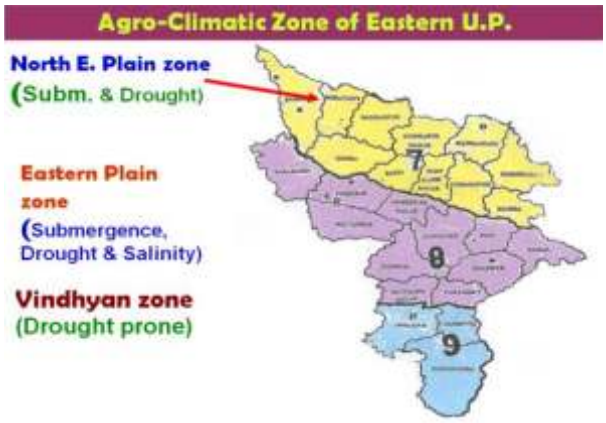
RESEARCH

Mission:

The Directorate of Research is solely responsible for overall supervision, guidance and co-ordination of need based and production oriented agricultural research in 26 districts belonging to seven revenue divisions viz; Faizabad, Basti, Devipatan, Gorakhpur, Varanasi, Azamgarh and Vindhyachal Dham of eastern U.P.

Service Area:

The Directorate of Research governs the research activities in three agro-climatic zones i.e., North Eastern plain zone (NEPZ), Eastern plain zone (EPZ) and Vindhyan zone (VZ). The university has seven research stations in different agro-climatic zones under its jurisdiction. These research stations are listed below:



NEPZ:

1. Crop Research Station (CRS) Ghaghraghat (Bahraich)- Main centre for Deep Water Rice Research.
2. Crop Research Station (CRS) Bahraich- Centre for Maize, Juteand Agro-meteorology research.
3. Zonal Agril. Research Station (ZARS) Basuli (Mahrajganj) – Centre for crop research.

EPZ:

1. Main Campus, Kumarganj (Faizabad)- Centre for basic and applied research through different colleges in various disciplines of Agriculture, Horticulture and Forestry, Veterinary Science and Animal Husbandry, Fisheries, Agril. Eng. & Tech. and Home Science.
2. Crop Research Station (CRS), Masodha (Faizabad)- Main Centre for Rice Research.
3. Zonal Agricultural Research sub-station (ZARSS) Baribagh & Ankushpur (Ghazipur)- Centre for crops research

VZ:

1. Zonal Agricultural Research Station (ZARS) Tissuhi, (Mirzapur)- Centre for Pulses and Oilseed research.

Zonal Research and Extension Advisory Committee (ZREAC) Meeting:

ZREAC meetings were held on 21-05-2018 at Crop Research Station, Masodha for Eastern Plain Zone &Vindhyan Zone, on dated 23.05.2018 at Crop Research Station, Bahraich and on dated 30.10.2018 at Crop Research Station, Ghaghraghat for North Eastern Plain Zone. In these meetings, the scientists as well as farmers of respective zones participated. The technical problems were solved by the

scientists and technical programmes of scientists of Crop Research Stations were also discussed and finalized.

Technical Programme Meeting:

The technical programme meetings were convened from 17-19 May, 2018 in kharif season and 23-24October, 2018 during rabiseason. In these meetings, the technical programmes of the research projects were thoroughly discussed and approved after necessary corrections.

QRT:

- QRT of AICRP on Meditional and aromatic plant headed by Dr. H.S.Gupta, Dr. A. K. Shashne, Dr. R. Nagaraja Reddy, Dr Harihar Ram visited the centre during 16th July to 17th July, 2018 to access the progress of the project.
- QRT of AICRP on Wheat&Barley was presented on 21st January 2019 at BHU Varanasi in the chairmanship of Professor R.B Singh.

Research Projects:

Based on the location specific problems affecting productivity and farmers needs, the research programmes are formulated by the scientists concerned. During 2018-19,54 research projects are functioning in the University. The details are given below:

A- All India Co-Ordinated Research Projects (75% ICAR share and 25% State share):

S.No.	Name of the Project/ Scheme	Year of Start
1.	AICRP on Rice Improvement	1976
2.	AICRP on Deep Water Rice	1976
3.	AICRP on Maize Improvement	1976
4.	AICRP on Wheat & Barley Improvement	1987
5.	AICRP on MULLaRP Crops	2001
6.	AICRP on Chickpea	2001
7.	AICRP on forage Crops Improvement	2001
8.	AICRP on Potential Crops	1995
9.	National Seed Project (Crops)- 1- Seed Technology Research 2- Breeder Seed production	1978
10.	AICRP for Dry land Agriculture	1987
11.	AICRP on Irrigation Water management	1980
12.	AICRP on Integrated Farming System	1976
13.	AICRP on Vegetable Improvement	1980

14.	AICRP on Potato Improvement	1987
15.	AICRP on Spices	1995
16.	AICRP on Arid Fruits	1987
17.	AICRP on Medicinal & Aromatic Plants	1980
18.	AICRP on Agro-forestry	1987
19.	AICRP on Agro-meteorology	1990

B- Scheme 100% Financed by ICAR:

1.	National Initiative on climate resilient agriculture (NICRA) – Dryland Agriculture	2010 to contd.
2.	NICRA (Agro-meterology)	2010 to cont.
3.	Mega Seed Project	2016-17

C- Research Projects Financed by International Agencies:

1.	Stress tolerant rice for poor farmers of Africa and South Asia (STRASA) Submergence & salinity – H.Q. and CRS, Masodha	2003-04 to 2018-19

D- Research Projects Financed by Other National/ State Agencies:

1.	Gramin Krishi Mausam Seva (i) Head Quarter, Kumarganj Ministry of Earth Science (IAAS) (ii)Bahraich	1993
2.	Mission Integrated Development of Horticulture (MIDH)	2005
3.	Forecasting Agricultural output using space, agro-meterology and land based observations (FASAL) Ministry of Earth Science (Govt. of India)	2010
4.	Development of High-Yielding salt tolerant rice varieties through marker assisted back cross breeding and identification of SALTOL QTL for reproductive stage salinity tolerance (DBT) Govt. of India	2015 (ended in Sept.2018)
5.	Creation of Seed hubs for increasing indigenous production of pulses in India(NFSM)	2016-17 to 2017-18
6.	Establishment of Molecular lab for identification of physio-molecular traits in the way of submergence & drought dual tolerance rice varieties for rain-fed low land areas of Eastern U.P. (RKVY)	2016-17
7.	Collection, characterization, evaluation, maintenance and registration of minor seed spices grown in farmers' field (GOI)	2017-18
8.	Conservation, Propagation & Genetic Improvement of Sahiwal Cattle in eastern U.P. (RKVY)	2013-14

9.	CapacityBuilding and Technology Demonstration on Processing of local fruits and vegetables for alternate livelihood of Tharu Tribe Women.- (DST, GOI)	2017-18
10.	Centre of Excellence in Rice (State Govt.)	2018-19
11.	Frozen Cemen Bank for Indigenous Livestock (RKVY)	2018-19
12.	Strengthening of Veterinary Clinical Complex (RKVY)	2018-19
13.	Establishment of model seed testing lab. Under quality control Component of sub mission on seeds & planting material (SMSP) (Ministry of Agril. & Farmers Welfare ,GOI)	2018-19
14.	Establishment of Feed Analysis and Quality Control Laboratory (RKVY)	2018-19

E - Non - Plan Projects 100% Financed by State Govt:

1.	Sodh Scheme (Rice , Masodha)
2.	Oil Seed Project
3.	Pulses Project
4.	Research on Vegetable Crops
5.	Research on Crop Physiology
6.	NARP (Adjusted), Kumarganj, Faizabad
7.	NARP (Adjusted), Masodha, Faizabad
8.	Foundation and breeder seed production unit and strengthening of seed testing lab.
9.	NARP (Adjusted), (Tissuhi), Mirzapur
10.	Sodh Scheme, Tissuhi (Mirzapur)
11.	Flood Rice Research Scheme : Ghaghragaht (Bahraich)
12.	NARP (H.Q.), Ghaghraghat (Bahraich)
13.	Jute Establishment Scheme : Bahraich
14.	NARP Sub Station – Bahraich
15.	NARP (Adjusted), Ghazipur
16.	Sodh scheme, Ghazipur
17.	Production and processing of fruits in usar wasteland
18.	NARP adjusted Basuli

Varietal Improvement:

The major research thrust in crop production has been to develop high yielding varieties of all important crops resistant to biotic and abiotic stresses. As a result during 2018-19, 04 improved varieties were released by State Variety Release Committee. The details of which have been given below:

1. Rice -NDR 9930111 (Shallow & Semi Deep Water): NDR 9930111 was developed from the triple cross of CN 843-7-1/KDML 105//IR49830-7-1-2-3. Yield potential of this variety is 55-60 q/ha. The variety NDR 9930111 posses Short Bold grain type with good cooking qualities, milling 68.1% and head rice recovery is 56.4% with amylose content of about 23.56%. It cooks better as its gel consistency is soft (50 mm) and alkali spreading value of 4.5

2. Linseed (NDL-2011-31) : Rain-fed, duration 120-125 days, yield 12-14 q/ha, oil content 37-39%, resistant to lodging & shuttering as well as wilt rust and powdery mildew.

