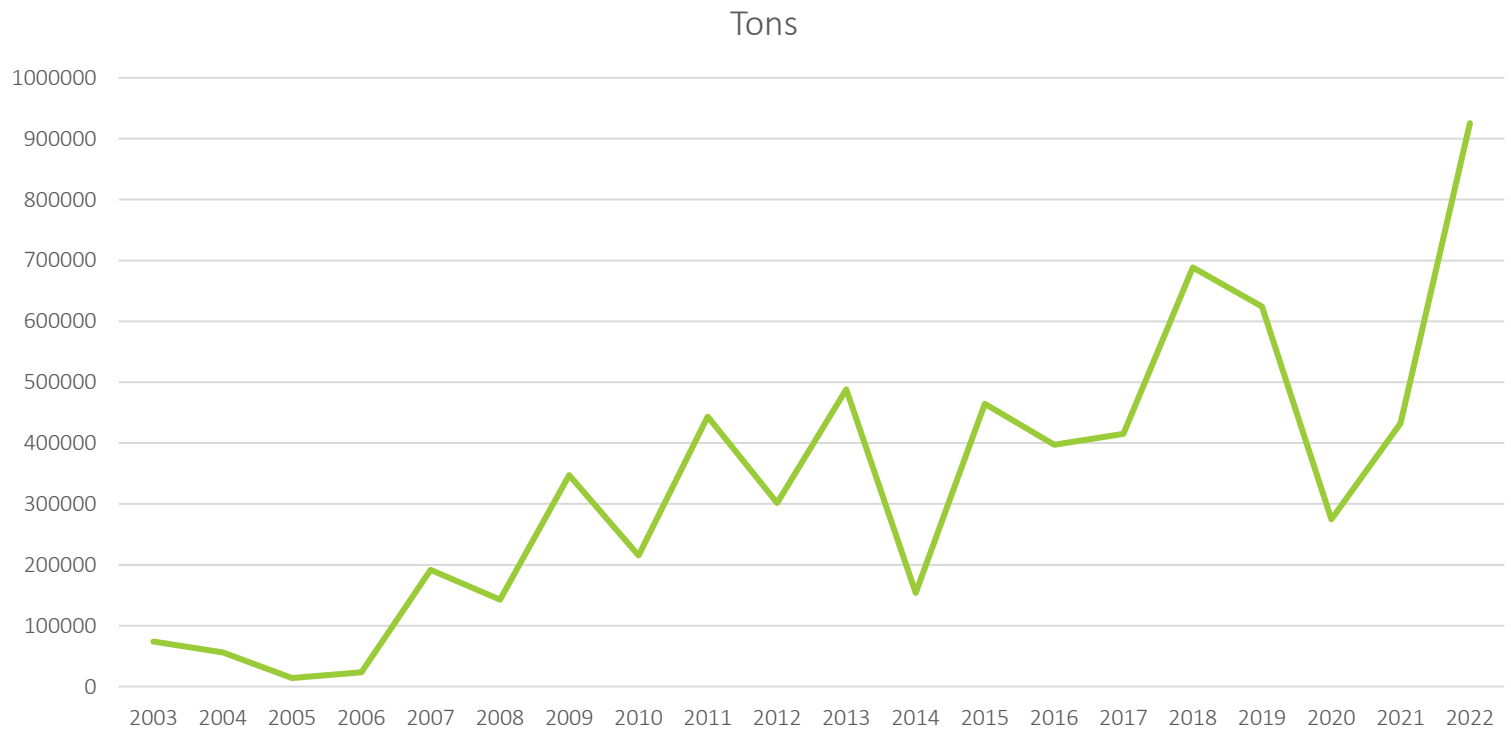


World Leading Fresh Potato Importing Countries (Tonnes)

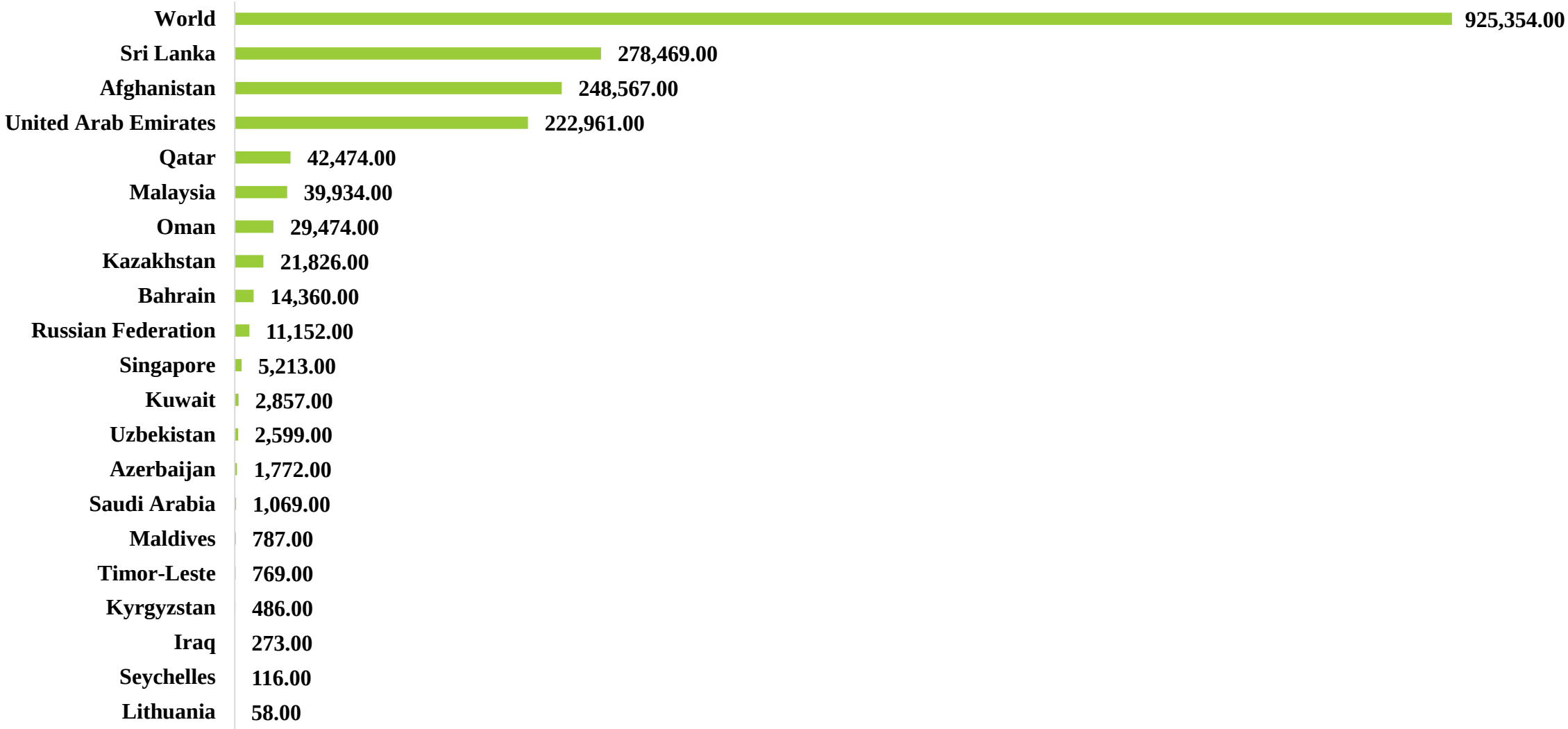


POTATO EXPORT STATUS IN THE INTERNATIONAL MARKET

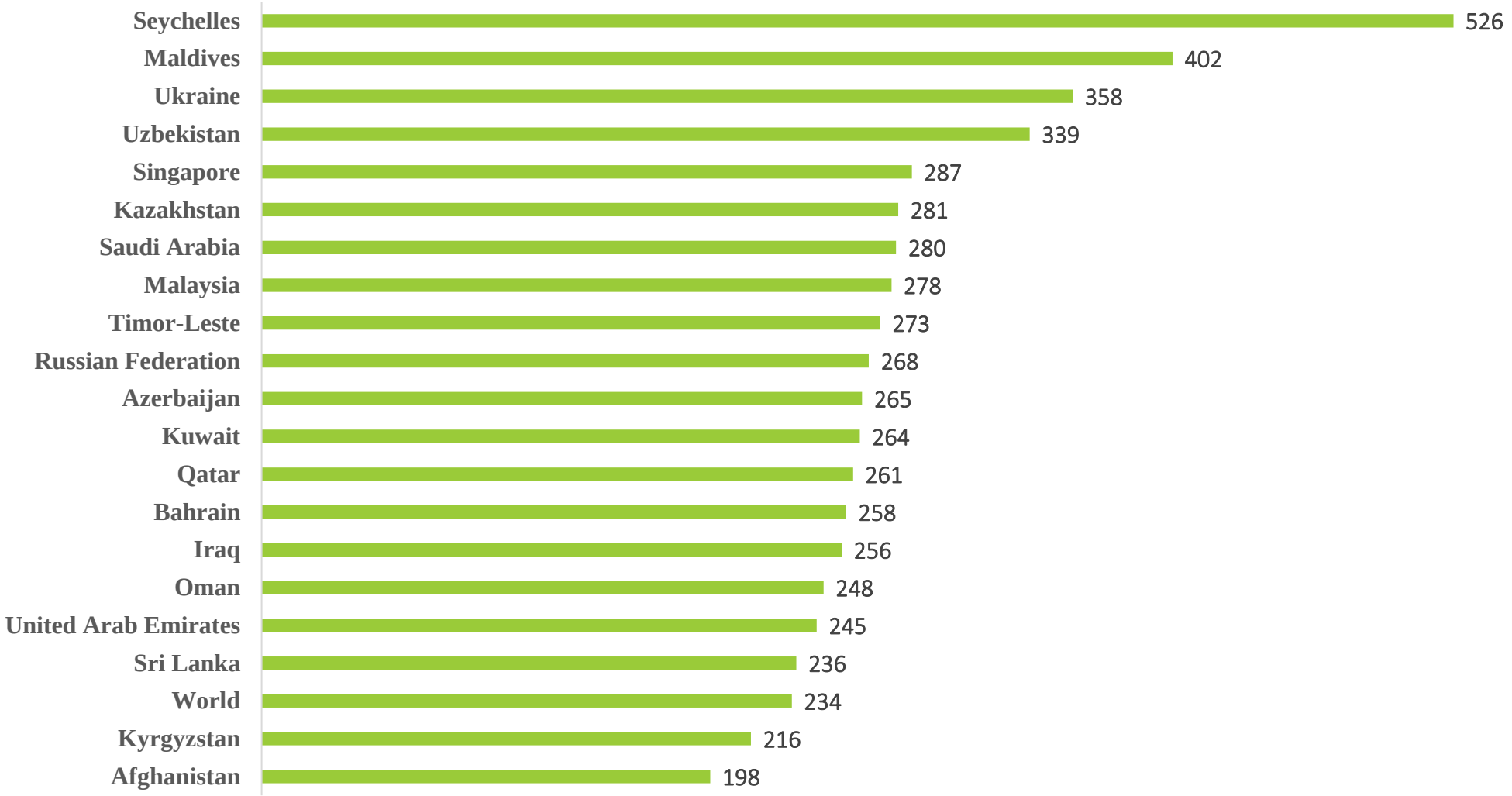
Pakistan exported value in 2022 = 216,591,000 USD
World exported value in 2021= 5,195,933,000 USD



Pakistan Potato Export by Countries (Quantities in Tons)



Pakistan Potato Export by countries Value (USD/Ton)

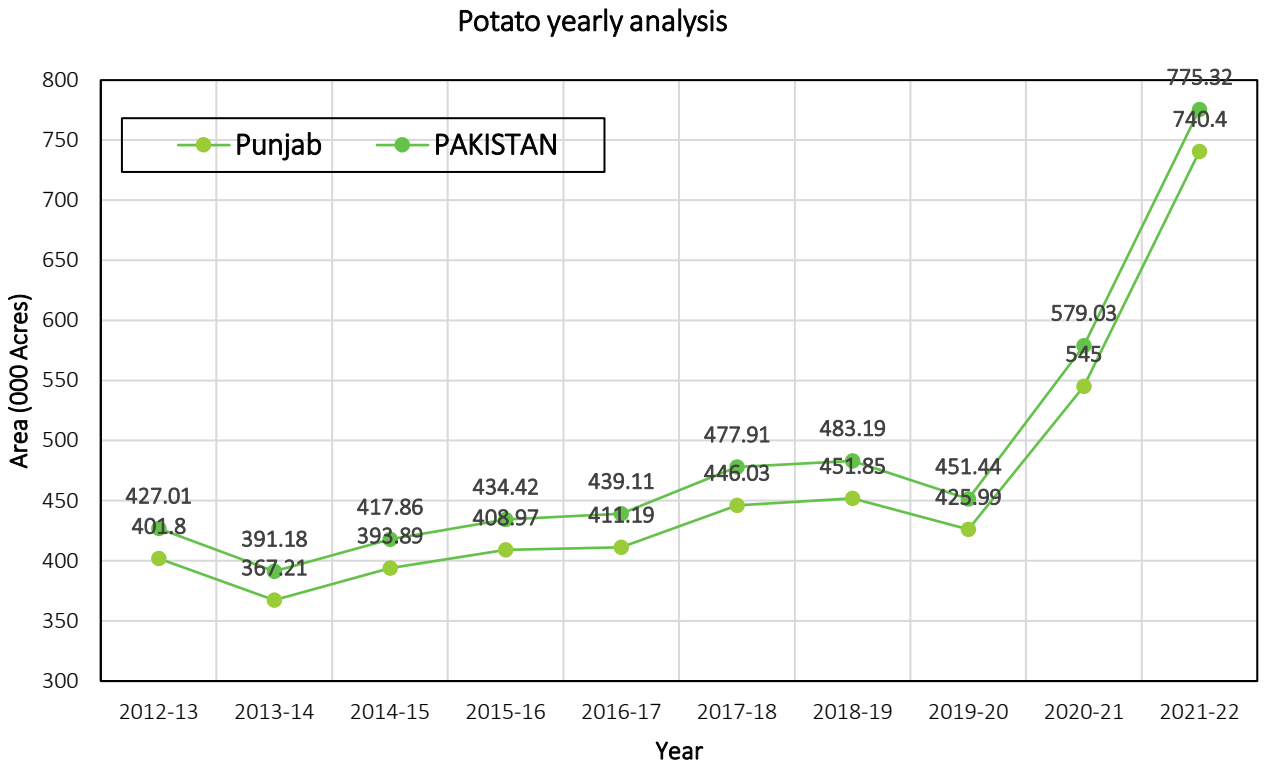


POTATO YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Area Analysis

- From 2012-13 to 2021-22, both Punjab and Pakistan have seen an increase in potato cultivation area.
- The cultivation area for potato in Punjab has nearly doubled in size, growing from 401.8 thousand hectares in 2012-13 to 740.4 thousand hectares in 2021-22. The primary cultivation area is in Sahiwal Division, which covers **2,104,440** acres.

During this period, the cultivation area in Pakistan has grown from 427.01 to 775.32 thousand acres, with Punjab showing the most rapid growth.

