

VISION-2050

Agriculture University, Jodhpur



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Jodhpur 342 304, Rajasthan

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Message



Agriculture started nearly 10,000 years ago; since then it kept evolving and undergone several significant development over time. Modern agricultural technologies have contributed in tremendous increase in food production and productivity. Indian economy is predominantly dependent on agricultural sector; it is main source of income of more than 50% population. The present phase of agriculture being encounter with numerous challenges viz. reducing arable land, depleting soil and water quality, nutrient deficiency, climate change, loss of biodiversity, fragmented farm holdings, urban migration, IPR and trade regulations are few of them. This requires a paradigm shift in our approaches for agricultural development in the country. Therefore, scientific research, proper integration of scientific knowledge in farming is essential for continuous growth in agricultural sector.

Vision-2050 of Agriculture University, Jodhpur is prepared based on a comprehensive assessment of past, present and future agricultural scenario for the science led agricultural development in the western parts of Rajasthan. I believe this vision document will serve as a guiding light for future endeavors of the University.

Dated : January, 28, 2025

Place: Jodhpur

(Arun Kumar)



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1. Overview

India is predominantly an agriculture-dependent country; agriculture sector contributes nearly 17% of the country's Gross Domestic Product. Agricultural growth in the country is essential to ensure food and livelihood security of the growing population. Since, independence food production increased 6.5 times, from 50.82 million ton food grain production during 1950-51 to 314.5 million ton during 2021-22. Similarly, there is an increase of 13.3 times in horticulture production, 17.8 times in fish production, 12.4 times in milk production and 67.8 times in egg production in the country. Rajasthan is one of the important agricultural producing state. The cultivated area of Rajasthan is 17.4 million hectare and 70% area is rainfed with average precipitation of 575 mm. The main sources of irrigation in the state are canals, tube-wells and wells. Western part of Rajasthan is mostly arid; agricultural production in this region is challenging due to several climatic factors including salinity, drought stress, high temperature, poor soil structure and organic matter. The Agricultural University, Jodhpur, in Rajasthan, provides agricultural education, research, and extension services in the western arid and semi-arid regions. The University was established on September 14, 2013, under the Government of Rajasthan Act No. 21 of 2013, with Amendment No. 23 of 2013. The jurisdiction area of the University encompasses six districts (Fig. 1), classified under the arid and semi-arid regions, which include: Arid Western Plain (Zone Ia – Jodhpur and Barmer districts), Transitional Plain of Luni Basin (Zone IIb – Jalore, Pali, and Sirohi districts), and part of the Transitional Plain of Inland Drainage (Zone IIa – Nagaur district).

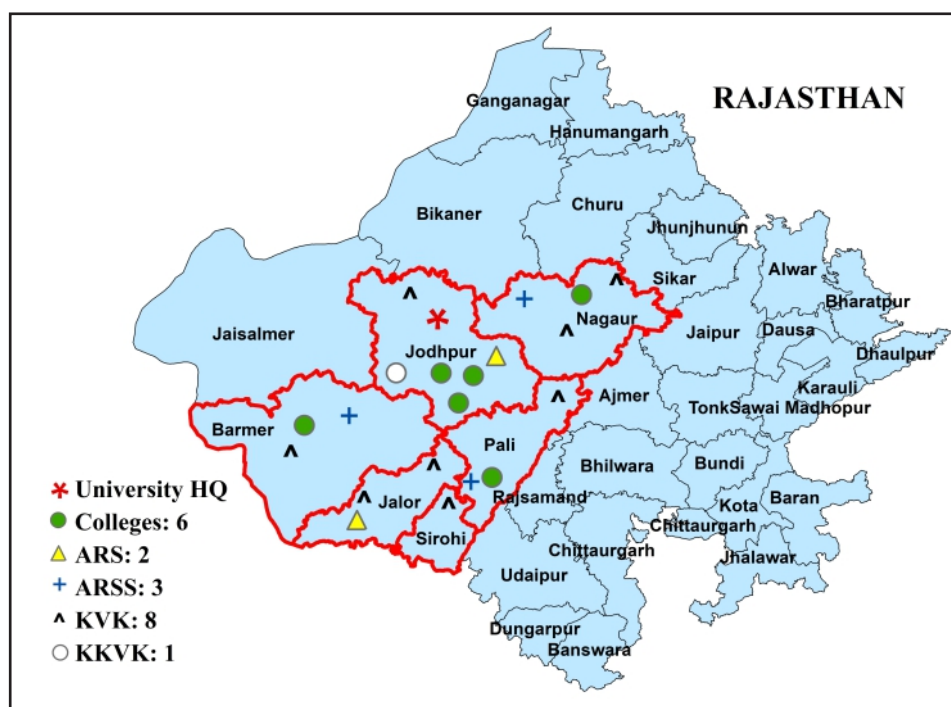


Figure 1: Jurisdiction area of Agriculture University, Jodhpur



The University's jurisdiction covers 28.4% of the state's total geographical area and supports 21.1% of the human population and 28.7% of the livestock population.

Table 1: Jurisdiction area and share of the university in the state

S. No.	Particular	Area (lakh ha)		Share of Jurisdiction of AU, Jodhpur in the State (%)
		Rajasthan	AU, Jodhpur	
1.	Geographical area	342.24	96.45	28.4
2.	Cultivable land	256.33	-	-
	<i>In Kharif</i>	164.6	54.7	33.2
	<i>In Rabi</i>	100.9	18.9	18.7
3.	Population	6,86,21,012	1,45,05,237	21.1
4.	Livestock	5,64,81,508	1,62,22,137	28.7

The University has a strong teaching, research and extension setup to envisage agricultural development in the western parts of Rajasthan. It comprises four Agricultural Colleges, one College of Dairy and Food Technology, one College of Technology and Agriculture Engineering, two Agricultural Research Stations (ARS), three Agricultural Research Sub-Stations (ARSS), eight *Krishi Vigyan Kendras* (KVKs) and one Kisan Kaushal Vikas Kendra (KKVK).

