ANNUAL REPORT
2018-19

ASSAM AGRICULTURAL UNIVERSITY
JORHAT – 785013, ASSAM
ASSAM AGRICULTURAL UNIVERSITY
Jorhat -785013, Assam

Citation
Assam Agricultural University, Jorhat, Assam, India

Published by
Vice-Chancellor, AAU, Jorhat -13, Assam

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Printed at
Jagdamba Offset & Publishers, Jorhat, Assam
FOREWORD

It gives me great pleasure to place before you the Annual Report for the academic year 2018-19 of Assam Agricultural University. With another year gone by, it is a matter of pride for me to declare that this academic year, the University not only fulfilled its prime objective and responsibility of imparting quality education to the young aspiring minds of the country but also successfully conducting research on varied matters of relevance to the farmers and agriculturalists and disseminating these through its extension machinery. By serving the needs of the farmers, while simultaneously shaping the formative years of the students, the University fulfills its mandate of education, research and extension in an appropriate manner.

Agriculture has become a much sought after career option for aspiring students. AAU, being at the forefront of education in agriculture and allied subjects of the country, has been witnessing an increasing trend of applicants for admission every year. The number of applicants rose by 12.84% in 2018-19 in comparison to 2017-18. Apart from North-Eastern states, there are sizeable numbers of students from other states of India in this University. In addition to that, eleven foreign students are currently studying at Assam Agricultural University.

In the field of research, the University maintained its legacy of striving for excellence. A total of about 152 externally funded research projects were completed this year and another 142 are in progress. I take great delight in informing all that a patent application was successfully filed for a novel dipstick method of infiel detection of citrus tristeza virus and gas-fired oven for bamboo stalked cooked rice, and application for Geographical Indication for Phulam gamusa (No. 594) and Komal chaul (no. 572) has been placed. Another momentous achievement of the University has been the development of a new medium-duration rice variety called "Shraboni" by our pool of competent scientists and researchers.

This year paved the way for robotics in agricultural technology as the drone was used for agricultural research for the first time. The technological advancement of AAU was also acclaimed by Dr. M. Morell, Hon'ble Director General, International Rice Research Institute (IRRI), Manila, Philippines. AAU implemented a project with the sponsorship of Oil India Limited, and established a model organic farm at Chabua, Dibrugarh, while also marking an agreement with Norwegian Institute of Bio-economy Research (NBIO) for livelihood upliftment of subsidiary rice farmers of Assam.

The Directorate of Extension Education which shoulders the responsibility of extending real-time support to
the farmers and entrepreneurs by functioning as the seat for storing, collecting and disseminating information executed their directive through the release of 58 publications, organisation of seven training programmes, seven exhibitions and collaborative programmes, and a certificate course. The 23 KVKs under the University conducted 953 scheduled training programmes (on/off campus) where more than 25,000 trainees participated. In addition to this, 134 programmes were also broadcasted through AIR during the period from 1st April, 2018 to 31st March, 2019. Many departments of the colleges under the University furthered the propagation of pertinent information by conducting trainings, talks and research projects on a vast gamut of agriculture-related issues.

Quite a few numbers of distinguished dignitaries also graced the University this year. Prominent among these were the visits of Hon’ble Ambassador of Norway and Hon’ble Minister of Agriculture of Assam to the Department of Agricultural Biotechnology, AAU, Jorhat. Some other notable personages to call on the premises of the University this year were Sri Hitendra Nath Goswami, Hon’ble Speaker of Assam Legislative Assembly, Dr. K.J. Ramesh, Director General, Indian Meteorological Department, Dr. Alok Adholeya, Director, TERI, New Delhi, and Prof. S.K. Sopory, Eminent Scientist and Former VC, JNU.

The wheels of the institution are incessantly treading on the pathway towards progress and these are but a few realizations of the accomplishments of the University. Here, it becomes imperative for me to acknowledge the financial assistance received by the University from various sources. During 2018-19, the University received a cumulative amount of Rs. 46,910.09 lakhs, out of which about 70% was contributed by the State Government. Owing to this, the University has also made significant expansion in the sphere of infrastructure and has completed about 38 construction, renovation and developmental projects worth about seven crores.

Finally, I would like to extend my heartfelt gratitude to all our faculty, staff and students who contributed towards making the year 2018-19 a successful one for the University. I sincerely hope that the passion and motivation, which I witness here, will drive this institution towards greater heights, and aid in the creation of a pristine ambience which will sustain the process of continuous and uninterrupted growth.

(A. Bhattacharyya)
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1. The University

Assam Agricultural University, the first institution of its kind in the whole of the north-eastern region of India, was established on April 1, 1969 by an act called The Assam Agricultural University Act, 1968 with its headquarters at Jorhat. The base of this new institution comprised of the erstwhile Assam Agricultural College at Jorhat and the Assam Veterinary College at Khanapara.

The seeds of agricultural education in the north-eastern part of the country were sown way back in the first quarter of the 20th century with the establishment of two rice research stations, one at Karimganj in the Barak Valley and the other at Titabor in the Brahmaputra Valley, in 1913 and 1923, respectively. Even while the stations were producing trainees, the need for an agricultural college was felt immediately after independence. Consequently, the Assam Agricultural College at Jorhat and Assam Veterinary College at Nagaon came into existence in 1948 as a result of exemplary will-power and dedication to service of Bharat Ratna Late Gopinath Bordoloi, the first Chief Minister of Assam. Initially, both the colleges were affiliated to Gauhati University, and then to Dibrugarh University, before the Assam Agricultural University came into being, embracing both the colleges.

1.1 Mandate

- Imparting technical education in agriculture and allied branches of learning
- Furthering the advancement of learning through innovative research in agriculture and allied sciences, and
- Taking the technologies to the stakeholders' doorstep to harness optimum benefits in production, profitability, and permanency in agriculture.
1.2 Vision
Provisioning of quality human resource to facilitate technology-led agricultural renaissance; revitalizing and rejuvenating post-green-revolution agriculture; ensuring both production and environmental sustainability; targeting a minimum of 4% agricultural growth while addressing the issues of household food and nutritional security, farmers' distress, commerce in agriculture as well as regional, national and global food crisis, taking the advantage of innovative technology, market reforms, and liberalization.

1.3 Mission
To fill up the talent gap in agriculture and allied sectors to combat the emerging challenges in agriculture and ensure productivity increase in agri-horti-animal-fish crops in the face of shrinking/fragmented land holdings, ailing soil health, diminishing water resources, and increased human population.

1.4 Goals
- Provide quality education and training in the areas of agriculture and allied sciences.
- Undertake basic, applied and adaptive research relevant to the needs of the farmers and entrepreneurs of Assam.
- Transfer the technologies to the stakeholders, particularly, farmers for increasing the production, productivity and income to ultimately improve the socio-economic conditions of the people, and
- Play a key role in transforming the state's agriculture of subsistence to agriculture of abundance.

1.5 Organization
To carry out the education as per mandate, the University has six faculties in the fields of Agriculture, Veterinary, Community Science, Fishery, Horticulture and Sericulture with 9 constituent colleges - three in agriculture, two in veterinary science and one each in community science, fishery, horticulture and sericulture. Except Horticulture and Sericulture, all the other seven constituent colleges have state of the art facilities for imparting education in designated locations in the state. The Dean is the official head of the Faculty and Chairman of the Board of Studies of the respective faculty. There is a Director of Post Graduate Studies to coordinate Post-Graduate Studies in all the departments and colleges of the University. To coordinate the research activities, the University has two full-fledged Directorates of Research, one for Agriculture and Community Science, and the other for Veterinary Science and Fisheries, headed by a Director of Research. The extension programme of the University is carried out under the Directorate of Extension Education headed by a Director of Extension Education. Apart from these, the University has Director of Students' Welfare, Director of Physical Plant and Chief Librarian and other important officers as per the Statute. The Director of Students' Welfare is responsible for the arrangement of housing for students, student counseling and placement, besides supervising the extra-curricular activities and general needs of the students. The Director of Physical Plant is responsible for all construction-related activities and repair/renovation of the University. The organizational structure of the University is depicted in the organogram presented in Figure 1.2.
Vice-Chancellor also supervises the Extension Education Institute, Govt. of India and DBT-AAU Centre, AAU, Jorhat

Figure 1.2. Organizational structure of Assam Agricultural University, Jorhat
2. Awards and Recognitions

2.1 Institute Level Awards

![Image of award ceremony]

*Figure 2.1. Honorary Membership Award received by Dr. K. M. Bujarbarua, Hon'ble Vice-Chancellor, AAU, Jorhat at 27th National Conference of Soil Conservation Society of India, New Delhi held at Assam Agricultural University, Jorhat during 25th-27th October, 2018.*

2.2 Awards and Recognitions to Teachers/Scientists and Students

2.2.1 Agriculture

2.2.1.1 Faculty/Scientists

- Dr. B.K. Sarmah, Director DBT-AAU Centre obtained following appointments from DBT, GoI
  - Panel member of Indo-UK 'Pulses and Oilseed Research Initiative'
  - Co-chair of the DBT-NER Steering Committee to review the proposals in the area of Human Resource Development
  - Member of the DBT-NER Technical Expert Committee (TEC) to review the proposals in the area of Agriculture Biotechnology & Allied Sciences on 28th December, 2018.
  - Member of the DBT-NER Scientific and Technical Appraisal and Advisory Group (STAG) to review the proposals in the area of Agriculture, Animal & Allied Sciences for North-Eastern Region.
  - Appointed by DBT to act as Co-chair for DBT HRD for NER
  - Dr. M.K. Modi, Professor & Head, Department of Agricultural Biotechnology, Jorhat.
- Selected to act as the coordinator of a PG Certificate Course 'Plant Tissue Culture-Techniques & Application' by DBT, GOI for three years.
- Appointed as a member of Technical Expert Committee (TEC) to review the proposals in the area of Knowledge Generation & Discovery Research and New Tools & Technologies for North Eastern Region (NER) by the DBT, GOI.
- Dr. Madhumita Barooah, Professor, Department of Agricultural Biotechnology, Jorhat
- The heritage drinks story of Dr. Madhumita Barooah has been nicely covered in the magazine *Spiritz*.
- MoU was signed for the transfer of microbial cultures that enhances rice seed germination.
- Invited as the lead speaker by German Engineering Federation (VDMA) to speak on 'The Science in Traditional Brewing Heritage Alcoholic Beverages: Elucidating and Improvement' in the Drink Technology India, 2018 (International Trade Fair for the Beverage dairy and liquid food) during October 24-25, 2018.
- Dr. Basanta Kr. Borah, Assistant Professor, Department of Agricultural Biotechnology, Jorhat, has been selected as the reviewer of the following journals: Indian Phytopathology, Indian Journal of Virology, Current Sciences, Virology Journal, Journal of Plant Breeding and Genetics, Botanical Sciences, International Journal of Agriculture Sciences, Virus Disease, Virologica Sinica and Proceedings of the National Academy of Sciences, India Section B: Biological Sciences.
- Dr. Nivedita Deka, Professor, Department of Agricultural Economics, Jorhat.
- Selected as an External Examiner for PhD thesis of Department of Agricultural Economics, BHU, Varanasi on 19th September, 2018.
- Selected as a member of the BOS meeting for the Department of Rural Development & Agricultural Production, NEHU on 8th September, 2018.
- Appointed as an external paper setter for PhD and M.Sc. (Agri) for Department of Agricultural Economics, CPGS, Barapani, 2018-2019.
- Mr. Dipanjan Kashyap, Assistant Professor, Department of Agricultural Economics and FM, Jorhat guided a student team as one of the five winners in the event viz., 'Impact Week on Design Thinking' organised by Indian Institute of Entrepreneurship, Guwahati in collaboration with Impact Week Team, Germany from 12th to 20th December, 2018.
- Dr. Abhijit Borah, Principal Scientist, Department of Agricultural Engineering, Jorhat, bagged ISAE Best paper award for the year 2017 on 'Energy Utilization Efficiency and Entrepreneurial Potential of a Solar-Biomass Integrated Drying System'.
Mrs. Ranjana Deka, Assistant Food Microbiologist, from the Department of Agricultural Engineering, Jorhat.

- Bagged the second prize in National level essay competition on 'Contribution of Innovative Agricultural Processing Technology/Machinery in Farmers' Prosperity and Need of New Technology/Machinery in Context of Above' hosted by Department of Agricultural Process Engineering and AICRP on PHET, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.


- Adjudged as the Best Trainee in the Winter School Training on 'Entrepreneurship Development through Value Addition of Underutilized Crops' sponsored by ICAR, New Delhi and organized by College of Agricultural Engineering and Technology, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar from 15th November to 5th December, 2018.

- Dr. K.K. Sharma, Principal Scientist, IFS, Jorhat, was Selected as a Member of the Management Committee, Tarajan High School, Jorhat.

- Dr. I.C. Barua, Principal Scientist, Department of Agronomy, Jorhat.

- Nominated as an Expert in the PhD Research Committee at Rain Forest Research Institute, Jorhat since 26th September, 2018.

- Selected as an Expert of the JRF/SRF Selection Committee of Rain Forest Research Institute, Jorhat on 18th June, 2018.

- Dr. Priyanka Das, Professor, Department of Biochemistry & Agricultural Chemistry, Jorhat, was selected as a Member of the Steering Committee on Biotechnology Based Programme for Societal Development (Rural Development, SC/ST Population and Women).

- Dr. R Kandali, Professor, Department of Biochemistry & Agricultural Chemistry, Jorhat, delivered a lecture on 'Cold Acclimation in Crops' in Winter School on Abiotic Stress Advances, Impact and Prospect held during 6th-26th February, 2019 at AAU, Jorhat.

- Dr. A.M. Baruah, Professor, Department of Biochemistry & Agricultural Chemistry, Jorhat.

- Nominated as Adjunct Faculty, Uttar Banga Krishi Viswavidyalaya (UBKV), West Bengal.

- Selected as a Member, Research Advisory Group (RAG), Rain Forest Research Institute (RFRI), Jorhat, under Indian Council of Forestry Research and Education (ICFRE).

- Dr. S. Rathi, Assistant Professor, Department of Biochemistry & Agricultural Chemistry delivered a lecture on 'Sucrose and Starch Metabolism in Photosynthetic and Non-Photosynthetic Tissues under High CO2' in ICAR sponsored Winter School entitled 'Abiotic Stress: Advances, Impact and Prospects' held from 6th-26th February, 2019 at AAU, Jorhat.

- Dr. A. Rahman, Professor and Head, Department of Entomology, Jorhat.

- Selected as a member, BSMA (Plant Protection).

- Selected as Member, Apiary Industry Selection Committee (Food and Agriculture Division Council).

- Selected as member of Food and Agriculture Divisional Council of Bureau of Indian Standard.

- Dr. D.K. Saikia, Principal Scientist, Department of Entomology, Jorhat.

- Appointed as an external question setter for Umroi, Umiam, Meghalaya for comprehensive examination.

- Appointed as an examiner for thesis evaluation of M.Sc. (Agri.) of Nagaland University.
Dr. M.K. Deka, Principal Scientist, Department of Entomology, Jorhat, became a member, Selection of Committee, ARS Scientist, ICAR Research Complex, Umiam, Barapani.

Dr. B. Bhattacharyya, Principal Scientist, Department of Entomology, Jorhat, All India Network Project on Soil Arthropod Pests, AAU Jorhat Centre.

Created 'National Record' along with 100 farmers of Majuli of 'Most Beetles Collected in 3 hours' by collecting 73,700 numbers of white grub beetle at Maharichuk Village, Majuli on 9th April, 2018.

Recipient of the prestigious 'Best Researcher Award, 2018' bestowed by AAU on the occasion of Foundation Day on 17th April, 2018.

Conferred with the prestigious second 'Dr. H.K. Jain CAU Award 2015-16' for excellence in Agricultural Research in the North-Eastern States of India on the occasion of 4th Convocation of CAU, Imphal on 11th January, 2019.

Selected as a member of Departmental Academic Coordination Committee (DACC), Department of Entomology.

Entrusted with the duty of Central Instrumentation Facility Member, Monitoring of Integrated University Management System (IUMS).

Selected as Coordinator, Research Monitoring and Advisory Teams.

Selected as Member, IPR Cell and NAHEP Cell, AAU.

Mr. Rudra Narayan Barkakoty, Jr. Scientist, Department of Entomology, Jorhat.

Received the Best Oral Presentation Award in 'International Conference on Climate Change, Biodiversity and Sustainable Agriculture' held at AAU, Jorhat from 13th-16th December, 2018.

Appointed as the Question Setter for UG course of UBKV, Pundibari.

Dr. Sudhansu Bhagawati, Jr. Scientist, Department of Entomology, Jorhat, become a Committee Member to prepare District Agricultural Contingency Plans for Majuli district.

Dr. Akashi Sarma, Professor, Department of Plant Breeding and Genetics, Jorhat.

Nominated as Chairperson in the Plant Breeding Session under the 62nd Annual Maize Workshop of the AICRP held from 5th-7th April, 2019 in AAU, Jorhat.

Acted as Co-chairperson in the Technical Session 19 under the International Conference on Climate Change, Biodiversity and Sustainable Agriculture held from 13th-16th December, 2018 at AAU, Jorhat.

Dr. Sharmila Dutta Deka, Department of Plant Breeding and Genetics, Jorhat, was nominated as Subject Expert, College of PG Studies, CAU, Barapani, 2019.

Dr. R.N. Sarma, Professor, Department of Plant Breeding and Genetics, Jorhat, successfully completed a Massive Open Online Course (MOOC) on 'Dynamics of Teaching–Learning' Conducted by ICAR-National Academy of Agricultural Research Management held during November, 2018 and was awarded the certificate of completion.

Dr. M. K. Saikia, Principal Scientist, Department of Plant Pathology, Jorhat, became an External Expert for selection of Research Associate at Rain Forest Research Institute, Jorhat on 11th March, 2019.

Dr. Pranab Dutta, Scientist (S-II), Department of Plant Pathology, Jorhat.

- Organised Workshop on 'Fluorescence and Confocal Microscopy' sponsored by Leica Microsystem India (19th and 20th December, 2018) organized by Department of Plant Pathology with help from Department of Agricultural Biotechnology.

- Delivered the lead lecture at North-Eastern Zonal Meeting and National Symposium, Tripura, College of Agriculture, Lembucherra, 19th-20th January, 2019; Title of Paper: 'Use of Nanoparticles as an Alternative Way for Plant Disease Management'.

- Attended National Symposium on Role of Plant Pathology on Empowering and Doubling Farmers Income, at the annual meeting of Indian Society of Plant Pathologist.

- Recipient of the ICPP 2018 Congress BURSARY Award by American Phytopathological Society and invited to deliver a talk during 29th July - 3rd August, 2018 at Boston, USA.

- Dr. Munmi Borah, Jr. Scientist, Department of Plant Pathology, Jorhat.

- Received the second-best Poster Presentation award in International Symposium on 'Biotechnology for Food-Nutritional Security & Organic Agriculture' organized by NE CAB, AAU, Jorhat during 25th-26th March, 2019 at AAU, Jorhat.

- Received the Best Poster Presentation award in Research Conclave, 2019 organized by Indian Institute of Technology, Guwahati during 14th-17th March, 2019.

- Dr. Anjali Basumatary, Professor, Department of Soil Science, Jorhat.


- Selected as Member of Editorial Board in Annals of Plant and Soil Research, G.K.V. Society.

- Dr. K. N. Das, Department of Soil Science, awarded the Best Teacher Award, 2018-19.

- Dr. Bipul Deka, Professor, Department of Soil Science, Jorhat, awarded the 'Leadership Award' by Soil Conservation Society of India, New Delhi (2018).

- Mr. Bhabesh Gogoi, Junior Scientist, AICRP on IFS, Department of Soil Science, Jorhat.

- Recipient of 'Leadership Award' by Soil Conservation Society of India during 27th
National Conference held during 25th-27th October, 2018 at AAU, Jorhat, Assam.

- Received the Best Paper Award for oral presentation for the paper entitled 'Carbon Footprint Estimation in the Integrated Farming System: An Assam Agriculture Experience' in the International Conference on 'Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018)' held at AAU, Jorhat, Assam from 13th-16th December, 2018.

- Dr. Danish Tamuly, Assistant Professor, Department of Soil Science, Jorhat, bagged the Best Paper award 'Toxicity and Bioremediation Feasibility of Iron (II) Through Bacillus spp in Few Indica Rice Cultivars of Assam: A Laboratory Study' in Oral Session in the 27th National Conference of Soil Conservation Society of India, New Delhi, held at AAU, Jorhat during 25th-27th October, 2018.

- Dr. Debanand Das, Principal Scientist, Department of Nematology, Jorhat, was selected as an Expert Member (Chancellor's nominee) to the Selection Committee, OUAT, Bhubaneswar.

- Mr. S. Barman, Assistant Professor, Department of Extension Education, Jorhat.

- Acted as External Evaluator for Gunotsav-II organized by Axom Sarba Siksa Abhijan, Jorhat District.

- Selected as External Evaluator for Gunotsav-II organized by Axom Sarba Siksa Abhijan, Jorhat District selected as Member of the Management Committee, Kendriya Vidyalaya, ONGC, Jorhat.

- Dr. Bondita Goswami, PI, AICRPAM from the Department of Agrometeorology, Jorhat, received the Best Centre award of AICRP on agrometeorology (AICRPAM) for the year 2017-18 on 15th November, 2018.

- Dr. Aditi Smith Gogoi, Assistant Professor, Department of Tea Husbandry & Technology, Jorhat, was awarded the Young Scientist Award in First International Congress on Cocoa Coffee and Tea Asia, 2018 held from 17th-20th October, 2018 at Hefei, China.

### 2.2.1.2 Students

- Sanjay Singh, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Priyanka Das, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Panchashree Das, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Dr. Kamalakshi Devi, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Shephrou Helena, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Limasunep Longkumar, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Rashmi Rekha Baruah, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Indrani Kakati, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Debajit Das, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Nayana Hazarika, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Ricky Raj Paswan, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Rahul Kaldate, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Dharmendra S. Lagoriya, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Dipankar Saha, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Nikita Deka, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Swapnil Meshram, Department of Agricultural Biotechnology qualified ARS NET, 2018.

- Anupam Gogoi, Department of Agricultural Biotechnology qualified ARS NET, 2018.
Mrs. Debajani Gogoi, Department of Agricultural Biotechnology qualified ARS NET, 2018.

Sachin Rajput, Department of Agricultural Biotechnology.
- Qualified ARS NET, 2018.
- Qualified for BET JRF and joined IMTECH, Chandigarh as a PhD student.

Anupam Gogoi, Department of Agricultural Biotechnology got PhD fellowship at Norwegian University of Life Sciences.

Udit Nandan Misra, Department of Bio and Agricultural Chemistry, PhD. student, qualified for ICAR-NET & SRF; also cleared ARS-Mains in Biochemistry.

Abhijit Debnath, Department of Bio and Agricultural Chemistry, M.Sc. student, qualified for ICAR-SRF.

Mr. Suman Nath, Department of Bio and Agricultural Chemistry, M.Sc. student, qualified for CSIR-NET, SRF and cleared ARS-Mains in Biochemistry.

Pranab Nath, Nikita Deka, Rashmi Rekha Baruah, Lipika Khatoniyar and Snigdha Hazarika, Department of Agricultural Biotechnology Bagged the top award (2nd Prize - 1st prize was not given) in model competition on 16th August, 2018, on the occasion of the Foundation Day of the College of Agriculture.

Ruby Gupta, PhD. Scholar, Department of Agricultural Biotechnology presented a poster of her research work in the 6th Annual South Asia Biosafety Conference held at Dhaka on 15th September, 2018.

Sanjukta Singha, Department of Agricultural Biotechnology bagged the 2nd Best Oral Presentation for her work 'Cloning and Characterization of Gene Encoding eEF4E Bhut Jolokia (Capsicum chinense Jacq.)', at International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCCBSA) 13th-16th December, 2018.

Alokesh Ghosh, Department of Agricultural Biotechnology bagged the Best Poster award in the Technical Session 3 at the International Conference ICCBSA-2018.

Dr. Sushil Kumar Singh, Department of Agricultural Biotechnology awarded First Poster prize in International Conference on 'Climate Change, Biodiversity and Sustainable Agriculture' (ICCBS-2018) held on 13th to 16th December, 2018 at AAU, Jorhat.

Dr. Indrani Kakati, Department of Agricultural Biotechnology got selected for post-doctoral appointment to the Agricultural Research Service (ARS) Research Participation Programme. Dr. Bryan Bailey will serve as her mentor at the Sustainable Perennial Crops Laboratory located at Baltimore, Maryland, USA.

Ms. Suprava Priyadarshini Nayak, 5th-year M.Sc. student, Department of Agril Biotechnology Selected for the Khorana Fellowship to visit the USA for a period of Four Months.

Gitashree Das, Department of Plant Pathology, received the Commendation Award in Poster Presented on 'Effect of Nanopriming with ZnO and Ag Nanoparticle on Seed Germination, Growth Parameter of Chickpea (Cicer arietinum L.)' by G. Das, H. Kaushik, P. Kaman, D. Pathak, S. D. Pathak and P. Dutta, Department of Plant Pathology, received the Best Poster award 'Biopriming of Chickpea seeds can effectively enhance the plant growth parameter against Fusarium oxysporum. Sp-National Symposium, Tripura.

Ranima Mishra, Department of Plant Pathology.
- Participated in International Conference of Indian Phytopathological Society entitled 'Role of Soil and Plant Health in Achieving Sustainable Development Goals' in Bankok, Thailand from 21st-25th November, 2018.
- Best Presenter award in the poster category in The Conference in Bankok, Thailand
- Second Best oral presentation ICCBSA 2018 at
AAU, Jorhat

- Jutimala Phookan, Department of Plant Pathology.
  - Participated in International Conference of Indian Phytopathological Society ‘Role of Soil and Plant Health in Achieving Sustainable Development Goals’ in Bankok, Thailand from 21st-25th November, 2018.
  - Recipient of the best poster presentation award to at ICCBSA 2018.
- Himashree Dutta & Munmi Bora, Department of Plant Pathology attended the National Symposium on ‘Role of Plant Pathology in Empowering and Doubling Farmers Income’ & Annual Meeting of Indian Society of Plant Pathologist and presented a Poster on ‘Induction Resistance in Crop Plants against Viruses Using Microbial agents’.
- Sankar Hemanta Gogoi, Department of Plant Pathology.
- Acted as a Resource Person for Training on Plant Protection Measures (ASRLM- Teok, Koliapani).
- Participated in International Conference of Indian Phytopathological Society entitled ‘Role of Soil and Plant Health in Achieving Sustainable Development Goals’ in Bankok, Thailand 21st-25th November, 2018.
- Sonal Kumar, Department of Plant Pathology.
- Bagged the third prize in Research Conclave, Guwahati.
- R. Gautham Kumar, Department of Plant Pathology awarded the 2nd prize in Poster Presentation at ICCBSA 2018.
- Fahnaz Sultana, Department of Plant Pathology awarded 2nd prize in Poster Presentation at ICCBSA 2018.
- Parinda Barua, Department of Plant Pathology.
  - Awarded by a ‘Training Voucher’ to undergo training on Modern Molecular Biology and High Throughput Sequencing for a period of 3 weeks in Newcastle University and Fera Science Ltd., UK. Name of Project: CONNECTED (Community Network for African Vector Borne Plant Viruses). Name of Funder: Biotechnology and Biological Science Research Council.
- John Oladeji Oladokun, Department of Plant Pathology.
- Participated in International Conference of Indian Psychopathological Society entitled ‘Role of Soil and Plant Health in Achieving Sustainable Development Goals’ in Bankok, Thailand from 21st-25th November, 2018.
  - Awarded a ‘Training Voucher’ to perform a training on Modern Molecular Biology and High Throughput Sequencing for a period of 3 weeks in Newcastle University and Fera Science Ltd., UK. Name of Project: CONNECTED (Community Network for African Vector Borne Plant Viruses). Name of Funder: Biotechnology and Biological Science Research Council.
- Mohammad Hussam Halabi, Department of Plant Pathology.
- Participated in International Conference of Indian Phytopathological Society entitled ‘Role of Soil and Plant Health in Achieving Sustainable Development Goals’ in Bankok, Thailand from 21st-25th November, 2018.
  - Awarded a ‘Training Voucher’ to perform a training on Modern Molecular Biology and High Throughput Sequencing for a period of 3 weeks in Newcastle University and Fera Science Ltd., UK. Name of Project: CONNECTED (Community Network for African Vector Borne Plant Viruses). Name of Funder: Biotechnology
and Biological Science Research Council.

- Himadri Kaushik, Department of Plant Pathology got Best Oral Presentation award for paper 'Antifungal Activity of 2 No. Nanoparticles against Sclerotiorum Causing White Mold of French Bean' by Himadri Kaushik and Pranab Dutta at National Symposium, Tripura.

- Bhanushree Doley, Department of Plant Pathology got Best Oral Presentation award at Indian Society of Seed Technology ICAR Research complex, Imphal, Manipur; also participated in the workshop in IPR at Research Conclave19, IIT, Guwahati.

- Parveen Khan, Department of Plant Pathology awarded as 2nd Best Poster in 'Biosciences and Bioengineering', IIT Guwahati.

- Swagata Saikia, Department of Plant Pathology awarded as 2nd Best Poster in 'Biosciences and Bioengineering', IIT Guwahati.

- Ms. Mehjebin Rahman, Department of Plant Pathology awarded 3rd Best Poster in 'Biosciences and Bioengineering', IIT Guwahati.

- Lohita Rabha, Department of Extension Education awarded with Best Poster Presentation award at 27th National Conference of Soil Conservation Society of India, New Delhi held at AAU, Jorhat from 25th-27th, 2018.

- Sasanka Sekhar Borah, PhD Scholar, Department of Entomology, awarded as Best Poster Presentation Award in 'International Conference on Climate Change, Biodiversity and Sustainable Agriculture' held at AAU, Jorhat from 13th-16th December, 2018.

- Utpal Roy, Department of Plant Breeding and Genetics awarded as Best Poster award for poster 'Determination of LD50 of Gamma Rays for Induction of Mutations in India Mustard [Brassica juncea (L.) Czem & Coss.]' by Utpal Roy, Purna Kanta Barua and S.J. Jambhulkar in the International Conference at AAU, from 13th-16th December, 2018 under thematic group 'Use of Radiation Technology in Crop Improvement'.

- Kasturi Shivam, Department of Plant Breeding and Genetics, presented poster at Assam Botany Congress & Intl Conf. On Plant Science from 4th-6th February, 2019 at Cotton University, Guwahati.

- Priyanka Dutta, Department of Plant Breeding and Genetics Poster presented at Assam Botany Congress & International Conference on Plant Science, from 4th-6th February, 2019 at Cotton University, Guwahati.

- Prithviraj Pegu, Department of Plant Breeding and Genetics awarded 1st Prize in Oral Presentation (Humanities and Social Science) (Cash Prize Rs. 2000 and certificate) at Research Conclave 2019 from 15th-17th March, 2019 in IIT Guwahati at organized by SAB, IITG for the topic 'Impact of Seed Industry on Economic Development of Indian Agricultural Sector with Special Reference to NE States'.

- Udit N. Mishra, Department of Biochemistry & Agricultural Chemistry awarded with Best Oral Presentation in the technical session 21 in International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018) held at AAU, Jorhat from 13th-16th December, 2018.

- Shilpa Saikia, Department of Sericulture selected for Bayer Fellowship 2018-19.

- Kisholoyee Gogoi, Department of Horticulture, awarded with Best Poster award (1st Position) in technical session 17, ICCBS, 2018 held from 13th-16th December, 2018 at Department of Crop Physiology, AAU, Jorhat.

- Sudeshna Baruah, Department of Horticulture, awarded with Best Poster award (2nd Position) in technical session 6, ICCBS, 2018 held from 13th-16th December, 2018 at Department of Crop Physiology, AAU, Jorhat.
Kakoli Konwar, Department of Agronomy, in 'International conference on climate change, biodiversity and sustainable agriculture 'oral presentation of the student's research project on the topic of 'Increasing productivity of rapeseed through system of rapeseed intensification' and it was uploaded in www.slideshare.net of SRI Rice International programme, CALS, Cornell University.

Krishna Bharadwaj, Department of Agronomy secured 2nd position in Poster Presentation during technical session-10 on the topic 'Determination of Water Requirements and Crop Coefficient Using Weighing Type Lysimeter in Potato' in ICCBSA-18, held from 13th to 16th December, 2018.

Binod Kalita, Department of Agronomy secured 1st position in Poster Presentation during technical session-18 on 'Tea Plantation Techniques, Cash and Allied Crops' in ICCBSA-18 held from 13th to 16th December, 2018.

Nitumoni Mahanta and Jami Naveen, Department of Agronomy presented a poster on the topic 'Soil Moisture Content and Yield of Rapeseed as Influenced by Moisture Conservation and INM Practices' at ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan held from 11th-14th February, 2019.

Prathana Gogoi and Brota Sing Bey, Department of Agricultural Economics and FM awarded with 3rd Best Poster Presentation on 'Climate Related ITK's of Assam' in the International Conference on Climate Change Sustainable Agriculture and Biodiversity held from 10th-14th December, 2018 at AAU, Jorhat.

Elangbam Yaipaleima, Department of Agricultural Economics and FM Secured 1st position in Oral Presentation for her research paper entitled 'Study of Marketing Channels, Marketing Cost and Marketing Margins of Black Scented Rice (Chak-Hao) in Manipur' in the National Agribusiness Entrepreneurship Conclave organized by ICAR Complex, Barapani, Meghalaya.

Asem Aruna Devi, Department of Agricultural Economics and FM Secured 2nd position in Oral Presentation for her research paper entitled 'Economic Analysis of Marketing of Pineapple in Thoubal District of Manipur' in the National Agribusiness Entrepreneurship Conclave organized by ICAR Complex, Barapani, Meghalaya.

Sunita Devi, Department of Nematoogy awarded as Best Poster Presentation in 27th National Conference of Soil Conservation Society of India held from 25th-27th October, 2018 at AAU, Jorhat

Shraddha Mohanty, Department of Soil Science won Indian Society of Soil Science Zonal Award (East Zone) for best M.Sc. Dissertation in Soil Science, 2018; also secured 1st prize in All India Post Graduate Students' Research Convention in Soil Science held at Bihar Agricultural University, Bhagalpur from 15th-16th March, 2019.

Prarthana Priyam Hazarika, Department of Soil Science secured Second Prize in Poster Presentation at Research Conclave'18, IIT Guwahati (March'18); also won the Best Paper award in Poster Session (Technical Session V) at 27th National Conference of Soil Conservation Society of India, New Delhi on 'Sustainable Management of Soil and Water Resources for Doubling Farmers' Income' held at AAU, Jorhat (2018); Best Interactive Poster award at International Conference on Next Generation Plant Production and Bioresources Utilization Technologies, IIT, Guwahati held from 11th-13th February, 2019; Best Interactive Poster award at International Conference on Next Generation Plant Production and Bioresources Utilization Technologies, IIT, Guwahati, 11th-13th February, 2019; Third prize at Three Minutes Thesis
Presentation at Research Conclave'19, IIT, Guwahati, held from 14th-17th March, 2019.


2.2.2 Veterinary
2.2.2.1 Faculty/Scientists

- Dr. K.K. Saharia, Department of Extension Education of CVSc, Khanapara received Sr. Randhir Singh Award for the Best of Gender Issues on Management of Indigenous Breeds in Hilly Areas at XXVI Annual Convention of the Indian Society of Animal Production and Management, College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala during 23rd to 25th January, 2019

- Dr. Leema Bora, Department of Extension Education of CVSc, Khanapara received the Best presentation award in 'International Seminar on Doubling Farmers' Income: Technology, Policy and Strategy Options' held on 27th to 28th February, 2019 organized by CVSc, AAU, Khanapara on the occasion of AAU Golden Jubilee.

- Dr. Probodh Bora, Professor and Head, Department of Animal Biotechnology, CVSc, Khanapara.

- Member of the Task Force for 'Research Resources, Service Facilities and Platforms' and 'DBT-BUILDER Programme' (2017-19) of DBT, Govt. of India.

- Member of the Expert Committee constituted by DBT, Govt. of India for the Review of Completed Indo-Japan Projects as well as to review the proposal from AIST-Japan for up-gradation of DIALAB into DIACENTRE for 3 years from July, 2017.

- Member of the Group of Experts Committee constituted by Department of Science & Technology, Govt. of India to review the projects funded by DST and implemented by the State Science & Technology Councils since October, 2018.

- Member of the Expert Committee constituted by DBT, Govt. of India for the Atal Incubation Centres (DBT-NERIAI) Scheme launched by NITI Aayog for 3 years from September, 2017.

- A Member of the Steering Committee on Biotechnology Based Programme for Societal Development (Rural Development, SC/ST Population and Women) constituted by DBT, Gol, New Delhi since December, 2018.

- Chairman of the Institutional Ethics Committee of Gauhati Medical College since September, 2017.

- Member of the Research Advisory Committee (RAC) of Fakhruddin Ali Ahmed Medical College, Barpeta since December, 2018.

- External Member of the Departmental Research Committee of the Department of Molecular Biology & Biotechnology of Cotton University for 2 years since October, 2017.

- Member of the Research Advisory Committee of National Research Centre on Mithun constituted by ICAR, New Delhi since December, 2018.

- External Expert Member of the Institutional Biosafety Committee (IBSC), IASST, Guwahati for the period 2018-2021.

- Dr. R.A. Hazarika, Prof. & Head, Department of Veterinary Public Health, CVSc, AAU, Khanapara

- Certificate of Appreciation for involvement as Core group member in PERIMILK study by Public Health Foundation of India, Gurgaon.

- Member of the Expert Committee constituted by DBT, Govt. of India for the Review of Completed Indo-Japan Projects as well as to Review the proposal from AIST-Japan for up-gradation of DIALAB into DIACENTRE for 3 years from

- A Member of the Group of Experts Committee constituted by Department of Science & Technology, Govt. of India to review the projects funded by DST and implemented by the State S & T Councils since October, 2018.

- Member of the Expert Committee constituted by DBT, Govt. of India for the Atal Incubation Centres (DBT-NERAIC) Scheme launched by NITI Aayog for 3 years from September, 2017.

- Member of the Steering Committee on Biotechnology Based Programme for Societal Development (Rural Development, SC/ST Population and Women) constituted by DBT, GoI, New Delhi since December, 2018.

- Chairman of the Institutional Ethics Committee of Gauhati Medical College since September, 2017.

- Member of the Research Advisory Committee (RAC) of Fakhruddin Ali Ahmed Medical College, Barpeta, since December, 2018.

- External Member of the Departmental Research Committee of the Department of Molecular Biology & Biotechnology of Cotton University for 2 years since October, 2017.