3. Oat (NDO-1101): Plant height 130-145 cm, duration 130-140 days, yield 18.5-23.5 q/ha resistant to lodging & shuttering, recommended for normal as well as salt –affected soils of U.P.

4. Jute (NDJC-2013): Plant height 4.00 – 4.25 m., duration 160-170 days, resistant to lodging and water logging, tolerant to drought, recommended for upland and lowlands of eastern U.P.

Variety Identified:

A variety of Methi named as Narendra Richa (NDM-79) was identified in workshop of AICRP on Spices. This variety matures in 125-130 days having potential yield 280 q/ha with average yield 120-150 q/ha. The variety is tolerant to alkalinity.

Research Achievements :

Rice:

Crop Improvement:

Lines identified in RATDS trials (2017-18):

- Scented Basmati Type

  NDR 6257

- User conditions

  NDRK 50054, NDRK 50058, NDRK 50060, NDRK 50063

Entries promoted in RATDS trials (2017-18):

- Rainfed upland (100 to 120 days)

  NDR 1170-1-4 (Final year of testing)

- Irrigated Early (100 to 120 days)

  NDR 2104, NDR 2105 (2nd year of testing)

  Irrigated medium (120 to 140 days)

  NDR 3120-10-05 (Final year of testing)

- Irrigated Late (> 140 days)

  NDR 40181, NDR 40182, NDR 40183 (Final year of testing)

  NDR 40501, NDR 40502 (2nd year of testing)

  NDR 8850,NDR 9005 (Final year of testing)

  Slender Grain

  NDR 6304, NDR 6306 (Final year of testing)

- Local scented

  NDR 8400-3, NDR 8418-3 (2nd year of testing)

  User conditions

  NDRK 50051 (3rd year of testing)

  NDRK 50053, NDRK 50055, NDRK 50059, NDRK 50065, NDRK 50069, NDRK 15-1,

  NDRK 15-2, NDRK 15-3, NDRK 15-4, NDRK 15-5 (2nd year of testing)

Deep water:

Rice Production Oriented Survey of 7 districts like Faizabad, Ambedkar Nagar, Barabanki, Sultanpur, Basti, Sant Kabir Nagar and Siddharth Nagar districts of eastern Uttar Pradesh was conducted by scientists of crop research station Ghagraghat revealed that:

- Sheath blight and bacterial leaf blight were observed from low to moderate intensity however false smut was noticed in the late maturing / hybrids rice varieties upto moderate intensity. Infestation of stem borer, leaf folder and gundhi bug was observed from low to moderate intensity in all the surveyed districts.
- *Echinochloa colona, Ecliptaalba, E. crusgalli, Cyperus iria, C. rotundus, Cloeme viscosa, Fimbristylis dichotoma and Paspalum distichum* L. were common weeds found in the rice fields.
- The maximum yield (32.75 q / ha) was recorded with Coragen followed by Token (30.25 q / ha). Among the botanicals, maximum yield (28.60 q / ha) was recorded in Neemazal.
- Transplanting by SRI method produced significantly higher grain yield of rice 36.07 q / ha with application of 50% RDF (120:60:40 kg / ha) + FYM @10 t / ha.
- The maximum grain yield (27.66 q / ha) was recorded with Wheat residue 50% N+ 50% N by Green mannering of Dhaincha.
- Sequential survey of selected villages was done in Bahraich, Gonda and

Barabanki district revealed that slight to moderate incidence of grass hopper, leaf folder, rice hispa, termite, stem borer and gundhi bug was observed at all locations.

- Nativo 0.4g/lit was found effective fungicides reducing leaf blast and neck blast.

Wheat & Barley:

Crop Improvement:

Wheat:

- Release proposal of NW-5013 have been submitted for rainfed condition in U.P.
- NW- 6048 identified for rainfed condition in U.P. and release proposal will be submitted.
- Genetic stock registered – Germplasm IC 252459 of Wheat (INGR-18013) has been registered by Plant Germplasm Registration Committee of ICAR on June 2,2018.
- Improved lines of Wheat NW-7068 and NW-7073 contributed for SATSN.
- Improved lines of Wheat NW- 7062 and NW-7060 contributed for inclusion in theSPL-AST-IR-TS.
- Eight improved entries of Wheat Included in the Different NIVTs. They are NW-7067,
- NW-7060,NW-7057, NW-7064, NW-7075, NW-7053, NW-7062 and NW-7069.
- Thirteen entries included in state adoptive trial.
- NW-7049 has been contributed in MLHT-1 experiment.

Barley:

- NDB-1629 identified for rainfed condition in U.P. and release proposal will be submitted.
- NDB-1639 and NDB-1648 identified for alkaline saline soil in U.P. and release proposal will be submitted.
- NDB-1713 and 21 entries included in state adoptive trials.

Chick pea:

- Desi timely sown-NDG 15-2(AICRP Experiment / State Adoptive trial)
- Desi late sown-NDG 15-4(AICRP (Experiment / State Adoptive trial)

Promoted entries:

- Desi timely sown-NDG 15-6(AICRP Experiment), NDG 14-11(State Adoptive trial)

Mullarp Crops:

Crop Improvement:

- Identified Narendra Urd -3 (NDUZ 14-21) for release from U.P. State Department of Agriculture for Zaid condition. It is moderately resistant to YMV and CLS diseases and producing an average yield 8-10 q/ha.
- Promotion of field pea entry: Field pea genotype developed from NDUAT, Kumarganj Ayodhya has been promoted from IVT dwarf to AVT-1 dwarf
- Promotion of mungbean entry: A mungbean genotype NDMK 16-324 has been promoted from IVT to AVT-1 under NEPZ
- Entry contributed under State

Adoptive Trial; Mungbean: NDMK 16-324 and Urdbean: NDUK 15-222.

- Promising entry of pulses identified resistance to important diseases;Urdbean: NDU 3-5, NDU 3-4 and NDU-1 against MYMV disease. NDU 7-34, NDU 95-5 and NDU 7-31 against CLS disease.
- Mungbean: NDM 5-3, NDM 5-16 and NDM 5-8 against MYMV disease.
- Lentil: RVL 15-4, multiple resistant to rust root rot and Asochyta blight.

Potential Crops:

Crop Improvement:

- Three promising genotypes of faba bean namely NDFB17-1, NDFB 17-2 and NDFB 17-3 have been entered / conducted in Initial Varietal Trial in All India Coordinated Research Project on Potential crops during *Rabi* 2018-19.
- Four promising genotypes of faba bean namely NDFB-13, NDFB13-2, NDFB 14 and NDFB 16-2 have been entered / conducted in Advanced Varietal Trial- I in All India Coordinated Research Project on Potential crops during *Rabi* 2018-19.
- One promising genotype of faba bean namely NDFB16-3 has been entered / conducted in Advanced Varietal Trial in All India Coordinated Research Project on Potential crops during *Rabi* 2018-19.

Forage Crops:

Crop Improvement:

Advance lines:

New promising lines of forage bajra and oats crops for normal & saline / alkali soils:

- Forage bajra: NDFB-1502,NDFB-936, NDFB-1603, NDFB12, NDFB904, NDFB-914, NDFB-926, and NDFB-939.
- Forage oat: NDO-1102, NDO-1202, NDO-1501, NDO-1709, NDO-901, NDO-726, NDO-729, 1802.
- Hybrid Napier:NDHN-9, NDHN-8, NDHN-10.

