

Vision-2035

SVPUAT

2023



**SARDAR VALLABHBHAI PATEL UNIVERSITY OF AGRICULTURE AND
TECHNOLOGY, MODIPURAM MEERUT- 250 110**

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Message

Agriculture has evolved over time; regional diversity is the one which contributed for gradual evolution of agriculture and its application for human survival. It was the domestication of local biodiversity which made agriculture as self employment venture to produce food for satisfying human hunger. Gradually, it took a shape of an industry operative through human efforts by utilizing natural resources to meet diverse need of ever increasing human population. Agriculture has grown as regional entity and local resources are the backbone for agricultural sustainability and prosperity. In India, climatic diversity is wide, considering from Tarai region to Western Ghats; or may it be from North Eastern regions to arid western parts. Agricultural is a regional subject, defined under the boundaries of State, the Agricultural Universities are foremost bodies taking responsibilities to deliver innovative and improved technologies to make agriculture sustainable under prevailing agro-climatic conditions and available resources. Science has to run ahead with time considering future needs and resource availability. Hence, the present document is envisioning agricultural developmental needs of the Western Uttar Pradesh of Uttar Pradesh State by the year 2035. The Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut Uttar Pradesh is bestowed with the responsibility of agricultural research, education and extension in the western parts of Uttar Pradesh.

“There are no miracles in agricultural production”

- Norman Borlaug

Although, the hot arid and semi-arid regions are resource limited depicting, its' inherent constraints to showcase agriculture holistically as a profitable venture. The present level of sustainability has only accounted due to the natural adaptation and utilization of biodiversity by the populace for survival. Looking to the other side of the coin, the climatic peculiarities have generated diverse natural populations adapted to prevailing abiotic stresses; mainly high temperature, salinity, limited moisture etc. Henceforth, the future perspectives of agriculture development in the region lies with effective deployment of genomic configurations of the adapted biodiversity with available natural resources in the form of innovative technologies. I can foresee, this VISION document will be a torch bearer for all the future endeavors of the University to deliver the needful with time for making agriculture prosperous in western parts of Uttar Pradesh.

(K.K. Singh)



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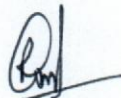


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1. OVERVIEW

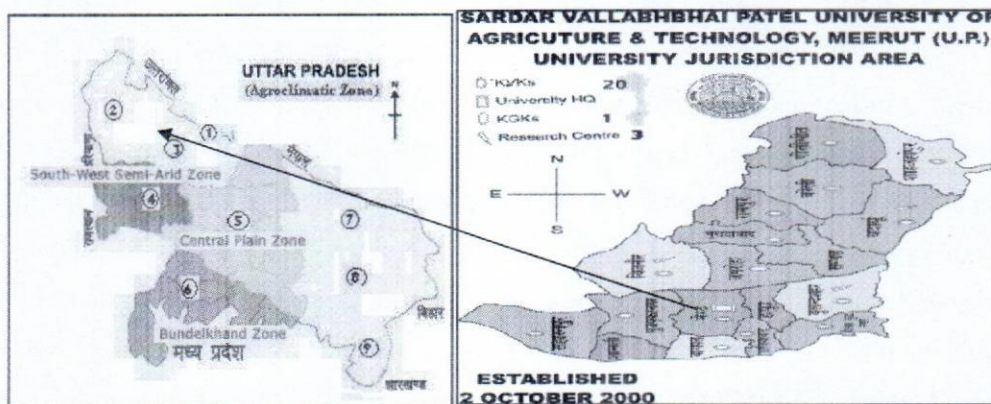
India predominantly being an agriculture dependent country has to apprehend continuous growth in agriculture research and development for sustainability and livelihood security of farmers. The National Agricultural Research System (NARS), which is accounted as one of the unique system existing across world for agriculture research and development has emphasized upon to develop a strong network of agencies/bodies to deal with national and regional agricultural needs and problems in the country. As agriculture always influenced by local resources and regional climate, and Indian conditions are too diverse along the length and breadth of national boundaries. Henceforth, it becomes imperative to have regional units to deal with local agricultural needs, the network of regional units adds to national prosperity in a cumulative way. Agricultural Universities are an integral part of the NARS to deal with the regional agricultural problems for national food security and prosperity. Being a part of NARS, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut of Uttar Pradesh State is responsible for providing agriculture education, research and extension in western regions of the state. Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut was established on 2nd October, 2000 under Uttar Pradesh Agriculture University Act (revised, 1958) and has the honour of being “first Agriculture University of the 21st Century”. It was inaugurated on 28th March, 2002. It is included in the list of recognized Universities maintained by the University Grant Commission (UGC) of India and is ICAR accredited. It is committed to a unique mandate of integrating education, research and extension to serve the rural community.

The University has the mandate for imparting education in agriculture and other allied branches, furthering the advancement of learning and prosecution of research and undertaking extension of such sciences, especially to the rural people of western Uttar Pradesh. Over the years, this University has contributed significantly in transforming the farm scenario of Western Uttar Pradesh. It is considered most peaceful institution in the state with very conducive atmosphere to pursue academic and research activities. University has been ranked the No. 1 Agricultural University in Uttar Pradesh and the 15th best in the country for the year 2018 by the Indian Council of Agricultural Research (ICAR).



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The jurisdiction area of this University spans over 29.085°N latitude and 77.697°E longitude and spreads across 18 districts namely Baghpat, Badaun-II, Bijnor, Badaun, Bulandshahr, G.B.Nagar, Ghaziabad, Hapur, Amroha, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Rampur, Saharanpur, Sambhal, Shahjahanpur Shamli under four divisions of U.P i.e.. Meerut, Saharanpur, Moradabad and Bareilly. Initially there was a proposal of 12 colleges in the original master plan of the university. Through a journey of 20 years, the university has grown into a campus with 6 colleges i.e. College of Agriculture, College of Biotechnology, College of Veterinary & Animal Sciences, College of Horticulture, College of Post Harvest Technology and Food Processing and College of Technology. Efforts are going on to enrich the campus in terms of faculties, basic facilities and amenities for comfortable living and congenial atmosphere in academic pursuits. Resource generation and human resource development is critical for sustaining, diversifying and realizing the potentials of agricultural sectors. Strengthening agricultural education and innovation is the key to transform agriculture. Abiding by the VISION-2035, SVPUAT will develop strategies to foster high quality education, research and extension to produce resourceful, proficient and self-motivated students with strong scientific temperament, high moral and ethical values to construct a tolerant and pluralistic and vibrant society.



Districts : 18			
Saharanpur	Meerut	Moradabad	Bareilly
Saharanpur	Meerut	Moradabad	Bareilly
Muzaffarnagar	Ghaziabad	Bijnor	Bulandshahr
Shahjahanpur	Baghpat	Rampur	Muzaffarnagar
	G.B. Nagar	J.B. Nagar	Pilibhit
	Bulandshahr	Sambhal	
	Hapur		

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The University is esteemed to have a strong teaching, research and extension setup to envisage agricultural development in the western parts of Uttar Pradesh.

1.1 Colleges

The University Head Quarter is sprawling over a vast area of around 108 ha and the campus. Board of Management, Academic Council and Board of Faculties are at the helm of affairs in the endeavor of making the university a formidable seat of learning in agriculture and allied fields to realize its mandate. There are 06 functional colleges offering undergraduate, post graduate and PhD programs in various disciplines of Agriculture, Biotechnology, and Veterinary & Animal Sciences, Horticulture, Post-harvest Technology and Food Processing and College of Technology as per the ICAR Vth Dean's committee recommendations. Currently the University is offering Bachelors degree programme in 06 disciplines, Master's degree programme in 29 disciplines and PhD degree in 10 disciplines; with a total intake capacity of 821 per year in all the courses. The constituent colleges aim to meet the challenges of the agriculture sector and upliftment of rural people in western Uttar Pradesh in particular and the state of Uttar Pradesh and the nation in general.

The College of Agriculture comprise of different departments like Agronomy, Horticulture, Soil Science, Entomology, Plant Pathology, Animal Husbandry, Genetics and Plant Breeding, Agriculture Economics and Management, Agriculture Extension, Agricultural Engineering and Food Technology, Agricultural Biotechnology. The laboratories are equipped with modern equipments required for teaching as well as for basic and applied research in different departments. These laboratories are being updated continuously with latest scientific and electronic equipments. College developed some specialized laboratories to undertake research projects. These include phyto-sanitary, bio-control, molecular biology lab, micronutrient lab, tissue culture lab, mushroom lab, phyto-nematology lab, aquaculture, food processing laboratory and video production laboratory. The Practical Crop Production course provides a unique model for practical training in crop production which envisages professional training and work experience. Another innovative feature of the agricultural education is the student READY (Rural Entrepreneurship Awareness Development Yojana) Programme under which Experiential Learning Programme (ELP) and Agro-Industrial Attachment (AIA) are



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important component to learn Entrepreneurial skills and get exposure to actual farming situations where they learn management and application of technologies.