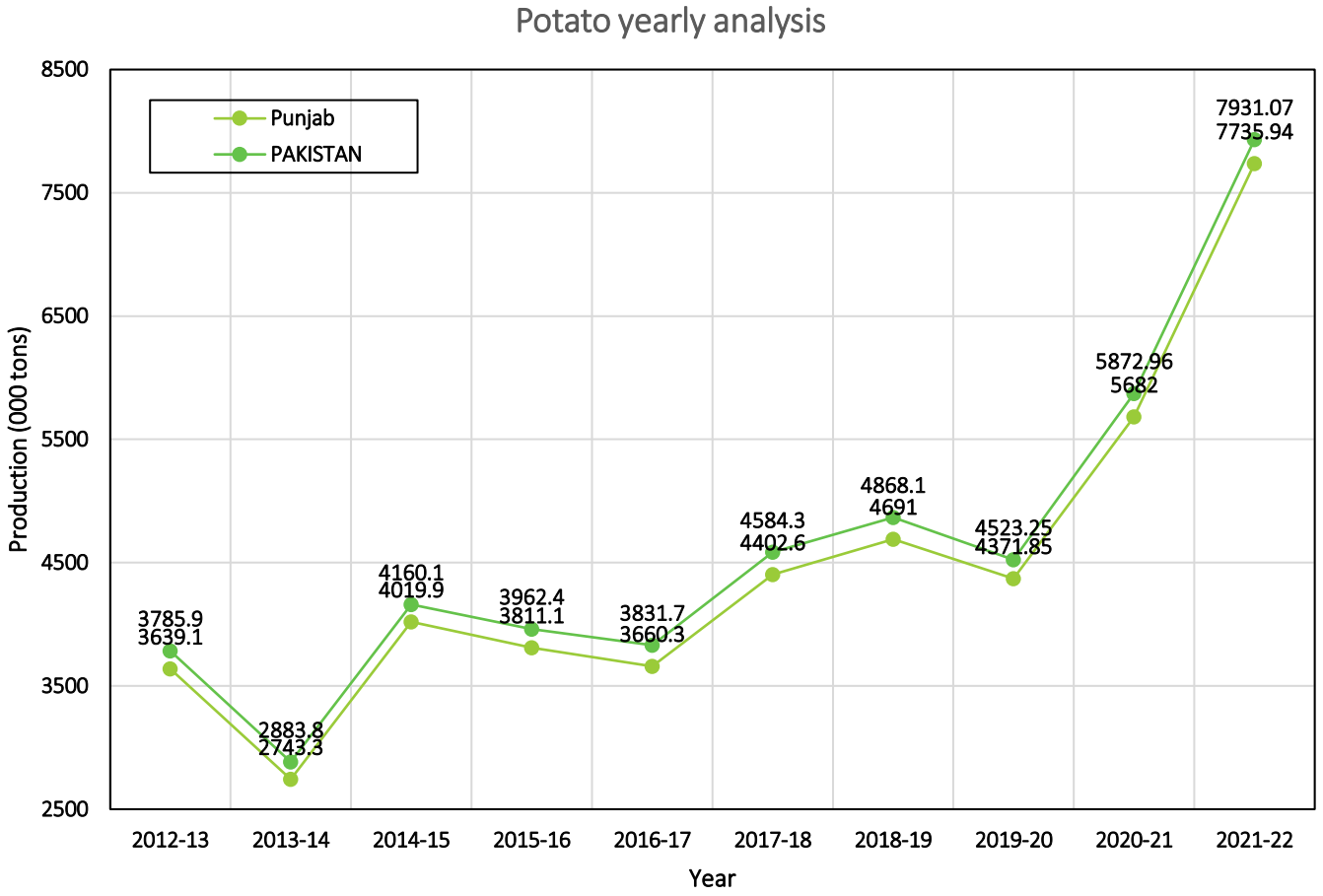


Source: AMIS

POTATO YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Production Analysis

- Punjab's production generally follows the same trend as the national production, it often produces a larger quantity.
- The production gap between Punjab and Pakistan is particularly notable in 2020-21 and 2021-22, indicating Punjab's increasing dominance in groundnut production.



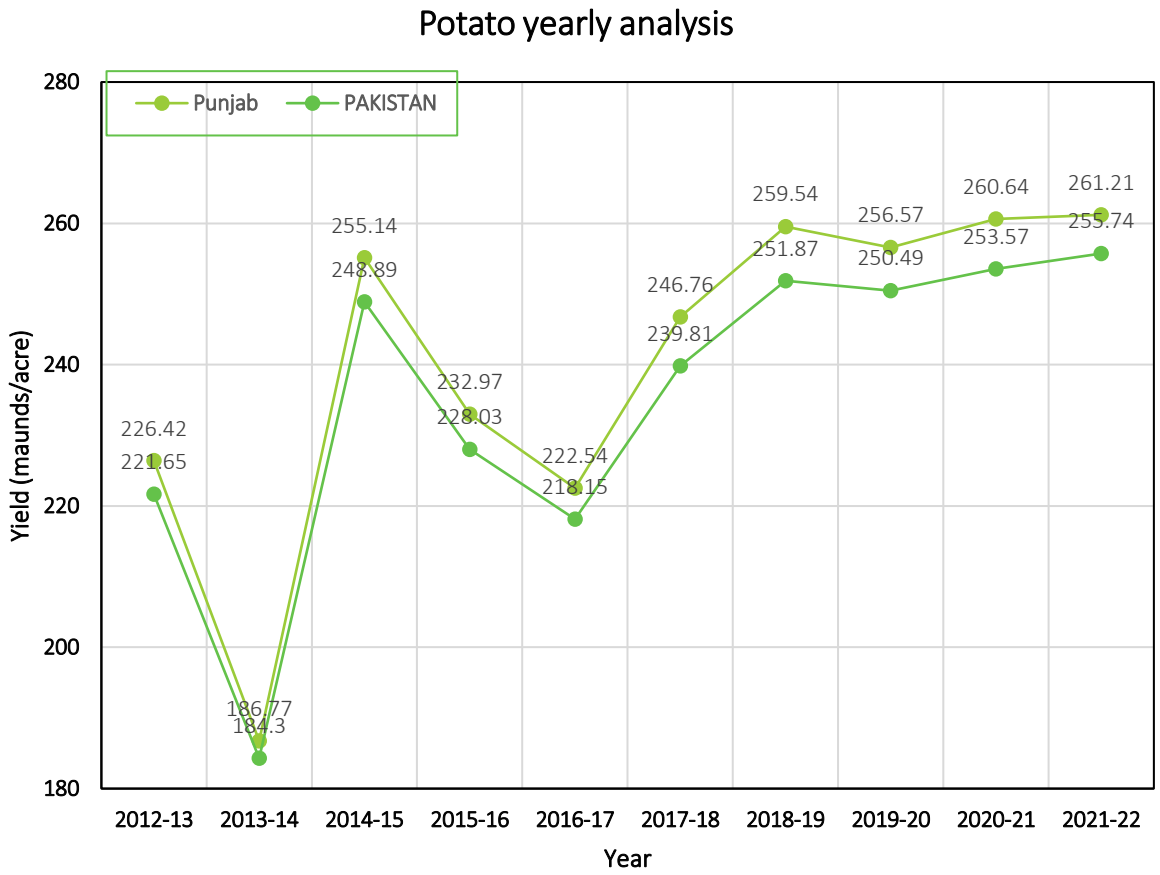
Source: CRS Punjab (2021-22)

Source: AMIS

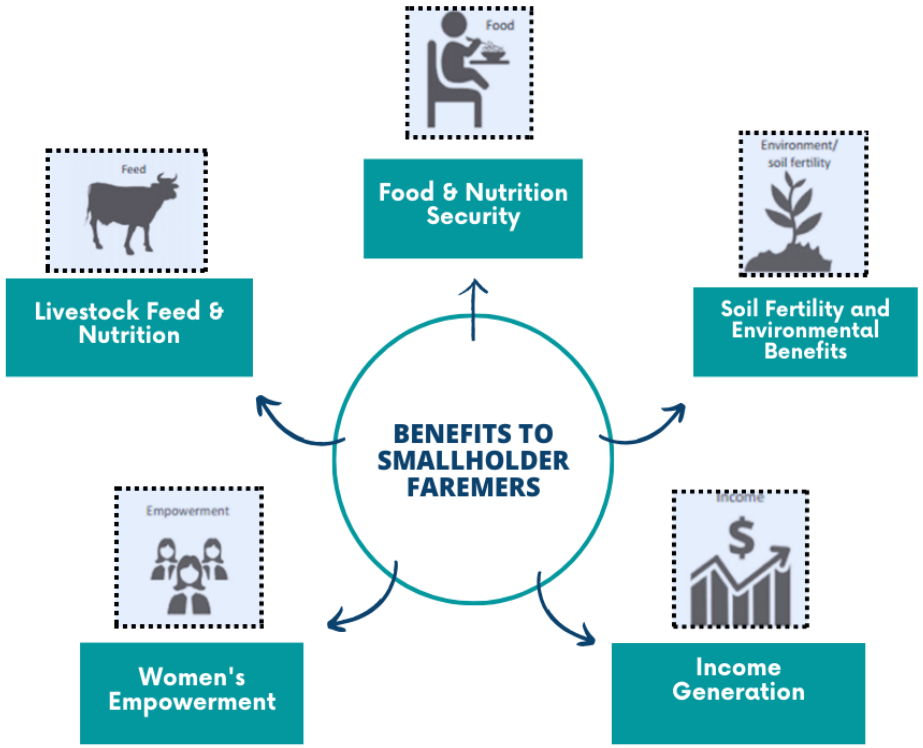
POTATO YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Yield Analysis

- Punjab has consistently achieved a higher yield (measured in monds/acre) than other regions in most years.
- Punjab, has consistently produced higher agricultural yields of potato compared to other provinces in the country. This could be attributed to a number of factors, such as favorable agro-climatic conditions, advanced farming practices, and access to improved technologies and inputs. The combination of these factors might have contributed to the province's sustained success in producing higher yields.



Source: AMIS



1. Food and Nutrition Security

- Potatoes are a rich source of carbohydrates, providing a significant portion of dietary calories.
- These are a good source of dietary fiber, including both soluble and insoluble fibers. This fiber content aids in digestion, helps regulate blood sugar levels, and contributes to a feeling of fullness, which can be beneficial for weight
- It contain essential vitamins and minerals, including vitamin C, potassium, vitamin B6, and folate. These nutrients are vital for various bodily functions, including immune system support, cell metabolism, and the formation of red blood cells.
- Potatoes have good storage stability, which allows them to be stored for extended periods without significant loss of nutritional value.

2. Livestock Feed and Nutrition

- Potatoes can be incorporated into various forms in animal diets, such as being fed raw, boiled, or processed into by-products like potato meal or silage.
- Potatoes have high digestibility, making them an efficient feed option for livestock.
- Some by-products of potato processing, such as potato peels and pulps, can be used as feed additives.

3. Soil Fertility and Environmental Benefits

- Alternating potato cultivation with other crops enhances nutrient cycling and prevents the depletion of specific nutrients in the soil.
- After harvesting, the leftover potato vines and residues decompose, adding organic matter to the soil.
- Potatoes can be grown in various climates and soil types, making them adaptable to different agricultural settings.

4. Income Generation

- Potatoes have high demand in local and global markets provides opportunities for farmers to sell their produce and engage in commercial farming.
- Farmers involved in certified seed potato production can generate income by selling high-quality potato seeds to other farmers.
- Small farmers can explore simple processing techniques, such as making potato chips, fries, or dehydrated products.

5. Women's Empowerment

- Women provide support with all kinds of harvest and post-harvest practices.
- Engaging women in competitive markets empowers them economically and socially.

POTATO VALUE ADDED PRODUCTS

Value addition is needed to diversify the use of potato. This includes producing value-added products such as potato starch, potato flakes, potato chips, dried potato slices, potato cakes, potato cutlets, potato soups and exporting.

Source: PRI

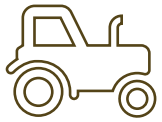
VALUE CHAIN ASSESSMENT OF POTATO CROP ISSUES

Seed

- Lack of Certified Seed Potato
- Lack of awareness about certified seed varieties.
- Lack of Value-Added Potato Varieties
- Improper storage and handling of seed.
- Declination of genetic purity of seed

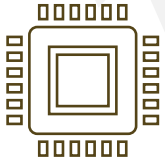
Farm

- High Cost of Production
- Improper Use of Inputs
- Diseases (e.g. potato scab) and insect pest attack
- Inconsistent Irrigational Water Supply
- Unavailability of modern machinery
- Biotic and Abiotic Stresses



Harvest & Logistics

- High post-harvest losses due to improper storage and handling.
- Limited transportation infrastructure in rural areas.
- Low efficiency of existing planting and harvesting machinery (lower plant population & 30% is left in the soil after digging).
- Challenges in timely harvesting and delivery to processing units.



Processing

- Lack of Mechanized Grading and Packing Facilities.
- Limited access to technological advancements
- Improper handling and storage practices
- Improper Packing in Gunny Bags

Markets

- Fluctuating market prices
- No facilities for exporters
- Quality issues, especially in terms of an export market
- Heavy taxation on export
- Inefficiency of local markets
- Limited access to high-value markets

POTATO VALUE CHAIN DEVELOPMENT INTERVENTIONS

1. Seed Development:

Seed Certification Framework:

Enhance seed certification for top-quality potatoes, meeting global standards.

Promote Awareness and Training: Organize training programs to educate farmers on the benefits of using certified seeds, proper storage techniques, and the significance of genetic purity.

Research and Development Investment: Establish partnerships with research institutions and private enterprises to accelerate the development and dissemination of improved potato varieties.

2. Production:

- **Cost-Effective Agricultural Practices:** Promote the adoption of cost-effective and sustainable agricultural practices through training programs, extension services, and incentives.
- **Efficient Input Use:** Implement educational campaigns to enhance farmers' knowledge about proper input use, including fertilizers, pesticides, and other agrochemicals.
- **Integrated Pest and Disease Management:** Develop and implement policies that support integrated pest and disease management strategies.
- **Irrigation Infrastructure Development:** Invest in irrigation infrastructure to ensure consistent water supply for crops.
- **Access to Modern Machinery:** Introduce policies to facilitate the availability and affordability of modern agricultural machinery through subsidies, loans, or leasing programs.
- **Climate-Resilient Agriculture:** Develop and promote policies that focus on climate-resilient agricultural practices to mitigate biotic and abiotic stresses.

3. Post-Harvest & Marketing and Distribution Handling:

- **Cold Storage Infrastructure:** Invest in the development and improvement of cold storage facilities to reduce post-harvest losses and extend the shelf life of potatoes..
- **Market Information Systems:** Utilize technology, such as mobile applications, to disseminate market information to farmers and stakeholders.
- Implement systems for timely and accurate market information to enable farmers to make informed decisions on when and where to sell their produce.
- **Quality Assurance and Grading Standards**: Establish and enforce quality assurance and grading standards for potatoes to ensure consistency and meet market requirements.
- **Market linkages:** Connect farmers to local markets, processors, and exporters. Form cooperatives to negotiate better prices.
- **Market Diversification Strategies:**
- Develop policies to encourage diversification of markets, including exploring export opportunities for potatoes.
- Establish partnerships with international trade organizations to facilitate export market access.

4. Value Addition:

- **Diversification into High-Value Potato Products:** Encourage farmers to explore new products such as potato flour, potato flakes, dried potato slices, potato starch, potato cakes etc.
- Provide financial incentives, grants, or tax breaks to encourage the establishment and expansion of potato processing facilities.
- Implement training programs for farmers and processors to enhance skills in potato value addition techniques.
- Facilitate market access for processed potato products through trade agreements, and export incentives.

5. Capacity Building and Training:

- **Training Programs for Farmers:** Initiate comprehensive training programs for potato farmers on modern cultivation techniques, pest management, and best agronomic practices.
- **Partnerships with NGOs and Private Sector:** Forge partnerships with non-governmental organizations (NGOs) and the private sector to expand the reach and effectiveness of capacity-building initiatives.