Entries contributed under State Adoptive Trials:

Forage bajra: NDFB 904, NDFB 914, and NDFB 928 & NDFB 936

Oat: NDO-952, NDO-1501, NDO-1102, NDO-1202& NDO-1802

Entries contributed / promoted in coordinated trials :

Forage bajra: NDFB 1502 -AVTPM

Oat: NDO-1802- IVT Oat (SC)

NDO-1501- AVT Oat (SC)-I

Crop Production:

- NDFB-939 was found superior for green fodder, dry matter and crude protein yields as well as per day productivity.
- Application of Topramezone + Atrazine @ 35g+ 250g / ha or Tembotrione + Atrazine 120g+ 250g / ha has post emergence recarded the lowest weed infestation and higher green forage yield of maize.
- Oat entry NDO-951 was found superior in all parameters; plant height, leaf stem ratio, green fodder, dry matter and crude protein yields as well as crude

protein content. This entry also recorded maximum per day productivity.

Water management

- Irrigation schedule, 6 cm irrigation in check basin of 5x10m^2 in wheat at critical stages (CRI, Late jointing and milking stages) under canal command gave 31.3% higher yield with BC ratio of 2.39.
- Intercropping of gram with mustard (4:1) under poor availability of water in canal command of Chandpur distributory gave higher wheat equivalent yield of 52.4 q/ha with BC ratio of 3.59.
- Conjunctive use of canal and ground water (2:1) with 6 cm irrigation at CRI, late jointing and milking stage of wheat in check basin (5x10m^2) at middle of the distributory of canal command resulted in 33.6 % higher yield with maximum benefit cost ratio of 2.31.
- Drip irrigation @ 60% PE every 3rd day with 75% dose of RDN in 6 equal splits was found the most economically viable irrigation system for Rajmash beans.
- Bed planting of wheat after conventional tillage with 1.0 IW/CPE irrigation schedule produced higher yield of wheat (48.3 q/ha) with BCR 1.87.
- Irrigation schedule 1.0 IW/CPE in each furrow and integrated nutrient management; 75% RDN through urea with 25% N through FYM nitrogen management practice produced significantly higher yield of potato (315.50 q/ha) with maximum B-C ratio of 4.32.

Dryland Agriulture

- Pigeonpea+ blackgram inter cropping systems gave higher pigeanpea equivalent yield of 22.96 q/ha as against sole pigeonpea yield 15.51 q/ha, with a B: C ratio of 3.03, respectively. Among the nutrient management, maximum PYE 21.65 q/ha was recorded with 100 % RDF + Rhizobium+ PSB+ FYM+ Harit vardan @5kg/ha).

Pigeonpea Sole

Pigeonpea + Sesame

Pigeonpea + Sorghum

- Foliar spray of Urea @ 1%, 2%, water soluble complex fertilizers (19:19:19) @ 0.5%, + recommended dose of ZnSO4 + Boron was found most remunerative and to mitigate the drought effect on paddy.

View of experiment

Performance of pegionpea base inter cropping system with INM

Hon'ble V C visited the experiments of AICRP for Dryland Agriculture

Integrated Farming System:

- The vegetable based cropping sequences viz. rice – potato – greengram, rice – cauliflower – cowpea (veg) and rice – frenchbean – okra was found more productive, remunerative and energy efficient for resourceful farmers.
- The farmers having poor resources, viz. rice – gram – green fodder (maize + cowpea) and rice – lentil – sudanchari was more remunerative and energy efficient.
- Substitution of 50% recommended nitrogen through farm yard manure or Sesbania green manure to rice accompanied with 100% recommended dose of NPK to wheat was foundsuitable for higher productivity and soil fertility in log run.
- Integrated farming system viz. crop + dairy + fish + horticulture should be

practiced to fulfil the requirement of the family in addition to sustain the productivity and environment as well.

Seed Technology:

- Hydro priming and seed coating with drought alleviating bacteria+ biogrow was found the best followed by hydropriming and seed coating with BioNPK treatment.
- Foliar spray of Salicylic acid @400ppm increased yield and yield attributes mustard CV. NDR 8501.
- Spray of Emamectin benzoate (Proclaim 5 SG) @ 40mg /kg seed was found superior in term of germination(88.3%) with 0.7 % insect damage. Among botanicals, Neemazal 10,000ppm @ 1.5ml/kg seed recorded highest seed germination (84.7%) with 1.98% insect damage applied after six month of storage.
- Spraying of emamectin benzoate 5 SG @0.3ml/L was recorded the lowest damage of pulse beetle.

Pathology:

- Seed treatment with Carbendazim + Thiram (1:2) @ 3g/kg of seed or seed treatment with *Trichoderma viride* + Carboxin (6:1) @ 3g/kg seed resulted in lower wilt disease incidence and higher yield.
- The minimum disease (MYMV and CLS) severity and higher grain yield was recorded with Foliar spray of Tebuconazole+Trifloxystrobin (0.15%).
- Combined application of Fluxapyroxad 62.5g/l + Epoxyconazole 62.5g/l EC (Adexar) was found best in checking the Sheath blight severity (21.8 %), and recorded higher grain yield of rice (37.5 q/ha).
- Under integrated disease management, Combined application of *FYM+ Seed Treatment+DAP+MOP+FYM+ Trichoderma+ Cultural practices+75% DF+one blank application of insecticide + one blank application of Propiconazole at boot stage)* was found most effective in checking the sheath blight severity (29.2 %), incidence (21.6 %) and increase the grain yield (34.8 q/ha) in comparison to non IPM adopted plot disease severity (67.4%), incidence (42.9%) and grain yield (21.6q/ha) of rice.

Agro-meteorology:

- Seasonal rainfall status revealed that in U.P. during last five years, average rainfall during S-W monsoon period occurred 71.5% of the normal rainfall (829.8mm). However average percentage of total rainfall during June-May was 73.6%.
- The maximum Accumulated heat Unit (GDD) and thermal use efficiency requirement from sowing to maturity of Mustard were recorded 1795 ^{0}C days and 0.64 for 31st Oct. sowing while minimum with Nov. 30 sowing.
- Among the maize varieties, Kanchan took relatively longer duration and ultimately matured 4 days delayed over Azad Hybrid-1 in 30th June sowing.
- Maximum temp. of 34.2^{0}C, 33.3^{0}C and 33.1 ^{0}C during emergence, tasseling and dough stage, respectively were

favoured to get higher yield and yield attributing characters of maize.

Potato:

- Application of 6 kg /ha zinc sulphate was found beneficial for improving production of potato for eastern UP.
- Tuber treatment with *Trichoderma Viride* @ 8g/kg at planting is most effective measure to control of black scurf disease.
- The spraying of boric acid (3%) on tuber was found effective as compared to boric acid dip treatment. Boric acid spray treatment to tubers after harvest and before cold storage is recommended for the control tuber borne disease.
- Sowing of 25-50gm tubers may be used @ 30-35q / ha for planting potato crop.
- Application of 150 kg / ha N along with recommended dose of P and K was found optimum dose for commercial production of potato for newly released variety.
- Metribuzin @ 0.75 kg / ha PE or POE at 10% germination was more effective for effective weed management.

Ginger:

- Out of 63 germplasm collected and tested, the NDG-9 recarded the maximum yield (141.6 q / hac) followed by NDG-59 (140.0 Q / hac) and NDG-56 (133.70 Q / hac).
- The lowest incidence of soft rot of ginger was found in soil solarization + plastic mulching + rhizome treatment with 2% neem oil (39.30) q / ha.

Turmeric:

- Out of 180 Germplasm collected over the period, the maximum yield was recarded in NDH-86 (270 g / plant), early maturing, germplasm NDH-98 (295 g / plant), in medium and NDH-2 (285 g / plant), in late maturing plant.
- The minimum leaf blotch incidence in Turmeric was observed in foliar spray of Argimone oil @ 1.0% (27.3%).

Black Cumin:

- Total 36 germplasm of BLACK CUMIN were evaluated,NDBC-20 recorded maximum yield (9.34g / plant) followed by NDBC-7 (9.10 g / plant).

Azowain:

- In CVT, NDAJ-10 recorded the maximum yield (8.26 q / ha) followed by AA-6 (7.99 q / ha).