The College of Biotechnology was offers B.Tech. (Biotechnology) degree and M.Tech./M.Sc. degree programmes. This college has 4 divisions (Plant biotechnology, Animal biotechnology, Environmental and Microbial Technology and Bioinformatics) as per the ICARs guidelines. The Bioinformatics section is funded by DBT, New Delhi.

The College of Veterinary and Animal Science comprises of 17 departments cutting across the broad clinical and non clinical disciplines. All laboratories are well equipped with scientific instruments. The college harbors a super specialty teaching facility and a veterinary clinic complex. This hospital is admitting referred and serious cases of the Uttar Pradesh, Delhi, Haryana and Gadwal area of Uttrakhand. The veterinary polyclinic, instructional livestock and poultry farms is having all basic facilities to impart hands on training to the students and other entrepreneurs.

The College of Post Harvest Technology & Food Processing is currently running with 6 departments, Food process technology, Food process engineering, Food safety and quality assurance, Food business management, Basic engineering, Basic sciences and Food Plant Operations and offers B.Tech. (Food Technology) programme. The College of Technology was established with the following departments Agricultural Engineering, Soil and Water Conservation Engineering, Irrigation and Drainage Engineering, Agricultural Machinery and Power Engineering, Postharvest Technology, Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics Engineering, Computer Engineering, Information Technology and Basic Sciences and offers B.Tech. Degree programme in Agricultural Engineering. The College of Horticulture has 8 departments, Fruit science, Vegetable science, Floriculture and Landscape architecture, Post-harvest technology, Plant Protection, Natural Resource management, Basic science and Social Science. Infrastructure for protected cultivation and post harvest management of fruits and vegetables have been created for providing hands on training to the students and farmers.

The Academic excellence reflected in their placements in private sectors; Nationalized Banks such as Syndicate Bank, State Bank of India , HDFC; Daurala Sugar Works;



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Unicorn Seed Limited; PRADAN; ICICI Bank; Godrej; Agrovat Pvt. Ltd., Modi sugar Mills; Dena Bank; Food Industries; UCO Bank; Bank of India; Union Bank of India; Bayer Bio-Sciences and Reliance etc. The level of knowledge gained by the students during the course of study is also reflected in the selection of these graduates to organizations of repute like IARI, New Delhi, GBPUA&T, Pantnagar, IITs, NITs, CSIR institutes, BHU, PU for higher studies. Students are also selected for Agribusiness management programmes at NAARM, NIAM, MANAGE, Bikaner and GBPUA&T, Pantnagar. Several students have qualified in ICAR (NET), CSIR (NET/JRF), GATE. Admission process in various degree programs of the university is very transparent and is made through the Uttar Pradesh Combined Agriculture and Technology Entrance Test (UPCATET) conducted annually. The University is also organizing tutorial classes for the economically weaker students and rural youth to prepare them for the competitive examinations. The academic atmosphere of the university is very congenial. The students and faculty are proving their academic excellence at both the national as well as global level.

1.2 Research

The University jurisdiction area covers an area of 151.65 ha research farms on-campus and 44.01 ha of area under off-campus research stations. The western UP region is endowed with plenty of high quality natural resources suitable for cultivation of a wide range of crops, fruits, vegetables, forage crops and forestry etc. Besides crop cultivation, dairy and food processing are other important areas for income generation and employment for the rural people. Efforts on research front are being made under the Directorate of Research through on- and off- campus research activities Livestock Research Center, Seed Production Farm, Fisheries Research & Training Center (FRTC), Poultry Research & Training Center (PRTC), Seed Processing Unit (SPU), Mushroom Research & Training Center (MRTC), Bio-control Production Unit, Instructional Livestock Farm Complex, Vermicompost Unit, Technology park and three Zonal Research Stations viz. Nagina, Bulandshahr and Ujhani located in different agro-ecological conditions, besides food processing unit, bakery product processing, sugarcane tissue culture unit, bio-fertilizer unit, sanitary and phyto-sanitary centre of excellence, centre of excellence in agricultural biotechnology, bioinformatics centre, soil testing unit etc. all of which are providing training to the students, farmers, budding scientists and entrepreneurs. Developing location



specific farmers' friendly and sustainable technologies is the central theme of university research programme aimed at food security, conservation and improvement of natural resource base, improving profit margins and generating rural employment.

The highly skilled and system-motivated scientific strength has evolved on the foundation of advanced research orientation and scientific temperament. The University has developed need based technologies and released high yielding varieties of different crops to make farmers to reap higher yields with better quality. The University's activities have been expanded in new frontier areas of research such as soil health, biofertilizers, bioactive compounds, bio-control agents, genome sequencing, and fermented functional foods. These activities are additional apart from mandatory research focus on basmati rice, wheat, rapeseed-mustard, oats, maize, sugarcane, potato, chickpea, lentil, pea, pigeonpea, urd, and many more including fruit crops (Mango, Guava, Litchi, Bael, Aonla, Jamun, citrus, Papaya, Grapes, Pear, Peach, Custard apple, Loquat, Lemon, Sapota, Kinnow, Pomegranate, Malta, Litchi, Phalsa, Ber, Karonda), Vegetables (Cole crops, Cruciferae crops, Cucurbits, Potato, Onion, Garlic), Spices, Flowers (Gladiolus, Marigold, Chrysanthemum), Medicinal and Aromatic Plants, plantation crops (popular), forage crops, animal breeding, mushroom cultivation, poultry, integrated farming systems, seed production, dairy and food products. Zero Budget Natural Farming (ZBNF) experiments are also being under taken in mustard, chickpea and lentil. A 3TPH capacity seed processing plant and seed testing laboratory is functional in the university developed under the Mega seed project for field crops supported by ICAR. Model nursery for production of meditational and aromatic plants has been established in western plain zones of UP. A high density orchard having 12 different and reared fruit plants have been established in one acre area. Mother plants nurseries for high degree pedigree planting materials for fruit crops have been establishment. The Livestock Research Station of the university maintains breeds of Murrarah buffalo and Sahiwal cow. This centre is actively engaged in milk production and breed improvement. The center also has a vermicompost production unit. Poultry Research and Demonstration centre maintains CARI- Nirbheek, CARI-Shyama, Hitcari, Upcari, CARI-Devendra, Kadaknath, Aseel, Vanraja, Chabro, Kroiler, Barred Plymouth Rock, Rhode Island Red, Quial breeds. The Instructional Livestock Farm Complex is actively involved in conservation and maintenance of small ruminats including elite germplasm of pig (Middle White



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Yorkshire), sheep (Muzaffarnagri breed), goat (Barbari breed) and horse for imparting specialized teaching and research training to veterinary students. At the Fisheries Research and Demonstration Unit indigenous fish like rohu, katla, nain and exotic types like silver carp, grass carp and common carp are produced. Fish spawn is also produced and distributed among farmers besides imparting trainings. The university also has a Fish & Aquaculture Unit which includes Fish culture, seed production, integrated fish farming and cutlet preparation. University has a well established Niche area of excellence - Isolation, characterization, production and dissemination of bio-agents supported by ICAR, under which several bio-agents like *Trichogramma card*, *Beauveria bassiana*, *Trichoderma*, *Meterihizum* are being produced. The Mushroom Production Unit undertakes the production of *Plurotus*, *Agaricus*, *Ballverala* mushroom and Spawn production. All India Coordinated Research Projects on rice and voluntary centers on sorghum, wheat and barley, mushrooms and nematodes are successfully being operated in the university. Several other research projects supported by Rastriya Krishi Vikas Yojna, NIAM, National Horticulture Board, Indian Council of Agricultural Research, Council of Science and Technology, Department of Biotechnology, Spice Board, Ministry of earth science, Sirius Minerals London, FMC PVT LTD, Natco Pharma Ltd., NCIPM New Delhi and ADAMA Ltd. are currently operational in the University. Zonal Research Station Bulandshahar has collected and maintained 406 Cotton Germplasm and released 2 Varieties, Lohit and Shyamli. Research Station Nagina is one of the premier Rice Research Station of the country which was established by British Govt. in 1921. This station has developed 24 rice varieties. An export quality rice variety Type -3, known as Dehraduni Basmati, is the first variety by which the quality rice export was first time by India and N-22, a drought resistant variety, is still being used as donor parent for drought resistant breeding. This research station boasts a collection of 556 rice germplasm. Zonal Research Station Ujhani (Budaun) has released Vallabh Taramira-1 and 2 of taramira and identified one variety of rapeseed and mustard viz., Vallabh Mustard -1.

