CSA University

ROADMAP

Chandra Shekhar Azad
University of Agriculture & Technology, Kanpur, UP, India
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ROADMAP

Chandra Shekhar Azad
University of Agriculture & Technology,
Kanpur- 208002

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चन्द्रशेखर आजाद कृषि एवं प्रौद्योगिक विश्वविद्यालय
कानपुर-208 002, उत्तर प्रदेश, भारत
Chandra Shekhar Azad University of Agriculture & Technology
Kanpur-208002, Uttar Pradesh, India

Foreword

Chandra Shekhar Azad University of Agriculture & Technology, Kanpur is a premier agricultural institution serving the nation since 1893, came into existence in 1975 by upgrading UP Institute of Agricultural Sciences with two constituent colleges *viz;* College of Agriculture at Kanpur and College of veterinary Sciences & Animal Husbandry at Mathura, with a massive commitment towards improving the agrarian prosperity through education, research and extension activities, in a continued manner. The University has been addressing the various challenges faced by the agricultural sector, through its basic and applied research initiatives, thereby facilitating a quantum jump in agricultural production and productivity, in addition to provide the quality of human resource to the country.

Agriculture sector of Uttar Pradesh has an important role for national food basket. The state is the largest milk producing state of the country with an annual milk production of 30.5 million metric tons accounting for 18 percent of total milk production of the country. Keeping in view of vast potential, the state has major role to play in ushering agriculture sector led economic growth of the country. Despite of largest contribution to agriculture produce of the country and achieving some improvement in the State's growth rate but it is still lagging behind the national average and consequently, the gap in per capita income is increasing with the passage of time. There is tremendous scope for further development in every sub-sector of the agriculture sector including crops, horticulture, animal husbandry and pissiculture. The major challenges before the State are bridging the gap in per capita income, poverty alleviation, improvement in human development index, improving growth in primary sector specially agriculture and animal husbandry

Climate Change, depletion in natural resources impacted agricultural scenario of the country, it is imperative that our approaches be capable of attaining the highest level of excellence towards developing improved cultivars and their matching technologies with effective dissemination, along with highly skilled human resource. Diversification of agriculture is of utmost importance in the present scenario for assured for doubling the agrarian economy and nutritional security of the farm families. The Roadmap document has been prepared with a comprehensive approach to harness the potential of modern-day cutting-edge technologies along with the conventional strategies, keeping in view the past experiences and future concerns. The various approaches highlighted for sustained development in this document which will helpful for preparing a strong foundation for strengthening the agricultural education, research and extension activities improving the quality education, research and extension capabilities for enhancing the productivity, profitability and sustainability of agriculture.

I am hopeful that this Roadmap document would go a long way in providing a strategic plan by providing the quality human resource for achieving sustainable and inclusive agricultural development and growth in the state of Uttar Pradesh.

I am extremely grateful to the Hon'ble Chancellor of the University & Governor of Uttar Pradesh Mrs Anandiben Patel for her guidance and encouragement at each stage. I extend my cordial thanks to Hon'ble Minister of Agriculture, Agriculture Education & Research Sri Surya Pratap Sahi ji and Hon'ble State Minister of Agriculture, Agriculture Education & Research Sri Lakhan Singh Rajput ji for their every support for all-round development of this prestigious institution. I appreciate the efforts of Dr H.G. Prakash, Director Research and his team for their excellent contribution in preparing roadmap of the University.

(D. R. Singh)
Vice Chancellor

Preface

Agricultural sector, broadly defined to include livestock, forestry and fishery, has been trailing in growth performance compared to other sectors in the post liberalization period. Agriculture has languished when the trend rate of growth in rest of the economy has been has been mounting. Agriculture forms an integral part of UP's economy and the livelihood security of its population. Nearly 69 percent of land in the state is under cultivation. The state agriculture sector is key contributor in the national economy in and contributes nearly 14 per cent of the national GDP and engages more than 55 percent of the workforce. It has been widely recognized that agriculture is one of the most effective instruments for achieving growth and reducing poverty. However, the promise of agriculture to reduce poverty and unleash development in any economy can be realized if the state lends its hand in bringing additional area under cultivation, extension of irrigation facilities, the use of quality seed of high yielding varieties, better production technologies, water management and plant protection, judicious use of fertilizer, pesticides and cropping practices. Agriculture is the impetus that drives the economy of UP state and always alarm to develop and adopt of innovations & technologies at farm level to the level of end users. Climate changes, depletion in natural resources, urbanization and industrialization have poses challenges in agriculture. Hence, our technological innovation approaches should be matched with changing environment or resilient to agriculture system.

Chandra Shekhar Azad University of Agriculture and Technology, Kanpur, is national premier institution of agricultural education, research & extension has played a pivotal role as a technology leader in development of agriculture sector. Presently, University offers various degree programmes through its 8 constituent colleges and has strong research base having 4 Research Sections, 5 Regional Research Stations, 4 Crop Units and 16 Research and seed production farms scattered in area jurisdiction of the University. The transfer of technology is another important function of the University for which, thirteen KVKs have been established and shouldering the responsibility of technological input delivery system to the farmers.

I express my sincere gratitude towards Dr. D.R. Singh Vice Chancellor for initiating, inspiring and guiding for preparation of Roadmap document in which attempts has been made to depict the productivity constraints, challenges and way of means to overcome problems in a sustained manner.

The input of Deans of Faculties, Directors, Head of Departments and Inchages of different units and other faculty of the University, have been most helpful for preparation of the this document. The information was compiled by Dr Shweta and technical assistance by Dr A.K. Dubey, Dr Mohd. Shamim and Sri Manoj Mishra in preparation of the document deserve appreciation. The help rendered by Sri Manendra Singh, Sri Deepak Pandey, Sri Manoj Kumar, Kanishka Kushwaha and Smt Mandakini Mishra in graphics and typing of the document duly acknowledged.

Suggestions for the improvement from our esteemed readers are solicited.

(H.G. Prakash)
Director Research

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Prologue

A school was established at Cawnpore (Kanpur) in 1893 for imparting Agricultural education in Uttar Pradesh for training of Quanungos (Revenue Officers). The School of Agriculture was elevated to Government Agriculture College Cawnpore (Kanpur) in 1906 known as 'Patter College' for providing three years course *'Licentiate in Agriculture* (L. Ag.). In 1914, in lieu of the three year course, a four years course was introduced which was recognized by Agra University, Agra, equivalent to the degree of Bachelor of Science in Agriculture in 1930. Government Agriculture College, Kanpur was upgraded to UP Institute of Agricultural Sciences in 1969 by integrating teaching, research and extension education under an Umbrella. On the other hand, Veterinary Education in Uttar Pradesh started in 1947 with the establishment of the college in Mathura. U.P. Institute of Agricultural Sciences was upgraded to the status of a SAU named as Chandra Shekhar Azad University of Agriculture & Technology on March 1975 with two constituent colleges I college of agriculture at Kanpur and college of Veterinary Science & Animal Husbandry at Mathura.

Presently, area of jurisdiction of the University is spread over in 22 districts (Kanpur, Kanpur Dehat, Auraiya, Etawah, Farrukhabad, Kannauj, Mainpuri, Etah, Agra, Firozabad, Mathura, Aligarh, Hathras, Kasganj, Hardoi, Sitapur, Lucknow, Lakhimpur Kheri, Unnao, Raebareli, Fatehpur & Kaushambi) & seven commissionaires (Kanpur, Lucknow, Allahabad, Agra & Aligarh,) of Uttar Pradesh which covers two agro-climatic zones of UP (South Western Semi-Arid & Central Plain).

The University offers various degree programs through its constituent colleges *viz.,* College of Agriculture, College of Home Science, College of Forestry, College of Horticulture at main campus Kanpur and College of Agricultural Engineering & Technology, College of Fisheries Sciences & Research Centre and College of Dairy Technology at Etawah. A second College of Agriculture is also established at Lakhimpur Kheri. The University has a strong research base comprising of four Research Sections (*Rabi* cereals, Oilseeds, Legumes & Vegetables), o5 Regional Research Stations (Daleepnagar-Kanpur, Saini-Kushambi, Kalai-Aligarh, Hazratpur-Firozbad and Mainpuri), four Crop Units and 16 Research and seed production farms scattered in area jurisdiction of the University. Besides, bio-control lab, spawn production lab, bacterial agent production lab, pesticide residue analysis lab, soil & water nutrient lab, tissue culture lab, bio technology lab, food analysis lab etc. are well equipped and furnished.

Quality Seed is a critical and basic input for enhancing agricultural production and productivity in different crops grown under varied agro-climatic regions. Greater emphasis is being laid on production of nucleus, breeder, foundation & certified seeds and maintaining adequate safeguards for quality assurance in the seed multiplication chain. The Directorate of Seed & Farms was established before 1975 but emphasis on seed production was given after the inception of a massive National Seed Programme (NSP). A seed processing plant was established in the University in 1978.

Road Map

Transfer of Technology is another important mandate of the University. Eighteen KVKs have been established and are shouldering the responsibility of technological input delivery system to the farmers. The major extension services include-trainings, demonstrations, organization of fields days, gosthies, farmers exhibition etc and also providing diagnostic advisory and input related services to the farmers of service area.

The University, from its existence has always strived to do better for the welfare of agriculture through teaching, research and extension work. Roadmap of the Chandra Shekhar Azad University of Agriculture & Technology, Kanpur outlines the key prospective plan for developing an appropriate strategy and a roadmap for sustainable agricultural development in Uttar Pradesh.

State Agriculture: Performance and challenges

Uttar Pradesh is the largest state of the India in terms of population and second largest in area in the country and posses an agrarian economy with more than 60 per cent of the population depending on agriculture for their livelihood. The state is the largest producer of food grain in India and offers a diverse agro climatic condition which is conducive for agricultural production. The state is well known for its highest contribution to nation's sugarcane basket. The state also offers excellent investment opportunities for industrial development. Presently, Uttar Pradesh covers 2.41 lakh sq. km. area and accounts for 7.3 per cent of total area of the country, while its share in country's population is 16.16 per cent i.e.19.95 crore as per Census 2011 of which 79.2% reside in rural area of the state. The majority of villages in UP are small with an average population of around 2500 per panchayat. The state is situated in the Indo–Gangetic plain and intersected by rivers. In economic terms, it is divided into four regions viz., Western Region, Central Region, Eastern Region and Bundelkhand and also into 9 agro-climatic zones, namely, Bhabhar & Tarai, Western Plain, Central-Western Plain South Western Plain, Central Plain, Bundelkhand, North-Eastern Plain, Eastern Plain, and Vindhyan region. The state is well known for its success in the green revolution and is the highest producer of food grains and sugarcane in the country.

The state is the largest producer of wheat, potato, sugarcane and milk whereas third largest producer of rice. Agriculture still constitutes the backbone of the state economy, more so, because it provides livelihood to about two-third population of the state. The state is endowed with ample alluvial soil along with diverse agro-climatic profile which can support the cultivation of a variety of crops. Due to large cultivated area, its share in national agricultural production is quite impressive but low crop productivity has hindered the realization of its ultimate potential.

Physical Features: Being a border state of India, Uttar Pradesh's northern frontiers adjoin Nepal which earlier extended upto Tibet before the creation of Uttaranchal (whose Shivalik ranges near Tibet Border). UP's boundaries touch Haryana, Delhi and Rajasthan in the west, Madhaya Pradesh in the south and Bihar in the east. In geo-physical terms, the Shivalik range of the Himalayas in the north, the river Yamuna and the Vindhyas in the west, south-west and the Gandak river in the east demarcate the terrain called Uttar Pradesh.

Natural Resource Management: Land is a basic natural resource which has been supporting the growth and development of humans and other living beings including water and plants from the beginning of the creation. Inadequate management of natural resources affected bio diversity, agriculture productivity and ecological balance. Non scientific use of land creates numerous problems like land degradation, ravine and water logging. It is necessary to implement soil and water conservation programmes on priority basis, in problematic areas, to ensure planned development and to achieve the required production of food, fodder and bio fuel. Schemes implemented also provide local employment to the agriculture labourers, small and marginal farmers.

In Uttar Pradesh 2.7% of holdings is of more than 4 hectares and accounts for 19.2% of total area, while about 75.4% of the marginal holdings accounts for 33.7% of the total area which clearly reflects severe inequities in the ownership of land holding. Despite all odds, the state contributes 32% wheat, 40% sugarcane and 26% potato produced in the country.

Land use pattern in this state shows that the total reported geographical area of about 241.7 lakh ha out of which 166 lakh ha is under cultivation. Gross cropped area is 261 lakh ha with the cropping intensity of 157.53 %. More than half (93.49 lakh ha) of the cultivated area is sown more than once. The states share in the total geographical area, net sown area and gross cropped area of the country are 7.90, 11.84 and 13.28 per cent, respectively. In Uttar Pradesh the average size of holdings is around 0.83 ha and per capita land area of the state is 0.14 ha as compared to 0.33 ha for the country as a whole. The small and marginal farmers own 64.77 % of the total land area. The average size of holding of marginal farmers is only 0.40 ha. Thus, the state has to support more people with lesser land (2018-19).