- Member of the Research Advisory Committee of National Research Centre on Mithun constituted by ICAR, New Delhi since December, 2018.

- External Expert Member of the Institutional Biosafety Committee (IBSC), IASST, Guwahati for the period 2018-2021.

- Certificate of Appreciation for involvement as Core group member in PERIMILK study by Public Health Foundation of India, Gurgaon.

- Certificate of Appreciation for involvement as Core group member in Research Capacity Building Programme by Public Health Foundation of India, Gurgaon.

- Letter of Appreciation for active co-operation and participation in International Conference on 'Intensifying Food Systems and Health: Emphasis on Antimicrobial Use in Agricultural Systems' organized by International Livestock Research Institute from 4<sup>th</sup> to 6<sup>th</sup> April, 2018 at Jaipur, Rajasthan.

- Dr. A. Gohain Barua, Professor, Department of Veterinary Public Health CVSc, Khanapara received Certificate of Appreciation for involvement as Core group member in PERIMILK study by Public Health Foundation of India, Gurgaon.

- Dr. G.C. Das and Dr. G. Zaman Professor, Department of AGB, CVSc, Khanapara, honoured for breed registration of Luit, a native buffalo of Assam with the accession no. INDIA_BUFFALO_0212_LUIT_010 14 by ICAR, New Delhi.

- Dr. G. Zaman, Professor, Department of AGB, CVSc, Khanapara, along with Dr.
Naba Nahardeka and Dr. A. Salaque, GRS, AAU, Burnihat, Assam were honoured for breed registration of Assam Hill, a native goat of Assam with the accession no. INDIA_GOAT_0213_ASSAMHILL_06031 by ICAR, New Delhi.

- Dr. Kushal Konwar Sarma, Professor & Head, Department of Surgery & Radiology, Khanapara, received Certificate of Appreciation from Dy. Director, Dudhwa Tiger Reserve for 'Commitment and Outstanding Service' during the greater one-horned rhinoceros translocation exercise in the park from 10th to 13th April, 2018.

- Dr. Dhruba Jyoti Kalita, Professor, Department of Veterinary Biochemistry, College of Veterinary Science, Khanapara.

- Invited to act as a Chairman of a technical session in 19th Indian Veterinary Congress (IVC) and XXVI Annual Conference of IAAVR at West Bengal University of Animals and Fishery Sciences (WBUAFS), Kolkata held from 1st to 2nd February, 2019.

- Invited as a Guest Lecturer to deliver a lecture on 'Reducing antibiotic residues through novel antimicrobial peptides' at Gauhati Medical College on the occasion of Dr. Pratul Goswami Memorial Ceremony organized by Department of Biochemistry, Gauhati Medical College on 16th February, 2019.

- Dr. Trishna Borpuzari, Professor, Department of Livestock Products Technology, CVSc, Khanapara awarded Third prize in Oral Presentation titled 'Development of Ready To Serve Whey-Based Fruit Beverage' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at College of CVSc, AAU, Khanapara, on 27th - 28th February, 2019.

- Dr. M. Hazarika, Professor & Head, Department of Livestock Products Technology, CVSc, Khanapara.


- Recipient of the Third Prize in Oral Presentation titled 'Development of Ready-to-Serve Whey-Based Fruit Beverage' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27th - 28th February, 2019.

- Dr. D.C. Roy, Professor cum P.I., Department of Pharmacology & Toxicology, CVSc, Khanapara.


- Conferred D. Lit by Ashcroft University, London, UK, on 7th April, 2018 at Bengaluru, Karnataka, at the National Unity Conference.

- Recipient of the Assam Bharatiya Udyog Rata Gold Medal Award by Global Economic Progress and Research Association at Bengaluru on 7th April, 2018.

- Dr. Jitendra Goswami, Professor and Head, Department of Physiology, CVSc, Khanapara conferred APA Fellow 2018 by Animal Physiologists Association on 22nd December, 2018.

- Dr. Rita Nath, Professor, Department of Biochemistry, CVSc, Khanapara awarded Third prize in Oral Presentation titled 'Development of Ready-to-Serve Whey Based Fruit Beverage' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27th - 28th February, 2019.
Dr. A.K. Sharma, Professor, Department of Livestock Production & Management, CVSc, Khanapara awarded Third prize in Oral Presentation titled 'Development of Ready-to-Serve Whey Based Fruit Beverage' in 'International Seminar on Animal agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

Dr. K.C. Nath, Retired Professor, Department of ARGO, CVSc, Khanapara awarded with Lifetime Achievement award in ISSAR 'Productivity Enhancement through Augmenting Reproductive Efficiency of Livestock for Sustainable Rural Economy' during 28\textsuperscript{th} to 30\textsuperscript{th} December, 2018, at Anand Agricultural University, Gujarat.

Dr. B.C. Deka, Retired Head and Professor, Department of ARGO, CVSc, Khanapara ISSAR-Fellow in ISSAR Productivity Enhancement through Augmenting Reproductive Efficiency of Livestock for Sustainable Rural Economy' 28\textsuperscript{th} to 30\textsuperscript{th} December, 2018, at Anand Agricultural University, Gujarat

Dr. Bitupona Deuri, Assistant Professor, Department of Surgery & Radiology, Khanapara, Awarded with Dalmia Young Achievement Award, 2018 under the category 'Woman Empowerment'.

Dr. Santosh Upadhyay, Junior Scientist, AICRP on PHET, CVSc, Khanapara,

- Bagged the First Prize in Poster Presentation titled 'Development and Quality Evaluation of Bhujia Incorporated with Spent Hen Meat Powder' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Awarded the First Prize in Oral Presentation titled 'Development of Liquid Smoke Production Plant' in 'International Seminar on Animal agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Dr. Protiva Gogoi, Junior Scientist AICRP on PHET, CVSc, Khanapara.

- Bagged the First prize in Poster Presentation titled 'Development and Quality Evaluation of Bhujia Incorporated With Spent Hen Meat Powder' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Got the First prize in Oral Presentation titled 'Development of Liquid Smoke Production Plant' in 'International Seminar on Animal agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Dr. Ankur Das, Assistant Professor, Department of Livestock Products Technology, CVSc, Khanapara.

- Got the First Prize in Poster Presentation titled'Development and Quality Evaluation of Bhujia Incorporated with Spent Hen Meat Powder' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Bagged the First prize in Oral Presentation titled 'Development of Liquid Smoke Production Plant' in 'International Seminar on Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27\textsuperscript{th} - 28\textsuperscript{th} February, 2019.

- Dr. Jakir Hussain, Assistant Professor (LPM), CVSc, Khanapara, awarded with the N.S.R. Sastry Eight-Sisters NE for Best LPM Research for his oral presentation of research paper entitled 'Effect of Restricted Suckling on the Growth Performance of Hampshire Piglets' in the
National Conference on 'Innovations in Animal Production for Sustainability and Doubling Farmers' Income' & 26th Annual Convention held at the College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerela (Kerela Veterinary and Animal Sciences University) from 23rd- 25th January, 2019.

- Dr. S. Sonowal, Assistant Professor, Department of Veterinary Public Health, CVSc, Khanapara received Certificate of Appreciation for involvement as a Core Group Member in PERIMILK study by Public Health Foundation of India, Gurgaon.

- Dr. S. Tamuly, Assistant Professor, Department of Veterinary Biochemistry, CVSc, Khanapara, awarded Overseas Fellowship for Post-Doctoral Study by DBT, Govt of India.

- Dr. Anil Deka, Assistant Professor, Department of Anatomy & Histology, CVSc, Khanapara awarded the Best Paper award in Anatomy of Wild and Zoo Animals at XXXIII Annual Convention and National Symposium of IAVA at Aizwal, held on 28th-30th November, 2018.

- Dr. Deepsikha Deori, Jr. Scientist AICRP on PHET, CVSc, Khanapara awarded 1st prize in Oral Presentation titled 'Development of Liquid Smoke Production Plant' in 'International Seminar on Animal agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27th-28th February, 2019.

2.2.2.2 Students


- Dr. Simanta Koushik awarded 2nd position for Poster Presentation in International Seminar on 'Animal Agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at Assam Agricultural University, Khanapara, Guwahati from 27-28th February, 2019.

- Dr. Chandrani Goswami awarded Certificate of Appreciation for completing her research project under the Research Capacity Building Programme by Public Health Foundation of India, Gurgaon.

- Dr. Zabirul Bakht, MVSc student Department of Livestock Products Technology, CVSc, AAU, Khanapara awarded Third prize in Oral Presentation titled 'Development of Ready to Serve Whey-Based Fruit Beverage' in 'International Seminar on Animal agriculture for Doubling Farmers' Income: Technology, Policy and Strategy Options' held at CVSc, AAU, Khanapara, on 27th-28th February, 2019.


- Dr. Monica Tissopi, LPM Deptt., has been

2.2.3 Community Science
2.2.3.1 Faculty/Scientists

- Dr. Manoshi Baruah Deka, Professor, Department of Ext. and Communication Management, College of Community Science, AAU, appointed as External Expert in Extension Advisory Committee of College of Home Science, CAU, Tura.

- Dr. Pranati Das, Professor, Department of Food and Nutrition, College of Community Science, AAU, nominated as Subject Expert for selection of Associate Professor (Food Science and Nutrition), College of Home Science, Tura on 9th August, 2018.

- Dr. Premila Bordoloi, Assistant Professor, Department of Food Science and Nutrition awarded as Best Poster Award under Food Science section at 50th Annual International Conference of Nutrition Society of India held at Hyderabad, Telengana.

2.2.3.2 Students

- Darshana Chetia, M.Sc Student, Department of FRMCS, awarded Third Best Poster Presenter Award in International Conference on Climate Change, Biodiversity and Sustainable Agriculture, AAU, Jorhat.

- Sonia Langthasa, M.Sc Student, Department of FRMCS, awarded Third Best Poster Presenter award in International Conference on Climate Change, Biodiversity and Sustainable Agriculture, AAU, Jorhat.

- Gitasree Goswami awarded Young Scientist Award, 2018 in International Conference on Climate Change, Biodiversity and Sustainable Agriculture, AAU, Jorhat.

- Papori Bora awarded the Third Best Poster Presenter award in International Conference on Climate Change, Biodiversity and Sustainable Agriculture AAU, Jorhat.

2.2.4 College of Sericulture
2.2.4.1 Faculty/Scientists

- Dr. Anjuma Gayan, Assistant Professor, Soil Science, College of Sericulture, Titabor, awarded as Best Poster award in 27th National Conference of Soil Conservation Society of India, New Delhi, on Sustainable Management of Soil and Water Resources for Doubling Farmer's Income, 25th - 27th October, 2018.

2.2.5 BNCA
2.2.5.1 Students

- Kishalayee Gogoi, M. Talukdar and M. Barooah, Department of Horticulture, BNCA awarded with Best Poster on International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018) from 13th - 16th December, 2018, AAU.

- Jaiz Isfaque Rahman, D. N. Hazarika, M. K. Kalita, P. K. Sharma and S. Langthasa, Department of Horticulture, BNCA, awarded with 2nd Best Poster Presentation on International Conference on Climate change, Biodiversity and Sustainable Agriculture (ICCBSA-2018) from 13th-16th December, 2018 at AAU, Jorhat.

- Sanjukta Chakraborty, BNCA received Dr. Dharani Das Memorial Cash Award for securing highest CGPA in 2nd year, B. Sc.(Hons.) Agriculture.

2.2.6 College of Fisheries Science, Raha
2.2.6.1 Students

- Kongkon J. Bhuyan, M.FSc student bagged the
Babu Jagjivan Ram Award, 2018 for his excellent performance in the field of literature as well as in print media.

2.2.7 College of Horticulture

2.2.7.1 Students

- Kishalayee Gogoi from College of Horticulture, AAU, Jorhat bagged Best Poster award in the technical session 17, International Conference Climate Change, Biodiversity and Sustainable Agriculture -2018 held from 13th-16th December, 2018 in the Department of Crop Physiology, AAU, Jorhat.

2.2.8 Fishery Research Centre, Jorhat

2.2.8.1 Faculty/Scientists

- Dr. Bibha Chetia Borah, Principal Scientist & Officer-in-Charge, Fisheries Research Centre, Jorhat.
- Recipient of the Prof. B.N. Pandey Medal (ZSI) in the 31st All India Congress of Zoology and National Seminar on 'Climate Smart Aquaculture' organized by NESFA, India and Zoological Society of India from Minister of Fisheries, Govt. of Tripura, Shri N.C. Debabarma, DDG (Fisheries), ICAR, Dr. J.K. Jena, and Vice-Chancellor, CAU, Imphal Dr. M. Premjit Singh.
- Elected as a fellow of Zoological Society, Kolkata (FZS Cal) for the year 2018 in the 72nd Annual General Meeting held on 26th July, 2018 at Kolkata University.
- Received honorary fellowship of Society of Life Science for the year 2018 in the 6th Annual Session of the Society of Life Sciences on 7th November, 2018.
- Dr. Pallab Kr. Sarma, Principal Scientist, BNCA.
- Nominated as a Subject Expert, Soil Science of College of Hort. & Fishery, and College of Post Graduate Studies, CAU.
- Selected as Advisor in Climate Change Innovation Programme- ACT-Phase-II.
- Dr. M. K. Sarma, Professor, BNCA.
- Received reviewer's Excellence Award, ARCC, Hissar, Haryana.

Figure 2.8. Kishalayee Gogoi from College of Horticulture, AAU, Jorhat won Best Poster award in technical session 17, International Conference on Climate Change, Biodiversity and Sustainable Agriculture, 2018

Figure 2.9. Dr. Bibha Chetia Borah, Principal Scientist and Officer-in-Charge, FRC, AAU receiving Prof. B.N. Pandey medal (ZSI)
Became a Member of the selection committee of Arunachal Pradesh Public Service Commission.
Selected as a Member of Departmental Research Committee, Department of Biotechnology and Bioengineering, Gauhati University, Guwahati.
Become a PhD thesis examiner of Banaras Hindu University, Varanasi.
Dr. Prashanta Neog, Principal Scientist, BNCA, become the Consultant in the Climate Change Innovation Programme- ACT-Phase-II.
Drs. Prasanta Neog, D. Saikia, R.K. Goswami, and Mrs. R.R. Changmai, BNCA, were awarded the Best Paper award in Oral Presentation category for the paper titled 'Management of Rhizome Rot Disease of Ginger Though Adjustment of Microclimate in North Bank Plain Zone of Assam' presented in the International Symposium on 'Advances in Agrometeorology for Managing Climatic Risk of Farmers' held from 11th-13th February, 2019 at JNU, New Delhi.
Dr. P. Saikia, Chief Scientist, RARS, North Lakhimpur, was appointed as Hony. Wildlife Warden of Assam by His Excellency, Governor of Assam for the year 2018-2020.
Dr. J. C. Nath, Principal Scientist, HRS, Kahikuchi, was selected as Nominee/Representative of AAU to the state-level monitoring committee of Coconut Development Board.
Dr. Ayub Ali Ahmed, Principal Scientist, HRS, Kahikuchi.
Nominated as External Examiner of PhD thesis viva-voce, BCKV, Mohanpur, West Bengal.
Selected as Subject-Matter Expert for selection of SMS (Agronomy), KVK, Sipahijala, Tripura.
Dr. S.K. Borah, Principal Scientist, HRS, Kahikuchi.
Appointed as External Examiner at CAU, Imphal.
Acted as Question Paper Setter of Plant Pathology and Horticulture discipline for courses of B Sc (Agri) and M Sc (Agri) of CAU, Imphal.
Selected as Project evaluator at ASRLM, Dispur.
Ms. D. Dutta, Jr. Scientist, SRS, Buralikson selected as Member of the monitoring team of North-Central and North-East Zone under AICRP on Sugarcane for the year 2019.
3. Important Events

3.1 AAU Golden Jubilee Year (2018-19)

The celebration of AAU Golden Jubilee Year (2018-19) commenced on 1st April, 2018. The commemorative AAU Golden Jubilee Gate was inaugurated by the hon'ble Vice-Chancellor of AAU, Dr. K. M. Bujarbarua, on 1st April, 2018. The auspicious event was attended by the statutory officers, teachers, students and staff of AAU, Jorhat campus.

3.2 AAU Golden Jubilee Logo

The AAU Golden Jubilee Logo with the motto 'TRANSFORMING AGRICULTURE, TRANSFORMING ASSAM' was inaugurated by the hon'ble Vice-Chancellor of AAU, Dr. K. M. Bujarbarua, on 1st April, 2018. The logos of two constituent institutes of Assam Agricultural University- College of Horticulture and College of Sericulture also inaugurated by the hon'ble Vice-Chancellor, AAU.
3.3 Cultural rally

A cultural rally was organized on 3rd April, 2018 at Jorhat town in which more than two thousands teachers, students, employees and alumni of AAU took part to mark the Golden Jubilee Year of Assam Agricultural University, Jorhat.

3.4 Opening ceremony of the Golden Jubilee Year of AAU

The opening ceremony of the year-long celebration of the Golden Jubilee Year of AAU, Jorhat was held on 17th April, 2018 at AAU Auditorium. Hon'ble Vice President of India Sjt. Venkaiah Naidu graced the occasion as the chief guest which was also attended by hon'ble Governor of Assam, Prof. Jagdish Mukhi, hon'ble Minister of Agriculture, Horticulture and Food Processing, Animal Husbandry and Veterinary, Govt. of Assam, Shri Atul Bora and Member of Parliament, Shri Kamakhya Prasad Tasa. Justice S. N. Phukan, former Acting Chief Justice of Himachal Pradesh High Court and Chief Justice of Orissa High Court and one of the leading citizen of Jorhat was felicitated by the hon'ble Vice President of India Sjt. Venkaiah Naidu on the occasion.
3.5 International Conference on Climate Change, Biodiversity and Sustainable Agriculture

An International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018) was held on December 13-16, 2018 at the Assam Agricultural University, Jorhat campus. The four day event was attended by 1200 participants from 17 countries. The conference was edified with three key note lectures, 15 plenary, 63 Lead, 75 invited, 200 oral and 750 poster presentations, organized in various scientific technical sessions by the eminent personalities in the field.
3.6 International Seminar on 'Animal Agriculture for Doubling Farmers' Income Technology, Policy and Strategy Options' CVSc, Khanapara

An International Seminar on 'Animal Agriculture for Doubling Farmers' Income Technology, Policy and Strategy Options' CVSc, Khanapara was organized by CVSc, Khanapara on 27-28th February, 2019. The well attended opening session was graced by his Excellency Governor of Assam, Prof. Jagadish Mukhi, hon'ble Vice-Chancellor of AAU, Dr. K. M. Bujharbaruah and other dignitaries. His Excellency Governor of Assam, Prof. Jagadish Mukhi attended a presentation session of the International Seminar.

Fig. 3.17. Lighting of ceremonial lamp by the hon'ble VC, AAU in the presence of His Excellency the Governor of Assam and other dignitaries

Fig. 3.18. His Excellency the Governor of Assam attending a presentation

Fig. 3.19. Inauguration of Exhibition by hon'ble VC, AAU

3.7 International Day of Art of Giving

International Day of Art of Giving is celebrated on 17th May, 2018 at Boy's Juvenile Observation Home, Lichubari. Dr. D. K. Bora, NSS programme Co-ordinator and Director of Students' Welfare, AAU, Jorhat graced the occasion. In the day more than 300 NSS volunteers participated by sharing gifts to the boys inmates.

Fig. 3.20. Release of Compendium and Book by the his Excellency Governor of Assam and other dignitaries

Fig. 3.21. Observation of the International Day of Art of Giving at Boy's Juvenile Observation Home, Lichubari

Fig. 3.22. Observation of the International Day of Art of Giving at Boy's Juvenile Observation Home, Lichubari

3.8 World Environmental day on 5th June, 2018

World Environment Day was celebrated on 5th June, 2018. On the day a ceremonial tree plantation programme was observed at AAU, Jorhat campus and
in the village. In the plantation programme Dr. D. K. Bora, NSS programme Co-ordinator and Director, Students' Welfare, AAU, Jorhat highlighting the year's UN theme of “Beat Plastic Pollution”. Senior teachers and students of the College of Agriculture, Community Science, Sericulture and Horticulture were participated. More than 200 student's volunteers also participated in the plantation programme.

3.9 International Day of Yoga on 21st June, 2018
Fourth International Yoga Day was observed in the Indoor stadium at AAU, Jorhat campus on 21st June 2018. The event was held in presence of Dr. D. K. Borah, Dean, College of Agriculture, Dr. S. Kour, Dean college of Community Science, Dr. C. Hazarika, Director, PG studies and Dr. D. K. Bora, Director, Students Welfare. In the programme, more than 150 teachers, students, staff members and 350 NSS volunteers participated.

3.10 BRICS International Youth Summit from 15-20 July, 2018
BRICS International Youth Summit was celebrated at Bela-Bela, Zebula Estate, Limpopo Province on 15-20 July 2018. Ms. Archita Goswami from College of Agriculture, Jorhat was in the Indian Youth Delegation.

3.11 Swachhata Pakhwada (Cleanliness Fortnight) from 1st to 15th August 2018
Swachhata Pakhwada programme (Cleanliness Fortnight) was organised from 1st to 15th August 2018. During the period different programme was organised such as easy competition, play card completion etc. In the period cleanliness drive was organised by NSS volunteer's especially 1st year students in respective hostels and nearby public places such as schools and hospital compounds. In the end of the programme, a Rally was brought out in the vicinity of AAU campus with the active support of Students' Society, AAU, Jorhat. In the rally, more than 400 NSS volunteers participated with Statutory Officers, Programme Officers and teachers share the awareness for cleanliness.

3.12 Celebration of NSS Day 24th September, 2018
NSS Day was observed on 24th September 2018 by 1st year NSS volunteers at AAU, Jorhat. On the occasion of the NSS Day, a talk was delivered Dr. R. P. Bhuyan
3.13 Disaster Preparedness Programme by NSS, AAU, Jorhat on 28th Sep, 2018

A disaster - preparedness talk followed by a rescue drill and demonstration for NSS volunteers, students and other officers/staff was organised on 28th Sep, 2018 in front of Canteen and Hostels of AAU Jorhat Campus with the help of the personnel and volunteers of the Civil Defence team, Jorhat District Administration, Jorhat.

The programme was organised by NSS Cell, AAU, Jorhat jointly with EEI, AAU, Jorhat. Above 300 NSS volunteers, students and other officers/staff attended the programme expressed their satisfaction on the same. Officer participants from the EEI (NE Region) attending a training workshop also attended the programme.

3.14 Swacchta Hi Seva on 2nd October, 2018

Swacchta Hi Seva was observed on 2nd October, 2018. On this day more than 600 NSS volunteers participated in hostel-wise for cleaning their surroundings.

3.15 Unity Day on 31st October, 2018

National Unity Day on Birth Anniversary of Sardar Ballabh Patel was celebrated on 31st October, 2018 with a Unity Run by student NSS volunteers to maintain the unity amongst all people irrespective of community. On the occasion more than 250 NSS volunteers participated.

3.16 Special Camp from 17-23 November, 2018

National Service Scheme (NSS) Unit of Assam Agricultural University, Jorhat successfully organized a Special Camp from November 17 – 23, 2018 in various places nearby AAU, Jorhat. About 250 student NSS volunteers presented various messages as a part of the Awareness Programme amongst the people of the village, majority of them are farmers, the NSS student volunteers who comprised of students of Agriculture, Horticulture, Community Science and Sericulture got an opportunity to interact with the people residing in rural areas. The student volunteers presented Street Plays to generate public awareness on social issues including agricultural, environmental and others topics/themes. The programme was ended by cultural presentations by NSS volunteers and was attended by above 300 local people.

3.17 NSS Adventure Camp from 25th to 4th December, 2018

NSS Adventure Camp was organised from 25th to 4th December 2018 at NIMAS, Dirang, Arunachal Pradesh. Six numbers of (6) NSS Volunteers from AAU participated in Adventure Camp.
3.18 World Aids Day on 1st December, 2018

World Aids Day was organised on 1st December 2018, by NSS unit of AAU, Jorhat at Assam Agricultural University, Jorhat. In the programme importance of World Aids Day was clearly presented to the students. The theme of the World Aids Day in the year 2018 was “Know Your Status”.

3.19 NSS National Integration Camp from 10th to 16th March, 2019

NSS National Integration Camp was celebrated from 10th to 16th March 2019 at RN Tagore University, Bhopal. Four NSS Volunteers from AAU participated in the National Integration Camp.

3.20 NSS North East Festival from 18-22 March, 2019

NSS North East Festival was celebrated from 18th to 22nd March 2019, at Don Bosco University, Tapesia, Sonapur. In the festival seven NSS Volunteers from AAU, Jorhat were participated in the North East Festival.

3.21 NSS National Integration Camp from 24th to 30th March, 2019

NSS National Integration Camp was celebrated from 24th to 30th March 2019 at Chandigarh. Eight NSS Volunteers from AAU, Jorhat participated in the National Integration Camp held at Chandigarh.

3.22 Blood Donation cum Group Identification Camp on 30 March, 2019

An awareness camp on blood donation was organised by NSS Unit of Assam Agricultural University, Jorhat and Students' Society (Student Aid Fund and Social Service) in collaboration with JMC Blood Bank at Medical Unit of AAU, Jorhat on 30th March, 2019. Dr R. P. Bhuyan, DSW cum NSS Programme Coordinator, AAU delivered the Welcome Address and Dr. Jayanta Deka, Dean, College of Agriculture, AAU, Jorhat exhorted all students to keep up the rich tradition of AAU in donating blood as social service. In this relation, brief speeches on the need and importance of voluntary blood donation were presented by Dr. Shemim Rahman, Medical Officer-in-charge, JMC Blood Bank. In the camp free blood grouping was done by Indian Red Cross Society of Jorhat branch.

3.23 Alumni Meet of College of Community Science

The Alumni Meet of College of Community Science, the erstwhile College of Home Science was held with much fanfare on 7th April, 2018. More than 400 alumni of the college attended the meet and participated in various events of the Alumni Meet. The opening ceremony of the meet was graced by the presence of Rupshikha S. Borah, Director of Finance, OIL and noted Assamese actress Chetana Das. Hon’ble VC, AAU and the two other dignitaries Rupshikha S. Borah and Chetana Das addressed the alumni assembled in their alma matter from different parts of the country.
3.24 Alumni Meet of College of Agriculture, Jorhat

The Alumni Meet of College of Agriculture, Jorhat was held 3rd-4th May, 2018. More than 1000 alumni of the college attended the meet and made the meet a grand success by their enthusiastic participation in different events. The keynote address in the open session was delivered by Dr. M. Hazarika, hon’ble VC, Gauhati University. A number of dignitaries from the university and outside graced the occasion by their presence.

3.25 All Assam Debating competition

An All Assam Debating competition was held on 15th May, 2018 at AAU, Jorhat to commemorate the Golden Jubilee Year of Assam Agricultural University. A number of College and university debate teams
participated in the debating competition. B. Borooah College of Guwahati bagged the prize of champion debate team while College of Agriculture, Jorhat and Cotton University, Guwahati were adjudged first runners-up and second runners-up, respectively.

3.26 Other Important Events in 2018-19

3.26.1 Agriculture:

- ICAR sponsored short course on 'Role of Agribusiness Sector and Market Intelligence in Enhancing Farmer's Income' was organized by Dept. of Agricultural Economics from 10th July, 2018 to 19th July, 2018 at AAU, Jorhat.

- Centre for International Project Trust sponsored national workshop on 'Exploring Possibilities for Sustainable Agriculture and Farmer's Livelihood in Assam' was organized by the Department of Agricultural Economics and Farm Management, Jorhat and Centre for International Project Trust on 20th November, 2018.

- National Institute for Agricultural Management, Jaipur sponsored national-level event on 'Agriculture Market and Enterprise Development' was organized by Department of Agricultural Economics and Farm Management, Jorhat and National Institute for Agricultural Management, Jaipur from 12th February, 2019 to 13th February, 2019 at the Department of Agricultural Economics and Farm Management, Jorhat.

- AAU sponsored state-level 10-day training program on the 'Application of SPSS Package in Social Sciences' was organized by the Department of Agricultural Statistics, Jorhat from 4th October, 2018 to 13th October, 2018 at Central Computer Lab, Department of Agricultural Statistics, CA, Jorhat.

- Commission for Scientific and Technical Terminology under MHRD sponsored two days National Workshop on 'Scientific and Technical Terminology in Agricultural Sciences' was organized by the Department of Agricultural Statistics, Jorhat, from 21st November, 2018 to 22nd November, 2018 at AAU, Jorhat.

- State-level Computer Training on 'Web Designing and its Applications in Agriculture' for UG Students of different faculties of AAU, was held from 16th November, 2018 to 10th December, 2018, was organized by Central Computer Laboratory, Dept. Of Agricultural Statistics, Jorhat, and sponsored by Dean, FA, at Central Computer Laboratory, Department of Agricultural Statistics, Jorhat.

- State-level 10-Day training programme on 'MS-Office, SPSS Package, Adobe Photoshop and Corel DRAW' for the staff of AICRP - Home Science, was organized by Department of Agricultural Statistics, Jorhat and AICRP - Home Science, College of Community Science, Jorhat and sponsored by Directorate of Research (Agri.), Jorhat from 25th March, 2019 to 8th April, 2019 at Central Computer Laboratory, Department of Agricultural Statistics, Jorhat.

- Training on personality development for ELP students of B.Sc. (Agri) organized by AAU and sponsored by Dean, FA, from 4th October, 2018 to 11th October, 2018 at Department of Extension Education, EEI and Fishery Research Centre, AAU, Jorhat.

- Distributed Information Centre sponsored national hands-on training on 'Molecular Modeling & Molecular Dynamics Simulation' was organized by Department of Agricultural Biotechnology, AAU, Jorhat from 21st February, 2019 to 23rd February, 2019 at Department of Agricultural Biotechnology, Jorhat.

- DIC sponsored National Training on 'NGS Data Analysis' was organized by Distributed Information Centre, Department of Agricultural Biotechnology, AAU, Jorhat from 14th March, 2019 to 16th March, 2019 at Department of Agricultural Biotechnology, Jorhat.

- AINP on Soil Arthropod Pests, CA, Jorhat sponsored and organized a regional-level awareness programme on Majuli white grub, _Lepidota mansuetus_ for the farmers of Majuli.
• National level training programme on 'Techniques in Biofertilizers and Biopesticides Production for Organic Agriculture' attended by Mr. Sudhansu Bhagawati was held from 14th November, 2018 to 4th December, 2018 at CAFT in Organic Farming, CA, Jorhat.

• A national 21 days training programme on 'Recent trends in Pest Status, Pesticide Use and Insect Pest Management Strategies' was held from 5th October, 2018 to 25th October, 2018 at CSSHAU, Hisar.

• State-level skill development on Floriculture was organized by EEI, AAU in collaboration with Department of Horticulture, Jorhat from 28th November, 2018 to 2nd January 2019 at AAU, Jorhat.

• ICAR, New Delhi sponsored national-level 'Value Chain Analysis for Agricultural Commodities' organized by CCS-NIAM, Jaipur in collaboration with EEI (NER) from 18th January, 2019 to 19th January, 2019 at EEI, Jorhat.

• GoI sponsored state-level programme on 'Advanced Technology in Horticulture Crop Production' was organized by MIDH, Department of Horticulture, Jorhat on 15th February, 2019 at AAU, Jorhat.

• ICAR, New Delhi sponsored national-level discussion on 'Scouting Novelties for Nematode Management in Crops' and appraisal meeting of AICRP on 'Nematodes in Agriculture' was organized by Assam Agricultural University, Jorhat from 12th November, 2018 to 13th November, 2018 at AAU, Jorhat.

• Soil Conservation Society of India, New Delhi sponsored 27th National Conference of the Soil Conservation Society of India, New Delhi on 'Sustainable Management of Soil and Water Resources for Doubling Farmers' Income' was organized by Soil Conservation Society of India, New Delhi & AAU, Jorhat from 25th October, 2018 to 27th October, 2018 at AAU, Jorhat.

• ICAR sponsored National-level 21 days training on 'Techniques in Bio-fertilizers and Bio-pesticides Production for Organic Agriculture' was organized by Centre of Advance Faculty Training in Organic Farming from 14th November, 2018 to 4th December, 2018 at the Department of Soil Science, Jorhat.

• ICAR sponsored National-level 21 days training on 'Development in Organic Agriculture' was organized by Centre of Advanced Faculty Training in Organic Farming from 6th February, 2019 to 26th February, 2019 at Department of Soil Science, Jorhat.
Tea Board, India sponsored national and regional-level programme on 'Tea Production Technology' was organized by Department of Tea Husbandry and Technology, Jorhat during 27th-31st January, 2019, 3rd-7th February, 2019, 11th-15th February, 2019, 18th-22nd February, 2019, 25th February-1st March, 2019, 18th-22nd March, 2019 and 26th-30th March, 2019 at Department of Tea Husbandry and Technology, Jorhat.

3.26.2 Veterinary

ICAR-CIPHET sponsored state-level event 'Hygienic Meat Production, Processing and Slaughter house Management' was organized by AICRP on PHET and Department of LPT (CVSc & LCVCs) from 10th January, 2019 to 11th January, 2019 at LCVCs, North Lakhimpur.

ICAR sponsored national event of Broad Subject Matter Area for M.V.Sc. and Ph. D. Course Curriculum formulation on 'Livestock Production Management' was organized by Department of Livestock Production Management, CVSc, Khanapara from 9th October, 2018 to 10th October, 2018 at Department of Livestock Production Management, CVSc, Khanapara.

ICAR sponsored national event of Broad Subject Matter Area for the revision of Masters and PhD Courses syllabi on 'Livestock Products and Production Management' was organized by CVSc, Khanapara on 9th and 10th October, 2018 at the CVSc, Khanapara.

Ministry for Development of North-Eastern Region, Govt. of India sponsored National Training on 'Capacity Building of Teachers, Researchers and Biomedical Practitioners of North Eastern Region on Advanced Techniques in Molecular Biology and Microbiology' was organized by Department of Animal Biotechnology, CVSc, Khanapara, from 30th May to 8th June, 2018 at the Department of Animal Biotechnology, CVSc, Khanapara.

Department of Biotechnology, Govt. of India sponsored National Training on 'Advanced Molecular Techniques for Biological Research' was organized by Advanced State Biotech Hub & Department of Animal Biotechnology from 6th August, 2018 to 10th August, 2018 at Department of Animal Biotechnology, CVSc, Khanapara.

Department of Biotechnology, Govt. of India sponsored National Training on 'Techniques in Genomics and Proteomics' was organized by Advanced State Biotech Hub & Department of Animal Biotechnology, CVSc, Khanapara from 28th November, 2018 to 7th December, 2018 at Department of Animal Biotechnology, CVSc, Khanapara.

Department of Biotechnology, Govt. of India sponsored National Training on 'Computational Assessment of Biological Data Using Bioinformatics Tools' was organized by Department of Animal Biotechnology & Bioinformatics Infrastructure Facilities, CVSc, Khanapara, from 17th to 21st December, 2018 at Department of Animal Biotechnology, CVSc, Khanapara.
- Department of Biotechnology, Govt. of India sponsored National Training on 'Biomolecular Interactions, Dynamics and Computer-Aided Drug Designing' was organized by Department of Animal Biotechnology & Bioinformatics Infrastructure Facilities, CVSc, Khanapara from 12th to 16th March, 2019 at the Bioinformatics Infrastructure Facilities, CVSc, Khanapara.

3.26.3 Fisheries

- RF, FRC sponsored National Fish Farmers' Day was organized by FRC, AAU on 10th July, 2018 at FRC, Jorhat
- UGC sponsored state-level Diploma Course on Industrial Fish & Fisheries was organized by FRC, AAU & DR College, Golaghat during 10th-12th July, 2018 at FRC, Jorhat.
- RF, FRC sponsored state-level Annual Mega Fish Sale organized by FRC, AAU on 11th January, 2019 at FRC.
4. Education

4.1. Faculties
Being the sole agricultural university of the state, education is the frontier mandate of the University like any other agricultural university in the country. There are four faculties in the University to carry out this mandate. They are (1) Faculty of Agriculture with its headquarters at Jorhat (2) Faculty of Veterinary Science at Khanapara (3) Faculty of Community Science at Jorhat and (4) Faculty of Fishery Science at Raha, Nagaon. Colleges of Horticulture and Sericulture are under the Faculty of Agriculture.

4.2. Degree Programme
Assam Agricultural University offers courses in six areas of science viz., Agriculture, Veterinary, Community Science, Fishery Science, Horticulture and Sericulture. Bachelor's Degree is offered in all the six areas while postgraduate (Master's and Ph. D.) Degree is offered in the first four areas viz., Agriculture, Veterinary, Community Science and Fishery Science. With the implementation of the 5th Deans Committee's recommendation from the academic session 2016-17 (in all the Faculties except Veterinary), the 4 year Bachelor's Degree is broken into two parts. The first three consecutive years are devoted to course work and in the final year The students are exposed to the 'Student READY' (Rural Entrepreneurship Awareness Development Yojana) Programme of 40 credits – 20 credits each in the 7th and 8th semester. The duration of the B.V.Sc. Degree also has been increased in the same academic session from 5 years to 5 ½ years comprising course work of 4 ½ years and internship for 1 year. Besides, the nomenclatures of the degrees have also been changed in the areas of Agriculture, Community Science, Horticulture and Sericulture in accordance with the recommendations of the ICAR.

In addition to the degree courses, the University also offered 9 Certificate courses during the year through its Directorate of Extension Education, Jorhat. These courses include (i) Bakery (ii) Tea Production Technology & Management (iii) Pig farming. (iv) Apparel Designing & Construction (v) Aquaculture Production and Management (vi) Poultry Production Technology and Management (vii) Master Goat Production (viii) Cut Flower Production, and (ix) Dyeing & Printing of Textiles.

4.3. Course Curricul
Assam Agricultural University is implementing the undergraduate Course Curricula prescribed by the 5th Deans Committee of ICAR in the Faculty of Agriculture, Community Science and Fishery Science. However, the colleges under the Faculty of Veterinary follow the course curricula approved by the Veterinary Council of India as per the MSVE, 2016. The present UG Curricula is 'Student READY' Programme (prescribed by the ICAR 5th Deans Committee from the year 2016-17) designed to develop much needed skill and entrepreneurial mind-set among the graduates to take up self-employment. The 'Student READY' Programme is being offered in all the colleges of the University since the academic Session 2016-17.

4.4. Intake and Output
During 2018-19, 810 students were admitted in the University of which 500 in Bachelor's, 219 in Master's and 91 in Ph.D. degree programmes. In regards to output, 751 students obtained degrees during the year, of which 396 were Bachelor's Degree, 293 Master's Degree and 62 Ph.D. Degree holders. The constituent college wise student enrollment and output under different degree programmes is shown in Table 4.1.