Research planning, review and bringing out recommendations for the farmers and scientific community are executed in an exemplary manner through Research advisory committee chaired by the Hon'ble Vice Chancellor of the university. Important input for prioritization of research and monitoring of the impact of recommended technologies for farmers are provided by the RAC which meets twice in a year i.e., for Kharif and Rabi seasons to churn



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out the researchable issues and to decide the directions of further research. PME Cell in the University also exists to monitor the same. The research achievements and recommendations are as follows:

Varietal Development

S.N.	Crop	No. of Varieties	Name of Varieties
1.	Basmati Rice	5	Vallabh Basmati-21,22,23, 24 and Nagina Vallabh Basmati-1(identiied)
2.	Chickpea	5	Sadbhavbna, Surya,WCG-10, Vallabh Kallar Chana-1, Vallabh Kabuli Chana 1
3.	Black gram	1	Vallabh Urd-1
4.	Turmeric	2	Vallabh Priya, Vallabh Sharad
5.	Colocasia	2	Vallabh Nikki, Vallabh Hans
6.	Coriander	1	Sarvhari
7.	Fenugreek	1	Vallabh Chinki
8.	Bottle Gourd	1	Vallabh Saral
9.	Sounf	1	Vallabh Punit
10.	Kalongi	1	Vallabh Bhavi
11.	Ash Gourd	1	Vallabh Petha -1
12.	Taramira	2	Vallabh Taramira 1 and 2
	Total	23	

Besides several technologies for crop production, crop protection and value addition have been developed by the University for the farmers.

1.3 Extension Education

SVPUAT is committed to serve the farming community under multi-facet extension education activities in stream line with State and Central Government targets and objectives. The Directorate of Extension started functioning with the inception of university with a team at headquarter and 20 KVK's in different districts of the university jurisdiction. The total area



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covered under 20 KVKs is 241.83 ha. Twenty KVKs i.e. Baghra (Muzaffarnagar), Bulandshahar, Dhamora (Rampur), Hastinapur (Meerut), Khajuribagh (Saharanpur), Khekara (Baghpat), Muradnagar (Ghaziabad), Nagina (Bijnor), Niyamatpur (Shahjahanpur), Noorpur Chholas (G.B. Nagar), Rustam Nagar (Moradabad), Tanda Bijeshi (Pilibhit), Ujhani (Badaun), Hapur, Amroha, Sambhal, Dataganj (Badaun), Muzaffarnagar-II, Moradabad-II and Shamli and one KGK (Bareilly) are working under the administrative control of the University. ATIC is a single window advisory unit for advisory, diagnostic services and supply of critical inputs. With advancement in research management and information/ communication technology, extension programs of the university are being modernized with fresh approaches that are farmers' friendly, ecologically sustainable and motivational for participatory approach. Conduct of monthly and seasonal workshops/ meeting, Front Line Demonstration (FLD), Field days, Farmer's fairs, Animal health campus, Farmer's tour, Radio & T.V. talk, Kisan helpline, distribution of literature etc. are the key features of the University extension programme.

The various technologies and package of practices developed and recommended by SVPUAT are being well adopted by the farmers. The farmer's interest in advancements of agricultural practices especially in area of quality seeds, organic farming, irrigation, horticultural crops, food processing and value addition, export trade, dairy farming etc. have made the university more responsible for being dynamic resource centre through providing time to time technical inputs and advices. University organizes extension activities like Farmer fair, Gosthi, development of technical literature etc. The extension services of the university are mainly focused through publications, mass media such as press, radio and T.V. channels for the benefit of farming community. Cattle show is also organized during the Kisan Mela every year at university campus in which allied class pedigreed cattle and buffalo of Uttar Pradesh, Haryana and nearby states are participating. The university also organizes routine outbreak camps in various places of western Uttar Pradesh. Regular ambulatory services and technical support is being provided to the farmers and stakeholders. Faculty members are also engaged in delivering the talks on radios and televisions at all India level. Poultry Research and Training Center (PRTC) and Livestock Research Centre (LRC) are regularly organizing various trainings for farmers on various aspects for promotion of entrepreneurship development. The major activities of the Directorate include training, demonstrations, on farm testings, production and distribution



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of quality seeds/planting materials through its instructional farms at KVKs and farm advisory services. The Directorate is imparting trainings to the practicing farmers, farm women, rural youth and extension functionaries on various aspects of agriculture like IPM, IPNM, seed production, diversification, improved production technologies of various crops (cereals, pulses, oil seed crops, sugarcane, fruits, vegetables, spices, medicinal and aromatic plants and agroforestry etc.), soil and water conservation, soil health, integrated farming system, organic farming and many other aspects related to the farming community through KVKs and KGKs. The front line demonstrations (FLDs) and on farm trials (OFTs), technology demonstrations and varietal response trials for maximum production and profitability are being conducted both at farmers' field and at KVK farms. Under farm advisory services the important activities includes the Helpline facility at head quarter to solve the farmers problem and the on line technology dissemination through mobile calls / messages by KVKs /KGKs scientists, organization / participation in Kisan mela, gosthi, exhibition, animal camps, scientists visits to farmers fields and farmers visit to centre etc.

1.4 Students' Welfare

Student welfare activities viz. scholarship, fellowship, educational tour, extra-curricular activities like such as sports, cultural and other competitions are organized regularly by the Dean Student Welfare section. The University provides facilities like sports complex, canteen, auditorium, mobility and transport, hostels, health care, training and counseling cell for the students. SVPUAT has well maintained separate hostels for boys and girls, health centre, physical education programmes etc. for the welfare of students. The NCC, NSS and other activities like tree plantation, animal health care camp, Swachchhata Abhiyan, yoga camp, thalassemia detection, blood donation camp and expert lectures on personality development & health awareness are regularly organized. The SVPUAT students participate in All India Inter Agricultural University Sports Meets, Youth Festivals.

1.5 IT Cell

The university has its own website. Most of the classrooms are equipped with modern ICT facilities. Each and every faculty member is given internet connection through LAN. Every college has its own computer lab which is equipped with power backup and internet facility



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through LAN/wifi. All the hostels are having wifi facility. The entire campus is connected through OFC. Video conferencing facility is also available. A Media Production Centre has been established to develop the e-contents. E-Lectures along with the power point presentations related to different course content of Agriculture, Biotechnology and Veterinary have been developed and uploaded on OLAT. Students and faculties, registered on OLAT can access the e-contents available on this e-learning software. University is registered on Consortium for e-Resources in Agriculture (CeRA), faculties and students access the journals available on CeRA. Apart from this, Academic Management System Software is being implemented which will help to manage the various academic activities efficiently. IT is facilitating all the purchase in University through Government e-Market Portal (GeM) and e-Tendering.

1.6 Linkages

SVPUAT has a strong network of linkages with state and national organizations, institutes and industries. The University has signed several MoUs with regional and national organizations/ institutions in the field of Research, Education and Extension activities. Some of the international agencies with which University has made linkages include Cornell University, CIMMYT, IRRI, ICRISAT, NIPGR ICAR Institutes (CIRC, CPRI, CIPHET, IIFSR, IHWBR, IIMR, CIRB), NAARM, CSIR, DBT, DST, IMD, PAU, IIRS etc. and others like State Department of Agriculture, Horticulture, Animal Husbandry, NABARD, SAUs, NGOs, RVC, Meerut, NIAH, Baghpat, WWF, Hastinapur, IFFCO.

2 Mission

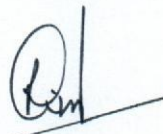
Enhancement of rural socio-economic and livelihood conditions, employment generation and creation of proficient human resource through excellence in education, research and extension in agriculture and allied sciences.

3 Vision

A technology led profitable, vibrant and sustainable rural development.

4. Mandate

- ❖ Develop academically qualified human resources through UG, PG, Ph.D. and other academic programmes in different branches of agriculture & allied branches of learning and scholarship



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- ❖ 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

5. Objectives

- ❖ To impart quality education, learning through research and create excellence in human resources in the agriculture and allied sciences for socio-economic transformation of the rural society
- ❖ To build a strong academic foundation in the region.
- ❖ To undertake location specific, need-based research by adapting modern technology
- ❖ To generate cutting edge technologies for improvement of the agriculture sector
- ❖ To transmit the knowledge gained and technology generated through research to the stakeholders – the farmers, youth, industries etc through extension education
- ❖ To encourage partnership and linkages with national, international institutions and private sector
- ❖ To promote participation of women in Agriculture and develop a separate economic identity for them
- ❖ To make Indian Agriculture globally competitive.