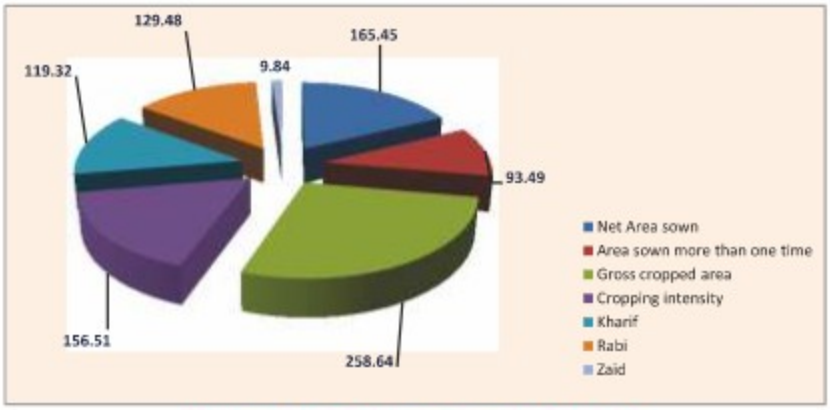

Figure 1: Land use pattern (lakh ha)

Soils:

In the western districts of Uttar Pradesh viz., Saharanpur, Meerut, Muzaffarnagar, Bijnor, Moradabad, Pilibhit and Bareilly, the soil is typically the same. It is, generally, deep brown and loamy in some places, also mixed with sand. The soil is shallow, gravelly and full of stones – being generally acidic. In the western plains (Saharanpur, Meerut and Muzaffarnagar) the soil is deeper and fertile. Further eastwards (Bareilly, Moradabad, Bijnor and Pilibhit) the soil gets to be loamy, still further down the Pilibhit district, some of the soils are acidic while the rest show some alkaline properties. The soil in the central regions comprising Lakhimpur Kheri, Sitapur, Lucknow, Barabanki, Hardoi, Kanpur and Azamgarh districts is loamy and sandy loams. In the eastern part of the state, the districts of Gorakhpur, Basti, Mahrajganj, Siddarthnagar and Gonda contain two varieties of the soil, which are locally known as 'Bhat' and 'banjar'. The alluvial soil is called 'dhuh'. The one described as 'mant' is comparatively loamy sandy and calcareous. The soil in the north western districts of the state contains less of phosphate. The district of Jaunpur, Azamgarh and Mau are found to be lacking in potash and the drier areas are known as 'usar' and 'reh'. The soils of Aligarh, Mainpuri, Kanpur, Etah, Etawah, Sitapur, Unnao, Raebareli and Lucknow are salt affected and are known as 'usar' and 'reh' soils. Mixed red and black soil is found in the Jhansi division of the state and the districts of Mirzapur and Sonebhadra as well as the Karchhana and Meja tehsils of Prayagraj, besides Chakia and Varanasi district. Black soil is sticky, calcareous and fertile. It expands as it soaks moisture and contracts on drying up. In the upper plateau of these districts the soil is red and is of two kinds – 'parwa' and 'rackar.

Irrigation: The net irrigated area in the state is 140.26 lakh ha. The canals and private tube wells are the main sources of irrigation accounting for approximately 18.23 and 71.96 per cent of the net irrigated area, respectively. Over three- fourth of the sown area is irrigated. State has fairly large canal network, which account for about 22% of irrigated area. Ground water is easily tapable and accounts for about 78% of irrigated area.

Agro-climatic zones: Uttar Pradesh is the leading state in terms of agriculture production in the country. The state is divided into four economic regions: western, central, eastern, and Bundelkhand and has nine agro-climatic zones viz; namely, Bhabhar & Tarai, Western Plain, Central-Western Plain, South Western Plain, Central Plain, Bundelkhand, North-Eastern Plain, Eastern Plain and Vindhyan region. The state has a strong agricultural base with the most fertile land masses and a well connected river network, and enabling it to play a significant role in the country's food and nutrition security programme.

Agro-climatic zone of Uttar Pradesh

S. No.	Agro climatic zones	Geographical Area in ha	Districts	Soil Type
1	Tarai & Bhabhar	1847319	Saharanpur (58%), Muzaffarnagar (10%), Bijnaur (79%), Moradabad (21%), Rampur(40%), Bareilly(19%), Pilibhit (75%), Shahjahanpur (6%), Khirl (39%), Bahraich (47%), Shravasti (71%)	Alluvial, least to medium phosphorus, medium to high potassium and highly carbonised matter.
2	Western Plain	1637424	Saharanpur(42%), Muzaffarnagar(90%), Meerut, Bagpat, Gaziabad, Gautam Budh Nagar, Bulandshahar	Alluvial, PH value normal to sodic and carbonic matter from least to medium
3	Mid- Western	1697125	Bareilly (81%), Badaun, Pilibhit (25%), Moradabad(79%), J.P.Nagar, Rampur(60%), Bijnour(21%)	Allmost alluvial, normal to slight sodic and contanin's medium corbonic matters
4	Mid-Plain/ Central	5647307	Shahjahanpur(94%), Kanpur Nagar, Kanpur dehat, Etawah, Auraiya, Farrukhabad, Kannauj, Lucknow, Unnao, Raebareli, Hardoi, Kheri (61%), Sitapur, Fatehpur, Prayagraj (58%) & Kushambi	Alluvial, PH normal to sodic and containing carbonic matter from least to medium quantity
5	South Western Semi-Dry	2234222	Agra, Firozabad, Aligarh, Hathras, Mathura, Mainpuri, Etah	Alluvial & arawali.
6	Bundelkhand	2961006	Lalitpur, Jhansi, Jalaun, Hamirpur, Mahoba, Banda and Chitrakoot	Rakar, Parwa, Kabar and Maar
7	North Eastern	2955485	Gorakhpur, Maharajganj, Deoria, Kushinagar, Basti, Sant Kabir Nagar, Siddharthnagar, Gonda, Baharaich (63%), Balrampur and Shrawasti (29%)	Alluvial, calcarius
8	Eastern Plain	3808718	Azamgarh, Mau, Ballia, Pratapgarh, Ayodhya, Faizabad, Ambedkar Nagar, Barabanki, Sultanpur,Varanasi, Chandauli, Jaunpur, Ghazipur and Sant Ravidas Nagar(86%)	Alluvial, sodic and Diara soil
9	Vindhyan	1381840	Prayagraj (42%), Sant Ravidas Nagar(14%), Mirzapur and Sonbhadra	Kali, Bhari red granules and alluvial soil in plane area

Road Map

Climate: The climate of the state is generally sub-tropical and semi arid type. The month of May is the hottest month, with maximum temperature varying from 45 to 47^{0}c and the coldest month is January, when the minimum temperature varies from 5 to 8^{0}c. The annual normal rainfall of the state is 947 mm, in the range of 594 to 1400 mm and relative humidity varying from 25 to 95%. Generally, maximum rainfall occurred during monsoon season (June to September) by south west monsoon.

Major cropping pattern: U.P. is undoubtedly one of the major food grains producing states with rice, wheat, chickpea, field pea, lentil, moongbean, urdbean, pigeon pea, mustard, groundnut, sesame and linseed as the major food grain crops. Sugar cane is another important crop, cultivation of which is increased with the expansion of irrigated area.

Area under major crops: Foodgrains dominate the cropping systems in the state and nearly 4/5th of the gross cropped area is occupied by food grains as compared to the national level share of about 38%. Within food grains, cereals and pulses occupy about 69% and 10 per cent of the total cropped area, respectively.

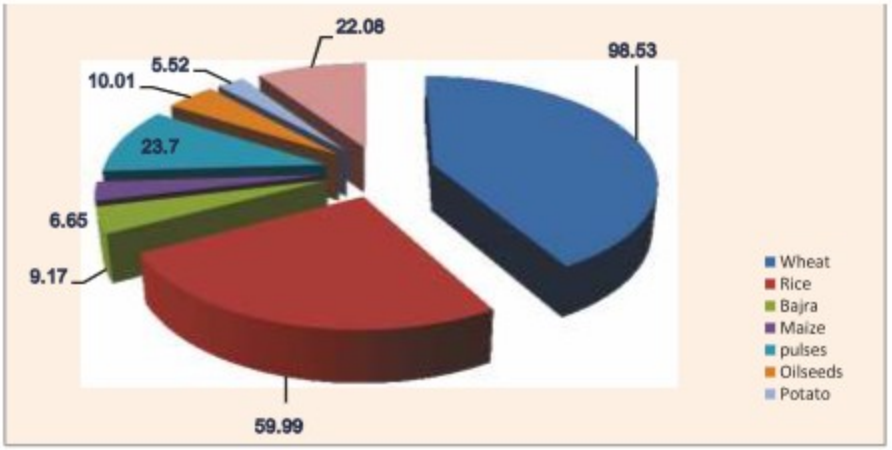

Figure 2: area under major crops (2019-20)

Wheat is dominated crop sown in 98.53 lakh ha whereas rice is sown in 59.99 lakh ha and coarse cereals are cultivated in about 10 per cent area. Maize and Pearl millet (bajra) are the most important coarse cereals accounting for 6.65 and 9.17 lakh ha, respectively. Non-food grain crops of the State, which comprise of oilseeds, vegetables, fruits, spices, flowers, sugarcane, cotton, tobacco and others, are sown in about 20 per cent area. Sugarcane is the main non-food grain and commercial crop of the state which is cultivated in about 22.08 lakh ha. Oilseeds, grown in about 4.45 per cent area include sesame, rapeseed & mustard, linseed, groundnut, soybean, and sunflower during the year 2019-20.

Contribution of major crops: The state is the largest producer of sugarcane which contributes about 40.26 per cent followed by wheat contributing about 31.7% to national food basket whereas it is the second largest producer of rice, which accounts for about 13.78 per cent of the national production. The average production of wheat was 36.75 q per ha in 2019-20 while the average production of barley, rice, bajra, maize and jowar was 31.32, 28.73, 21.15, 24.67 and 13.49 q per ha, respectively during 2019-20 in U.P. The average production of gram, arhar, moong (zaid) and urd (zaid) was 13.71 q, 9.80 q, 8.85 q and 7.16 q per ha, respectively during 2019-20. The average production of mustard and groundnut was 12.60 q and 9.42 q per ha, respectively during 2019-20. Total Food grain Production is 649.86 lakh metric tons. The average production of sugarcane and potato during 2019-20 was 1795.98 lakh metric tons with 813.3 q per ha productivity. The cropping intensity was 157.53 % in 2013-14, which were higher than that in previous years.

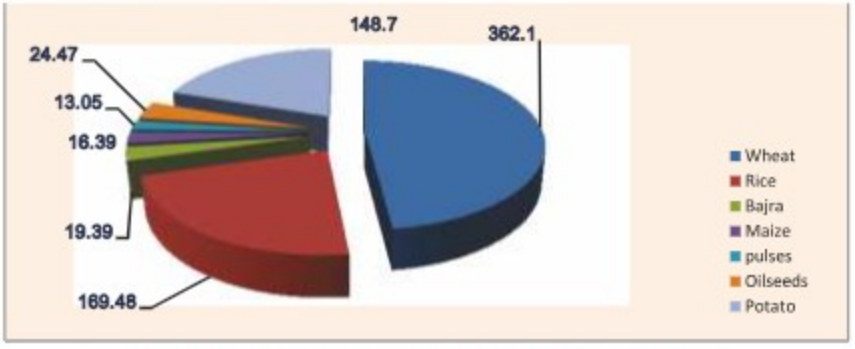

Figure 3: Contribution of major crops (2019-20)

Livestock: An estimated 70 million households are rural out of which about three fourth are landless, marginal or small farmers engaged in livestock production. In case of landless households, half of income comes from livestock production. The agriculture land holdings are decreasing day by day which adversely affects production of fodder. For the optimal use of present fodder we need mixed farming with considerations of small ruminants (which can utilize the tree leaves and bushes), cattle and buffalo (which feed on by products like fodder-straw, sugarcane tops and other agro based products) for conversion of all low cost fodder into precious meat (Chicken, mutton, pork, etc.), along with milk production.

Uttar Pradesh is a vast state with huge livestock population consists of 190.19 lakh cattle, 330.17 lakh buffalo, 144.80 lakh goat and 9.84 lakh sheep in 20th census (2019). Livestock census 2012 depicted that the total population of livestock was 68715147 lakh in the state of which buffaloes accounted for 44.57% followed by 28.46%, 22.68% and 1.97% of cattle, goats and sheep respectively. Out of total population of bovines (50182401lakh), the buffaloes accounted for 61.03% followed by 38.97% by cattle. The livestock resources of Uttar Pradesh also includes 145.94 lakh goats, 13.71 lakh sheep, 19.73 lakh pigs and 105.79 lakh poultry. The data revealed that the livestock population in India has grown by 4.6% from 512 million in 2012 to about 536 million in 2019. State is also well known for Kherigarh, Ponwar, Gangatiri and Kenkatha breeds of cow; Bhadwari breed of buffalo; Jamunapari and barbari breeds of Goats and Jalauni breed of sheep. With this huge livestock wealth, Uttar Pradesh is the largest producer of milk in the country with the production of 305 lakh MT annually in year 2019-20 which is about 18 % of the country. Uttar Pradesh is also one of the largest meat producing State and share more than 60% of country's meat export. State produces 1607.633 million eggs and 14.202 lac kg. of wool annually. (Source: Department of Animal Husbandry Govt. of Uttar Pradesh).