4.5. Total Students on Roll
Altogether 2800 students were on roll in the University during 2018-19 academic year of which more than 54 per cent were girl students (1519). Out of the total
### Table 4.1: Fresh students enrolled and students passed out in different degree programmes of the University during 2018-19

<table>
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<td>-</td>
</tr>
<tr>
<td>College of Community Science, Jorhat</td>
<td>47</td>
<td>36</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>College of Fisheries Science, Raha</td>
<td>24</td>
<td>15</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>College of Sericulture, Jorhat</td>
<td>25</td>
<td>23</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>College of Horticulture, Jorhat</td>
<td>25</td>
<td>22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>500</strong></td>
<td><strong>396</strong></td>
<td><strong>219</strong></td>
<td><strong>293</strong></td>
</tr>
</tbody>
</table>

### Table 4.2: Total students on roll in different colleges of the University during 2018-19

<table>
<thead>
<tr>
<th>College</th>
<th>Bachelors Degree</th>
<th>Masters Degree</th>
<th>Ph.D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□irls</td>
<td>Boys</td>
<td>Total</td>
<td>□irls</td>
</tr>
<tr>
<td>College of Agriculture, Jorhat</td>
<td>315</td>
<td>251</td>
<td>566</td>
<td>191</td>
</tr>
<tr>
<td>BN College of Agriculture, BNCA</td>
<td>97</td>
<td>71</td>
<td>168</td>
<td>20</td>
</tr>
<tr>
<td>SCS College of Agriculture, Dhubri</td>
<td>37</td>
<td>74</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>College of Veterinary Science, Khanapara</td>
<td>215</td>
<td>279</td>
<td>494</td>
<td>62</td>
</tr>
<tr>
<td>College of Community Science</td>
<td>124</td>
<td>43</td>
<td>167</td>
<td>36</td>
</tr>
<tr>
<td>College of Sericulture, Titabor</td>
<td>60</td>
<td>33</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>College of Horticulture, Nalbari</td>
<td>64</td>
<td>30</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>College of Fisheries, Raha</td>
<td>50</td>
<td>51</td>
<td>101</td>
<td>9</td>
</tr>
<tr>
<td>Lakhimpur College of Veterinary Science, Lakhimpur</td>
<td>42</td>
<td>64</td>
<td>106</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1004</strong></td>
<td><strong>896</strong></td>
<td><strong>1900</strong></td>
<td><strong>318</strong></td>
</tr>
</tbody>
</table>


students on roll, 1900, 526 and 374 were in Bachelor's, Master's and Ph.D. degree programmes, respectively. The college wise details of total and girl and boy students are given in Table 4.2 and Figure 4.2.

4.6. Fellowships awarded to students and national tests qualified

During the year, 287 students of the University were either awarded fellowships or qualified for national or state test of which 20 were awarded Junior Research Fellowship, 9 Senior Research Fellowship, 125 qualified for NET. In addition, 131 students (UG & PG) were awarded merit scholarships during the year.

4.7. Publication

The teachers and scientists of the University have published altogether 1008 publications during the year. Out of these 467 were research papers in journals, 321 research abstracts in journals and proceedings, 28 books, 69 practical manuals, 58 book chapters, 39 popular articles, 11 technical bulletins and 10 other publications. College of Veterinary Science had the maximum number of publications (372), which was followed by College of Agriculture with 337 publications. The college wise breakup of the publications is shown in Table 4.3 and depicted in Figure 4.3.
4.8 Human Resource Development

Altogether 452 teachers / scientists of the University were deputed for attending regional / national / international level training / workshop / seminar etc during 2018-19. The College of Veterinary Science deputed the maximum number of teachers (212). The college wise and event wise breakup of the number of teachers deputed from the University is given in Table 4.4 and Figure 4.4.

4.9 Training/Seminar/Workshop Organized

The University organized 127 regional /national level trainings/ workshops/ seminars etc. during the year. The College of Agriculture, Jorhat (organizing 49 events) was ahead of other colleges of the University in organizing such events. The breakup of the organized events in different colleges of the University is presented in Table 4.5 and Figure 4.5.

4.10 Library

The Rev. B M Pugh Library (RBMPL) is serving as the knowledge resource center on Agriculture and allied areas since its inception in the year 1969 to the diverse user community consisting of students, teachers/scientists, research scholars and the staff. The RBMPL offers its Library and Information Services to the four colleges housed within the University Head Quarter, Jorhat viz., College of Agriculture, College of Community Science, College of Horticulture and College of Sericulture. Besides RBMPL, the University has its branch libraries in the following colleges such as College of Veterinary Science, Khanapara, Guwahati; College of Fisheries Science, Raha; Biswanath College of Agriculture, Biswanath Chariali; Lakhimpur College of Veterinary Science, Joyhing, Lakhimpur and SCS College of Agriculture, Dhubri.

### Table 4.4: Teachers deputed for attending training, seminar, workshop etc. during 2018-19

<table>
<thead>
<tr>
<th>Training, seminar, conference attended</th>
<th>Teachers (No.) attending training, seminar, workshop etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAJ</td>
</tr>
<tr>
<td>International level training</td>
<td>3</td>
</tr>
<tr>
<td>National level training</td>
<td>30</td>
</tr>
<tr>
<td>Regional level training</td>
<td>3</td>
</tr>
<tr>
<td>International level seminar</td>
<td>-</td>
</tr>
<tr>
<td>National level seminar</td>
<td>11</td>
</tr>
<tr>
<td>Regional level seminar</td>
<td>5</td>
</tr>
<tr>
<td>International level conference</td>
<td>10</td>
</tr>
<tr>
<td>National level conference</td>
<td>1</td>
</tr>
<tr>
<td>Regional level conference</td>
<td>-</td>
</tr>
<tr>
<td>International level workshop</td>
<td>2</td>
</tr>
<tr>
<td>National level workshop</td>
<td>23</td>
</tr>
<tr>
<td>Regional level Workshop</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

**Figure 4.4.** College wise number of teachers attending trainings, workshops etc. from AAU in 2018-19

The College of Agriculture, Jorhat (organizing 49 events) was ahead of other colleges of the University in organizing such events. The breakup of the organized events in different colleges of the University is presented in Table 4.5 and Figure 4.5.
### Table 4.5: Training, seminar, workshop organized in the colleges during 2018-19

<table>
<thead>
<tr>
<th>Particulars of Events</th>
<th>Training, seminar, workshop etc organized (No)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAJ</td>
</tr>
<tr>
<td>International level training, Seminar, Workshop</td>
<td>-</td>
</tr>
<tr>
<td>National level training, Seminar, Workshop</td>
<td>32</td>
</tr>
<tr>
<td>Regional level training Seminar, Workshop</td>
<td>9</td>
</tr>
<tr>
<td>State Level training, Seminar, Workshop</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49</strong></td>
</tr>
</tbody>
</table>

**Figure 4.5.** College wise number of trainings, workshops etc. organized in AAU in 2018-19

### 4.10.1 Library Holdings

The total library holdings in the University during 2017-18 were 2,83,998 which include 2,04,201 text books, 39,123 reference books; 67 journals /periodicals; 272 periodicals and 27,477 back volume of periodicals, 3903 e-books, 4114 e-journals and 4841 theses. The Rev. B. M. Pugh Library, Jorhat constitutes the maximum (approx. 72 per cent) of the total holdings of the University. College-wise details of the types of printed collection during the year are given in Table 4.6. The e-resources available in the RBMPL are accessible to registered users from the other colleges and research stations through the EZ-Proxy server.

### Table 4.6: Books and other printed collection of the libraries of constituent colleges of the University during 2018-19

<table>
<thead>
<tr>
<th>Particular of Publication</th>
<th>Number of publication in constituent colleges</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAJ</td>
<td>BNCA</td>
</tr>
<tr>
<td>Research Paper in Journal</td>
<td>132</td>
<td>22</td>
</tr>
<tr>
<td>Research Abstracts in Proceeding</td>
<td>79</td>
<td>29</td>
</tr>
<tr>
<td>Books</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Practical Manual</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>Book Chapter</td>
<td>47</td>
<td>-</td>
</tr>
<tr>
<td>Popular Articles</td>
<td>31</td>
<td>-</td>
</tr>
<tr>
<td>Technical Bulletin</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>337</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

* Including Fisheries Research Centre, Jorhat (FRCJ)
4.10.2. “Rev. B M Pugh Library (RBMPL)” and its Activities

Some of the facilities/services of “Rev. BM Pugh Library (RBMPL)” and its activities during the year under report are discussed below.

4.10.2.1 E-Resources Availability

- **CeRA**: Consortium of e-resources in Agriculture: Access to full text electronic journal on Agriculture and allied areas. About 3765 e-journals are available under CeRA and Access is available to full text 1174 e-books along with 17 e-book series of Elsevier.
  URL: http://cera.iari.res.in/
  URL: http://jgateplus.com/search/

- **DeLCON**: DBT-Electronic Journal Consortium: About 900 full text journals are covered under DeLCON
  Url: http://delcon.gov.in/eresources.htm

- **Krishiprabha**: It is a Full text electronic Database of Agricultural Doctoral dissertations submitted by research scholars of the 45 State/Deemed Agricultural Universities during the period from 1.1.2001- 31.12.2006
  http://krishikosh.egranth.ac.in/handle/1/466

- **Krishikosh Repository**
  http://krishikosh.egranth.ac.in/

- **CAB Abstract** available online at www.cabdirect.org and those from 1972 to 2013 are available on CD ROM at RBMP Library, AAU.

- **International E-Book Packages, CRC Press, Taylor & Francis (617)**
  1. AGRICULTUREnetBASE (288)
  2. NUTRITIONnetBASE (112)
  3. VetnetBASE(147)
  4. Agri Economics netBase (70)
  Online Access Link: www.crcnetbase.com

- **Cabi E-Books on Veterinary (166)**

- **Indian E-Book Packages (456)**
  1. E-Books on Horticulture (101)
  2. E-Books on Agriculture (223)
  3. E-Books on Aquaculture and Fisheries (10)
  4. E-Books on Veterinary (122)
  Online access link: www.asapglobe.com

- **India AgriStat Database**
  http://www.indiaagristat.com/default.aspx

- **ISO Agriculture in CD ROM**
  (575 E-Resources)
  Online Access Link: http://standards.bsbedge.com
  E-books & E-Journals of Rev B.M Pugh Library are accessible remotely through OCLC Ezproxy software for all registered members including those from outstations of AAU.

4.10.2.2 User Service Provided

- **Users Enrolled**: A total of 2644 users have been enrolled in the library during the year which include students (1581 MSc / PhD students in Agri / Community Science), Faculty/Scientist (523)
and Non-teaching/others (540).

- **Library Membership to Enrolled Users:** In Circulation section, readers (Library Users) can get themselves registered as members of the library by abiding library rules. After enrolment as bonafide member, they have the privilege to borrow books (Figure 4.7). Books are issued for a period of one month. Number of books to be issued for different categories of students are (i) Under Graduate students : 5 books (ii) Post Graduate students : 7 books and (iii) Research Scholars : 10 books.

- **Consultation Services to Outside Scholars:** The library provides consultation facilities to outside scholars on the basis of letter of introduction. Consultation fee @ Rs 10/- per day and Rs 50/- per month is charged.

- **Library Services:** The library provides the services such as Lending service, Reference/Information service, Current Awareness Service, Documentation service, Internet/E-mail facility, E-journal/ eBook and CD-ROM database searching facility, Resource-sharing facility, User education programme, Document delivery service and Reprography facility.

- **Lending Service to Readers through Text Book Bank:** This section of the library provides minimum five to six books to every enrolled student for the semester and the number of borrowed books depends upon availability of books in this section.

- **Library Service to Patron:** The RBMPL provides service to patrons with an average of 10,000 students and 400 faculty & research scholars annually. The number of faculties and students that used library during the year was 600 and 12,936, respectively.

- **Services to Visitors:** An average of 50 visitors (both national and international) visit the library annually for accessing information in their respective areas of interest and discipline. The number of visitors during 2017-18 was 60 which were around 20 per cent higher than that of 2016-17.

- **Internet Services:** The internet browsing facility is available in the library premises on the basis of a user account created in the AAU Portal which is strictly provided by the System Administration i.e. ARIS cell of the AAU. There is also the provision of access to the internet by the visitors on request of a guest account created by ARIS accordingly. There were altogether 4206 internet users during the year which is about 10 per cent higher than the previous year (Figure 4.8).

- **User Education Programme Provided:** The RBMPL, apart from providing dedicated user service, is also extending quality user education programmes. This include:
  - **Library orientation** which is one of the most common user education programmes is provided to the users of AAU, in particular the under graduate patrons, maintaining a proper discipline-
wise streaming in the early part of their formal vocations.

- **Education on Library and Information Service in the form of a non-credit compulsory course (PGS 501)** is also conducted to impart appropriate knowledge in the field of information retrieval and dissemination, technical writing stressing more on literature review and citation analysis as well as the proper techniques in browsing the different resources present in the library.

- **On-request User Service:** Most users, the faculty and research scholars, in particular enjoy the on request information service from CeRA in print form for those information resources are available only in electronic form and are not downloadable.

- **Automation and Digitization:** Recently, Rev B. M. Pugh Library has implemented library automation and digitization process with KOHA LMS software under ICAR library strengthening project. Presently KOHA LMS database has been migrated to Open LX Platform-Best Book Buddies (on Cloud) as per ICAR instructions. Proposal has been made to include all the libraries of the outstation constituent colleges under library automation in a single platform. Rev B M Pugh Library is already a member of Krishikosh / E-granth repository and Ph.D theses uploading on Krishikosh is going on.

- **RFID Library Security System:** Library has been implementing the Radio Frequency Identification (RFID) security system for security of rare and reference documents of the library.

4.10.3. Activities of RBMP Library during 2018-19

RBMP library received approx. Rupees Two Crore for library strengthening under the scheme “Strengthening & Development of Higher Education in India”. The fund has been utilized for strengthening the followings of AAU libraries:

- Subscribing of e-book packages on Agriculture, Agricultural Economics and Veterinary Science.
- The Rev. B M Pugh Library acquired approx. 4000 books during the year besides acquisition of books by other constituent libraries in colleges through ICAR fund.
- Under ICT infrastructure for the year 2018-19, Rev B M Pugh library has been implementing RFID security system for rare and reference book collections.

4.11. Students' Welfare

4.11.1. Games and Sport Activities

4.11.1.1 Annual College Meet

- As in the previous years, the Annual College Meets was organized by all the constituent colleges during the year.

4.11.1.2 XXIX Inter College Meet, 2019

- The XXIX Inter College Meet of Assam Agricultural University was celebrated amidst great fanfare at the Jorhat Campus of Assam Agricultural University during 20th-23rd February, 2019. Dr. K.M. Bujarbaruah, Hon'ble Vice-Chancellor declared the meet open. Shri Hrishikesh Goswami, Press Adviser to the Hon'ble Chief Minister, Govt of Assam was the Chief Guest at the inaugural ceremony.
- The IC Meet began with a colorful March Past competition amongst the teams of all constituent colleges of the University. The College of Horticulture was declared the best March Past team. The College of Agriculture, Jorhat led the medals tally in both the sports and cultural sections and was also adjudged the Best College of the XXIX Inter College Meet, 2019. A vibrant cultural function was organized to mark the end of the four day event.

4.11.2 Cultural Programme

4.11.2.1 Agri-Unifest
Agricultural University Youth Festival (Agri-Unifest) held in Sardar Krushinagar Dantiwada Agricultural University, Sardarkrushinagar during 3rd-7th February, 2019. AAU team was represented by a 27 member students group. Miss Pragya Prerona of AAU bagged the first prize in the Light Vocal competition. The AAU contingent also bagged the second prize in Cultural Procession, and third prizes in Clay Modeling and Group Dance, respectively.

4.11.2.2 Other Activities

- The Educational Tours of 3rd year Under Graduate Students of the Colleges of Agriculture, Horticulture and Sericulture was organized during January, 2019. During the study tour, students visited various educational research institutes, departments, regional centres of South India and were benefitted from the exposure.

4.11.2.3. District-level Inter College Debate Competition on 5th June, 2018

- On the occasion of Golden Jubilee Year Celebration of Assam Agricultural University, the College of Fisheries, AAU, Raha organized a district level inter-college debate competition on 5th June, 2018 at the college campus. The topic of the debate was “The Present Agricultural Education has contributed substantially in the Development of Agricultural Sector of the Country”. A total of 30 participants from different Colleges of Nagaon district were participated in the competition. Mr. Kripalu Dutta, a student of College of Fisheries Science, AAU, Raha won the first prize in the competition.
- Ms Parisma Das and Ms Montrisha Rajkhowa representing College of Agriculture won the 2nd Best Team at the Debating Competition organized during the socio-cultural festival 'Phoenix' organized at Jorhat Engineering College during March, 2019. Mr Arunav Khound was adjudged the 3rd Best Debater at the Debating Competition organized by SIPE during March, 2019. The team comprising Ms Ishani Borthakur and Mr Inzuddin Ahmed bagged the 1st Prize for Literature during the socio-cultural festival 'Phoenix' organized at Jorhat Engineering College during March, 2019.
- Raktim Baruah and Biprajit Datta Choudhury bagged third prize in 'Phoenix' held at JEC, Jorhat on 18th March, 2019 and also bagged Second prize in Xiworong at Rajib Gandhi Institute of Petroleum Technology, Sivasagar on 24th March, 2019.
- A Personality Development Programme was organized at Assam Agricultural University, Jorhat during October 5-11, 2018.
- Three faculty members, Mr Dipanjan Kashyap, Mr Sanjib Sharma, Dr Aditi S. Gogoi, of the university were nominated as Junior coaches to participate in the collaborative IIE-German Design Thinking Impact Team programme for Entrepreneurial careers named ‘Impact Week’ at IIE, Guwahati during December 12-20, 2018. A group of 10 students from the constituent colleges were selected for the programme.
- Students Medical Assistance Scheme for all UG and PG students with a minimal premium of Rs. 360/- per year per student is provided to the students. A number of students of the university have availed the assistance under this scheme for their medical treatment during the year.

4.11.2.4 National Service Scheme
On the occasion of the 50th Foundation Day of AAU, the NSS Unit of BNCA organized a Swachh Abhiyan and Tree Plantation programme at the BNCA campus on April 1, 2018 where all teachers, employees and students of BN College of Agriculture participated.

The International Day of Art of Giving was celebrated on May 17, 2018 at Boys' Juvenile Observation Home with 30 NSS volunteers of AAU, Jorhat campus. The NSS volunteers participated in the programme by sharing gifts to the boys' inmates.

World Environmental Day was observed by all NSS Units of AAU on 5th June, 2018. A tree plantation programme was held at the Jorhat campus of the university where all statutory officers took part. Teachers and NSS volunteers planted saplings and conducted a cleanliness drive around the campus. World Environment Day was successfully conducted by the NSS Unit of BNCA at the BNCA campus. Dr. K.C. Deka, i/c Associate Dean, BN College of Agriculture inaugurated the programme and narrated about the importance of conservation of the environment. A plantation programme was held in the campus. World Environment Day was celebrated with a day long programme in the College of Fisheries Science, Raha. A cleanliness drive and plantation was carried out in the college campus. Further, a Green initiative was undertaken through plantation and fencing of ornamental plants at Chaparmukh area An Awareness camp on “Detrimental Effects of use of Plastic” was also carried out at Chaparmukh HS School. A street play named “Seuji Dharrani Dhuniya” by the NSS volunteers. A series of competitions among the students were organized. Around 120 saplings were planted by the NSS Unit, LCVSc in the College premises of Lakhimpur College of Veterinary Science, Zoyhing. A lecture was delivered by Associate Dean, SCSCA to the NSS volunteers and the students of Rangamati High School on the occasion of World Environment Day, 2018 at SCSCA. An audio visual presentation on how plastic is spoiling the entire environment was presented by the NSS Programme Officer of SCSCA. The NSS volunteers and the students of Rangamati High School then marched to the Rangamati High School campus for a plantation programme.

Swatchha Pakhwada: To create awareness on maintenance of cleanliness, the Swachhta Pakhwada Programme was organized by the NSS Units of all colleges of AAU Jorhat campus, from August 1-15, 2018. All statutory officers, teachers, Programme Officers and 400 NSS volunteers participated in the programme in and around hostels, campus and nearby villages. A drive was also taken up in the Lichubari market area. The Swachhta Pakhwada programme was organized by the NSS Unit, BNCA from August 1-15, 2018. Besides cleaning the BNCA campus, NSS volunteers, teachers and employees of the College participated in a cleanliness drive in the nearby Gorehagi ME. School campus. Dr. RN Barman, Associate Dean inaugurated the programme. A painting competition was organized among the NSS Volunteers. In CFSc, Raha, various activities were performed. On August 1, 2018, the Programme Officer, CFSc NSS Unit, briefed the BSc 1st Year students about objectives of NSS and role of NSS volunteers in Swachh Bharat Abhiyan and Swachhta Pakhwada. A cleanliness drive, in all students' hostel campuses, was conducted. Classrooms, laboratories, libraries, toilets, auditoriums, playgrounds, roads, surroundings of hostels etc were also cleaned. During the second week, NSS volunteers conducted a door to door campaign to make the local masses aware about cleanliness. Mahadeosal
Archaeological site was cleaned by the NSS volunteers. Awareness camps on cleanliness among the teacher and students of Vineyard English School and Bagariguri PN Tamuli High School were organized. A placard competition was organized amongst NSS volunteers to reflect Swatchhata messages. An essay writing competition was also organized.

- A cleanliness drive in the classrooms, laboratories and departmental premises of the LCVSc, Joyhing was conducted. The NSS Unit Volunteers of LCVSc enacted a play depicting importance of cleanliness and healthy. A rally with placards, on the importance of cleanliness as a part of the Swachhta Pakhwada programme was organized from the College campus to Joyhing market.

- An essay writing competition was organized among the NSS volunteers of SCSCA on the topic “What can I do for a clean India?” on August 10, 2018. A cleanliness drive was organized on 12th August, 2018 by the NSS unit of SCSCA at Gandhi Maidam, Chapar, Dhubri. A team of NSS volunteers cleaned the Maidam. Local people the circle officer of Chapar Mr. Nabajit Pathak also joined in.

- **Gandhi Jayanti**: The NSS Unit of BNCA celebrated the 150th Birth Anniversary of Mahatma Gandi on October 2, 2018. On the occasion NSS Unit organized a cleanliness programme at BNCA. A cleanliness programme was organized in the CFSc. NSS Unit Volunteers of LCVSc conducted a special cleanliness drive in the college premises and an essay writing competition was organized.

- **International Yoga Day**: About 350 volunteers of the NSS Units of the constituent colleges of AAU, Jorhat campus participated in the Yoga camp. The NSS Unit, BNCA observed the Day too. Under the guidance of Sri Nitya Sharma, Coach, Biswanath District Body Builders Association a demonstration on Yoga was held.

- In the morning, the NSS Unit, CFSc, Raha organized a Yoga Demonstration camp. This was followed by a seminar on Yoga. A yoga session to create awareness on the role of Yoga in daily life was conducted at the LCVSc, Joyhing. The NSS unit of SCSCA celebrated the third International Day of Yoga in the college premises. A Yoga Guru was invited to the College on the occasion, who demonstrated the asanas. The Yoga guru also delivered a lecture.

- **BRICS International Youth Summit**: Miss Archita Goswami, NSS volunteer from the College of Agriculture, Jorhat attended the BRICS International Youth Summit at Bela-Bela, Zebula Estate, Limpopo Province during July 15-20, 2018, as a member of the Indian Youth delegation.

- **Foundation Day NSS**: Foundation day of NSS was observed by 300 NSS volunteers at AAU, Jorhat on September 24, 2018 under the theme Swachhta Hi Sewa (SHS). A cleanliness programme was conducted in the college and hostel campus followed by a plantation programme. The NSS Unit of BNCA celebrated NSS Day at Gorehagi Village, Biswanath Chariali. The day began with school students and teachers carrying out a cleanliness drive. NSS volunteers also organized a demonstration cum awareness programme on the benefits of keeping oneself clean. A rally with placards to create awareness on benefits of Hand Washing in the college and adopted village was organized followed by a demonstration cum awareness programme on hand-washing.

- On the occasion of NSS Day, a meeting was organized at SCSCA, Dhubri. Associate Dean and faculty members deliberated on the role of NSS volunteers towards the well being of the society.

- **Disaster Preparedness Drill and Demonstr-
A disaster preparedness drill and demonstration was organized by the NSS units of the constituent colleges of AAU Jorhat campus, in association with the Civil Defence wing of the Jorhat District Administration, on September 28, 2018. Over 300 NSS volunteers participated in the programme and volunteers were educated on the importance of preparedness in the event of various types of disasters such as earthquakes, fire, floods etc.

National Unity Day: The Birth Anniversary of Sardar Vallabhbhai Patel was also celebrated on October 31, 2018 by the NSS Units of the constituent colleges of AAU, Jorhat campus, where 250 volunteers participated. The NSS Unit, BNCA participated in the Run for Unity programme, organized by the District administration, on the occasion of birth anniversary of the Iron man of India, Sardar Vallabhbhai Patel.

Pre-Republic Day Parade Camp: Two students namely (i) Miss Dixita Rajkhowa, 2nd Year, College of Horticulture and (ii) Mr Priyamjit Roy, 2nd Year, College of Agriculture, participated in the Pre-Republic Day Parade Camp organized by the Ministry of Youth Affairs and Sports, National Service Scheme, Government of India, Regional Centre, during 15th October to 15th November, 2018.

World AIDS Day: World AIDS Day was observed in the AAU Jorhat campus. Ribbons were distributed. The day was also observed in the CFSc, Raha on December 1, 2018. An open session was organized at the campus where teachers and NSS volunteers interacted on the importance of awareness.

Republic Day Parade Camp: Miss Dixita Rajkhowa, 2nd Year, College of Horticulture was selected for the Republic Day Parade Camp-2019 organized by the Ministry of Youth Affairs and Sports, National Service Scheme, Government of India, Regional Centre, at New Delhi from January 1-31, 2019.

National Integration Camp/ Other Camp: A NSS Special Camp was organized under RAWEP at KVK Teok during September 5-11, 2018, and 35 volunteers took part. They did street plays to create awareness on environmental issues as a part of the SVEEP programme of the Govt. of India.

350 NSS volunteers actively participated in the NSS Special Camp held during November 17-23, 2018 in the villages near AAU Jorhat campus.

6 (six) NSS volunteers from AAU participated in the NSS Adventure Camp at NIMAS, Dirang, Arunachal Pradesh held during November 25-December 4, 2018,

Six NSS volunteers selected from the Colleges of Agriculture, Community Science, Fisheries Science and Biswanath College of Agriculture, participated in the National Integration Camp organized by the NSS, Ministry of Youth Affairs & Sports, Government of India, at Rabindranath Tagore University, Bhopal, Madhya Pradesh during March 10-16, 2019.

Seven NSS volunteers selected from the Colleges of Agriculture, Community Science, and Sericulture, participated in in the North East NSS Festival, organized by the NSS, Ministry of Youth Affairs & Sports, Government of India, at Don Bosco University, Tenesia. Sonanur during March
Eight NSS volunteers selected from the Colleges of Agriculture, Sericulture and Horticulture, participated in the National Integration Camp organized by the NSS, Ministry of Youth Affairs & Sports, Government of India, at Chandigarh, during March 24-30, 2019.

**Blood Donation Camp:** On April 7, 2018 the NSS Unit of BNCA organized a blood donation camp at BNCA. The camp was inaugurated by Dr. R.N. Barman, Associate Dean, BNCA. The camp was conducted by Medical Officers and staff of Kanaklata Civil Hospital, Tezpur and Civil Hospital, Biswanath Chariali. A number of NSS volunteers, teachers and employees of BNCA voluntarily donated blood. A Blood Donation Camp was organized by the NSS Cell jointly with Students’ Society of Assam Agricultural University, Jorhat, in association with Blood Bank of Jorhat Medical College and Red Cross Society, Jorhat, in the Medical Unit of AAU on March 30, 2019. The camp was aptly handled by all Programme Officers of NSS units at Jorhat campus under the stewardship of Dr Sajib Baruah. In the camp 32 student volunteers of AAU donated blood and blood group of 50 NSS volunteers were determined.

4.12 College of Veterinary Science, Khanapara

- **71st Foundation Day of College of Veterinary Science:** 71st Foundation Day of CVSc, Khanapara was organized on 18th August/2018 with a colourful day long programme. The Dean, hoisted the College Flag amidst presence of all students, teachers and employees.

- **Late Lt. Col Dipjyoti Gogoi Memorial All Assam Inter College/University Prize Money Debating Competition-2018:** All Assam Debating Competition was organized in memory of Late Lt. Col Dipjyoti Gogoi, an alumnus of College on 7th October, 2018 in the College Auditorium. Lt. Col Dipjyoti Gogoi Memorial Trophy was donated by Dr. AR. Gogoi, Retd. Dean and his family in memory of their youngest son Lt. Col Gogoi.

- **Adya Shraddha Ceremony of the Victims of Gas Tanker Blast:** Eight students of the CVSc, Khanapara, Guwahati-22 tragically dies near the College Campus in the Gas Tanker Blast accident that occurred on 1st November, 1998. Since then students, employees and faculty members of the College observes Shraddha Ceremony on this day with Naam Prasanga for eternal peace of the departed soul. This year also the Adya Shraddha was organized on 1st November, 2018 near the Swahid Bedi. Nam Kirton organised in the New Hostel (PG) and A.T. Hostel in the evening with participation of large number of students, teachers and employees.

- **Annual College Meet – 2018:** The Annual College Meet, 2018 was organized from 20th to 23rd November, 2018. Hon’ble VC, AAU, was invited as Chief Guest inaugurated the ACM, 2018 and declared the Annual College Meet open. Sjt Hrishikesh Goswami, Media advisor to the Chief Minister, Assam was the Guest of Honour.

- **Republic Day Camp at New Delhi, 2019:** Four students, Purushattam Gogoi, Prakash Nehra, Leosmitha Burhagohain and Rajashree Bhuyan participated in the Republic Day Parade at New Delhi.

- Two students, Dhiman Patgiri & Mandakranta Bhuyan, won the prestigious Parag Kumar Das All Assam Inter College Debate Competition-2018 held on 19th August, 2018. Dhiman Patgiri was also adjudged the Best Debater of the meet.

- Dhiman Patgiri & Mandakranta Bhuyan won the Best Team Award in the 1st Dr. Sangeeta Das Memorial Debate Competition-2018, organised by Mahapurush Srimanta Sankardev University held on 23rd September, 2018.
- Dhiman Patgiri was adjudged the Best Debater in the All Assam Inter College Debate Competition-2018, organised by North East Institute of Advanced Studies (NE-IAS) held on 25th November, 2018.

- The Debate Team of Dhiman Patgiri and Salima Siddika was adjudged as the Best in the Siddhant Sharma Memorial All Assam Inter College Debate Competition, organised by Rangia College Students' Union, held on 8th February, 2019.

- Dhiman Patgiri was adjudged the 2nd best debater in the Assam Debate-2018, All North East Inter College Debate Competition-2018 held on 20th August, 2018 and also in the 21st Nando Talukdar All North East, Inter College Debate Competition-2018, organised by Pandu College held on 30th October, 2018.

- Dhiman Patgiri won the 3rd Best Debater prize in the Inter College Debate Competition organised by ASIAN Institute of Nursing Education, 2018 held on 20th October, 2018 and also in the Dr. Birinchi Kr. Baruah Memorial All Assam Inter College Debate Competition organised by B. Baruah College, held on 10th September, 2018.
5. Research

Research Achievements During 2018-19

Altogether, 43 numbers of All India Coordinated Research Project (AICRP) and All India Network Projects (AINP) on different agricultural subject areas are in operation under Directorate of Research (Agri) in Assam Agricultural University, Jorhat. During the year 2018-19, 32 competitive agricultural research projects were obtained additionally from different agencies and institutes, viz., Department of Biotechnology (DBT), Indian Council of Agricultural Research (ICAR), Indian Council of Medical Research (ICMR), Department of AYUSH, IRRI-IFAD etc. to promote agricultural research in particular.

To address some critical issues in agriculture like doubling farmers’ income by 2022, promoting organic agriculture, ensuring fair prices to agricultural produce, availability of quality seed in agriculture, etc., jointly through suitable agricultural research and extension along with alteration of agricultural policy of Assam, an eleven-point declaration on agriculture was signed by AAU and Govt. of Assam on June 28, 2018.

AAU is one of the key implementing agencies and knowledge partner of Assam Agribusiness and Rural Transformation Project (APART); the university, in collaboration with several international agencies and institutes like IRRI, CIP, World Vegetable Centre, World Fish Centre etc., and with the financial assistance of the Govt. of Assam and World Bank, had accomplished 2000 mini kit, 900 head to head and 250 cluster demonstrations during Sali and Rabi seasons of 2018-19 along with 200 on-farm trials and 10 capacity building training programmes benefitting altogether 6475 farmers across 16 districts of Assam. Moreover, to strengthen the post-harvest management by introducing improved practices, including post-harvest mechanization and support services to improve the rice value chain, different agricultural equipment like reaper, axial flow thresher, open drum thresher, mini combine harvester, solar dryer, super bag, RCC ring bin, portable rice mill and dry grinding machines were demonstrated across the states under APART. In this context, Dr. M. Morell, Hon'ble Director General, International Rice Research Institute (IRRI), Manila, Philippines had visited AAU, Jorhat during August 25-26, 2018 and expressed great satisfaction with the kind of technological advancements AAU had in different fields of agricultural science.

The AAU has also been successfully implementing a project under Schedule Tribe Community (earlier Tribal Sub-Plan) to improve the livelihood of the tribal peoples of four districts Assam with a financial outlay of 49.16 lakhs during 2018-19. Five Custom Hiring Centers of agricultural implements in four different districts viz., KarbiAnglong, Dima Hasao, Dhemaji and Kokrajhar were established to cater the need of agricultural implements during critical stages of farming.

Under the aegis of Oil India Limited, AAU in CSR initiative has been implementing a project on “Augmentation of Agriculture through Efficient Resource Utilization with Participatory Approach” and was able to establish a model organic farm at Chabua, Dibrugarh with technological backstopping from AAU. Integrated farming system models for small farm holders were demonstrated at Rahmoria and Khowang along with a commercial nursery at Tingrai region of Assam.
AAU also had an agreement with Norwegian Institute of Bio-economy Research (NBIO) for livelihood upliftment of small and marginal rice farmers of Assam. The university had launched a program on “Building Climate Resilience of Indian Small holders through Sustainable Intensification and Agro-ecological Farming Systems to Strengthen Food and Nutrition Security” in presence of Hon’ble Ambassador, Norway Government with a financial involvement of 1.2 crores on October 9, 2018.

Similarly, AAU had initiated a project on Hybrid Rice with IRRI, Philippines and Mobile Farm Clinic in collaboration with Innovative Change Collaborative (ICCO), India along with research on potato value chain in collaboration with including the teachers-students exchange program with International Potato Centre (CIP), Peru.

During 2018-19, a “Centre of Excellence for Citrus” at CRS, AAU, Tinsukia and a “Regional Facilitation centre on medicinal and aromatic plants” at AAU, Jorhat with a financial cost of Rs. 10.00 and Rs. 1.50 crores, respectively, were sanctioned to create excellence in the subject matter.

For the first time in Assam, drone has been used in Agricultural Research under the IRRI funded Project on Global Rice Array at RARS, Titabor in 2018-19, and paved a way forward on the use of robotics in agricultural crop management.

During the year 2018-19, AAU could be able to file for patent for a novel dipstick method for in-field detection of citrus tristeza virus and gas-fired oven for bamboo stalked cooked rice, whereas several others are ready to file. Moreover, application for geographical indication (GI) of goods two products viz., Phulam gamusa (No. 594) and Komal chaul (No. 572) of Assam has been filed at Geographical Indications Registry, Govt. of India, Chennai, which was under examination and consideration.

During 2018-19, AAU has been able to develop a new rice variety, “Shraboni”, which is medium duration with medium slender grain and best suited for double cropping in rice fallow cropping sequence. Several improved varieties of agricultural crops like mustard (NRCHB-101), foxtail millet (IC-0624917), Guinea grass (Bundel Guinea 2) and soybean (JS97-52, RKS-18) were also evaluated and recommended for cultivation in Assam.

RESEARCH ACHIEVEMENTS UNDER DIFFERENT PROJECTS
A. FIELD CROPS
I. CEREALS
5.1. Rice
5.1.1. Crop Improvement

- A total of 731 visible mutants including short stature, early maturity, pigmented, high tillering, stiff straw, different sterility, photo-insensitive were identified in the M2 generation through induced mutations for morpho-agronomic traits during 2018.
- Highly insect tolerant: 200-3-19-5 (i.e., 200 gy-3block no.19 row-5 plant no.), erect; insect (Leaf folder, Cnaphalocrocis medinalis) tolerant and dense panicle: 13 selections; very dense panicle & insect tolerant: 7 selections; dense panicle & insect tolerant: 20 selections; partially emerged panicle & insect tolerant: 13 selections; more seeds per panicle & insect tolerant: 27 selections; colored grain & insect tolerant: 7 selections and medium durated & insect tolerant: 11 selections were recorded through mutation breeding.
- Twenty-three shorter duration M3 lines were developed through mutation and MAS with a duration of 125-130 days. Further, the presence of Sub1 QTL was carried out and the selected lines found to be positive for Sub1 QTL in 4 lines.

Figure 4.1. M3 Generation (23 lines)
Morphogenetic Barcoding of Aromatic and Glutinous Rice varieties of Assam indicated duplicates among the speciality rice group and shows clear grouping within the genotypes. A chemical test that can be helpful in rapid genetic purity testing of the genotypes has been designed and molecular fingerprints of the important Joha and Bora rice has been done for successful use for rapid genetic purity testing of genotypes. Altogether 103 numbers of aromatic rice germplasm were evaluated for different qualitative and quantitative characters, which revealed significant variations in all the characters. The germplasms were analyzed with a panel of 10 SNPs markers comprising of SNPs for BADH2, Bacterial blight (xa5, xa13, Xa21), Blast (Pita, Pi9, Pi54), BPH, Chalkiness, Sub1 genes and observed that BADH2 is present in 68 numbers of aromatic germplasm.

A haplotype-based neighbor-joining tree has been developed which gives ten hierarchical clusters to represent 96 deepwater rice accessions. A diversity-based phylogenetic tree has also been constructed which represents the same ten clusters.