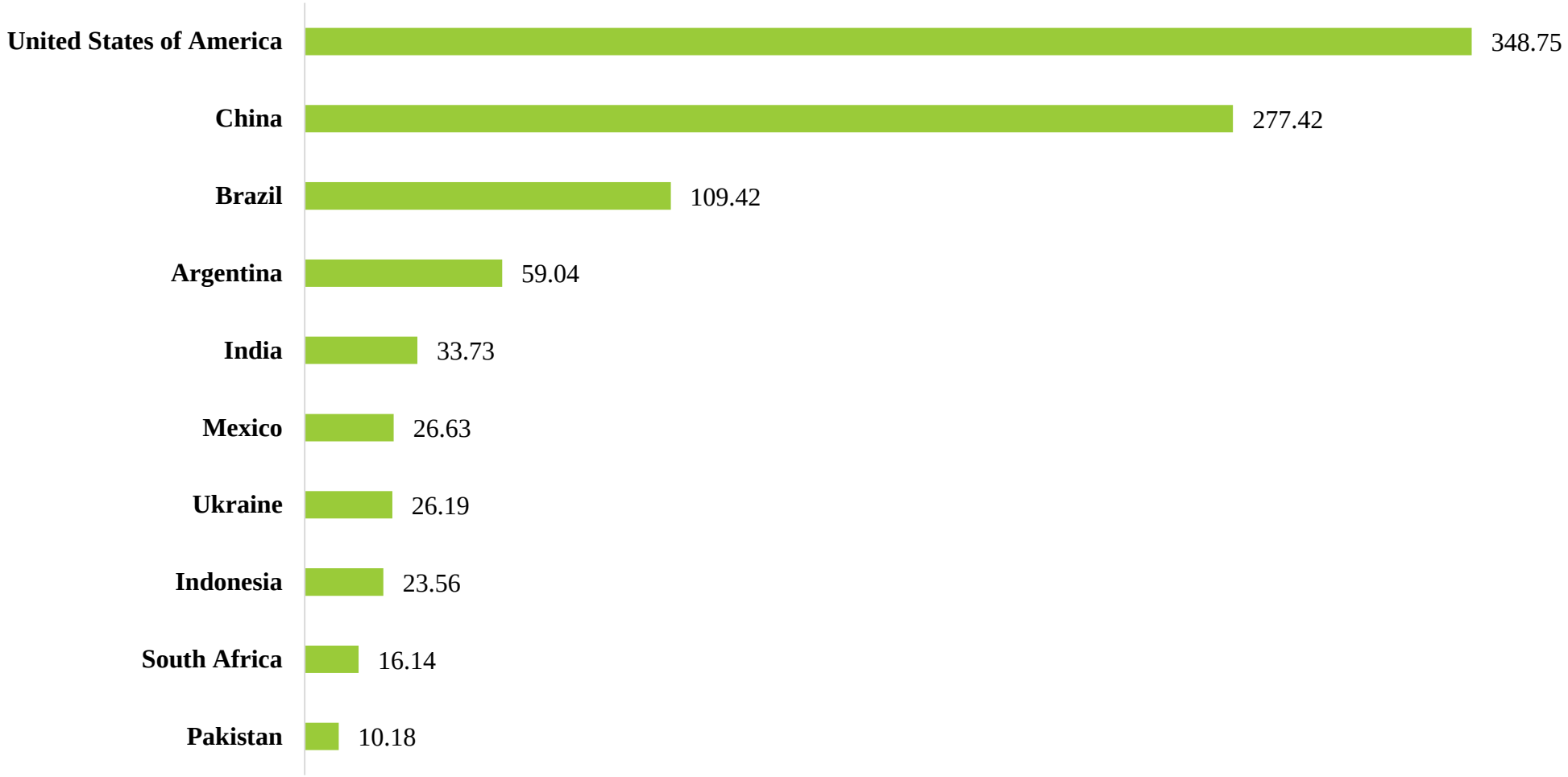
6. Infrastructure Development:

- **Processing Plants and Technology:** Facilitate the establishment of modern processing plants for value-added potato products.
- **Transportation Networks:**
- Improve transportation infrastructure to ensure efficient and timely movement of potatoes from farms to storage facilities and markets.
- Invest in the development of well-maintained roads and logistics hubs, particularly in potato-producing regions.
- **Research and Innovation Hubs:** Create research and innovation hubs focused on potato cultivation, post-harvest management, and processing technologies

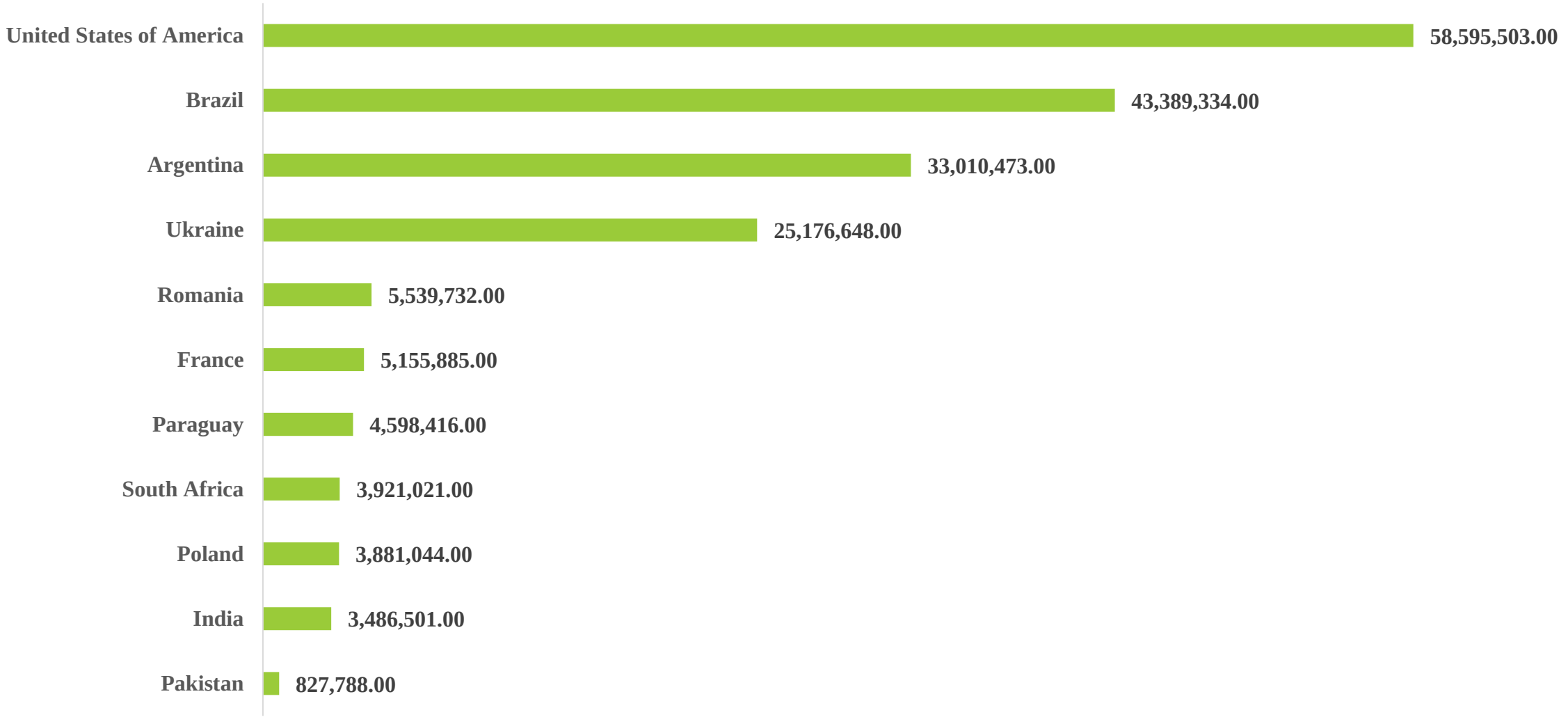
MAIZE VALUE CHAIN

- Area, Production ,Yield Analysis
- Smallholder Farmer benefits
- Maize Potential for Investment
- Maize Value chain process
- Maize Value Addition
- Maize Value Chain wise issues & recommendations

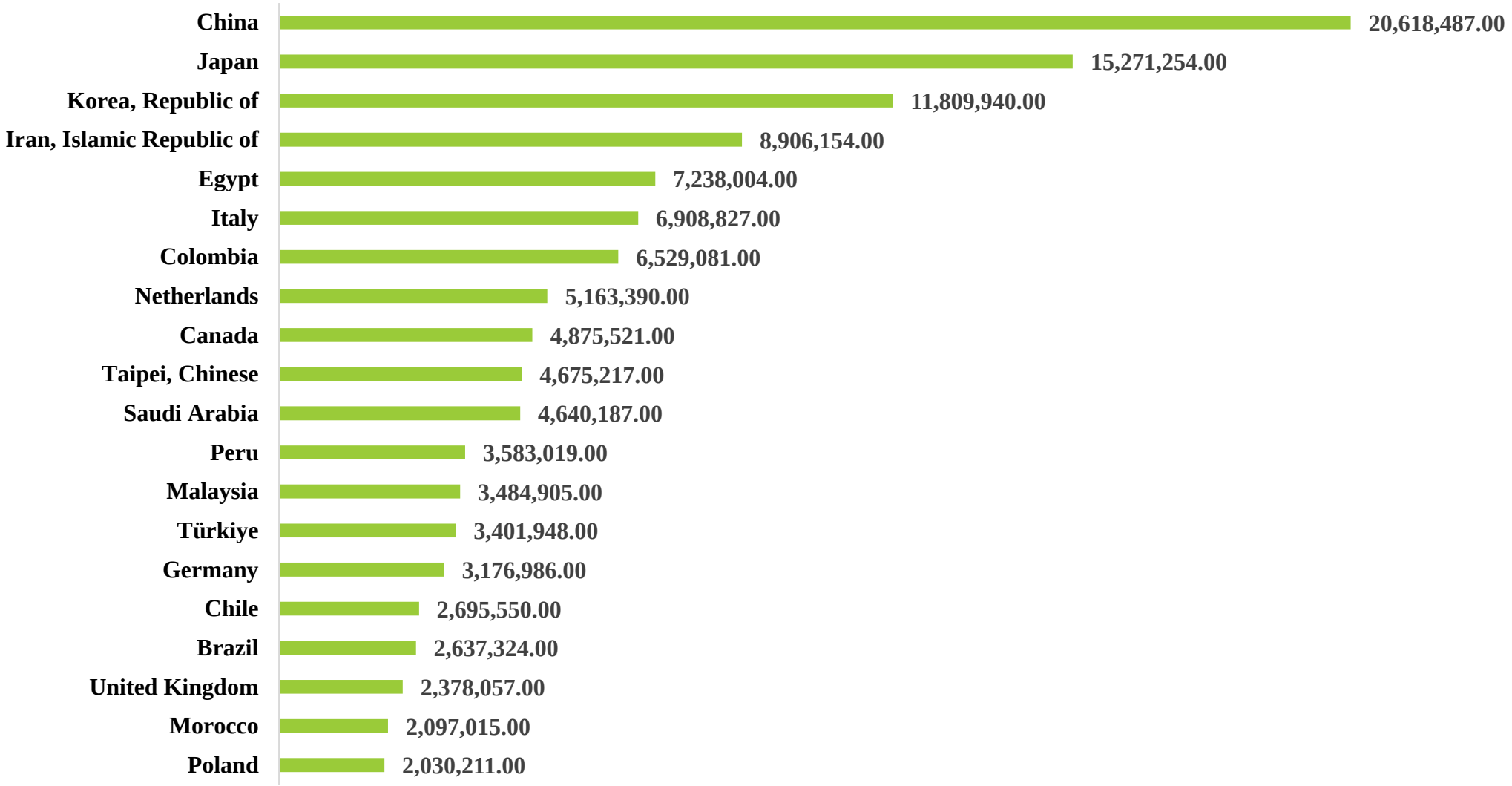
World Leading Maize Producing Countries (Million Tonnes)



World leading Maize Exporting Countries (Tons)



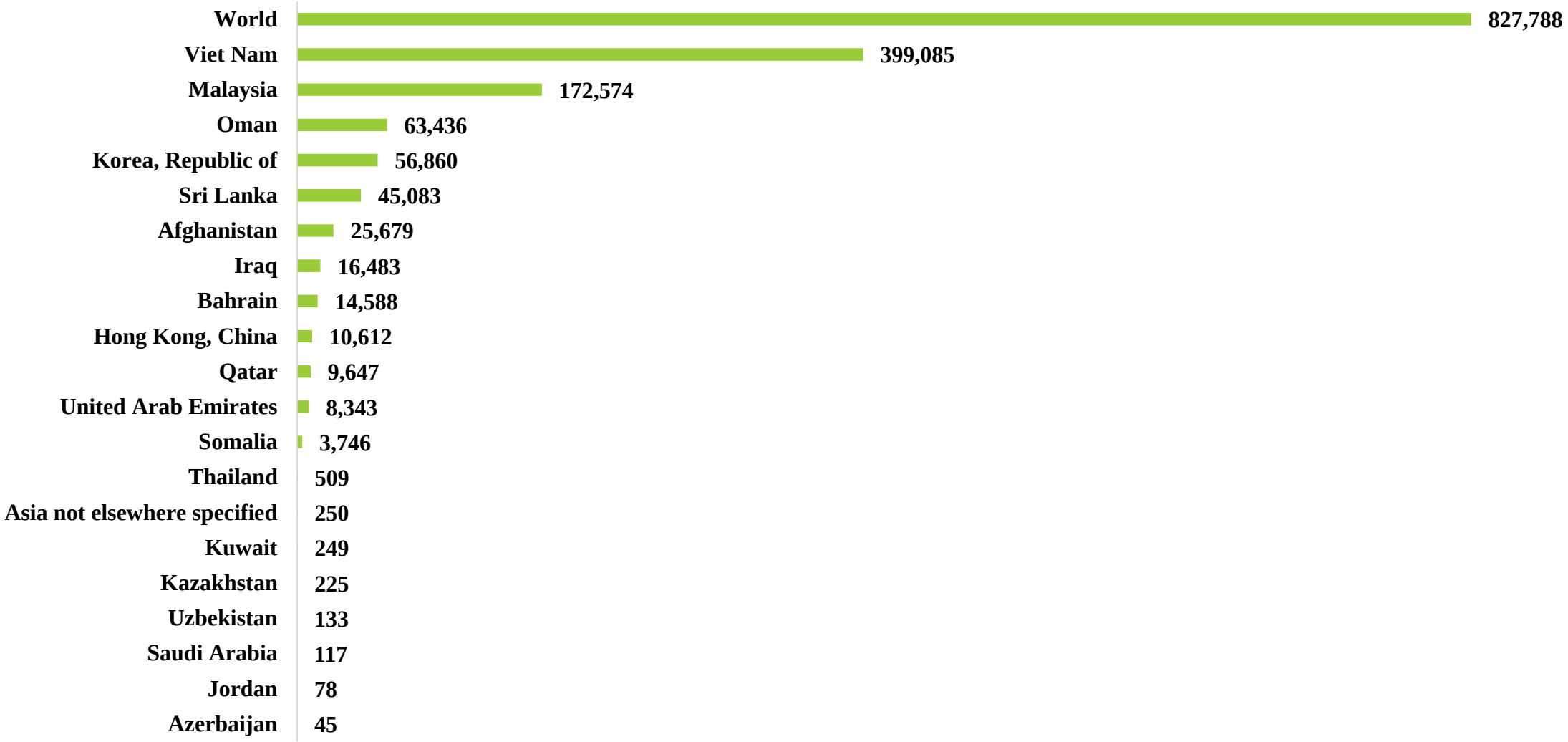
World Leading Fresh Maize Importing Countries (Tonnes)



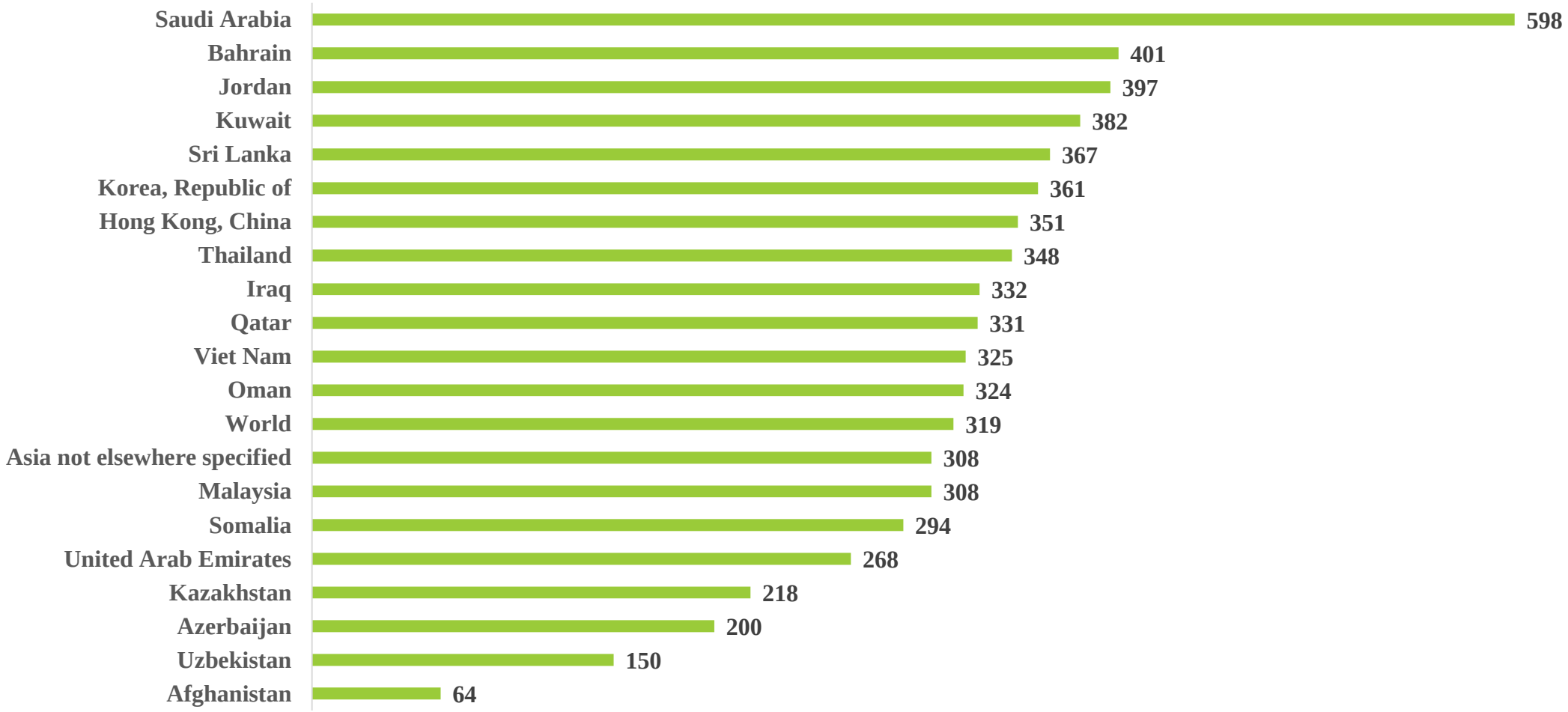
MAIZE EXPORT STATUS IN THE INTERNATIONAL MARKET

Pakistan exported value in 2022 = 264,017,000 USD
World exported value in 2021= 68,164,884,000 USD