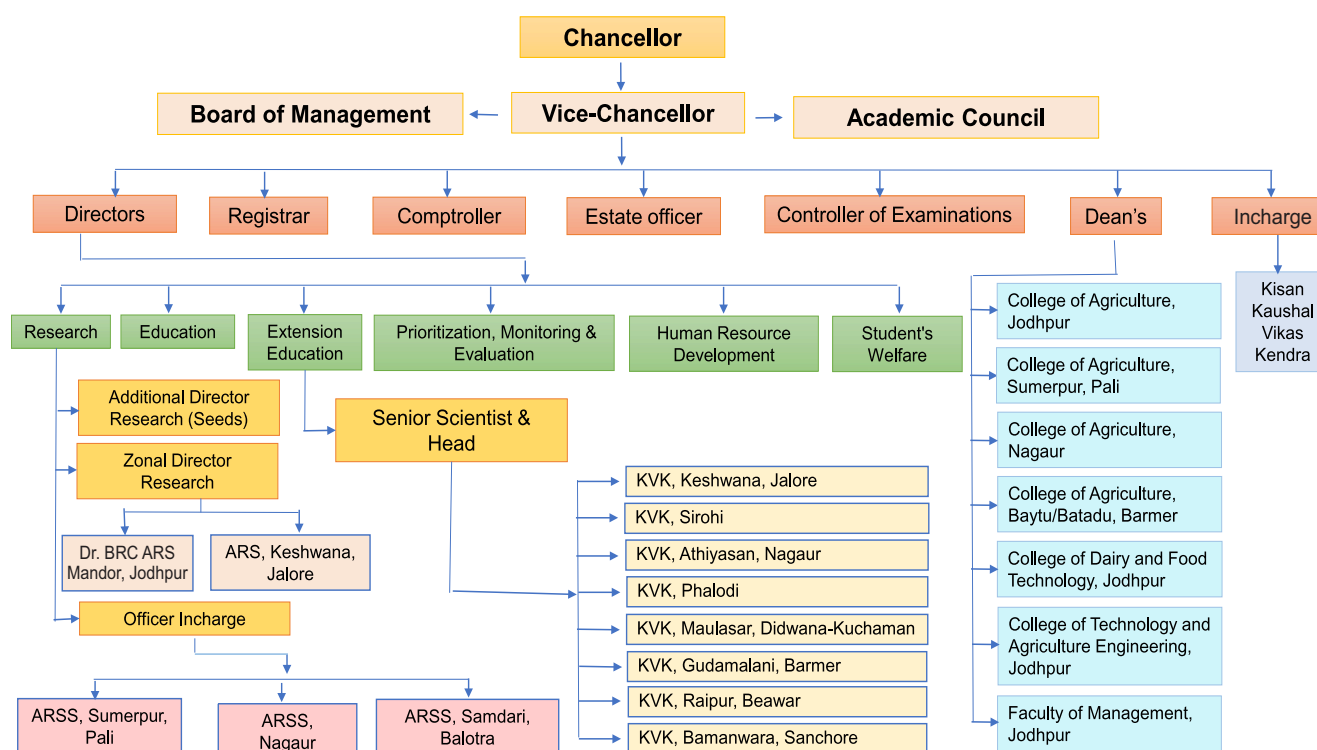


Figure 2: Organogram of Agriculture University, Jodhpur

1.1. Climatic Conditions

As an integral part of the National Agricultural Research System (NARS), the University actively contributes to state and national research and extension initiatives aimed at advancing agriculture and allied sectors. Western Rajasthan is characterized by an arid to semi-arid climate, with extreme temperature variations ranging from near-freezing in winter to over 50°C in summer. The region experiences low and erratic rainfall, averaging around 330 mm annually, predominantly during the brief southwest monsoon season from July to September. These climatic conditions limiting agricultural productivity. The predominant soil types in the region are Arid soils, which are mineral-rich but commonly found in dry climates. These soils often have horizons of accumulated soluble salts and carbonates, presenting significant challenges for conventional agricultural practices. Additionally, the sandy texture of the soil limits water retention, further complicating agricultural sustainability. Water is the most critical and limited resource in this region, primarily available as groundwater, over 85% of which is brackish.

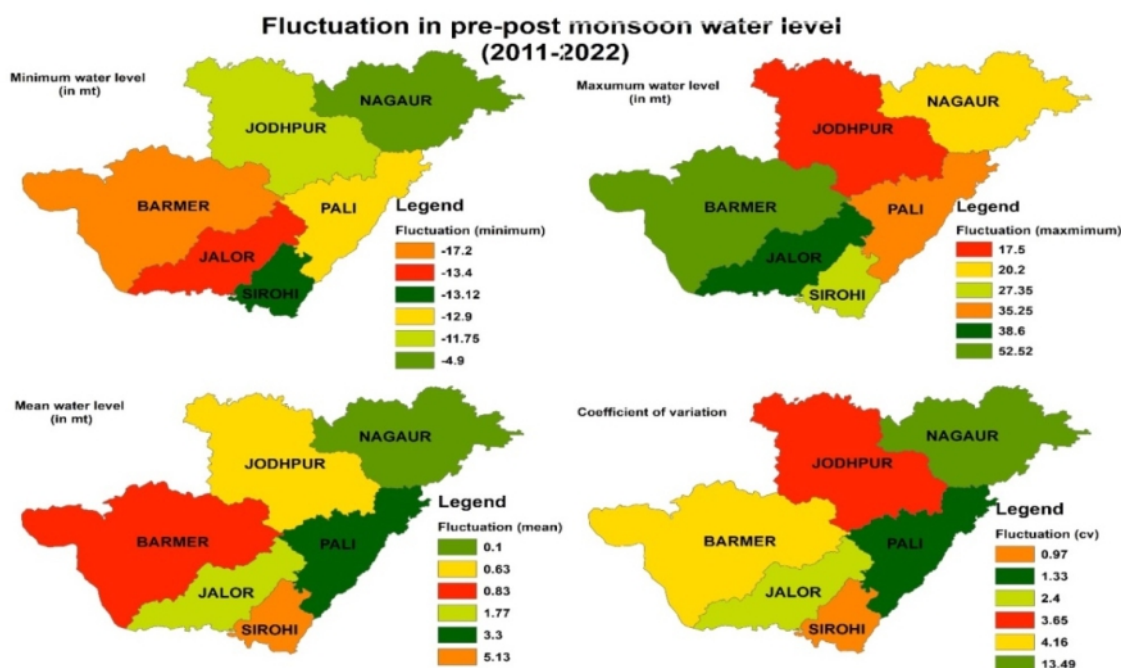


Figure 3: Fluctuations in Pre-Post Monsoon Water Level

1.2. Major Crops of the Western Rajasthan

A diverse range of crops are being grown in the western region of Rajasthan. In the *kharif* season, Pearl millet, Mungbean, Mothbean, Clusterbean, Sesame, Castor, Groundnut, Cotton, and Henna are major crops. Among them, Pearl millet stands out as the leading crop in *kharif*, covering 46.57% of the state's area, making it the most extensively cultivated crop. Mungbean occupies 60.22% of the state's area, particularly in regions like Nagaur. Mothbean, covering 40.0% of the state's area, is another significant crop, mainly grown in Barmer and Jodhpur. Both Clusterbean and Sesame are important as well, occupying 22.46% and 53.44% of the area, respectively. Other crops, such as Sorghum and Groundnut, are



also cultivated. Castor, with a notable 95.57% of the state's area is very important crop of this region. Cotton and Henna, although grown in smaller areas, remain significant livelihood security for many farming households.

Major crops in *rabi* season include cumin, mustard, taramira, isabgol, wheat, fenugreek, fennel, onion, and pomegranate. Cumin is the dominant crop, occupying 85.04% of the state's area, with Jodhpur and Barmer being the primary producers, contributing 91.43% of the state's total cumin production. Mustard and taramira are important oilseed crops of the region. Isabgol, grown on 74.85% of the state's area, is mainly cultivated in Jodhpur and Barmer producing 76.41% of the state output. Fenugreek and fennel are major another seed spices being grown in this area. Pomegranate is notable for its production, particularly in Barmer.