A total of 219 cultivars of Boro rice germplasms were screened for cold tolerance and the cultivars, viz., Agnisali, PSB-RC-2, PSB-RC-68, were chosen as donor parent. Two mapping populations were developed involving PSB-RC-2 and Jyotiprasad, and the other one was between Ranjit and PSB 68. The cold tolerance phenotyping was performed in the F3 plants.

To develop high yielding, non-lodging and biotic resistant varieties of black scented rice of Manipur and joha rice of Assam through biotechnological intervention, BC2F1 seeds were produced during kharif 2018. Back-crossing with the recurrent parent, Keteki joha was attempted during kharif, 2018.

For the first time in Assam, drone has been used in high throughput phenotyping of improve rice varieties at RARS, Titabor.

For the first time in Assam, drone has been used in high throughput phenotyping of improve rice varieties at RARS, Titabor.
• In order to transfer of unique antioxidant potential of coloured rice of Assam to elite high yielding rice by utilizing flavonoid biosynthesis gene-based marker-assisted breeding, altogether, 5 cross combinations (F1) were developed at RARS, Shillongani and Nagaon during the Salí season. Initial data are under process of analyses to carry out back cross generations through MAB during the Salí season, 2019.

• Introggression of phosphorous stress-tolerant (PSTOL 1) and multiple disease resistance genes into rice through marker-assisted selection on three genotypes viz. CB14001, Lachit and IR64pup-I have been initiated under the staggered sowing plan.

• Release of submergence tolerance rice varieties, Ranjit Sub1 and Bahadur Sub-1, by CVRC and notified by the Government of India for Assam was achieved. Moreover, introgression of resistance genes xa5, xa13 and Xa21 for bacterial blight in Ranjit Sub 1 is going on and altogether 13, advanced lines were developed.

• In medium duration rice varietal trial, Entry no. 1416 and 1401 recorded grain yield of 5910 kg/ha and 5752 kg/ha, respectively, which were significantly superior to the check variety TTB 404 (4568 kg/ha), while in long-duration group, two entices viz., No. 1614 and 1613 with grain yield of 6030 kg/ha and 5879 kg/ha out yielded the check variety Ranjit (4728 kg/ha).

• Rice varieties viz., MSM, US-312, HRI-174 and JKRh 3333 performed better under acid soil condition (pH 5.2) and the average yield was more than 5 t/ha.

• Rice genotype Aki Sali was tolerant to low-light while contrasting genotypes under low light condition are BSV-1 (5.88 t/h, 18.07 % reduction) and Misisali (0.28 t/h, 93.98% yield reduction), whereas the contrasting ones under normal light condition are BSV-1 (7.18 t/h) and Bhagawanti (3.14 t/h with 74.30% yield reduction).

5.1.2. Crop Management:

• With crop intensification and diversification, the highest B:C ratio of 3.92 along with a net return of Rs.1,45,643.00 could be obtained with the Winter rice-chilli-blackgram sequence under irrigated medium land situation. Organic farming package for winter rice-potato-lady’s finger and winter rice-toria-blackgram sequence was developed for Assam situation, with the application of full recommended doses of fertilizers through organic sources (i.e. 1/4, FYM + 1/4 vermicompost + 1/4, mustard oil cake) and plant protection with biopesticides (Pumello fruit applied to winter rice).

• The highest average grain (6.50 t ha⁻¹) and straw (8.25 t ha⁻¹) yield of winter rice-autumn rice sequence was recorded in case of 75% recommended NPK through fertilizers along with 25%N through crop stubbles in winter rice and 75% recommended NPK through fertilizers in autumn rice.
• A raised and sunken bed module with around 0.12 ha wetland area produced a net return of Rs.5,534.00 along with a B:C ratio of 2.15 and an employment generation of 17 mandays/year, which may be recommended for the rainfed, wetland situation of Assam.

• The grain yield of rice of the system significantly increased under MT (DSR) and CT (TR) compared to CT (DSR).

• Nutrient management package (RDF + ZnSO₄ @ 5 Kg/ha) was developed for rice-rice sequence under the rainfed condition for the flood-affected area of Assam.

• In transplanted early ahu rice, irrigation at 15 cm
depletion of water from the soil surface and irrigation at 3 days after the disappearance of ponded water recorded the highest grain yield of rice.

- Inoculation of Zn solubilizing bacteria in Zn deficient soils (<0.6ppm) and potash solubilizing bacteria (KSB) in 120-136 kg/ha soil exhibited promising results in organic nutrient management of rice.

5.1.3. Crop Protection

- Flusilazole 12.5% or Carbendazim 25% EC (Lustre 37.5 SE) @ 1ml/L was the best fungicide for the management of sheath blight of rice.
- Spinetram 6%+methoxyfenozide 30%+ Contafwere the best combination treatment in reducing stem borer, leaf folder and sheath blight, significantly.
- Camphor oil was found to control stem borer, leaf folder, gall midge and caseworm infestation and are at par with botanical insecticide, Neemazal and chemical insecticide, Coragen 20SC.
- Pretilachlor 0.75 Kg/ha pre-emergence + hand weeding 30 DAS and hand weeding 20 and 40 DAS resulted in significantly higher grain yield in rice.
- In the long-term herbicidal trial in rice-rice cropping sequence, the highest grain yield in autumn and winter rice has been achieved with the treatment of pyrazosulfuron 25g/ha + 2,4-D 0.5kg/ha rotated with pretilachlor 0.75kg/ha (75% nutrient through fertilizers + 25 % nutrient through organic source).
- In the herbicide residue study under conservation agriculture, pretilachlor residue level was observed at BDL from 60 day of in case of minimum tillage with LOQ 0.05 mg kg⁻¹ and LOD 0.016 mg kg⁻¹. However, pendimethalin residue in the long-term conservation agriculture experiment was observed at BDL in case of minimum tillage from 45th day of application with LOQ 0.05 mg kg⁻¹ and LOD 0.016 mg kg⁻¹
- Large scale demonstration of biocontrol based IPM package in rice (variety 'Ranjit') showed no significant difference in the case of Dead heart, WEH and damage leaves due to Cnaphalocrocis sp. in between BIPM and Farmer's practice plot. The % dead heart and damaged leaf caused by Scirpophaga sp. and Cnaphalocrocis sp. were 3.42 and 3.60 in BIPM package as against 2.85 and 2.85 in farmer’s practice after 60 DAT, respectively. The net returns over control in BIPM package were Rs. 53729.50 as compared to Rs.44585.00 in farmers practice plot with a cost: benefit ratio of 1:2.58 and 1:1.78, respectively.

5.1.4. Extension

- Two Village Knowledge Centres (VKC) was inaugurated in Sivasagar and Golaghat district on 15th and 16th March, 2019. VKC will provide various services like audio conferencing, voice message dissemination and editing technique, video conferencing, need-based knowledge through WhatsApp group, plant clinic, etc. for building climate resilience of Indian small holders through sustainable intensification and agro-ecological farming systems to strengthen food and nutrition security.

5.2. Maize

5.2.1. Crop management

- Agro techniques for baby corn and sweet corn cultivation were standardized for the state.
- Highest grain yield of Maize (34.81 q/ha) and green gram (48.73 q/ha) was recorded in the cropping sequence: Maize-Greengram-Potato.
5.3. Small millets
5.3.1. Crop Improvement
- Gossaigaon Marua collection (GSC-1), a local cultivar with curling type has been recommended for the zone.
- Out of the 25 cultivars of small millet, the most promising entries are PR1639 (37.53 qt/ha), Gossaigaon local (36.543 qt/ha) & WN 562 (33.58 q/ha), respectively.

II. PULSES
5.4. Green gram
5.4.1. Crop Improvement
- 200Gy+0.2% EMS treatment and 200 Gy treatment showed synchronous maturity in pods in the M4 generation through induction of mutation in summer green gram. Dense clustered, long and brown podded mutants observed in 200Gy+0.2% EMS treatment in the earlier generations were carried on up to M4 generation.

5.4.2. Crop management
- For sustaining higher soil productivity through cropping system and land configuration under rainfed condition, growing of Greengram and Sesamum (in 2:1 ratio) in broad bedded (BB) system and Rice in furrow (F) during Kharif; following Chili in broad bed (BB) and Toria in furrow during Rabi as well as growing of Cowpea during Summer gives a net return of Rs. 3,39,865.00 along with a B:C ratio of 3.36 and an employment generation of 223 mandays/ ha/year.

5.4.3. Crop Protection
- A module for management of MYMV and foliar diseases of green gram and black gram, “seed treatment with imidacloprid 25 WP @ 5g/kg seed + carbendazim 50 WP @ 2g/kg seed followed by spraying of imidacloprid 30 SC @ 0.05% (350 ml/ha) 25 days after sowing and 3 (three) sprays of tebuconazole 25 EC@ 0.1% (600 ml /ha) at 10–15 days interval after appearance of diseases” has been developed and recommended.
- Pod damage by pod bugs (Nezara vulgaris, Riptortus linearis and R. pedestris) can be minimized by sprays of quinalphos 25 EC @ 0.05% at the appearance of the bugs followed by dimethoate 30 EC @ 0.06% at one-week interval in greengram and urdbean.

5.5. Blackgram
5.5.1. Crop Improvement
- A new high yielding blackgram variety PU 31 was recommended for the state of Assam and proposed for inclusion in the Package of practices, 2019.

5.5.2. Crop management
- Application of 1 kg B ha^-1+ 20 kg sulphur ha^-1 along with recommended dose of NPK recorded the highest grain yield(9.00 q/ha) and B: C ratio (2.55) in black gram.

5.6. Soybean
5.6.1. Crop Improvement
- Trap nursery trial for disease incidence, evaluation of breeding materials for resistant donor, evaluation of breeding materials for resistant donor(s), Incidence of various diseases in AVT-I are in progress.
5.6.2. Crop Protection

- Survey and surveillance of soybean disease revealed that Seed rot (Pythium, Phytophthora), Seedling mortality (Phytophthora, Rhizoctonia, Pythium) and Root and lower stem decay (Fusarium, Rhizoctonia, Phytophthora) were common during the rainy season.
- Among the foliar diseases, Alternaria leaf spot appeared during the first week of September vegetative growth stage of the crop and wilting/Sudden death syndrome (SDS) were observed August 25th onward (high rainfall experienced) at the vegetative growth stage of the crop.

5.7. Lathyrus
5.7.1. Crop Improvement

- During 2018-19, two varieties of Lathyrus i.e., Mahateora and Prateek were recommended for Package of Practices 2019.

5.8. Rajmah
5.8.1. Crop Improvement

- Rajmah variety Arun was recommended for the Package of Practices 2019.

III. OILSEEDS

5.9. Rapeseed-Mustard
5.9.1. Crop Improvement

- The package of practices of a short duration high yielding mustard var. NRCHB 101 and recommendation for fertilizer dose of mustard were standardized and proposed for the recommendation in the state.
- The fungal pathogen, Alternaria brassicae, causing Alternaria blight in Brassica rapa has been successfully isolated from local varieties and the total RNA extracted from the samples for high throughput transcriptome sequencing and analysis. Standardized Agrobacterium tumefaciens mediated transformation protocol for Toria, to transform the host with genes related to non-host resistance.
- M populations (800 Gy, 1000 Gy and 1200 Gy) of NRCHB-101 was evaluated in single rows where 331 nos. of plants are selected based on desirable traits like early flowering, early maturing, high yielding ability and low foot lengths. Early flowering plants (2 nos. 14 days earlier than control) were found in 800 Gy M population. Early maturing plants (3 nos. 12 days earlier than control) were found in the 800 Gy M population.
- In M1 generations, 32 progenies of TM-2 were found early maturing type (earlier by 7 or more days than control), in which 20 progenies had shown early maturing trait in M1 generation during 2017-18. Progeny no. 15 M3, 600 Gy of TM-2 was the earliest in maturity (20 days earlier than control); in M3 it was 10 days earlier than control; followed by progeny no. 17 M3 and 38, which were

- Three toriavarieties, viz., TS-38, JT-90-1 and yellow sarson were evaluated at four different dates of sowing (S1: 22/10/2018, S2: 6/11/2018, S3: 22/11/2018 and S4: 6/12/2018) and the highest yield and benefit-cost ratio were recorded in toria variety TS-38 sown on 22/10/2018.

5.9.2. Crop management

- Application of S@20kg/ha+B1.5 kg/ha+RD NPK
recorded the highest seed yield over the recommended dose of NPK.

- Foliar spray of 1% Urea to cope with mid-season drought revealed that the highest benefit:cost ratio of 2.38, however highest grain yield of 1027.1 kg/ha was recorded in treatment with water-soluble complex fertilizer (19:19:19) @ 0.5% + ZnSO4@ 0.5% & borax @ 0.5 with a B:C ratio of 1.8.

- Efficacy evaluation of encapsulated fungal formulation for improving phosphorus nutrition in rapeseed revealed increases yield (1036.74 Kg/ha) as compared to the control (960.15 Kg/ha), which was *at par* with the recommended dose of phosphate without formulation (1042.29 Kg/ha).

5.10. Jute and Allied Fibres

5.10.1. Crop Improvement

- The check variety JRO 204 produced the highest fibre yield of 40.36 q/ha followed by NOJ 27-26 (40.25 q/ha) a variety of Nagaon
- NCJ 16-53 produced 48.03 q/ha, followed by NCJ 33-9 (45.14 q/ha) against JRC 517 (44.62 q/ha)

5.10.2. Crop Management

- Fertilizer dose of 150% NPK on ST –TY + lime + OM gave the highest fibre yield (48.02 q/ha) as compared to normal fertilization (35.83 q/ha) in jute.

5.10.3. Crop protection

- Seed treatment with carbendazim 50 WP @ 2g/kg + spraying of (spiromesifen 240 SC @ 0.7 ml/kg at 35 DAS + tebuconazole @ 0.15 % at 35 + lamda cyhalothrin @ 0.6 ml/l at 55 DAS gives better pest control with better yield of 30.32 q/ha.
- The combination of fungicide molecules (azoxystrobin and difenoconazole) offered better management for *Macrophomina phaseolina* induced disease complex in jute when applied as seed treatment @ 1.0 ml/kg seed followed by spray @ 0.075 % at 40-45 days of crop age.

5.11. Ramie

5.11.1. Crop Improvement

- Fourteen numbers of different INM practices on ramie was evaluated, out of which the highest B:C
ratio (mean of 3 years) was observed in the application of 30:15:15:: N, P2O5, K2O kg/ha/cutting + Vermicompost @ 0.5t/cuttings/ha with a cost-benefit ratio of 1.64.

- Altogether, 21 ramie germplasms are collected from various parts of NE India and maintained at the center and among these, R-1415, R-1411, BNC 7 and BNC 12 showed better performance in respect of fibre yield.

V. SUGAR CROP
5.12. Sugarcane
5.12.1. Crop Improvement
- Altogether 36 entries comprising 24 from Initial varietal Trial, 11 from the advanced varietal trail and Akipura-a local cultivar was tested, out of which CoP 15436 showed resistant reactions in plug method. While CoSe 95422 was moderately susceptible to red rot pathogen in the cotton swab method.
- Altogether 83 clones were tested for juice quality and cane yield and 21 clones were selected for further evaluation.
- In an observational trial, fifteen clones were selected based on quality and cane yield out of 46 high yielding clones.
- Breeder seeds of 8 varieties viz., Lohit, Borak, Kolong, Dishang, Dhansiri, Nambor and Kapilipar have been produced during 2018-19.
- The entries CoSe 14454 (9.45 t/ha, 78.07 t/ha) and CoBln15501 (9.65 t/ha., 81.93 t/ha) were found better performing with respect to CCS (commercial cane sugar) yield.

5.12.2. Crop Management
- Application of 200, 140 and 120 kg N,P,K /ha produced the highest cane yield (73.33 t/ha) and the number of millable cane (86.67x000/ha). However, juice quality did not vary significantly due to variation in fertilizer doses.
- Crop yield of the ratoon II crop of sugarcane was low varying from 16.97 t/ha under control to 32.1 t/ha under organic practices. However, cane yield under organic cultivation was at par with that of fertilized control (33.34 t/ha) indicating sustainable crop yield under organic cultivation after 3 years of the crop cycle.

5.12.3. Crop Protection
- A survey, conducted in various sugarcane growing areas in Golaghat district of Assam during 2018-19, revealed that the occurrence of red rot was observed up to 4.76-10.53% in Co 997 and C0 740 in the farmers’ field. While wilt was observed in the plant as well as ratoon crop ranging from 2.12 to 19.42.
- Survey on sugarcane insect pests revealed sugarcane woolly aphid (Ceratovacuna lanigera) as a serious pest in the sugarcane growing areas of Assam with high to moderate infestation in the areas of Balidowa, Khanikar, Missamora, Buralikson of Golaghat district.
- A neuropteran predator Micromusi gorotus, a lepidopteran predator Dipha aphidivora, parasitoid, Encarsia flavoscutellum and syrphid, Eupeodes confrater were observed to rapidly colonize woolly aphid infested sugarcane field.

VI. TUBER CROPS
5.13. Potato
5.13.1. Crop Improvement
- Potato Hybrid AICRP-P-14 showed the highest total tuber yield (19.20t/ha) at 75 days harvest and in 90 days harvest, the hybrid AICRP-P-24 recorded the highest total tuber yield (26.20t/ha).

Figure 5.19. The best treatment (T.)
at 15 days harvest. In 90 days harvest the hybrid AICRP-P-9 recorded the highest total tuber yield (22.00 t/ha).

- An early maturing hybrid, AICRP-P-36 exhibited the highest total tuber yield 13.70 t/ha) at 60 days harvest and at 75 days harvest the hybrid AICRP-P-9 showed the highest total tuber yield (18.20 t/ha).
- In the case of red-skinned hybrids, AICRP-P-45 exhibits the highest total tuber yield (190.10 t/ha) at 75 days harvest and in 90 days harvest the check variety AICRP-C-14 recorded highest total tuber yield (22.70 t/ha) followed by the hybrid AICRP-P-46 (21.20 t/ha).

5.13.2. Crop management

- In an organic-based potato trial, treatment with residue incorporation + compost @ 1 t/ha + biofertilizers (Azotobacter and phosphobacteria) + neem cake @ 5 t/ha + soil application Beauveria bassiana @ 4 kg/ha + seed treatment with Trichoderma formulation @ 8 g/kg seed + foliar spray of neem oil @ 3 ml/l + foliar spray of copper oxychloride @ 3 g/l) yielded highest tuber yield of 18.97 t/h.

5.13.3. Crop Protection

- Two forms of copper viz. copper oxychloride (Blitox) and copper hydroxide (Kocide) were tested @ 0.2% under two different spray schedule against late blight of potato under organic situation. The 1st schedule consists of 10 number of sprays at 4 days interval and the 2nd consists of eight number of sprays at five days interval. Both the spray showed better efficacy in delaying of late blight appearance and reduction of disease severity in comparison to untreated control.
- Potato leaf roll is a major disease that lowers the yield considerably and is transmitted through aphid, therefore. Aphid population was observed to increase gradually from the first week of January 2019 and attained a peak in 2nd week of February which afterwards declined gradually till harvesting of potato.

VII. FORAGE CROPS

5.14. Rice bean

5.14.1. Crop improvement

- Fourteen rice bean germplasms were evaluated for their earliness, productivity, quality and disease and pests resistance, out of these, 10 entries were found to be suitable for Rabi season also.
- Characterization of F1 progenies of diallel cross was made during Kharif 2017 with to develop a variety with high biomass.

5.15. Cowpea

5.15.1. Crop improvement

- Four local germplasms were crossed with the national check variety UPC 4200 to develop a variety with high biomass.

5.16. Lathyrus

5.16.1. Crop improvement

- Ten selected promising entries were found to perform better in respect of green forage yield, dry matter yield and crude protein content.
- Hybridization programme in lathyrus, adiallel cross is in progress to develop a forage lathyrus variety with high biomass yield, quality, disease resistance and low BOAA content.

5.17. Teosinte

5.17.1. Crop management

- The highest green forage equivalent yield in Teosinte + Rice bean intercropping at 3:3 row ratio (839.9 q/ha) followed by and at par in Teosinte+ Rice bean intercropping at 3:2 row ratio (793.3 q/ha).
- INM with 50% RDF + 50% N through Vermi compost recorded the highest GFEMY (800.0 q/ha) and CP yield (9.01 q/ha) than other treatments.
- The highest crude protein yield was recorded in Teosinte+ Rice bean intercropping at a3:3 row ratio (9.93 q/ha).
- The residual effect on Rice crop indicated that the highest grain yield of rice was recorded in Teosinte+ Rice bean (3:3 ratio) followed by rice being 36.1 q/ha. The effect of INM treatment indicated that the highest grain yield of rice was recorded in 50% RDF + 50% N through FYM (36.1 8q/ha).
5.18. Oat
5.18.1. Crop Management
- Oat + Pea intercropping in a replacement series at 3:3 row ratio along with 50% N through vermicompost + 50% N through inorganic fertilizer produced higher green forage equivalent yield (747.02 q/ha), dry matter yield (50.76 q/ha), crude protein yield (8.43 q/ha) and net return (Rs 61548/ha).

5.19. Rye Grass
5.19.1. Crop management
- Application of ryegrass seed @ 20 kg/ha was better in respect of higher green fodder, dry matter and crude protein yield /ha with a B:C ratio of 1.47.

VIII. OTHER FIELD CROPS
5.20. Makhana
5.20.1. Crop management
- Planting of makhana on 30th March recorded significantly higher seed yield (2.53 t ha⁻¹) with the highest benefit-cost ratio (3.05).
- Planting at the spacing 125 cm x 120 cm recorded the highest seed yield (2.51 t ha⁻¹) and benefit-cost ratio(3.04).

5.21. Citrus
5.21.1. Crop Improvement
- Five new collections of germplasms viz., rough lemon (Sohjieu), Chambula, Sweet lime, Citrus macroptera, Chinera (Citrus ichangensis) were added to the existing germplasm.
- A total of 55 accessions have already been characterized and accession numbers of 41 germplasm have been received, while passport data of 25 more accessions have been sent to NBPGR, New Delhi for obtaining IC numbers. A total of 3400 numbers of Khasi mandarin grafted/ budded planting materials and 2600 numbers of Assam lemon cuttings were produced during 2018-19 through budwood certification programme and established Orange and Assam Lemon mother block.

5.21.2. Crop Protection
- Roving survey of Citrus orchards in Tinsukia district of Assam, recorded new pests like Citrus green bug, Rhyncocoris humeralis (Thunberg), (Hemiptera: Pentatomidae) Brown Marmorated Stink Bug, Halyomorpha halys (Stal), (Hemiptera: Pentatomidae) and Green Stink bug, Nezara viridula, (Hemiptera: Pentatomidae) in traces with an incidence level of 8.50, 6.45 and 7.20 %, respectively.
- Petroleum spray oil @ 2% was found to be the best in reducing fruit drop by 15.60 % followed by Jatropa oil @ 2%.
- Propargite was significantly more effective in reducing mite population recording only 1.05 mites/leaf after 14 days after treatment.
Foliar application of neem formulation 10000 ppm @ 5ml/l followed by spinosad (0.015%) or thiamethoxam (0.008%) at 7 days interval during the new flushing period effectively manage citrus leaf miner up to 14 days after spraying.

Three major fungal diseases of Khasi mandarin viz., Twig light (6.66 -36.66%), Gummosis/Foot rot (3.33 – 26.66%), Fruit drop due pre-harvest stem end rot (up to 30.00%) and minor fungal diseases were Scab (3.33-18.33%) and Sooty mould (up to 11.66%) were recorded during 2018-19.

Among Virus & Virus-like pathogen, i.e., CTV was recorded up to incidence level of 45.00% while Citrus Greening Disease (CGD) was observed up to 46.66%.

For the management of Citrus Greening disease, 50% more than the recommended dose of Phosphorus (RDP) + Tetracycline hydrochloride 600ppm + ZnSO₄ of 200g was found better in terms of percent disease control (42.94%) and yield (49.97 Kg/plant).

5.21.3. Extension
During 2018-19, Field level Demonstration (FLD) on best IPM module for management of insect pests and diseases of citrus was carried out at Kakopathar village of Tinsukia district under TSP to minimize the use of chemicals covering 4 acres land of 3 tribal farmers on Khasi mandarin, 6 acres of 8 farmers on Assam lemon and 5 acres of 10 farmers on ginger crop, respectively.

5.22. Mandarin
5.22.1. Crop Improvement
• Among the different cultivars, Coorg mandarin recorded the highest plant height (2.25m) and stem girth (17.52cm), respectively. Canopy volume was found to be highest in Nagpur mandarin (4.65m3) followed by Coorg mandarin (3.09m3). Lowest plant height (1.82 m), stem girth (13.79m) and canopy volume (2.15m3) were observed in Kinnow mandarin.

• In order to understand the gene-expression profile, expression was compared between sweet orange and trifoliate orange. 24054 unigenes of sweet orange and 16168 unigenes of Trifoliate orange were showing significant similarity with different citrus species. Gene Ontology (GO) term of upregulated genes for both varieties was identified and in Sweet orange 5% of genes and in trifoliate variety 4% of genes were found to be involved in response to stimulus process. Optimization of genetic transformation protocol in Citrus reticulate cv. Khasi mandarin mediated through Agrobacterium using in vitro germinated zygotic and nucellar seedling hypocotyle region is in progress.
5.22.2. Crop management
- The treatment comprising 75% Vermicompost (on N equivalent basis of RDF) + Trichoderma harzianum (30-40 ml/plant) + Azadirachtin (1% at 3-4 ml/litre as spray) + Pseudomonas fluorescence (30-40 ml/plant) was found to be effective for improved vegetative growth with a maximum plant height (4.78m), stem girth (42cm) and canopy volume (35.14).

5.22.3. Crop protection
- Application of Dimethomorph (50WP) + mancozeb (75WP) and addition of two bioagents viz., Trichoderma harzianum & Pseudomonas fluorescence (100g/plant) could significantly reduce the Phytophthora root rot in mandarin recording a trunk lesion recovery (50.37%), fruit yield (51.8kg/tree), highest B:C ratio (2.26) and reduced feeder root rot index (49.72%).

5.23. Banana
5.23.1. Crop Improvement
- Out of ten local germplasms tested, Barjahaji was found to be higher yielder followed by Bogimonohar and Agnisagar whereas the cultivar Kachkal and Assamese malbhog were found to be the lowest performer in this regard.
- In plantain group, the Manjeri Nendran recorded maximum height (2.59 m) whereas the maximum girth (60.00 cm) and fewer days to shooting (268.00) were recorded in NRCB selection. In regards to bunch weight and yield, NRCB selection recorded the highest yield (30.22 t/ha) and bunch weight (9.25 kg) followed by check variety Monohar 28.67 t/ha and 9.00 kg, respectively.
- The plants grown from macropropagated plantlets recorded higher height (2.00 m), girth (65.90 cm), yield (97.37 t/ha), bunch weight (32.45 kg), hands/bunch (12.64) and numbers of finger/bunch (197.65) for the variety Grandnaine compared with respective sucker grown plants.
- Seedless plant production and mass scale propagation of Musa balbisiana (bhimkol) of NER using in vitro approach was carried out successfully at the Department of Biotechnology, AAU. The banana suckers of bhimkol were collected from different agroclimatic zones of Assam for studying morphological and genetic diversity. Standardization of anther culture/ endosperm culture and regeneration of plantlets is under progress.
- Altogether 21 local banana germplasms were utilized for downstream processing of Banana waste for natural fibre extraction, fibre-based products, Biomass briquettes and utility compounds and tested for various physical parameters including fibre strength, tensile strength, thickness etc. The work on isolation and Plate Screening of Pectinolytic and Cellulolytic Bacteria from Banana pseudostem samples is going on.
- 35 different genotypes of banana including wild spp. and cultivars viz., Athia, Digjowa, Amrit Sagar, Bogimanohar, Grand Naine, Kachkal, Honda, Chenichampa, Assamese Malbhog, Simolu Manohar, Gobin Tulchi, Bhimkal, Agnisagar, Barjahahi, Jatikal, Suti Jahaji, Doodh Sagar, Savari, Balha Kual, Banria, Lumgkamg, Ludum, Lumungashie, Naga Malbhog, Naga Cheni, Wild-1, Wild-2, Wild-3, Wild-4, Wild-5, Wild-6, Wild-7, Wild-8, Wild-9 and Wild-10 were tested against the physiological and biochemical parameters for management of low temperature and moisture deficit stresses in banana grown in NE India.
- INO gene of bhimkol was isolated cloned into pGEM-T Easy Vector and sequenced. Based on the INO gene nuceotide sequence generated, two crRNAs at Exonic region 2 and 3 were designed and cloned first into pSH923B driven by U3 promoter and pSH924A driven by U6B2 promoter. A total of 8 INO_CRISPR/Cpf1Lb constructs developed and Callus has been induced from the 40 numbers of male flowers (upto 11 brackets) of bhimkol. Partial sequences (sense and anti-sense) of ftf1 (298nt) and velvet (451nt) were amplified and cloned into T/A cloning vector and further cloning into pHannibal is in progress. Later it will be mobilized into a suitable binary vector system for banana transformation. The establishment of Embryogenic Cell Suspension from malbhog is under progress.
Figure 5.26. Development of Embryogenic calli suspension (ECS) from male flowers of Malbhog

- **Banana germplasm** (resistant and susceptible to Sigatoka) have been collected and isolation as well as morphological/molecular identification of local strains of *Mycosphaerella* spp. is being done from cultivars available around Jorhat.

### 5.23.2. Crop Protection

- Bioassay of 24 botanical (insecticidal) plants against banana leaf and fruit scarring beetle revealed that chloroform extracts of *Monisal (Sapindus saponaria)*, *Karanj (Pongamia glabra)* and *Neem (Azadirachta indica)* show the highest effectivity, similar to the aqueous extracts, *Monisal (Sapindus saponaria)* showed the highest effectivity followed by *Neem (A. indica)*, *Karanj (Pongamia glabra)* and *Sewali (Nyctanthes arbor-tristis)*.

- Covering of banana bunch with Plastic bags (7.31 beetles/plant) and four numbers of spray with Chlorpyrifos 20 EC (7.88 beetles/plant) were equally effective in reducing the leaf scarring beetle/plant. Chlorpyrifos 20 EC @ 2.5 ml/l was found to be the best (6.37%) to reduce the % fruit infestation by scarring beetle followed by bunch covering with plastic bag (10.53%).

### 5.23.2. Crop Economics

- A market feasibility study for tissue culture banana in Assam revealed that *Grandnaine* was grown as tissue culture jahaji variety widely in Assam, while *rasthali* was grown as tissue culture malbhog variety. The adoption percentage of tissue culture banana was 11.23% only with total demand for tissue culture seedlings was found to be 1,22,657 numbers/year of which demand for malbhog variety was 54.24% and rest 45.76% for jahaji variety. Among the districts, Kamrup district accounted for the highest proportion of total demand (31.28%) and the lowest by Darrang district (5.19%).

### 5.24. Guava

#### 5.24.1. Crop Protection

- Application of *B. bassiana* (IIHR formulation) either talc formulation (10g/l) effectively reduced the fruit damage of guava tea mosquito bug as compared to the standard check (lamda-cyhalothrin- 0.05%) of fruit damage at Tinsukia.
II. VEGETABLE CROPS

5.25. Brinjal

5.25.1. Crop Protection
- Nine releases of *Trichogramma chilonis* (MITS) @ 1,00,000 /ha followed by spraying of NSKE 5% and *Lecanicillium lecanii* (NBAIR culture) @ 5g/lit at 10 days interval was more or less equally effective compared to chemical control plot against brinjal shoot and fruit borer.

- Brinjal intercropped with Carrot and Cowpea as border crop recorded the least population of aphid (2.65/leaf), leafhopper (2.32/leaf) and shoot (11.37%) and fruit (10.08%) infestation with maximum yield of 210.67 q/ha.

Figure 5.28. View of experimental plot of brinjal

5.26. Broccoli

5.26.1. Crop Management
- The highest head weight and head yield could be obtained by the through drip fertigation at 100% EpR (Evaporation replenishment) along with the application 100-80-60 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O/ha or with 75 -60-45 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O/ha + Panchagavya (50 lit/ha) + FYM (5 t/ha).

5.27. French bean (pole type)

5.27.1. Crop Improvement
- French bean entry 2015/FBPVAR-2 had the longest pod with average length 14.68 cm followed by entry 2015/FBPVAR-3; whereas average pod girth was more in 2015/FBPVAR-1(1.01 cm) followed by 2015/FBPVAR-4 (0.98 cm).

5.28. Radish

5.28.1. Crop Improvement
- Out of tested six entries, the entry 2015/RADVAR-3 performed consistently well in three years and gave the highest yield of 386.21 q/ha in pooled analysis followed by 2015/RADVAR-2 with 287.09 q/ha. 2015/RADVAR3 gave 43.36 % increased yield over the best check variety Kashi Sweta with a pooled yield of 269.39 q/ha and had long white less pungent roots.

5.29. Chilli

5.29.1. Crop improvement
- For standardizing the regeneration protocol for Bhut Jolokia, Isolation of DNA from the leaves of Bhut Jolokia, using CTAB method has been done and designed the guide RNAs based on the draft sequence of *Capsicum chinensis* available in the public database.

5.29.2. Crop Management
- The highest yield of fresh chilli fruits could be obtained with rice straw mulching followed by one hand weeding though oxo-biodegradable plastic film.

5.29.3. Crop Protection
- Study the virome, RNAome and leaf curl disease manifestation in Bhut jolokia (*C. chinense*) and *C. frutescens* revealed that chilli leaf curl disease hosts several viruses, including a geminivirus and is not transmitted by mechanical means to tomato, *N. benthamiana* and *N. tabacum*. Several attempts failed to transmit the disease to these hosts.

5.30. Bathua (*Chenopodium sp.*)
5.30. Crop Improvement
- Variety Pusa Bathua was found to be the best performing with 253.67 q/ha yield.

5.31. Yam
5.31.1. Crop Improvement
- A new Greater Yam Variety IGDa-2 was successful and recommended for the state of Assam.

5.32. Taro
5.32.1. Crop Improvement
- Corms and cormels of different treatments like 10 Gy(M), 10 Gy (M), 10 Gy(M)+0.5% EMS and 5 Gy (M) are harvested and different growth and yield parameters have been recorded. The corms and cormels of best treatment like 10 GyM and 10 GyM have been planted and replicated for M3 generation for further studies like the nutritional and post-harvest parameter.

III. SPICES
5.33. Black Pepper
5.33.1. Crop Improvement:
- All total 23 varieties of black peppers have been collected and maintained at HRS, Kahikuchi.
- Out of all the tested 12 varieties/hybrids of Black pepper, Panniyur-5 recorded significantly higher fresh and dry berry yield (7.65 kg and 2.30 kg per plant) followed by Subhakara (7.30 kg and 2.19 kg per plant).

5.33.2. Crop Management:
- The first week of May was found to be the best time for the propagation of Bush pepper with 80% success in Panniyur-1 and 85% success in Karimunda at Assam condition.
- Grafting of black pepper taking Brazilian Pepper (Piper colubrinum) and Black pepper (Piper nigrum) as root-stock was found successful in the month of May, which took 18-22 days for setting.
- A combination of Neem cake + silt + cow dung + vermicompost (1:2:2:2) produced the highest number of spikes (135 no.), maximum spike length (12.6 cm) and highest fresh berry yield (810g/plant) in black pepper cultivation.
5.34. Turmeric

5.34.1. Crop Improvement:
- The highest fresh rhizome yield was recorded in variety Rajendra Sonia (0.515 kg/clump) followed by Megha Turmeric-1 (0.480 kg/clump). The curcumin content was found highest in Megha turmeric-1 (5.81) followed by Rajendra Sonia (5.73).

5.35. Coconut

5.35.1. Crop improvement:
- The highest plant height, girth, annual leaf production, number of functional leaves as well as nut yield (74.6 nuts/palm/year) was recorded in IC 610357 (74.6 nuts/palm/year). Genotype IC 610354 recorded the biggest nut size and nut weight (1460 g/nut) along with the highest tender nut water of 380 ml/nut.

- The highest fruit yield (58.0 nuts/palm/year) was recorded in AGT x PHOT closely followed by AGT x MYD (55.0 nuts/palm/year) whereas, the lowest yield of 45.0 nuts/palm/year was found in CRP 501 x PHOT.

- The highest plant height (498.0 cm), girth (107.4 cm), no. of leaves (17.9), total leaf length (312 cm) were observed LCT x ADOT whereas, the hybrid ADOT x ECT recorded the lowest values for the above characters.

5.35.2. Crop Production:
- Application of 50% of RDF + 50% N through organic recycling with vermicompost + In situ Greenmanuring + Biofertilizer + Vermiwash was reported to record the highest yield/ha with a benefit: cost ratio of 2.06 under coconut based cropping system.

IV. PALMS

5.36. Cocoa

5.36.1. Crop improvement:
- Multilocaton trial of cocoa clones under palms was conducted during 2018 with 16 nos. of cocoa clones (VTLC series & one hybrid) and the highest plant height (208.6 cm), girth (25.0 cm), number secondary branches (16.5 ) per plant, plant spread (E-W and N-S) were recorded in VTLC-20 followed by VTLC-18.
V. FLOWERS

5.37. Orchid
5.37.1. Crop Improvement:
- During the year 2018-19, only 4 species of *Rhynchostylis* and one species of each *Goodyera* and *Vanilla* were collected and maintained at HRS, Kahikuchi

5.38. Tuberose
5.38.1. Crop Improvement:
- Under Single Type, 9 (nine) tuberose varieties viz., Local Single, Shringar, Arka Nirantara, Prajwal, Phule Rajani, Sikkim Selection, GKTC_4, Bidhan Rajani H-1, Bidhan Rajani H-2 were maintained at HRS, Kahikuchi.

5.39. Gerbera
5.39.1. Crop Improvement:
- Thirteen varieties/ germplasms of gerbera are being maintained at HRS, Kahikuchi.
- Induction of mutation was observed in gladiolus with all doses of gamma radiation, i.e., 20Gy, 30Gy, 40Gy, 50G and 60Gy. The mutation frequency in Red Majesty was found to be the highest followed by Red Candiman, Pasibica Beauty and Summer Sunshine.

5.40. Heliconia, Bird's of Paradise and Lotus
5.40.1. Crop Improvement:
- As a part of the collection of under exploited ornamentals, 2 germplasms of white and red water lily (*Nymphaea* spp.); and a single collection of white lotus (*Nelumbo nucifera*) were collected and maintained in artificial tanks.

5.41. Other native ornamentals
5.41.1. Crop Improvement:
- Under native ornamentals, 7 (seven) collection of trumpet lily, one (1) *Crinum* lily, one (1) ball lily, three (3) alocassia, one each perennial flowering shrubs viz., Brazilian bachelor button and *Phutuka* were collected during 2018-19.