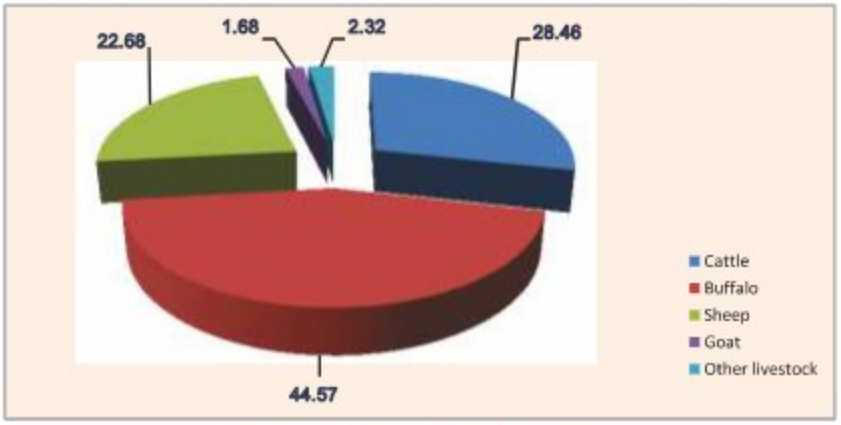

Figure 4: Per cent livestock in UP

Fisheries: Uttar Pradesh being a land locked state has vast freshwater resources viz., rivers, lakes, reservoirs, ponds and tanks. The freshwater aquaculture resources in the country comprises of 2.25 million hectares of ponds and tanks out of which Uttar Pradesh has 1.61 lakh ha, 1.3 million ha of jheels and derelict water, 2.09 million ha of lakes, 270652 ha irrigational canal and 1.2 lakh km channels. The state has 720000 ha water bodies where rivers occupy 28500 km and a few lakh ha of paddy fields, a portion which is amenable to fish farming. The total production of fish in state was 3067 thousand qt. during 2006-07 which has increased to 4297 thousand qt. during 2011-12 thereby showing 40.10% increase over the period while the fish production has decreased in 2013-14. The productivity of fish was 4041 kg/ha in U.P. during 2014-15.

Major Constraints in agriculture productivity and production

The state occupies the first position in total foodgrain production with a share of around 20 per cent of the overall foodgrain production of country. The state contributes around 31.7 per cent of wheat in the country, occupies 2nd position with respect to rice production and first position in sugarcane and potato production. However at the productivity level the state has poor performance compared to some advanced states like Punjab, Harayana and Tamilnadu .The main reason for lower productivity levels are:

1. Land holding size is getting smaller day by day resulting in poor investment capacity of the farmers and low productivity.
2. Decreasing availability of irrigation water.
3. No timely availability of inputs like seed and fertilizer.
4. Problematic area; the state has a total problematic area of around 120 lakh ha which includes areas prone to erosion, soil salinity, alkalinity, water logging, ravines, diyara lands etc.
5. Poor investments in agriculture sectors.
6. In case of vegetable and fruit production also the state position is at second position but in these crops also the productivity is poor as compared to other state.
7. Erratic monsoon trend and occasional moisture stress conditions with long dry spell especially in rainfed areas and run off from sloppy lands causing severe erosion also results in poor productivity and production.
8. Poor soil health and low organic matter content in the soil is also a major cause for low productivity. Soils are getting deficient in some important nutrients like Sulphur, Iron, Zinc, Boron etc. which also results in low productivity of different crops and vegetables. Low seed replacement rate particularly in case of pulses & oilseeds the main crops of the rainfed areas also results is low productivity.
9. Non Availability of good quality feed and green fodder leading the low productivity of milch-animals.

About CSAU

Chandra Shekhar Azad University of Agriculture & Technology, Kanpur a premier Agriculture Institution serving the nation since 1893 came into existence in the present form in 1975. It has a glorious past and has been able to maintain meritorious records of research, teaching and extension education since its inception. The University has huge catchment area, spread over 22 districts (Kanpur, Kanpur Dehat, Auraiya, Etawah, Farrukhabad, Kannauj, Mainpuri, Etah, Agra, Firozabad, Mathura, Aligarh, Hathras, Kasganj, Hardoi, Sitapur, Lucknow, Lakhimpur Kheri, Unnao, Raebareli, Fatehpur & Kaushambi) & seven commissionaires (Kanpur, Lucknow, Allahabad, Agra & Aligarh) of Uttar Pradesh, which covers two agro-climatic zones of UP. (South Western Semi-Arid & Central Plain). The university has following the major mandates;

1. Making provision for the education of rural people of Uttar Pradesh in different branches of study, particularly agriculture, rural industry and business and other allied subjects
2. Furthering the prosecution of research, particularly in agriculture and other allied sciences; and
3. Undertaking field and extension programmes.

The University is committed to continuous improvement in agriculture and allied sectors by developing quality manpower, providing relevant production technologies & disseminating technologies to the farmers fields through agricultural education, research and extension approaches, with an aim to prove its excellence in areas of concern.

The University offers various degree programmes through its constituent colleges *viz.,* College of Agriculture, College of Home Science, College of Forestry and College of Horticulture at Kanpur main campus and College of Agricultural Engineering & Technology, College of Fisheries Sciences & Research Centre and College of Dairy Technology at Etawah. A second College of Agriculture is also established at Lakhimpur Kheri.

The Directorate of Research is engaged in *Planning, Execution, Monitoring, Coordination, Evaluation and Impact Assessment of Research Programmes across the Faculties* to cater the research needs of three agro-climatic zones of Uttar Pradesh. The University has a long history of significant research contributions made by the well established four Research Sections (*Rabi* cereals, Oilseeds, Legume & Vegetables), five Regional Research Stations (Daleepnagar-Kanpur, Saini-Kaushambi, Kalai-Aligarh, Hazratpur-Firozbad and Mainpuri), four Crop Units and 16 Research and seed production farms scattered in the entire service area of the University.

Transfer of Technology is another important function of the University. Fourteen Krishi Vigyan Kendras (KVKs) have been established and are shouldering the responsibility of technological input delivery system to the farmers. The major extension services include, training demonstrations, organization of fields days, gosthies, farmers exhibition etc. Agriculture Technology Information Centre (ATIC) has been provides diagnostic advisory and input related services to the farmers.

The University imparts job oriented professional education in the fields of Agriculture, Horticulture, Forestry, Home Science and Agricultural Engineering. The University has setup a full-fledged Directorate of Placement in year 2001, as an attempt to provide job opportunities to the students in public and private sector organizations/ companies/ industries etc.

Characteristics of Area Jurisdiction

The University service area is spread over seven commissionaires which comprises 22 districts covering 02 agro-ecological zones occupies 35.31% of total area of Uttar Pradesh. The goals of research in the University are aimed at a wide range of issues to cater to the agricultural and socio-economic needs of the people of Uttar Pradesh. While the broder objectives and goals have remained unchanged, the specific research problems and priorities have undergone changes in tune with the dynamic nature of agriculture in the State. The subjects of studies and products aimed have been modified from time to time to be in the forefront of agricultural research and all other fields of study taken up in the university. These modifications and the priorities set in the research activities reflect the research needs of the State at large and to some extent the nationwide and worldwide trends in approaches to meet these needs. With a view to strengthen the regional research capabilities through furthering location specific research and need based extension activities, the entire service area of the University come in two agro-climatic zones, their main characteristics are given as under.

South- Western Semi Arid Zone: South- Western Semi Arid Zone comprises districts of Aligarh, Hathrus, Mathura, Agra, Firozabad, Mainpuri, Kashiramnager and Etah and occupies 23.80 % of the service area of the University. Total reported area of the zone is 22.34 lakh ha and net area under cultivation is 16.99 lakh ha (2013-14) of which about 58.6% area is irrigated. Tube wells are main source of irrigation which covers 77% of irrigated area. The area sown more than once is 11.25 lakh ha. The gross cropped area is 28.25 lakh ha in the zone. The soil of the zone is alluvial & arawali. Major crops are wheat, barley, mustard and potato in *Rabi*; bajra, maize, urd bean, moong bean, paddy and pigeon pea in *kharif* and falsa, ber, bel, aonla and citrus, the major horticultural crops. The cropping intensity of the zone is 166.79 %. Livestock is another sector which play vital role in the economy of the zone which includes 189.59 lakh cattle, 261.20 lakh buffaloes, 145.94 lakh goats, 13.71 lakh sheep, 19.73 lakh pigs and 105.79 lakh poultry.

Productivity constraints

1. Problem of brackish water in Mathura, Agra and Aligarh districts.
2. Problem of salinity/alkalinity in all districts of the zone.
3. Depletion in ground water in all districts of the zone.
4. Emerging deficiency of secondary nutrients and depletion of organic carbon in soils.
5. Diseases like *Alternaria* blight, white rust and aphid in mustard, powdery mildew in pea, wilt in gram and pigeonpea, late and early blight and black scurf in potato, problem of bud necrosis in groundnut and incidence of insects in cotton are the serious problems of the zone.
6. Severe incidence of insect, pests & diseases and complex problems in crops.
7. Non availability of quality seed of high yielding varieties.
8. Lack of varieties of phalsa, ber, bel, aonla and citrus and suitable agro-techniques.
9. Epidemics, parasitic infestation, malnutrition, delay in puberty in buffalo & goat, brucellosis, anoestrous and mastitis in buffaloes and higher calf mortality.
10. Lack of farming system modules for ravines.
11. Slow pace of technology flow towards end users.

Central Plain Zone: Central Zone comprises of 03 commissionaires and 14 districts viz, Farrukhabad, Kannauj, Etawah, Auraiya, Kanpur, Kanpur Dehat, Fatehpur, Kaushambi, Lucknow, Unnao, Raebareli, Sitapur, Hordoi and Lakhimpur Kheri. Total geographical area is 41.90 lakh ha

which is 17.34% of state. It occupies 44.64 % of the service area of University. The net area sown in the zone is 28.50 lakh ha, area sown more than once is 14.76 lakh ha. The gross cropped area is 43.26 lakh ha in the zone. The soil of the zone is alluvial, P^H normal to sodic and containing organic carbon from least to medium quantity. The major crops are wheat, mustard, gram and potato in *Rabi* and paddy, maize, urd & moong bean and pigeon pea in *kharif*. Sugarcane is also an important crop of the zone occupying on sizeable area. Phalsa, ber, bel, aonla, citrus and mango are the major horticultural crops. Cropping intensity of the zone is 151.19 %. The livestock is also another enterprise which play vital role in strengthening the economy of the farm families.

Productivity constraints

1. Problem of salinity/alkalinity in all districts of the zone.
2. Depletion in ground water in all districts of the zone.
3. Emerging deficiency of secondary nutrients and depletion in organic carbon in soils.
4. Powdery mildew in pea, wilt in gram and pigeonpea, *Alternaria* blight, white rust and aphid in mustard, yellow mosaic in green gram and black gram, late and early blight and black scurf in potato are the serious problems of the zone.
5. Severe incidence of insect, pests & diseases and complex problems in crops.
6. Incidence of nematodes is an emerging problem in crops.
7. Lack of climate resilient varieties of paddy, wheat, barley, mustard, chickpea, fieldpea, pigeon pea.
8. Non availability of quality seed of high yielding varieties.
9. Alternate bearing, fruit dropping, mealy bugs in mango and fruit fly and wilt in guava.
10. Heavy fruit dropping in aonla.
11. Stem and fruit bores in brinjal and tomato.
12. Epidemics, parasitic infestation, malnutrition, delay in puberty in buffalo & goat, brucellosis, anoestrous and mastitis in buffaloes and higher calf mortality
13. Unavailability of quality fingerlings, malnutrition, low production potential, higher fingerlings mortality and low maintenance of water bodies in fisheries.
14. Slow pace of technology flow towards end users.

Education Roadmap

Mandate:

- Making provision for the quality education of rural people of Uttar Pradesh in different branches of agriculture, including rural industry and business and other allied subjects.
- Furthering the prosecution of research in agriculture and allied science.
- Undertaking field and extension programmes.

Mission:

The current mission of the colleges is not different from the mission of the university adopted at the time of its establishment. The basis mission has not been changed. Based on current needs of the changing agricultural scenario at the national and international levels and needs of users, agencies and client, new programmes are being added. However, the mission of the college is as follows :

- People's participation to strengthen the implementation of the programme.
- To pursue excellence in teaching and research activities
- Efforts to establish pockets of excellence in areas and fields in which rapid change is necessary e.g. high yielding varieties with nutrient fortification modern high energy saving implements and machinery, large modern storage facilities and demonstration of technologies on the farmers' fields.
- Closer co-ordination with various agencies involved in the development of Agriculture, Horticulture (Vegetables, Fruits & Flowers), Agro-Forestry and Agro-processing.
- Develop improved varieties/breeds of agricultural crops like *Rabi* Cereals, Oilseeds, vegetables, pulses etc and plant varieties suitable to different agro-climatic conditions and livestock for different regions of the universities' area jurisdiction.
- Efforts to rejuvenate denuded and marginal lands in and around the villages and use them for growing crops, trees, fodder etc.
- Wide coverage against diseases and pests to ensure desired yield and checking of atmospheric pollution.
- Increasing post harvest capabilities and storage facilities for value addition and minimize the post harvest losses.
- Increasing productivity in villages to ensure better returns to farmers. The extent of diversification of the agricultural industries should be such which may provide consumers' awareness choice in terms of variety, quality, packaging and distribution of agricultural commodities.
- Modern transportation and storage facilities for conserved agricultural products on national level to facilities in easing out the regional and seasonal imbalanced and ensuring the availability of products.
- Training and manpower development will be a major activity of the University. Special trainings and manpower development programme will be undertaken for all levels of persons engaged in agricultural development e.g. farmers, extension workers, researchers and teachers.

To increase the return of farmers, it is necessary to assess, refine and transfer the technologies to them for enhancing the productivity. The University and the colleges will make said efforts for the growth of agriculture. To fulfill the mission, the College has provided leadership at all levels to students interested in agricultural career with basic knowledge of the main disciplines through different colleges. In an effort to build additional curricula strength in to their programmes, students also register themselves for selected courses in basic sciences, computer education, and other areas to supplement their knowledge in agriculture. The college has also provided leadership for the development of agriculture to Utter Pradesh State in particular and at national and international level in general. The improved agricultural technology in crop production coupled with the required facility created by the government in

terms of irrigation potential and power availability and other inputs have greatly contributed to increase food grain production. The ICAR recommendations for undergraduate and post graduate curricula and common regulations have been adopted.