The overview of Agriculture University, Jodhpur highlights the unique agricultural landscape of western Rajasthan, which is characterized by arid and semi-arid conditions with extreme temperatures, low and erratic rainfall, and limited water resources. The region sustains a significant portion of the state's human and livestock population, relying on diverse cropping patterns adapted to the challenging climatic and soil conditions. In response to the above factors, a comprehensive vision has been developed to address the agricultural challenges, ensure sustainability, and support the livelihoods of farming communities of Western Rajasthan.

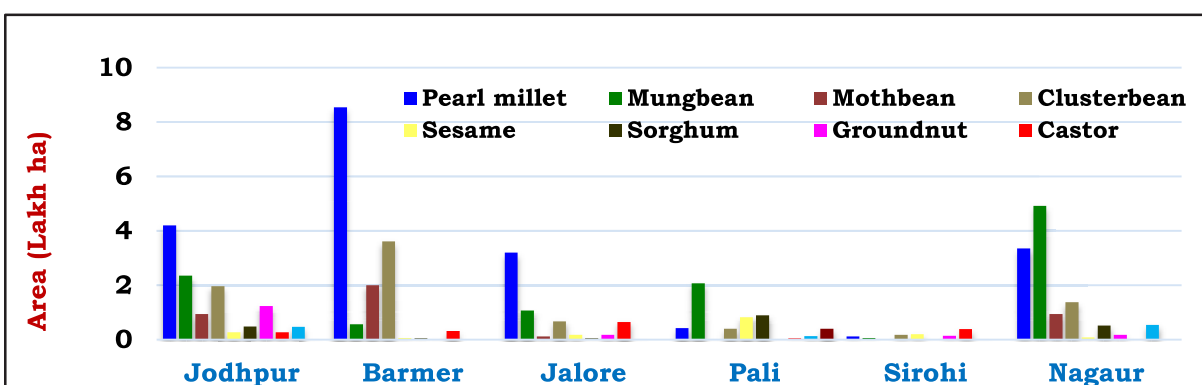


Figure 4: Area (Lakh ha) of Major *Kharif* Crops in six districts (Av. 2013-22)

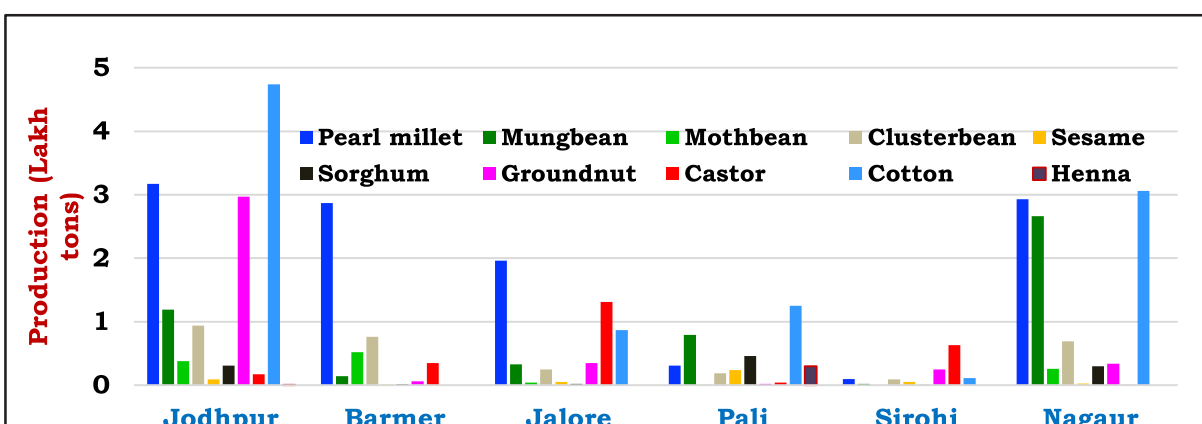


Figure 5: Production (Lakh tons) of Major *Kharif* Crops in six districts (Av. 2013-22)

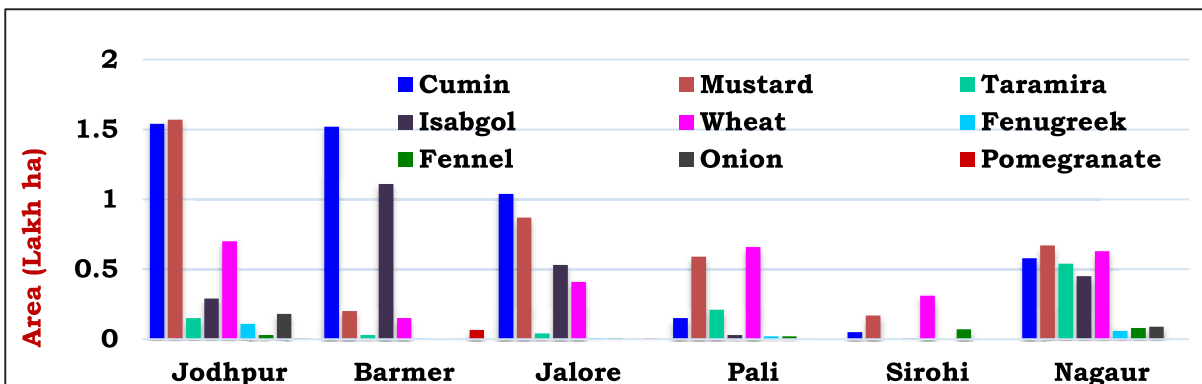


Figure 6: Area (Lakh ha) of Major Rabi Crops in six districts (Av. 2013-22)

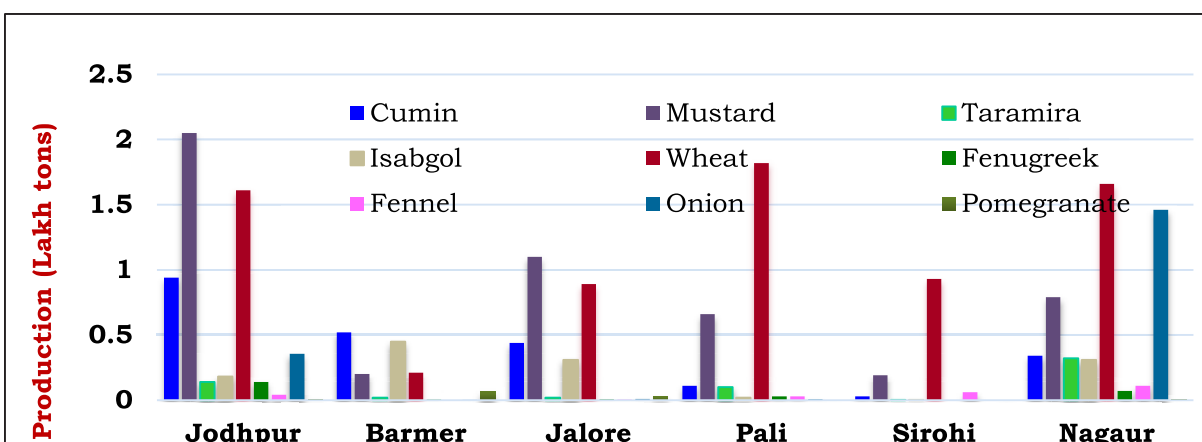


Figure 7: Production (Lakh tons) of Major Rabi Crops in six districts (Av. 2013-22)

1.3 Vision

To emerge as a center of excellence in teaching, research and extension in agriculture and allied sectors to ensure food, nutritional and livelihood security of farming communities of western Rajasthan.