Coriander:

- The highest yield of coriander was recorded in Drip fertigation at 0.6 IW / CPE cumulative per evaporation) ratio followed by Drip fertigation at 0.4 IW / CPE ratio.

Arid Zone Fruits:

- In varietal trial of ber Kaithali recorded the highest fruit in 74.8 kg / tree.
- In varietal trial of bael, cv. Narendra Bael-16 recarded the maximum No. of fruit (118 / tree).
- NA-5recarded maximum fruit yield (16kg / h) per plant.
- Out of forty nine germplasm, Tikadi cv. was found resistant against black leaf spot.

- Under the nursery the minimum PDI (14.60) and maximum per cent disease control (64.75%) was recorded with Propiconazole followed by Difenconazole (17.20) and PDC (58.48).

Agro forestry:

Agri-silvi-horti system:

- In *Casuarina equsetifolia* and *Psidium guajava* based agri-silvi-horti system, the *P. guajava* yield and turmeric rhizome yield (5.53 t/ha^{-1} yr^{-1}) was higher with combined use of 50% NPK+50% recommended dose of FYM (7.32 tha^{-1}yr^{-1}).

Agri-silvi system:

- The maximum yield of rice and wheat was recorded with FYM applied @ 15 t ha^{-1}with Inter cropping of Paddy and Wheat with *Casuarina equiestifolia* and *Dalbergia sissoo* based agri-silvi systems.
- The variety Narendra Urd-1 showed significantly higher grain yield (0.72 t ha^{-1})as compared to Pant Urd-19 (0.67 t ha^{-1}) under *Casuarina equisetifolia* based agri-silviculture system.
- The maximum grain yield of paddy var.Sarjoo-52 (2.09 t ha^{-1}) was obtained with the application of FYM 10 t ha^{-1} under*Dalbergiasissoo*based agri-silviculture system.

Silvi-pastoral system :

In the silvi-pastoral system, the maximum annual green fodder yield was found with yield of *Pennisetum purpureum* (42.75 h^{a-1}), followed by *Brachiaria mutica* (29.14 t h^{a-1}) and *Panicum maximum* (28.26 h^{a-1}).

Agri-silvi-horti system

Agri-silvi system

Medicinal and Aromatic Plants:

Crop Production:

Isabgole:

- Isabgole sownat closest plant spacing of 30 cm x 10 cm produced significantly more seed yield followed by 30 cm x15 cm and 30 cm x 20 cm. The maximum seed yield was recorded with application of 20 t FYM ha^{-1} significantly followed by RDF (50:40:20 kg NPK ha^{-1}) + a10 t FYM ha^{-1}.

Asalio (L*epidium sativum*):

- Themaximum seed yield was noted with RDF: 60:40:30 Kg NPK ha^{-}

[1]followed by 5 t Vermicompost ha^{-1} and 4 t Vermicompost ha^{-1}.

Crop Protection:

Opium poppy:

- In organic disease management modules against bacterial blight disease, use of Neem cake mixture (100g / m2) enriched with *Trichoderma* +*Pseudomonas* @ 2.0% at sowing +seed treatment with Streptocycline @ 0.035% plus drenching with Tebuconazole 25 EC @ 0.1% at 40, 55 and70 DAS resulted in the minimum bacterial blight disease (23.39 %) with maximum disease control of (68.39 %) and yielded highest dry latex powder (47.77 kg ha^{-1}), seed (14.17 q ha^{-1}) and capsule husk (9.58 q ha^{-1}) as compared to the untreated inoculated control.
- The organic disease management modules against Downy mildew disease of opium poppy, Neem cake mixture (100g / m2) *Trichoderma* +*Pseudomonas* talc @ 2.0% at the sowing followed by three foliar sprays of fresh cow urine @10 % first at initiation of disease followed by 15-days interval resulted in minimum Downy mildew (23.89 %) with maximum disease control (69.80 %) which yielded highest dry latex powder (25.17 kg ha^{-1}), seed (10.83 q ha^{-1}) and capsule husk (7.77 q ha^{-1}).

Stress Tolerant Rice for Africa and South Asia (STRASA):

The success of green revolution technology is little visible in 17.4 m. ha of rainfed lowlands of India. This ecology has huge potential and need to exploite as we move to the next century. Additional supplies of rice must come not only from the irrigated area, but also from all the rainfed ecologies, the rainfed lowlands offer the greatest opportunity. The productivity of rainfed lowland area is very low due to flooding at early stages, prolonged water logging, low soil fertility and low light intensity and declining temperature during flowering coupled with reproductive stage drought. Poor plant population, delayed seeding / transplanting, high grains sterility, weed infestation especially in direct seeded crop, damage due to stem borer, bacterial leaf blight (BLB), blast and poor nutrient management of soil are known to limit rice productivity in the farmers field. Varietal improvement remains the main strategy for improving production and productivity of rice in farmers' field. Prevalent rainfall patterns coupled with land topography leads to prolonged water logging in lowland areas. Ensuring, the timely sowing of succeeding Rabi crop after rice exerts additional pressure on farming communities to continue use of traditional photoperiod sensitive varieties with poor yields, which further limits rice productivity in such areas. Efforts are made through Eastern India Shuttle Breeding Programme under Rainfed Lowland Rice Research Consortium has generated a number of promising rice lines for lowland ecology. Large number of early generation segregating lines have broadened genetic base and the promising lines are being utilized in advanced national testing programme of AICRIP.

Varieties identified for release by SVRC, Uttar Pradesh

NDR 9730018 – Submergence tolerant, long slender grain

NDR 8015 - Aromatic, short slender grain

NDR 8017 - Submergence tolerant, Short slender grain

NDR 9501 -Submergence tolerant, long slender grain

New Nominations-2019

- National 1
- State 6

Screening of submergence tolerance of rice in field conditioin

Rastriya Krishi Vikas Yojna (RKVY):

Four projects have been sanctioned under the RKVY sanctioned during 2018-19. Their achievements are given below-

Centre of Excellence for Rice:

Uttar Pradesh Government has decided to establish "Centre of Excellence for Rice" in NDUAT, Kumarganj, Ayodhya (Uttar Pradesh), India, during year 2018-2019 and released Rs. 100 Lakh to establish advanced laboratory to develop high yielding rice varieties tolerant to submergence, drought, disease and pest resistance. Achieve to above target research was started at main campus, CRS Masodha, CRS Ghaghara Ghat and Ghazipur centers with the collaboration of rice breeders, physiologist, Agronomist, Pathologist, Soil Scientist & Bio-technologist. At different centers 9000 Germplasms are under screening process during 2019-20.

1. Frozen Cemen Bank for Indigenous Livestock :

   During 2018-19, Rs. 161.00 lac.was sanctioned. 08 bulls have been purchased. Bull shed and boundary wall is being constructed under this project.

2. Strengthening of Veterinary Clinical Complex :

   During 2018-19, Rs. 497.00 lac.was sanctioned. The laboratory equipments of Rs. 130.00 lac.have been purchased and the laboratory is being renovated.

3. Establishment of Feed Analysis and Quality Control Laboratory :

   During 2018-19, Rs. 290.00 lac.was sanctioned. Agency has been nominated and process for purchase of equipments is going on.

4. Strengthening of KVKs :

   During 2018-19, Rs. 1986.00 lac.was sanctioned. The vehicles have been purchased and construction of boundary wall is in process.

Crop Cafeteria:

- In the crop cafeteria, 27 varieties/ hybrids of rice were transplanted at Main Experiment Station, Kumarganj with the financial support of IRRI and some private companies. A field day was organized at this site in which progressive farmers as well as scientists participated.

Testing of new hybrids :- Uttar Pradesh Council of Agriculture Research sanctioned project for testing of new hybrids of paddy, maize and mustard. These testings were done at CRS Masodha, CRS Bahraich and ZARS, Basuli. In kharif 2019, the testing of paddy and maize hybrids is also being done at above centres.

Bringing Green Revolution in Eastern

India (BGREI) : The scientists of the University have been nominated for providing technical knowledge to the farmers under the project in different districts of eastern Uttar Pradesh.