Vision:

To impart quality education in agriculture and allied sciences and to foster collaboration in agricultural education, research and outreach with national and international institutions of repute.

Goal:

The Colleges, the premier institution established almost a century ago is devoted to education, research and extension to advance the economic and social development of the state through its mandate given in the University Act. It manages its staff, physical and financial resources to respond to new challenges and opportunities through a well organized planning process. The College keeps on addressing changes in the themes of the programmes by creating value for achieving improvement in the research, teaching and extension programmes. Keeping the mandate in view, Colleges has set the following goals :

- Provide opportunities for the citizens of the state and the country for education in the field of agriculture in its broad sense and to promote research, field and extension programmes in agriculture and allied sciences.
- Strengthen UG and PG teaching through periodic revision of syllabus.
- Establish required infrastructure to conduct location specific research in the field of agriculture and allied sciences.
- Generate technologies to improve farm production and income of the farmers.
- Provide needed assistance to the development departments of the government and other agencies to test and disseminate the improved technologies developed.
- Provide opportunities for rural youth and women for learning and adoption of improved agro-technologies.
- Revitalize extension activities through the creation of students READY Programme in UG level.
- Adopt advancements in information technology and computers to improve the formal academic programmes and introduce non-formal distance and contact learning programmes for the benefits of farmers, rural youth and women.

The under graduate and postgraduate course curricula in agriculture and allied subject undergo constant review and re-designing to develop technical expertise in agriculture based on diverse career opportunities. There is a need to introduce specific academic programmes at UG and PG levels directed towards training human resource in areas of post-harvest technology, agro-processing value addition, bio-fertilizer and mushroom cultivation.

The University has established good infrastructure and liaison for the successful completion of its mission.

College of Agriculture

The college started B.Sc. (Ag.) Degree programme and Master's Degree programme in 1930 and 1944 respectively affiliated to Agra University. Now the college has two campus; first, Main Kanpur Campus (Accredited), second, Lakhimpur Khiri campus Main campus Kanpur has a grand and historical academic

building stretched in about 235 thousand square meters. Eighteen (14 Boys & 4 Girls) beautiful and spacious hostels with a capacity of 1650 students along with an international Hostel for foreign students, excellent central library and a centrally located grand auditorium (900 seats). The college of agriculture offers one graduate programme B.Sc. (Hons.) Ag.The 13 Master's programmes M.Sc. (Ag.) and Doctorate programmes for (Agriculture Biochemistry,Agricultural Economics, Agricultural Extension Agronomy, Dairy Technology, Live Stock production & Management.Entomology, Genetics and Plant Breeding, Plant Pathology, Plant Physiology/Crop Physiology, Seed Science and Technology, Soil Conservation and Water management, Soil Science and Agricultural Chemistry). Each year about 120 students enroll in graduate programme and more than 150 in postgraduate programmes. Teaching of B.Sc. (Hons.) Ag. in Lakhimpur Khiri (Newly established) started from 2015-2016. Post Graduate programme of Agri business management (ABM) under self finance scheme is running with seat capacity of 40. A fairly large number of students are serving presently at international and national positions. Students participate in cultural and literary, sports and Yoga/NCC/NSS activities. Presently, Master's and Doctorate programme are running in 13 disciplines. Filling up the desired number of sanctioned faculty positions, increasing students' intake capacity and strengthening of existing infrastructure would fulfill the requirement and desired output may be achieved.

College of Agriculture, Lakhimpur Kheri

The college of Agriculture, Lakhimpur Kheri (Campus) located at Jamunabad, Gola, Lakhimpur Kheri (U.P.). This campus was established in 2014 for awarding B.Sc. (Hons) Agriculture Degree. The undergraduate programme in Agriculture has already been started five years back (2015-16) and the students pursuing education at main campus at Kanpur during the development stage. The students of first batch of this college was completed their degree in 2019. Teaching has been started from current academic session (2019-20) at Lakhimpur Kheri campus. At present, 60 students are being admitted each year and currently 166 students are studying in under graduate level. The 54 students of first batch were awarded degree (2019). The skills and knowledge of our graduates have to meet new international standards.

College of Home Science

After the establishment of CSAUA&T, Kanpur, the University in its 38th meeting of the Board of management held on 29th July 1981 considered and approved SND schemes for the year 1981-82 through which the concept of imparting Home Science education, the science and art of managing the farm/rural family system, took birth. The general consensus amongst the learned members of the Board of Management to this concept, culminated in the consolidation of it and thus, a decision to start Home Science as a discipline under the Umbrella of the Faculty of Agriculture took shape.

According to the statutes of the University, there exists a provision for a Home Science College of Home Science Faculty. In 1983-84, the Faculty of Agriculture opened the Department of Home Science in the University to introduce to B.Sc.(Home Science) Degree. The Faculty of Home Science was established in the year 1998 along with 5 major departments *viz*; Department of Extension Education and Communication Management, Food Science & Nutrition, Textile & Clothing, Human Development and Family Studies and Family Resource Management being bifurcated at the same time.

Department of Extension Education and Communication Management received 8 PDF fellows till date. At present 6 PDF fellows from UGC and ICSSR, New Delhi are doing their research Work. Two seats of Ph.D. one bring should in three department (Food Science & Nutritional, Textiles & Clothing, Extension Communication Management and Human Development and family studies) from the academic session 2020-21.

College of Agricultural Engineering & Technology, Etawah

Baba Saheb Dr. Bhim Rao Ambedkar College of Agricultural Engineering & Technology, Etawah was established during the year 1994-95. The foundation stone of the College was laiddown on 8th October 1994 by Shri Mulayam Singh Yadav ji, the then Hon'ble Chief Minister of Uttar Pradesh. The main motto of the College is to make provision for education of mainly rural people of Uttar Pradesh and provide good facilities for research and extension in the field of Agricultural Engineering and Technology. This campus is spread over an area of about 113.71 acres. Besides this, there is a demonstration cum research farm of 22.5 acres. This technology campus of the University has an established workshop, Academic Building, Library, Advance Research Centre, Medical Centre, Girls (04) & Boys hostels (03), residential quarters (86) for staff, teachers and Dean. The college from its very inception had adopted a very progressive policy and extended all possible facilities to the students for their better education and co-curricular activities.

Though the university has approved total 10 department viz. Production Technology, Farm Machinery and Power Engineering, Soil and Water conservation Engineering, Irrigation and drainage Engineering, Post Harvest Processing and Food Engineering, Mechanical Engineering, Electronics and Communication Engineering, Computer Science and Engineering, Civil Engineering, Electrical Engineering, but B.Tech programs are run in disciplines *viz*; Agricultural Engineering, Electronics & Communication Engineering, Computer Science and Engineering & Mechanical Engineering.

The B. Tech. degree program in Agricultural Engineering was started in academic year 1994-95 with an annual intake of 40 students and up to academic year 2020 twenty-three (23) batches are passed out. Under Self-Finance-Scheme the B. Tech. degree program in the disciplines of Electronics & Communication Engineering, and Computer Science and Engineering also got started from the academic year 2002-03 and likewise B. Tech. degree program in the discipline of Mechanical Engineering got started from the academic year 2003-04. The PG programs (M.Tech.) in Agricultural Engineering and Mechanical Engineering was introduced from the academic year 2017-18 in the campus.

The college has been fabricating/tinkering and modifying the small farm needed agricultural equipment /tools like (1) manually operated garlic planter (2) manually operated groundnut decorticator (3) manually operated maize Sheller (4) manually operated potato slicer (5) manually operated dibbler (6) manually operated mango harvester (7) manually operated onion planter (8) manually operated 5-tyne hand hoe (9) manually operated seed cum ferti-drill (10) manually operated seed/fertilizer broadcaster (11) manually operated potato digger elevator.

In addition to this some of the manually/ power operated equipment/machine are also developed and are under trial through an adhoc project "Small farmer women friendly equipment" sanctioned by UPCAR, Lucknow. The manually/ power operated equipment/machine developed under the project are viz. manually operated garlic planter, power operated paddy thresher cum winnower, power operated groundnut decorticator, power operated corn sheller.

The campus is made lush green science inception of college but this year more focus was drawn on plantation of tree species like teak, mango, badhal, citreous plants, papal, neem, bael, moringa etc

Road Map

College of Dairy Technology, Etawah

The establishment process of College of Dairy Technology, at Etawah, under Chandra Shekhar Azad University of Agriculture and Technology Kanpur started with the announcement made by Shri. Mulayam Singh Yadav Ji, the then Chief Minister of Uttar Pradesh on dated 14 /01/2006 keeping in view the vast potential of dairy in the nearby districts of Etawah, Firozabad, Mainpuri, Kannauj and Auraiya. After the completion of necessary constructional work, the College of Dairy, at Etawah became functional from academic year 2015-16.

Dairy farming becomes profitable only on realizing the importance of value-addition by conversion of milk into numerous nutritious milk products. As such, to generate the required manpower for the dairy industry, Dairy Technology Program was started as a constituent college of Dairy Technology during the academic year 2015-16 as 4 Years B. Tech. (Dairy Technology) degree program with an annual intake of 40 students. The present curriculum adopted for B. Tech. (Dairy Technology) is as per the recommendations of the ICAR V Deans' Committee. Students are trained in the preparation of various products during Hands on Training in the seventh semester at the respective institutes followed by industrial training (In-plant training) for 5 months during last semester in commercial dairy plants of Uttar Pradesh.

The college building houses well-furnished audio-visual enabled classrooms, computer lab and laboratories. The students are given practical exposures at training centre, Anand, Gujarat, Parag Kanpur and Mother Dairy Etawah/Noida. Students were successful in securing admission for pursuing higher studies in various reputed institutions. The graduates of this institution are also creating a remarkable impact on the dairy industry of the country by getting employment in the reputed firms like Amul, Modern Dairy, Parag Dairy etc.

The second batch of B. Tech. (Dairy Technology) passed out in year 2020. More than 50% students are engaged in different industries like Pradeshik cooperative dairy federation, Amul, Parag, Gyan, Banas, Paras, Madusudan; etc and also some students are doing M.Tech. It is our main aim to equip this college to respond positively to the challenges of the future in the field of dairy, dairy products, dairy beverages, dairy research and dairy extension.

College of Fisheries Science & Research Centre, Etawah

The establishment process of College of Fisheries Science and Research Centre, at Etawah, under Chandra Shekhar Azad University of Agriculture and Technology Kanpur, started with the announcement by Shri. Mulayam Singh Yadav Ji, Hon'ble Chief Minister of Uttar Pradesh on dated 14/01/2006 keeping in view the vast potential of fisheries in the nearby districts of Etawah, Firozabad, Mainpuri, Kannauj and Auraiya. In Etawah district itself, there is a confluence of five rivers *viz;* *Kunwari, Pahuj, Jamuna, Chambal and Sind* called the 'Pachnada' has a rich habitat for dolphins. After the completion of necessary constructional work, the College of Fisheries Science and Research Centre, at Etawah became functional from Year, 2015. At Present seven departments are there *viz;* Department of Aquaculture, Fisheries Resource Management, Aquatic Animal Health Management, Aquatic Environment Management, Fish Processing Technology, Fisheries Engineering and Fisheries Extension, Economics & Statistics.

The second batch of B.F.Sc. passed out in year 2020. Most of the students are engaged in different industries and processing plant; etc and some students are doing MFSc. Many students qualified JRF and working at Central University Imphal, RPCAU, Samstipur and Junagarh University, Gujarat. The college is performing P-line culture in ornamental fisheries, IMC Culture in earthen ponds. Other species like catla, rohu, mringal and Common carp are being reared. Biofloc culture is also being done for singhi species. Fish waste is used as fish food preparation as by-product by students by during ongoing COVID-19 Pendamic. Indigenous fish feed was made using Rice bran and mustard oil cake during COVID for Indian measure carp (IMC) to supplement fish feed requirement. Students are given exposure for field Training at Cold Water Fisheries Training Centre Bheemtal, Govt. Hatcheries in U.P, Junagarh Training Centre, NBFGR, Luckonw, Govt. hatcheries of Rajasthan and local hatchery centres at Etawah. It is our main aim to equip this college to respond positively to the challenges of the future in the field of fisheries, fisheries products, and fisheries research and fisheries extension.

College of Horticulture

Postgraduate classes in Horticulture were initiated in 1945 under the administrative control of Professor Agricultural Botany with one Assistant Professor, one lecturer and one demonstrator. In 1960 separate Department of Horticulture was created with 15 acres of Garden for practical and research purpose. College of Horticulture came into existence on September, 2010 with two department *viz.,* Department of Fruit Science and Department of Vegetables Science.

The major activity of the department is teaching of courses related to fruit production, floriculture and post-harvest management to the students of B.Sc. (Hons.) Ag., B.Sc. (Hons.) Hort., M.Sc. (Hons.) Hort. Fruit Science and Ph.D. Fruit Science and conduct research to improve production, productivity, and quality of different fruit crops. In the department, every year 10 students in a master degree and 4-5 students in the doctoral degree program were admitted. Presently department has 13 acres of Garden of different blocks of fruits *viz.*, mango, guava, litchi, sapota, pomegranate, aonla, ber, phalsa, citrus fruits, jackfruit, jamun etc., flowers (rose, tuberose, marigold and all seasonal annuals), few plants of different minor fruits, ornamental plants and shrubs are also there for practical purposes of the students and two acres areas under nursery for practical training to the students.