1.4 Mission

The mission of Agriculture University, Jodhpur, is to promote sustainable agricultural development in arid and semi-arid regions through high-quality education, innovative research, and effective extension services. It aims to enhance the productivity and profitability of agriculture and allied sectors while conserving natural resources, improving livelihoods, and addressing the unique challenges of the region. The university is committed to empowering farmers, advancing scientific knowledge, and fostering collaborations for inclusive and eco-friendly agricultural growth.

1.5 Mandates

- Develop academically qualified human resources through UG, PG, Ph.D. and other academic programmes in different branches of agriculture & allied sectors.
- Conduct basic, strategic and need based area specific applied research in Agriculture (both rainfed & irrigated), Horticulture, Agriculture Engineering, Forestry, Animal Husbandry, Fisheries and other



allied fields to develop technologies relevant to farming community for livelihood security and high farm income.

- Undertake extension education and training programmes for improving the agricultural situation of the state and socio-economic status of weaker section of the society especially in rural areas.
- Help and provide technical guidance to the State Government for development of agriculture in the state.
- Develop collaborative linkages with State Agriculture Universities, Government Departments, Government Undertakings, and National & International Organizations for fulfilling above objectives and such other purpose which the University determines from time to time.

1.6 Objectives

- To provide quality education in agriculture and allied sciences, developing skilled professionals to address regional agricultural challenges.
- To conduct region-specific research aimed at enhancing agricultural productivity, sustainability, and resource management in arid and semi-arid areas.
- To disseminate advanced agricultural knowledge and technologies to farmers, promoting eco-friendly and innovative farming practices.
- To improve rural livelihoods through sustainable agricultural practices, value addition, and market linkages tailored to regional needs.
- To build partnerships with institutions, industries, and stakeholders for fostering entrepreneurship, agribusiness, and holistic rural development.

1.7. Infrastructure

Agriculture University Jodhpur is equipped with a robust and expanding infrastructure that supports education, research, and extension activities. Continuously developing infrastructure in University has created an academic environment. Recently, University has established a new building for the College of Agriculture at Baytu, Barmer, as well as for College of Technology and Engineering (CTAE), College of Dairy and Food Technology (CDFT) at Sawat Kuan, Baori, Jodhpur and administrative building at University headquarter. The College of Agriculture Jodhpur shifted to a new campus at Nimba-Nibri, featuring updated Undergraduate (UG) and Postgraduate (PG) academic blocks, a library, computer lab, smart classrooms, virtual labs, boys' and girls' hostels. Student well-being is a key focus at the new College of Agriculture Jodhpur campus, with the development of a modern sports facility, complementing the existing sports facilities at College of Agriculture, Nagaur and Sumerpur. To facilitate millet research, university has established a Centre of Excellence for millet at Jodhpur. The Constitutional Park at Agriculture University, Jodhpur highlights India's constitutional values, inspiring students and visitors to learn about their rights and duties in a green and welcoming environment.



Each of the PG department at COA Jodhpur is equipped with modern laboratories to support both academic and research programme. Notable facilities include the Seed Processing Unit, Automatic Weather Station, Molecular Breeding Laboratory, Molecular Plant Pathology Laboratory, Food Processing Laboratories, and Renewable Energy Lab. A variety of advanced instruments, such as HPLC, NIR, PCR, Refrigeration Unit (-20°C), Centrifuge, Soxhlet Automatic N Analyzer, Atomic Absorption Spectrophotometer, and Double Beam Spectrophotometer, are available for research and teaching. Additionally, a new milk processing unit is being established at CDFT to promote agricultural productivity and value addition.



Constitutional Park



Video Conferencing Hall



Centre of Excellence for Millets

Figure 8: Newly established facilities in the university



The university has established a "Center of Excellence for Millets," focusing on research in sustainable and climate-resilient crops. The university's research and seed production farms are equipped with advanced tools and machinery to support large-scale mechanical agricultural practices. We also have high-tech protected cultivation structures for the commercial cultivation of crops and nurseries. The central seed processing plant, with a capacity of 5.0 tons per hour, is located at the university's headquarters, supported by seed storage and processing facilities under the Seed Hub and MIDH projects at most of the units. In addition to these facilities, the university offers general amenities, including an auditorium, guesthouse, newly constructed farmers' hostel, conference halls, committee rooms, and recreational spaces.

In the area of extension activities, the university has strengthened its presence by establishing two new Krishi Vigyan Kendras (KVKs) at Bamanwara, Jalore-II, and Raipur, Pali-II. These two new KVKs have moved to newly constructed buildings, alongside the operational Kishan Kaushal Vikas Kendra, Kisan Call Center, ATIC unit, and the upcoming Marudhara Vikrya Kendra at each unit. To further support farmers, a mobile soil testing bus is actively conducting soil sample analysis. This expanding infrastructure underscores university's commitment in advancing education, research, and extension.

The university has developed state-of-the-art infrastructure, including the R&D Cell, IPR Cell, ARIS Cell, Innovation Cell, IQAC Cell, NIRF Cell, and NAAC Cell in line with its vision to foster innovation, promote sustainable agricultural practices, ensure academic excellence, and drive global recognition. These components will support groundbreaking research, protect intellectual property, nurture entrepreneurship, enhance the quality of education, and achieve national and international acclaim in agricultural sciences."

1.7.1. Seed Processing Plant

The seed processing plant at Jodhpur, with a 5 t/hr capacity and advanced Sortex technology ensures superior seed quality by sorting and cleaning based on key parameters.

1.7.2. MTS Unit and Available Genetic Diversity in different Crops

Medium term storage facility for conservation of plant genetic materials is developed. It has two cold storage rooms with the capacity of 5000 germplasm storage.



Seed Processing Plant



MTS Unit



1.7.3. Automated Irrigation facility

Created sensor based automated irrigation facility for conducting experiments to study water management techniques, crop responses, and the impact of various irrigation strategies.

1.7.4. Renewable energy

University has established Solar power units of 230 KW capacity at Jodhpur, 120 KW capacity at Nagaur and 120 KW capacity at Sumerpur on the office building that generate approximate 1600 units of electricity monthly.



Automated Irrigation facility



Solar Power Unit

1.7.5. KKVK Center

Kisan Kaushal Vikas Kendra (KKVK) at AU Jodhpur provides comprehensive training to farmers in modern agricultural practices, technological innovations, and sustainable farming techniques.

1.7.6. Kisan Call Centre

The Kisan Call Centre at AU Jodhpur (1800 180 3000) offers expert guidance to farmers on agricultural practices and address farming-related concerns.