5.41.2. Crop protection
- Four (4) new species of fungal pathogens causing different diseases in ornamentals have been identified viz., Leaf spot of Chinese box (*Murry akoenigii*) / Kamini kanchan: *Hysterium pulicare*, Leaf spot of snake plant (*Sanisvieria trifasciata*): *Colletotrichum sansivieriae* and *Corynespora trifassiata*, Leaf spot of *Ixora* (*Ixora coccinea*): *Pestalopsis longiappendiculata* and Leaf spot of areca palm (*Dypsis lutescens*): *Diplodia phoeniceum*.
- Azoxytrobin (0.05%) followed by tebuconazole (0.1%) were found superior to other chemicals in the management of leaf blight in tuberose.

VI. AGROFORESTRY
- Different agroforestry systems identified are: agri-
horticulture, agri-silviculture, agri-horti-silviculture, aqua-horticulture, aqua-silviculture, aqua-horti-silviculture, horti-horticulture, silvipastoral and homestead.

- 95 saplings of *Gmelina arborea* collected from 19 seed sources were planted, of which AAU 18 (Silchar), recorded the highest timber volume of 1.503 m$^3$/tree, biomass of 1108.83 Mg/ha and above ground C stock of 554.41 Mg/ha.

- The maximum plant height (15.37 m), dbh (32.88 cm), canopy diameter (9.18 m), timber volume (297.01 m$^3$/ha), tree biomass (407.08 Mg/ha) and above-ground carbon stock (200.04 Mg/ha) was observed in intercrop plot at 5 m x 4 m tree spacing in *Acacia mangium* based agroforestry systems.

- In Jackfruit based agroforestry system, tree height of 8.41m, the dbh (28.45 cm), timber volume (32.03 m$^3$/ha), tree biomass (88.12Mg/ha) and above ground C stock (44.06Mg/ha) of jackfruit was recorded in intercrop plot which was superior in comparison to the sole tree.

- In *Gmelina arborea* based Agri silvicultural system, the height and collar girth of the tree were 3.06 m and 17.93 cm. 98.6 cm in the most promising intercrop cowpea-toria maximum height and collar girth of *Gmelina arborea* sole was 3.45 m and 18.53 cm.

- *Muli* bamboo (*Melocanna baccifera*) attained 14.44 m in height and 15.4 cm in girth in 14 years. It yielded 91.7 t/ha in the 6th year after plantation from seed.

- Mean plant height (22.78 m), spread (3.31 m), new culm (9.85 no.), total culms (91.80 nos.), canopy diameter (15.96 m), biomass (168.12Mg/ha) and harvestable yield (775 no./ha) of *Bambusa balcooa* was recorded in 10 years after plantation.

- Mean plant height (19.39 m), spread (3.28m), new culm (15.74 no.), total culms (77.60 nos.), canopy diameter (11.60 m), biomass (201.45 Mg/ha) and harvestable yield (1364 no./ha) was observed in *Bambusa tulda* in 10 years after plantation.

- The highest plant height was observed in the intercropped Assam Lemons grown in open condition (No tree) while the lowest was observed in *Gmelina arborea* and *Michelia-champaca* based Agri-horti-silvicultural system.

### C. OTHERS

#### 5.42. Integrated Farming System

- An Integrated Farming System (IFS) model developed by AICRP on IFS, AAU Centre for a rainfed condition with Crops + Cattle + Fishery/water harvesting structure + Apiary in one hectare area can generate a net income of Rs. 2,08,398 with the B:C ratio 1.97, and with the employment opportunities of 429 mandays/year under the rainfed situation of Assam.

#### 5.43. Nanobiosteresics

- Chitosan nanoparticle (Ch NP) from shrimp chitin was tested for its compatibility with different biocontrol agents like *Trichoderma asperellum*, *Beauveria basianna*, *Paecilomyces lilacinus* etc. revealed that highest sporulation was recorded in treatments 1% and 0.5% Ch NP as compared to control.

- Study on the combinations of different biocontrol agents + Ch NP at different doses against targeted pathogens like *Rhizoctonia solani*, *Sclerotium rolfsii*, *Fusarium* sp., *Sarocladium oryzae* showed that upon combining the biocontrol agents with
chitosan nanoparticle, their antimicrobial activity, chitinase activity, \( \beta-1,3 \) glucanase activity as well as biomass were enhanced.

- Seeds of rice, tomato when treated with 1% Ch NP + \textit{T. asperellum} germinated 2 days earlier than other treatments.
- Similarly, the root length, shoot length, No. of branches were recorded highest in plants treated with 1% Ch NP + \textit{T. asperellum}.

5.44. Alternative food source

- Collection of snail species from different parts of NE India is in progress and altogether 4 species have already been identified under Edible Molluscs in collaboration with NBAIR, Bangalore. The nutritional profiling of the collected samples is in progress in collaboration at CFTRI, Mysore.

Figure 5.43. Edible snails identified from various locations of North East India

5.45. Veterinary pest management

- Plant samples of \textit{Argemone mexicana} (NBA18/D1) and \textit{Datura metel} (NBA22/F1) along with the root rhizosphere soils were collected from six agroclimatic zones of Assam at flowering stage and tested for their acaricidal potential against ticks collected from five districts of Assam, viz., Barpeta (BPT), Kamrup Metropolitan (KMP), Morigaon (MGN), Nagaon (NGO), Sonitpur (SNP) and from Ri Bhoi (RBH) district of Meghalaya. The Presence of potential candidate metabolites (Atropine and Scopolamine in \textit{Datura}, and Berberine and Sanguinarine in case of \textit{Argemone}) having acaricidal activity were assayed both qualitatively (by HPTLC) and quantitatively, and a correlation with acaricidal activity of the plant extract was tried to establish. Among fungal endophytes, the genus \textit{Aspergillus} was found predominant in both the plant species.

5.46. Precision farming Development Center (PFDC)

- The highest leaf length, leaf number, bulb weight and the total yield was recorded in treatment with 75% ETc. and 100% RDF.
- Standardization of drip irrigation and fertigation schedule for banana with plastic mulch and mango is in progress.
- Estimation of drip irrigation and fertigation of strawberry with polythene mulch under plastic greenhouse is in progress.
- Standardization of precision farming technology for the cultivation of muskmelon in plains of Assam is in progress.

5.47. Medicinal and aromatic plants

- An area of three hectare land is taken up under the establishment of the field gene bank of available medicinal plant genetic resources. Altogether 505 species including 95 trees, 177 herbs, 68 vines and 165 shrubs have been planted. A micro field gene bank is also established in an area of 0.5 hectare at AAU.
- Collected the planting materials of six medicinal plants, viz., (i) \textit{Acorus calamus}, (ii) \textit{Clitoria ternatea}, (iii) \textit{Artemesia annua}, (iv) \textit{Ferula foetida}, (v) \textit{Ipomoea mauritiana} and (vi) \textit{Panax pseudo-ginseng} from CIMAP, Lucknow, RGU, Rono Hills, Naharlagun, Arunachal Pradesh and JK Medicinal Plants Introduction Centre, Srinagar, Kashmir and they are now being grown in the experimental field of BNCA.
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- Morphological and molecular characterization of all the 62 germplasm of different medicinal plants and betelvines maintained at AAU were done.
- Marketing efficiency analysis for medicinal plants like Amla (\textit{Emblica officinalis}), Hilika (\textit{Terminalia chebula}), Bhomora (\textit{Terminalia bellerica}), Brahmi (\textit{Bacopa monnieri}), Pipali (\textit{Piper longum}) and Arjun (\textit{Terminalia arjuna}) was done and Producer/collector-processor-retailer-consumer was found to be more efficient for the trade of medicinal plants like Brahmi (\textit{Bacopa monnieri}).
5.48. Soil Mapping

- Mapping and soil testing of macro and micro-nutrients for precise fertilizer recommendation to the farmers of Assam has been done during 2018-19 covering 9 (nine) parameters viz, pH, OC, N, P, K, S, Zn, B and Lime requirement (LR) of different blocks of the districts of Upper Brahmaputra Valley Zone (UBVZ), Northern Bank Plain Zone (NBPZ) and Central Brahmaputra Valley Zone (CBVZ).

5.49. Soil Test Based Crop Response (STCR)

- Finalized Fertilizer Prescription Equations for Hybrid Rice for recommendation.

**Targeted Yield Equations for Hybrid Rice (NPK Alone)**

- FN = 4.08 x T – 0.75 x STVN
- FP = 1.19 x T – 2.57 x STVP
- FK = 4.17 x T – 1.15 x STVK

- Finalized Fertilizer Prescription Equations for Hybrid Rice (with NPK + IPNS)

- FN = 4.08 x T – 0.75 x STVN – 0.59 x M
- FP = 1.19 x T – 2.57 x STVP – 0.37 x M
- FK = 4.17 x T – 1.15 x STVK – 0.58 x M

- Developed and refined Fertilizer Prescription Equations for Scented Rice (Joha rice).

**Targeted Yield Equations for Scented Rice (NPK Alone)**

- FN = 5.55 x T – 0.67 x STVN
- FP = 0.91 x T – 1.53 x STVP
- FK = 4.25 x T – 0.78 x STVK

**Targeted Yield Equations for Scented Rice (with NPK + IPNS)**

- FN = 5.55 x T – 0.67 x STVN – 0.20 x M
- FP = 0.91 x T – 1.53 x STVP – 0.05 x M
- FK = 4.25 x T – 0.78 x STVK – 0.35 x M

5.49. Biofertilizers

- Three PGPM, viz, *Rhizobium* sp., *Azotobacter* sp. and phosphate solubilizing bacteria (*Burkholderia tropica*) were utilized for encapsulation in the selected polymer matrix with cassava starch was selected as a module with Na-alginate (1.5 % Na-alginate in combination with 2.0% cassava starch). The frequency of viable cells assessed in the fresh beads was in the range of 9.36 to 9.55 log cfu/bead in the polymer matrix of 1.5% Na-alginate and 2.0% cassava starch in the inside of the beads, while it was 4.31 to 4.60 log cfu/bead in the surface of the beads.

5.50. Micro and Secondary nutrients and pollutant elements in soils and plants

- Demarcation of percent samples deficient and sufficient for micro and secondary nutrients in East Karbi Anglong and west Karbi Anglong district was completed.
5.51. Groundwater Quality Mapping

5.51.1. Jorhat district
- The pH level of all the samples was found to be within the range of 6.42 to 6.92. However, pH value of all the samples did not surpass the desirable limit (6.5-8.5) as set by the Bureau of Indian Standard (BIS). Iron content varied from 10.70 to 158.49 mg L\(^{-1}\) and considerable numbers of samples exceeded the desirable limit (1.0 mg L\(^{-1}\)) of BIS. The copper content in groundwater, it was found to vary from 0.28 to 10.47 mg L\(^{-1}\) with the maximum area under the category of 0.28 to 2.7 mg L\(^{-1}\). Zinc content ranged from 0.27 to 0.94 mg L\(^{-1}\) showing maximum area in the category of 0.60 to 0.65 mg L\(^{-1}\). GIS-aided spatial distribution map of Mn ranged from 3.89 to 37.7 mg L\(^{-1}\). All the samples had their Mn content above the desirable limit (0.3 mg L\(^{-1}\)) of BIS.

5.51.2. Nagaon district
- Although groundwater pH of the district was within the desirable limit as recommended by WHO, 67.30% sample covering 79% of the total geographical area of the district was slightly alkaline in nature. Groundwater quality parameters that surpassed the desirable limit recommended by WHO were electrical conductivity and nitrate which accounted for 41.22% and 0.79% of the total samples, respectively. Total dissolved solids, calcium, magnesium, carbonate, bi-carbonate and nitrate in groundwater were recorded within the desirable limit of WHO and thus could be considered as safe.

5.52. Vertebrate Pest Management

5.52.1. Rodent Control
- Surveillance of rodent pests in the rice-pulse cropping system revealed the presence of the rodent activity throughout the cropping season with the highest number of LBC (46.11/ha) during kharif rice in October-November and (36.66/ha) during Rabi vegetables in February-March.
- The highest trap index (6.67%) was recorded at the ripening stage of rice whereas, in peas, the highest trap index (4.41%) was recorded at the pod formation stage. The surveillance studied in the rice-pea cropping system revealed the peak rodent incidence in terms of tiller damage (7.67%) at grain formation stage of rice while in pea, it was 3.66% during Rabi season.
- The predominant rodent species were Bandicota bengalensis, B. indica, Mus booduga, Rattus sikkimensis and Dremomys lokriah, out of which the B. bengalensis was found to be the most predominant species with the highest mean number (6.11±3.6).
- Monitoring of rodent pests in Hill zone of Assam revealed the presence of Bandicota galensis, B. indica, Mus booduga, Rattus sikkimensis and Dremomys lokriah.
- Botanicals like Azadirachta indica seed kernel, Carica papaya, Solanum khasianum, Ananasscosmosus, Moringa oleifera have shown a good anti feedant effect on both the sexes of Bandicota bengalensis.
• Cultural practices (removal of weeds/bushes) + application of castor oil (1:20) on bunds at tillering stage of rice + bromadiolone (0.005%) baiting at PI stage of rice + trapping with local bamboo traps @ 50 traps/ha at ripening stage of rice + smoking in burrows with rice straw at harvest) was found most effective module resulting in 64.66-68.8% reduction in rodent population in Kharif rice and 52.21-56.67% reduction in rodent population in Rabi vegetables, respectively.

• The comparative trapping efficacy of local bamboo traps revealed the highest trap index of (8.04±0.37) with maatchitap in comparison to neulchitika (4.61±1.11) at the maturity stage of kharif rice.

5.52.2. Agricultural Ornithology

• Large scale demonstration has been done on the installation of bird perches made of either bamboo or tree branch in the shape of ‘T’ @ 50/ha as a component of IPM in BTAD districts of Assam.

• Birds belong to Nectariniidae followed by Dicaeidae and Zosteropidae are major pollinators of crops. Plant families Lauraceae, Myrtaceae, Sapotaceae, Rutaceae, Rubiaceae and Symplocaceae are found to be benefitted by birds pollination services.

• Oriental White eyes and Sunbirds are predominant bird pollinator species recorded in Homestead agroecosystem of NBPZ of Assam.

• Successful breeding of Barn owl, (a potential predator of Rodent pests) inside artificial wooden nest boxes designed by ICAR- AINP on VPM (Agricultural Ornithology).

• 166 bird species recorded to date (March 2019) in the Agricultural Landscape of Assam.

• 141 species of birds belong to 47 families were identified in Agricultural landscape of Majuli

• Recorded Oriental White Ibis *Threskiornis melanocephalus*, a Near Threatened (NT) bird for the first time on the island.

5.53. Lac insect genetic resources

• Altogether 17 districts of Assam have been surveyed out of which, naturally occurring lac insects were found in 3 districts and cultivated lac insect found in one district (Dhemaji). In West Bengal, Eleven districts comprising 14 blocks and cities were surveyed during October, 2018 and naturally occurring lac insects were found in 6 districts.

• The germplasm conservation of lac insect comprises of 3 live races of Assam and 5 races of West Bengal. Germplasm conservation of lac host plants comprised of 17 number of species.

• Correlation study of weather parameters with a life cycle duration of lac insect revealed a significant positive correlation (r=0.85) with morning relative humidity and significant negative correlation (r=-0.68) with rainfall.

• The *Kerria* species prevailed in Assam (West Karbi Anglong) is *Kerria chinensis* Mahd. (Gene bank accession no. MH562709 & MH562710).

5.54. Agricultural Acarology

• Fifty (50) germplasms/lines of chilli were screened for resistant against yellow mite, *Polyphagotarsonemus latus* and reported that the lines PC/2602, CCH-65 (d), 27/10 and 4/09 A (Black) were found to be moderately resistant and the local collection *Memjolokia*, *Krishna*, *Konjolokia* and *Moni* were found to be resistant against the pest.

• Release of the predatory mite, *Neoseiulus longispinosus* @ 20 Nos./plant could control 100% mite of *Tetranychus urticae* in rose and *Brevipalpus californicus* in ginger after 10 days of release.

• The IPM package comprising of light pruning *i.e.*
destruction of highly infested leaves/twigs of litchi plant before two months of flowering followed by two sprayings of propargite 57 EC @ 1 ml/litre of water at 10 days intervals before flowering have been recommended for themannagement of litchi mite, *Aceria litchi*.

- Mass production technique of the predatory mite, *Neoseiulus longispinosus* has been developed in *Amaranthus hybridus* as host crop on *Tetranychus urticae* as prey mites.

- *Polygonum hydropiper* leaf extracts was found effective in controlling 90% of the pests after 7 days of application.

- Two sprays of etoxazole 10 SC @ 40 g a.i./ha or 5.33 g a.i./ bigha at 15 days interval has been recommended against red spider mite of tea, *Oligonychus coffee* which controls 97.10% of the pest after 7 days of application.

**5.55. Soil Arthropod Pests**

- Altogether 2792 numbers of scarab beetles were collected using light trap technology and the beetles were profiled species wise.

- Pheromonal compounds of *Lepidiota mansueta* were identified and two major compounds (cis-9-Hexadecenoic acid & Octadec-9-enoic acid) were found common in both the sexes of the beetles and field testing of these two synthetic pheromonal compounds are in progress at Majuli, Assam.

- One local isolate of an EPN (*Heterorhabditis bacteriophora*) from the grubs of *L. mansueta* has been formulated, which showed 100% survivability of the EPN species up to six weeks in storage. The complete amino acid profiling of 4 edible insects (*L. mansueta*, *L. albistigma*, *Brachytrupes portentosus* and *Gryllotalpa africana*) were carried out. Out of aof total 20 standard amino acids, 17 amino acids have been identified and quantified.

- The complete fatty acid profiling of the aforementioned edible insects were also carried out at CSIR-CFTRI, Mysore. *Brachytrupes portentosus* (9.61, 10.56 & 8.13) recorded highest amount of saturated, monounsaturated and polyunsaturated fatty acids as compared to *L. mansueta* (2.24, 0.57 & 0.49), *L. albistigma* (3.56, 3.15 & 1.11) and *Gryllotalpa africana* (5.45, 7.18 & 4.82) respectively.

- A unique solvent-free method of extraction of mucin from Giant African Snail has been standardized. The first-ever attempt to convert the liquid snail mucin to dry form has been successfully standardized.

- The technology “Furrow application of chlorpyriphos 20 EC @3 ml/lit (or chlorpyriphos 300 g a.i./ha) against red ants, *Dorylus orientalis* in potato” has been recommended for incorporation in the Package of practices of *Rabi* crops of Assam.

- Demonstrating the power of Social Engineering, AAU created history by entering into “India Book of Records” by setting a national record of “most beetles collected in three hours” by collecting 73,700 white grub beetles at Majuli River Island in 2018.

- Patent applied: 2 Nos. (a. An invention entitled “Use of empty shell of Giant African snail (*Achatina fulica*) as lighting lamp (diya)” b. “Development of a Jatropha based ointment as a herbal remedy for livestock against ectoparasites and pathogenic microorganisms and process for obtaining the same” has been applied for patent right at Indian Patent Office, Kolkata.
5.56. Honey Bees and Pollinators

- Five (5) *Apis cerana* colonies/ha could increase the yield of mango to 72.12±0.5 q/ha over open pollination (61.41±0.3 q/ha) with an increase in yield (17.44%) and cost-benefit ratio of 1:3.15.

While studying the Impact of elevated temperature and carbon dioxide on foraging behaviour of *Apis cerana* F. in rapeseed and mustard it was found that the yield per treatment was found to be 12.50 q/ha under temperature gradient tunnel (CTGT-I) (550 ppm CO₂ + 2°C higher than ambient) and 7.41 q/ha in CTGT-II (650 ppm CO₂ + 4°C higher than ambient) and 13.89 q/ha in open condition. Bee mortality has been recorded to be 10.25% in CTGT-I and 18.40% in CTGT-II.

- A Bamboo hive of size 2857 cc has been recommended for rearing *Tetragonula idipennis* with a brood area of 230.04 cc.

- Five species of stingless bees, viz., *Tetragonula idipennis*, *T. laeviceps*, *T. gressitti*, *Lepidotrigona arcifera*, and *Lophotrigona canifrons* have been reported from different physiographic zones of Northeast India. Component analysis of the data of 23 morphometric characters explained 78.03% of variations observed among the locations of different physiographic zones.

- The application of different doses (1, 1.25, 1.50, 1.75, 2.00 ng/ml) of imidacloprid, thiacloprid and malathion reduced the fecundity of *A. cerana*. The queen died after the application of 2.00 ng/ml Imidacloprid and thiacloprid.

- Exposure of UV radiation of 254nm and 368nm for 10, 20, 30, 40, 50, 60 sec to the queen resulted in the death of the insect and the fecundity and longevity of the progeny were decreased.
5.57. Nematode management in Agriculture

- The occurrence of *Meloidogyne graminicola* and *Hirschmanniela oryzae* was 64 and 60 %, respectively in Nagaon district.
- In Puranigudam village of Nagaon district, the population of *Meloidogyne incognita* was above the threshold level around the papaya rhizosphere.
- Two species of entomopathogenic nematodes viz., *Heterorhabditis bacteriophora* and *Osheius* spp. were reported.
- *Oryza glaberrima* line 44, Sorghum (HJ 541), rice (PB1121), weeds (*Dactyloctenium aegyptium* and *Leptochloa chinensis*) were found as host of *M. graminicola*.
- Rice root-knot nematode, *Meloidogyne graminicola* in direct-seeded rice can effectively be managed by split application of FYM @1 t/ha + agricultural lime @ 10kg/ha + wood ash @ 2 kg /ha half as basal application and a half at 45 DAS.
- Rice root-knot nematode, *Meloidogyne graminicola* in direct-seeded as well as transplanted rice can effectively be managed biologically by the application of *Bacillus subtilis* (2x10^8 cfu/g, talc formulation) @ 10 kg/ha at sowing.
- Seed treatment with carbosulfan @ 3% + carbofuran (soil application) @1 kg a.i./ha at 45 DAS (days after sowing) was able to reduce the number of galls and nematode population (both in soil & root) in rice (var. Luit).
- Root-knot nematode, *Meloidogyne incognita* in cowpea can be effectively managed by combined application of *Purpureocillium lilacinum* 20g/m^2 (cfu 2x10^6) and neem cake @100g/m^2. The treatment was the best in reducing the root-knot nematode population in soil (43.42 %), in root (42.59%), root-knot index (35.56%) and increasing yield of the crop (33.03%) than the untreated control.
- Combined application of carbofuran @1 kg a.i./ha and Streptomycin sulphate @4 g/lit water (800 l/ha) was the best in managing the disease complex caused by *Meloidogyne incognita* and *Ralstonia solanacearum*.
- In the Crop Rotation trial, the summer crops increased the population of *Meloidogyne incognita* in all the treatments. Maximum soil and root population at harvest were recorded in Mung, however, the maximum % increase of root-knot nematode population was recorded in okra and cowpea, though there was no significant difference in soil and root population among the treatments.

5.58. Seed production of agricultural crops

- Breeder seed production of 13 rice varieties, namely, Ranjit, Ranjit Sub1, Bahadur, Bahadur Sub 1, Mahsuri, Swarna, Swarna Sub 1, Keteki, Luit, Lachit, Aghoni, Gitesh and ManoharSali were undertaken and 58.50 quintal breeder seed was produced.
- Out of 100 paddy seed samples collected from Sonitpur District, 65 percent samples recorded germination percentage above IMSCS and it ranged from 47 % to 96 %. All seed samples were infected by mycoflora and presence of *Curvularia*, *Aspergillus*, *Penicillium*, *Drechslera*, *Rhizopus*, *Fusarium* and *Alternaria* were observed.
- SSR primers, RM 206, RM263, RM216 and RM234, were found to be polymorphic and useful in identification and genetic purity testing of hybrid and its parental lines.
During 2018-19, an 559.45 quintals of breeder, 3878.03 quintals of foundation and 3195.40 quintals of certified seeds of new and promising varieties of rice (Ranjit sub1, Bahadur sub1, Swarna sub1, Shraboni, Gitesh, etc.), lentil (HUL 57), green gram (IPM 02-3, SGC-16, SGC-20), black gram (PU-31), jute (Tarun and Apeswari), rapeseed and mustard (M-27, TS36, TS38, TS 46, TS 67, PM-25, PM-26), linseed (Sekhar,T-397) etc. through AAU research-cum-instructional farm (production unit) along with participatory seed production at farmers field under ICAR-Seed Project during both Kharif and Rabi, 2018-19.

Altogether 140 farmers from three districts of upper Brahmaputra valley zone (Jorhat, Golaghat and Sivasagar) were trained on different aspects of recent advances in seed production of crops.

Small tools and equipment were distributed amongst 71 farmers of Jorhat district involved in seed production of agricultural crops, especially rice seed.

5.59. Farm Implements and Machinery
- Feasibility study of using Tractor drawn Straw chopper to clear paddy stubble after winter or summer rice revealed its easy and efficient land preparation for the next crop (potato).
- Demonstration of the walk-behind type trans-planter, drum seeder and reaper was conducted.

5.60. Post Harvest Engineering Technology
- A bamboo shoot grating designed and fabricated with a capacity of one peeled shoot in 2-3 minutes.
- A bamboo stalk cooked rice (chunga chawal) making machine conceptualized, designed and fabricated with a capacity of 4 kg/batch of 8 bamboo stalks.
- Designed and developed a storage structure for green gram and glutinous paddy for high moisture environment with a capacity of 15 kg. The designed storage structure showed less infestation (7.67%) of Callosobruchus chinesis over other storage devices in 12 months of study.
- Methanol extract of Jatropha leaf @ 2ml/kg of grain was found to be effective against Sitophilus oryzae. Hexane extract of Tulsi @ 2ml/kg of grain was found to be effective against Tribolium castaneum in the storage of wheat.

5.61. Storage insect pest management
- Neemazal 10000 ppm @1.5 ml/kg of seed and Acorus calamus TNAU formulation @ 10 mg/kg of seed were found to be superior to make the seeds free of insect infestation up to 9 months of storage under ambient conditions.
- After 8 weeks of harvest pre-harvest spraying of Emamectin benzoate @ 0.3 ml/L and Profenophos 50 EC @ 1ml/L restrict the field infestation of pulse beetle below the IMSCS when applied at 50 % pod maturity.

5.62. Mushroom
- Out of 12 strains evaluated for performance, PL-18-10 was found to be the best giving more than 100% bio efficiency.
- A total of 84 farmers were trained in 4 groups on oyster mushroom cultivation under the project and all the groups are growing oyster mushroom successfully.
- A total of 120 samples were collected from various locations of north-east India to test nutritional status and medicinal properties, which revealed that Lentinus squorrulus was the dominant one followed by Lentinus sajor-caju. The highest flavonoid content of 2569.09 mg/100 g of dry mass was recorded in the sample APS-1 (Pycnoporus sp.). Thirty mushroom samples were screened for
laccase activity, out of which 14 samples were detected to be laccase positive with the highest production during the 6th, 8th or 10th days of fruiting. Norbaeocystein, a hallucinogenic compound was detected in sample BP-5 only but not in the other samples. Similarly, Aeruginasein, a hallucinogenic compound which was detected in the samples BP1 and BP2 (members of the genus Paeneolus) was not in the other samples such as KM-1, KM-2 (Pleurotus giganteus), AAU-1, AAU-2 (L. squarrosulus).

5.63. Agarwood crop management

Identified the fungal diversity viz. Aspergillus nomius, Rhizomucor variabilis, Fusarium solani, Hypocreales sp., Lasiodiplidi atheobromae, Geotrichum candidum, Hyphomucor assamensis, Aspergillus nomius, Penicillium citrinum and Aspergillus flavus associated with agarwood infection. Out of 13 isolates of fungi, 3 isolates tested positive for cellulase activity and 2 for pectinase. Culture-independent approaches revealed that the fully infected samples showed the highest percentage of bacteria (79.34%) and lowest percentage of eukaryote (20.50%) compared to the Control (NC) and Initial Infected (IN) samples. In the initial infected sample, the top genus percentage belonged to Klebsiella (~19%) followed by Escherichia (~13%).

5.64. Tea

5.64.1. Crop Management

- To optimize total polyphenols and antioxidant activity of tea leaves by Response Surface Methodology (RSM), the optimum operating conditions were found to be leaves-to-solvent ratio=30.384 ml, extraction time of 1.5 h, number of extraction of 1.07577 (equal to 1), at which the values for total polyphenols and antioxidant activity were 4.93472 g catechin equivalent/100 g of sample and 87.7473%, respectively.

5.64.2. Others

- For occupational wellness of pluckers engaged in manual tea plucking activity, worker-friendly basket for tea pluckers with ergonomic design approaches has been designed with a leaf capacity of 8 kg, which can reduce the average working heart rate (beats min⁻¹) by 12%.
To protect the tea pluckers from the abrasions of tea bushers, two functional dresses were designed for their convenience. One is for the winter season which is like long kurta with long sleeve, made of cotton and raincoat material and another one is for summer season which is like an apron made of cotton and raincoat material.

5.65. Post-harvest and value addition

5.65.1. Fruits preservation and value addition

- For long-distance transportation of high-value horticultural crops viz., pineapple, guava, Assam lemon, Khasi mandarin, papaya and Kiwi, CFB boxes with suitable dimensions and separators fitted with foams soaked in ethylene has been designed and were found best in transporting fruits up to a distance of 1000 km under ambient condition. The maximum number of days fruit stored after transportation in the case of Kiwi fruit, Khasi mandarin, Guava, Pineapple, Assam lemon and Papaya are 20, 20, 9, 7, 15 and 9 days, respectively.

- Three widely grown indigenous jackfruit genotypes of Assam i.e. **Dhol kathal**, **Pat kathal** and **Mridongia kathal** were collected and analyzed for their quality characteristics and **Dhol kathal** was found to be superior among all the three varieties in terms of quality characteristics such as weight of fruit (kg), no of bulbs per fruit, weight of a bulb without seed (g), weight of a seed (g), flakes colour and selected for further process standardization and product development.

- A total of four products were developed from jackfruit (**Dhol kathal**) at various stages namely dehydrated tender jackfruit - ready to cook, jackfruit chips (mature, unripe), jackfruit leather (mature, ripe) and osmotically dehydrated jackfruit bulb (mature, ripe).

- Developed products were irradiated using different radiation doses i.e. 1, 2 and 5Kgy to increase the shelf life of the products. Standardization of radiation doses are going on based on microbial study on a timely interval.

- For the management of green wastes for economic benefit and women and empowerment, areca palm leaf-based disposable plates and bowls, having a high commercial value, are being prepared. To add new value, modification has been undertaken to enhance design to the plates and become more appealing to the people.
• Development of commercially viable handicraft products from dried water hyacinth stems as abase material was carried out for manufacturing following handicraft products – handbags, hats, napkin holder, fruit basket, pen holder, dining mat, etc. One kilogram of dried water hyacinth stems costing Rs.40.00 and one can earn Rs.2950.00 weekly with a benefit-cost ratio of 1.65 which indicates encouraging viability of the enterprise.

5.66. Agrometeorology

• The probability of occurrence of dry spell is much more in Tinsukia district as compared to other districts of Upper Brahmaputra Valley Zone of Assam.
• Minimum temperature during the ripening stage was found to contribute significantly to predict yield variation in Sali rice with $R^2=0.905^{**}$ under the agro climatic conditions of Jorhat.
• Among the phasic mean meteorological parameters pan evaporation (PANE), Evening Relative Humidity (RHII) during flowering and Mean Relative Humidity (MRH), Minimum Temperature (MINT) during 50% podding were found to contribute significantly to predict the yield variation in green gram.
• Morning Relative Humidity and minimum temperature affected the development of brown leaf spot diseases of kharif rice grown under the agro-climatic conditions of Jorhat.
• If planting of potato is delayed beyond November, all the cultivars i.e. Kufri Jyoti, Kufri Pokhraj and Kufri Himalini are likely to record a drastic reduction of tuber yield.
• Kufri Pokhraj is likely to remain as a viable cultivar under the subtropical conditions of Jorhat under the present climate change scenario.

5.67. Gramin Krishi Mausam Sewa (GKMS)

• Altogether 208 numbers of Agromet Advisory Bulletin (Assamese & English) were disseminated through the website, mKisan messaging, radio, print media, KVKs, ADOs, WhatsApp group covering 32,434 numbers of farmers.
• An awareness camp on GKMS and benefits of Agromet Advisory Services in agricultural crop production was organized at Thengal Gaon, of Golaghat district on 2nd August, 2018.

5.68. Forecasting Agricultural Output using Space, Agrometeorology and Land-based observations (FASAL)

• Issued jute yield forecast at F1 (vegetative) stage for nine districts of Assam on 27th June, 2018.
• Issued yield forecast of rice crop at F1 (vegetative) stage for 27 districts of Assam on 18th August, 2018.
• Issued rice yield forecast at the F2 (mid-season) stage for 27 districts of Assam on 25th September, 2018.
• Collected various agronomic parameters and yield data of kharif rice from farmers’ field at Dhekiajuli village under Titabor block of Jorhat, Assam as per requirements of the DSSAT model.

5.69. Real-time contingency planning (RTCP)

• During 2018, the monsoon was delayed by 7 days (11.06.2018) and pre-monsoon rainfall which was harvested in the farm ponds of the village was used for raising nursery beds for sowing Salirice (particularly long-duration cultivars) during 1st week of June to facilitate timely transplanting. Water harvested in the ponds was lifted with WLPs of the custom hiring centre of the NICRA village.
• A dry spell of 21 days (14th October to 3rd November, 2018) affected the vegetative growth of potato and toria under upland condition. One supplemental life-saving irrigation of (1 cm) depth has been given with the help of water lifting pump in the early vegetative stage of potato.
• As real-time response farmers were advised to irrigate (2cm depth) the crop by harvested rainwater in the farm ponds using water lifting pump of Custom hiring centre established in the NICRA village Chamua benefiting 10 farmers of 5 villages.
• Moreover, locally available organic mulching material like rice straw, straw of rapeseed, water hyacinth etc. are used in turmeric, ginger and colocasia to reduce the effect of intermittent dry spells in both Kharif (mid-season as well as
terminal) and Rabi seasons recording 26% increase in yield.

5.70. Antibacterial toxin production
- *Serratia marcescens* D1, a gram-negative bacterium was found to be associated and detected inside the hyphae of *Mucor irregularis* and transcriptome analysis of *M. irregularis* also suggested the occurrence of molecular changes at the transcriptional level during *Serratia-Mucor* interaction, many of which are related to metabolic activities and membrane functions. Prodigiosin, a red coloured pigment isolated from *S. marcescens* D1 showed potent antibacterial activity against Gram-positive bacteria. Prodigiosin also showed growth retardation activity against fungal pathogens.

5.71. Mucilage extraction from Dellinia
- Qualitative screening of the calyx and mucilage extracts of *Dillenia indica* revealed the presence of terpenoids, sterols, carbohydrates, flavonoids, tannins, phenols and glycosides. The calyx extract contains high amount of total soluble sugar (7.415 g/100g), reducing sugar (0.016 g/100g), soluble protein (3.682 g/100g), crude protein (0.481%), crude fibre (5%), ash (0.847%), total phenols (0.740 g/100g), flavanols (0.434 g/100g) and tannins (1.87 g/100g), while the mucilage extract contains high amount of crude protein (1.487%), ash (2.167 %), total phenol (0.833 g/100g) and flavanols (1.373 g/100g) and less amount of total soluble sugar (1.490 g/100g), reducing sugar (0.011 g/100g) and soluble protein (0.813 g/100g) with respect to those of calyx extract. Isolation and characterization of mucilage powder from *D. indica* have been done and the creation of vitamin E loaded microbeads helped us in concluding that mucilage powder of *D. indica* can prove to be a good natural polymer which in turn can help in the development of pharmaceutical excipients in drug delivery.

5.72. Extension and Communication Management
- Completed situation analysis of 100 women and 100 men on knowledge and use of ICT in agriculture and allied sectors in terms of availability, accessibility and ownership.
- Although nearly 32% rural women respondents owned mobile phones without internet, 25% used their family members and the use of common computer/laptop was very low (5%), none of the rural men and women had attended any kind of training related to mobile, computer or internet use.
- Main problems were technical illiteracy on the use of ICTs (94.00%), high cost of ICT services (93%), Kiosks/Internet Cafe are far away (100%). Pre knowledge test on enhanced use of selected ICT application has been conducted for 60 farm women who are members of FWKG and results revealed that 80% know to remove or insert battery, 73.3% respondents know to make calls, 61.6% women had knowledge on the use mobile phones, 56.6% know to open or receive SMS, 33.3% know to send SMS, 31.6% know to save contact.
Assessment of present level of awareness and knowledge regarding climate change revealed more than 93% were fully aware of the increase in temperature, (62.5%) about the changes in water level and 60% change in the length of season, etc.

Regarding the adoption of situation-specific coping strategies, none of the respondents had adopted any strategy due to a lack of awareness and low-level knowledge.

5.73. Family Resource Management

- For uprooting and transplanting in the paddy production system, no technology was used by the farm women.
- For harvesting (cutting and cleaning) and loading in paddy production system farm women used conventional technologies namely- Sickle, traditional winnower (Kula) and bamboo basket.
- Duration/time in the paddy production system is analyzed and it was found that in uprooting, transplanting and harvesting (cutting) activities workload is more as per time spent.
- Postures used in the paddy production system are analyzed and it was observed that many awkward postures namely: standing-bending and twisting are used while performing transplanting, harvesting and loading activities of paddy production system which is exclusively done by farm women.
- Drudgery experience in the paddy production system is analyzed and farm women reported that in uprooting, transplanting, harvesting and storage of production activities in the paddy production system as very demanding, exhausted and very painful activities.
- An ergonomically designed bamboo ladle for parboiling of rice was developed for reducing the drudgery of farm women during the parboiling activity.
- Workplace Ergonomics risk assessment (WERA) has been done according to different subtasks of weaving and the risk level of the tasks performed found to be 'moderate' in weaving and developed ergonomically designed “Plank” for fly shuttle weaver. Grip strength of both the hand was measured with Grip Dynamometer during the operation. Grip strength of the right hand is found to be high while performing the tasks (namely, weaving).
5.74. Food and Nutrition

- A low glycemic index multigrain mix was developed using different rice varieties with functional properties, foxtail millet, pulses, vegetables and spices.

- Using the low glycemic index multigrain mix, two traditional breakfast foods and one food for lunch and dinner were selected and modified. A high fibre multigrain mix I from locally available cereals, millets, pulses and other functional food ingredients for management of overnutrition was developed.