Established with the purpose of imparting quality education to Agriculture and Horticulture undergraduates, post-graduates and Doctoral candidates, the Department of Fruit Sciences has so far achieved standardization in propagation techniques of several fruit crops *viz.*, Mango, Guava, Litchi, Lime, Lemon, Jackfruit, Ber, Aonla, Phalsa, Peach, etc. Standardized doses of various bio-fertilizers, plant bio-regulators, major and minor nutrients in different fruit crops for quality production of higher yield. Harvesting/maturity standards for phalsa, mango, guava, citrus, strawberry and banana etc., were also standardized. Pruning time and technique for rose, guava, phalsa, and litchi also had been standardized. Students passed out from this department have secured the highest rank and position throughout the country. This shall be achieved by overall increase in productivity in all spheres–better nursery, proper use of available infrastructure and coordinated plans for teaching and training supervised by the Department and University administration.

Road Map

College of Forestry

The department was established in the year 2002. Presently four years B. Sc (Forestry) degree course has been running. 16 batches of B.Sc.(Forestry) students have been admitted through entrance examination. Every year 33 students are admitted. Some additional students are also admitted by the nomination of ICAR. From 2002 two new Dept. *viz;* Silviculture & Agro-forestry and Natural Resource Management were opened with intake of 5 students in each department. But due to non sanction of teaching post by the State Govt. these departments were closed. Currently, the Forestry Department was upgraded as College of Forestry vide Letter No. 7773/GS dated 22.09.2010 of OSD (Legal) of Hon'ble Chancellor, Uttar Pradesh and University Registrar Notification No. CSAU/R 2314/2010 Dated Oct. 26, 2010. The College of Forestry has now imparted teaching under four departments namely Silviculture & Agro-forestry, Tree Improvement & Forest Biology, Forest Products & Utilization and Environmental Science and NRM with the mandate of imparting teaching to undergraduate.

Strength Weakness Opportunity & Threats Analysis and Prospective Plans of Colleges

A. SWOT Analysis of different Colleges

College of Agriculture Main Campus

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Appropriate laboratory facilities especially in Plant Pathology and Soil Science Agricultural Chemistry, Seed Science and Technology, Tissue culture and Soil Testing Lab. • Good infrastructure in terms of building available at the campus. • Appropriate field for research and demonstration of developed technologies	• Technical/supporting staff less aware/lacking with latest technology. • Lack of faculty almost in every department. • Devoid of latest equipment.	• To increase the intake capacity in postgraduate programmes. • To start postgraduate programmes in emerging and newer areas. • Inter-disciplinary research. • Present infrastructure may be utilized to provide training to students of other institutions. • To press state government for creating the desired number of posts as per the ICAR norms. • Creation of various certificate and diploma courses.	• High inbreeding among students and faculties. • Delay recruitment of faculty

College of Agriculture, Lakhimpur Kheri

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Sound infrastructure facility (Under developmental stage)	• Technical/supporting staff must provided opportunity with latest awareness/technology. • No permanent faculty, Lack of fund, Shortage of guest faculty, Lack of contingent fund, • Power supplies only 12-18 hrs at campus, College is situated 35 km away from Lakhimpur Kheri city and 6 km from Gola Gokarnnath town.	• To increase the intake capacity in college of Agriculture, Lakhimpur Kheri campus. • To start Post Graduate program. • Present infrastructure may be utilized to provide the training to students of other Institutions.	• College building still not hand over to the University. • There is no permanent faculty recruited therefore, students will not attract towards our college for

			study. • Lack of sports complex in the college • Roads of college campus still yet to be completed

College of Home Science

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Established smart class, Ph.D. presentation room, institution lab and cafeteria, first aid room, teachers committee room and eco-friendly equipment lab in ECM department. • ELC unit in the department of ECM. • One fully equipped laboratory for U.G. students and two other laboratories for stitching and weaving/knitting are present in the department. • Human Development and Family Studies Department having nursery observation laboratory. • Well equipped child testing lab	• Lack of hi-tech laboratories. • Lack of drudgery reducing equipments in our extension lab. • Since the accreditation of college could not be done, we lack teachers, ministerial staff and highly qualified technical staff. • Lack of separate toilets for males and females in old building and very poor maintenance facilities. • No Vehicle for students RAWE Programme	• To start postgraduate programmes in emerging and newer areas. • Inter-disciplinary research in collaboration with other universities in India and International level. . • HDFS Department can establish a counseling centre for parents and children and conduct remedial intervention • HDFS Department can conduct a pre school teacher's training programme • Rural women can be trained by the Home Science students to make value added clothing and textile articles during RAWE and NSS camp and make themselves economically independent	• Delay recruitment of faculty

College of Agricultural Engineering & Technology, Etawah

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Appropriate workshop facility • Sound infrastructure facility • Appropriate field for demonstration of equipment machinery • Inter-disciplinary contractual faculty and staff from self-finance courses	• Lack of periodical training within university and outside university to Technical / supporting staff. • Lack of faculty in different disciplines, vacant positions needs to be filled. • Existing infrastructure need to be strengthened. • Dependence on traditional class room teaching instead virtual online learning during lockdown due to Covid-19 and the like situations.	• To increase the intake capacity in Agril Engg/ Mechanical Engg., Electronics & Communication Engg. Computer Science & Engg. branch. • To start P.G. program in other branch also. • Inter disciplinary research. • Present infrastructure may be utilized to provide the in-plant training to students of other Institutions. • Adopting to online learning mode Synergistic use of faculties at the campus once posts are filled-up. • Technological development and technological transfer including agro industrial.	• Poor entry of students at UG level. • Poor admission trend due to loss of interest / craze towards engineering education. • Insufficient internet connectivity, • Advance training to teachers for advance course. • Strengthen the training and placement cell at the college campus. • Expected development of teaching, research and extension as per mandate of University of college, is difficult for want of faculty positions

College of Dairy Technology, Etawah

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Appropriate mechanical workshop facility • Sound infrastructure facility • Appropriate teaching faculties available from College of Agril Engg & Technology in the same campus to teach allied courses viz mechanical, electrical and electronics, computer science and civil engineering courses. • Library facilities also available from College of Agril Engg. & Technology. • Ministerial staff support from College of Agril Engg. & Technology.	• No permanent teaching and non-teaching staff available, teaching done through Guest Faculty only. • Lack of laboratory equipment and machine even for basic needs. • Lack of books, journals and periodicals • No facilities available to provide experiential learning to the students. • Lack of smart classrooms.	• P.G. program may be introduced. • Creation of central instrumentation lab facilities. • Synergistic use of faculties at the campus once posts are filled-up. • Technological development and technological transfer including agro food / dairy products processing.	• Delay recruitment of faculty. • Insufficient internet connectivity, • Advance training to teachers for advance course. • Strengthen the training and placement cell at the college campus. • Expected development of teaching, research and extension as per mandate of University of college, is difficult for want of faculty positions

College of Fisheries Science & Research Centre, Etawah

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Good building structure, sufficient earthen and pitched wall ponds available • Inter-discipline teaching faculties available from College of Agril Engg. & Technology to teach allied courses *viz* mechanical, electrical and electronics, computer science and mathematics courses. • Some support from Library also available from College of Agril Engg. & Technology. • Ministerial staff support from from College of Agril Engg. & Technology.	• No permanent teaching and non-teaching staff available, teaching done through Guest Faculty only. • Lack of laboratory equipment and machine even for basic needs. • Lack of books, journals and periodicals • No facilities available to provide experiential learning to the students. • Lack of smart classrooms.	• P.G. program may be introduced. • Creation of central instrumentation lab facilities. • Synergistic use of faculties at the campus once posts are filled-up. • Technological development & technological transfer including agro food / dairy products processing.	• Delay recruitment of faculty. • Insufficient internet connectivity, • Advance training to teachers for advance course. • Strengthen the training and placement cell at the college campus. Expected development of teaching, research and extension as per mandate of University of college, is difficult for want of faculty positions

College of Horticulture

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Well established blocks of Mango, Litchi, Ber , Phalsa, Citrus species, Aonla, Jackfuit, Jamun, Pomegranate cultivars.	• Lack of trained/skilled workers for various propagation works in the nursery.	· Intake capacity of UG & PG students may be enhanced. · Creation of Post Harvest management department.	• Lack of faculty • Delay recruitment of faculty.

• Well established blocks of Rose and different species of Shrubs, ornamental and flowering plants. • Well established model of Sunken Garden. • Few plants of other minor fruits such as Custard Apple, Bael, Loquat, Tamarind, Wood apple (Kaintha), Monkey Fruit, Karonda and Low chilling peach etc., are also present. • Nursery in two hectare area having different sapling/plants of various species of ornamentals, annuals, perennials, flowering avenue trees, different fruit species, medicinal and aromatic plants for practical work of students and for selling to the orchardists/ city peoples for beautification of land.	• Lack of skilled lab technician in the departmental labs. • Lack of subject-specific teachers in the department. • Lack of fund for various time to time works in the department, raising of nursery, different intercultural and after care activities in the garden/nursery		

College of Forestry

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
• Well established college building. • Well established biodiversity park in catchment area.	• Non creation of faculty in the college. • Lack of high quality infrastructure	• Creation of various certificate & diploma courses. • Introduction of PG programme	• Lack of faculty & supporting staff

B. Prospective Plans

Short term plan (0- 03 Years)	Medium Term plan (03- 05 Years)	Long term Plan (> 05 Years)
College of Agriculture Main Campus		
• Development of good facility of online teaching at UG & PG level. • Establishment of U.G. Computer Lab with 50-60 computers. • Uninterrupted electric supply to all departments/campus. • High vision camera in examination. • Inclusion of multimedia based teaching in lecture class room. • To prepare practical manual for different courses. • Frequent exchange programme of faculty and students to exposure nationally/Internationally.	• Online attendance of B.Sc., M.Sc. & Ph.D. and their class room monitoring on screen. • Establishment of high standard central instruments lab with all facilities of quality analysis. • Establishment of various high standard labs for various diploma programmes. • Model class room to be set up for advance teaching • Creation of standard research infrastructure for PG students through rejuvenation of CIL	• Development of software for online submission of marks from each department. • Participation and collaboration of seed and agro based industry in academics of U.G. and P.G. activities. • Development of software for online examination of students.

• E-filing & Biometric • Digitalization & strengthening of Library • Human resource development • Development of vibrant linkages with Industry • Preparation of objective books on different subjects of Agriculture for competitive examination of JRF/SRF/NET etc. • Off line certificate course on "Mushroom cultivation" to be initiated at Mushroom Research & Development Centre, Department of plant Pathology. • Off line certificate courses on "International Agricultural Trade Management" to be initiated at Agricultural Business. • Short Term soil testing course to be run at Department of Soil Science & Agriculture Chemistry. • Each and every department should monitor selected farmer farming system of two villages for doubling farmers' income. • As per need, extra classes to be taken to complete the syllabus within time due to Covid-19 situations. • e-learning materials of various courses to be prepared and loaded in NAHEP-ICAR website. • Development of entrepreneur of UG students through experiential learning programme. • Development of Plant health clinic centre to solve the farmer's problem. • Beautification of the campus through tree plantation and other management practices. • Faculty up-gradation through training, extra moral lecture, participation in seminar & symposium and foreign visit. • Development of general exhibition gallery and Butter fly park for identification of insect by visitors farmers and students of University • English spoken courses to be run to support communication skill in English for UG/PG foreign students. • Establishment of smart classes • E-content to students, mooc		

College of Agriculture, Lakhimpur Kheri		
• Appointment of qualified guest faculty • To arrange extramural lecturers for student and faculty • To prepare practical manuals for different courses as per ICAR fifth Dean's Committee recommendation. • Finance for smooth functioning of laboratories. . • Maintenance unit staff requirement for college E-filing & Biometric Digitalization & strengthening of Library Human resource development Development of vibrant linkages with Industry Establishment of smart classes E-content, Video tutorials to students, mooc	• Creation of new Hostels • Emphasis will be given to development of sports complex. • To develop linkages with ICAR institutes. • Auditorium for conducting seminars, cultural activities etc. • Establishment of Library • Establishment of Gene bank on medicinal & aromatic plant • Landscaping & beautification of campus	• Establishment of well equipped laboratories. • Establishment of playgrounds, swimming pool and indoor halls for gymnasium, TT, badminton. • Need of Common Instrumentation Laboratory • Library Networking & online journal subscription
College of Home Science		
• Strengthening of lab. • Functioning of food processing lab. • To produce and disseminate material on nutrition to policy makers, the media, educations, food industry, farmer associations and consumers. • Encourage innovations in the dissemination of nutrition knowledge. • To prepare the undergraduate to take graduate program in applied Human Nutrition and food Science and post harvest technology. E-filing & Biometric Digitalization & strengthening of Library Human resource development Development of vibrant linkages with Industry Establishment of smart classes E-content, Video tutorials to students, mooc Adoption of SHG Establishment of Nutri kitchen gardening Development of Nutri products (Millets, Drumstick, etc.)	• Establishment of diet counselling lab. • Establishment of well advanced equipped laboratories. • To provide quality training for a diverse group of students in academics, health care and education by integrating clinical and profession experiences with an innovative evidence based curriculum. • Orientation of the U.G. Programme towards specific specialization. • Establishment of internship programs, a shift of focus learning and achievement based evaluation. • Up gradations of Home Science syllabus at undergraduate level in accordance with the vocational needs of the students in order to fulfill its status of being a vocational area of study and to validate its aim to equip students with entrepreneurial skills.	• To make all 5 labs well equipped with modern technology to enable students to learn hi-tech modern techniques. • To establish video conferencing room, 500 capacity auditorium, documentary room for students, farm women and home scientists. • To offer long term and short term certificate courses likes dietitian, fashion designing, mass communication, journalism, housekeeping, interior designing, food presentation, etc. so that the students are able to became entrepreneurs in future years. • To build women training centers and rural women hostels to encourage long term relationship among training programs and rural women.
College of Agricultural Engineering & Technology, Etawah		
• Provide year round personality development programme and quality education to UG and PG students. • Facilitate research environment for the students as well as scientists. • Arrange and organize skill development training, industrial / internship training and experiential learning program.	• Development of LCD based classes in each department. • Strengthen existing laboratory and workshop. • Installation of RO system in academic building similar to Administrative building. • Strengthen and digitalized main library in terms of books,	• Establishment auditorium of 1000 capacity. • Development of existing Advance Research Centre (ARC) • Strengthen the existing workshop with latest and machines. • Creation of Renewable Energy