1.7.7. Drone Pilot Training Centre

The Drone Pilot Training Centre at AU Jodhpur trains farmers and stakeholders in using drones for crop monitoring, precision agriculture, and spraying to enhance efficiency and productivity in farming.



KKVK Center



Kisan Call Centre



Drone Pilot Training Centre





2. Achievements

2.1. Education

The university has made remarkable strides in enhancing its educational landscape by adopting the guidelines of the National Education Policy (NEP) 2020 and implementing the recommendations of the 6th Dean Committee. A significant advancement in the university's academic framework has been made through the establishment of new faculties, particularly College of Dairy and Food Technology (CDFT) and College of Technology and Agricultural Engineering (CTAE). The university has also introduced new programs, including a Postgraduate program in Organic Farming, as well as programs in Fruit Science, Vegetable Science, Plantation Crops, Spices, Medicinal and Aromatic Plants; MBA in Water Technology, and a Diploma in Geo-informatics.

The university has increased student intake across various programs. The current student strength for the B.Sc. (Hons.) in agriculture has doubled from 60 to 120 students. Similarly, the intake for PG programs has increased to 10 students, and the Ph.D. intake has risen by 4 students in every discipline. The university is committed to integrating modern technologies into its educational framework. Establishment of virtual lab, language lab, computer lab and smart classrooms equipped with the latest teaching tools are few example. The university has also actively pursued collaborations with both national and international institutions, facilitating faculty and student exchange programs that provide valuable opportunities for exposure to global best practices in education and research. Over the past three years, students have successfully secured jobs in government organizations as well as leading companies such as agricultural universities, state agricultural departments, seed certification bodies, cooperatives, nationalized banks, Gujarat State Fertilizer and Chemical Limited (GSFCL), Syngenta, Ganga Organic Ltd., and Trident India Ltd., etc. are the indicative list.

2.2 Research

Agriculture University, Jodhpur plays a crucial role in agricultural research, focusing on generating scientific technology and developing improved crop varieties through a network of All India Coordinated Research Projects (AICRPs), externally funded projects from national, international and state funding agencies. The university runs 03 AICRPs (Pearl millet, Sesame & Niger and Castor), 01 All India Network Project (Potential Crops), 01 centrally sponsored long-term project on seed spices, 06 voluntary centers (Rapeseed & Mustard, Groundnut, Medicinal Crops, Seed Spices, Forage, *Kharif & Rabi* Pulses), 07 seedhubs, and 24 externally funded projects, including 03 ICAR-funded projects on Farmers' First project, TSP, SC-SP project, 03 DST projects and 07 RKVY projects.

In the western Rajasthan major crops are Pearl millet, Sesame, Mungbean, Mothbean, Clusterbean, Groundnut, Cumin, Isabgol, Chilli, Mustard, Taramira, Fennel, Fenugreek, Castor, and Wheat. The region also produces a variety of fruits such as Ber, Pomegranate, Datepalm, Guava, Papaya, Lime, Aonla, and Cordia. In addition, vegetable crops of solanaceous and cucurbit families are commonly cultivated.



The university has made significant contributions in research in developing varieties & technologies for the farmers. Over the years, University has developed 31 improved crop varieties of different crops (Table 2), including MPMH 17 of Pearl millet, and RT 346, RT 351, and RT 372 varieties of Sesame, which have gained popularity for their high yields, disease resistance, and suitability for the local growing conditions. These varieties have helped in improve productivity and resilience to biotic and abiotic stresses. Recently, eleven varieties have been developed, including TJM 1 & TJM 2 (mustard), JYS 1 & JYS 2 (yellow sarson), JR 1 & JR 2 (grain amaranth), JA 1 (asaliya), TJW 153 (wheat), RHC 2 (castor), JC 1 (chia), and RT 392 (sesame).

Table 2: Varieties developed by the University

Crop	Name of varieties released	Total
Sesame	RT 46, RT 54, RT 103, RT 125, RT 127, RT 346, RT 351, RT 372	08
Castor	RHC 1, RHC 2	02
Grain Amaranth	RMA 4, RMA 7, JR 1, JR 2	04
Pearl Millet	MBC 2, MPMH 17, MPMH 21, MPMH 35, MPMH 42	05
Rapeseed & Mustard	TJM 1, TJM 2, JYS 1 & JYS 2	04
Wheat	TJW 153	01
Asalio	JA 1	01
Clusterbean	RGm 112	01
Chilli	RCh 1	01
Mothbean	ICPMo 880, RMO 40	02
Kulthi	KS 2	01
Tumba	RMT 59	01



Jodhpur Rajgira 2



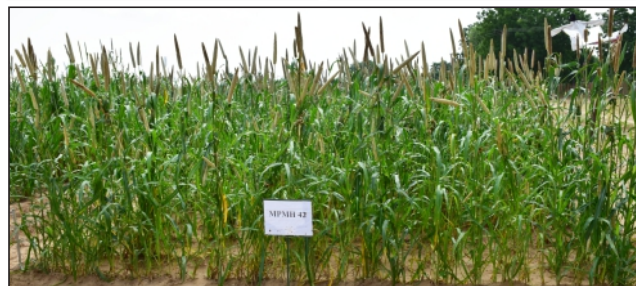
Jodhpur Asaliya 1



Jodhpur Yellow Sarson 2



RT 372



MPMH 42 (Shree Anna Bajri 42)



MPMH 17

Figure 9: Photographs of newly released varieties in the university

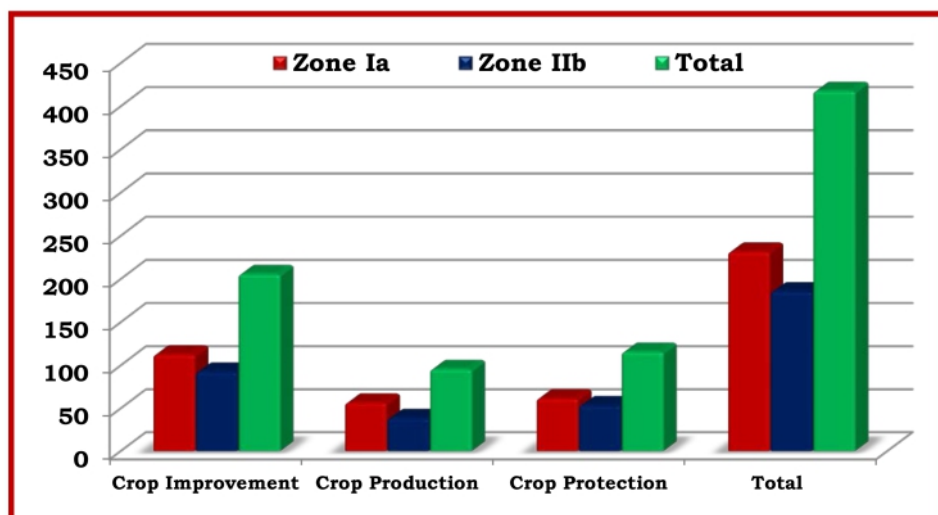


Figure 10: Technologies developed by the University

In the last five years university has produced 1175.67 quintal of certified seed, and 5451.29 quintal of truthful level seed, and 9563.66 quintal breeder seed.