6. On-going Thrust Areas

- ❖ Basmati rice improvement
- ❖ Resource conservation technology



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- ❖ Integrated pest disease and nutrient management
- ❖ Integrated farming system research
- ❖ Crop residue management
- ❖ Capacity building programmes and entrepreneurial development activities
- ❖ Hi-tech Horticulture, Post harvest technology and value addition
- ❖ Crop and Livestock characterization and improvement through conventional and biotechnological tools
- ❖ Crop and Livestock disease diagnosis and management
- ❖ Farmer advisory services



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CHAPTER 2

STRENGTHS, WEAKNESSES, OPPORTUNITIES AND CHALLENGES

Through sustained efforts during the last two decades this University has played a significant role in strengthening agricultural education, research and extension in the western Uttar Pradesh region. The notable achievements in education have been substantiated by student's placement in private and public sector organizations of national and international repute. A comparison of the present with the past gives us great satisfaction in terms of its all-round development and in the dynamic world the University is well equipped to venture to take on the new responsibility of agricultural development in western U.P. At this juncture it is essential to review and analyze our strengths, weaknesses and opportunities so that we may herald a faster growth in the next 10 years and fulfill the aspirations and expectations of the people of region.

Strengths

The setting of this University in an environment representing the green belt of the NWPZ region, where receptivity of farmers is high, is an asset for the U.P. state and the Government of India. The University has established a good reputation among national and international centers of agricultural education and research, as evidenced by various collaborative research programmes and posting of its alumni in various responsible positions in national/international organizations. Their strength, cooperation and support can be secured for further development of this University. With new research and extension responsibility the University has greater scope to initiate and coordinate research projects with other SAUs/institutions of ICAR and secure greater integration for effective technology generation and dissemination. The University has got some highly specialized well developed and equipped departments. These departments may further be upgraded depending upon the need and scope of their development. Our major strength comes through highly qualified and experienced teachers, well equipped research laboratory facilities for basic and applied research and higher education in agriculture. The course curricula of the undergraduate and post-graduate programmes have been revised as per ICAR recommendations for all round development of the students. The University's well extended research programme and land for seed production is a great asset to earn a name in the service of farmers.



Weaknesses

There is need of appropriate priority setting at the University level which avoids duplicity in research and infrastructure development. Inter-institutional linkage to strengthen human source development, collaborative research, training and management issues are not sufficient to meet new challenges of the future. Linkage among research scientists, extension personnel and farmers has also been poor. This is resulted in slow pace of technology transfer. Lack of resources for diagnostic surveys has been one of the shortcomings in our research efforts. Lack of strong linkage with the line departments of the state and other Universities has also resulted in the multiplicity of isolated research efforts and lack of synergy. Despite development of production technologies, greater receptivity for modernization of agriculture among farmers and high investment, the profit from agriculture and allied sectors is not secured due to frequent and uncontrollable natural disasters. We do not have priority and programmes on disaster management. There is a lack of sufficient funds for renovation and modernization of the laboratories which were established in past. Repair, maintenance and renovation of buildings is also a major problem. Water leakage during rainy season may spoil sophisticated air-conditioned labs. The University has procured several costly equipments in the past most of which have gone out of order. For want of their substitution or repair the research programmes suffer. The University scientists have succeeded in evolving technologies for higher production but in respect of quality improvement they are lagging behind. Similarly to ensure nutrition security and sustainability in agricultural production very little has been done. During the last two decades in the race to earn more, there has been an unbalanced production of crops, vegetables and poultry products causing their glut or scarcity in the market. The U.P. has predominance of subsistence agriculture and much has to be achieved by the research for small and marginal farmers.

Opportunities

The University is located in the NCR region and very much near to Delhi and many other reputed ICAR Institutions and National and International organizations. With the globalization of markets, there are ample opportunities for high demand of new products. Similarly there are growing demands for highly trained manpower in Agriculture and allied subjects. There is already a growing awareness about the many challenges in Indian agriculture is likely to face in



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future on account of stagnation in yield, unabated growing population, continuous use of chemicals and pesticides with harmful residues, depleting resources and many other adversities. The scientists have to prepare themselves to overcome these new challenges to be faced in the future, new research strategies and action plans should be planned.

With the rapid changing global scenarios, key elements such as quality, consumer awareness, competitive pricing, hygienic, market intelligence and environmental sustainability are emerging as the controlling factors for governing present day's agriculture. The advent of technological developments has transformed the agriculture into a leading sector, offering enormous multifaceted opportunities to cater the needs of ever growing population. With a view to strengthen the growth of agriculture, the SVPUAT is continuously providing higher number of quality and competent human resources, tailor-made agricultural technologies for sustainable production and post-production solutions for efficient natural resource management, climate resilient agriculture, value addition, information technology for efficient agriculture management and agri-entrepreneurship to the stakeholders in the most helpful way.

Under changing professional requirements, SVPUAT has implemented quality education in the form of advanced courses on niche areas and emerging technologies. SVPUAT is addressing the opportunities by creating learning and innovative environment in the agriculture education and research as a whole. The main mandate is to bring specific quality outcomes in the form of uplifting the 17 livelihood of farmers. The prominence and competence as already existed in SVPUAT, is going to be appropriately harnessed to apprehend a research based knowledge hub yielding skilled youths/scholars having advanced levels of exposures as well as aptitudes like research methodologies, analytical skills, writing communications, verbal communications, investigating capabilities, numeracy, planning and organizing potentials, team working, information based communication and technologies, technical skills and many other innovative academic sprouts.

SVPUAT needs to enhance the intrinsic and extrinsic values of the academic programmes by evolving each specialized discipline into full-fledged centers of excellence. The work on newer programmes in education such as a few selected Post Graduate Diplomas & Masters Programmes, innovations in Learning Styles and Pedagogy, and advanced research in Quality



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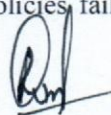
Value Chain will be the need of the time. The University needs to facilitate the young technical faculties by identifying their expertise through trainings from resource persons of esteemed institutes from India as well as abroad to cope up the challenges in the future. University may also undertake starting of executive programmes, wherein working personnel in the Agro industry can come back to the University to refresh their skills. The University always encourages more girl student's enrolment in various courses by giving various monetary and non-monetary incentives to maintain the gender balance. Focus is set to evolve need based skills through trainings, R&D activities and research based education of higher standards. Such innovations are proposed to be pursued and evolved by effective integrations and involvement with agrarian industries, entrepreneurs, markets, regional needs and opportunities.

As a needs of competitive world, SVPUAT plans to serve as a global classroom with lectures delivered to the students from teachers and researchers around the world through video conferencing and visits. Digitization of courses of Agriculture and allied sciences for e-learning and distance learning can also be planned in near future. SVPUAT is also working on the exchange programmes of students, scientists and professors with the Universities around the world which will help SVPUAT to achieve newer heights.

The agricultural technology information is another potential area which can be catered/ disseminated effectively through computer and internet services. The cropping intensity in irrigated as well as rainfed areas is very low which can be doubled using irrigation and other infrastructure in agriculture. Due to globalization of agriculture new areas have emerged for production, processing and services sector, which demands for future research in these areas. The diversification of agriculture will provide plenty of opportunities to the scientists, farmers and industries to move towards prosperity and self-employment in the agricultural sector. New areas in agriculture and allied will be emerging to be tackled through long-term research in soil and water management, plant protection, biotechnology, energy management, marketing processing related to crops, fruits, milk, egg, meat, fish, etc. which require continuous research.

Challenges

India has enough food but it has too little agricultural workforce. India needs a different set of solutions for agriculture. Agriculture policies fail to recognize how crop choices, input



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costs, and the supply chain are intertwined, 18 perpetuating marginal farming. Though the growth in agriculture and farmer profitability improved in the first decade of the new millennium, the predominantly price-incentive-driven nature of this growth raises serious doubts over its sustainability in the absence of breakthrough technologies. Raising agricultural productivity per unit of land will be the major challenge for agricultural growth. Water resources are also limited and the availability of water for irrigation will face difficulty with increasing industrial and urban needs. Another challenge is non-farm employment, for the poor, landless, women, scheduled castes and tribes. There are strong regional disparities like the majority of Indian poor are in rain-fed areas. Agricultural growth to factor in food security should be envisioned. Indian agriculture is continuously subjected to instability arising out of fluctuations in weather. In the absence of assured and controlled water supply, the agricultural productivity in India is bound to be low. Indian farmers are facing the problem of low income from their marketable surplus crops in the absence of proper organized markets and adequate transportation facilities. Scattered and sub-divided holdings are also creating serious problem for marketing their products. Agricultural marketing in India is also facing the problem of marketing farmers' produce in the absence of adequate transportation and communication facilities. Fluctuation in the prices of agricultural products poses a big threat to Indian agriculture. Stabilization of prices is not only important for the growers but also for the consumers, exporters, agro-based industries. Unemployment may be the challenge in near future. So the job opportunities must be created and motivation of human resource is required to be done towards development of entrepreneurs.