5.75. Human Development and Family Studies

- While assessing Reproductive Health Care in Agrarian families, it was found that majority of the respondents (69.85%) belong to the lower middle class followed by the upper middle class (17.54%). None of the respondents belongs to the upper high and very poor category.

- Results in the area of maternal and child health revealed that the majority (83.69%) of respondents have good level of knowledge. Though the majority of them are found to be in the level of a good category of knowledge, it has been observed that they lack in practising their knowledge in most of the areas.

- It has been found that majorities (76.92%) of the respondents have a good level of knowledge on reproductive health and remaining respondents (23.08%) have an average level of knowledge in the same area.

- While assessing the wellbeing of the respondents it has been found that most of the respondents fall under the average category in all the five aspects of wellbeing. Only 1.54% and 18.15% of respondents fall under the categories of a very good and good level of physical health.

5.76. Textile and Apparel Design:

- The underutilized (Cotton rose) fibres can be dyed successfully in both natural and synthetic dyes with good to fair colorfastness property. The spin ability of the cotton rose fibre is found to be good by blending with jute fibre. The yarn blended with ratio 50:50 (Cotton rose: Jute) has higher strength than the yarn with ratio 30:70 (Cotton rose: Jute).

- Woven fabric with cotton rose: jute 50:50 has good physical properties in terms of thickness, tearing strength, count and GSM. Non-woven fabrics were made by cotton rose fibre blending with jute fibre at the ratios 50:50 and 30:70.

- Green extracts of Kharpaat (Cassia alata L.) and Tulsi (Ocimum basilicum) were found to have a considerable zone of inhibition for microbial growth against Staphylococcus aureus (gram+ve) and Proteus vulgaris (gram –ve) respectively and can be utilized through Direct method and Pad-dry-cure method.

- Diversified products like area rugs, runner, cushion cover, tapestry, placemat, shoulder bag, etc. were prepared with developed designs through weaving with dobby attachment.
(III) Veterinary Science

During the report period, i.e., from 01 April 2018 to 31 March 2019, 59 externally funded projects were in operation. Out of these, 24 new projects were implemented in 2018-19. Five projects were completed during the period. The Directorate is also acting as a nodal centre for TSP and SC/SP programs.

The list of ongoing projects is furnished as per the format in Annexure VI.

5.77. Breed Registration:

The two indigenous breeds of livestock were registered during the report period. They are:

<table>
<thead>
<tr>
<th>SL. No.</th>
<th>Species</th>
<th>Registered Name</th>
<th>Accession Number</th>
<th>Name of Scientist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Swamp Buffaloes</td>
<td>LUIT</td>
<td>INDIA_BUFFALO_0212_LUIT_01014 Ceremony for distribution of certificate was held on 12th December, 2018, at New Delhi.</td>
<td>Dr. Gopal Ch. Das</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dr. G. Zaman</td>
</tr>
<tr>
<td>2</td>
<td>Local goat</td>
<td>ASSAM HILL</td>
<td>INDIA_GOAT_0213_ASSAMHILL_06031 Ceremony for distribution of certificate was held on 12th December, 2018 at New Delhi.</td>
<td>Dr. Naba Nahar Deka</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dr. A. Saleque</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dr. G. Zaman</td>
</tr>
</tbody>
</table>

A brief description of each breed is furnished:

**LUIT**

*Breed Registration Accession No. INDIA_BUFFALO_0212_LUIT_01014*

Luit is swamp buffaloes having 48 diploid (2N) no. of chromosomes and distributed in upper Brahmaputra valley of Assam. Luit is a medium-sized black coloured buffalo with a compact body and strong built. The forehead is broad with conical face and wide muzzle. Eyes are prominent. Horns are broad at the base, curved upward forming a semi-circle and taper to a narrow tip. Light white stocking up to the knee are present in both fore and hind legs. The tail is short reaching up to the hocks. The udder is bowl-shaped and small in size. Lactation milk yield ranges from 385 to 505 kg. Bullocks are excellent draft animals for carting and ploughing especially in muddy fields for paddy cultivation.
5.78. Some significant achievements of ongoing projects are furnished below:

5.78.1. ICAR-AICRP on Pig:

- The herd strength at the beginning of the year and at the end of the year under report was 324 and 90 respectively irrespective of sex and age of HD-K75 (75% H) genetic group under ICAR – AICRP on Pig.

- A total of 509 (279+230) piglets were obtained from 2nd and 3rd furrowing during the year under report. The age at first furrowing (days), litter size at birth, litter weight at birth (kg), litter size at weaning and litter weight at weaning (kg) were recorded as 349.23  1.25 days, 8.17  0.58, 8.51  0.52, 7.99  0.51 and 78.97  0.33 respectively of HD- K75 (75% H) genetic group under ICAR – AICRP on Pig.

- The average body weight at birth, weaning weight (6 weeks) and body weight at 5 months of age were found to be 1.05  0.12, 9.94  0.83 and 41.37  0.75 kg respectively. The average daily body weight gain (g /day) during the pre-weaning period was found to be 211.81 g.

- The mortality percentages during pre-weaning and post-weaning period were recorded as 2.94 and 3.78, respectively.

- A total of 389 (221+168) piglets of different ages were sold to the different government organizations like State A.H &Vety. Department, Govt. of Assam, Sikkim, KVKs of the AAU, ICAR NRC on Pig, ICAR NBAGR, Karnal, M/S Mothanga Agro Producers Pvt. Ltd etc. as parent stock of the different projects. 51 beneficiaries were also benefited from the piglets (HD-K75) of AICRP on Pig.

- The Artificial insemination programme in Pig is practiced in collaboration with the Department of ARGO, C.V.Sc., Khanapara (funded by DBT) in the project as well as in the field.

- The bio-gas project under ICAR- AICRP on Pig, CVSc, Khanapara was inaugurated on 3rd April, 2018 by the Hon’ble Vice-chancellor of AAU in presence of Dr. Bhabesh Goswami, Vice-chancellor, Cotton State University. The NISURGUNA Bio-Gas plant manufactured by Global Scientific Inco., Nagpur, Maharashtra with the help of the technology of BARC, Mumbai installed at the premises of ICAR-AICRP on Pig, AAU, Khanapara, Guwahati. The bio-gas plant on the recycling of pig dung has been established for the first time in India. The fecal materials of the two projects and kitchen waste of the hostels are collected daily and being utilized as fuel for cooking for the staff and farm use. The manure produced from the plant is being utilized in fodder cultivation of the Instructional Livestock Cattle Farm, flower gardens of different establishments of the AAU, Khanapara campus. Proper scientific disposal of the farm waste materials, i.e. pig dung has been successfully carried out to create an eco-friendly environment in the campus. This has

<table>
<thead>
<tr>
<th>ASSAM HILL</th>
<th>Breed Registration Accession No.</th>
<th>INDIA_GOAT_0213_ASSAMHILL_06031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam Hill goats are mostly white with occasional black patches on backline and legs. These goats are short-legged with small body size. Both bucks and does are bearded and have short cylindrical horns which are directed upwards and outward. Ears are medium in size, horizontally placed with pointed tips. This is an important meat-type animal with high prolificacy. THESE GOATS ARE REARED MAINLY FOR MEAT. Adult body weight ranges from 15 to 26 kg. Age at first kidding ranges from 337 to 447 days. Average kidding size is 1.6.</td>
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</tr>
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</table>

Figure 5.79. ASSAM HILL goat breed
minimized the foul odor, flies and other germs.

5.78.2. ICAR-Mega Seed Production (MSP)

- The herd strength under ICAR- Mega Seed Project on Pig was 492 and 373 at the beginning and at the end of the year respectively, irrespective of age, sex and genetic group (50% H & HD-K75).
- A total of 979 piglets were obtained from 125 furrowings.
- A total of 1051 weaned piglets were sold to the farmers, Government organization like State A.H & Vety. Department, Govt. of Assam, Sikkim, KVKs of the AAU, ICAR NRC on Pig, ICAR-NBAGR, Karnal, M/S Mothanga Agro Producers Pvt. Ltd. etc. as parent stock of the different projects.
- The Artificial insemination programme in Pig is regularly practiced in collaboration with the Department of ARGO, C.V.Sc., Khanapara (funded by DBT) in the project as well as in the field.
- Farmers of different organizations like the states of Nagaland, Arunachal, Meghalaya and Assam visited the Mega Seed Project as exposure visit.

Figure 5.80. HD-K 75 Boar

Figure 5.81. Training programme at the institute

Figure 5.82. A. H &Vety. Deptt. Govt. of Assam has purchased piglets as parent stock for pig breeding farm, Morigaon

Figure 5.83. HD-K 75 Sow with piglets

Figure 5.84. Training programme in the field

Figure 5.85. Hands on Demonstration
5.78.3. AICRP on Nutritional and Physiological Approaches for Enhancing Reproductive Performance in Animal

- The levels of serum cytokines *i.e.* IL-6 and IL-10 and acute phase proteins *i.e.* SAA and HP were significantly lower in endometritic crossbred cows with supplementation of nutrients. The relative gene expressions of IL-6 and IL-10 were also comparatively lower in supplemented cows.
- Administration of antiluteolytic drug (Meloxicam) on day 16 and 17 post AI resulted in higher conception rate in non-infectious repeat breeder crossbred cows.
- Double synch oestrus synchronization protocol was found to be efficacious in inducing fertile oestrus in crossbred and indigenous cows of Assam.
- Supplementation of nutrients in feed for a period of two months substantially improved the quality of frozen goat semen.
- A total of 30720 nos. of hatching egg and day-old-chick of Kamrupa have been supplied to the rural farmers of Assam and NE region.
- The indigenous flock was regenerated and replacement stock for all the stock was procured in desired population strength and their performance was studied.
- Procured different equipment for different units of AICRP on Poultry Breeding.
- Renovated Poultry house no.2 under infrastructure development work.
- Conducted TSP work in BTAD where all inputs have been given free to 125 TSP beneficiaries and monitoring is going on.
- Conducted four poultry trainings in different locations of Assam as a mark of golden jubilee celebration of AAU with AICRP on Poultry Breeding fund.

5.78.4. AICRP on Poultry Breeding:

- The new variety of dual-purpose chicken “KAMRUPA” which was developed in AICRP in Poultry Breeding and was released on 11th February, 2015 is performing well both in farm and field conditions.
- The average mortality rate in the field units has
During the period 2018-19, a total of 704 does gave birth to 1136 kids with a population growth of 100.89 % in the adopted field units.

Percentage of single and multiple births for the reporting period have been recorded to be 46.59 and 53.41, respectively.

During this period 809 goats were sold by the beneficiaries with a total income of Rs. 14,52,225.

Milk yield was recorded in 236 does where the 30, 60 and 90 days milk yield were found to be 3.89±0.21, 7.13±0.38 and 11.93±0.83 kg. The total lactation yield was recorded as 12.98 ± 14.20 kg for the average lactation length of 72.32 ±1.70 days with an average yield of 129.67 gms per day.

The body-weight of the goats at birth, 3, 6, 9 and 12 months of age during the reporting period was recorded to be 1.22±0.11, 5.31±0.03, 8.05±0.06, 10.79±0.08 and 13.95 ±0.80 kg, respectively.

The age at first mating (days), weight at first mating (kg), age at first kidding (days), weight at first kidding (kg), first kidding interval (days), service period (days), and gestational period (days) in Assam hill goats were recorded as 253.76± 8.01, 11.01±0.09, 401.09±0.11, 14.96±0.12, 223.93± 7.34, 79.34±8.16 and 147.56±0.91, respectively.

A total of 37 new beneficiaries and 311 new goats have been registered under the project for the reporting period.

The average family income from goatery has been recorded as Rs. 4,685 per household for the year 2018-19.

Twelve awareness cum training camps have been organized in the field units as well as headquarter, i.e., Goat Research Station, Assam Agricultural University, Burnihat, Assam for augmenting the knowledge on goat rearing.

A total of 15 beneficiaries, three from each field unit, were taken to Central Institute for Research on Goats (CIRG), Makhdoom as a part of exposure visit. Another visit was organized for 62 numbers of farmers from Tetelia field unit under district Kamrup (M) to Sheep and Goat Breeding Farm, Silonijan to give them an exposure to scientific rearing and management of goats.

To motivate and encourage the farmers for proper scientific farming of goat, a goat rally and judging was organized at Digholbari under Morigaon district.

Twenty-nine vaccination camps to immunize 12083 animals, 31 deworming camps to deworm 5351 animals and 33 treatment camps to treat 5297 animals were organised during the reporting period.

Awareness, training cum vaccination programme was organized by the project on 13th and 14th March, 2019 in Baksa district under TSP. A total of 287 farmers participated in the awareness cum training programme where an exhibition was also organized. A total of 921 animals were vaccinated against goat pox.

To introduce fresh blood into the goat population of field units of the project, a total of 16 elite bucks have been distributed. Moreover, the exchange of the other 11 bucks among the field units has also been carried out to avoid inbreeding.
Sub Project 1: Isolation of bioactive peptides having iron-binding and anti-hypertensive activities from slaughterhouse blood for possible pharmaceutical/nutraceutical applications.

Salient achievements:
- The hydrolysis of porcine plasma by different protease preparations resulted in the generation of hydrolysate with varying degrees of iron-binding and anti-hypertensive activity.
- Hydrolysate with a high yield of soluble peptides was obtained by using flavourzyme and fungal protease.
- Hydrolysate generated after 6 hours of hydrolysis with flavourzyme was found to have a good iron-binding ability as compared to that of fractions generated by hydrolysis with alcalase or thermodysin.
- Hydrolysate generated after 5 hours of hydrolysis with alcalase yield bioactive peptides with high hypertensive activity as compared to fungal protease and trypsin.
- The fractions containing peptides with molecular wt less than 3 KD showed superior iron-binding ability and anti-hypertensive activity as compared to the fraction with high molecular weight peptides in all the preparations.
- The peptides generated have the potential to be used in iron preparations in pharmaceutical industries or as nutraceuticals in iron-enriched product.

Sub Project 2: Development of a Low-Cost Liquid Smoke Production Plant

Salient achievements:
- Fabrication
- Liquid smoke has been generated @ 150 ml/hr.
- Cost of Fabrication of Liquid Smoke Production Plant is Rs. 16,100 (Rupees Sixteen Thousand One Hundred) only.
- The cost of production of 1 litre of liquid smoke was Rs. 500.00 which is very low in comparison to the commercially available liquid smoke cost of Rs. 2500.00/litre.
Sub Project 3. Harnessing solar energy for production of solar dried pork product

Salient achievements:
- A 15 kg capacity tray type solar dryer with 3 hours solar powered battery back up has been designed and fabricated for drying of meat and preparation of different solar-dried meat products.
- Solar dryer fabricated can be effectively used for the production of solar-dried pork products.
- Pork balls and spent hen meat powder were prepared in the fabricated solar drier by sun drying for a period of 36 – 40 hrs.
- Sensory evaluation of the dried products under solar dryer reveals higher overall acceptability.
- The prepared products can be stored up to 6 months without deterioration in its quality parameters.

Sub Project 4. Harnessing Utilization of slaughterhouse by-products for production of high value cheaper pet (Dog Loaf) food and Pet Treat

Salient achievements:
- Three different combinations of dog loaf were prepared by using by-product concentration of 40%, 50% and 60% poultry by-product and other non-meat ingredients.
- The dog loaf with 60% By-products was found to be nutritionally rich with higher crude protein and fat content.
- The shelf life of the products is found to be safe up to 7 days in aerobic packaging and 14 days in vacuum packaging at refrigerated temperature.
- The products were offered to dogs for sensory tests and found to be highly acceptable.
- The cost of production of 1 kg of dog loaf (60% by-product) was Rs. 64.00/Kg.
- Pet treats were prepared by a slight modification of the technology adopted by the Chennai centre of the AICRP on PHET. The CP and EE contents of the final product were 42% and 17%, respectively. They can be stored for up to a period of 6 months. The cost of the production of pet treat was Rs. 220.00/Kg.

Sub Project 5. Development of a Foot Pedal Operated Meat Mincer

Salient achievements:
- A market survey for identification of potential fabricator for the fabrication of instrument was conducted.
- The machine has been approved for fabrication by M/S. Bajrang Fabrication located at VIP Road, Six-mile, Guwahati.
- Fabrication of the instrument is in progress and will be completed in a period of 1 month.
Sub Project 6. Development of a Poultry Processing Cum By-Product Collection Unit for Butchers

Salient achievements:
- A market survey on the identification of potential fabricators for the fabrication of instrument was conducted.
- The machine has been approved for fabrication by M/S. Bajrang Fabrication located at VIP Road, Six-mile, Guwahati.
- Fabrication of the instrument is in progress and will be completed in a period of 2 months.

Sub Project 7. Development of an eco-friendly packaging material using banana leaves for packaging and hauling of meat and meat products

Salient achievements:
- Preliminary work for the development of a packaging material using banana leaves is in progress.

Sub Project 8. Utilization of poultry feather for upholstery and extraction of keratin protein hydrolysate for effective utilization

Salient achievements:
- Preliminary work for the utilization of feather for the development of upholstery products is in progress.

Sub Project 9. Mobile pork cutting, display cum selling table to extend the shelf-life and quality of fresh pork in open regular market.

Salient achievements:
- A market survey on the identification of potential fabricator for fabrication of instrument was
conducted.

- The machine has been approved for fabrication by M/S. Bajrang Fabrication located at VIP Road, Six-mile, Guwahati-22.

![Figure 5.102. Proposed model of mobile pork cutting cum sale and display unit](attachment:Figure5.102.png)

5.78.5. DBT project: Capacity building and awareness generation for enhanced productivity of pig through assisted reproductive biotechnology in North Eastern region through community participation.

- Total of 4 workshops conducted in Baksa, Goalpara, Udalguri District and Khanapara with the participation of 53 Veterinary Officers.
- A total of 18 Hampshire crossbred boars of 7-8 months of age were trained at ICAR-AICRP on Pig, AAU, Khanapara for semen collection.
- Semen collection by Simple Fist technique & Preservation was successfully done by using TRIXcell + commercial extender from IMV & Modena extender (1:4) at 15°C (BOD Incubator).
- Artificial Insemination was done in 812 saw out of which 769 saw furrowed with a maximum litter size of 16 piglets.

5.78.6. DBT Twinning Project: Conservation of indigenous pig of Assam through Handmade Cloning Technique.

- Pig somatic cell isolation, culture, characterization, quality evaluation and their preservation are standardized/established.
- *In vitro* maturation of pig oocytes for cloning is standardized.
- Successfully established the protocol for pig cloned embryos production.

5.78.7. DBT Twinning Project: Enhancing pig productivity by optimizing bio-molecular expression through nutritional intervention in the existing system of pig farming.

**Location: LCVsc, Joyhing, North Lakhimpur**

- Comparative study of Temperature Humidity Index in the area of study revealed an average increase of THI during the last six years in the study area from 2012 to 2018. The trend of increasing THI during the different hours of a day indicates the stress level that may impact severely on piggery production in the study area.
- The pigs reared in semi-intensive system in the study area are deficit in Dry Matter (DM), Crude Protein (CP) and Metabolizable Energy (ME) in different growth periods. The deficiency of CP and ME is the major cause of poor growth (2.48 kg/month; Table 6) and delayed puberty (16.27 months; Table 6) of pigs in the study area. Inclement weather (seven months in a year; Table 1) along with nutritional deficiency further aggravated the economic return to the farmers from pig farming in the area of study.
- The expression of biomolecules related to reproduction shows a significant (P<0.01) difference between the two seasons of the year. However, the level of Kisspeptin (ng/ml) and FSH βreceptor (mIU/ml) in the serum of the experimental animals was found to be insufficient to initiate puberty. Because optimum serum concentration of kisspeptin is important in prepubertal gilt to stimulate secretion of FSH, Estrogen for the attainment of puberty followed by ovulation and secretion of Progesterone from corpus luteum. This insufficient serum concentration might be due to nutritional as well as environmental stress.
- The expression of HSP70 increases at THI (81) than THI 78 (figure 4). Both the THI is above the comfort zone (THI 65-72). The higher temperature/THI further enhances the stress level. It showed the existing piggery farming in the study area is already under nutritional stress but the higher temperature might enhance the stress level. The decrease level of IGF1 gene copies at THI 81 than THI 78 is further indicating the hindrances of
growth under stress which resulted in decreased growth rate, prone to disease, and economic loss under heat stress.

5.78.8. DBT twinning project: Regulation of Corpus Luteum Function by Locally Produced Angiogenic Growth Factors in Pigs (SusScrofa)

- According to their gross morphology, ovaries obtained within 1 h of the slaughter at a local abattoir were assigned to functional stages of the oestrous cycle by examining them for corpora haemorrhagica, corpora lutea, corpora albicains and developing follicles, and their relative numbers, sizes, colours, consistencies and degree of blood supply. The luteal phases were each subdivided into early (EL), mid (ML), late (LL) and regressed stages (R) (n=6 for each stage). Follicular fluid aspirated from pre-ovulatory follicles (PF) (n=6) was stored at -20°C for P4 estimation. Granulosa cells were pelleted by centrifuging.
- Luteal tissues were dissected from the rest ovarian tissue and samples for RNA-Seq were preserved in RNA later solution. Tissue samples from each luteal stage and granulosa cells from PFs were outsourced for RNA Sequencing.
- The remaining luteal tissues were snap frozen and triturated using liquid nitrogen. Total RNA was isolated by Trizol method and its quality, quantity and integrity were verified by agarose gel electrophoresis and spectrophotometric readings.
- Total RNA from different samples were reverse transcribed into cDNA.
- Porcine specific primers for VEGF system, FGF system and IGF system were designed using FAST PCR (Version 6.2.73) software and were optimized with the cDNA prepared.
- qRT-PCR analysis was performed to determine the expression pattern for angiogenic factor VEGF and its receptor KDR during different developmental stages of porcine corpus luteum. GAPDH was used as a house-keeping/reference gene. The pre-ovulatory follicles were used as a calibrator/control. Relative expression was calculated by Pfaffl method and the data was analyzed by using SPSS Version 16. Differences were considered significant if p<0.05.
- Analysis of VEGF and its receptor KDR by qRT-PCR showed that they were expressed at all developmental stages of corpus luteum, however, their abundance varied through the stages. The relative mRNA expression of VEGF and its receptor KDR was highest during the early (EL) and mid-luteal (ML) phase and decreased (p<0.05) steadily during late-luteal (LL) to reach the lowest level during theregressed luteal stage.

5.78.9. DBT Twinning: Biotechnological interventions to augment productive performance of pigs on horticultural byproduct based diet.

- Availability of horticultural byproducts in two hill districts e.g East Karbi Anglong and West Karbi Anglong and two plain districts e.g, Sonitpur and Nagaon have been calculated out.
- Nutritional status of Pigs have been studied. It revealed that the animals did not receive the required amounts of nutrients. The nutrient deficit tuned to about 30%.
- Chemical analysis of feed, fed to the animals were carried out.
- Rations have been prepared incorporating the horticultural byproducts at different ratios for conducting feeding trials.

5.78.10. DBT twinning project: Characterization of Kisspeptin and Kiss1 gene during reproductive cyclicity and pregnancy in Assam local and crossbred cows.

- Exogenous Kisspeptin-10 (Metastin 45-54) @ 1.3 µg/Kg body weight was administered intravenously on the day of estrus to the selected Assam local cows.
- Follicular dynamics & blood flow was studied (7.5MHz transducer).
- Antral follicles measuring 1.00±0.03 cm in diameter per pair of ovaries were determined and counted.
- The flow of blood to the follicle increased gradually as it grew up and became the highest on the day of ovulation.
- Blood supply to the growing corpus luteum (CL) increased till the day it obtained the maximum size...
and decreased gradually thereafter and became the lowest till disappeared.

- Plasma Progesterone is found basal level at estrus and reached peak at Day 11 and falls rapidly 5 Days before estrus in Assam Local Cows.

- LH peak observed at around 3 hours and reach the basal level at around 6 hours of post-treatment with exogenous Kisspeptin-10.

- For Assam Local Cows the Kiss1 and Kiss1R genes were gradually increases and found to be higher on the 3rd day of estrous cycle. It gradually decreases from day 5 and becomes negligible on day 13th of the estrous cycle and it was found to have corresponded to the plasma kisspeptin concentrations. The transcript encoding KiSS1R maintains its blood concentration level from 5th day to 15th day of estrous cycle. Both the transcripts encoding Kiss1 and Kiss1R genes were increased gradually from day 17 and were found to be higher two days before the beginning of the next estrous cycle.

- These two genes have expressed more abundantly during proestrus and estrus stages than any other phases of estrous cycle.
Day 19
Day 15
Day 17

Day 0 (Ovulation)
Day 17

Figure 5.103. Representative images of follicular growth and blood supply to the dominant follicle during different days of estrous cycle of Assam local cows as captured through CFM of ultrasonography

Figure 5.104. Sizes of antral follicle in Assam local cows at estrous (1.00±0.03 cm)

5.78.11. DBT twinning project: Isolation, characterization and development of Culture Method for long-term preservation of Spermatogonial Stem Cells from Doom Pig

- Stem Cell laboratory was established.
- Conditions for in vitro culture of Spermatogonial stem cell like cells from Doom pig and their immunofluorescence analysis has been standardized and cultured cells were cryo preserved.
- Thawing of the cryo preserved cell was successful and grew well on in vitro culture condition.

5.78.12. ICAR project: National Fund: Aflatoxin tolerant duck production through genetic and epigenetic approaches

- Pati duck farm is established.
- Aflatoxin challenged Pati ducks are raised in the farm.
- Successfully established the artificial hatching of Pati ducks chicks.

HEALTH SECTOR

5.78.13. DBT-NER Centre for Advanced Animal Disease Diagnosis and Management Consortium (ADMaC)

Salient Findings:
During the first four years, the project has significantly contributed in animal disease diagnosis and disease management services. Some of the achievements made by this project are as follows:

Development of disease diagnosis network:
In order to develop core competency in disease diagnosis, modernization of lab facilities, training of man powers, creation of diagnostic reagents and kits in core as well as field laboratories were done. A website (www.neradslab.res.in) is created for sharing disease diagnosis protocols, contact network and providing information on the outbreak of any animal diseases in any part of the region.

Figure 5.105. Disease diagnosis network in CVSc, AAU
Development of Technologies: All the three core laboratories and National laboratories have developed genomic and antibody-based various cost-effective diagnostic facilities for diagnosis of existing and exotic diseases of livestock and poultry as well as wild animals. In order to bring uniformity of the diagnostic test results, Standard Diagnostic Protocols (SDP) are developed as per OIE guidelines, validated and uploaded in the official website of the project (www.neradslab.res.in).

Considering the need of the farmers, the project developed PK15 cell line adopted CSF vaccine and cell culture adopted duck plague vaccine on trial basis. At present, four more vaccines, viz., RK-13 adapted CSF vaccine; vaccines for swine pasteurellosis, Goatpox and Orf are in the pipe-line and are expected for experimental trial within a period of six months.

Outcome of the project: For the first time, attempts were made to create an authentic disease database of livestock and poultry of NER using meta analysis technique. Disease maps of important infectious and parasitic diseases of animals and birds were also created based on GPS location to depict real-time in-situ disease outbreaks. Creation of Risk map of important diseases of the north-east region of India helped in the prediction of the disease outbreak. Another important outcome of this network project is cataloging of various microbial isolates including new pathogens discovered from livestock, birds and wild fauna of NER India. Through this project, the scientific literature including one book, 5 laboratory manuals, 16 leaflets and 32 research articles in high impact journals are published.

Societal impact: The project created a link with the livestock farmers for a permanent societal impact. As a result, farmers are in constant contact with requests for vaccines, diagnosis of the diseases of their domestic birds or animals. The majority of the Government organizations, viz., State forest departments, state AHV departments are in touch with the ADMaC consortium. A glaring example is the recent death of a large number of foxes in the state zoo of Guwahati where death due to Canine Distemper virus infection was first confirmed by ADMaC laboratories. Many Krishi Vigyan Kendras are now utilizing the services of ADMaC project in their program of “doubling the farmers’ income” scheme.

The ADMaC project has organized much vaccination cum health camps in collaboration with state A.H. and Veterinary Departments to create awareness among farmers about early diagnosis of the diseases of livestock and poultry. The mobile App named “ADMaC” was developed to provide first-hand information on clinical and gross changes of important infectious diseases of livestock and poultry. The ADMaC project renders research support to post-graduate scholars to carry out their research program.

Identification of re-emerging, exotic and new pathogens:

Staphylococcus hycus was identified as re-emerging pathogen from Pig, Salmonella miami, S. hiddudify, S. infantis, from Pig, E. marmatae, E. fergusonni from Mithun, Ralstonia pickettii from Elephant and Ralstonia pickettii from Rhinoceros was identified as new pathogens, Porcine Reproductive and Respiratory Syndrome Virus, Porcine Circo Virus2, Torque Teno Sus Virus, were recognized as exotic virus from pigs. Swine Influenza Virus, Swine Pox Virus, Blue Tongue Virus, Peste des petits Ruminants, Goat Pox from Goat, Infectious Bovine Rhinotraceitis Virus Bovine Viral Diarrhoea Virus from Bovine Duck pox incidence, IBH- HPS Infectious Laryngotraceitis Virus, from Duck Elephant Endotheliotropic Herpes Virus from Elephant were recognized as emerging virus. Theileria, Anaplasma, Trypanosoma from Cattle were identified as emerging parasite.
5.78.14. ICAR-AICRP project:
Epidemiological Studies on Foot and Mouth Disease.

Salient Research Findings
- Foot-and-Mouth disease virus type 'O' was recorded to be predominant serotype involving in all the outbreaks reported during 2018-19.
- Standardization of mRT-PCR for serotyping of FMD virus.
- Standardization of real-time PCR for detection of cytokine level in persistently infected cattle.

5.78.15. OUTREACH PROGRAMME ON ZOONOTIC DISEASES

Tuberculosis
- A total of 450 cattle were examined in different abattoirs of Assam and Nagaland for diagnosis of tuberculous lesions and out of which carcasses 28 (6.22 %) was found ZN stain positive.
- Out of 110 dairy cows in and around Guwahati city, Assam, 12 SICTT positive reactors (10.90%) were recorded. In Ri-bhoi district of Meghalaya, out of 50 dairy cows, 1 SICTT positive reactors (2.00%) were recorded. Also, a total of 50 cattle were examined for SICTT and gamma-interferon assay in Kohima (n=20) and Dimapur (n=30) districts of Nagaland. Out of which the prevalence of tuberculosis by SICTT and gamma-interferon assay was recorded as 15% and 10% in Kohima and 6.66% and 3.33% in Dimapur district, respectively.
- In Dimapur, a total of 25 dogs were examined for canine tuberculosis by SIT (three intradermal injections of 0.1 ml of 2TU, 5TU and 10TU of Tuberculin PPD) and IFN-gamma assay. However, all dogs were found negative.

Cysticercosis
- A total of 840 pig carcass were examined for the presence of Cysticercosis in Assam (n=440) and Nagaland (n=400), out of which five pigs were found positive in Assam (1.13%) and seven pigs were found positive in Nagaland (1.75%). The overall prevalence was recorded at 1.43%.
- Sero-prevalence of Cysticercosis in Assam is found to be 2.58% (8/310), and in Nagaland 10% (19/190). The overall sero prevalence was recorded as 5.40.

Though Trichinella was deleted from this center in the last review meeting (2017-18) but a total of 20 pigs (tongue and diaphragm) were examined for Trichinellosis, but no larva was detected by acid-pepsin digestion and results were revalidated with Mumbai Veterinary College.

Awareness camps
- An awareness camp was organized in Adaabarrie Tea Estate of Tezpur district of Assam on 2nd November, 2018 on the topic “Disease that Transmitted from Pig/Pork to Man”. There were at least 60-70 (approx.) participants during the camp and emphasis was given in the life cycle, transmission, clinical manifestation and control & prevention of the disease.
- Another awareness camp has done on 14th March, 2019 in the Cinamara Tea Estate, Jorhat, Assam.
5.78.16. Outreach Programme on “Monitoring of Drug Residues and Environmental Pollutants”

- A total of 720 pork samples comprising of Kidney (244), Liver (239) and Muscle (237) were collected from the local markets of Assam, Nagaland, Manipur and Mizoram.
- 2.63%, 2.22%, 1.52%, and 1.53% samples were found to be positive for oxytetracycline residue in the States of Assam, Nagaland, Manipur and Mizoram, respectively.
- 2.22%, 1.81%, 1.39% and 1.39% samples were found to be positive for ciprofloxacin residue in the States of Assam, Nagaland, Manipur and Mizoram respectively.
- 2.08%, 1.53%, 0.83% and 0.69% samples were found to be positive for fenbendazole residue in the States of Assam, Nagaland, Manipur and Mizoram respectively.
- The maximum level of residue was found in the Kidney followed by Liver and Muscle.
- However, the level of residue detected was below the permissible limit (MRL) so pose no threat to the consumers.

5.78.17. ICAR ALL INDIA NETWORK PROJECT on “Gastrointestinal Parasitism”

- As part of the epidemiological study of gastrointestinal parasitism, a total of 2361 faecal samples were collected from small ruminants (goat and sheep) for 12 months (April, 2018 to March, 2019).
- Of the total, 2027 faecal samples from goat and 334 faecal samples of sheep were examined.
- The breeds of goat included in the study were Assam Hill goat (local and crossbred), Beetal and Sirohi while only local variety of sheep were examined.
- Faecal samples were collected from 21 different districts from 6 climatic zones of Assam viz. Central Brahmaputra valley (Morigaon, Nagaon); Hills Temperate (Karbi Anglong, N.C. Hills); Lower Brahmaputra Valley (Barpeta, Baksa, Chirang, Bongaigaon, Dhubri, Goalpara, Kamrup, Kokrajhar, Nalbari), North Bank Plain (Darrang, Dhemaji, Lakhimpur, Sonitpur, Biswanath Chariali), Upper Brahmaputra Valley (Dibrugarh, Golaghat, Jorhat, Sivasagar). Barak Valley (Cachar, Hailakandi, Karimganj) is yet to be covered.
- In goat, out of 2027 faecal samples examined, 1122 were found to be positive for gastrointestinal parasites (prevalence 55.35%) and the highest prevalence recorded was 75.19% in Goalpara district and lowest 21% in Sivasagar district.
- In sheep, out of 334 samples examined, 123 were found to be positive for gastrointestinal parasites (prevalence 36.82%) and the highest prevalence recorded was 63.51% in Bongaigaon district and lowest 30% in Dhubri district.
- Several species of gastrointestinal parasites were recorded on microscopic examination of faecal samples and culture viz. nematodes *Haemonchus contortus*, *Oesophagostomum* sp., *Strongyloides papillosus*, *Trichostrongylus* sp., *Cooperia* sp., *Trichuris* sp., trematodes as Amphistomes, cestode as *Moniez-iaexpansa* and protozoa as oocysts of coccidia. *H. contortus* was found to be the predominant nematode species.
- *In-vivo* Anthelmintic resistance work against G.I. parasites in sheep and goat is completed along with Primary PCR for detection of Beta Tubulin gene in *H. scontortus*.
- Herbal/plant-based anthelmintic study is continuing in GRS, AAU, Byrnihat to study the phytochemical anthelmintics properties of several effective plants.

![Figure 5.113. Larvae of Strongyle in faecal examination](image)

![Figure 5.114. Eggs of different parasites and oocysts of Coccidia in faecal examination](image)
5.78.18. DBT Project on Molecular Platform for Epidemiology, Disease Mapping and Development of Diagnostics for Economically Important Diseases of Ducks.

- The fecal, blood, tissue samples of ducks were collected from various parts of Assam and following parasites were diagnosed by conventional and molecular method, viz, Coccidia, Trematodes (Echinostoma revolutum, Notocotylus, etc.), Cestodes (Hymenolepis collaris, Raillitina tetragona, Fimbria rium etc.), Nematodes (Ascardia galli, Heterakis gallinarum, Tetra meres).
- Viral Diseases (Duck Plague).
- Bacterial diseases are diagnosed, viz, E. coli and Staphylococcus.
- Cannibalism was also recorded from Morigaon district of Assam.
- Molecular identification of Echinostoma cercariae was done and research works are on progress.

5.78.19. DBT Twinning Project on Epidemiological Studies on Emerging Diseases of Elephants (Elephas maximus) with special reference to Tuberculosis (TB) and Elephant Endotheliotropic Herpes Virus (EEHV)

- The overall prevalence of Elephant Endotheliotropic Herpes Virus (EEHV) in Assam was 4.60%, with (13.64%) in wild orphan elephant calves and (0.69%) in adult elephants.
- The success rate of treatment in wild orphan elephant calves was 100% in comparison to 60-80% of the developed countries.
- Three selected EEHVA1 gene loci representing EEHV Pan Pol./U38 PCR, EEHV1U77/HEL and EEHV1U51/Vg PCR targeted for PCR amplification and the amplified PCR product showed band size of 520, 600 and 930 bp.
- The PCR amplified product with size 600 bp had shown the gene sequence for EEHV1U77/HEL.
- Fungal infection in elephant was treated successfully by local application of Sodium the osulfate and Salicylic acid making a paste with Loraxane anti-septic cream.

5.78.20. DBT Twinning project: An integrated omics approach to characterize circulating Newcastle disease virus and intervention strategies to control Newcastle disease in North East India.

- Standardization of RT-PCR for detection of Newcastle disease virus.
- Reagents required for HA/HI test were developed and standardized.
- A total of 17 Newcastle disease virus were isolated from different district of Assam, 5 Newcastle disease virus isolates from Assam were deposited in VTCC, Hissar.
- Sequenced 11 NDV isolates from Assam.
- One duck origin lentogenic NDV was isolated in embryonated chicken eggs and adapted in DF-1 and vero cell line.

Creation of online repository of biotechnology and bioinformatics resources of north-east India (BABRONE).
- The online database has been designed and
biotechnology and biosciences, a section titled 'Viewpoint' to express views of readers on a specific contentious issue, a section named 'Curiosity' with answers to questions on biosciences received from school students, a separate section for school children in Assamese, news about forthcoming seminars/symposia and other important events at national as well as international levels, a section on contemporary advancements in biology research, a special section on Nobel laureates, biology news, letters to the editor, job news and career opportunities and a biodiversity gallery. A separate section has also been included to highlight the research achievements of promising young researchers of the region.

5.78.17. Study on persistence of Japanese Encephalitis in reservoir host, pig in je endemic area of Odisha, Manipur and Assam

- A total of 400 serum and 55 tonsil tissue samples of pig belonging to different sex and age group were collected from five different Japanese Encephalitis (JE) endemic districts of Assam. Out of this, 15 serum samples (3.75%) were found to be positive in ELISA, RT-PCR and qPCR.
- Except Tinisukia, JE was found to be prevalent in the swine population of the other four districts of Assam (Dhemaji, Lakhimpur, Jorhat and Kamrup).
- Preliminary results of phylogenetic analysis based on amplified gene sequences coding virus envelop protein indicated that the strains prevailing in the four districts are closely related to human strains of JEV earlier reported from the state and the adjoining state, West Bengal.