• Organize inter and intra institutional workshops and seminar. • Arrangement of classes for JRF, GATE and competitive exams for higher education. • Arrange extra mural lectures and strengthen the extension activities. • Strengthen of existing computational facilities as per AICTE norms. • Strengthen of library as per AICTE norms. • Strengthening existing labs with basic instruments / tools / machines • Establishment of Video conference lab in each department. • Arrange and organize skill development training, industrial / internship training, in-plant training and hands on training • E-filing & Biometric • Digitalization & strengthening of Library • Human resource development • Development of vibrant linkages with Industry • Establishment of smart classes • E-content, Video tutorials to students, mooc	journals and periodicals along with library management software. • Extension of wifi internet facility in Residential Campus.	Centre • Enhance existing intake capacity each UG and PG programs
College of Dairy Technology, Etawah		
• Provide year round personality development programme and quality education to UG students. • Procurement and establishment of smart class rooms for each department. • Strengthening existing labs with basic instruments / tools / machines and strengthening library. • Arrangement of extra moral lectures and strengthens the extension activities. • Arrangement of classes for JRF, GATE and competitive exams for higher education • Establishment of Video conference lab in each department. • Arrange and organize skill development training, industrial / internship training, in-plant training and hands on training E-filing & Biometric Digitalization & strengthening of Library Human resource development Development of vibrant linkages with Industry Establishment of smart classes E-content, Video tutorials to students, mooc	• To start summer and winter short courses to update the knowledge of staff • Development of LCD based classes in each department. • Strengthen existing laboratory and developing dairy workshop. • Procuring more number of books, journals and periodicals along with library management software. • Establishment of Milk Homogenizer Unit • Establishment of butter manufacturing Unit • Establishment of Ghee Manufacturing Unit • Establishment of students training dairy plant	• Establishment of Bulk Milk Chilling Unit • Establishment of Milk Chilling Plant • Establishment of Milk pasteurization unit • Establishment of Ice cream manufacturing unit • Strengthen of dairy workshop with latest Technology • To introduce M. Tech. programs in dairy technology, dairy engineering; etc

College of Fisheries Science & Research Centre, Etawah		
• Provide year round personality development programme and quality education to UG students. • Procurement and establishment of smart class rooms for each department. • Strengthening existing labs with basic instruments / tools / machines and strengthening library. • Arrangement of extra mural lectures and strengthens the extension activities. • Arrangement of classes for JRF and competitive exams for higher education • Establishment of Video conference lab in each department. • Arrange and organize skill development training, industrial / internship training, in-plant training and hands on training • E-filing & Biometric • Digitalization & strengthening of Library • Human resource development • Development of vibrant linkages with Industry • Establishment of smart classes • E-content, Video tutorials to students, mooc	• To start summer and winter short courses to update the knowledge of staff • Development of LCD based classes in each department. • Strengthen existing laboratory and developing hatchery unit for students. • Procuring more number of books, journals and periodicals along with library management software. • Establishment mini RAS fish culture for students • Establishment of Bio-floc fish culture for students	• Strengthen of hatchery units and strengthening traditional fish culture • To introduce MFSc in different discipline of fisheries sciences
College of Horticulture		
• Development of different teaching-aids for skill up-gradation of under & postgraduate students. • Collection and maintenance of different *minor fruits in the department from different regions.* • Standardization of protocol for organic farming in various fruit crops. E-filing & Biometric Digitalization & strengthening of Library Human resource development Development of vibrant linkages with Industry Establishment of smart classes E-content, Video tutorials to students, mooc	• Development of /Standardization of propagation technologies for different fruit crops with respect to changing climate through research work with post-graduate students. • Standardization of low-cost production technology in changing climatic conditions in different fruit crops under central U.P. conditions. • Standardization of post-harvest techniques and efficient processing techniques for various fruits.	• Standardization and popularization of *minor fruits production technologies for different minor fruit crops.* • Standardization of agro-techniques for protected cultivation of some specific fruits such as strawberry and cape gooseberry.
College of Forestry		
• Expansion of Department (Facilities to be developed such as buildings/Labs/Equipments etc.) • Unfurnished building-need to complete the furnishing of forestry building • Projects on development of agro-techniques of medicinal and aromatic plants	• Development of /Standardization of propagation technologies for different forestry plants with respect to changing climate through research work with post-graduate students. • Establishment of exotic forestry plant nursery.	• Development of Agro-forestry models

• To develop Agro forestry and horti-mediculture models • Establishment of Nursery of QPM • E-filing & Biometric • Digitalization & strengthening of Library • Human resource development • Development of vibrant linkages with Industry • Establishment of smart classes • E-content, Video tutorials to students, mooc		
Establishment of New Colleges		
• Establishment of College of Veterinary Science & Animal Husbandry • Establishment of College of Basic Science & Humanities		

Research

University came into existence in March 1975 and since then its contribution and achievements are flourishing continuously even today. The University has taken several programmes and initiatives for furthering agricultural research which have resulted in several notable contributions and remarkable accomplishments as narrates its glorious past of this Centenary agricultural institution. Attempt has also been given to develop low cost production technology especially for small and marginal farmers who hardly managed high investment. Many released varieties were found suitable in cropping systems and paved a way for diversification of Agriculture and greater emphasis is being laid on improving agriculture productivity by developing short duration, high yielding, diseases and pests resistant varieties in crops with their matching agro-techniques suited to various regions.

Directorate of Research of the University was established in March 1975 with Mandate of Planning, Execution, Monitoring, Co-ordination, Evaluation and Impact Assessment of Research Programmes across the Faculties to cater the research needs of two agro-climatic zones of state of Uttar Pradesh namely, South-Western Semi- Arid and Central plain zones covering 22 districts of five administrative divisions *viz.*; Lucknow, Kanpur, Prayagraj, Aligarh and Agra. The University has a long history of significant research contributions made by the well established faculties, Research Sections, Regional Stations and research farms and developed more than 280 high yielding varieties in cereals, oilseeds, pulses, vegetables and other important crops. University have four Research Sections (Rabi cereals, oilseeds, legumes and vegetables), four crop units (paddy, sorghum, cotton & tobacco), five Regional Research Stations (Kalai Aligarh, Mainpuri, Hazratpur-Firozabad, Daleepneger-Kanpur, Saini–Kaushambi,) and 14 farms (research and seed multiplication).

Productivity Constrains and area of Research:

The area jurisdiction of University spread over in two zones of State of Uttar Pradesh *viz*; South Western Semi-arid Zone and Central Plain Zone and working for enhancement of the agricultural and socio-economic development of the regions. The agriculture productivity constraints of both the zone is depicted as below:

South- Western Semi Arid Zone

- Problem of brackish water in Mathura, Agra and Aligarh districts.
- Problem of salinity/alkalinity in all districts of the zone.
- Depletion in ground water in all districts of the zone.
- Emerging deficiency of secondary nutrients and depletion of organic carbon in soils.
- Diseases like Alternaria blight, white rust and aphid in mustard, powdery mildew in pea, wilt in gram and pigeonpea, late and early blight and black scurf in potato, problem of bud necrosis in groundnut and pest attack in cotton are the serious problems of the zone.
- Severe incidence of insect, pests & diseases and complex problems in crops.
- Non availability of quality seed of high yielding varieties. 8. Lack of varieties of falsa, ber, bel, aonla and citrus and suitable agro-techniques.
- Epidemics, parasitic infestation, malnutrition, delay in puberty in buffalo & goat, brucellosis, anoestrous and mastitis in buffaloes and higher calf mortality.
- Lack of farming system modules for ravines.
- Slow pace of technology flow towards end users.

Central Plain Zone

- Depletion in ground water in all districts of the zone.
- Emerging deficiency of secondary nutrients and depletion in organic carbon in soils.
- Powdery mildew in pea, wilt in gram and pigeonpea, Alternaria blight, white rust and aphid in mustard, yellow mosaic in green gram and black gram, late and early blight and black scurf in potato are the serious problems of the zone.
- Severe incidence of insect, pests & diseases and complex problems in crops.
- Incidence of nematodes is an emerging problem in crops.
- Lack of climate resilient varieties of paddy, wheat, barley, mustard, chickpea, fieldpea, pigeon pea.
- Non availability of quality seed of high yielding varieties.
- Alternate bearing, fruit dropping, mealy bugs in mango and fruit fly and wilt in guava.
- Heavy fruit dropping in aonla.
- Stem and fruit bores in brinjal and tomato.
- Epidemics, parasitic infestation, malnutrition, delay in puberty in buffalo & goat, brucellosis, anoestrous and mastitis in buffaloes and higher calf mortality
- Unavailability of quality fingerlings, malnutrition, low production potential, higher fingerlings mortality and low maintenance of water bodies in fisheries.
- Slow pace of technology flow towards end users.

Research Projects

Twenty seven non-plan research schemes are running in the various departments, Research Section, Crop units, Regional Research Station, Crop Research Station besides, sixteen All India Coordinated Research Projects (AICRPs) are operating in the University for which Indian Council of Agriculture Research has been providing 75% financial support and 25% are meeting out from State Govt. The zone wise their location is as under;

- One AICRP on groundnut is running in South-western Semi-arid Zone.

- Fifteen AICRP on wheat & barley, rapeseed and mustard, cotton, linseed, vegetables, Integrated farming systems, soil salinity, tobacco, potato, castor, paddy, Pigeon pea, pesticide residue, breeder seed production, Agro-meteorology and seed technology are operating in Central Plain Zone.

Prologue of Research Sections

1. Section of Rabi Cereals

Wheat research work started in 1904 by Dr. H.K. Leak first Economic botanist in U.P. Wheat variety C-13 and C-46 were developed during 1916 and 1920, respectively. Wheat variety K-68 developed in 1963 and K-65. This centre awarded further momentum with sanction of breeding for rust resistance in wheat in 1956. Later on, to strengthen the ongoing programme an All India coordinate Wheat and Barley improvement project (AICWBIP) was sanctioned by ICAR New Delhi in 1971. University is also have credited with develop of an internationally acclaimed wheat varieties K-9107(*Deva*), adopted by Bangladesh for large scale cultivation and K-9006 (*Ujiyar*) used by Nepal and released as *Achutya*. Since then this centre has developed 42 wheat & 32 barley verities till date for general cultivation under different agro-climatic conditions. A Centre of Excellence for wheat was established during 2018-19. The wheat improvement programme in this university is one of the oldest initiate since 1904 in India.

This centre has the credit to develop 42 varieties among K 68, K 9107 and K 306 recognized best for chapatti making. This university also took lead in the development of a climate smart variety, Halna, Unnat Halna which has high terminal heat-stress escape mechanism while newly developed variety K 1317 recognized as best variety under restricted irrigation condition. Bio fortified Variety K1006 possessed high content of Zn-49.2 ppm and Fe – 45.4 ppm,K 1317 having 43.05 PPM Iron and 38.3 PPM Zinc and K9107 high Protein Content: (14 %) were released as best option available to alleviate hidden hunger prevailed in India.

2. Oilseed Section

Research work was started on oilseeds in 1922-23 under the control of Economic Botanist Oilseeds, pulses and millets when Dr. T.S. Sabnish I.A.S. was incharge of this section to conduct the research on Rapeseed-mustard, linseed, sesame, castor and groundnut. All India Coordinated Research Project (AICRP) on rapeseed-mustard, linseed, sesame and groundnut was started in September 1967. This centre has developed number of Rapeseed mustard varieties that were popular at National level. More than 30 varieties are developed till date for general cultivation under different agro-climatic conditions. Type 11 is the variety developed in 1936 for central tract of UP. Varuna is the most popular variety of rapeseed mustard developed in 1975 for entire country. These varieties are widely used in various breeding programmes in India for improvement of rapeseed mustard.

3. Legume Section

Legume section is an oldest and premier pulse improvement centre of country. Work on pulses in this section was started in 1943 by inception of pulse scheme jointly funded by ICAR and State on 50:50 basis. Fully fledged "Section of Economic Botanist (Legumes)"was established in 1962.More than 60 varieties of different pulses were developed by this section i. e. of Chickpea, Field pea, Lentil, Urd bean, Moong bean and Pigeon pea.

4. Vegetables Section

State Government had established a research unit for the improvement of vegetable crops at Alambagh, Lucknow in 1951. Thereafter in 1954, this unit was shifted from Lucknow to Kalyanpur, Kanpur under the supervision and administrative control of Late Dr. Y.R. Mehta, Horticulturist. Subsequently in the year 1962, the vegetable research unit was strengthened with the creation of a post of Economic Botanist (Vegetables). During 1971-72, two sub centres of All India Coordinated Vegetable Improvement Project (AICVIP) and All India Coordinated Research Project on Potato (AICRP on Potato) were sanctioned by the ICAR. Thereafter, in 1981-82, Government of India was also sanctioned a project on "Breeder Seed Production of Vegetable crops" to this centre. All India network project on Onion and Garlic was also sanctioned in 2007 to cater the research need of these spices crops. Presently, 02 All India Coordinated Research Projects, 01 Networking project and 01 Seed Spices Development Scheme are running in this section to facilitate the research work. This centre is has developed an early group of vegetable pea variety *Azad P-3*, adopted by several states. Since the inception of this centre, 58 varieties and more than 80 agro-techniques of different vegetable crops have been developed for the cultivation of different agro-climatic conditions

5. Paddy Research Unit

A cooperating centre under the All India Coordinated Rice Improvement Project was sanctioned to CSAUA&T, Kanpur during Xth plan period (2002 - 2007) by Indian Council of Agricultural Research, New Delhi which became operational w.e.f. April 2005 for the development of rice varieties and production technologies for alkaline and inland sodic soils to enhance the productivity of more than 12.0 lakh ha salt affected area. More than 50% area of saline and alkaline soils of the state is confined in

University area jurisdiction. Besides this, the development of varieties for irrigated ecology, aromatic and aerobic rice are also in our priority.