Pakistan Maize Export by Countries (Quantities in Tons)



Pakistan Maize Export by Countries Value (USD/Ton)

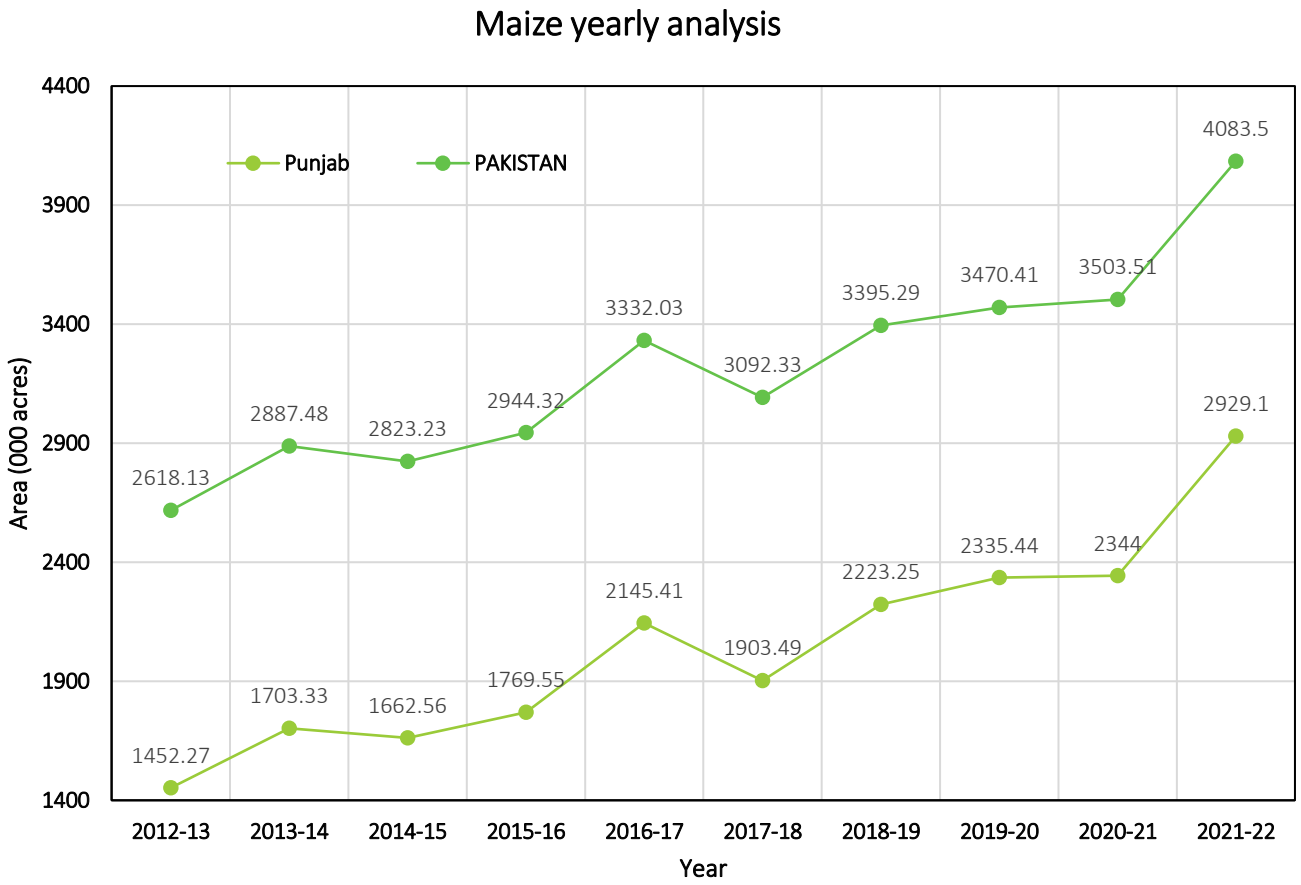


MAIZE YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Area Analysis

- From 2012-13 to 2021-22, both Punjab and Pakistan have seen an increase in maize cultivation area.
- The cultivation area for maize in Punjab has nearly doubled in size, growing from 1452.27 thousand acres in 2012-13 to 2929.1 thousand acres in 2021-22. The primary cultivation area is in Sahiwal Division, which covers **2,104,440** acres.

During this period, the cultivation area in Pakistan has grown from 2618.13 to 4083.5 thousand acres, with Punjab showing the most rapid growth.

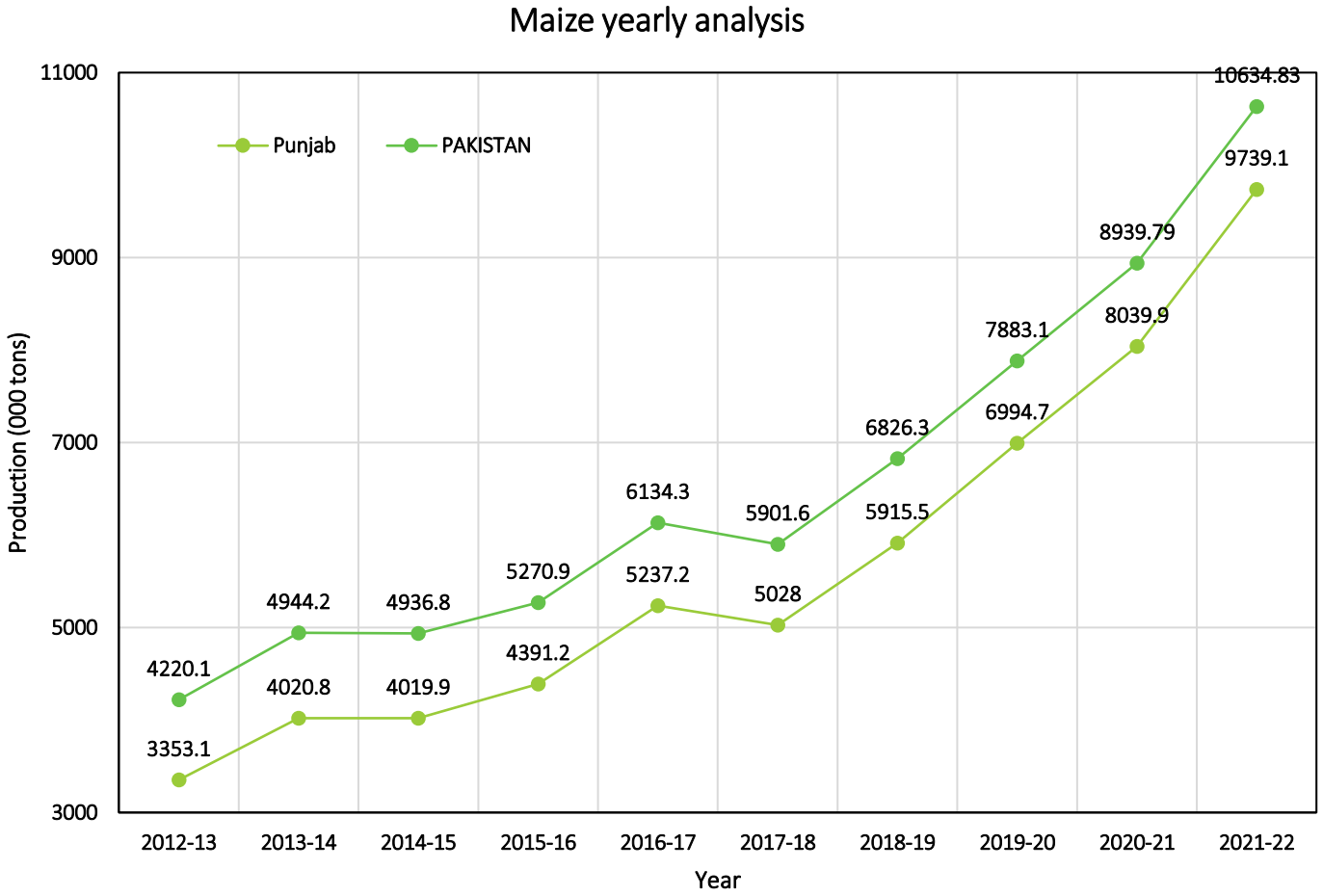


Source: AMIS

MAIZE YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Production Analysis

- Punjab is one of the major contributors to maize production in Pakistan.
- Punjab's production generally follows the same trend as the national production, it often produces a larger quantity.
- The production gap between Punjab and Pakistan is particularly notable in 2020-21 and 2021-22, indicating Punjab's increasing dominance in maize production.

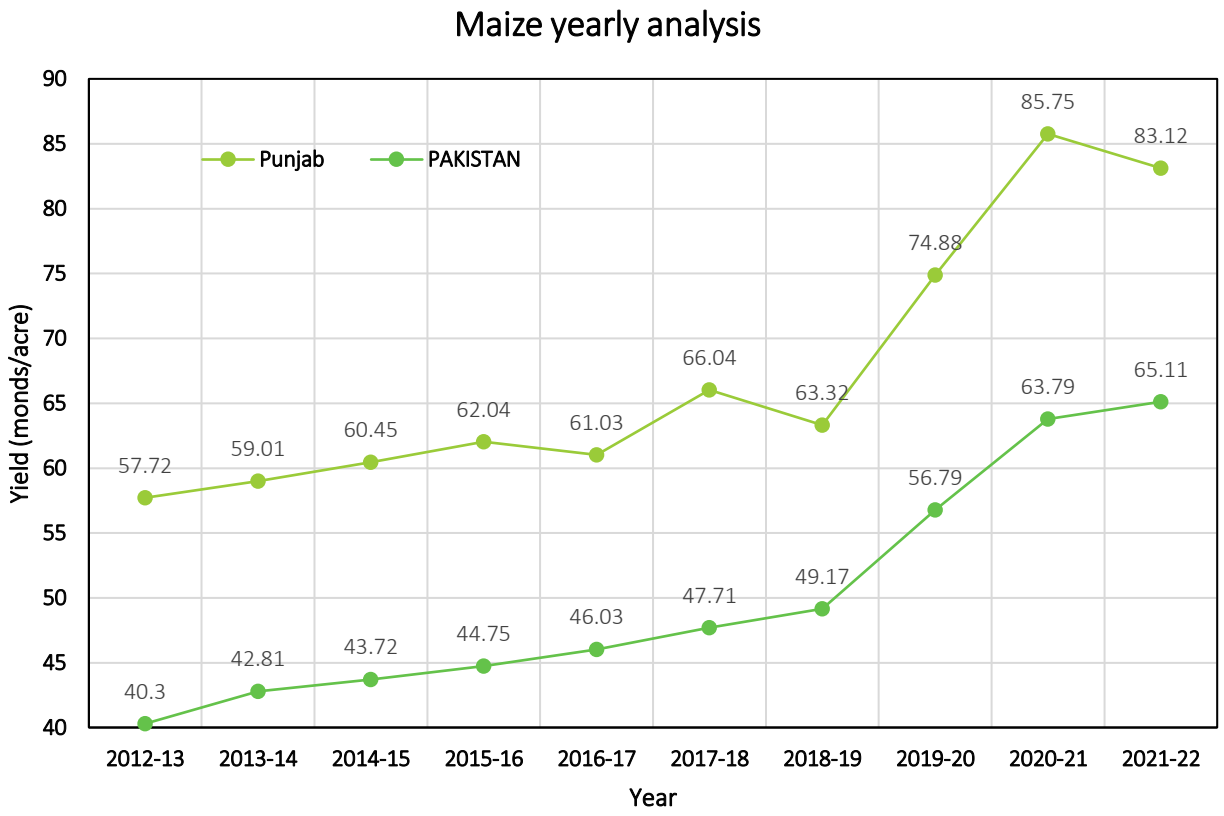


Source: AMIS

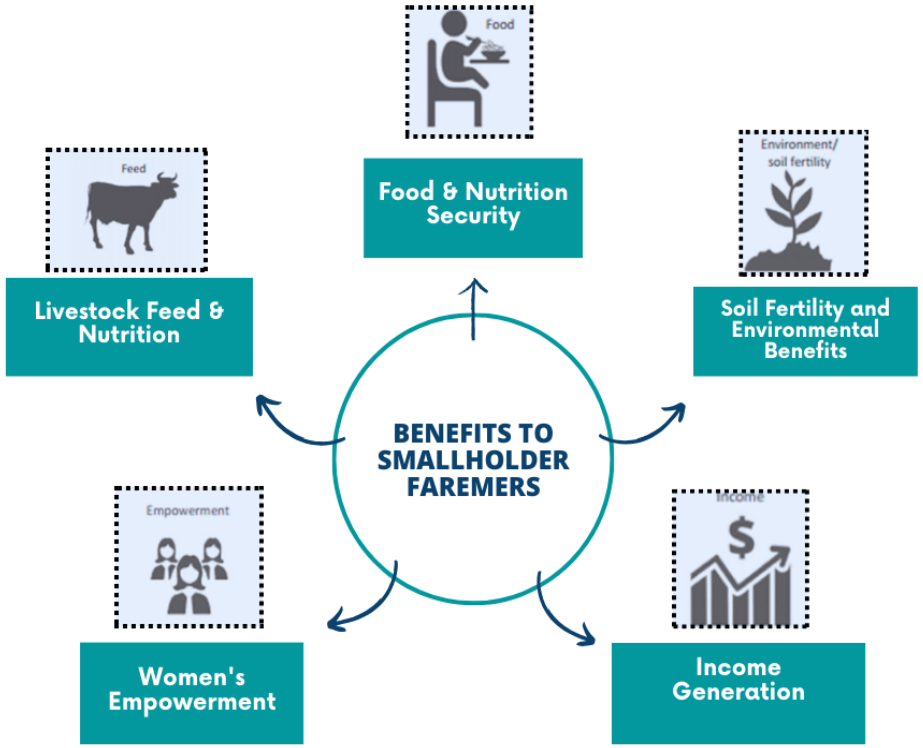
MAIZE YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Yield Analysis

- Punjab has consistently achieved a higher yield (measured in monds/acre) than other regions in most years.
- Punjab, has consistently produced higher agricultural yields of maize compared to other provinces in the country. This could be attributed to a number of factors, such as favorable agro-climatic conditions, advanced farming practices, and access to improved technologies and inputs. The combination of these factors might have contributed to the province's sustained success in producing higher yields.



Source: AMIS



1. Food and Nutrition Security

- Maize serves as a primary food source for smallholder farmers, offering a reliable and essential staple in their diets. Its cultivation ensures a consistent food supply for these farmers and their communities.
- Maize can be processed into various forms, such as flour, grits, and meal, and used in a wide range of food products. This versatility contributes to dietary diversity, allowing people to incorporate maize into different meals and enhancing overall nutrition.
- It also contains essential nutrients such as fiber, vitamins (like B vitamins), and minerals (such as phosphorus and magnesium).

2. Livestock Feed and Nutrition

- Smallholder farmers often engage in mixed farming practices. Maize, as a key component of livestock feed, supports smallholders in animal husbandry, providing an additional source of income through the sale of meat, milk, or other livestock products.
- Maize is highly digestible for many livestock species, facilitating efficient nutrient absorption. This characteristic contributes to improved feed conversion rates, promoting optimal growth and production in animals.
- Maize is often more affordable compared to some alternative feed sources, making it a cost-effective option for smallholder farmers. This affordability enables farmers to provide consistent and sufficient nutrition to their livestock.

3. Soil Fertility and Environmental Benefits

- Introducing maize into a crop rotation system helps break pest and disease cycles, reducing the pressure on the soil.
- Maize residues, such as stalks and leaves, can be used as organic mulch or incorporated into the soil. This practice improves soil structure, moisture retention, and nutrient content.
- Maize can be used as a cover crop during non-growing seasons. Cover cropping helps prevent soil erosion, suppress weed growth, and improve nutrient cycling.