Figure 5.123. Research area-wise number of publications included in the database.

So far nine issues of the e-zine have been published. The number of visitors to the e-zine is growing rapidly and it has already crossed 28,000. The 10th issue of the e-zine is proposed to be published shortly on the first week of May, 2019. A number of prominent teachers/scientists/students/research scholars of the region have contributed their articles/write-ups for the e-zine.

A total of 5506 numbers of research publications from different fields of life sciences were included in the database.

Figure 5.124. JE-IgG Indirect ELISA showing positives results for JEV antibody

Figure 5.125. Showing 390 bp of PCR amplified E gene of JE Virus
5.78.18. Analysis of Gut metagenome of duck (*Anas platyrhynchos*) with special reference to identification of bacteria having probiotic potential

- A total of 28 faecal samples of pati duck were collected from Jorhat and Lakhimpur district of Assam. Three metagenomic DNA samples extracted from faeces were sent for Next-Generation Sequencing by outsourcing. From 15 faecal samples, potential probiotic bacteria of *Lactobacillus* spp. and *Bifidobacteria* spp. have been isolated.

5.78.19. Development of nanoparticle or micro-particle Adjuvanted subunit oral vaccine against poultry salmonellosis

- Optimization of the culture conditions for the maximum production of outer membrane vesicles from the *Salmonella typhimurium* was successfully completed. The size of outer membrane vesicles was found to range from 900 to 1200 nm. The maximum yield of OMVs based on protein concentration that was obtained was 11.7 grams per liter of media.

- Standardization of method of synthesis of poly-lactide co-glycolide (PLG) microparticles, chitosan nanoparticles and poly(anhydride) nanoparticles. The chitosan nanoparticle, poly(anhydride) nanoparticle and PLG microparticles were found be of size 286 ± 27.65, 247.4 ±14.36 and 3654±914 nm. The zeta potential of chitosan nanoparticle, poly(anhydride) nanoparticle and PLG microparticles were found to be 12.8, be -52.6 and 3.38. The PLG microparticles were found to have less zeta potential indicating the less stability in aqueous solution hence the PLG microparticles adjuvant will be kept in dried form and will be resuspended in PBS just before the immunization.

- The dose of poly-lactide co-glycolidemicro-
particle-OMV, chitosan nanoparticle-OMV and poly(anhydride) nanoparticle-OMV has been optimized in mice and poultry birds through oral route on the basis of humoral immune response.

- The three oral vaccine formulations are ready for immunization and toxicity trials in mice and poultry. The trial is in progress.

### 5.78.20. Development and evaluation of DIVA-based vaccine utilizing an Indian isolate of classical swine fever virus.

- **Maintenance of clean PK-15 cell line:** PK-15 cells were procured from ATCC (#CAT No. -CCL-33) and are maintained in cell culture EMEM. Regular screening of PK-15 cell line, sera was done for opportunistic contamination like BVDV, Circovirus, and mycoplasma. A PCR based protocol as per the guide line of AHVLA, UK is

![Figure 5.130. Confluent monolayer of PK-15](image-url)

- **Molecular characterization of CSFV isolates:** A total of 25 isolates were revived. Molecular characterization of cell culture propagated CSF virus strains was done based on E2 partial, NTR, NS5B, full-length E2 and E™ genes. Phylogenetic analysis of the field strains on the basis of the sequence analysis of the E2 and NS5B genes revealed that field isolates from pygmy hog and wild hog (PH-2016 and WH-AS-2013) belonged to genogroup 1.1, Domestic pig of Assam(DP-AS-2017) belonged to 1.2 genogroup and domestic pig from Tripura and Meghalaya (DP-TR-2017, and DP-MG-2012) belonged to 2.2 genogroup.

- **Optimization of ErnsELISA:** PK-15 cell lysate with expressed Erns protein-coated at a concentration of 10 micrograms detected the antibody. Blocking buffer containing 5% LAH + 2% goat sera could eliminate nonspecific reactions. The Mean OD of positive control was 0.368 and negative control was 0.073. The test will be used for screening of vaccine antibody against Erns deleted VLP and CSFV whole virus in immunized pigs.

- Immune response of DIVA vaccine: Animals vaccinated with Montanide oil adjuvanted Erns deleted DIVA vaccine and cell culture adapted whole virus vaccine were found safe. Post-vaccination antibody response in primary and booster vaccinated animals of both the groups showed high titre upto 60 days of post-primary vaccination.

![Figure 5.131. Immune response of deletion mutants as marker vaccine candidate](image-url)

### 5.78.21. Attempt to develop diagnostic and preventive measure for suspected fish viral diseases encountered in Assam.

- Different places were visited and diseased fish were collected and processed for microbial investigations as follows:

**Viral Diseases**

- The collected fish were preserved at -80°C and sent to Gauhati University for onward dispatch to C. Abdul Hakeem College, Tamil Nadu for the screening of viral agents.

![Figure 5.132. Lesions on body, fin](image-url)
Bacterial and Fungal Diseases

- The collected fish samples were processed and examined for growth on Bacterial and Mycological media. Various morphological analyses and a complete battery of confirmatory tests were conducted.

5.79. Goat Research Station, AAU, Burnihat
5.79.1. Herd strength (GRS, AAU, Burnihat)

<table>
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<tr>
<th>S.No.</th>
<th>Particulars</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Beetal</td>
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</tr>
<tr>
<td></td>
<td>Adult Male</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Adult female</td>
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</tr>
<tr>
<td></td>
<td>Male kids</td>
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</tr>
<tr>
<td></td>
<td>Female kids</td>
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</tr>
<tr>
<td>2.</td>
<td>Sirohi Male</td>
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</tr>
<tr>
<td>3.</td>
<td>Crossbred</td>
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<tr>
<td></td>
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<td>4</td>
</tr>
<tr>
<td></td>
<td>Adult female</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Male kids</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Female kids</td>
<td>7</td>
</tr>
<tr>
<td>4.</td>
<td>Assam Hill Goat</td>
<td></td>
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<tr>
<td></td>
<td>Adult male</td>
<td>14</td>
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<tr>
<td></td>
<td>Adult female</td>
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<tr>
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<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Castrated male</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>191</td>
</tr>
</tbody>
</table>

5.79.2. Frozen Semen Production

Goat Research Station, AAU, Burnihat is the only centre in the entire State of Assam producing frozen goat semen in collaboration with the Department of Animal Reproduction Gynecology and Obstetrics. The facility for producing the frozen goat semen was created through an RKVY project. A brief report is as under:

- In November, 2017, a total of 59 adult Beetal goats true to its breed comprising 30 males and 29 females were procured from Punjab and are being maintained at G.R.S., Burnihat.
- After their adaptation and giving training to the male goats for semen collection 9395 and 829 doses of quality frozen semen having post-thaw motility of > 50% of Beetal and Assam Hill Goat, respectively, were produced and supplied in 2018-19 to Assam Livestock Development Agency (ALDA) for utilization in breeding goats in different districts of Assam. The sale of frozen goat semen earned revenue to the tune of Rs.2,55,600.00 to AAU and has become a self-sustaining revenue-earning proposition.
- The procurement of need-based equipment/appliances was made for processing and freezing of goat semen. Necessary medicines, feeds, stationery, furniture, liquid nitrogen, etc. were also purchased.
- This project is involved in imparting practical training to the UG & PG students on frozen semen technology and Artificial Insemination operations in goat.

Livestock Research Station, Mandira, Kamrup
5.80.1. Livestock Sector

- 50 numbers of Murrah buffaloes are reared in the station and found that the Murrah buffaloes adapt well under the agro-climatic condition of Assam under scientific feeding & management.
- A total of 7800 nos of day-old chicks (Vanaraja & Gramapriya variety) for backyard farming were hatched out at poultry Seed Production Unit. The hatching eggs were procured from the Directorate of Poultry Research, Hyderabad. The chicks were procured by KVKs, NGOs & progressive farmers.
- The cattle unit has 18 Jersey crossbred cows with their followers.
- The piggery unit has 73 pigs. The piglets produced are being sold/distributed to the farmers, FPO & KVKs and TSP programmes.
• Goat & Sheep unit has 8 Beetal goats, 18 local goat & 36 sheep.
• There is a unit of 15 geese.
• Duck unit has 52 White Pekin & 60 Khaki Campbell.
• TSP programme is under operation with components of piggery, poultry, goat, agro-horti & fisheries.

5.80.2. Fishery Sector
• Under NPFR programme of AAU, a project on Ornamental Fish Breeding-cum-Rearing unit is under operation. Breeding of various indigenous and exotic fish species is going on.
• AAU funding project on integrated duck-cum-fish farming is under operation.

5.80.3. Agriculture Sector
• Boro paddy seeds (cv. Joymoti) produced in the station @ 75 qtl/ha were distributed among the farmers & KVKs.
• The Garden with 140 nos. of cashew nut is in the fruiting stage and 500 nos. of Assam lemon plant are bearing fruits for sale in the local market.

5.80.4. Extension Activities
• Three Farmers' Trainings on modern techniques of production of Assam lemon, coconut & cultivation of fodder crops were organised during the year.
• Two camps for vaccination cum treatment of poultry & pigs were organised in Boko Block.
• Two months RFWET programme for students of CFSc, AAU, Raha was conducted.
• Farmers' trainings on integrated farming systems, goat & pig production and poultry rearing were conducted during the year.
• Students from nearby schools were demonstrated by the scientists under their educational exposure visits.

Revenue earned during 2018-19
Rs. 44,18,268 (The centre is one of the highest revenue earning centre of AAU).
5.80.5. Tribal Sub Plan Project

The Directorate has a tribal sub-plan project implemented at KVK, Kokrajhar, KVK, Diphu, KVK, Dhemaji, Shilonijan, Karbi Anglong through State Animal Husbandry and Veterinary Department, Sapekhati through an NGO, SPREAD NE (FPO) and Mothonga Agro Producers Company Ltd. (FPO). Another TSP Project funded by ICAR-NBAGR is also implemented in the Baksa District of Assam.

Figure 5.140. Low cost housing at Shilonijan

Figure 5.141. Beneficiary under TSP at Sonapur

Figure 5.142. Input Distribution under TSP ICAR -NBAGR

Figure 5.143. Vaccination at Baksa under TSP Mothonga (FPO)

Figure 5.144. Study on impact of enhance temperature on breeding performance of *Cyprinus carpio*

Figure 5.145. Breeding implement designed at FRC, Jorhat.

Figure 5.146. Brood fish (F1 generation) Juvenile of *A. testudineus*
5.81. Fisheries Research

- Raising fish seeds in cages during the flood season was suggested as an mitigation strategy and an ideal unit size of a cage was found to be 12 cu.m. (4 m x 2 m x 1.5 m) with a stocking capacity of 250 numbers/cu.m. Moreover, 3-4 stocking operations can be carried out in a cage during the entire rainy season with a cost-benefit ratio of 1.42.
- Under the artificially enhanced temperature, the embryonic development was faster and hatching took place after an incubation period of 37±0.7 hours in the polyhouse pond, whereas in control, the incubation period was 125±10 hour which was 85-90 hours higher than the experimental. These findings pave the way for using polyhouse for intensive breeding of the species under a controlled environment.
- A model for fish seed grader cum counter with provision for grading and counting fish fry/ fingerling upto 4 size groups have been designed in collaboration with DIC-IIT Guwahati under the project Development of Automatic Fish Seed Grader cum Counter. The CAD Model design is Complete and physical model preparation is under progress.
- Induced Breeding and seed raising for indigenous Anabas testudineus (Kawoi) by using F1 brooders raised under captive condition has been done successfully. The study on the breeding rhythm of the F1 generation of induced bred Anabas under captive condition, age and size at first maturity and off-season induced breeding.
- A farmer’s friendly portable implement for induced breeding of Anabas has been designed at Fisheries Research Centre, Jorhat and found to be efficient for the breeding of 10-15 pairs of brooders at a time.
The Directorate of Extension Education, Assam Agricultural University, Jorhat is undertaking the responsibility of Human Resource development through skill upgradation, training programme, and frontline demonstration on agricultural production and related technologies. The Directorate also organized seminars, workshops, exhibitions and was involved in various transfer of technology programme of agriculture, animal husbandry, fishery and dairy sectors for the upliftment of the socio-economic condition of the rural masses. Keeping in view the mandate of Assam Agricultural University, emphasis is being given to impart refresher training to the technical personals/officers of the state departments of agriculture, horticulture, animal husbandry and veterinary, dairy development as well as state department of fisheries, to offer information on latest production technology, and also to improve management and communication skill of the field workers. The Directorate is also shouldering the responsibilities of offering training and technical guidance to the educated unemployed youth and farmers (including farm woman) of the state in the field of improved livestock farming as a means of generating income for their livelihood. Efforts are also being made to sustain these activities through farm advisory services, on-farm demonstrations, farmers' fairs etc. organized periodically by this Directorate. Apart from this, the Publication and Information Wing of the Directorate regularly publishes Annual Reports, Newsletters, Farm Newspaper, Extension Bulletins etc. Besides, the technologies generated in the University are disseminated through electronic and print media.

6. Extension Education

The mandates of the directorate are:
- Developing linkages between various govt. and non-govt. organizations concerned with agricultural and allied extension programmes.
- Organizing need-based training for extension functionaries, farmers, farm women, rural youth and SHG members.
- Advisory services to farmers.
- Functioning as a centre for collecting, storing and disseminating information to farmers and extension functionaries.
- Conducting demonstration for transfer of technology.
- Entrepreneurship development in agriculture and allied areas.
- Publication.

Organizational network
The organogram of the Directorate is presented below:

![Extension Organogram](image)

Figure 6.1. Extension Organogram
The network of different units/programmes under the Directorate comprises of:

1. Krishi Vigyan Kendras (KVKs): There are 23 KVKs, one each in the districts of Baksa, Barpeta, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dhurib, Dibrugarh, Golaghat, Jorhat, Kamrup, Karbi Anglong, Karimganj, Kokrajhar, Lakhimpur, Morigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tinsukia and Udalguri.

2. Agricultural Technology Information Centre.

3. Agri-clinics and Agri-business Training Cell.

4. Facilitation Centre for Medicinal Plants.

5. Publication and Information.

**Manpower (Teaching/Non-teaching) at Directorate of Extension Education, Jorhat Campus**

<table>
<thead>
<tr>
<th>Category</th>
<th>Manpower in position</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEE</td>
<td>1</td>
</tr>
<tr>
<td>ADEE (P &amp; I)</td>
<td>1</td>
</tr>
<tr>
<td>ADEE (Training)</td>
<td>1</td>
</tr>
<tr>
<td>Senior Extension Specialist</td>
<td>4</td>
</tr>
<tr>
<td>Extension Specialist</td>
<td>1</td>
</tr>
<tr>
<td>Manager, ATIC</td>
<td>1</td>
</tr>
<tr>
<td>Asst. Editor</td>
<td>1</td>
</tr>
<tr>
<td>Jr. Extension Specialist</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Manpower in position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officer staff</td>
<td>4</td>
</tr>
<tr>
<td>Establishment staff</td>
<td>16</td>
</tr>
<tr>
<td>Accounts staff</td>
<td>5</td>
</tr>
<tr>
<td>Field/Technical staff</td>
<td>30</td>
</tr>
<tr>
<td>Grade IV staff</td>
<td>25</td>
</tr>
<tr>
<td>Farm Manager/Prog. Assistant/Computer Programmer</td>
<td>5 (Attached under DoEE)</td>
</tr>
<tr>
<td>Consolidated pay (Grade III)</td>
<td>1</td>
</tr>
<tr>
<td>MR/Fixed pay</td>
<td>14</td>
</tr>
</tbody>
</table>

**6.1 Agricultural Technology Information Centre (ATIC)**

**6.1.1 Introduction**

The role of appropriate information technology and its dissemination to the farmers or other end users is extremely vital. The important point is not only to generate the technology, but also to ensure that the required information is delivered rapidly to the farmers with the least dissemination loss.

In the course of agricultural revolution, the availability of improved varieties of cereals, oilseeds, pulses and other crops, breeds of livestock including poultry and fisheries, horticultural plant materials and improved management practices have been largely possible for attaining food self sufficiency despite population explosion. For this purpose, the farmers are in search of quality seeds, planting materials and other inputs, diagnostic services, information through printed, audio, video and electronic media and consultancy services.

The establishment of ATIC is intended to provide such facilities of information technology for dissemination to the farmers as a single window delivery system. This service includes both to provide solution to location specific problems and make available all the technological information along with technology inputs and products.

**6.1.2 Need**

The needs for establishment of such ATIC are:

- Providing diagnostic services for soil testing, plant and livestock health.
- Supplying research products such as seeds and other planting materials, poultry strains etc. emerging from the institution for testing and adoption by various clienteles.
- Disseminating information through published literature and communication materials as well as audio-visual aids.
- Providing an opportunity to the institution to have resource generation through the sale of their technologies.

**6.1.3 Objectives**

The objectives for establishment of such a centre as single window system are:

- To provide a single window delivery system for the products and species available from the university to the farmers and other interested groups as a process of innovativeness in technology dissemination.
To facilitate direct access to the farmers the resources available at the university in terms of technology, advice, technology products, etc. for reducing technology dissemination losses.

To provide mechanism for feedback from the users to the university.

6.1.4 Facilities

Technological Products

- Seeds of field crops, vegetable and other horticultural crops.
- Nursery plants of vegetables, fruits and ornamental plants.
- Bio-fertilizer.
- IPM-organic and bio-pesticides including NPV.
- Small Farm Implements.
- Tissue cultured plant materials.
- Processed products and by-products of cereals, oilseeds, pulses, vegetables, fruits, mushrooms including spawn, honey, milk, meat & fish etc.
- Poultry strains, livestock breeds, semen, fish seed etc.
- Agricultural equipment and drawing of designs.
- Vermiculture and vermicompost.
- Vaccine/diagnostic kit.
- Microbial culture for milk and milk products.

Services

- Soil testing.
- Seed quality testing.
- Plants health clinic.
- Veterinary/animal clinics for small and large animals.
- Testing and calibration of agricultural equipments and implements.
- Project profile and consultancy.
- On-farm consultancy for farmers/orchardists.

Information

- Farm literature-leaflets, pamphlets, journals/magazines, booklets, manuals.
- Audio and Video cassettes of crops and other agri-related enterprises.
- Exhibits including dioramas, transparencies
- Specimen etc.

6.1.5 Functional Components of ATIC

The functional components of ATIC have been indicated in the following figure:

Figure 6.2. The functioning of ATIC

No. of farmers visiting ATIC

<table>
<thead>
<tr>
<th>Numbers of farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5165</td>
</tr>
<tr>
<td>Female</td>
<td>3307</td>
</tr>
<tr>
<td></td>
<td>8472</td>
</tr>
</tbody>
</table>

6.1.6 Technological inputs sold

ATIC has sold rice seeds of different varieties, vegetable seeds, planting materials, processed products like tea, black pepper, honey etc. Moreover, fresh vegetables like cabbage, tomato, brinjal, lemon, capsicum, beans, cucumber, etc. have also been sold in the daily sale counter of ATIC. The value of the products sold through ATIC for this financial year was Rs. 3,26,300.

Input/products sold through ATIC in 2018-19

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tea (CTC)</td>
<td>2,77,800.00</td>
</tr>
<tr>
<td>2. Green Tea</td>
<td>16,800.00</td>
</tr>
<tr>
<td>3. Black Pepper</td>
<td>22,500.00</td>
</tr>
<tr>
<td>4. Biofor PF-2</td>
<td>4,200.00</td>
</tr>
<tr>
<td>5. Biozen PTB</td>
<td>5000.00</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total sale proceed</strong></td>
<td><strong>Rs. 3,26,300.00</strong></td>
</tr>
</tbody>
</table>

Farm Advisory Services

Scientists involved in ATIC activities and other staff of the university provide technical guidance to the farmers through individual, farm and home visit, personal contact and correspondences. Similarly, farmers including farm women regularly visit us to seek guidance in agricultural technology, animal production, live stock management, sericulture, home science and other farm problems, and they are well attended by scientists/staff of the university. Scientists also respond to urgent calls on farm problems.
encountered by Department of Agriculture, Veterinary, Fishery and Sericulture etc. A well-knit liaison also exists with different funding agencies such as NABARD, Nationalized Bank, DRDA etc.

6.1.8 Development of Website “Bridhhi”

Constant developmental works in designing of the website are in progress, including updating and inclusion of additional contents. Meteorological information alongwith the crop advisories have been included due to the present scenario of the weather condition for the benefit of the farming community.

6.1.9 Publication and Information

The Directorate of Extension has published several bulletins, newsletters, farm newspaper, booklets, folders, magazines, laboratory/training manuals, etc. during 2018-19, as detailed below. All these publications have been printed at AAU Printing Press, Jorhat.

<table>
<thead>
<tr>
<th>Publications</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAU Newsletter</td>
<td>4</td>
</tr>
<tr>
<td>Ghare Pathare</td>
<td>24</td>
</tr>
<tr>
<td>Bulletins</td>
<td>22</td>
</tr>
<tr>
<td>Practical Manuals</td>
<td>8</td>
</tr>
</tbody>
</table>

6.1.9.1 Radio talk: During the period from April 1, 2018 to March 31, 2019, altogether 102 programmes were broadcasted through AIR, Jorhat and 32 programmes were broadcasted through AIR, Dibrugarh.

6.1.9.2 Phone in Programme: Altogether, 108 questions on various aspects relating to Agriculture, Veterinary, Horticulture, Animal Husbandry and Fisheries were received from 108 farmers, which were replied by the scientists of the University.

6.1.9.3 Exhibitions

The Directorate participated in the following exhibitions during 2018-19:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16th-17th Dec., 2018</td>
<td>State level Farmers’ Fair organized at Kahikuchi campus, AAU</td>
</tr>
<tr>
<td>2</td>
<td>11th-13th Jan., 2019</td>
<td>CAU-Regional Agri Fair at CAU, Imphal</td>
</tr>
<tr>
<td>3</td>
<td>18th-20th Jan., 2019</td>
<td>Exhibition during Central Committee Conference of KAAS at Hojai</td>
</tr>
<tr>
<td>4</td>
<td>27th-28th Feb., 2019</td>
<td>Exhibition during International Conference on Animal Agriculture for Doubling Farmers' Income: Technology Policy and Strategy Options at Khanapara Campus, AAU</td>
</tr>
</tbody>
</table>

6.1.9.4 Workshops/Group Meetings/Trainings under Directorate of Extension Educations

The Directorate of Extension Education also organized the following programmes:

**a. Trainings**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date organized</th>
<th>Title of the training programme</th>
<th>Organised by</th>
<th>Training For</th>
<th>No. of Participants</th>
<th>No. of KVKs involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19th-26th November, 2018</td>
<td>Model Training Course on Integrated Farming Systems for Sustainable Agriculture (Sponsored by Ministry of Agri &amp; Farmers’ Welfare, GoI)</td>
<td>DoEE, AAU</td>
<td>Officials/Scientists</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>5th-7th February, 2019</td>
<td>HRD Training Programme on Recent Advances in Horticulture and Plantation Crops</td>
<td>-do-</td>
<td>SMS</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>4th-6th March, 2019</td>
<td>HRD training for SMSSs in the discipline of Soil Science</td>
<td>-do-</td>
<td>SMS</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>18th-20th March, 2019</td>
<td>HRD Programme on Training for SMS &amp; PA(Fishery Science)</td>
<td>-do-</td>
<td>SMS/PA</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>14th-16th March, 2019</td>
<td>HRD training for SMSSs/PAs in the discipline of Crop Production</td>
<td>-do-</td>
<td>SMS/PA</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>
### b. Exhibition/Collaborative Programme

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date organized</th>
<th>Title of the programme</th>
<th>Organised by</th>
<th>Type</th>
<th>No. of Participants</th>
<th>No. of KVKs involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18th-20th January, 2019</td>
<td>Central Committee Conference of KASS organised by KASS held at Hojai</td>
<td>AAU &amp; KVK, Nagaon</td>
<td>Exhibition</td>
<td>In mass</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>7th-8th December, 2018</td>
<td>North East Agriculture: Farmers Perspective held at CAU, Barapani</td>
<td>CAU, Barapani</td>
<td>Regional Conference</td>
<td>4 (farmers)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>16th-17th December, 2018</td>
<td>State Level Farmers Fair</td>
<td>ICAR, ATARI, Zove-VI</td>
<td>State Level Fair</td>
<td>In mass</td>
<td>6 (Morigaon, Kamrup, Bongaigaon, Nalbari, Nagaon, Darrang)</td>
</tr>
</tbody>
</table>

### 6.2 AAU Certificate Courses

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date organized</th>
<th>Title of the programme</th>
<th>Organised by</th>
<th>Training For</th>
<th>No. of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st November, 2018-30th April, 2019</td>
<td>Tea Production Technology &amp; Management</td>
<td>DoEE, AAU</td>
<td>Rural Youth etc.</td>
<td>25</td>
</tr>
</tbody>
</table>

### 6.3 Review Meeting of KVKs

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date organized</th>
<th>Title of the programme</th>
<th>Organised by</th>
<th>Training For</th>
<th>No of programmes</th>
<th>No. of Participants</th>
<th>No. of KVKs involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24th June, 2018</td>
<td>Review Meeting of KVKs</td>
<td>DoEE, AAU &amp; KVK, Kamrup</td>
<td>Head, KVK</td>
<td>1</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>9th-10th November, 2018</td>
<td>Review Meeting of KVKs</td>
<td>DoEE, AAU</td>
<td>Head, KVK</td>
<td>1</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

### 6.4 Training Programmes under APART

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date organized</th>
<th>Title of the programme</th>
<th>Organised by</th>
<th>Training For</th>
<th>No of programmes</th>
<th>No. of Participants</th>
<th>No. of KVKs involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27th-29th September, 2018</td>
<td>Training of Vegetable Nursery Growers under APART (Sponsored by ARIAS Society, Guwahati)</td>
<td>DoEE, AAU</td>
<td>Practicing Farmers</td>
<td>1</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>29th-30th October, 2018</td>
<td>Orientation Workshop for Scientific Staff on the World Bank Funded Project APART (Sponsored by ARIAS Society, Guwahati)</td>
<td>DoEE, AAU</td>
<td>Scientific Staff under APART</td>
<td>1</td>
<td>77</td>
<td>23</td>
</tr>
</tbody>
</table>
6.5 KVKs

Assam Agricultural University presently has 23 number of *Krishi Vigyan Kendras* functioning directly under the Directorate of Extension Education. To achieve the set mandate, the KVKs are imparting training to the farmers, farm women, rural youths, extension functionaries, conducting Front Line Demonstration (FLD) and On-Farm Trials (OFT). The KVKs also organize Field Day, *Kishan Mela*, Agri Expo, Exposure Visit, Farmers-Scientists Interaction, Awareness Camp, PRA Exercise etc. During 2018-19, 953 numbers of scheduled training programme (on/off campus) were conducted by all these KVKs where more than 25,060 trainees participated. Technology dissemination is a major aspect of KVK and it was carried out through a number of FLDs and OFTs.

6.5.1 Training Particulars

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of KVK</th>
<th>No. of Training</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Baska</td>
<td>45</td>
<td>920</td>
<td>228</td>
<td>1148</td>
</tr>
<tr>
<td>2.</td>
<td>Barpeta</td>
<td>45</td>
<td>757</td>
<td>523</td>
<td>1280</td>
</tr>
<tr>
<td>3.</td>
<td>Bongaigaon</td>
<td>82</td>
<td>2170</td>
<td>40</td>
<td>2210</td>
</tr>
<tr>
<td>4.</td>
<td>Cachar</td>
<td>40</td>
<td>764</td>
<td>324</td>
<td>1088</td>
</tr>
<tr>
<td>5.</td>
<td>Chirang</td>
<td>67</td>
<td>1127</td>
<td>533</td>
<td>1680</td>
</tr>
<tr>
<td>6.</td>
<td>Darrang</td>
<td>43</td>
<td>581</td>
<td>494</td>
<td>1075</td>
</tr>
<tr>
<td>7.</td>
<td>Dhemaji</td>
<td>59</td>
<td>760</td>
<td>757</td>
<td>1517</td>
</tr>
<tr>
<td>8.</td>
<td>Dhubri</td>
<td>65</td>
<td>996</td>
<td>549</td>
<td>1545</td>
</tr>
<tr>
<td>9.</td>
<td>Dibrugarh</td>
<td>73</td>
<td>1287</td>
<td>812</td>
<td>2097</td>
</tr>
<tr>
<td>10.</td>
<td>Golaghat</td>
<td>80</td>
<td>1667</td>
<td>740</td>
<td>2407</td>
</tr>
<tr>
<td>11.</td>
<td>Jorhat</td>
<td>51</td>
<td>536</td>
<td>625</td>
<td>1161</td>
</tr>
<tr>
<td>12.</td>
<td>Kamrup</td>
<td>72</td>
<td>1146</td>
<td>884</td>
<td>2030</td>
</tr>
<tr>
<td>13.</td>
<td>Karbi Anglong</td>
<td>64</td>
<td>1026</td>
<td>798</td>
<td>1824</td>
</tr>
<tr>
<td>14.</td>
<td>Karimganj</td>
<td>64</td>
<td>1275</td>
<td>320</td>
<td>1595</td>
</tr>
<tr>
<td>15.</td>
<td>Kokrajhar</td>
<td>88</td>
<td>1207</td>
<td>1141</td>
<td>2349</td>
</tr>
<tr>
<td>16.</td>
<td>Lakhimpur</td>
<td>74</td>
<td>1418</td>
<td>766</td>
<td>2184</td>
</tr>
<tr>
<td>17.</td>
<td>Morigaon</td>
<td>96</td>
<td>1779</td>
<td>1476</td>
<td>3255</td>
</tr>
<tr>
<td>18.</td>
<td>Nagaon</td>
<td>44</td>
<td>426</td>
<td>619</td>
<td>1045</td>
</tr>
<tr>
<td>19.</td>
<td>Nalbari</td>
<td>78</td>
<td>1600</td>
<td>445</td>
<td>2045</td>
</tr>
<tr>
<td>20.</td>
<td>Sivasagar</td>
<td>60</td>
<td>727</td>
<td>943</td>
<td>1677</td>
</tr>
<tr>
<td>21.</td>
<td>Sonitpur</td>
<td>27</td>
<td>483</td>
<td>253</td>
<td>781</td>
</tr>
<tr>
<td>22.</td>
<td>Tinsukia</td>
<td>57</td>
<td>836</td>
<td>805</td>
<td>1641</td>
</tr>
<tr>
<td>23.</td>
<td>Udalguri</td>
<td>101</td>
<td>3194</td>
<td>1349</td>
<td>4543</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1475</strong></td>
<td><strong>26682</strong></td>
<td><strong>15444</strong></td>
<td><strong>42176</strong></td>
</tr>
</tbody>
</table>

6.5.2 On Firm Trials (OFTs) & Front Line Demonstrations (FLDs)

<table>
<thead>
<tr>
<th>Name of KVK</th>
<th>OFTs</th>
<th>FLDs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target achieved</td>
<td>No. of Farmers covered</td>
</tr>
<tr>
<td>Baska</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td>Barpeta</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>Bongaigaon</td>
<td>14</td>
<td>63</td>
</tr>
<tr>
<td>Cachar</td>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td>Chirang</td>
<td>18</td>
<td>51</td>
</tr>
<tr>
<td>Darrang</td>
<td>12</td>
<td>43</td>
</tr>
<tr>
<td>Dhemaji</td>
<td>12</td>
<td>47</td>
</tr>
<tr>
<td>Dhubri</td>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>Dibrugarh</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>Golaghat</td>
<td>18</td>
<td>83</td>
</tr>
<tr>
<td>Jorhat</td>
<td>25</td>
<td>123</td>
</tr>
<tr>
<td>Kamrup</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>Karbi Anglong</td>
<td>19</td>
<td>45</td>
</tr>
<tr>
<td>Karimganj</td>
<td>17</td>
<td>66</td>
</tr>
<tr>
<td>Kokrajhar</td>
<td>14</td>
<td>49</td>
</tr>
<tr>
<td>Lakhimpur</td>
<td>15</td>
<td>77</td>
</tr>
<tr>
<td>Morigaon</td>
<td>23</td>
<td>115</td>
</tr>
<tr>
<td>Nagaon</td>
<td>17</td>
<td>55</td>
</tr>
<tr>
<td>Nalbari</td>
<td>16</td>
<td>42</td>
</tr>
<tr>
<td>Sivasagar</td>
<td>15</td>
<td>250</td>
</tr>
<tr>
<td>Sonitpur</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Tinsukia</td>
<td>14</td>
<td>39</td>
</tr>
<tr>
<td>Udalguri</td>
<td>15</td>
<td>145</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>359</strong></td>
<td><strong>1543</strong></td>
</tr>
</tbody>
</table>

Fig. 6.3. OFT on Management of Brinjal Fruit and Shoot Borer through IPM by KVK, Baska
6.6 Extension Activities by the Constituent College of Agriculture

Apart from Directorate of Extension Education, the teachers and Scientists of constituent Colleges of Veterinary Science, Community Science and College of Agriculture were also involved in extension activities during the year.

6.6.1 Veterinary Science Extension

6.6.1.1 Salient Extension activities

The month-long Participatory Rural Appraisal (PRA) programme conducted by the Department of Extension Education, College of Veterinary Science, Khanapara came to an end on 17th February, 2019 with a daylong treatment cum vaccination camp at Borgaon, Mantabori and Sonowabari villages of Mayong Development Block, Morigaon District. A group of 30 teachers from different disciplines of Veterinary Science, 95 UG students and 11 PG students under the leadership of Dr. P. Hazarika, Professor and Head, Dept. of Extension Education participated in the camp, where a total of 1445 cattle and buffaloes were vaccinated against Haemorrhagic Septicaemia and Black Quarter. Moreover, 1980 other livestock and poultry birds were also treated for different ailments.

Several officials of the Dept. of A.H. & Vety., Govt. of Assam, viz., Dr. Paresh Sarma, Assistant Director, NERDDL; Dr. Ajitav Kakoti, Deputy Director, ICDP and Dr. Upen Kakoty, Veterinary Officer of Santipur Veterinary Dispensary, Morigaon attended the programme. The State Vety. Department also supported the programme by providing materials in the form of medicine and vaccine.

A Farmers-Scientists Interaction Session was also organized on the occasion in the Borgaon Panchayat Hall in the presence of above State Veterinary Officials, Dr. P. Hazarika, Prof. & Head and Department of Extension Education, CVSc, Khanapara and was largely attended by farmers of the locality and the village headmen.

The PRA programmes were conducted essentially for the students with their pro-active involvement as a part of their academic requirement in extension education wherein knowledge about rural people and their resources were explored through different PRA methods. This time, the participating farmers, farm women, youths and children of Borgaon and nearabout villages assembled at three different locations and drew social and resource map of the village themselves and also took part in discussion with the visiting teachers and students. This helped the students know the habitation pattern, social grouping and fragmentation, cohesion and cooperation, needs and interest and priorities and preferences of the villagers. Later, the students under the guidance of the teachers and few farmers, also made a transect-walk around the village to physically verify the resources and infrastructure of the village. Other tools of PRA like Venn diagramming and timeline were also demonstrated. The extension camp and the PRA activities were concluded with a success note under the supervision of Dr. Leema Bora, Assistant Professor of Department of Extension Education under the guidance of Dr. M.N. Ray and support of Dr. Sadananda Payeng and Dr. Monosri Johari of the Department.
6.6.2 Community Science Extension

6.6.2.1 Dept of Textile and Apparel Design


6.6.2.2 Activities undertaken during Swachh Bharat Abhiyan

Under Swachh Bharat Abhiyan, cleaning activities were undertaken in several AICRP-adapted villages in Jorhat. The faculty members and the students helped the villagers to understand the means and needs of keeping clean.
6.6.2.3 Trainings conducted in AICRP adopted villages

- Training on Fabric Painting at Pirakota Bharaluwagaon on 17th May, 2018 organized by AICRP home Science-CT component.
- Training on Stencil Printing at Pirakota Bharaluwagaon on 18th May, 2018 organized by AICRP home Science-CT component.
- Training on Fabric Construction at Noapam Gohaingaon on 11th June, 2018 organized by AICRP home Science-CT component.
- Training on Macrame at Mudoijan Bharaluwagaon on 14th June, 2018 organized by AICRP home Science-CT component.
- Training on Warping for Weaving at Mudoijan Bharaluwagaon on 5th Oct, 2018 organized by AICRP Home Science-CT component.
6.6.2.4 Dept. of Food Science and Nutrition Research Findings under External Funding agencies

1. Development and Evaluation of Dehydrated and Irradiated Jackfruit (Artocarpus heterophyllus) Products

- Three widely grown indigenous jackfruit genotypes of Assam i.e. Dhol kathal, Pat kathal and Mridongia kathal were collected and analyzed for their quality characteristics.
- *Dhol kathal* was found to be superior among all the three varieties in terms of quality characteristics such as weight of fruit, no of bulbs per fruit, weight of a bulb without seed (g), weight of a seed, flakes colour, and selected for further process standardization and product development.
- Four processes were standardized based on numerous trials for the development of four different dehydrated products from jackfruit at different stages of maturity.
- Four products were developed from jackfruit (*Dhol kathal*) at various stages namely dehydrated tender jackfruit – ready-to-cook, jackfruit chips (mature, unripe), jackfruit leather (mature, ripe) and osmotically dehydrated jackfruit bulb (mature, ripe).
- Sensory evaluation of developed products was done for quality and acceptability and found to be highly acceptable based on 9-Point Hedonic scale.
- Nutrient analysis of the developed product revealed that developed products were rich source of macronutrients.
- Developed products were irradiated using different radiation doses i.e. 1, 2 and 5Kgy to increase the shelf life of the products. Standardization of radiation doses is going on based on microbial study on a timely interval.

2. Development of Region-Specific Therapeutic Foods for Prevention of Diabetes

- A total of 48 food items from different food groups having low Glycemic Index were documented and a database was prepared.
- Analysis of glycemic index and the dietary fibre content of the standardized traditional recipes was done.
- A low glycemic index multigrain mix was developed using different rice varieties with functional properties, foxtail millet, pulses, vegetables and spices.
- Using the low glycemic index multigrain mix, two traditional breakfast foods and one food for lunch and dinner were selected and modified.
- Screening of pre-diabetic subjects was done.
- Processing of the raw ingredients for the preparation of low glycemic index mix for feeding trial is in progress.