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CHAPTER 3

THRUST AREAS OF SVPUAT-2035

SVPUAT strives to pursue academic and research excellence and develop leadership at national and international levels, aiming quality education, research, capacity building, consultancy and pioneering outreach to benefit the local, national and global society. To realize these goals, following thrust areas have been prepared.

EDUCATION

Agricultural education has become more challenging as agricultural practices have become more complex and new technologies are being rapidly developed. As a result, many of the skills taught in the university have become obsolete and many new learning methodologies need to be adopted. Therefore, there is a need for a paradigm shift in education from “teaching to learning”, conventional to market-driven education, state/regional /national to global level education, information intensive to knowledge and skill intensive education and lecture centric to interactive mode of education. SVPUAT strives to pursue academic and research excellence and develop leadership at national and international levels, aiming quality education, research, capacity building and consultancy and pioneering outreach to benefit the local, national and global society and become best Indian Agriculture University for teaching and learning. Students will demonstrate the transformational impact a SVPUAT education has on their lives and will know the whole University community is invested in their success. University faculty will be students’ role models and guides, and their graduation will not be a point of departure from the University but a milestone in a lifelong partnership in learning. In the next decade University will be driven by the ‘why’: SVPUAT graduates are critical in helping to deliver a highly educated workforce, upon which national wellbeing depends. We will develop our education offerings in Western Uttar Pradesh, providing new opportunities for skills development that progress our existing strategy to build a greater presence in this vibrant, diverse area at the National capital region of the country. To drive a transformational experience, University will improve how to learn from data and insights from our students, staff and partners to ensure teaching contributes more effectively to desired learning outcomes. Thereby we continuously improve our systems, timetabling, teaching, assessment and support, and ensure both that our current curricula are sustainable and that we are responsive to emerging areas of study. By doing this, we will meet the needs of our learners, and offer employers – and society more broadly – graduates driven by a sense of civic responsibility and ready to succeed in the field of their choice. Better insights will also shape how we harness new technology and digital transformation



to reinvigorate existing courses and dynamically develop new ones, including short-form options so that we deliver the best learning in person and online. Underpinned by our new Academic Excellence Framework, we will be committed to a shared belief that excellence in teaching is as critical as excellence in research. We will define and reward excellence at every career stage, embracing peer review, and encouraging innovation. We will invest in more teaching and learning support staff, and support them with professional development grounded in the best research on learning. Hence, a paradigm change in education system requires transformation from teaching to learning to knowledge generation at local level. To provide high-quality education that prepares students for successful careers in agriculture and allied sciences a systematic approach as outlined below is envisioned:

1. Preparation of Comprehensive Roadmap for Implementation of New Education Policy

SVPUAT will be implementing the National Education Policy (NEP) 2020 in a phased manner. For preparing the Comprehensive Roadmap for Implementation of NEP a Task Force will be constituted. Task Force will make a series of discussions/consultative sessions with the eminent experts from various prestigious higher educational institutes and academia of the University. The Task Force will also conduct brainstorming sessions with internal and external experts to devise the roadmap for implementation. subsequently following actions will be taken:

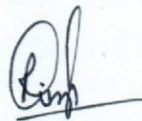
- ❖ Phased-implementation of the Policy.
- ❖ NEP and Outcome-based Curricular Reforms.
- ❖ Devising of Institutional Development Plan.
- ❖ Governance Reforms in tune with NEP-2020

2. Enhancing the quality of teaching:

- ❖ Modernize education systems (infrastructure, faculty)
- ❖ The University envisions improving the quality of teaching by hiring experienced faculty, providing professional development opportunities, and implementing innovative teaching methods.
- ❖ Imparting quality education to generate globally competitive graduates and post-graduates in different areas of agriculture and allied sectors.
- ❖ Shifting classroom-oriented education to real-world exposure that is vital to transform learning into action.
- ❖ Revisiting the course curricula for bringing in effective modifications including introduction of subjects of upcoming interests as per the need



- ❖ Upgrading technical proficiency of teachers in diverse domains for comprehensive teaching
- ❖ Imparting industry-specific and focused vocational training and experiential learning to youth for skill development and enabling students to become entrepreneur or seek employment in public and private sectors
- ❖ Lay emphasis on testing the ability of students by encouraging logical and conceptual understanding of the subjects.
- ❖ Enhancing the performance and visibility of the University by adopting an appropriate blend of knowledge, skill and attitude.
- ❖ Internalize problem solving approach in curricula (increase analytical skills; increase experiential learning; greater focus on science and processes)
- ❖ Effective co-ordination of multi-commodity, multi-disciplinary research in entire supply chain of agricultural commodities
- ❖ Capacity strengthening through training at the national and international level
- ❖ Imparting education in the newer areas of agricultural sciences viz., Designer foods, Functional foods, environmental engineering, Prescription foods based on metagenomics study of the consumer, Nano foods, Microbial foods, Food Process, Equipment Design, Food Business Management, renewable energy resources, climate change & climate resilient agriculture, organic farming, nano- biotechnology, agro tourism, disaster management, sustainable agriculture, etc.
- ❖ Introduction of Ph.D. programme in Animal Biotechnology, Environmental and Microbial Biotechnology, Bioinformatics
- ❖ Introduction of Post Graduate Diploma and Certificate courses in newer areas of farm and non-farm sector like agribusiness management, crop diagnostics, genetic engineering, DNA fingerprinting, bioinformatics, nanotechnology, plant tissue culture, food and dairy technology. Introduction of Degree Programme in B.Tech. (Sugar Science & Technology)
- ❖ Introduction of PG degree programme in Food technology
- ❖ Introduction of UG and PG degree programme in dairy technology.
- ❖ Introduction of UG and PG degree programme in Community Science (Home Science)
- ❖ Introduction of degree programme in different disciplines of College of Technology viz.. Civil engineering, Mechanical engineering, Computer science, Information technology, Chemical and nontechnology, Electrical Engineering and Electronics & Communication Engineering



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- ❖ Imparting education in the newer areas of Veterinary Sciences viz., Pet Animal Management, Onco and Neuro Surgery, Dentistry, Ophthalmology, Radiology & imaging, Nuclear Medicine, Ethno Veterinary Medicine, Developmental Anatomy & Stem Cell research, Metagenomics , Transcriptome & Gene expression studies, Digestive Physiology & Metabolic Disorder, Endocrinology, Livestock products technology, Livestock Economics & Marketing, Market Intelligence, Nanotechnology etc.
- ❖ Activity based projects to students for identifying local agriculture/ animal husbandry /dairy /food processing related problems and seeking their solutions.
- ❖ Strengthening of experiential learning and entrepreneurship/skill development through hands-on- training in agriculture and allied sciences.
- ❖ Introduction of short term skill development programs to rural youth that develops entrepreneurs, managers, agro-industrial workers and above all progressive farmers with a global perspective.

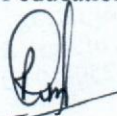
3. Improving student support services:

The University visions to provide additional academic support services, such as tutoring, mentorship, and career counseling, to help students succeed academically and professionally.

- ❖ Linkage of RAWE with the agri-industries and progressive farmers
- ❖ Fostering national and international linkages for capacity building
- ❖ Initiating students and faculties exchange programmes with various National and International Institutes to update the knowledge, to reinforce the academic standards and to share expertise
- ❖ Faculty improvement and capacity building in the areas of biotechnology, precision farming, post-harvest product processing technology, agrochemical residues analysis, ICT, AI and machine learning, etc. so as to facilitate multidisciplinary and holistic teaching through regular trainings.

4. Embracing technology:

- ❖ The university will integrate technology into teaching, to improve efficiency and effectiveness.
- ❖ Adopting new technologies and practices and undertake collaborative projects with reputed institutions (academic and industries) for long-term collaboration.
- ❖ Establishment of GIS and Remote Sensing facility
- ❖ Extensive use of ICT in the field of education and strengthening of existing facilities.



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- ❖ Development of high end ICT infrastructure facility for providing world class learning opportunity to the students through Network Lab and high tech computers
- ❖ Introducing the concept of virtual classroom, e-teaching and Discuss & Demonstrate mode of teaching

Performance measures

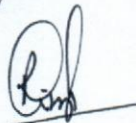
- ❖ Student outcomes: This includes tracking graduation rates, job placement rates, and student satisfaction surveys.
- ❖ Technology integration: This includes tracking the implementation of technology and the effectiveness of technology in improving teaching, research, and administration.

Our strategies

- ❖ Define, support and reward excellence and evidence-based innovation for individual teachers and teaching teams.
- ❖ Better understand our students by leveraging academic research, data and insights to drive an educational experience that is transformational for our learners and sustainable for the institution.
- ❖ Make partnership key to our education offerings.
- ❖ Become an in-demand provider of dynamic lifelong learning.
- ❖ Commit to pathways that ensure a greater diversity of students succeed at University.
- ❖ Increase the diversity of our staff, and our shared appreciation of how diversity improves all we do.
- ❖ Reaffirm our commitment to equity, diversity and inclusion throughout the University

What will success look like?