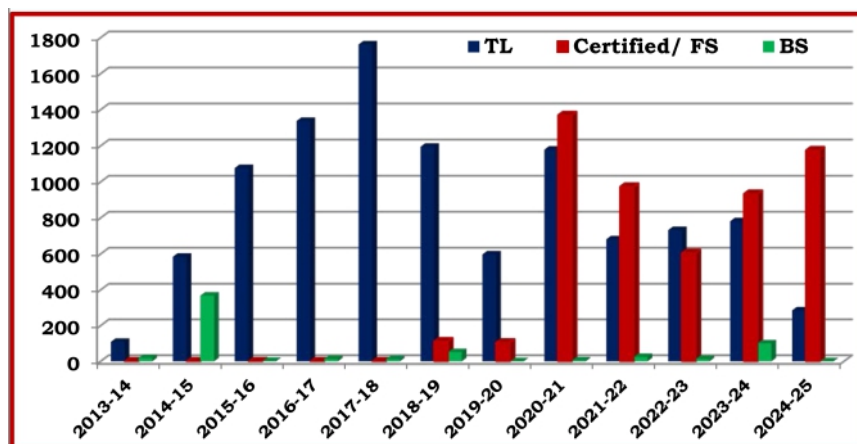


Figure 11: Seed Production of the University

University has developed harvesters for kair, moringa, methi and mehandi. Battery operated kair harvester and vacuum operated kair harvester are designed as low cost harvester so that small and marginal farmers can be benefitted out of these. Nagauri methi harvester is very efficient for the harvesting of nagauri methi.



(A)



(B)



(C)



(D)



(E)

Figure 12: Machines developed by the University a. Battery operated Kair harvester b. Vacuum operated Kair harvester c. Moringa leaf harvester d. Nagauri methi harvester e. Mehandi harvester



2.3 Extension education

The university achieved significant milestones in transfer of technologies for enhancing farmer income in western Rajasthan. Five farmers' fairs, have organized at district, regional and state level, in which thousands of farmers participated. Specialized training programs, seminars, and workshops are organized on crops like pulses, onion, garlic, arid fruits, and medicinal plants to strengthened knowledges of farmers and stakeholders. University has adopted four villages- Neora Road, Luni, Khudiyala and Balarwa for making them as smart villages. Recently a Kisan Call Centre is established with a toll free number 1800-180-3000.

Additionally, 183 Kisan Choupals have been conducted across 142 villages reached 5,771 farmers, addressing key agricultural challenges at the grassroots level. Mobile soil testing van and soil mapping for six districts of western Rajasthan have improved awareness and helped adequately in land planning and resource management for farmers. The establishment of Marudhara Vikray Kendra at University headquarters and all the KVKs has facilitated the sale of seeds, university products, and agricultural inputs to the farmers. Recently, construction of administrative buildings and farmer hostels in five new KVKs, has enhanced operational efficiency.





3. Challenges

Increasing population have a substantially increased the demand for food with high value and quality fruits; vegetables and livestock products are beyond the reach of poor farming household. Climate change and increased cost of cultivation are creating tremendous pressure on the farmers in terms of quantity and quality of produce. Increasing demand of water for industry, urbanization and households are shrinking its availability for agricultural produce. Few of the top challenges for the agricultural production and productivity which needs immediate attention are mentioned below-

- Shortage of skilled, globally competitive human resource in frontier areas, due to rapid technological advancements their demands are increasing.
- Highly erratic rainfall pattern and high temperature in the region coupled with high wind velocity are causing aridity in the region which led to highly unfavorable environment for crop production.
- Climate change particularly, temperature variations, hailstorms, seasonal shift in rainfall pattern putting agriculture at risk.
- Undulating land topography, shallow soil depth and poor soil organic matter in the region limit potential exploitation of land and resources.
- Soils in the canal catchment areas are being further degrading due to secondary salinization by seepage and overuse of water for irrigation
- The lack of diversification in crop and cropping systems is vulnerable to climatic challenges.
- Rural migration and limited agricultural mechanization have intensified labor shortages for cultivation in western Rajasthan.
- The limited availability of fodder and the reduction in grazing land areas are creating significant challenges for livestock farmers, impacting the overall livestock population in the region.
- Children and women of the small and marginal farmers, tribal areas are facing challenges of malnutrition.
- Emerging diseases and pest are challenging the farm productivity & quality of produce.





4. Opportunities

- The arid climate of this region is suitable for growing high-value seed spices like cumin, fennel, and fenugreek. Developing improved varieties and technologies in seed spices would be beneficial for the farmers of this region.
- Cultivated areas under fruits like pomegranate, fig, ber, and date palm in western Rajasthan have increased tremendously. There is an opportunity for developing improved varieties, propagation techniques, optimized farming practices, post-harvest processing & value addition to enhance farmer income, regional growth, and export potential.
- An opportunity exists in promoting traditional crops like kair, kumat, and kachari by their value addition, creating linkages in domestic and international markets.
- Promoting medicinal plants like ashwagandha, shankhpushpi, isabgol, aloe vera, and cactus, can be a new avenue to enhance profitability for growers.
- Post-harvest processing, packaging and branding of fruits and vegetables offers opportunities to extend shelf life, and enhance their market value.
- There is a significant opportunity for promoting hi-tech horticulture, precision farming, natural farming, organic farming to optimize resource use and enhance crop productivity in this region.
- Arid pulses like clusterbean and mothbean provides an opportunity for achieving self-sufficiency in pulses, promoting sustainable production, improving food security.
- Mustard, sesame, groundnut and castor cultivation provide a significant opportunity to work on oilseeds in Western Rajasthan.
- Livestock is an important component for farmers of western Rajasthan. Breeds like Tharparkar, Gir, Marwari goat, and Sirohi goat offers a significant opportunity for research and development in livestock management, breed improvement for ensuring farmers income.
- There is a significant demand for fodder in this region, availing green fodder throughout the season is challenging, provides new opportunities for round the year fodder production.
- With the growing need for advanced technology in agriculture, there is a strong opportunity to integrate ICT, AI, and virtual classes in agricultural education and extension services. These technologies can bridge with students at rural areas.
- Research on alternative energy sources, renewable energy, agricultural mechanization and automation are important sectors for agricultural research.





5. Targets/Priority Areas

Agriculture University, Jodhpur is committed to transform agricultural education, research, and extension in Western Rajasthan by 2050. The vision document focuses on addressing regional challenges, enhancing agricultural productivity, and promoting sustainable farming practices through innovative research and technology. By fostering collaborations with industries and global partners, university seeks to uplift farmer livelihoods, improve food security, and drive economic growth in the region. The vision will guide the university towards becoming a leading institution in agricultural development for arid and semi-arid areas.