Kalanamak Rice Research

- A new research programme in collaboration with BARC, Trobey for Kalanamak rice improvement through mutation breeding has been takenup in which a number of samples of Kalanamak Local from different villages of Siddarth nagar (U.P.) were irradiated by 300 GY dose at mutation breeding section, Nuclear Agriculture and Biotechnology Division (BARC) and 350 lines (harvest of individual M_1 Plant spike) are sown at M_2 generation for their further observation on various agronomic traits.
- A part from the above, an additional research programme has also been initiated on Kalanamak rice at KVK, Siddarth nagar, (U.P.), where the evaluation of various Kalanamak rice genotypes for yield and yield contributing traits as well as the multiplication of local widely accepted Kalanamak rice variety from Adilapur and Birdpur have also been takenup.

Seed Produced :

During 2018-19, following quantity of seeds of different crops were produced.

Crop	Breeder Seed	Foundation Seed	Certified Seed	Total
Rice	558.14	1863.51	3052.23	5372.99
Wheat	407.27	2041.22	1336.05	3784.54
Barley	48.66	11.36	-	60.02
Rapeseed Mustard	21.22	128.74	53.78	203.74
Pigeonpea	25.35	73.25	40.40	139.00
Chickpea	7.50	90.77	-	98.27
Lentil	38.60	81.95	15.50	136.05
Fieldpea	-	9.65	-	9.65
Moongbean	12.50	5.70	-	18.20
Urdbean	8.50	-	-	8.50
Potato				118.47
Other tubers				1.94
Vegetables -				5.52
Seed Spices				1.27
Turmeric				52.92
Medicinal Plants- Seed Kalmegh Herb Aloe Vera Suckers				 0.90 5.00 3000 Nos

Note :- This includes seed production under pulse hub project

Farm Development:

2.5 ha at NSP-1 and 6.10 ha new farm has been developed. 500 metre canal minor has been cleaned.

New Initiatives :

Hon'ble Vice-Chancellor, Prof. J.S. Sandhu provided guidelines to take up new initiatives in research. By his constant efforts, following initiatives were taken up by this Directorate –

1. Resource Conservation Technology (RCT) :-

(i) Happy Seeder :- The farmers were burning paddy straw and residues which caused pollution as well as loss of organic materials. Sowing of wheat with Happy Seeder proved effective to solved this great problem. Just after harvest of paddy by combine harvester, 60 ha wheat was sown by Happy Seeder during rabi 2018-19. The saving in cost of cultivation by this method was about Rs. 7500.00 / ha. The yield of wheat was about 10% more than traditional sowing method. In the standing crop of wheat, the rice straw and residues decomposed which will increase the soil fertility also. Keeping in view the benefits of sowing with Happy Seeder, the total wheat will be sown by this machine in future.

(ii) Drum Seeder :- During kharif 2018, the sowing of paddy with drum seeder was initiated which proved effective in saving of labour for transplanting. The average saving was Rs. 5500.00 / ha and yield was at par with traditional transplanting method. In kharif 2019 sowing with Drum Seeder was done in 26.00 ha.

2. Establishment of model seed testing lab :-

In 2018-19, a project proposal for establishment of model seed testing lab was submitted to Ministry of Agril. & Farmers Welfare ,GOI. A sum of Rs. 125.00 lac.was sanctioned. The lab will be established just after release of funds.

3. To bring additional area under seed production :-

University has sanctioned Rs. 132.50 lac. to bring 83.00 ha additional waste land area in to cultivation. The work has been started.

4. Technology Demonstration through mechanization :-

In 2018-19, a project proposal on technology demonstration through mechanization was submitted to Ministry of Agril. & Farmers Welfare, GOI. A sum of Rs. 117.00 lac.is likely to be sanctioned.

5. RKVY :-

U.P. Government has sanctioned Rs. 339.00 lac. for Embryo transfer programme of indigenous animals and Rs. 220.00 lac. for one kilometre boundary wall 10 units of solar pump and underground channel of the farm. The work will be started just after release of funds.

6. Composting :-

In order to facilitate compositing and to clean the University campus, an initiative was taken to collect the leaves, grass cuttings, hedge cuttings, sugarcane trash, paddy straw and other

agricultural residues as well as waste from kitchen were collected. The collected residues were mixed with dung and prepared decomposer was inoculated over it for fast decomposition. A cheap and good quality compost is being prepared. So far, about 250-300 q. compost has been prepared.

7. Memorandum of Understanding (MoU):-

Six MoUs were signed with following national organizations for scientific and technical cooperation-

(i) ICAR- National Bureau of Agriculturally Important Microorganisms, Kusmour, Mau Nath Bhanjan, U.P.

(ii) ICAR- National Research Centre on Litchi, Mushari, Mujaffarpur (Bihar).

(iii) CSIR – National Botanical Research Institute Rana Pratap Marg, Lucknow, U.P.

(iv) Patanjali Bio Research Institute Private Limited, Haridwar.

(v) ICAR- Central Institute for Subtropical Horticulture, Rahmankhera, Post- Kakori, Lucknow.

(vi) Horticulture Produce Management Institute, Noida, U.P.

Success story:

Turmeric (var. Narendra Haldi 1) Cultivation Turns into Profitable Venture

Sri Shambhoo Nath Yadav, living in village Kamas, Post Gondey of Pratapgarh district (UP). He was cultivating rice wheat cropping sequence which was note sufficient to meet their family requirement. Another problem was the soil. The soil of Kamas is saline and sodic soils, which provide very less productivity to various field crops. Being a young aged farmer, he alongwith same aged group friends visited Krishi Vigyan Kendra Gauriganj, Amethi and discussed with the scientists about their problems and request them to provide other alternative of the prevailing cropping system. Krishi VigyanKendra after assessing their problems and need provided a plateform with various research scientists engaged in the diversification at the premises to sort out their problems during November, 2015. Sri Yadav met with Dr. Vikrama Prasad Pandey, Associate Professor, & Dean College of Horticulture & Agroforestry, N.D.U.A.&T., Kumarganj, Faizabad (UP) during the meeting and after discussion he realized that seed spices and turmeric crop may be the solution of his problem.

Initially, the seed rhizomes of turmeric var. NDH 1 of half quintal provided to him through on farm trial programme of KVK, so that a trust must be developed within him and in the other villagers. Assessment of variety was also done with the programme. He yielded from half quintal seed to 10 quintals of raw turmeric. He dried about 05 quintals of turmeric and powdered it for domestic use to himself and other villagers of his village so that quality of turmeric powder can be judge out. A warm response of quality of turmeric powder and superiority with other powders prevailed in the market was obtained. Now he convinced that this cultivar of turmeric gave the better profit after commercialization.

Thereafter, he continuously grow turmeric in 0.5 ha area and commercialized the products with the help of local market alongwith the selling of seed rhizome. With 0.5 ha area he earned a profit of Rs. 55,000/- every year with the cultivation of turmeric crop. From last two years (2016-17 & 2017-18) he also harvested turmeric oil from its leaves and provided to nearby villagers with a remunerable rates. He now earned extra Rs. 20,000/- every year with the oil of turmeric crop.

Maturing in 225 days under irrigated conditions, NDH 1 gave an average yield of 25-28 tonnes per hectare with a dry recovery of 17.8 per cent. Relatively higher levels of Curcumin (4.25%), oleoresin (10.6%) and essential oil (5.5%) make NDH 1 a hottest choice for industrial, medicinal and culinary purposes. This high curcumin variety of turmeric was developed by N.D.U.A. & T. Kumarganj.

Regarding the future course of action, Sri Yadav has well thought out plans. He strongly feels that NDH 1 turmeric powder and oil should be marketed in the household as a unique branded product, owing to its better culinary properties. Current year he started to establish a processing plant for the processing of turmeric.

Success story-II

Name of Farmers : Mr. Mahesh Kumar Singh S/O Krishna Pratap Singh

Village and District : Haliyapur, Sultanpur (U.P.)