- ❖ Our teachers meet academic excellence expectations at every career stage, and we celebrate their achievements as visibly as high performance in research.
- ❖ We partner to create highly valued and respected lifelong learning opportunities in response to society's changing needs.
- ❖ Our curricula are both learner-focused and sustainable.
- ❖ Regardless of where and how they learn, our students are confident in their abilities, sure of their personal goals, and feel that they belong.
- ❖ We embrace equity, diversity and inclusion as core to our success, and our students and staff reflect the communities we serve.
- ❖ We demonstrate our ability to identify and support a full range of students from diverse backgrounds to flourish at the University



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RESEARCH AND EXTENSION

Agricultural research has played an important role in enabling the country to increase the agricultural production. Increasing population and income have raised the demand for food with a substantial increase in demand for the high value and quality produce like fruits/vegetables and livestock products. At the same time there has been awareness about quality of environment and standard of living. These changes have put tremendous pressure on agriculture. These challenges have to be addressed through improved technologies; without compromising the sustainability of our natural resource base. In fact, increasing demand for water from the industry and household sectors, shrinking agricultural land due to urbanization, and consequent rising energy demand in agriculture sector are likely to be the binding constraints in future. There is also a need for the agricultural and food systems to become more sustainable, whilst adapting to climate change and substantially contributing to climate change mitigation. Thus, the major challenges before agriculture are its marginal land holdings, widening production disparities between irrigated and rainfed areas, degradation and depletion of natural resource base, climate change, increase in non-agricultural demand for land and water, inadequate mechanization, labour shortage, inefficient use of inputs, wastage of agricultural produce due to inadequate post-harvest operations, lack of awareness among farmers for modern crop production methods, ineffective extension services, inefficient financial resources for investments, high levels of consumption services (such as subsidies) resulting in wastages and above all low per-capita income for farmers. The emerging scenario necessitates the University to have perspective vision which could be translated into reality through proactive, novel and innovative research approaches using cutting edge technologies. SVPUAT envision its research is excellent, tackles the greatest challenges and contributes to the common good. University will cultivate a long-term vision to build foundations for the deep-rooted transformation required to tackle challenges such as population growth, ever increasing food, feed and fodder requirements, natural resource degradation, climate change, emergence of new pest and diseases, slow increase in farm income, change in consumption patterns and new global trade regulations are diverse challenges and constraints, which demand major changes in formulating and executing the agricultural research programmes. The specific areas of concern needing priority attention are as follows:

1. Increasing productivity of agricultural production system per unit of land, water, energy and other critical inputs.



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2. Diversification of the production systems for household food & nutritional security and increased export of farm produce/product.
3. Sustainable management and equitable use of natural resources such as land, water and biodiversity, especially in the context of changing climate.
4. Bio-security and crop health management for higher yields and improved food quality.
5. Enhanced profitability, non-farm employment, rural livelihood, gender mainstreaming and global competitiveness in agriculture through appropriate technology development, market linkage and policy.
6. Accelerated information and technology flow to farmers and other stakeholders through efficient extension approaches.
7. Capacity building and quality human resource development in frontier areas of science and management of agricultural programs and enterprises.

The following programs are proposed to address the technological challenges:

I. Development of crop varieties and hybrids for higher productivity per unit resource and time, better nutrition and tolerance to biotic & abiotic stresses

It is proposed to be addressed through the following approaches:

- ❖ *Ex situ* and *In situ* conservation of germplasm and maintenance of crop biodiversity through establishment of gene bank and seed bank.
- ❖ Establishment of Genome editing facility and genome editing technologies in different crops
- ❖ Introduction of elite germplasm
- ❖ Development and operation of central database for storage and retrieval of information on plant genetic resources
- ❖ Precision breeding through extensive use of molecular biological techniques.
- ❖ DNA Fingerprinting and DNA barcodes developments of crop plants



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- ❖ Exploring wild germplasm to introgress novel genes and traits into cultivated species for development of climate resilient crop varieties
- ❖ Development of aerobic rice varieties / hybrids.
- ❖ Development of nutritionally fortified varieties of cereals and pulses.
- ❖ Breeding for location specific varieties of fruits, vegetables and ornamentals
- ❖ Association mapping and characterization of genes imparting resistance against various biotic and abiotic stresses and mapping populations for marker assisted breeding (MAS)
- ❖ Marker assisted selection and breeding for biotic and abiotic stress resistance in cereal crops
- ❖ Gene pyramiding for development of ideal plant type suitable for HDPS, mechanical harvesting and synchronized maturity.
- ❖ Develop hybrid/variety for quality protein maize, sweetcorn, babycorn, popcorn and high oil corn.
- ❖ Screening of resistant germplasm of different cultivated crops for the development of nematode resistant varieties.
- ❖ Develop high yielding, low HCN content, multi-cut and better quality with more tillering, quick regeneration capacity and high leaf stem ratio genotypes (high quality proteins) in forage crops.
- ❖ Identification, development and cultivation of exotic unconventional vegetables under protected cultivation.
- ❖ Collection, conservation, evaluation and characterization of under exploited germplasm of fruit and vegetables.
- ❖ Evolving horticultural crop varieties suitable for high density planting.
- ❖ Evolving varieties/hybrids suitable for aberrant weather conditions and soil types
- ❖ Development of tissue culture protocols of important field crops for mass propagation and supply of healthy planting materials
- ❖ Production of quality seed and planting material through establishment of SEED VILLAGES through co-operatives

II. Combating degradation/depletion of natural resources under changing climate




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Water, food and energy are emerging as important and vital issues under changing climatic conditions. Most of the river basins are experiencing moderate to severe water shortages. Over-exploitation of ground water is a major concern. There is a net negative balance of nutrients and a gradual depletion of the organic matter content of soil. Thus, the University envisions that agriculture should transform itself from input intensive to input responsive, carbon negative (C-) to carbon-positive (C+), low-efficiency to high-efficiency, polluting to pollution-free, and climate-prone to climate-smart agriculture. In this connection, following priority areas are proposed to gain more emphasis:

❖ **Enhancing efficiency of agri-inputs:** To enhance the efficiency of agri-inputs (water, nutrients, energy); novel products, precision-agriculture technologies and management practices suitable for both open fields and greenhouse conditions will be invented and explored.

- Agricultural resource characterization and constraint analysis under different agro ecological regions/ farming situations
- Improvements in nutrient-use efficiency and soil health sustainability will be achieved by the development of low-cost indigenous nitrification inhibitors and coating materials for developing more efficient nitrogenous fertilizers;
- INM in different farming/cropping systems
- Development of soil health indices for sustainable crop production and cropping systems management.
- Agro-ecosystems based plant and micro-organisms mediated nutrient management strategies;
- Development and promotion of secondary and micronutrient fortified customized fertilizers;
- Use of water-soluble nutrients to increase the nutrient and water productivity under different agro-ecosystems;
- Improving quality of fertilizer materials through the establishment of reliable referral laboratories and exploring alternative sources of nutrients viz. rocks, minerals and town refuse.



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- Nano-formulations for smart, slow release and commodity specific-nutrients and chemicals will be developed for improving fertilizer and pesticide use efficiency
 - Establish the role of nanonized zinc in mitigating the effect of terminal heat tolerance in wheat
 - Rhizo-engineering of soil-plant microbes to affix atmospheric nitrogen in the soil and work on Azolla and bio-fertilizers for the purpose of nitrogen economy
 - Next generation sensor based machinery will required to be developed for precision applications of agri-inputs on spatial sensitive mode.
 - Development of bio-fertilizers and bio-control agents from native microbial community
 - Nutrient availability through microorganisms and recycling of agricultural residues through microbial consortia
 - Water conservation/water use efficiency based farming system research to develop location specific technologies
 - Exploitation of smart irrigation techniques and frugal tillage for judicious management of water
 - Development of eco-friendly bioremediation modules for heavy metal contaminated soils
 - Development of low-cost technology for small and marginal farmers.
 - Standardization of technologies for increasing water use efficiency, reducing water-logging and improving drainage
 - Development of low cost technology for reclamation of salt affected soils
 - In-situ moisture conservation and ex-situ water harvesting
 - Research on geo-hydrology with special emphasis on ground water recharge
- ❖ **Managing vulnerability to climate change in agriculture:** Climate variability and changes are among the major challenges faced by the region. For making agriculture climate-resilient, appropriate adaptation and mitigation strategies have to be developed.
- Day to day forecast to the farmers of western Uttar Pradesh for avoidance of climate risks through better use of ICTs and to prepare detailed contingent crop



planning for different categories of anticipated weather situations and use of crop simulation models

- Assessing vulnerability of agriculture to climate change is the pre-requisite for developing and disseminating the climate-smart technologies as some regions are more vulnerable than the others.
- Technologies and strategies, therefore, need to be developed for adaptation of crop production systems of the vulnerable regions to the current and future climatic changes.
- Since climate change poses complex challenges of multiple abiotic and biotic stresses on crops, integrated and multi-disciplinary approaches will be required for developing climate-smart agriculture.