5.1 Building globally competitive human resources in agricultural science

Creating globally competitive human resources at university focuses on strengthening the teaching-learning process in agricultural and allied sciences. Modern teaching methodologies, integration of ICT tools, virtual labs, digital classrooms, fieldwork, and industrial exposure will be key to shaping skilled, confident, and competent professionals. Comprehensive faculty development programs will ensure educators stay at the forefront of agricultural research and teaching, fostering innovation and continuous learning. Simultaneously, students' academic and extracurricular growth will be prioritized through international collaborations, exposure to global practices, and preparation for competitive exams and international-level tests. This holistic approach aims to equip both faculty and students with the skills and attitudes needed to excel in the global arena.

5.2 Combating climate change, depletion of natural resources, and improving soil health and water holding capacity

Given the challenges posed by climate variability, it is essential to adopt mitigation strategies to ensure food and nutritional security. Therefore, our vision is to promote sustainable development by addressing the critical issues of climate change, resource depletion, and environmental degradation. We aim to develop climate-resilient crop varieties and agricultural practices that are both environmental friendly and economically viable, ensuring long-term agricultural resilience. The University plans to promote precision agriculture, conservation agriculture, water and irrigation technologies, agroforestry, organic farming, and zero-budget natural farming to build a robust and sustainable agricultural ecosystem.

Additionally, integrating renewable energy sources and optimizing resource use will support long-term sustainability. Our initiatives will also include developing water harvesting units to conserve rainwater, improving soil health, and enhancing water use efficiency through conservation agriculture practices such as zero tillage, residue retention, and crop diversification. In resource-poor farming sectors, university will promote natural farming and precision farming. Moreover, innovative strategies will be developed to utilize *Prosopis juliflora* (Vilayati babool), a vegetation abundant in the region, for the



production of biochar, biofuel, and other sustainable applications. These efforts will contribute to a more sustainable agricultural future for the region.

5.3 Promotion of research under dryland agriculture

Promotion of research under dryland agriculture, particularly through the establishment of a Dryland Agriculture Research Center, is crucial for addressing the challenges posed by climate variability and water scarcity. Drylands cover over 40% of the global land area and support more than 2 billion people, making it essential to focus on agriculture for food security and livelihoods. The research will focus on developing resilient, high-yielding crop varieties suited to moisture stress conditions, prioritizing innovative water-conservation techniques such as rainwater harvesting, micro-irrigation, and soil moisture retention methods. Additionally, conservation agriculture practices, integrated with nutrient and pest management techniques, will enhance production and profitability for farmers, ensuring sustainable agricultural practices in these regions.

5.4 Crop diversification and introducing high value crops and varieties

Crop diversification by introducing high-value crops and new, improved varieties that thrive in the climatic conditions of Western Rajasthan will enhance agricultural productivity, farmer incomes, and ensure sustainable farming practices. University introduces new crops like chamomile, chickory, quinoa, and chia. Research is being conducted to develop high yielding varieties. A new chia variety is developed by the university. With the growing demand for high-value crops in the global market, our vision is to enhance farmers' income through diversification and innovation.

5.5 Promotion of Millets in the Western Rajasthan

Millets are the native crops of Western Rajasthan, leveraging their increasing popularity and nutritional benefits farmers can earn good profit. With pearl millet being the predominant crop in the region, university has already released a composite variety, MBC 2, along with four hybrids (MPMH 17, MPMH 21, MPMH 35, MPMH 42) of pearl millet. Development of high yielding varieties of Proso millet, Foxtail millet, and Kodo millet is underway. Through continued research and development, university strengthening millet cultivation, boosting farmer incomes, and promoting these nutrient-rich crops as a sustainable and climate-resilient solution for the region.

5.6 Managing emerging pests, diseases, and ensuring environmental security

Managing emerging diseases and pests through ecofriendly measurements is crucial for maintaining ecological balance. The rapid spread of new diseases and pests, often exacerbated by climate change and changes in agricultural practices, poses a significant threat to food security, biodiversity, and ecosystem climatic variability in leading in emergence of new pathogen. Now-a-days, blast diseases becoming major threats in pearl millet which was earlier considered as minor disease. Most commonly occurring disease and pest are ergot, downy mildew, blast in peral millet; Aphids, saw fly, alternaria blight,



downy mildew of mustard; root rot diseases in groundnut; fusarium wilt, blight in cumin; fruit borer, and wilt in pomegranate; root rot and phyllody in sesame, wilt and leaf spot in castor. Integrated approach that combines preventive, biological, and chemical control methods while considering long-term environmental impacts is effective. Early detection and monitoring systems are essential for identifying emerging threats. Use of modern technologies, such as remote sensing, molecular diagnostics, and AI-based tools, to track the spread of pests and pathogens in real time will be given focus in due course of time. Moreover, the promotion of organic farming practices and reduced use of chemical fertilizers and pesticides can enhance biodiversity and improve the resilience of agricultural systems. Development of ecofriendly and reliable technologies specifically bio-pesticides, bio-fertilizers and their dissemination among the farming communities will be focused. University will promote the mass production and application of *Rhizobium*, *Pseudomonas*, *Tricoderma*, *Bacillus*, *Tricogramma* etc. on the farmers field.

5.7 Ensuring livelihood security of farmers through promotion of horticultural and medicinal crops

Horticulture is a profitable venture for farmers in western Rajasthan, with high-value crops such as ber, aonla, pomegranate, date palm, karonda, snap melon, melons, Mathania chili, fenugreek and dill showing strong market demand. The region is area under cultivation of fig and date palm is increasing, offering new opportunities for farmers. Additionally, medicinal plants like ashwagandha, guggal and sankhpushpi, which can thrive in poor-quality soil and water, hold significant potential to enhance farmers' incomes. The university envisions promoting these crops by proposing a separate horticulture college and creating centers of excellence for arid horticulture in this region.

5.8 Promotion of Hi-tech horticulture in western Rajasthan

Hi-tech horticulture uses advanced methods like precision farming, automated irrigation, and controlled environment agriculture to improve productivity, save resources and support sustainable farming. These innovations are especially valuable in water-scarce areas, enabling the cultivation of high-value crops like pomegranates, cumin, fenugreek, dragon fruit and date palms. The University aims to lead this transition, helping farmers adopt modern, efficient practices for sustainable and profitable horticulture.

5.9 Value additions and post-harvest processing

Value addition and post-harvest processing of locally grown crops can be useful in enhancing farmers income. We aim to unlock the immense potential of value added food products in domestic and international market. The crops such as sangri, kair, lasoda, kumut and kachri, pomegranate, fig, ber and date palm can be promoted in the national and international market. By transforming these crops into value-added or processed products, we strive to increase farmers' income, create sustainable livelihood opportunities, and strengthen the regional economy. University is committed to facilitating innovation and empowering farmers to tap into the potential of these unique crops, thereby adding value to their produce and opening new market avenues.