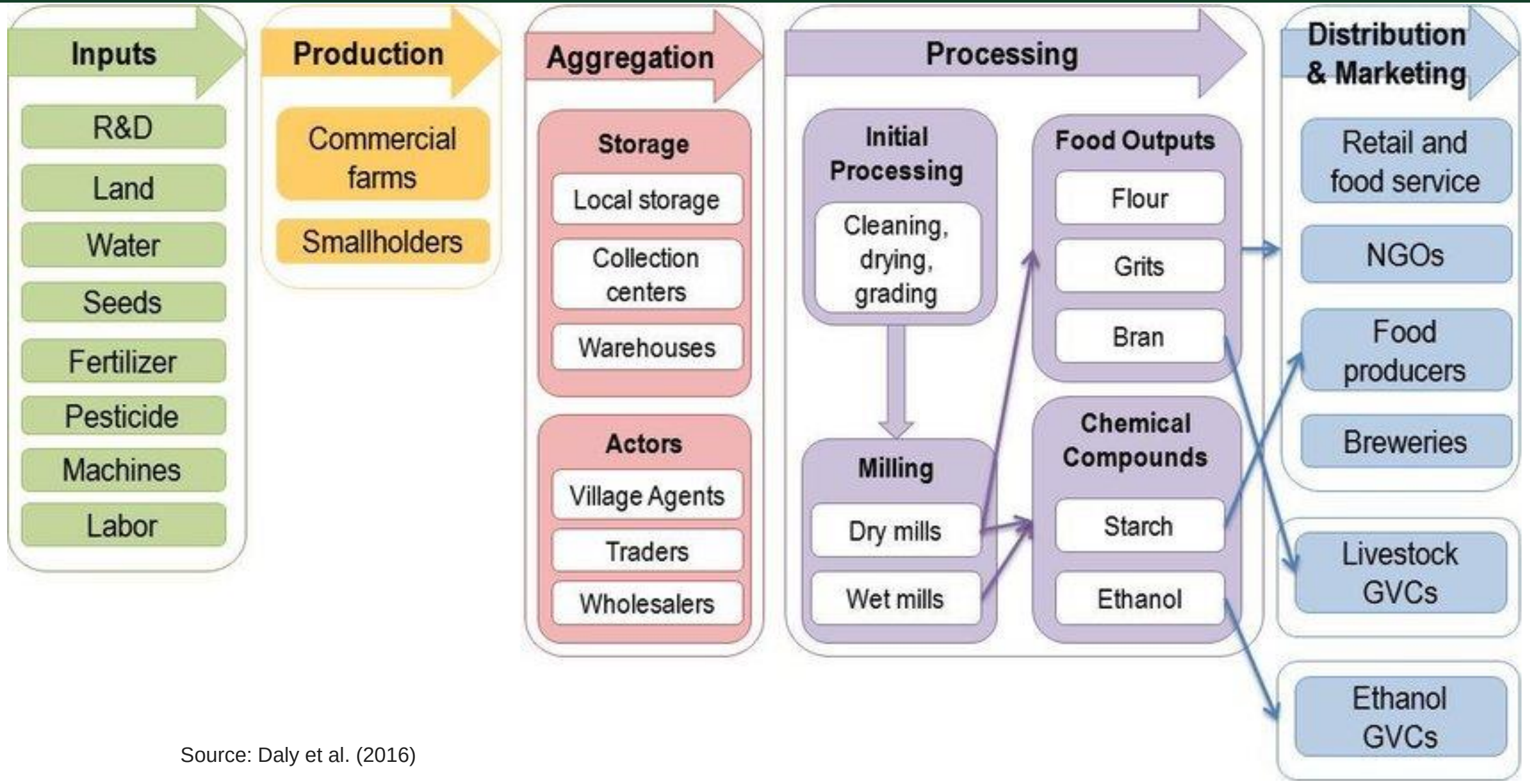
4. Income Generation

- Maize is a highly marketable crop, with a consistent demand for both human consumption and livestock feed. Smallholder farmers can sell maize grains or processed products in local markets, generating income throughout the year.
- Maize cultivation often requires labor during planting, harvesting, and processing. This creates employment opportunities for local communities, leading to income generation for laborers involved in various stages of maize production.

5. Women's Empowerment

- Maize farming provides women with opportunities to generate income through the sale of maize grains, processed products, or by-products.
- Successful involvement in maize farming may enable women to access resources such as credit, inputs, and extension services.

MAIZE VALUE CHAIN



Source: Daly et al. (2016)

MAIZE VALUE ADDED PRODUCTS

The value added products of maize include multigrain flours, corn starch, corn oil, corn steep liquor, gluten, cornflakes and feeds.

Corn Steep Liquor (CSL)

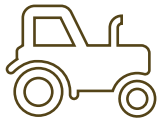
VALUE CHAIN ASSESSMENT OF MAIZE CROP ISSUES

Seed

- High Seed Costs.
- Limited availability of maize varieties adapted to changing climatic conditions.
- Limited farmer awareness on new seed technologies
- Research land encroachment

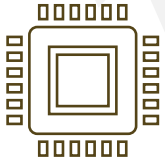
Farm

- High Cost of Production
- Unavailability of Inputs.
- Attack of diseases (e.g. stalk rot) and insect pests (e.g. fall armyworm).



Harvest & Logistics

- Unavailability of silage machinery.
- Unavailability of drying machinery.
- Limited access to real-time market information.



Processing

- Inadequate processing facilities, including milling plants and processing units.
- Limited access to modern and efficient processing equipment.
- Dependence on a limited range of maize products.

Markets

- Price Instability.
- No proper exporter setup.
- Insufficient access to real-time market information.

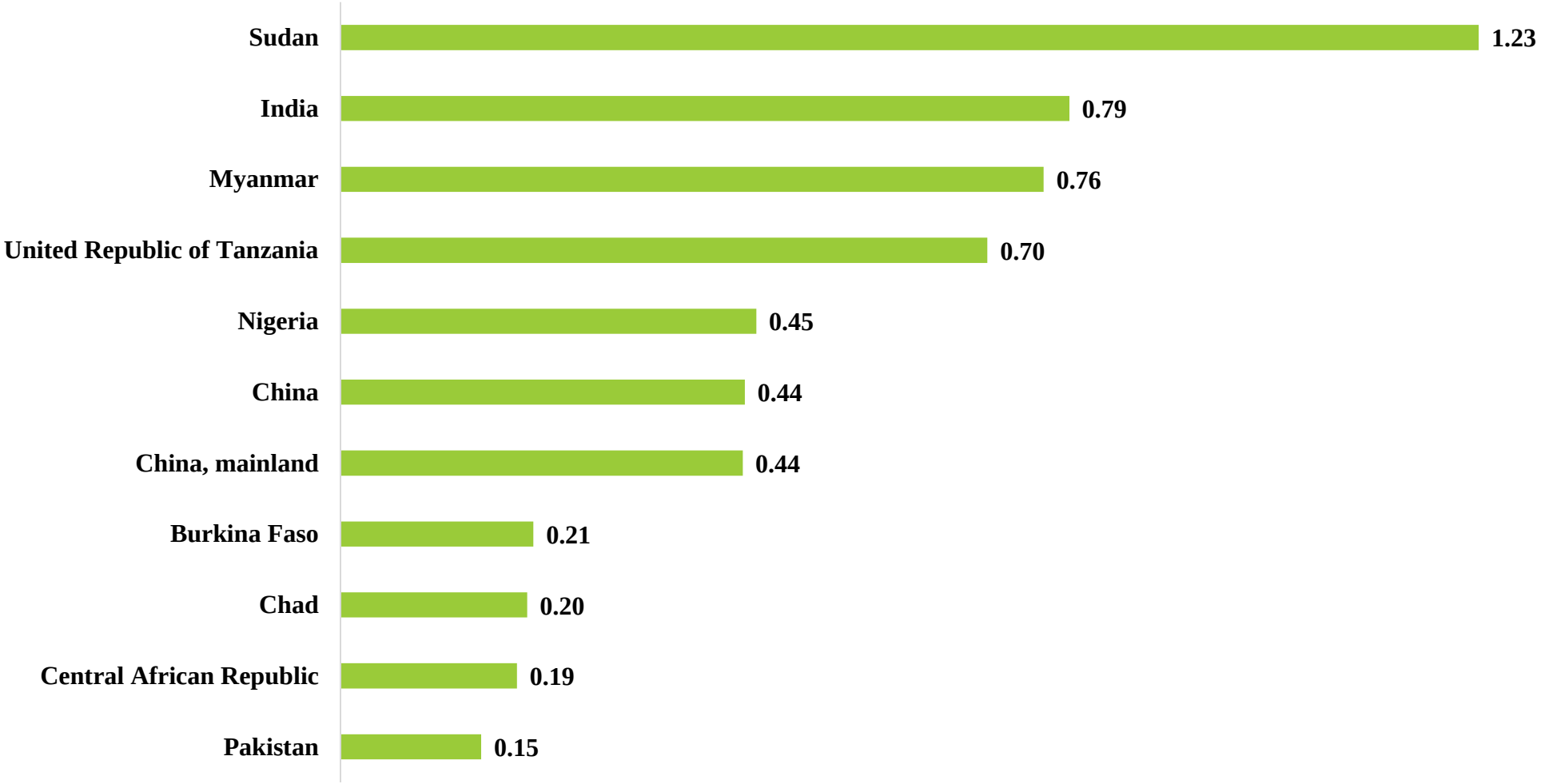
INTERVENTIONS

1. Allocate funding for ongoing research and development programs focused on breeding maize varieties adapted to Sahiwal Division's specific agro-climatic conditions
2. Establish a comprehensive seed certification and distribution system to ensure the availability of certified, high-quality seeds for maize.
3. Invest and upgrade efficient irrigation infrastructure, focusing on efficient water distribution systems, water-saving technologies, and reliable water sources to ensure consistent and optimal irrigation for maize.
4. Develop and implement policies that promote IPM practices for maize.
5. Promote climate-resilient agricultural practices such as conservation tillage, cover cropping, and agroforestry to mitigate the impact of climate change.
6. Facilitate market linkages for maize farmers, ensuring fair pricing and reducing post-harvest losses through improved storage and transportation facilities.
7. Increase value addition by incentivizing the private sector and processing industry for export enhancement

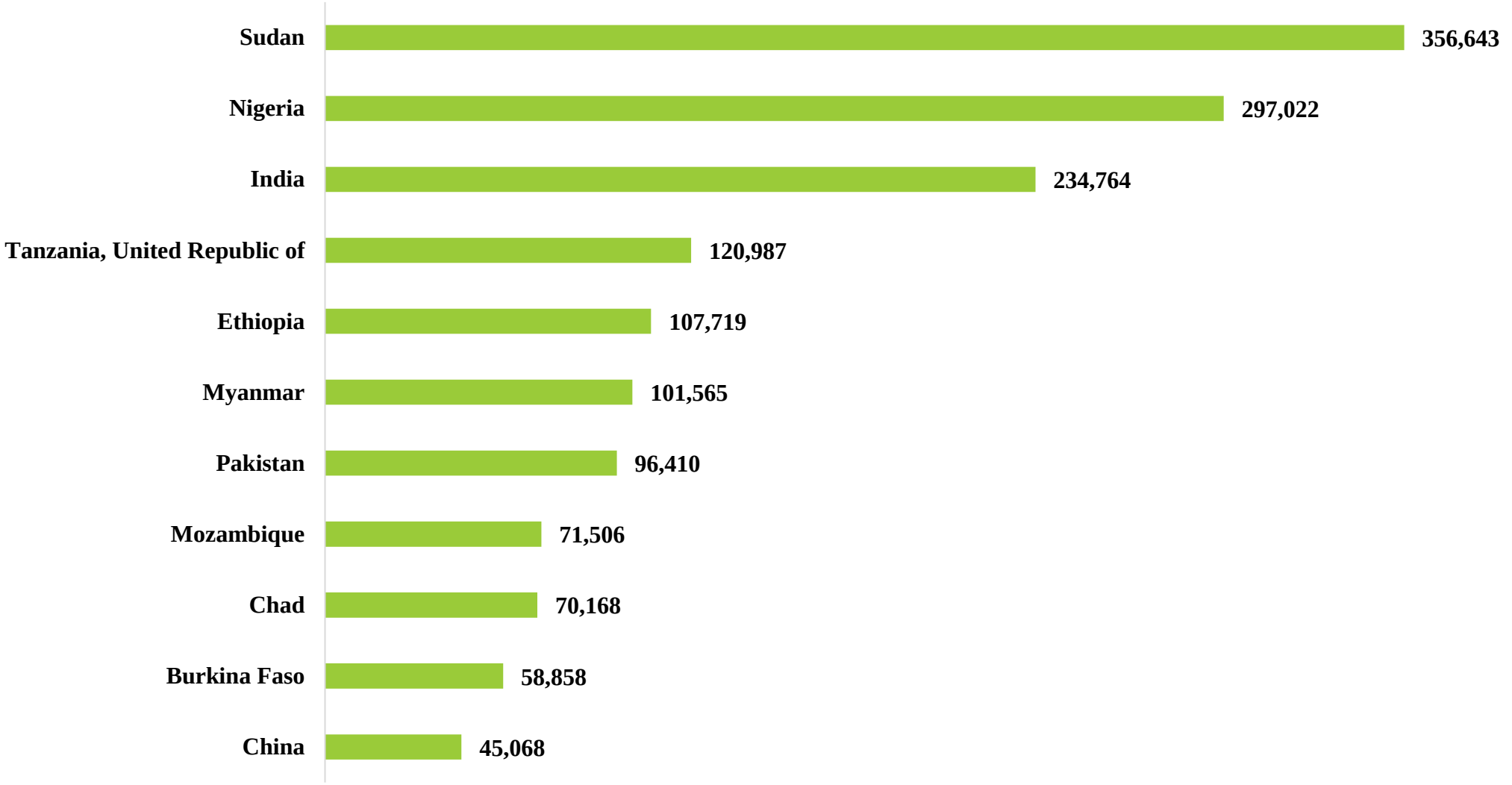
SESAMUM VALUE CHAIN

- Area, Production ,Yield Analysis
- Smallholder Farmer benefits
- Sesamum potential for investment
- Sesamum Value chain process
- Sesamum Value Addition

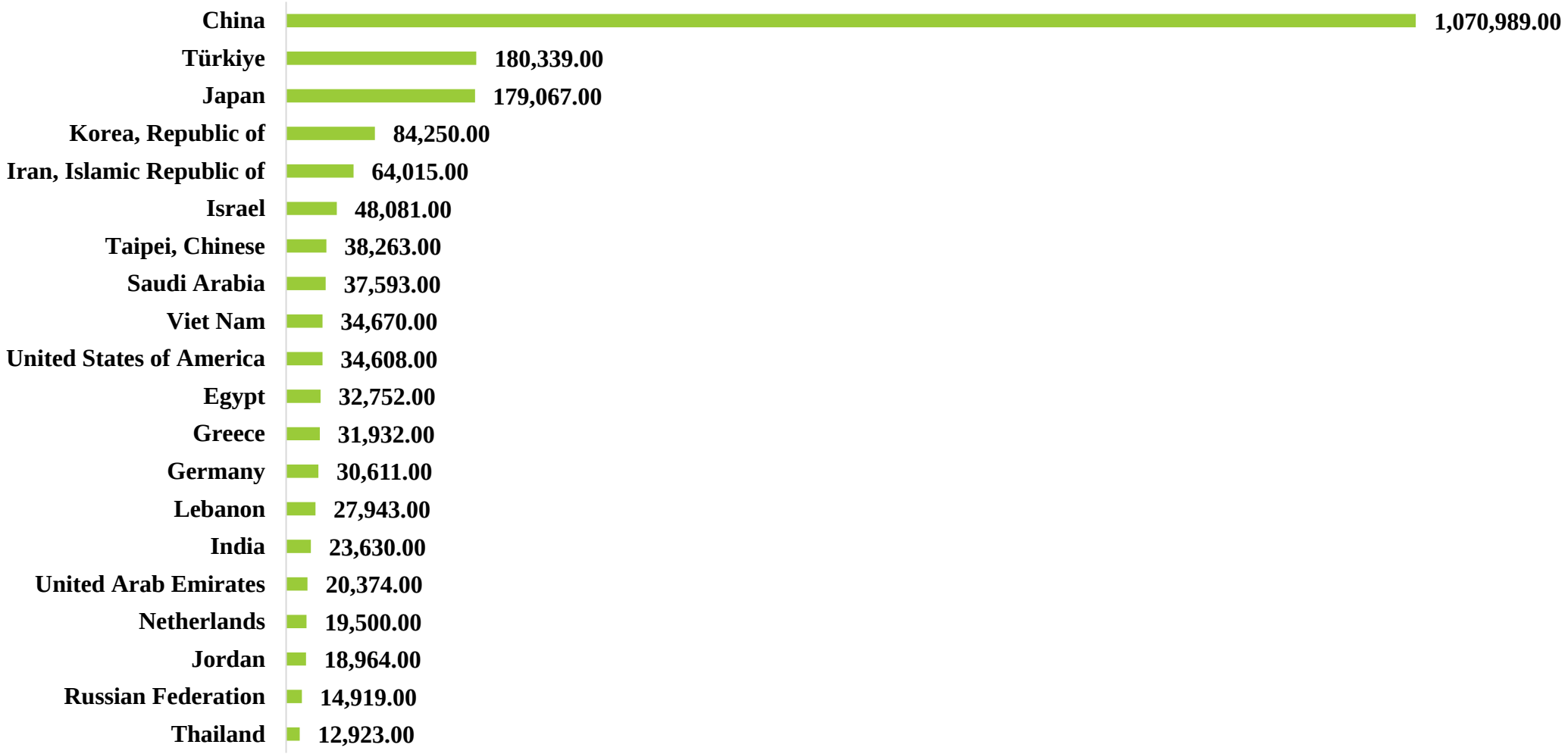
World Leading Sesamum Producing Countries (Million Tonnes)