❖ **Promoting conservation agriculture:** To improve soil health, environment and to enhance resource use efficiency, productivity and profitability

- conservation agriculture (CA) technologies such as zero tillage, residue retention and crop diversification will be promoted in irrigated as well as rainfed agro-ecologies. This activity will be integrated with the breeding programmes of the University under major cropping systems.
- Technologies will be developed to enhance soil organic matter; agro-biodiversity; carbon sequestration; and thereby improving soil physical, chemical and biological properties; and reclamation of degraded lands.
- Studies in relation to conservation agriculture practices on genotype x environment interactions in the changing climate; nutrients dynamics and input-use efficiency; weed and pest dynamics and management; moderation of heat and cold stress to crop; root growth and rhizosphere soil parameter influencing health of soil will be given emphasis.
- Modeling crop response under conservation agriculture practices would be another dimension.
- Identification of suitable agro-forestry systems
- High density planting in fruit crops



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❖ **Crop Residues Management:** A substantial quantity of crop residues are used for animal feeding, soil mulching, manuring, roof thatching and fuel purposes, a large remaining portion is burnt on-farm for timely clearance of fields for sowing of the next crop. Burning of crop residues not only causes environmental pollution adding to global warming but also results in depletion of valuable nutrients like N,P,K and S. With the poor availability of labour and increasing cropping intensities in the coming years, the problem is expected to assume greater dimensions. Hence, efficient management of crop residues is vital for long term sustainability of Agriculture. Though several technologies are available for residue use in conservation agriculture, lack of affordable and suitable mechanization remains a constraint. Efforts are required to quantify the economic, social and environmental benefits of residue management practices under different situations. The following areas of research will be given immediate attention:

- Development of region-specific crop residues inventories, including total production from different crops, their quality, utilization and amount burnt onfarm, for evolving management strategies. Satellite imageries will be used to estimate the amount of residues burnt on-farm.
- Assessing the quality of various crop residues and their suitability for off-farm (e.g. animal feed, composting, energy, biogas, biochar and biofuel production) and on-farm purposes and analysing the benefit: cost ratio, socio-economic impact and technical feasibility of off and on-farm uses of crop residues .
- Assessment and utilization of municipal, agricultural and industrial wastes in relation to crop production and development of scientific compost technology.
- Enhancing decomposition rate of residues for in-situ incorporation using efficient microbial strains.
- Identification of microorganism strains for rapid decomposition
- Commercial production of secondary metabolites from agri-wastes by using microbes.
- Quantifying the permissible amount of residues of different crops which can be incorporated/ retained, depending on the cropping systems, soil characteristics and



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climate without creating operational problems for the next crop or chemical and biological imbalance

❖ **Farm mechanization, protected and precision agriculture:**

- Up gradation of location specific technology in the field of agricultural engineering and modernization of agriculture, agro-processing and rural empowerment through farm mechanization
- Multi-task precision farm machinery allowing selective automation for crop production would be developed to make farming more energy and labour efficient, gender and ergonomically responsive. Appropriate power-machinery system should be made available for small, peri-urban/urban agriculture.
- Energy harnessing equipment and technologies for efficient home users of renewable energy will be developed.
- Low cost polyhouse for cultivation of high value crops in small farms will be developed.
- To enhance resource-use efficiency as well as crop productivity and to reduce environmental foot-prints of agriculture, precision farming research and technology development for field scaled application shall be emphasized.
- Estimating optimum sowing densities, fertilizers, irrigation water, herbicides, insecticides, fungicides requirements and schedules and developing efficient and scale neutral application devices for accurately applying these inputs as per crop needs will be focused on.
- Technologies will be developed for standardizing and promoting soil-less, hydroponics, aeroponics and vertical agriculture for feeding commercial enterprises.
- Development of crop, situation and gender specific manually operated and mechanized farm equipments/ implements
- Development of engineering techniques to mitigate effect of climate change on agriculture
- Development of efficient and effective machinery for farm and industry waste management



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- Protected or controlled environment cultivation using green house, net house technology for nursery, floriculture and vegetables
- ❖ **Developing biotic/ abiotic stress tolerant microbial inoculations:** Microbe based technologies including identification of microbes tolerant to various abiotic (drought, high temperature, salinity) and biotic (plant pathogenic fungi, bacteria and insects) stresses; studies on plant-microbe interactions under selected abiotic/biotic stresses; performance evaluation of promising strains in nutrient budgeting; and development of microbial inoculants for enhancing crop yields, soil health and water quality in stressed habitats needs strengthening.

III. Ensuring bio-security and integrated plant health management

The following issues will be addressed enabling our capabilities in managing future risk:

Molecular approaches to multiple stress tolerance: Pest tolerance crop derived through conventional or nonconventional approaches will continue to receive attention in the future.

Weed dynamics and management in cropped and non-cropped situations: Studies on weed dynamics under changing climate, development of composite weedcrop interference model for prediction of yield reduction and economic threshold levels will be the priority areas of research. In this direction,

- herbicide tolerance as an introduced trait in the crop to target weeds with minimum application of herbicide at one time without the sensitivities of pre-emergent, post-emergent, broad leaved versus narrow leaved, grassy versus leguminous weeds, etc., that require multiple sprays of multiple chemicals in today's agriculture where manual weeding is the most expensive and is increasingly becoming unavailable.
- Management of herbicide resistant weeds and development of bio-control for weeds
- The available technology of glyphosate and glufosinate tolerances are to be introduced in maize and soybean to enable fast adaptation of these crops in the



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water depleting zones of western Uttar Pradesh primarily to increase their adoption by mechanized agriculture.

- Thus, development of integrated weed management options for emerging cropping systems with more emphasis on selective stimulation for competitive ability of crops against weeds, use of bio-herbicides and herbicides tolerant crops in various cropping systems, soil/ herbicides plant interaction and assessment of slow release formulations of new low dose herbicides molecules in the changing weed scenario would be addressed in a holistic manner.

Integrated crop health management solutions: In order to minimize the annual losses of crop produce (about 25%) in India, knowledge based farmer-driven crop health management solutions have been developed for a few field and horticultural crops. These solutions are limited to small scale and need implementation on a large scale. Like for pulses, integrated crop health management solutions need to be developed for different cropping systems including protected cultivation, conservation agriculture and organic farming. Shrinking land and changing climatic conditions forces us to develop protected system of cultivation of crop plants especially in high value horticultural crops.

The solutions for this system need to be developed and greater emphasis has to be laid on:

- Monitoring and surveillance of emerging pest and diseases under global warming and mapping of pest and disease hot spots and free areas should receive priority.
- Sero-diagnosis of important plant pathogens and their races.
- Study of insect pest complex in different crops of western U.P.
- Development of rapid diagnostic techniques
- Identification and characterization of viruses and phtoplasma in horticultural crops
- Identification and evaluation of IPM and IDM strategies incorporating effective tools for management of major pest and diseases of major crops.
- Development of plant origin insecticides/pesticides using ITK systems.



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- Biological suppression of nematodes by use of crop and nematode specific microbial agents. Soil-solarisation technology for the control of root knot nematodes in nursery of horticultural crops.
- Critical estimation of ETL of important pests of field crops and horticultural crops
- Regular monitoring of food commodities for pesticide residue and heavy metals.
- Integrated and eco-friendly pest management with added use of botanicals
- Precision farming system coupled with crop monitoring including pests need to be developed for protected cultivation of crops.
- Crop health clinics with adequate technical capacity and infrastructure for rendering diagnostic and electronic surveillance services need to be established.
- The vision envisages exploring potential of space technology for mapping and monitoring pest and development of weather based forewarning in GIS environment.
- Robust forecasting model for economically important pests need to be developed for reliable pest advisory.
- Modern equipments like motorized sprayers, ULV sprayers and drone technology for the pest management
- Biotechnological approaches for the incorporation of host plant resistance
- Conservation and enhanced use of proven bio-agents in different cropping ecosystem i.e., natural enemies/ predators/parasites/fungi/entomophillic nematodes/ baculo-viruses
- Isolation and identification of new strains of Plant Growth Promoting Rhizobacteria (PGPRs)

Integrated Farming System and Organic Farming

- ❖ Integrated farming system research in varied ecosystems
- ❖ Identification of remunerative crop sequences for different agro-ecological situation of western Uttar Pradesh
- ❖ Development of climate smart IFS model for different agro-ecological regions and demonstration of IFS models on farmers field