5.10 Strengthening research on renewable energy as an alternative sources of energy

Solar and wind based energy are cost effective for powering farm equipment/ sensors/ pumps etc. Design and development of models for generating alternative energy sources would be milestone for the western Rajasthan. Establishment of R&D sector on cost effective transformation of agricultural waste and bio-residues into bio-coal/ biogas/ biogas slurry/ compost, etc. studying fuel efficiency/ impact under varying weather/ environmental conditions needs strengthening for promoting their wide scale direct/ indirect agricultural applications.

5.11 Improving cost effectiveness through farm mechanization

Farm mechanization modernizes farming operations, reducing production costs, and increasing productivity. Small and marginal farmers are paying more due to increase cost of labours and less equipped farm operations. By integrating advanced tools and equipment into agricultural practices, farmers can save labor, time, and resources while enhancing efficiency and profitability. University will focus on developing farm implements for promotion of organic farming, natural farming, post-harvest processing of fruits and vegetables, developing renewable energy source based farm equipment's for small and marginal farmers. Establishment of a Farm Machinery Testing Centre in the university would be beneficial for the farmers and different organizations involving in farm mechanization.

5.12 Production of high quality seed

Agriculture University, Jodhpur aims to become a leading center for producing and supplying high-quality seeds in the western Rajasthan. University targets to improve the seed replacement rate of major crops particularly pearl millet, mustard, groundnut, cluster bean, green gram and moth bean. Assuming 100% seed replacement in Rajasthan for pearl millet, 17400 q seeds will be required. Similarly, 55000 q of groundnut, 52500 q of cluster bean and 28000 q of green gram seed will be required for Rajasthan. Therefore, strategies will be developed to channelize seed production, processing, storage and their distribution to the farmers at the right time. University has established a seed processing unit with the capacity of 5t/hr. All the units of the university are involved in production of quality seeds. Seed production through participatory system with the involvement of farmer is being carried out. University will train more number of farmers for quality seed production and making seed production as profitable venture for the farmers.

5.13 Agro-entrepreneurship and agri-business promotion

University is committed to create a vibrant ecosystem that empowers students and aspiring entrepreneurs to innovate and lead the agricultural sector. By offering hands-on training, mentorship, and access to resources, including a dedicated incubation center, the university aims to foster an entrepreneurial spirit and drive the establishment of sustainable agri-business ventures. Focus will be on promoting innovative farming technologies, market linkages, and value-added products, creating new business opportunities. Providing training to the students and entrepreneurs for skill enhancement.



5.14 Technology dissemination, and outreach

Transfer of agricultural knowledge by leveraging mass media, social media, and advanced technologies through choupal, kisan mela and various means will be focused. The integration of drone technology and strengthening KVKs with modern equipments and technologies will be considered. This approach will empower farmers to enhance productivity, sustainability and economic viability, driving positive change in agricultural communities across the region.

5.15 Promotion of IPR in agricultural technologies

Our vision is to promote local products globally through initiatives like "One KVK One Product". Establishment of a vibrant IP Policy, strengthening IPR Cell, promoting innovative research programme in the university will ensure more values to research. Emphasis will be given for protection of intellectual properties of farmers and researchers through GI, farmer variety protection, patent, design and other forms of IP.





6. Strategic Framework

- To strengthen agricultural education and extension services, university will prioritize the integration of ICT, online courses from MOOCs and SWAYAM, smart classrooms, virtual labs, language lab etc. The university will be focusing on fostering innovation, conducting demonstrations, dissemination of advanced agricultural practices.
- University will emphasize innovative teaching and learning methodologies. Focus will be given on enhancing students' technical, entrepreneurial, and leadership skills through industrial exposure, competitive exam preparation and international collaborations.
- To accelerate research and innovation in dryland agriculture, university plan to establish dedicated research program on dryland agriculture on developing drought-resilient crop varieties, innovative water management technologies, and conservation agriculture methods.
- To promote horticulture and high-value crops like pomegranate, date palm, medicinal plants, and seed spices in Western Rajasthan, university plan to establish a "College of Horticulture". These initiatives aim to develop and disseminate advanced post-harvest management and value addition technologies while introducing modern practices like precision farming, Hi-Tech horticulture etc. The focus will also include adding value to local crops like sangri, kair and millets.
- To enhance the production and productivity of oilseeds, pulses, and millet crops in these region, university plan to develop climate-resilient varieties; bio-fortified varieties to enhance nutritional security. Promotion of modern breeding techniques like genome editing, speed breeding, genomic selection that accelerate the genetic gain in breeding programme.
- To promote agro-entrepreneurship and agri-business, the university plans to set up incubation center at different regions to support innovative ventures by young entrepreneurs. These initiatives will provide mentorship, training, and market linkages to foster entrepreneurial growth and value addition in agriculture.
- To mitigate effect of climate change in agriculture, developing accurate weather prediction models to address the climate change on agriculture. Furthermore, promotion of bio-pesticides, bio-fertilizers, and molecular diagnostics tools will ensure environmental security.
- Farm mechanization for small and marginal farmers will be emphasized through developing cost-effective, renewable energy-based machinery and tools. University will establish a Farm Machinery Testing Center, which will play a key role in validating and ensuring the quality of farm machinery, adhering to rigorous standards, and supporting the development of reliable and effective tools for the agricultural community.



- Focuses will be given on dairy and food technology to enhance the income of farmers depends on animal based farming. Strengthening animal breeding programme, immunization and disease management will be benefitting for the farmers.
- Promotion IPR in agriculture includes strengthening IPR Cell, establishment of IPR policy will be focused by the university. For the benefit of farming communities more emphasis will be given on registering GI, farmers varieties etc.





7. Way Forward

Agriculture University, Jodhpur, plays a crucial role in addressing the unique agricultural challenges of Western Rajasthan, in arid and semi-arid region that sustains 21.1% of the state's human population and 28.7% of its livestock population. The university's jurisdiction covers 28.4% of Rajasthan's geographical area, including districts such as Jodhpur, Barmer, Jalore, Pali, Sirohi, and Nagaur, which are home to a diverse range of crops adapted to the region's extreme conditions. The region's annual rainfall averages around 330 mm, and water is primarily sourced from groundwater, with over 85% being brackish. These environmental challenges necessitate region-specific research on drought-tolerant crops, water-efficient farming techniques, and improved varieties of crops like cumin, fenugreek, and pomegranate.

To support sustainable agricultural practices, the university should focus on integrating modern technologies such as genome editing, speed breeding, genomic selection, precision farming, and natural farming to optimize resource use and enhance crop productivity. With the growing demand for high-value crops like seed spices, fruits, and medicinal plants, the university can further contribute to regional economic growth by improving crop varieties and post-harvest practices. The increasing cultivation of fruits such as pomegranate, fig, and date palm presents a significant opportunity for research into improved varieties and optimized farming techniques to boost farmer income.

The university will continue to strengthen its educational offerings and extension services, training to next generation skilled professionals to address the region's agricultural needs. By collaborating with industries and national institutions, the university can foster innovation and create market linkages that will benefit both farmers and the regional economy. With a comprehensive focus on research, education, and extension, Agriculture University, Jodhpur, has the potential to transform Western Rajasthan into a model for sustainable agricultural development, driving prosperity and ensuring food and livelihood security for its communities.









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