6. Sorghum Research Unit

Sorghum is grown under rainfed condition. Since start-up of sorghum project following major jowar varieties have been developed for general cultivation in state and at national level *viz:* Mau Type-1, Mau Type-2, Versa, Vijayeta and Bundela. Besides these high yielding varieties several local collections were also collected from Bundelkhand region of state. Two promising genotypes namely Acc. no. MASC-5/02 locally known as "Pola" for high protein content (14.43%) and Acc. No. MASC-1/2002 with scented and suitable for "Kui" a local preparation notable.

7. Cotton Research Unit

The research work on cotton improvement at Kanpur was started in 1971, after that it was strengthened with the sanction of All India Coordinated Cotton Improvement Project in the year 1984 by the Indian Council of Agriculture Research, New Delhi with the objectives to develop the new cotton varieties and agro techniques for improvement of cotton in North India especially for U.P. Kanpur is a sub centre for cotton research.

8. Tobacco Research Unit

All India Network Project on Tobacco (AINPT) centre was sanctioned by ICAR-CTRI during seventh plan with an objective for conducting the location specific research on chewing and hookah type tobacco under the administrative control of University, which started functioning from 1988-89 at Saraimira then shifted to Araul Kanpur in 2004. Since then University has developed Patiyali, Kaliponia, Azad Kanchaw and ArR-2).

Mandate/Mission/Vision /Goal

The Mandate/Mission/Vision /Goal of Research Sections/crop units/ Regional Research Stations which are working on various crops *viz;* wheat, barley, Rapeseed & mustard, linseed, sesame and castor, Mungbean, urdbean, lentil, field pea, chickpea, pigeon pea, rajmas, Potato, table pea, brinjal, tomato, cabbage, cucurbits, sem, onion & garlic and spices, Paddy, Sorghum, Cotton and Tobacco are given as under;

Mandate	Mission	Vision	Goal
Crop improvement and development of their agro-techniques in crops	• Ensuring food security of Uttar Pradesh as well India by enhancing the quality, productivity and profitability of crops on an ecologically and economically sustainable mode • To ensure nutritional Security of state by developing high yielding varieties of various crops and their climate friendly matching agro-technique. • Develop technologies to enhance productivity, resource and input use efficiency and profitability without adverse affect on the environment.	• To develop New Plant Type high yielder variety inbuilt with resistant to multiple diseases and insect-pest. • More focus and priority to develop climate smart variety and bio fortification program towards mal-nutrition free India. • To provide solutions to farming community to enhance productivity with profitability through technology transmission. • Improved livelihoods and nutritional food security systems in the country.	• Breeding for biotic and abiotic stresses. • Enhancing nutrition through bio fortification and agronomic fortification for reducing malnutrition. • Sustainable intensification for improved livelihoods • To develop the high yielding varieties with high protein content under stress-tolerant condition. • Disseminate the developed varieties, agro-techniques knowledge about production, post harvest technology and marketing, among the farmers.

SWOT Analysis

The SWOT analyses of Research Sections/crop units/ Regional Research Stations which are working on various crops are given as under:

Research Section/ Unit/ Station	Strength	Weakness	Opportunities	Threats
Rabi Cereals Section	• Strong research and development base • Genetic diversity • Strong linkages coordinated set-up	• Inadequate human resources • Absence of procurement based on quality • Inadequate New Facilities/equipments and farm machineries • No facility of molecular lab • No facility of phytotron and rainout shelter • Poor storage facility	• Bridging yield gaps and addressed stress environment • Strong domestic demands from processing and baking industries and Value addition • Use of new biotechnological and bio-informatics tools	• Deteriorating soil health & Water scarcity • New diseases and insect pests • Global climate change • Global pricing and subsidy policies
Oil Seeds Section	• Strong research and development base • Genetic diversity	• Inadequate human resources • No facility of molecular lab.	• Development of mustard hybrids, transgenics and quality mustard varieties.	• New diseases and insect pest • Water scarcity • Declining in arable area due to urbanization
Legumes Section	• Abundant germplasm of different pulses with vast genetic diversity • Strong linkages and coordinated set-up with central Institutes	• No posting of Agronomist, Pathologist, Entomologist and Biochemist in the scheme. • Lack of suitable infrastructure for pathological/entomological and biochemical work. • Modern agricultural implements/equipments/labs not available. • Poor storage facility for seed, germplasms, and produce.	• An efficient hotspot area for biotic/abiotic stresses. • Strong domestic consumption and requirement for pulses. • Development and dispersal of agronomical technologies	• Climate change and poor soil health. • New emerging pathogen & insect & Pests

Vegetables Section	• Well developed and equipped vegetable research farm. • Huge number of germplams of different vegetable crops. • Linkages with different AICRP/AINRP on different vegetable crops.	• Inadequate skilled and field workers. • Non availability of the funds for dissemination and diffusion of the agro techniques. • Non availability of the quality testing laboratory. • No storage facility for the produce as well as seeds of vegetables crops. • No facility of molecular laboratory. • Lack of adequate irrigation facilities	• Huge domestic demands of the vegetables from processing industries, hotels, restaurants etc. • Use of molecular breeding and development of varieties for protected cultivation and parthinocarpic. • Value addition in vegetables through breeding.	• Low fertility status of the soil. • New emerging insects and diseases. • Climate change. • Perishable products.
Paddy Research Unit	• The AICRPs provide a platform for multi-location testing under a range of environments • It also strengthen networking partnership between various ICAR institutes, SAUs, Central / State Research Institutes as well as private sector.	• Lack of scientific, technical as well as supporting staff. • As of today no segregating generations are available with the centre. • Less number of germplasm/ genetic resources available.	• Field screening facility is available for high, moderate as well as low alkalinity stress. • Great scope to develop the high yielding genotypes for salt affected soils and direct seeded aerobic cultivation. • Local land races of aromatic rice may be collected and improved.	• New emerging insect and diseases. • Climate change.
Cotton Research Unit		• Lack of well-equipped laboratory for quality test of cotton. • Lack of skilled technical manpower for quality seed production & operating the ginning/quality machines.	• Scope for developments of disease and insect-pests resistant varieties/hybrids & highly salt tolerant varieties/hybrids have good opportunities for higher production.	• New emerging insects and diseases • Poor industrial demand in Uttar Pradesh
Tobacco Research Unit	• Abundant germplasm of different Indian tobacco with vast genetic diversity.	• The full potential is not being utilized due to inadequate market intelligence.	• The identification of several tobacco physiochemicals beneficial to mankind, exploitation of tobacco for alternative uses is promising opportunity.	• Pressure from anti-tobacco lobby and stringent regulations being enforced by government are posing a major threat to tobacco production.

Sorghum & Maize	• More than 250 inbred lines and 29 populations are maintained in genetic stock based on various morphological, maturity duration, agronomic traits, resistance to biotic/ abiotic stresses and quality traits	• Non- availability of quality testing lab and molecular analyzing laboratory. • Inadequate human recourses for research.	• Maize a crop can grow around the year. • Export potential of maize grains and value added products to the neighboring countries. From importer to exporter. • Consumer's preference is increase as use of maize fit for health" concept.	• High cost of Hybrid seeds in open market. • Lack of maize processing units in state.
Regional Research Stations, Kalai - Aligarh	• The station was established for the location specific problems solving, need based research of the region. • Abundant germplasm of chickpea and urdbean with vast genetic diversity.	• Lack of scientific staff • Lacking of infrastructure facilities like- laboratory farm implement/equip ments. • Lack of office building, fencing/boundar y wall and poor electricity supply.	• To develop agronomic practices to provide favourable environment to crop growth and to improve nutrient efficiency. • Selection of more nutrient efficient genotypes of the major crops of the zone to increase nutrient use efficiency.	• Deteriorating soil health. • Emerging new diseases and insect pests complex. • Water scarcity, Global climate change, pricing and subsidy policies.
Regional Research Stations Daleepnaga r-Kanpur	• The station was established for the location specific problems solving, need based research of the region and also engaged in reclamation, management and utilization of such problematic soils through the agronomic practices like the crop rotation. • The Centre is also conducting the researches on important vegetable and fodder of the area.	• Lack of scientific staff Agro-forestry, Animal nutrition and plant breeding. • Lack of infrastructure facilities like laboratory, equipments • Lack of supporting staff • Lack of funds • Lack of vehicle.	• To develop agronomic practices to provide favourable environment to crop growth and to improve nutrient efficiency of salt affected soil. • Centre has multidisciplinary research system to augment and diversify the production system under sodic soils to generate more income and enlarge the opportunity for productivity.	• Deteriorating soil health. • Area specific research

Regional Research Stations, Mainpuri	• The centre was reformulated under ZARS for additional function of KVKs from July 2000. • The Centre has lead research work on groundnut improvement of the state.	• Lack of scientific, technical as well as supporting staff	• To develop improved high yielding and superior groundnut for overall production of the state.	• Deteriorating soil health. • Becoming Gray zones of water availability. • Emerging new diseases and insect pests complex.
Regional Research Stations Hazratpur Firozabad	• The station was established for the location specific problems on soil and water conservation. • To develop agro-forestry packages for animals.	• Lack of scientific staff specialized in soil and water conservation. • Centre is lacking with horticultural and agro-forestry management. • Lacking office, laboratory farm fencing equipments	• To develop agronomic and horticultural modules and agroforestry package & practices for the development of the region.	• Deteriorating soil, water research of the station. • Declining cultivable area due to fast soil erosion.
Regional Research Stations Saini-Kaushambi	• The station involved for the location, specific problems, need based research of the region. • Engaged for the quality seed production of cereals, pulses and Oil seeds through active monitoring.	• Lack of scientific staff specialized in crop improvement, crop management of the region specific. • Infra structural facilities including office and lab are not properly available.	• To evaluate and develop site specific improved varieties and agronomic practices for favourable environment to crop growth specialized in cereals, pulses and oil seeds.	• Deteriorating soil and water health • Water scarcity climatic changes affecting crop health. • Lacking human resources.

Prospective Research Plan

The prospective research plan for Research Sections/crop units/ Regional Research Stations which are working on various crops are given as under;

Discipline	Short term plan (0- 03 Years)	Medium Term plan (03-05 Years)	Long term Plan (> 05 Years)
Breeding	• Effective exploitation of genetic resources for varietal improvement: • Collection, evaluation and conservation of genetic resources • Narrowing the gap between the productivity of varieties and farmers field: Farmers will be made aware through technology flow about new varieties, management practices and seed replacement. They will also be benefitted by providing the seed of newly released varieties through FLDs. • Site characterization: Soil profiling for fertility status, nutrient deficiency, stress level	• Effective exploitation of genetic resources for varietal improvement: • Germplasm conservation, evaluation and documentation of different crops. • To develop Climate Smart Variety through new techniques. • Work will be initiated on Screening of organic crop breeding • Effort and endeavour will be made for the establishment of	• Site and trait specific germplasm conservation, evaluation and documentation of different crops. • Facility for Phenotyping will be developed • Development of the new varieties for hybridization and mutation breeding of different crops. • Marker assisting targeted selection of major genes and quantitative traits to transform

	and water quality of all experiment growing area will be analysed at priority. • One ha area will be converted in organic farming to initiate organic breeding • Strengthening pre breeding activity for terminal heat, restricted irrigation and bio fortification • Effort will be made for procurement of modern equipments • Quality lab will be established • Maintenance breeding work for purification of existing varieties • Adequate screening work will be carried out at Dileepnagar for salt stress. • To produce nucleus and breeder seeds of different crops	Molecular and quality lab • To produce nucleus and breeder seeds of different crops. • Product profile based breeding work will be carried to fetch up International market.	breeding programs will be priority to develop high yielding, inbuilt resistant to major diseases and insect, climate tolerant varieties.
Agronomy	• Weed management practices for complex weed Flora in crop • Agronomic bio fortification • Best management practices to enhance yield and profitability of the farmer in Indo-gangetic plain zone under climatic resilient • Technology for salt stress condition will also be focus plan. • Development & standardization of agro-techniques for enhancing crop productivity:	• Residue management in cropping system • Water management under restricted irrigation and terminal heat • Agronomic bio fortification for selenium to improve human nutrition • Efforts will be made for the procurement of modern equipment for weeding, intercultural and harvesting activities • Development & standardization of agro-techniques for enhancing crop productivity	• Establishment of recourses conservation technology under stress environment • System agronomy for various crops • Develop agronomic practices to provide favorable environment to crop growth and to improve nutrient efficiency
Pathology	• Screen out donors for pest. • Multiple pest screening • Efficacy testing of bio pesticides and chemical against termite, shoot fly and aphids.	• Screen out donors for pest • Monitoring of segregating generations for multiple resistant as regular feature • Scoring the advanced lines for multiple disease	• Screen out donors • Monitoring of segregating generations for multiple resistant as regular feature • Scoring the advanced lines for multiple disease • Facility will be developed for pathotyping

Entomology	• Screen out the donor genotypes and segregating lines against termite, pod borer, shoot flies, aphids, etc. • Multiple pest screening in crop specific • Development of IPM for crops	• Screen out the donor genotypes and segregating lines against termite, pod borer, shoot flies, aphids, etc. • Multiple pest screening in crop specific • Development of IPM for crops	• Screen out the genotypes and advanced lines against common prevailing insects • Multiple pest screening • Efficacy testing of bio pesticides and chemical against termite shoot fly and aphids
Soil Science	• Site characterization: Soil profiling for fertility status, nutrient deficiency, stress level and water quality of all experiments growing area will be analyzed at priority. • All organic wastes should be returned to the soil. • Correct and efficient use of fertilizers, biologically fixed nitrogen, crop residues and their beneficial interactions are of great importance	• Current recommendations need refinement for correct practices to use crop residues. • Deficiency of zinc is wide spread in rice growing areas and deficiency of magnesium, Iron and sulphur in some areas of the zone. • Selection of more nutrient efficient genotypes of the major crops of the zone to increase nutrient use efficiency	• If the natural resources are scientifically and judiciously used, the long term sustainability and stability of production can inevitably be ensured. Adequate amount of the nutrients use is prerequisite to enhance the yield and sustain them. • Integrated nutrient management for rice, wheat and major crops of the zone to test. • To improve soil fertility for sustainable crop production. • To improve fertilizer use efficiency in various crops.
Horticulture	• Development of planting materials/propagating materials such as grafted, budded saplings etc. and distribution to farmers in farmers field demonstration	• Screening efficient plants, cultivars, germplasms of all horticultural plants. • Developing medicinal plant nursery	• Establishment of aonla, guava and other fruit crop orchards at the station

Extension

The Directorate of Extension is primarily an 'outreach service organization' meant to serve farming community. It is a nodal office to coordinate extension programmes of KVKs and responsible for administration, planning, budgeting, coordination, evaluation, monitoring and publication of extension outputs. The major extension programmes are focused on imparting training to farming community, rural youth and extension functionaries, front line demonstrations and location specific research on agriculture, horticulture and post harvest management technologies. Besides, organic farming, medicinal and aromatic plants, Bio-control, mushroom production etc. are the emerging areas to promote farming as entrepreneurship in changing climatic scenario.