Area : 1.0 hectare

System adopted : Agri-horti system Mango + Wheat

Establishment of Mango : 2006

Age of Mango tree : 12 yrs old

Economics:

Mango

Income from Mango production : Rs. 1,43,215=00

Cost of cultivation : Rs. 42,100=00

Net return : Rs. 1,01,115=00

Wheat

Income from wheat production : Rs. 37,500 =00

Cost of cultivation : Rs. 12,800=00

Net return : Rs. 24,700=00

Cost of cultivation for Mango+Wheat : Rs. 54,900=00 (Rs. 42100+12800)

Net return for Mango+Wheat : Rs. 1,25,815 =00

(Rs. 101115+24700)

Benefit: Cost Ratio : 2.29

Experiments of AICRP on Agrometeorology

Field visit of Experiments

IVT on *Chenopodium quinoia*

Dr. S. S. Sekhawat & Dr. R. C. Bairwa visited the forage trial during Kharif 2018

Hon'ble Vice Chancellor, Dr. J.S.Sandhu

Faba bean segregating material

Dr. U. S. Tiwana, P.A.U., Ludhiana visited the forage trial during Rabi 2018-19

Dr P.L.Saroj, Director & PC,AICRP on Arid Zone Fruits (June,2018)

Dr. Vishal Nath Pandey, Director, Hon'ble Vice chancelor Dr. J.S.Sandhu (April,2018
NRC, Licthi, Mujaffar pur

Visit of Hon'ble Vice-Chancellor at Opium
Poppy experiments

DIRECTORATE OF EXTENSION

The Directorate of Extension through KVKs is actively involved in transfer of technologies evolved by universities, ICAR institutions and central/state research laboratories to the farmers' field and getting feedback for further refinement. The mandatory activities of the Directorate are being carried out through various Krishi Vigyan Kendras (KVKs) and KGKs in twenty Six districts of Eastern Uttar Pradesh with the vision to make the farming community self-reliant, enriched agricultural knowledge with good access to marketing intelligence prevailing amongst the rural masses. Twenty three Krishi Vigyan Kendra namely Bahraich, Basti, Ballia, Varanasi, Mau, Azamgarh, Barabanki, Ayodhya, Siddharth Nagar, Chandauli, Sonbhadra, Balrampur, Jaunpur, Gorakhpur, Mahrajganj, Santkabir Nagar, Ambedkar Nagar, Amethi, Gonda II, Bahraich II, Sultanpur II, Jaunpur II, Ghazipur, and four Krishi Gyan Kendras at Deoria, Gonda, Amethi and Ghazipur district are engaged in the services of farmers.

Review meeting on doubling farmers' Income

The government aims to smooth and speedy transfer of modern agricultural technologies to uplifting the economic status of farming communities. The districts of eastern U.P. were fortunate to have six new KVKs in district namely Amethi, Bahraich II, Gonda II, Sultanpur II, Azamgarh II and Ghazipur. Of all the six KVKs cultivation of crop at farm, crop cafeteria, and various demonstration units like compost, bee, poultry goatry units have established and are engaged in providing technologies through training, FLD, CFLD and OFT to the farming community. The following

system is used to monitor KVKs and KGKs of the University through following executive councils, Viz. Extension Council, Zonal Research and Extension Advisory Council (ZREAC), Scientific Advisory Committee, Monthly Review Meetings of KVKs/KGKs at University headquarter, Annual, Mid Term and Zonal Workshops, Farm Management Committee

Services provided to various stakeholders:

The directorate of extension is providing extension services through farm advisory services at the doorsteps of the farmers in the Eastern Uttar Pradesh. Agricultural technology transfer by imparting trainings for capacity building of human resources, act as a link between researcher and farmer to develop demand led technology in the state. Facilitation in planning, implementation, execution and monitoring of the agricultural development in the state and encouraging the rural population to work in groups.

Agriculture Technology Information Centre (ATIC):

Agricultural Technology Information Centre (ATIC) is a single window delivery system in the University from where the farmers can purchase the required inputs and

get latest technology related to different aspects of agriculture. During the year 2018 total 2866 farmers were visited ATIC of which, 591 farmers for technology Information through telephonic conversation, 2200 farmers for technology Products and 75 VIP dignitaries have visited the Directorate. During the same year Technology Products like 1870 Krishi Diary, 689 Book, Mini kit, Folder and 5468 Technical Inventory Sold by ATICs. Apart from this 220 membership of Purwanchal Kheti received and 220 Purwanchal Kheti distributed at the same time 3.25 qt Vermi Compost as Bio-Product were also sold.

Krishi Vigyan Kendras (KVKs):

Assessment and refinement (On Farm Testing) and demonstration on location specific technologies under various farming situation are the first priority of the KVK. Also, organize training to update the extension personnel with emerging advances in agricultural research on regular basis, along with long-term vocational training courses in agriculture and allied vocation for the rural youths with emphasis on "learning by doing" for generating self-employment through institutional financing. Krishi Vigyan Kendras linkage with the District level officers of the line departments has been functional by providing updated technical information to the extension functionaries and farmers on one hand and to bring back the field problems (backward linkage) for their solution at the KVKs' farms and the Experiment Stations of the University on the other hand.

1.1 On Farm Testing:

Keeping in view the local need of farmers and prevailing problems and practices of the areas 128 on farm trials (OFT) 106 on crops, 19 on live stocks and 3 in other enterprises were conducted on 641 farmers' field by 17 KVKs and provided the recommendations like proper and timely application of input, irrigation, recommended dose of fertiliser, judicious use of chemical and pesticides were given after assessment and refinement of the technologies in participatory mode with the farming community.

1.2 Front Line Demonstration:

Front line demonstrations is another methods to disseminate frontier technologies in a effective manner KVKs have conducted FLD and CFLD on large scale using following broad category of technologies:

- Newly released varieties of different crops
- SRI, Drum Seeding and DSR methods of rice establishment
- Use of bio fertilizers and bio pesticides
- Resource Conservation Technology
- Precision agriculture
- Integrated fish farming
- Clean milk production

In order to provide wider adoption, validation, refinement, the frontline demonstrations were conducted on 1527.36 ha land area, including 273.7 ha on oilseeds, 563.30 ha on pulses, 588.16 ha on cereals, 85 ha on farm implements and 72 ha on hybrid variety of crops. Apart from crop enterprise demonstration on livestock and fisheries and other enterprises were also conducted on 164 ha through which 4503 farmer were benefited with above activities.

1.3 Trainings:

KVKs actively involved in four types of

training programme *viz*. training for practicing farmers (on campus or off campus), rural youth, extension functionaries and organizing sponsored trainings at farm, and outside the campus. Total 2939 trainings were imparted, out of which, 1860 trainings were given to practicing farmers, 316 rural youth trainings, 202 extension functionaries, 420 Sponsored Training, and 141Vocational Trainings were conducted and total 71775beneficiaries were benefited.

1.4 Other Extension activities:

During the year 2018 total 9842 extension activities were organized through which 218120 farmers, 8227 extension personnels were benefitted. The mass media coverage includes 149 radio talks and 148 TV talks newspaper coverage and other broadcasted / telecasted.

1.5 Production of Seed and Saplings:

Krishi Vigyan Kendras are becoming a centre for supplying elite / quality planting material and seeds of different crops to the farmers. Total 5290.26quintals of seed of Cereals, Pulses, Oilseeds and other crop seeds 4.9lacs seedlings of fruits and vegetables, 27324.5 kg Bio-products and 197 tones livestocks production have been produced amounting Rs. 1.12 crores. Almost all KVKs are having Goatry unit, Orchard / Forestry and some KVKs are having fisheries unit in running conditions.

Adoption of village by KVKs:

Keeping in view the resource constraints, faced by the KVKs, five villages (One village in each block) as Adarsh Krishi Gaon were selected in each district to implement the all extension activities with view to saturate development of entire villages in holistic approach. To make the system more effective and viable, mobile numbers of selected farmers have been introduced for conducting and selecting Front Line Demonstration (FLD) and On Farm Trials (OFT). In order to maintain transparency in the work all conducted trainings FLD and OFT vocational trainings has got updated and uploaded on concern districts website for public references. Programs like OFT, FLD and training are planned in groups. All the Subject Matter Specialists (SMS) / Programme Assistants have made a regular visit to the selected village once in a week. Farm Management Committee including, Senior Scientist and Head as chairman, all Subject Matter Specialists as member and Farm Manager as member secretary have already constituted at each KVK to advise and monitor farm activities to improve the productivity / revolving fund of the KVK farms.

Contribution towards Academic Programme:

Scientists involve in extension activities are also engaged in various academic programs as and when required on regular basis by university authorities. Scientists of KVKs are also engaged in conducting RAWE / RHWE for undergraduate Agriculture and Horticulture programme. Post graduate students are also guided by Scientist of Extension.