World leading Sesamum Exporting Countries (Tons)

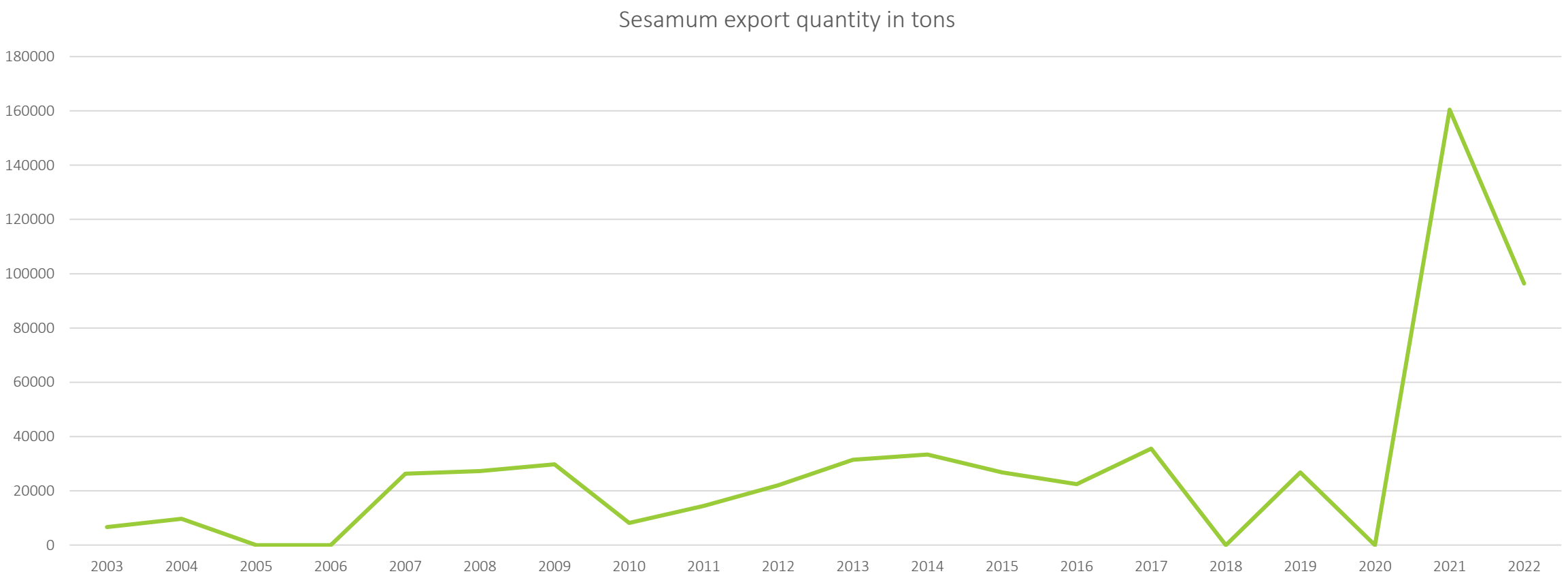


World Leading Sesamum Importing Countries (Tonnes)

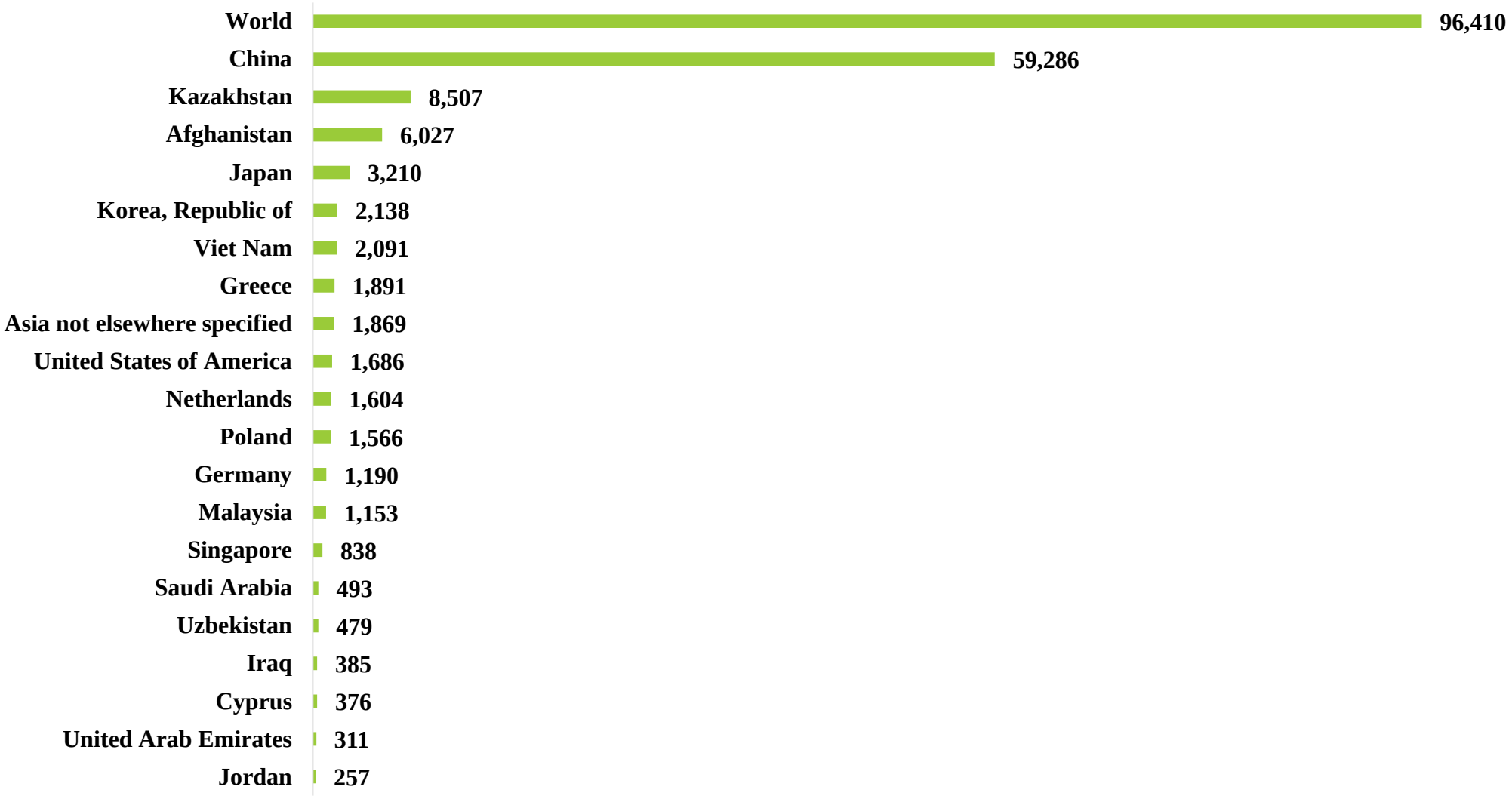


SESAMUM EXPORT STATUS IN THE INTERNATIONAL MARKET

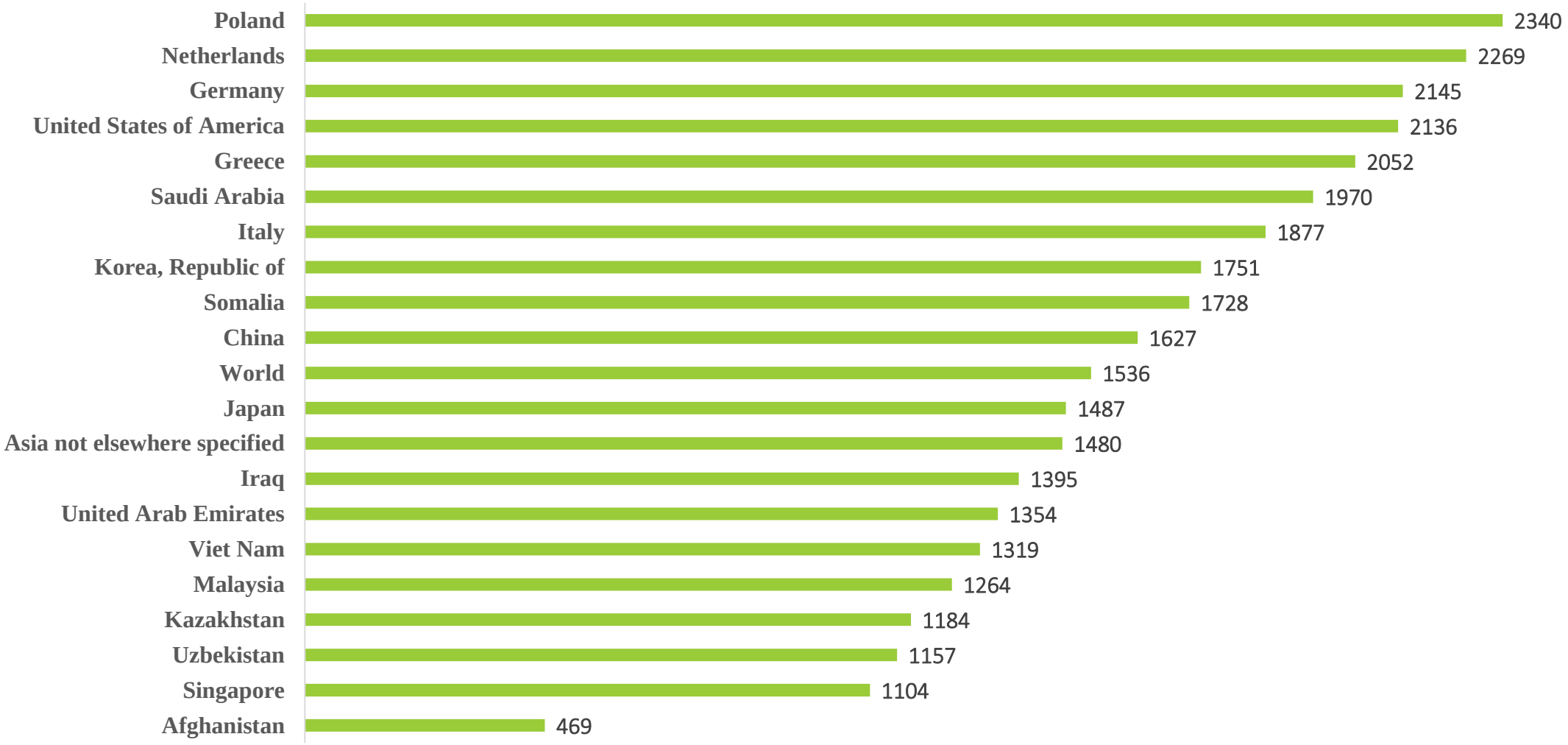
Pakistan exported value in 2022 = 148,062,000 USD
World exported value in 2021= 2,910,055,000 USD



Pakistan Sesamum Export by Countries (Quantities in Tons)



Pakistan Sesamum Export by Countries Value (USD/Ton)

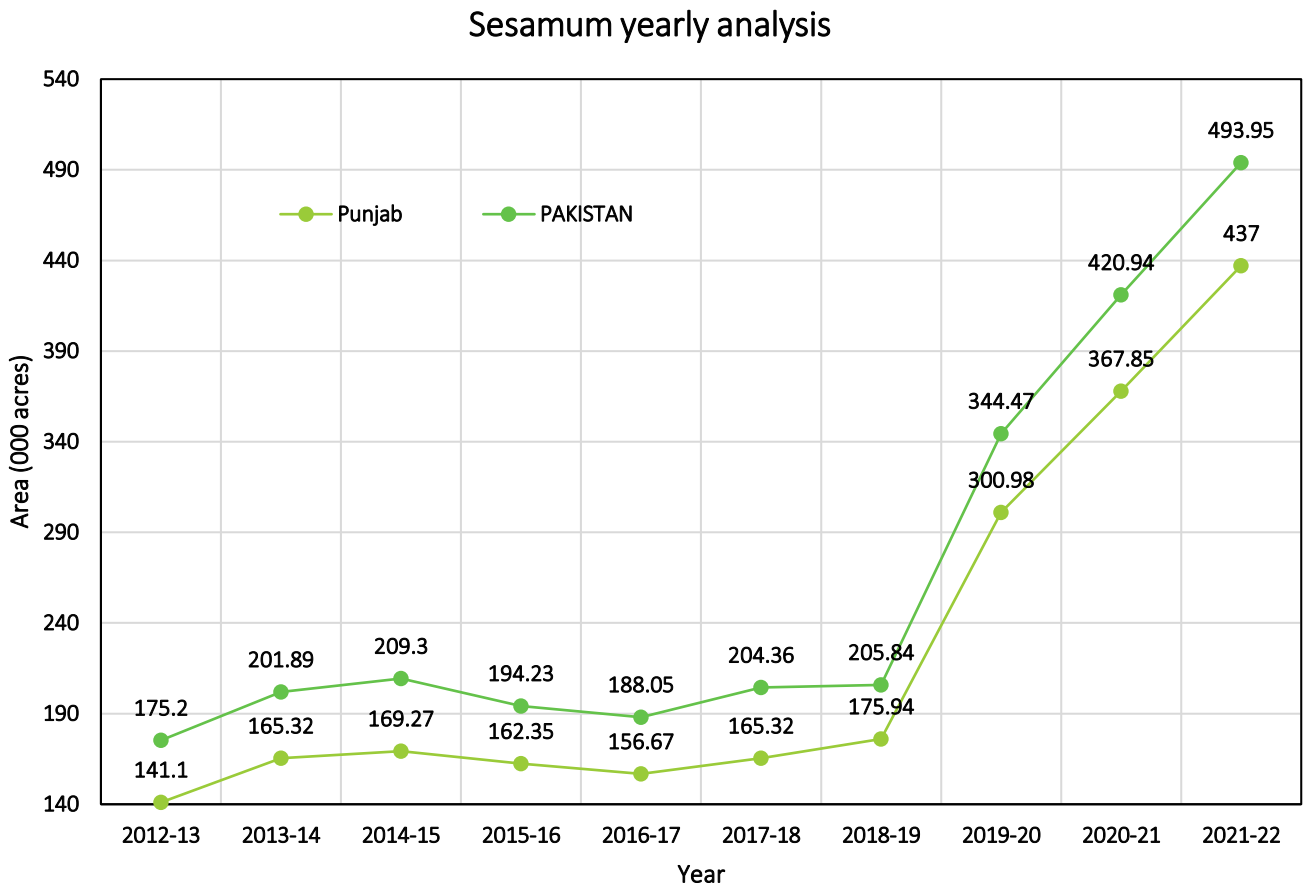


SESAMUM YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Area Analysis

- From 2012-13 to 2021-22, both Punjab and Pakistan have seen an increase in sesamum cultivation area.
- The cultivation area for sesamum in Punjab was more than tripple in size, growing from 141.1 thousand acres in 2012-13 to 437 thousand acres in 2021-22. The primary cultivation area is in Sahiwal Division, which covers **2,104,440** acres.

During this period, the cultivation area in Pakistan has grown from 175.2 to 493.95 thousand acres, with Punjab showing the most rapid growth.