Mandate

- To disseminate technology to farmers, extension personnel and organizations engaged in agricultural development through various extension methodologies..
- To facilitate transfer of research emanated technologies and to conduct impact analysis through socio-economic research.
- To maintain seed flow of improved varieties through quality seed production at KVK farms.
- Organization of farm advisory services at the doorsteps of the farmers.
- Imparting trainings for capacity building of human resource.
- Enhance the agricultural vocation.
- Act as a bridge between researcher and farmer to develop demand driven technology.
- Provide services to the farmers through single window delivery system.
- Facilitation in planning, implementation, execution and monitoring of agricultural development.
- Encourage to work in groups at the grass root level for overall development.
- Act as a centre for training in research methodologies in the fields basic to management of rain-fed farming systems
- Provide consultancy.

Mission

- To bridge the agricultural technology gap at grass root level.
- To educate rural people and extension functionaries.
- To create awareness about health, hygiene, environment and bio-diversity conservation for sustainable development.
- To link farmers with newly emerging globalized world by providing them information and guidance.
- To develop a system for effective research and extension linkages.
- To generate employment in the field of agriculture and allied disciplines.
- Integration of IT in rural system for speedy development.

Visions

- "Self-reliant, healthy rural population with rich agricultural knowledge and good marketing intelligence"

Extension Programmes and Activities

- Farm advisory services, refresher and vocational training courses, on-farm trials (OFT), front line demonstrations (FLDs) and field days on farmers' field.
- Training of farmers, farm women, rural youth and extension functionaries.

Road Map

- Demonstrations of new technologies and testing of technologies developed at the research stations through KVKs on farmer's field.
- Organize and participate in various training programmes at the state, university, division, district, block and panchayat levels.
- Provide services to the farmers through; Single window delivery system for availability of technological inputs like seeds, planting materials, bio-fertilizers, bio-pesticides, mushroom spawn etc. and advisory & diagnostic services through Agricultural Technology Information Center (ATIC).
- Act as link between researchers and farmers by updating researches with feedbacks of backend and to help them in developing and reforming "Demand Driven Technology".
- Conducting group visits, publication of extension literature and its distribution among farmers and extension functionaries.
- Organizing distance learning education programmes in agriculture and allied subjects.
- Organizing All India Farmers Fair and Agro-Industrial Exhibitions each year at the university headquarter and also at KVKs.
- University established an Agricultural Information Bureau. It brings out seasonal magazine "KRISHAK BHARATI" and university "NEWS LETTER" to provide information support to farmers and other entrepreneurs.
- Provide help-line services to farmers for satisfy their quarries on help line telephone no. (0512) 2555666 and 2555444 (Toll Free) phone no. 18001805122.
- Developed district wise agricultural contingent plan for deficit rainfall conditions in collaboration with state Agricultural departments.

Strategy and Framework

To accomplish the vision and the mission of the Directorate of Extension concentrate on the following key areas;

- Delivering institutional mechanism for attaining food, nutrition and income security through community mobilization.
- To build capacity and preparedness for climate related challenges by promoting indigenous knowledge and practices coupled with modern scientific knowledge.
- Building capacity of KVK to act as knowledge and resource centre for the benefit of farmers.
- Promote environment friendly technologies, increasing seed replacement rate, use of bio-fertilizers and bio-pesticides for sustainable agriculture.
- Promote linkages, convergence and collaboration with public and private, national and international organizations for the benefit of farming community.
- Promotion and integration of secondary agriculture such as mushroom cultivation, protected cultivation, off-season vegetables for increasing the economic profitability of farmers.
- Focus on rainfed agriculture, degraded land, problematic soils for enhancing income and food production.
- Bringing diversification in farming through focused programmes on horticulture, dairy, feed & fodder, breed improvements in livestock, goat, poultry and fisheries.
- Promote market oriented extension for backward and forward linkages keeping income security of the farmers in mind.
- Focus on entrepreneurship development among rural youths for self employment.
- Empowerment of women through well designed employment oriented trainings and promoting gender sensitive technologies.
- Following strategies are proposed to be adopted to accomplish the vision and goals:

Infrastructure Development

- Renovation of old buildings, farm, boundary walls / fencing etc
- New laboratories in different KVKs, constructions / modernization of meeting halls

- Strengthening of ATIC are proposed to strengthening of extension programme
- Equipments/facilities for farm mechanization

Human Resource Development

- More emphasis on faculty up gradation and development in new areas through exposure visits / training in state of art laboratories / organizations / institution in the country and abroad under bilateral programmes of State / Central Government, participation / conduct of summer / winter courses for effective implementation of new / revised curricula / new subjects like nano technology, bio diversity etc.
- Build on farm innovations and improve farmers' capability through KVKs.

Crop Production and protection

- Strengthening of research on conservation agriculture to protect soil, water and environmental pollution
- Standardization of crop production utilization integrated approach (IPNS/IWM/IPM for changing/emerging cropping systems
- Standardization and promotion of integrated farming approach for better livelihood security
- Study and utilization of underground microbial community in integrated crop management
- Standardization of techniques for organic production
- Development of technique for soil quality management
- Working out models on forecasting of pest/disease incidence
- Testing of botanicals and bio-agents for management of pests and diseases and use of indigenous technical knowledge in their combination

Value addition and marketing

- Establishment of production units for bee keeping, vermin-composting, bio-fertilizers and bio-agents with standardization of techniques for maximization of production
- High-tech horticulture
- Quality seed and seedling production of vegetables and spices
- Development of pre and post harvest technologies for value addition
- Standardization and promotion of low cost poultry and animal feed
- Standardization and promotion of collective marketing and linkage strengthening
- Export promotion

Director Seed & Farm

Use of quality seeds of improved varieties suitable to location specific condition has played a most significant role in enhancing agricultural production and productivity. It is, therefore, imperative to place more emphasis for developing an efficient, effective and latest technology for seeds production involving farmers, which should be relatively low cost and affordable to the low-income farmers in the area jurisdiction of university as well as state as a whole. Besides, teaching, research and extension, production of quality seeds of promising varieties/hybrids of field crops/ vegetables/forage crops seeds /seedlings & saplings of flowers and fruits, mushroom and fingerling production suitable to local specific conditions is the mandatory responsibility of state Agricultural Universities. Keeping in view the increasing importance and awareness of quality seeds among cultivators, the university re-oriented its seeds production programme but to percolate the benefits of high yielding, fertilizer responsive and disease resistant varieties /hybrids suitable to local specific condition to lowest strata of farmers community by way of higher seeds replacement rate, still there is an urgent need for strengthening and expending seeds production programme of the university.

Road Map

Improved seed is a one of the production facility for enhancing agriculture production and productivity of different crops. The seed classified *viz;* Nucleus, Breeder, Foundation and Certified. The yield of different crops increased about 15% to 20% by the use of nucleus, Breeder, Foundation and Certified seed. In command area of Director Seed & Farms only ten farms which are producing only foundation and certified seed. In Agriculture development and modernization, use of quality seed of improved varieties suitable to location specific condition have played a most significant role in enhancing agricultural production and productivity. It is, therefore, imperative to place more emphasis for developing an efficient, effective and latest technology for seed production involving farms, Which should be relatively low cast and affordable to the low income farmers in the area jurisdiction of university. Directorate Seed & Farms was established during the government institutional period of this organization; but real emphasis on seed production was given after the inception of National seed programme. In that process the seed processing unit was established in 1978 in the university.

S. No.	Name of farms	Total Area (ha.)	Cultivable Area (ha.)
1.	C.R.F. Nawabganj, Kanpur	35.20	26.20
2.	ORF. Kalyanpur , Kanpur	62.27	44.00
3.	C.R.F. Daleepnagar, Kanpur	174.58	43.50
4.	C.R.F., Bojha, Kanpur	117.26	20.00
5.	C.R.F., Uttaripura, Kanpur	25.80	21.33
6.	C.R.F., Farrukhabad	3.20	2.20
7.	C.R.F. , Fatehabad Agra	17.72	2.40
8.	C.R.F. , Mainpuri	16.00	16.00
9.	C.R.F. , Kalai Aligarh	15.89	14.70
10.	C.R.F., Saini Kushambi	25.20	22.20
11.	NDF, Kalyanpur	43.06	33.00
12.	C.R.F. Araul, Kanpur	20.84	17.84
13.	C.R.F., Deegh, Kanpur Dehat	22.70	17.25
14.	V R F, Kalyanpur, Kanpur	24.02	17.80
15.	SIF, Nawabganj, Kanpur	32.00	27.80
16.	ODF, Nawabganj , Kanpur	34.80	32.00
	G. Total	**710.54**	**358.22**

Prospective Research Plan

The prospective research plans for Seed Production of various crops are given as under:

Discipline	Short term plan (0- 03 Years)	Medium Term plan (03-05 Years)	Long term Plan (> 05 Years)
Farm Development	• Relayout of farm & Modernization of farms • Modernization of irrigation facilities • Fencing • Mechanization • Conversion of uncultivated area into cultivation (50 ha) • Crop residue management • Plantation on 50 ha	• Development of ICT enabled seed production infrastructure • Conversion of uncultivated area into cultivation of crops (100ha)	• Conversion of uncultivated area into cultivation of crops (150ha)
Nucleus seed Production	• Maintenance breeding of University develop varieties • Emphasis will be given to nucleus seed production	• Maintenance breeding of University develop varieties • Emphasis will be given to nucleus seed production	• Maintenance breeding of University develop varieties • Emphasis will be given to nucleus seed production
Breeder Seed Production	• Emphasis will be given to Breeder Seed Production of University developed varieties & indented varieties of other institutions	• Emphasis will be given to Breeder Seed Production of University developed varieties & indented varieties of other institutions	• Emphasis will be given to Breeder Seed Production of University developed varieties & indented varieties of other institutions
Foundation Seed Production	• Enhancement in foundation seed production upto 7000 qts	• Enhancement in foundation seed production upto 9000 qts	• Enhancement in foundation seed production upto 10000 qts
Processing Plant	• Modernization of seed processing infrastructures	• Extension of processing infrastructures	
Seed Marketing	• Introduction of online seed marketing	• Online seed marketing	• Online seed marketing
Value addition of farm produces	• Creation of Infrastructure for value addition of farm produce • Marketing of value added farm products	• Extension of marketing for value added farm products	• Extension of marketing for value added farm products

Epilogue

Chandra Shekhar Azad University of Agriculture & Technology, Kanpur is dedicated towards the agrarian economy and farmers of Uttar Pradesh in different branches of agriculture and allied sciences and to develop high quality human resource for cause agricultural development, maintaining rural prosperity and livelihood security and to make strides in agricultural science research, education and extension for sustainable agriculture development.

The ongoing programmes and outreach activities of the University is aimed at continuous improvement in agriculture and allied sectors by developing trained human resources, manpower, providing location specific production technologies and dissemination of technologies to the farmers' fields through agricultural education, research and extension approaches, with a view to prove excellence in areas of concern to realize the concept of "Food Security & nutrition security". Inspite of development of cutting edge technologies in various fields, there are still several challenges and constraints for enhancing agricultural productivity. Attempts have been made to identify the constraints of teaching, research and extension that limit overall farm productivity & return, and these are the main issues of roadmap. The suggested strategies through integrated multi-disciplinary approach will be key factors for enhancing overall progress as well as inclusive agricultural growth. University agricultural education, research and extension approach would certainly be helpful in augmenting farm production, farmers' income and enhancing the employment opportunities to the agrarian communities.

For effective implementation of the identified programmes, linkages will be fostered with national and international R&D institutions on one hand and with the beneficiaries/farmers/industries and other stakeholders on the other hand, through collaborative research, consultancy, contract research and contract service, training, extension activities, etc.


अमर शहीद चन्द्रशेखर आजाद
सन १९०६ - १९३१
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