State level Kisan Mela and Agricultural Exhibition:

Ministry of Agriculture & Farmers Welfare, GOI, has announced and implemented 100 percent Central Government shared scheme i.e. “In Situ management of crop residues” under this scheme, three KVK namely Azamgarh, Jaunpur and Varanasi of ANDUAT Kumarganj Ayodhya has been chosen to implement these scheme. Field trial

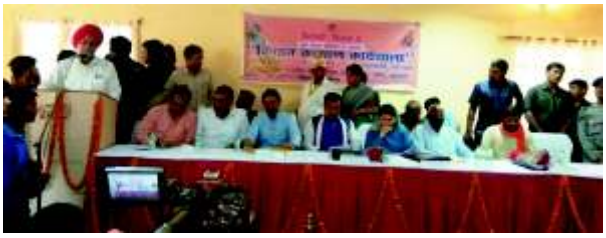
on crop residues is also being implemented; sowing of wheat by Happy Seder at various farms and instructional farms of University was done to popularize Situ management of crop residue at KVK Varanasi, Jaunpur and Azamgarh. Two days farmers fare & Agriculture Exhibition was organized at on 7-8 December, 2018 having the theme on "In Situ Management of Crop residue." In which Hon'ble V.C. has shared his experience of Mexico visit on In Situ Management of Crop residue. The fare was inaugurated by Hon'ble Minister of Agriculture Sriyut Surya Pratap Shahi Ji and Sri. Lallu Singh Ji, Hon'ble Member of parliament of Ayodhya was also present. Various Technology model was demonstrated for creating farmers awareness at main experimental station of University research farm and Demonstration Plot of Agriculture Extension in the University Campus. The advance technologies were displayed by various organisation in the field of Agriculture. Shri. Rishikesh Upadhyay, Mayor of Ayodhya was chief guest in the valedictory session. During the farmers fare Farmers were rewarded for excellent production in various fields. Stalls imposed by various institutions were also awarded.

Cereal System Initiative for South Asia (CSISA)

International Centre for maize and wheat improvement Mexico has implemented another scheme of cereal i.e. Cereals System Initiative for South Asia (CSISA) project, throughout the country. Initially Seven KVKs namely KVK Gorakhpur, Chandauli, Sonbhadra, Ballia, Barabanki, Siddharthnagar and Mahrajganj were taken up for implementation of CSISA projects in Eastern UP. On the basis of result obtained and interest of the farming community and need of the cropping pattern followed in the area nine more KVKs are further included under this scheme. Thus in total there were sixteen KVKs where the scheme of CSISA is being implemented in the second phase of the plan.

Krishak Kalyan Diwas

Sri Keshav Prasad Maurya, Deputy Chief Minister of the state has Inaugurated Krishak Kalyan Divas at KVK Haidergarh. On this occasion, Shri Chetan Chauhan, Memebr of Parliament of district Barabanki and Minister Sports and Youth Welfare, Sri Vijay Bahadur Pathak, Member of Legislative Assembly UP and Vice President of Kisan Forum, were also present on the occasion.



During the function Progressive Farmers were awarded with the honorary certificate for work was also given to them along with letter of appreciation. A similar function was also celebrated at KVK Chandauli where Dr. R.K. Sharma, Assistant Director, Agril. & Farmers Welfare Ministry of Agril., Government of India has participated one day training organized in Sisuk buzurg, village of Siddharth Nagar and Chandauli District on in the month of September 2018. Dr. A.P. Rao, D.E. and Dr. U.S. Gautam, Director, ATARI along with Honble V.C. Prof. J.S. Sandhu, ANDUAT, Kumarganj joined the training at both the districts.

Ministers visit to KVK Azamgarh

Sri Manoj Sinha Ji, Honble Minister Telecommunication (Independent) and State Minister Indian Railways visited KVK

Azamgarh on 04 August 2018. During this occasion Dr. U.S. Gautam, Director, ATARI, Kanpur was present. On the occasion Sriyut Manoj Sinha Ji has inaugurated Training Session on IFS, Poultry unit of Kadaknath Breed, which will help to facilitate Income and Employment generation opportunity through mushroom and other enterprise. Honble Minister has visited various units of Demonstration, Crop Cafeteria and also Planted Sandal tree in the KVK and College Campus. He has appreciated the collective efforts of KVK scientist and their work. A training session on safe and judicious use of Agriculture Chemicals and Pesticides were also organized on this occasion.

Krishi Kumbh:

Government of Uttar Pradesh organized four day Krishi Kumbh during 26-28 November, 2018. Twenty KVK of University participated and got enriched their knowledge and technical know-how. Prof. J.S. Sandhu, VC, ANDUAT, Dr. U.S. Gautam, VC, Banda University of Agriculture & Technology, Prof. A.P. Rao, Director Extension along with many scientists visited the stall placed by Directorate of Extension

World Soil Health Day:

World Soil health Day was celebrated by all 23 KVKs on 5 Dec 2018. During this programme, Product Manager, Indofil and Dr. Santosh Kumar Singh, Regional Manager, Indolife have also participated as special guest and address the farmers about effective use of chemicals and avoid excessive use of Insecticides and Pesticides which has ill effects on human health.

A lesson on Seed Production:

Honble V.C. Prof. J.S. Sandhu provided a brief knowledge on seed production techniques to the faculty members, students and extension scientist at demonstration farm of Directorate of Extension

Innovative Farmers Conclave:

Two days Innovative Farmers Conclave was organized by IVRI, Izatnagar Bareilly. Innovative farmers from various districts of UP and Uttrakhand were participated and shared their knowledge on latest techniques. Innovative farmers were awarded and appreciated collectively by Dr. A.K. Singh by DDG Ag. Extension, ICAR, Dr. U.S. Gautam, Director, ICAR-ATARI, Kanpur and Dr. A.P. Rao Director Extension A.N.D.U.A.T Kumarganj.

MoU between ANDUAT and HPMI

Memorandum of understanding between the Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya 224 229 and the m/s Horticulture Produce Management Institute (HPMI), Noida for scientific and technical cooperation for farmers and agri-prenures empowerment programs in eastern Uttar Pradesh. To provide the available infrastructure on payment basis to the second party and to provide technical support to the second party as and when required and would charge as per existing rules of the university for

backward linkages, capacity building, event management, advisory services and other activities to identify the farmers interested in adopting new technologies and hi-tech farming and provide them the required support including training and facilitate all kind of inputs, if they require. To arrange funds through Government as well as self financed training and capacity building programs for agripreneurs as per as for the other entrepreneurs. This agreement shall be for a period of three to five years and may be extended further for another term of three to five years or so or till such time as both the parties are desirous of carrying out this activity. On this occasion Prof. J.S. Sandhu, V.C., Prof. A.P. Rao, Director Extension and Chief Executive of the Institute Mrs. Anupma were present.

Mid-Term Review workshop of KVKs

Two day mid-term review workshop was organized on 30 Nov - 01 Dec 2018 Dr. P.K. Singh, Dean, College of Agriculture/Registrar was the Chief guest of the occasion Dr. N.K. Bajpai Nominee of Director, Atari, Kanpur was guest of Honor during this function. During the workshop possibility on Doubling Farmers Income, elimination of hunger and malnutrition, value addition of agricultural produces were discussed at length. During this workshop eighty KVK of UP have participated. Prof. A.P. Rao, D.E., emphasized on Govt. Schemes & promotional schemes to double the farmers' income. Dr. R.R. Singh has conveyed vote of thank by adding his words before on In Situ management of crop residues and increasing soil health etc. during function.

Annual Zonal workshop of KVKs

ANDUAT, Kumarganj, Ayodhya has organized two days 26th Annual Zonal workshop of KVKs in joint collaboration with ICAR-ATARI Kanpur on 08-09 July, 2019. Yogi Sri Aditya Nath ji Honb'le CM of UP was Chief guest of the inaugural session and Sri Surya Pratap Sahi Ji, honb'le Agriculture minister of UP was the chief gust on the valedictory session. Besides, Sri Ranwendra Pratap Singh, honb'le state Agriculture minister of UP, Dr A K Singh DDG Agriculture Extension, ICAR, New Delhi, Dr U.S. Gautam VC, Banda Agriculture University, Dr Atar Singh, Director, ICAR-Atari, Kanpur were also present during this function. During the workshop deliberations on possibility of Doubling Farmers Income, Elimination of Hunger and Malnutrition, Value addition of Agri. Produces were discussed. All eighty four KVKs of UP have participated and presented their Progress report along with work plan for the upcoming years.