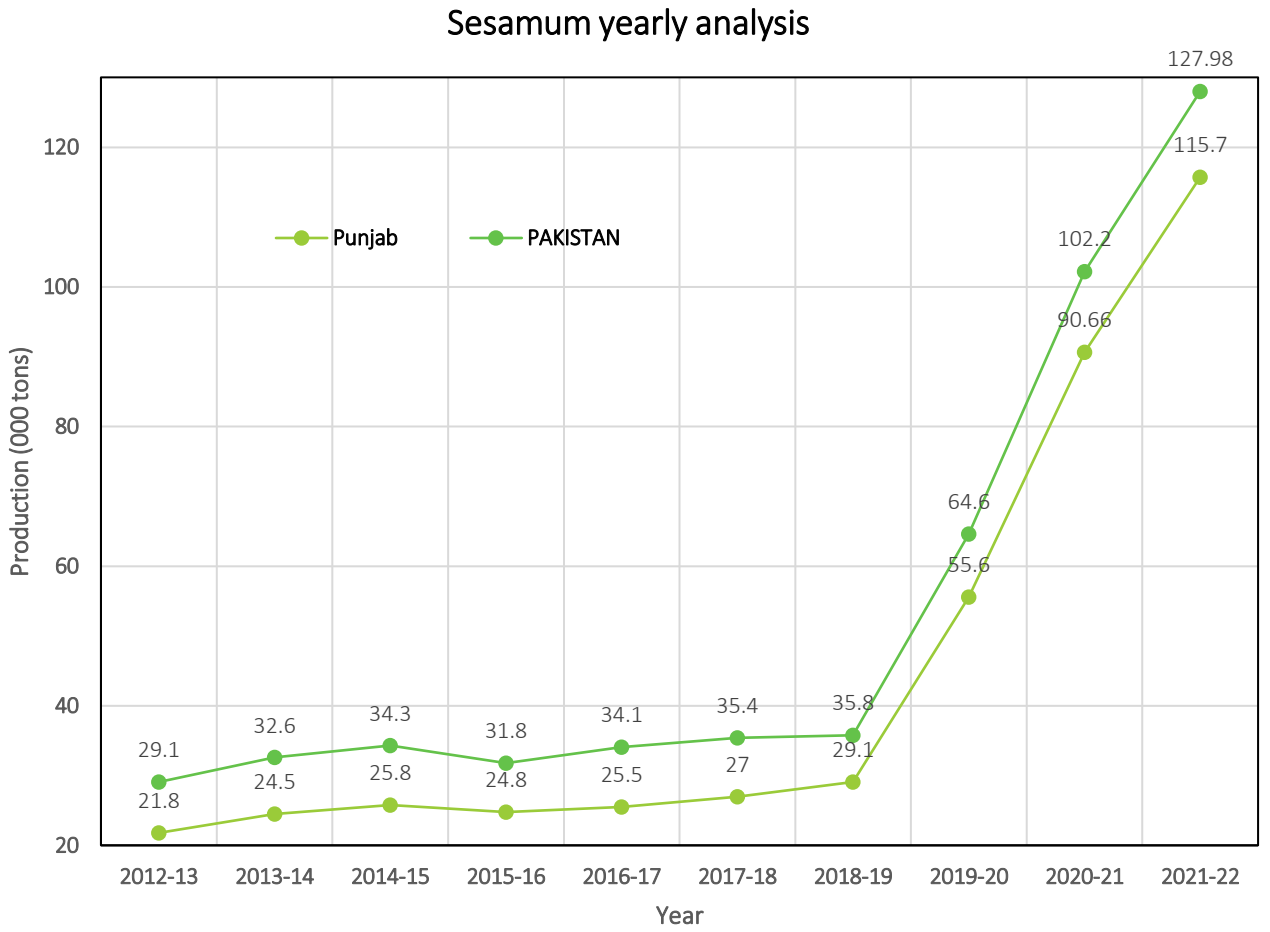


Source: AMIS

SESAMUM YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

Production Analysis

- Punjab's production generally follows the same trend as the national production, it often produces a larger quantity..
- The production gap between Punjab and Pakistan is particularly notable in 2020-21 and 2021-22, indicating Punjab's increasing dominance in sesamum production.



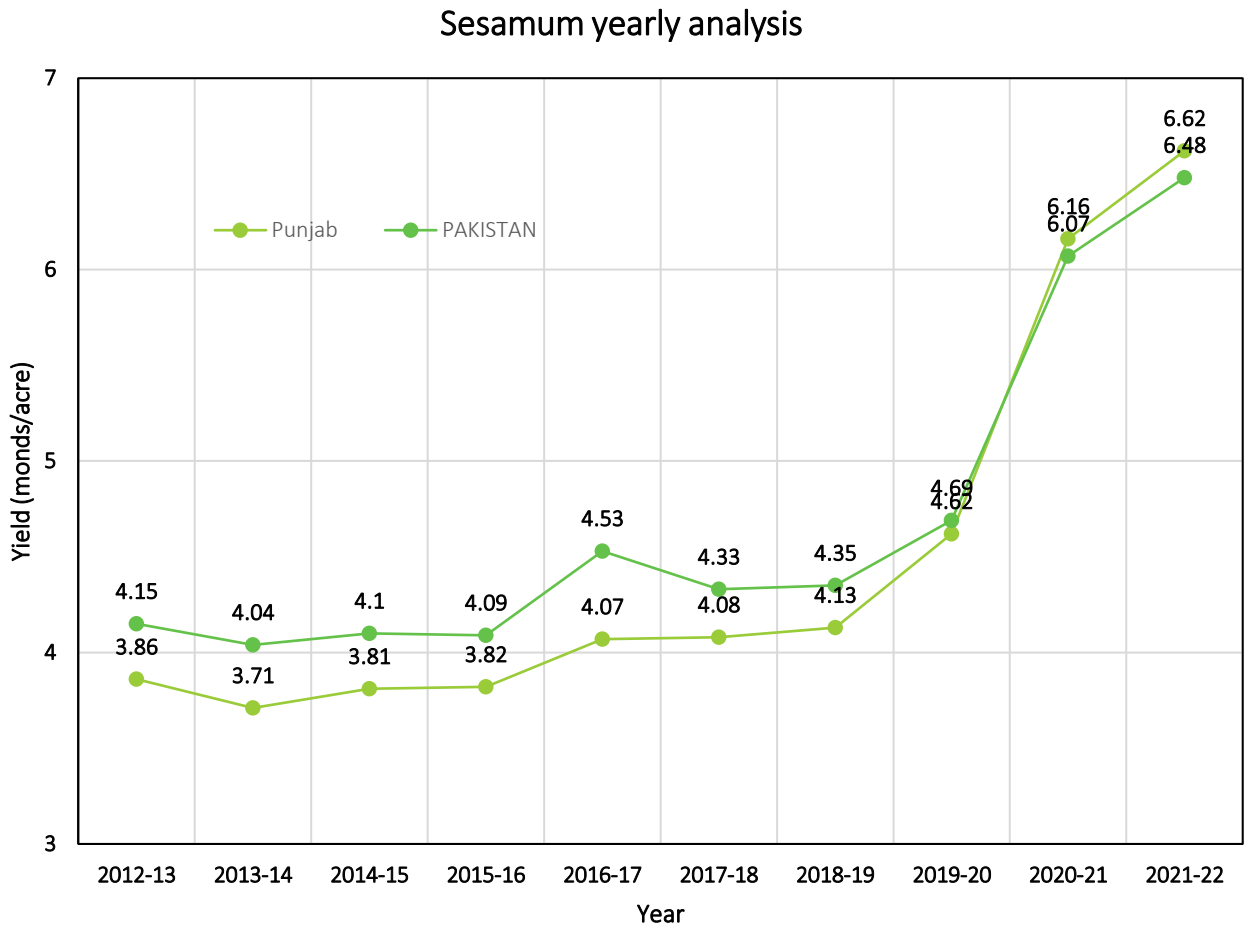
Source: CRS Punjab (2021-22)

Source: AMIS

SESAMUM YEARLY COMPARISON BETWEEN PUNJAB AND PAKISTAN

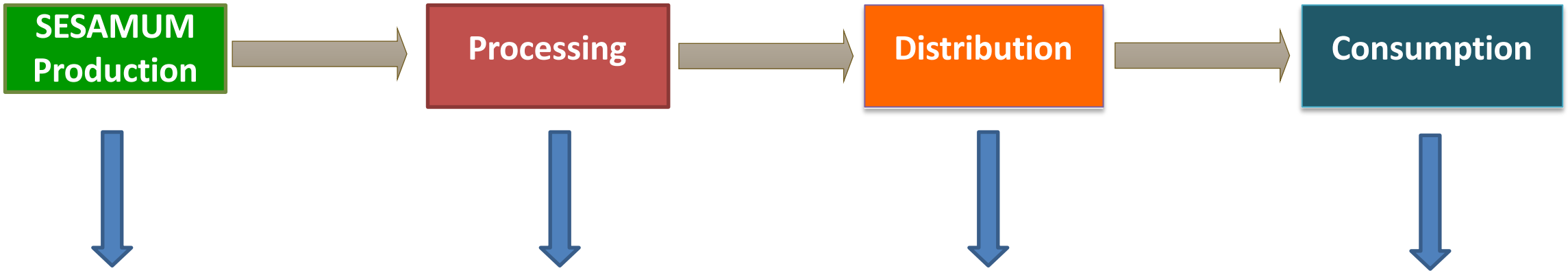
Yield Analysis

- Punjab has consistently achieved a higher yield (measured in Kg/ha) than other regions in most years.
- Punjab, has consistently produced higher agricultural yields of sesamum compared to other provinces in the country. This could be attributed to a number of factors, such as favorable agro-climatic conditions, advanced farming practices, and access to improved technologies and inputs. The combination of these factors might have contributed to the province's sustained success in producing higher yields.



Source: AMIS

SESAMUM POTENTIAL FOR INVESTMENT



SESAMUM Production	Processing	Distribution	Consumption
• The production of sesamum in the Sahiwal Division has been on the rise. This is a significant and favorable trend as it suggests that the local sesamum industry is growing and becoming more productive.	• Currently sesamum processing is missing in Sahiwal Division. • Various incentives are available for private sector investment, offering great potential for growth in the region.	• Currently, there is no state-of-the-art distribution system available in this region.	• Rising consumer demand for sesamum represents a promising investment opportunity in the Sahiwal Division. • In addition to raw food and confectionary purposes, sesame seeds are used in sweets and bakery products, as well as soaps, perfumes, vegetable oil and in carbon paper as well. • The Sahiwal Division holds great investment potential due to the growing consumption of sesamum.

CROPS

Interventions for Sesamum Crops

SEED

- Provision of high-quality seed.
- Address low yields of sesamum crop by enhancing production both vertically and horizontally
- Ensure Hybrid Seed Availability Through National and Multinational Seed Companies

FARM

- Subsidy on inputs to increase production of oil seed crop
- Arrange seminars at the district level in sesamum districts to create awareness about best management practices/production technology for selected crops
- Appreciation of best growers on the provincial and district level
- Development of model farms
- Provision of specialize extension services

HARVEST & LOGISTICS

- Promote mechanization for sesamum crop to minimize post-harvest losses and get good yields
- Capacity building of local human resource
- Strengthen the local research and development facilities in oilseed research institute for sesamum
- Create new jobs in the public and private sector

PROCESS

- Oil extraction units in clusters
- Promote value addition
- Development of processing units in Sahiwal division for sesamum export

MARKETS

- Incentivize the sesamum crop till market development.
- Establishment of state-of-the-art sesamum market.

SESAMUM VALUE ADDED PRODUCTS

The value added products of sesame include sesame oil, sesame paste, baking additives, antioxidants, massage oil, feed, fertilizer, sesame biodiesel, pesticide, cosmetics ingredients, medical ingredients or to decorate other foods

VEGETABLE INTERVENTIONS

Short term

Establish a packing house or the vegetable cartel.

Grade vegetables to have an export-oriented approach.

Explore value-added opportunities

Grow exotic vegetables like cherry tomatoes, asparagus, iceberg, and broccoli.

Establish cold stores to support the export of fruit and vegetables.

Improve the road infrastructure (Farm to Market)

Encourage the development of small and medium-sized food processing businesses that can create jobs and add value to locally grown products.

Medium-term

Build cold stores for vegetable growers to store their crops.

Provide financial assistance to farmers to maintain the supply chain.

Develop seed varieties with universities and research institutes.

Train farmers on grape pruning techniques and how to increase its shelf life.

Certify nurseries to ensure plant sustainability.

Encourage farmers to adopt climate-smart practices like rainwater harvesting and efficient irrigation to reduce greenhouse gas emissions.

Long term

Encourage tunnel farming in the region.

Establish a farm-to-market linkage.

Develop a drip irrigation system in the region.

Develop a comprehensive survey analysis on the vegetable growers in the region.

Establish more Opa-like units to process and sell frozen vegetables.

Conduct research to produce hybrid seeds of vegetables locally.

PROPOSED INTERVENTIONS TO IMPROVE FRUIT AND VEGETABLE MARKETS IN THE RAWALPINDI DIVISION

Promote the establishment of more Fruit & Vegetable markets:

Increase access to fresh produce by expanding Fruit & Vegetable markets.

Encourage the expansion of the vegetable markets:

Provide technical and financial assistance to individuals interested in starting a vegetable business to expand the variety of produce grown and sold in the region.

Support the development of value-added products from fruits & vegs:

Encourage farmers to create value-added products like jams, pickles, and sauces to tap into new market opportunities.

Improve the infrastructure for storing and transporting produce:

Improve storage and transport of perishable goods to reduce losses.

Encourage sustainable farming practices:

Promoting sustainable farming practices, such as conservation tillage and integrated pest management, can increase productivity while minimizing environmental impact.

Provide training and extension services to farmers:

Train farmers on best practices in agriculture, including pest management, soil fertility, and new technologies.

Strengthen market linkages and improve information systems:

Improve market information systems and strengthen market linkages to ensure farmers can access better prices and market opportunities for their produce.

Invest in research and development:

Invest in agricultural R&D to create crops adapted to local conditions.

INTERVENTIONS

Short-Term

Medium-Term

Long-Term

- Research & Inspection
- Certified/ Quality Seed Development
- Manure & Fertilizers
- Pesticides & Harvesting
- Sales & Packaging
- Mechanization

CROPS	SEED	FARM	HARVEST & LOGISTICS	PROCESS	MARKETS
WHEAT	• Seed replacement programs • Special program for the Seed Companies for certified wheat seed production • Implementation of amended seed act for wheat varieties registration • To develop climate-smart high yielding, rust and heat-stress-tolerant varieties of wheat. • Scale up the foundation cell for seed program	• Subsidy on Weedicide • Subsidy on gypsum & green manuring	• Development of Smart tools for mechanization especially for small farmers • Subsidy on implements for wheat	• Wheat value addition enhancement program	• Establishment of Grain Silos
ONION	• Development of Certified Seed (Pre basic, basic and multiplication) to the Farmer of Onion • Local onion seed varieties replacement program	• Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop onion cluster • Provision of specialized extension services for vegetable crops	• Capacity building and specialized labour for onion harvesting	• Incentivize onion processing by development of onion by-products such as paste, dehydrated flakes, powder, rings, puree, vinegar, pickle, juice, and oil	• Establishment of onion market in onion cluster

VEGETABLES

RICE

SEED

- Development of quality seeds and alternative varieties
- Development of sustainable rice seed supply system (work with seed enterprise, strengthening commercial out-growers, capacity building for seed growers, seed selection and cleaning, Seed soaking and other techniques

FARM

- Improve knowledge of the appropriate use of pesticide measures
- Facilitate and support research initiatives for rapid development of alternative varieties that are resistant to insect pests and disease, early maturing varieties, aromatic and other required traits
- Introduce the concept of Integrated Pest Management (IPM) to mitigate the current aggressive infestations of pests and diseases

HARVEST & LOGISTICS

- Increase knowledge of farmers on handling techniques and their produce destination and quality
- Improve the use of agro-technology like super seeder and drone to facilitate the farmers
- Access financial support through cost sharing to promote the use of appropriate and improved farm tools like weeders, harvesters, & row makers

PROCESS

- Support process to upgrade their processing machine to improve the processing efficiency
- Develop quality control mechanisms
- Assist to access sorting equipment to separate good and poor quality rice and grading their product according to standard
- Fostering linkage between processors and producers for productive relationship towards mutual benefit
- Increase the ratio of organized extension groups

MARKETS

- Increase the ratio of organized extension groups
- Market intelligence or access to market information
- Work with coops for warehouse services
- Assist to regulate the importation of substandard rice

VEGETABLES

LADYFINGER

SEED

- Facilitate the linkage between seed companies and farmers in the Sahiwal region to help them avail quality seeds
- Create service provider (seed retailers) to ensure information flow to the vegetable farmer

FARM

- Providing information to farmers about cultivation techniques
- Providing information to farmers about cultivation techniques and proper usage of inputs

HARVEST & LOGISTICS

- Providing finances to producers to be used for the cultivation of ladyfinger vegetable
- Introduce climate-resilient technologies to improve the yield of ladyfinger

PROCESS

- Facilitate the producers through hands-on training and demonstration, making them familiar with early cropping techniques

MARKETS

- Facilitate linkage between farmers and traders for vegetable collection from farmers
- Improve access to the market in terms of physical communication and transportation

VEGETABLES

	SEED	FARM	HARVEST & LOGISTICS	PROCESS	MARKETS
TOMATO	• Development of Certified Seed varieties (Pre basic, basic and multiplication). • Local tomato seed varieties replacement program.	• Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy.	• Capacity building and specialized labour for Tomato harvesting.	• Establishment of CA (Control Atmosphere) storage by incentivizing its import.	• Establishment of tomato market in tomato cluster.
MELON	• Establishment of melon seed systems • Development of Certified Seed (Pre basic, basic and multiplication)	• Melon climate-smart agronomic practices • Good Agricultural Practices (GAP) and Food Safety Management System (FSMS) • Improve extension services or access to improved technology or demonstrations • Climate change and climate smart agriculture.	• Melon harvesting and post-harvest management trainings • Mechanization of watermelon production activities	• Melon value addition enhancement program by create linkages with Agri. Universities and Research institutes.	• Empower farmer groups to explore market opportunities by incentivizing them by giving them trainings

Recommended Interventions for Agriculture (44,399 mn)

Certified/ Quality Seed Development	New Seed Varieties | Seed Replacement Program | Certification & Provision	*12 projects for Rs. 5,637 mn*
On Farm Management	IPM Practices | Availability of high quality inputs | Production Technologies	*23 projects for Rs. 9,280 mn*
Mechanization	Subsidy on Implements | Smart Tool Mechanization| Capacity Building	*10 projects for Rs. 2,141 mn*
Logistics & Markets	Model Markets | Storages and Warehouse | Grain silos	*21 projects for Rs. 7,240 mn*
Value Addition Process	Processing Units | Juice and Peeling Units | Ginning and Spinning Mills	*13 projects for Rs. 3,450 mn*
Improve Water Efficiency	Water Channel Improvement| HEIS | On Farm Water Storages	*5 projects for Rs. 14,981 mn*
Structural Reforms	Extension Services | Ease of Financial Access | Support Systems	*5 projects for Rs. 1,610 mn*

Thanks!