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- ❖ Organic farming modules particularly in fruits and vegetables for export
- ❖ Exploration of commercial floricultural crops suitable to the region
- ❖ Promotion of organic products having export potential
- ❖ Studies on issues related to marketing of organic produces in local market

Post-Harvest Management and Value addition

- ❖ Development of value chains for decreasing post harvest losses.
- ❖ Establishment of modern, sensor based and fully automated Referral Laboratories
- ❖ Generation of on-farm post-harvest technologies (cleaning, grading, packaging, storage, etc.) for the crops.
- ❖ Development of biodegradable, edible and economical packaging materials
- ❖ Intelligent packaging /smart packaging technologies
- ❖ Development of processing technology for by-products and waste utilization.
- ❖ Development of functional, designer and nano-foods
- ❖ Establishment of pilot plant for milk processing
- ❖ Establishment of pilot plant for sugarcane processing and its waste management

Veterinary Science

- ❖ Characterization, genetic evaluation and improvement of important native livestock breeds
- ❖ Sustainable & high-tech dairy farm management
- ❖ Nutritional intervention in expression of genetic potential in dairy animals
- ❖ Oocyte culture, IVF, in-vitro growth of embryo, splitting of embryo and sexing of embryo
- ❖ Metagenomic analysis of microbiota involved in diseases of cattle
- ❖ Development of technology for incorporation of crop residues/agricultural waste/non-conventional grasses, fodders, and tree twigs for production of high quality nutritious livestock feed at village level
- ❖ Use of artificial intelligence in disease diagnosis, herd management, estrus detection and synchronization, overall welfare of animals etc.
- ❖ Improvement in reproductive efficiency




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- ❖ Utilization of low quality roughages through in-vivo and in-vitro manipulations
Nutrigenomics, Nutraceuticals, Functional foods
- ❖ Newer approaches for semen quality parameters studies for fertility and freezability
- ❖ Sero-epidemiology, isolation and molecular characterization of various bacterial, viral and parasitic diseases
- ❖ Genome sequencing and identification of genes related to resistance against different diseases of animals in livestock and poultry
- ❖ Molecular signatures for native livestock breeds
- ❖ Monitoring of animal health hazards due to industrial effluents and its impact on public health
- ❖ Production performance studies of dairy animal in relation to climate changes
- ❖ Development of disease surveillance and parasitism modules for forecasting animal health problems
- ❖ Development of food quality laboratories and food quality assurance programme with GMP, GHP, HACCP, ISO certification system.
- ❖ Development of novel, designer and functional livestock products to cater the demand of future.
- ❖ Identification, genotypic and phenotypic characterization, evaluation and conservation of animal biodiversity
- ❖ Preservation and improvement of unique traits and production potential of various breeds/species of animals

EXTENSION EDUCATION

- ❖ Imparting efficient trainings to farmers and rural youths in the field of agriculture and allied sciences
- ❖ Strengthening of PPP involving farmers' groups, SHGs, NGOs etc.
- ❖ Frontline extension for fine tuning of recommendations to fit in farmers conditions
- ❖ Shift from supply driven extension to demand driven extension
- ❖ Establishment of adoptive research centre for assessment, refinement and manipulation of farm technologies as well as validation of local technologies in view of locations specific needs of the farmer

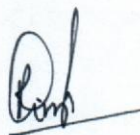


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- ❖ Vocational training programmes to cover the areas like agribusiness management, agro product processing and value addition in crops
- ❖ Identification of constraints faced by the farmers in the adoption of available technology and steps to overcome them
- ❖ Enhancing access to field problem diagnostics and farm advisory services through ICTs
- ❖ Establishment of incubation/start-up centres for agriculture technologies
- ❖ Improving Research Extension Linkage
- ❖ Diagnostic services in Single Window Mode
- ❖ Development of e-resources on agricultural knowledge and information for global exposure
- ❖ **Our strategies**
- ❖ Foster a culture where our Post graduate and PhD students and academics can excel, engage and have impact.
- ❖ Define expectations for performance and innovation through an Academic Excellence Framework, and support and reward excellence for individuals and teams.
- ❖ Focus investment on research with an excellent track record or the strongest potential to deliver excellence.
- ❖ Leverage our comprehensiveness and partnerships to drive multidisciplinary problem solving.

What will success look like?

- ❖ Diverse research programme meets clearly defined academic excellence expectations at every career stage.
- ❖ Excellence is evident in the national and global reach of our research partnerships, the diversity and scale of our funding support, publications and the translation of our research outputs into measurable benefit for society.



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CHAPTER 4

WAY FORWARD

The SVPUAT has been an active organization in terms of attracting grants, co-operative agreements, collaboration/consultancies, trainings, HRD, technical assistance, technological disseminations, wider employability, social sensitivity and many other measures/offers for farmers and agricultural stakeholders. The institution is fully dedicated to the development of demand driven technologies to fulfill and improve the livelihood status of farming community and youth aspirants of western Uttar Pradesh who want to build their career in agriculture. The University is committed to bring a need-based and technology-led revolution in the state to meet challenges of the rising demand of ever increasing population for food, improving livelihood of farmers and their families and for ensuring sustainable agriculture. Western Uttar Pradesh poses spectrum challenges and opportunities to the farming community and agro-based industries. The main motto of SVPUAT is education, research and extension education in agriculture which have the perfect capabilities to convert the medium economy of western Uttar Pradesh into a shining economy by augmenting farmers' income, generating employment opportunities in rural and urban areas, conserving natural resources, minimizing wastage of agricultural produce through processing, value addition and inclusive agricultural growth in this region. The interactive and smart classrooms, achieving better employment opportunities to outgoing graduates, improvement of examination and evaluation system, promotion of students to take their own start up programmes in agriculture and allied activities are the crucial future steps of SVPUAT to take the education quality to much higher level. The solid impact of research innovations in crops along with cattle improvement activities would open new vistas for harnessing underexploited domestic and even foreign markets.

Development of high yielding abiotic and biotic stress resistant crop varieties suitable for the region; insect pest management of crops in field and protected cultivation through environment friendly technologies including semio-chemicals; initiation of research on new innovative ideas like application of robotics, artificial intelligence, drones, nanotechnology in



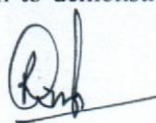
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agriculture; development of post-harvest technologies for vegetables and fruits to increase their shelf life and processing; studies on biochemical/molecular basis of abiotic stress in crop plants and microbes; development of suitable dryland farming technologies for field and horticulture crops; studies on zero budget natural farming; development of package of practices for high value horticultural crops under protected cultivation; vertical farming; planning research base for conservation agriculture and precision agriculture are the future research vistas of SVPUAT.

SVPUAT would make all the efforts to meet the needs of large population of poor farmers. The University is moving rapidly towards new unexploited arenas of research like improvement of various field and horticultural crops, renewable energy, agro by-product utilization, biotechnology for the benefit of various farmers and industrial stakeholders. In years to come, climate change and climate variability will certainly drive the research programme of the University in form and substance. The University would generate the highly skilled human resources in specialized areas of agriculture, biotechnology, horticulture, agriculture engineering, community science, basic science, dairy technology, food technology, agri-business management and veterinary science. Developing precision irrigation systems requiring low volume of water, Developing technology for sustainable improvement of soil health and fertility with bias on organic components, Emphasizing organic farming technology in prevailing crop production systems, IPNM and IPM technology of combating soil health and pests problems, Strengthening fruits, vegetables, floricultural, herbal and spices research activities, Promoting entrepreneurship vocations trade like poultry, mushroom, sericulture, apiculture, fisheries, piggery, goatary and dairying for diversification based agriculture, Post harvest technology and value addition of the crop produce for export purposes, Promoting aromatic and medicinal plants and floriculture for developing entrepreneurship for export, Development of programmes for improvement of buffalo, cattle and sheep are some o the areas where the University strives to gain excellence by 2030.

The transfer of technology from University will be taken to much more heights through effective training of farmers and in-service field functionaries of line departments; organization of farmer's fair in addition to demonstrations and field days for farmers, farm



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women and rural youths; creating facilities of mobile soil and water testing units; development of crop museum and Agricultural Technology Information Centre, Agricultural Technology Park, and participatory seed production programmes at farmer's field. Further, farmers will be encouraged for setting up agro-processing centre for post-harvest crop management or other supporting agencies. Intensive use of ICT to disseminate technologies, problem identification and ready solution to different aspects will also be looked upon in near future. University is committed to promote and encourage the FPOs, contractual and co-operative farming through specially designed extension programmes.

The University will develop mechanism to regularly monitor the changes in agricultural scenario at state level in particular and at national level in general, and the strategies to respond to the changes for the benefit of the farmers. Efforts will be made to maintain a work culture of responsibility, accountability, values and integrity in the University for a strong agrarian mission under the set endeavor of VISION 2035.



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