1. Infrastructure Development

Construction of Administrative Buildings at KVKs

ICAR and State Government sanctioned 08 new KVKs to this University. Among them, three KVKs namely Amethi, Bahraich II and Gonda II have received budget from ICAR for the construction of administrative building. The construction agencies were nominated by State Government at these KVKs and now the building construction are started at the KVK premises.

Construction of boundary wall

State Government took initiative to strengthen KVKs of the state and provided funds to seven KVKs namely Ayodhya, Basti, Bahraich, Barabanki, Gorakhpur, Siddharthnagar and Varanasi under *Rastriya Krishi Vikas Yojna* (RKVY). Among various works, the major work is proposed for

construction of boundary wall, approach road solar street light of KVK farms with the budget outlay of Rs 1124.00 lacs. Construction of boundary wall and various other works are in progress at each proposed KVK.

Other infrastructure development through RKVY

Various other infrastructural facilities were also taken through RKVY projects. Among them, farmers' hostel cum training hall, threshing floor, implement shed, tube-well, entrance gate, ponds, CC road, solar system, sprinkler system, farm machinery and publicity van were also established at 07 KVKs and total funds were provided by State Government under RKVY. Various units like poly house, mother orchard, vermi, honey bee, Azola / BGA, museum, fishery, duckery, poultry units were also established at KVK premises through RKVY.

ICT enabled KVK

All the KVKs established prior to 2018 have been proposed to be enriched with information and communication technology. Thus to make all the seventeen KVKs enable with ICT tools units like computer with CPU, Camera and Television set were procured through GeM Portal and provided to the concerned centres. ICAR-ATARI has made financial provision of Rs 1.80 lakh per KVK.

District Agro Metrology Unit (DAMU)

District Agro Metrology Unit (DAMU) has been established in seven Krishi Vigyan Kendra of ANDUAT Kumarganj, Ayodhya, with the help and co-operation of Indian Metrological department (New Delhi) and to make it operational selection process on seven post of Subject Matter Specialist and seven post of Observer on contract basis were also completed for successful implementation of DAMU. This unit will help farming community weather situation in the microclimate for better crop management.

Renovation of Fish pond

A fish pond available at training and demonstration farm was also currently renovated. The pond was used for fisheries based integrated farming system model and various fisheries based model like fisheries based poultry, duckery, poultry + duckery, livestock unit, goatry, horticulture crops will be established in next year for demonstration purposes so that farmers

Review meeting with Agriculture Minister.

An institutional level meeting was conducted to review the progress of teaching research extension activities of the university under the chairmanship of Hon'ble agriculture minister of state Sri Surya Pratap Sahi Ji on 01 june 2019. All senior scientist and head of KVKs and O / Ic of KGKs have participated. A brief report was presented by the directorate of extension mentioning the progress of KVK seed production, project implementation of RKVY etc. during the meeting Director General, UPCAR Dr. Brijendra Singh has also given his valuable suggestions to improve the productivity and efficiency of the KVKs.

Transplanting of Kharif Season Paddy

Hon'ble Vice Chancellor Prof Jeet Singh Sandhu has initiated the paddy transplanting in the field on 02nd July 2019 for ongoing Kharif season at training and demonstration farm along with Director Extension Prof. A.P. Rao, and other scientists of the university. On this occasion Dean, college of Agriculture Dr. P. K. Singh Dr. R.R. Singh, extension officer Soil Science, Executive Engineer Sri. Om Praksh,

Senior scientist and head Dr. Arvind Singh, KVK Santkabir Nagar, Dr. O. P. Verma Senior scientist and head of KVK Gonda II, Dr Anil Kumar, and Dr. V. P. Choudhary along with his team members have also transplanted paddy in the field.

Event Organised

Directorate of extension has organised Mango and Jmun Diwas on 02nd July 2019 at university campus Progressive mango and jamun growers of different districts of the Uttar Pradesh were invited for their participation. On the day total 98 entries were received for mango including varieties categorised under good for eating, good for processing good for keeping quality good for processing and local seeded varieties, whereas, thirty three entries of Jamun were received for exhibition. After completion of the ceremony farmers having better varieties and good quality fruits were recognised and certificate of appreciation was provided to them.

Human resource generation

The recruitment process of Six Senior scientist and head of all newly created KVKs on regular basis were completed. All those selected candidates namely Dr. Ratan Kumar Anand at KVK Amethi, Dr. Rajesh Kumar Verma at KVK Ghazipur, Dr. Lal Chnad Vema at KVK Siddharth Nagar, Dr. Krishna Mohan Singh at KVK Azamgarh, Dr. B. K. Sahi at KVK Bahraich II and Dr. Narendra Raghuvanshi at KVK Jaunpur II have joined their services. Furthermore eight posts of Assistant, Nine posts of Computer Assistant and Nine Stenographers were also appointed and have joined their duties. Four, Senior Research Fellow (SRF) were appointed under National Initiative on Crop Resilient Agriculture (NICRA). Eight posts of Farmers' change agent each for In-situ management of crop residue (CRM) management and Kisan Biotech project was also done on contractual basis.

Superannuation

During the year 2018-19, Dr. Prabhu Narayan Singh, SMS Horticulture of KVK Chandauli, Sri Ram Pratap Pandey, Senior Assistant, Sri Shiv Govind Tiwari and Sri Ram Samhar, Dispatch clerk of directorate of extension have successfully completed their services and got superannuated in the month of January, February and July 2018.

New Initiatives

- Six new KVKs in districts namely Amethi, Gonda II, Bahraich II, Sultanpur II, Jaunpur II and Ghazipur II were established.
- Directorate of Extension has develop a demonstration-cum-seed production farm at main campus.

Seed Shop at each KVK:

In a view to facilitate timely sowing of seed by the farmers' establishment of seed shop is being planned at each KVK of the university. Such shops are designed in such a way that all seed input like seeds of various crops, fish seeds, semen of cow and buffalo, planting materials, nursery saplings / plants, different types of composts, poultry birds (Chicks), goat kids etc. will be made available for sale to the farmers and other stakeholders under the concept of single window system.

Brand Ambassador of KVKs

In order to make KVKs more effective a list of 100 farmers have been collected with the help of pre-structured scheduled from all KVKs and out of these collected list of farmers

two farmers of each KVKs will be trained at head Quarter and made brand Ambassadors and would be used as stalwarts for better and effective communication and transmission of agricultural technology between KVKs and the farming community.

Water harvesting unit

A waste water harvesting unit was constructed at training and demonstration farm to utilize waste water for irrigation during hot summer days. Office and household waste water are drained through common outlet in *Betwa* drain / *naala* flowing in the mid of university campus. This channel was inhabited by aquatic weeds, silts and was managed. During the year, the channel was cleaned off and renovated for smooth running of water. A water reservoir prepared at the tail end of channel under the area jurisdiction of university near farm of Directorate of Extension. The reservoir worked as water harvesting unit and will be utilized for irrigation water during lean period.

Center of Excellence

Directorate of Extension has submitted project for establishment Six KVKs as Center of Excellence in three agro ecological zones of Eastern Uttar Pradesh. In North Eastern Plain Zone KVK, Pachpedwa, Balrampur as center of excellence on Fisheries based IFS model with budget outlay of Rs 97.50 lakhs and KVK, Belipar Gorakhpur as center of excellence on Protected and high-tech nursery worth Rs 94.00lakh. Under Eastern Plain Zone KVK, Kallipur Varanasi as center of excellence on Fruit and vegetable processing cum training center of worth Rs 95.00lakhandKVK Kathaura Amethi as center of excellence on Production and popularization of small millets worth Rs 84.50 lakh. Whereas, in Vindhayan Zone KVK, Chandauli will be developed as center of excellence on Horticulture based IFS model for small and marginal farmers' worth Rs 64.00 lakh and KVK Sonbhadra will be developed as center of excellence on Integrated Rain-fed farming system worth Rs 100.00 lakh. In a nut shell total budgetary outlay of Rs 450.50 lakh have been proposed for establishment of six centre of excellence under ANDUAT.

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