The Agriculture Team, Urban Unit

CROP WISE INTERVENTIONS

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Potato	Short-term	Establish seed banks to provide certified seed potatoes to farmers at subsidized rates	314
	Short-term	Organize workshops in collaboration with local agricultural extension services to educate farmers on the advantages of certified seeds and training on cost-effective production practices	150
	Short-term	Conduct training sessions on proper storage and post-harvest handling practices.	90
	Short-term	Distribute informational materials on integrated pest management techniques	40
	Medium-term	Establish regional seed production centers for certified seed potatoes	200
	Medium-term	Encourage the establishment of small-scale processing units for value-added products	50
	Medium-term	Upgrade existing storage facilities and build new ones with modern technologies	250
	Medium-term	Collaborate with agricultural experts to develop an integrated disease and pest management strategy	50
	Medium-term	Introduce precision irrigation systems and techniques to maximize water use efficiency	300
	Medium-term	Facilitate affordable access to modern farming machinery through structured financing programs	250
	Medium-term	Advocate for and participate in initiatives to improve rural transportation networks	400
	Medium-term	Introduce and popularize mechanized grading and packing systems	70
	Long-term	Conduct long-term studies on the impact and benefits of sustainable practices in potato cultivation	400
	Long-term	Create a centralized hub for continuous research and development of innovative potato products.	450
	Long-term	Encourage collaboration between researchers, farmers, and industries to drive product diversification	300
	Long-term	Develop a nationwide network of state-of-the-art seed storage facilities	800
	Long-term	Develop long-term strategies for minimizing the impact of emerging diseases and pests on potato crops	200
	Long-term	Implement policies and practices for sustainable water use in potato cultivation.	200
	Long-term	Invest in research and development for locally adaptable and sustainable farming machinery	450
	Long-term	Collaborate with regional and local authorities to improve transportation networks in rural areas.	800
	Long-term	Provide subsidies and incentives for farmers adopting smart irrigation practices	450
	Long-term	Develop markets and distribution channels for organic potato products, both domestically and internationally	500
	Long-term	Collaborate with climate scientists to anticipate and mitigate the impact of climate change on potato farming	270
	Long-term	Develop a national forecasting system for predicting pest and disease outbreaks	300

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Maize	Short-term	Provide farmers with subsidized maize seeds to reduce the financial burden.	60
	Short-term	Conduct workshops and awareness programs to educate farmers on maize varieties suitable for changing climatic conditions.	80
	Short-term	Facilitate a program ensuring timely and sufficient availability of essential inputs such as fertilizers and pesticides.	170
	Short-term	Conduct campaigns on integrated pest and disease management practices, providing farmers with effective strategies.	60
	Short-term	Establish a digital platform or SMS service providing farmers with up-to-date market information. (50 MILLION)	50
	Medium-term	Establish a comprehensive seed system to ensure sustainable access to quality seeds.	80
	Medium-term	Collaborate with research institutions to develop and introduce climate-resilient maize varieties through field trials and farmer engagement programs.	150
	Medium-term	Conduct farmer field schools, demonstration plots, and extension programs to educate farmers on the benefits and proper usage of modern seed technologies.	200
	Medium-term	Implement an early warning system, conduct regular field inspections, and promote the use of biopesticides to control diseases and pests effectively.	100
	Medium-term	Collaborate with financial institutions to provide subsidized loans for farmers to purchase or lease modern farming equipment and machinery.	300
	Medium-term	Provide financial incentives and support to processing units for the adoption of modern technology, leading to increased efficiency and product quality.	450
	Medium-term	Support research and development for new maize-based products, provide training on value addition, and create market linkages for these products.	500
	Long-term	Establish community-managed seed banks, invest in research for locally adapted seed varieties, and implement training programs on seed saving and preservation.	250
	Long-term	Conduct long-term genomic research, implement genetic modification strategies for climate resilience, and establish a national gene bank for maize diversity conservation.	320
	Long-term	Implement land protection measures, and establish community watch programs.	100
	Long-term	Promote precision irrigation techniques, introduce drought-resistant maize varieties, and provide training on water-efficient farming practices.	270
	Long-term	Invest in the construction and upgrade of silage and drying facilities, encouraging private sector participation and community-based cooperatives.	320
	Long-term	Provide financial incentives and support to processing units for the adoption of modern technology, leading to increased efficiency and product quality.	400
	Long-term	Enhance transportation networks, and reduce post-harvest losses through better storage and transportation practices.	800
	Long-term	Establish export protocols, address quality standards, and promote maize products in international markets.	350
		Total	5,010

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Sesamum	Short-term	Provision of High-Quality seed; through multiplication of pre-basic and basic quality seed developed by Oilseed Research Institute by introducing private seed companies to reduce import bill	250
		Introducing policy for incentivizing sesamum crop production till market development.	150
		Organizing competitions for the appreciation of best growers on provincial and district level.	150
		Arrange seminars at district level in core oilseed districts to create awareness about best management practices/production technology for selected crops during Rabi and Kharif season.	150
		Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop crop clusters.	533
	Medium-term	Promote mechanization for oilseed crops in order to minimize post-harvest losses and get good yields.	300
		Ensure Hybrid Seed Availability through National and Multinational Seed Companies.	300
		Incentivizing private sector by credit through banks for the establishment of Oil extraction units in clusters.	600
	Long-term	Establishment of state-of-the-art oilseed market with storage, packing and grading facilities to ensure quality.	160
		Total	2,593

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Lady Finger	Short-term	Seed replacement program; through multiplication of pre-basic and basic quality seed developed by VRI by introducing private seed companies to reduce import bill	314
		Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop ladyfinger cluster	171
	Medium-term	Organizing labor training programs with the help of VRI to ensure skill labor availability in the Crop Cluster	150
		Establishment of market in the crop cluster with storage, packing and grading facilities to ensure quality	200
		Establishment of value-added production unit by incentivizing private sector	60
	Long-term	Development of Certified Seed Varieties (Pre basic, basic and multiplication)	200
Total			1,095
Melon	Short-term	Good Agricultural Practices (GAP) and Food Safety Management System (FSMS)	170
	Medium-term	Provision of High-Quality seed; through multiplication of pre-basic and basic quality seed developed by Research Institute by introducing private seed companies to reduce import bill	180
		Introducing melon climate-smart agronomic practices with the help of HRI	110
		Integrated soil and water management practices for melon production	
		Incentivize and subsidize farmers for melon harvesting and post- harvest management	130
		Incentivizing private sector by credit through banks for to introduce melon value addition	200
	Long-term	Incentivize and subsidize farmers for Mechanization of melon production activities	250
		Development of Certified Seed (Pre basic, basic and multiplication) to the Farmer of peas.	200
Total			1,240
Tomatoes	Short-term	Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop tomato cluster.	696
		Local tomato seed varieties replacement program.	300
	Medium-term	Establishment of Tomato paste production unit	200
		Establishment of CA (Control Atmosphere) storage	180
		Establishment of tomato market in tomato cluster.	200
	Long-term	Development of Certified Seed (Pre basic, basic and multiplication) to the Farmer of Tomato.	300
Total			1,876

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Wheat	Short-term	Provision of subsidized support for gypsum & green manuring	1117
		Provision of financial assistance for wheat cultivation implements	900
		Support seed replacement through subsidy programs	1300
		Financial assistance for weedicide Procurement for wheat	1200
	Medium-term	Development of Smart tools for mechanization especially for small farmers.	1000
		Special program for the Seed Companies for Wheat Seed Production.	700
	Long-term	Climate Smart breeding program (Rebreeding, Hybridization, and innovative technologies for various zones: Rust and heat stress tolerant varieties, Spring Wheat , Durum Wheat, Triticale etc.).	500
		Total	6,717
Matter Peas	Short-term	Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop peas cluster.	696
		Local seed varieties replacement program.	300
	Medium-term	Establishment of Peas paste production unit	200
		Establishment of food processing units in peas processing (frozen peas) to meet the local need during scarcity period	180
		Establishment of peas market in peas cluster.	200
	Long-term	Development of Certified Seed (Pre basic, basic and multiplication) to the Farmer of peas.	300
		Total	1,876
Tunnel Farming of: Cucumber, Grapes, Strawberries, Bitter-Gourd, Onion, and Melon	Short-term	Conduct research to locally produce hybrid seeds of vegetables &Train farmers on seed breeding techniques to locally produce hybrid seeds of vegetables.	25
	Short-term	Establish a packing house in Dhanote for the vegetable cartel.	70
	Short-term	Grade vegetables to have an export-oriented approach.	30
	Short-term	Explore value-added opportunities, such as the production of pulps for strawberries and tomatoes.	80
	Short-term	Promote growing exotic vegetables like cherry tomatoes, asparagus, iceberg, and broccoli.	150
	Short-term	Establish cold stores at Multan airport to support the export of mangoes and vegetables & for vegetable growers to store their crops.	100
	Short-term	Improve the road infrastructure (Farm to Market) from Kehror Pakka to Mailsi to Vehari to Arif Wala to Burewala till Chichi Watni and Pakpattan.	200
	Medium-term	Provide financial assistance to farmers to maintain the supply chain.	15
	Medium-term	Develop seed varieties with universities and research institutes.	150
	Medium-term	Train farmers on grape pruning techniques and how to increase its shelf life.	10
	Medium-term	Certify nurseries to ensure plant sustainability.	30
	Long-term	Encourage tunnel farming in the region.	5
	Long-term	Establish a farm-to-market linkage.	15
	Long-term	Develop a drip irrigation system in the region.	25
	Long-term	Develop a comprehensive survey analysis on the vegetable growers in the region.	15
	Long-term	Establish more Opa-like units to process and sell frozen vegetables.	120
	Long-term	Increase the cultivation of sweet corn and explore its export potential.	70
		Total	1,110

Cops	Phase	Interventions	Cost (Tentative) in Million Pkr
Garlic	Short-term	Local seed varieties replacement program; through multiplication of pre-basic and basic quality seed developed by Research Institute by introducing private seed companies to reduce import bill	141
	Short-term	Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop garlic cluster.	130
	Medium-term	Organizing labor training programs with the help of VRI to ensure skill labor availability in the Crop Cluster	90
	Medium-term	Establishment of garlic market in garlic cluster with storage, packing and grading facilities to ensure quality.	110
	Medium-term	Incentivizing private sector by credit through banks for Establishment of Garlic powder and paste production unit	70
	Medium-term	Strengthen and capacity building programs for the provision of specialized extension services.	80
	Long-term	Development of Certified Seed (Pre basic, basic and multiplication) to the Farmer of Garlic.	245
	Long-term	Incentivize and subsidize farmers for Mechanization of Garlic production activities	220
		Total	**1,086**

Crops	Phase	Interventions	Cost (Tentative) in Million Pkr
Onion	Short-term	Local onion seed varieties replacement program	314
	Short-term	Provision of inputs (Fertilizer, Pesticides and Implements) on subsidy to develop onion cluster	171
	Medium-term	Capacity building of labor for onion harvesting	150
	Medium-term	Establishment of onion market in onion cluster	200
	Medium-term	Incentivize onion processing by development of onion by-products such as paste, dehydrated flakes, powder, rings, puree, vinegar, pickle, juice, and oil	200
	Long-term	Development of Certified Seed Varieties (Pre basic, basic and multiplication)	60
		Total	**1,095**

WATER EFFICIENCY			
WATER EFFICIENCY	**Short-term**	Climate Smart Water Management and Information Services	304
	Short-term	•Development of a Water Accounting System	
	Short-term	•Development of an Evapotranspiration-based Water Management System	
	Short-term	•Development of an Early Warning System	
	Short-term	•Provision of Information and Data to Facilitate Climate Change Adaptation	
	Short-term	Building on-Farm Resilience to Climate Change	348
	Short-term	•Development of practices for climate change resilient	
	Short-term	•Training of extension workers and farmer facilitators	
	Short-term	Establishment of Technology Transfer Centers (TTCs) in Sahiwal Division for the demonstration to enhance water use efficiency through;	655
	Short-term	•Farm layout planning/ designing, precision / LASER land leveling and water budgeting & accounting.	
	Short-term	•Provision of rapid soil testing kits to the farmers at TTCs for application of balanced fertilizer.	
	Short-term	•Fixation of pipe nakkas according to soil type and water flow for channelized stream flows.	
	Short-term	•Installation of flow measurement devices for open channels and tubewells for measuring the discharge of water for water accounting.	
	Short-term	•Installation of soil moisture monitoring gadgets.	
	Short-term	•Application of Alternate Wetting & Drying (AWD) and Direct Seeding Rice (DSR) water saving techniques in rice fields to increase the water productivity.	
	Short-term	Support farmers for installation of tunnels for off-season vegetable production.	210
	Short-term	Provision of 400 LASER land levelers to the farmers/ service providers for strengthening LASER land leveling services in the private sector.	400
	Medium-term	Construction of on-farm water storage ponds in irrigated areas for storing excess canal/ rainwater for supplemental irrigation.	6825
	Medium-term	Install solar systems for operating high efficiency irrigation systems.	630
	Long-term	Improvement of unimproved & additional lining of watercpourse improvement	6000
	Long-term	Promote high efficiency irrigation systems on Drip and Sprinkle Irrigation System on fruit and vegetables farms.	871
	Long-term	Deliver soil moisture to the farmers/ service providers.	
TOTAL			**16,243**

COMMON STRUCTURAL PROJECTS			
Common Structural Projects	Medium-term	Provision of specialized extension services for vegetable crops.	300
	Medium-term	Provision of specialized extension services for fruits.	300
	Medium-term	Ease of financial access and insurance services to farmers.	300
	Medium-term	Upgradation and establishment of agriculture markets by rehabilitation or provision of depleted/missing facilities, infrastructure, and utilities.	500
	Medium-term	Establishment of feed mills by incentivizing private sector in ppp mode.	300
	Medium-term	Integrated Pest diagnosed, warning, and control management for all crops	200
	Medium-term	Set up of support system for the farmers in case of crop failure and price fluctuation for vegetables and fruit crops.	500
	Long-term	Establishment of state of the art warehouse and grain silos in ppp mode.	300
	Long-term	Promoting research for enhancement of mash and lentil production to reduce pulse import bill	51.02
	Long-term	Improving an organizations overall performance and efficiency by improving the members (individuals and groups) performances, commitment, and flexibility. (HR)	.
		TOTAL	**2,751**
		GRAND TOTAL	**44,399**