- A high fibre multigrain mix I from locally available cereals, millets, pulses and other functional food ingredients for management of over nutrition was developed.
- A nutrient-dense multigrain mix II from locally available cereals, millets, pulses and other functional food ingredients for management of under nutrition was developed.
- Screening of underweight and overweight subjects was done.
• Processing of the raw ingredients for preparation of multigrain mix I and II for feeding trial is in progress.

Extension activities.
• Trainings on Food Processing for food and livelihood security to the farmers of Majuli.
• Observation of National Nutrition Month in Mudoijan Bharalua village of Jorhat.
• Participated in Farmer's Fair at Titabor Research Station, Titabor, and AAU campus, Jorhat.
6.6.2.5 Family Resource Management Assessment of Drudgery of Farm Women in Performance of Green Gram Cultivation

A green gram picking bag was designed which increases the productivity and comfort level of the farm women as compared to the traditional method. This bag can also be used for harvesting such type of pulses.

Effect of Cement Dust from Bokajan Cement Factory on Human Health and Their Performance

It was revealed in the study that majority of the non-workers exposed to cement dust of the CCI, Bokajan had suffered from various health problems having higher ranks in headache, hair loss, nausea ranked as I, II and III, respectively. Similarly, in the case of workers also, hair-loss, headache and nausea were ranked I, II, III among many other health problems assessed during the study. Respondents having worked in CCI factory for more number of years suffered from more number of health problems.

Dust accumulation rate was found to be the highest in the South direction and lowest in the East. It was also found that dust accumulation was highest in the month of February, March and April which could be due to more wind whereas it was low in Jun, July and August could be due to onset of rain.

The residential areas in the South followed by the North directions were heavily covered by dust compared to the other two. It was found that that zone planning was not done as per exposure to cement dust from CCI because of which health problems were more among the residents of the area.
label legible and readable. It was found that yellow background with black font of 5.5 size printed on a non-glossy material was the best choice to have legibility in label of cosmetics products.

A. AICRP on Home Science (FRM component)
- Designed parameters of weaving seat (wooden plank) were developed under AICRP on Home Science (FRM component) and are ready for commercialization.

![Figure 6.67. Using drawer for keeping accessories](image)

![Figure 6.68. Ergonomically designed 'Plank' for fly shuttle weaver](image)

**Advantages of Ergonomically Designed 'Plank' for Fly Shuttle Weaver**
- Average heart rate (beats/min) of weavers is reduced.
- The energy expenditure (kJ/min) of the weavers is also reduced.
- The postural stress is reduced significantly.
- The breadth of the plank is increased and it helps in reducing Pain in Different body parts considerably.
- Provision of drawer facilitates the weavers to keep the necessary weaving accessories.
- Enhancing greater efficiency, productivity, comfortability and health status of the fly shuttle weavers.

**Development and Ergonomics Evaluation of Gender-Friendly Technology Ladle for Parboiling of Rice**

An ergonomically designed bamboo ladle for parboiling of rice was developed for reducing drudgery of farm women during the parboiling activity.

![Figure 6.69. Developed Improved Bamboo Ladle for Parboiling of Rice](image)

**Advantages of using Improved Ladle for parboiling of rice**
- Physiological cost of work of farm women is reduced while using ladle for parboiling.
- Postural stress is also reduced.
- Grip fatigue of farm women is reduced.
- Enhance comfort of the user due to comfortable long cane handle and light weight.
- Ease in operation.
- The ladle is made of indigenously grown Bamboo plant and cane and hence affordable.

![Figure 6.70. Training Programme on Drudgery Reducing Hand-Tools and Technologies for Farmers](image)

**B. Design Innovation Centre (Ministry of Human Resource Development in collaborating institute IITG)**

**Ergonomic Design Approaches for Occupational wellness of Pluckers Engaged in Manual Tea Plucking Activity:**
- Improved tea plucking basket for tea industry was modified and is ready for commercialization.

![Fig. 6.71. Improved tea plucking basket](image)
![Fig. 6.72. Improved functional dress for winter](image)
![Fig. 6.73. Improved functional dress for Summer](image)
For convenience of work two functional dresses were designed for the tea pluckers to protect from the abrasions of tea bushes.

a. One is for winter season which is like a long kurta with long sleeves, made of cotton and raincoat material.
b. Another one is for summer season which is like an apron made of cotton and raincoat material.

C. DBT GOI
Management of Green Waste for Economic Benefit and Women Empowerment

Thermal efficiency of biomass briquettes prepared from different green wastes was determined and was found to be quite high and encouraging. The thermal efficiency of briquettes made from areca nut sheath and rice husk was above 4000 Kcal/kg and briquettes from combinations of other green wastes ranged from 3370 to 3965 Kcal/kg. This shows great feasibility for commercial production of biomass briquettes in small scale industries for income generation.

The cost-benefit ratio of value-added products from water hyacinth was found to be 1.65 which indicated encouraging for the entrepreneurs.

To add new value to the disposable plates made form areca sheath, modification has been undertaken to enhance the design of the plates.

Around 60.00% households used tube well as source of drinking water. 66.67% of the respondent's households had katcha drainage system. 56.67% disposes of their household waste by dumping in one place. More than 56% households had water stagnation around their house during rainy season. Mosquito as a common pest were found in all households. 68.33% household used incense burner to control pest. The study revealed that the problem of lack of drainage system in the cattle shed ranked first.

Knowledge, Attitude and Practices of Rural Women in Jorhat district of Assam regarding Herbal Medicinal Plants
Data revealed that 68.00 % of the respondent had medium level of knowledge and 74.00% of respondents had favourable attitude towards herbal medicinal plants. Maximum number of respondents i.e. 98.00% respondents had practice different herbal medicinal plants in their daily life. The findings also revealed that lack of knowledge of identification and not standardize doses intake of herbal medicinal plants is the very familiar problem among all respondents.

Effect of Selected Social Media on Development of Youth of Assam (Jorhat and Sivasagar districts)
Findings highlighted that majority (94.17%) of the respondents used WhatsApp followed by Facebook (74.17%), YouTube (59.17%), Instagram (25.00%), Twitter (4.17%) and only 0.83% respondents used LinkedIn. The data on reasons for using social media by the respondents revealed that communication with friends was ranked I followed by entertainment.

Knowledge and Practices of Homemakers of Dhemaji district of Assam regarding Food Hygiene
It was found that only 5% of the total respondents had training related to personal hygiene and food hygiene. Nearly 62% of the respondents had medium level of knowledge on food hygiene. 62.50% belonged to moderate category on overall food hygiene practices.

Attitude and Level of Competency of Rural Women towards Professional Homemaking
Findings showed that a majority (72%) of the respondents did not have any subsidiary income for their families, 86% had no experience of homemaking at others' house. 70% of the respondents had favourable attitude towards professional home-making. Regarding level of competency of the respondents, data revealed that majority of the respondents (74%) were found to be somewhat able to carry out the different categories of homemaking activities.

- **Impact of National Rural Health Mission (NRHM) on Maternal Health of Rural Women of Assam (in Jorhat, Dibrugarh, Morigaon and Darrang)**

More than 87% respondents had done early registration of pregnancy. 80% delivered babies in govt. hospital. Almost 44.25% of the respondents didn't get cash assistance at the time of discharge. Respondents faced difficulty in pregnancy related fatigue which was ranked as the first problem of beneficiaries of NRHM.

**Extension activities**

- Talk on Health and Hygiene at DCB College, Assam Academic Centre, Jorhat.
- Talk on Health and Hygiene in Pangirigaon organized by CKB Commerce College, Jorhat.
- A faculty was invited as a Resource person at RGVN, Jorhat.
- Observed International Women's day on 8th March 2019.

6.6.2.6 Dept. of Human Development and Family Studies

6.6.2.6.1 Reproductive Health Care in Agrarian families

- While assessing the respondents in relation to their socio-economic status, it was found that majority of the respondents (69.85%) belong to lower middle class followed by upper middle class (17.54%). None of the respondents belongs to upper high and very poor category. A meager portion (1.54%) of respondents belonged to high category of socio-economic status.
- In the area of maternal and child health results reveal that majority (83.69%) of respondents have a good level of knowledge. Though majority of them are found to be in the level of good category of knowledge but it has been observed that they lack in practicing their knowledge in most of the areas.
- Looking into the level of knowledge on reproductive health, it has been found that majority (76.92%) of the respondents have a good level of knowledge on reproductive health and remaining respondents (23.08%) have average level of knowledge on the same area. However, it has been observed that the mothers of young children are not very particular in practicing the healthy and hygienic methods of maintaining a healthy reproductive health as they believe more in the myths and social norms associated with the functions of reproductive health.
- While assessing the wellbeing of the respondents it has been found that most of the respondents fall...
under the average category in all the five aspects of wellbeing. With regards to social health and spiritual health a large portion of respondents i.e. 48% and 43.69%, respectively fall under the very good category, where more than half of the respondents (53.23%) are found to be in good level of emotional health. Only 1.54% and 18.15% of respondents fall under the categories of very good, and good level of physical health.

6.6.2.6.2 Intervention Programmes organized on Reproductive Health, Maternal and Child-Care and Well-being at village level

- Fourteen (14) numbers of intervention programmes have been conducted in the selected villages.

6.6.3 College of Agriculture
6.6.3.1 Salient Extension activities

6.3.1.1 Department of Extension Education

- An awareness programme on use of ICT in Agriculture was organised for 60 farmers in Dangdhara and Paninara villages of Titabar area on 15/02/18. The farmers were trained about uses of mobile phones for accessing agricultural information including the mkisan portal and making call to KCC for getting farm advisory.

6.3.1.2 Department of Agricultural Engineering

- Conducted FLD of Inclined plate Maize planter at Neul Gaon, Jorhat on 11th February, 2019.

6.6.3.1.3 Department of Tea Husbandry & Technology

- Conducted three institutional training programmes each of 5-day duration for small tea growers of Karbi Anglong and Udalguri districts of Assam and Tripura. Each training covered 30 participants.
- The department conducted one Institutional training programmes each of 5-day duration for small tea growers of Jorhat and Kokrajhar districts of Assam during the month of November, 2018.

1.2 Department of Agricultural Economics & Farm Management

- Mr. H. Gogoi, Asstt. Professor acted as a Resource Person in the training programme for Agriculture Advisors’ on 30th August, 2018 organised by the DEE in collaboration with the NGO, Pragya.
- Mr. H. Gogoi, Asstt. Professor, was involved in the organisation of “Gram Sabha” for awareness generation among the villagers on the “Unnat Bharat Abhiyan” a programme under UBA Cell, AAU and participated in the “Gram Sabha” on 27th September, 2018 organised at Dangdhora village.
- Dr. Nivedita Deka, Professor, imparted training on “Basic Enterprise Development and Market Linkage” under the Training Programme on Enterprise Development organized by NE Centre for Rural Livelihood Research (NECR) at Gendhali Village, Jorhat.
- Dr. Nivedita Deka, Professor, acted as resource person for farmers’ training on “Market Linkage” organized by Dept of Food Science and Nutrition, College of Community Science on 7th March, 2019.
The training was attended by 30 participants. The training was sponsored by Tea Board, India.

- The department conducted one Institutional training programmes of 5-day duration for small tea growers of Tinsukia district of Assam during the month of January, 2019. The training was attended by 25 participants. The training was sponsored by Tea Board, India.
- The department conducted four Institutional training programmes of 5-day duration for small tea growers of Karbi Anglong district of Assam and Nagaland during the month of February, 2019. The training was attended by 25 participants each. The training was sponsored by Tea Board, India.
- The department conducted two Institutional training programmes of 5-day duration for small tea growers of Karbi Anglong district of Assam and Nagaland during the month of March, 2019. The training was attended by 25 participants. The training was sponsored by Tea Board, India.
- Faculty members were involved in evaluation of TIWEP being going on in different commercial tea estates. This year TIWEP is being arranged in tea estates of Assam, Arunachal Pradesh and Kerala, South India.
- Faculty members were involved in evaluation of ELP students under the module 'Tea Production & Marketing' (ELP-420-V)
- Dr. S.C. Barua, Professor and Head of the department was invited as a Keynote speaker in the 2nd Africa Tea Science Symposium and Exhibition (ATSS) organised by the Agriculture and Food Authority, Kenya on November 22-23, 2018.
- Faculty members were involved in conducting classes of Certificate Course on 'Tea Production Technology & Management'.
- Dr. Gautam Kr. Saikia, Prof., Dept. of Tea Husbandry & Technology attended a brainstorming session as a resource person on tea cultivation organized by NERIWALM, Tezpur on 30.01.2019.
- Dr. Gautam Saikia, Professor, Dept. of THT delivered a lecture on 'Organic Tea Cultivation, at BNCA on 18.03.2019 organised by Regional Centre of Organic Farming, Imphal.

6.6.3.1.4 Department of Animal Husbandry and Dairying

- Eleven lectures were delivered in extension training.
- Six Radio talks were given.
- Attended 10 phone-in Programme organized by All India radio, Dibrugarh.
- Evaluated of 123 FLD and OFT programme of KViks.
- Provide technical support to 1175 farmers for establishment of Dairy, Piggery, Goat and Poultry farming along with supply of quality germplasm.
- Provide technical support and interaction among 3056 farmers and students, including students from DPS, ONGC, Nazira on 7th Feb, 2019; students from Air Force School, Jorhat on 8th Feb, 2019; farmers from different district of Assam for training cum exposure visit including small tea growers.
- Conducted 75 Experimental Learning Programme on Poultry Production Technology.

Participated in Farmers' day and displayed different live animal, birds and eggs etc. for farmers at Titabar Farmers day on 10.11.2018.

(1) Sale Proceed Generated from Livestock and Poultry Farm

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Production of Item</th>
<th>Value (Rs./Quantity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>By sale of milk, pork, fish etc</td>
<td>9,08,559.00</td>
</tr>
<tr>
<td>2.</td>
<td>By sale of eggs, chicken, quail, duck etc</td>
<td>11,23,464.00</td>
</tr>
<tr>
<td>3.</td>
<td>Cow milk</td>
<td>1308.250 ltr</td>
</tr>
<tr>
<td>4.</td>
<td>Buffalo Milk</td>
<td>38,500 ltr</td>
</tr>
<tr>
<td>5.</td>
<td>Egg production</td>
<td>15903nos</td>
</tr>
</tbody>
</table>

Total Deposit for the whole year 2018-19 of Livestock and Poultry Rs. 2032077.00.

(2) Instructional Dairy Farm and poultry farm Activities (Cultivation of Fodder):

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Fodder</th>
<th>Cultivated land (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Maize</td>
<td>0.50</td>
</tr>
<tr>
<td>b.</td>
<td>Napier</td>
<td>0.50</td>
</tr>
<tr>
<td>c.</td>
<td>Sateria</td>
<td>0.50</td>
</tr>
<tr>
<td>d.</td>
<td>Para</td>
<td>0.25</td>
</tr>
<tr>
<td>e.</td>
<td>Congo Signal</td>
<td>0.25</td>
</tr>
<tr>
<td>f.</td>
<td>Guinea</td>
<td>0.25</td>
</tr>
<tr>
<td>g.</td>
<td>Oats</td>
<td>0.25</td>
</tr>
</tbody>
</table>
6.6.3.1.5 Department of Nematology

- Conducted TSP programme on Livelihood promotion of tribal farmers through vegetable cultivation, on 'Management of root knot nematode in vegetable crops through bioagent at Baksa District, Assam'.

6.6.3.1.6 Department of Entomology

- AINP on Soil Arthropod Pests has conducted a massive mass campaigning programme against *Lepidiota mansueta* at Majuli by involving 400 farmers from 40 different endemic villages.

6.6.3.1.7 Department of Sericulture

- The faculties of the department have participated and act as resource persons in the Farmers’ Day at RARS, Titabar.
- C. Borsali Buragohain, 2nd year M.Sc (Agriculture) in Sericulture student attended as internee in Pabhoi Greens Farm, Biswanath Chariali for a period of 20 days (7-27 January, 2019) for Organic Farming.
- Sudipta Kr. Das and C. Borshali Buragohain, 2nd yr. M.Sc (Agri) student of Sericulture department participated in the poster presentation at Research Conclave, 2019 organised by Students’ Academic Board, IIT, Guwahati held on 14-17 March, 2019.
- C. Borshali Buragohain, 2nd yr. M.Sc (Agri) in Sericulture student participated in the workshop on Exploring possibilities for sustainable Agriculture and Farmer’s Livelihood in Assam held at AAU, Jorhat on 20.11.2018.

6.6.3.1.8 Department of Soil Science

- Conducted MLTs on Hybrid rice in RARS, Shillongai, Nagaon and RARS, North Lakhimpur and RARS, Titabor.
- Conducted OFTs on Hybrid Rice in KVK, Jorhat, KVK, Nagaon, KVK, Golaghat and KVK North Lakhimpur.
- Conduced Farmer’s Training under the project AICRP on STCR at Maharipara Village, Goreswar, Dist-Baksa on 30th Nov, 2018.
- Conduced Farmer’s Training under the project AICRP on STCR at Barbalishiha Village, Tamulpur, Dist-Baksa on 25th Jan, 2019.
- Acted as Resource Person for the HRD Training Programme on Crop Production for SMS/PA of KVKs of Assam on 19.03.2019 in the Directorate of Extension Education, AAU, Jorhat.
- Acted as expert in Write Shop for developing Rice Knowledge Bank under APART project from 6th to 8th Dec, 2018.
- Acted as expert in Write Shop for developing Rice Knowledge Bank under APART project from 9th to 10th Jan, 2019.
7. Developmental Activities

The Developmental Activities continued in the University during 2018-19 with the support, from ICAR and other agencies. Some of the important activities carried out during the year with the support mostly from ICAR, are mentioned below.

7.1. College of Agriculture/ Community Science, Jorhat
- The newly constructed college building of College of Community Science, Jorhat was inaugurated on 26th June, 2018 by Mr. H. Goswami, Hon’ble Speaker; Assam Assembly inaugurates New Building of College of Community Science.

7.2. Biswanath College of Agriculture, Biswanath
- Construction of RCC Staging 8.0 meter high at Girls' hostel costing rupees Rs. 6,87,208.
- Construction of Practical Class room (at Crop field) costing rupees Rs. 6,27,889.
• Repairing and renovation in Girls' hostel No-2 including a front assembly space costing rupees Rs.7,97,000.
• Repairing, renovation and modernization of UG classroom at Academic Block-B costing rupees Rs.11,90,220.

7.3. College of Fisheries Science, Raha
• Expenses of Rs. 50,00,000. for construction of an Examination Hall.

7.4. College of Veterinary Science, Khanapara
• One Digital P\textsuperscript{M} Meter was purchased.
• One Trinocular Research Microscope with Camera was purchased.
• Five Monocular Microscope were purchased.
• Electrical works of Operation Theatre at Clinics Complex costing Rs.6,16,000.
• Reconstruction of Campus boundary wall in different places costing Rs.8,34,000.
• Replacement of damaged water supply pipelines of the main campus costing Rs.5,91,000.
• Repair/ renovation of Buffalo Shed to convert it into a new Cattle Shed costing Rs.8,00,000.
• Renovation/repair works in the inside of the Department of Anatomy & Histology costing Rs. 623,649.
• Face-lifting of different structures on occasion of International Seminar costing Rs.8,25,000.
• Repair/ renovation of the Dean's office (FVSc) and Seminar Hall (civil works) costing Rs. 6,79,000.
• Repair/ renovation of Dean's office (FVSc) and Seminar Hall (furniture, W/S & sanitary and electrical works) costing Rs.946,000.
• Repair/ renovation of damaged stone masonry/ brick masonry boundary wall costing Rs.49,55,000.
• Construction of Postmortem Hall under Department of Pathology main building costing Rs.13,96,495.
• Different development works at In-patient Unit of TVCC costing Rs.11,38,215.

7.5. Lakhimpur College of Veterinary Science, Lakhimpur
• Construction of TVCC building.
• Construction of boundary wall.
• Construction of farm building.
• Construction of RCC staging and water supply pipe.
• Construction of Main Gate.
• Construction of Auditorium.

7.6. Sarat Chandra Sinha College of Agriculture, Dhubri
• Development of Playground.
• Construction of College Canteen.
• Construction of Second Academic Building.
• Construction of Second floor of Girls' Hostel (under construction).

7.7. Other constructions
• Construction of the State Bank of India and Post Office building costing Rs.1,91,30,600 at the main campus.
• Construction of Community Hall cum Guest House under Cost of Cultivation Scheme, AAU, Jorhat costing Rs.2,45,21,000.
Assam Agricultural University was graced by the visits of several dignitaries during 2018-19 to its Colleges and Research Centres. The details of their visits are given below:

A. College of Agriculture, Jorhat

- Dr. Puspendra, Soybean Breeder from GBPUAT, Pantnagar visited the Department of Plant Breeding & Genetics on 27th August, 2018.
- Dr. Rakesh K. Verma, Soybean Agronomist from Indian Institute of Soybean Research, Indore, visited the Department of Plant Breeding & Genetics on 27th August, 2018.
- Dr. S. Rangaiah, Professor from Department of Genetics & Plant Breeding, UAS. Bengaluru visited the Department of Plant Breeding & Genetics on 12th December, 2018.
- Dr. S.J. Jambhulkar, Scientist from B.A.R.C., Trombay, Mumbai visited the Department of Plant Breeding & Genetics on 12th December, 2018.
- Dr. B.C. Saha, Dean, PG Studies from Bihar Agricultural University, Sabour visited the Department of Plant Breeding & Genetics on 31st December, 2018.
- Dr. R.L. Agarwal from GBPUAT, Pantnagar visited the Department of Plant Breeding & Genetics from 16th March-12th April, 2019.
- Dr. M. Morell, DG, IRRI, Dr. P.K. Chokravarty, ADG (PP & B) from DG, IRR ADG (PP & B) visited the Department of Entomology from August-September, 2018.
- Dr. Khairul Ansari, Staff Scientist, Division of Neurosurgery, City of Hope National Medical Centre, Duarte, California, delivered a talk on the topic “Oligodendrocyte Progenitor Cell Mediated Blockade of Breast Cancer Leptomeningial Metastasis” visited the Department of Agricultural Biotechnology on 24th January, 2019.
- Dr. T. Janakiram & Dr. P. Monivel from ADG, ICAR, New Delhi, Director, Anand, Gujrat visited the Department of Horticulture on 28th September, 2018.
- Mr. Sanjio Kumar, IFS, Executive Director, Tea Board, India visited the Department of Tea Husbandry and Technology on 12th September, 2018.
- Mr. Arun Kr. Ray, IPS, Vice-Chairman, Tea Board, India visited the Department of Tea Husbandry and Technology on 12th September, 2018.
- Mr. R. Hazarika, Asstt. Director, Tea Board, India visited the Department of Tea Husbandry and Technology on 12th September, 2018.
- Ms. Yan Hou, Kunchi Hu, Meiqiao Cao, Tengfei Xu, Congcong Dai, Zheniang Liu, Yuzhe Cai, and Yan hou from Anhui Agricultural University, China visited the Department of Tea Husbandry and Technology from 25th-28th September, 2018.
- Prof. Chien-Tech-Chen, Alex Ng Wai, Wang Ai Li, Joyu Chen, Chen Chia Hung, C J ChuanChe from National Chung Hsing University, Taichung, Taiwan visited the Department of Tea Husbandry and Technology on 14th December, 2018.
- Dr. R. L. Agarwal, Retd. Professor, G.B. Pant University of Agriculture & Technology, Pantnagar, visited the Department of Tea Husbandry and Technology on 16th March, 2019.
- Dr. K. J. Ramesh from Director of General, India Meteorological Department, New Delhi visited
the Department of Agrometerology on 27th February, 2019.

- Mr. Andreas Leuenberger, Finance Officer, Swiss Bank, Switzerland visited the Department of Agricultural Economics & Farm Management on 27th November, 2018.

- Dr. S. K. Tyagi, Project Coordinator, AICRP on PHET, visited AAU Jorhat and took stock of the on-going activities of the AAU PHET centre; visited the Department of Agricultural Engineering from 3rd - 4th February, 2019.

- Dr. Suraj Singh Baghel visited the Department of Soil Science on 19th April, 2018.

- Dr. Ravikant Avasthe, Principal Scientist (Soil) & Joint Director, ICAR-National Organic Farming Research Institute (ICAR-NOFRI), Tadong, Gangtok, Sikkim visited the Department of Soil Science from 22nd - 23rd November, 2018.


- Mr. Ranjan Daipaayan Sen, Secretary, Jalpaiguri Vivekananda Education Society, Regional Council– PGS India Organic Certification, visited the Department of Soil Science on 8th February, 2019.

- Dr. Chirantan Chattopadhyay, Vice-Chancellor, UBKV, Pundibari, Cooch Behar, West Bengal visited the Department of Soil Science on 19th February, 2019.

B. College of Community Science, Jorhat

- Sri Hitendra Nath Goswami, Hon’ble Speaker, Assam Legislative Assembly visited College of Community Science on 26th June, 2018.

- Sri Kamakhyta Prasad Tasa, Hon’ble Member of Parliament visited College of Community Science on 26th June, 2018.


- Sri Hrishikesh Goswami, Press Advisor to the Hon’ble Chief Minister, Assam visited College of Community Science on 20th February, 2019.

- Mr. Rajesh Prasad, IAS, Agricultural Production Commissioner visited College of Community Science on 1st April, 2019.

C. College of Veterinary Science, Khanapara

- Dr. Tarani Kanta Barman, Senior Consultant, Nanogen Pharmaceuticals (Sister concern Nanoproteagen-Boston, USA) Indian Institute of Technology Delhi, Haus Khas, NEW Delhi, Visited Department of Physiology on 30th January 2019.

- Michael Friend, Pro- Vice Chancellor, Charles Sturt University, Australia visited the Department of Animal Genetics and Breeding on 10th October, 2019.

- Dr. Ashis Kr Ghosh, Professor Animal Genetics and Breeding, College of Veterinary and Animal Sciences, G.P. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand visited the Department of Animal Genetics and Breeding on 10th October 2019.

- Dr. A.S. Yadav, Professor and Head, Dept of AGB, LUVAS, Hisar visited the Department of Animal Genetics and Breeding on 10th October, 2019.

- Dr. S.M. K. Karthickeyan, Professor and Head, AGB, Madras Veterinary College, Chennai, TANUVAS visited the Department of Animal Genetics and Breeding on 10th October, 2019.
• Dr. Nitin Bhatia, Sr. General Manager (Tech and Res) cum Chief Editor- Intas Polivet, Intas Pharm Ltd, Ahmedabad visited the Department of Veterinary Surgery and Radiology.
• Dr. Tim Hackett, Deptt. of Clinical Science, Colorado State University, USA visited the Department of Veterinary Surgery and Radiology.
• Dr. Praveen Kumar, Superintendent, Super Specialty Vet. Hospital, Hyderabad visited the Department of Veterinary Surgery and Radiology.
• Dr. J. K. Cooper, Deptt. of Clinical Science, Colorado State University, USA visited the Department of Veterinary Surgery and Radiology.
• Dr. Anil Kr Hatekar, President, Veterinary Orthopaedic Foundation visited the Department of Veterinary Surgery and Radiology.
• Dr. Kiran Kumar, Executive Member, Veterinary Orthopaedic Foundation visited the Department of Veterinary Surgery and Radiology.
• Dr. Udoy Kumar Mahanta of Sher-e-Bangla Agril. Univ., Dhaka, Bangladesh with a team of students of 5th Yr. class for an Internship training Programme visited the Department of Parasitology from 5th to 16th December, 2019.
• Dr. P.S Banerjee, Prof & Head, Division of Parasitology, IVRI, Izatnagar, Uttarakhand on WVD day arrived at the invitation of Director of Clinics, TVCC, Khanapara on 28th April, 2018.

D. BNCA, Biswanath Chariali
• Dr. P. K. Das, Dean, School of Humanities and Social Sciences, Tezpur Central University visited BNCA on 02nd June, 2018.
• Mr. Rabendra Kumar Das, IAS (Retd), Guwahati, Assam visited BNCA on 22nd September, 2018.
• Dr. P. G. Patil, Director, ICAR-CIRCOT, Mumbai visited BNCA on 26th December, 2018.
• Dr. N. C. Talukdar, Director, IASST, Guwahati, Assam visited BNCA on 2nd February, 2019.
• Mr. P. R. Khand, Deputy Commissioner, Biswanath district, Biswanath Chariali visited BNCA on 24th February, 2019.
• Mr. P. Borthakur, MLA, Biswanath LAC visited BNCA on 24th February, 2019.

E. College of Fisheries, Raha
• Rakesh Kumar, IAS Joint Secretary, Department of Fishery, Govt. of Assam visited College of Fisheries on 12th July, 2017.
• Prof. C.V. Mohan, Research and Development Manager, Network of Aquaculture Centers in the Asia Pacific Visited College of Fisheries on 14th July, 2018.
• Mr. Mayur Bora, Social Activist and Faculty of Indian Institute of Bank Management, Guwahati, Assam visited College of Fisheries on 27th Sept., 2018.
• Mr. J. Taba, Director, Department of Fisheries, Govt. of Arunachal Pradesh visited College of Fisheries on 9th July, 2018.
• Prof. W. Vishwanath, Department of Life Sciences, Manipur University, visited College of Fisheries on 9th July, 2018.
• Dr. A. Pavan Kumar, Scientist, Fish Genetics and Biotechnology Division, Central Institute of Fisheries Education, Mumbai visited College of Fisheries on 9th July, 2018.
• Dr. Dandadhar Sarma, Professor, Department of Zoology, Gauhati University visited College of Fisheries on 9th January, 2019.

F. DBT-AAU, Jorhat
• Dr. T. J. Higgins, Honorary Fellow, CSIRO Food and Agriculture, Canberra visited DBT-AAU Center from 18th - 19th November, 2018.
• Dr. Md. Aslam, Adviser, DBT, Govt. of India, New Delhi visited DBT-AAU Center from 18th - 19th November, 2018
• Dr. T. Madhan Mohan, Consultant Adviser, DBT-NERBPMC, Govt. of India, New Delhi visited DBT-AAU Center from 18th - 19th November, 2018.
• Dr. Sunil Mukherjee, Senior Scientist, INSA, New Delhi, visited DBT-AAU Center from 18th - 19th November, 2018.
• Dr. M. V. Deshpande, Emeritus Scientist, NCL, Pune, visited DBT-AAU Center from 18th - 19th November, 2018 and from 25th - 26th March, 2019.
• Prof. Douglas Cook, University of California, DAVIS, USA, Director, USAID, Feed the Future Innovation Lab, visited DBT-AAU Centre from 25th - 26th March, 2019.
• Prof. N. K. Singh, ICAR-National Professor (B P Pal Chair) & Director NRCPB, New Delhi visited DBT-AAU Centre from 25th - 26th March, 2019.

• Dr. Alok Adholeya, Director, TERI, New Delhi, visited DBT-AAU Centre from 25th - 26th March, 2019.

• Dr. Ashok Giri, NCL, Pune, visited DBT-AAU Centre from 25th-26th March, 2019.

G. Fisheries Research Centre, AAU, Jorhat

• Dr. M. Premjit Singh, Vice-Chancellor, CAU visited the Fisheries Research Centre on 27th April, 2018.

• Dr. N. S. Rathore, DDG (Education), ICAR, New Delhi visited the Fisheries Research Centre on 14th June, 2018.

• Production Commissioner, GoA along with Director of Research (Agri.) and Director of Extension visited the Fisheries Research Centre on 29th June, 2018.

• Sri Hrishikesh Goswami, Press Adviser to the Hon'ble CM of Assam, along with Director of Research (Agri.) visited the Fisheries Research Centre on 20th February, 2019.
Mr. Jeevan Mohanty, Consultant, IFAD, UNO, New Delhi and Dr. Arman Ullah Mazadaddi, Principal Scientist, CIPHET, ICAR visited the Fisheries Research Centre on 10th September, 2018.

His Excellency Norwegian Ambassador, Nils Ragnar Kasmvag and his team along with Director of Research (Agri.) visited the Fisheries Research Centre on 10th October, 2018.

H. Lakhimpur College of Veterinary Science, North Lakhimpur

- Dr. K. M. Bujarbaruah, Vice-Chancellor, AAU visited LCVSc on 22nd September, 2018.
- Dr. Abhijit Mitra, Director of NRC Mithun visited LCVSc on 22nd September, 2018.
- Dr. Ronuj Pegu, MLA, Dhemaji Constituency visited LCVSc on 22nd September, 2018.
- Dr. Harpal Singh Suri, Joint Director of Health Services, Lakhimpur visited LCVSc on 28th September, 2018.
- Dr. Dilip Sarma, Joint Director, Animal Husbandry & Veterinary visited LCVSc on 28th September, 2018.
- Shri. Pradan Baruah, Hon’ble Member of Parliament, North Lakhimpur visited LCVSc on 27th November, 2018.
- Dr. Amin Addl., D.C., Lakhimpur visited LCVSc on 10th January, 2019.

I. SCS College, Agriculture, Dhemaji

- Dr. K. M. Bujarbaruah. Honourable Vice-Chancellor, AAU, Jorhat visited SCS college on the occasion of Annual College Meet on 27th-29th November, 2018.
- Dr. H.C. Bhattacharjee, Ex. DEE, AAU, Jorhat visited SCS College on the occasion of Annual College Meet on 27th-29th November, 2018.
- Dr. H.C. Bhattacharjee, Ex. DEE, AAU Jorhat visited SCS College on the occasion of SCSCA Foundation Day on 22nd August, 2018.
- Dr. Promod Deka, Sr. Scientist and Head, KVK, Sonitpur visited SCS College on the occasion of SCSCA Foundation Day on 22nd August, 2018.
- Dr. Dhiren Kalita, Sr. Scientist and Head, KVK, Kamrup visited SCS College on the occasion of SCSCA Foundation Day on 22nd August, 2018.
- Dr. K.K. Sharma, PI & Nodal Officer, NAHEP visited SCS College on the occasion of Workshop on NAHEP on 4th December, 2018.
- Dr. R. P. Bhuyan, Director of Students Welfare, AAU, Jorhat visited SCS College on the occasion of Workshop on NAHEP on 4th December, 2018.

J. College of Sericulture

- Dr. Vinoda K.S. and Dr. Radha B.N. of College of Sericulture, Chintamani, UAS, Bangalore visited the college on 20th November, 2018.
9. Finance

The University received its financial resources from various sources like State Government, ICAR, GOI and internal source of the University. During 2018-19 financial year, the University received an amount of Rs. 5,0665.05 lacs from these sources of which around 69 per cent was received under Plan head and the rest under Non-plan head. State Government contributed the maximum (around 70 per cent) to this fund followed by ICAR and others (Table 9.1).

<table>
<thead>
<tr>
<th>Receipt</th>
<th>State</th>
<th>ICAR</th>
<th>GOI</th>
<th>Internal Receipt</th>
<th>Total (Rupees in Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Plan</td>
<td>34,975.40</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>34,975.40</td>
</tr>
<tr>
<td>Plan</td>
<td>5,68.00</td>
<td>9,913.75</td>
<td>3,695.90</td>
<td>–</td>
<td>14,177.65</td>
</tr>
<tr>
<td>Internal Receipt</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1,512.00</td>
<td>1,512.00</td>
</tr>
<tr>
<td>Total</td>
<td>35,543.40</td>
<td>9,913.75</td>
<td>3,695.90</td>
<td>1,512.00</td>
<td>5,0665.05</td>
</tr>
</tbody>
</table>

Table 9.1. Receipt of fund (in Lacs) by Assam Agricultural University during 2018-19.
## APPENDIX- I

### Externally Funded Research Projects in operation in the Faculty of Agriculture and Community Science during 2018-19

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Faculty of Agriculture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All India Coordinated Research Project (AICRP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>AICRP on Forage Crops and Utilization</td>
<td>ICAR</td>
<td>Dr. Karuna Kr. Sharma</td>
</tr>
<tr>
<td>2</td>
<td>AICRP on Integrated Farming System</td>
<td>ICAR</td>
<td>Dr. Karuna Kr. Sharma</td>
</tr>
<tr>
<td>3</td>
<td>AICRP on HONEYBEE</td>
<td>ICAR</td>
<td>Dr. Ataur Rahman</td>
</tr>
<tr>
<td>4</td>
<td>AICRP on Biological Control of Crop Pests and Weeds</td>
<td>ICAR-NBAIR</td>
<td>Dr. Dilip Kr. Saikia</td>
</tr>
<tr>
<td>5</td>
<td>AICRP on Agro meteorology</td>
<td>ICAR-CRIDA</td>
<td>Dr. Bondita Goswami</td>
</tr>
<tr>
<td>6</td>
<td>AICRPAM-NICRA</td>
<td>ICAR-CRIDA</td>
<td>Dr. Bondita Goswami</td>
</tr>
<tr>
<td>7</td>
<td>AICRP on tuber crops other than potato</td>
<td>ICAR</td>
<td>Dr. Sheriful Alam</td>
</tr>
<tr>
<td>8</td>
<td>AICRP on Vegetable crops</td>
<td>ICAR</td>
<td>Dr. Sailen Gogoi</td>
</tr>
<tr>
<td>9</td>
<td>AICRP on Fruits</td>
<td>ICAR</td>
<td>Dr. Kartik Baruah</td>
</tr>
<tr>
<td>10</td>
<td>AICRP on Nematodes in Agriculture</td>
<td>ICAR</td>
<td>Dr. Debanand Das</td>
</tr>
<tr>
<td>11</td>
<td>AICRP on Post-Harvest Engineering &amp; Technology</td>
<td>ICAR</td>
<td>Dr. Abhijit Borah</td>
</tr>
<tr>
<td>12</td>
<td>AICRP on Farm Implements and Machines</td>
<td>ICAR</td>
<td>Er. Manas J. Barooah</td>
</tr>
<tr>
<td>13</td>
<td>AICRP on Rice</td>
<td>ICAR</td>
<td>Dr. Tamizuddin Ahmed</td>
</tr>
<tr>
<td>14</td>
<td>AICRP on Fruits (CRS and AAU)</td>
<td>ICAR</td>
<td>Dr. Amrit Ch. Barbora and Dr. Nibedita Borgohain</td>
</tr>
<tr>
<td>15</td>
<td>AICRP on Rapeseed and Mustard</td>
<td>ICAR</td>
<td>Dr. N. K. Sarmah</td>
</tr>
<tr>
<td>16</td>
<td>AICRP on MULLARP</td>
<td>ICAR</td>
<td>Dr. Hiranya Kr. Bora</td>
</tr>
<tr>
<td>17</td>
<td>AICRP on Wheat</td>
<td>ICAR</td>
<td>Dr. Pankaj Kr. Devchoudhury</td>
</tr>
<tr>
<td>18</td>
<td>AICRP on Linseed</td>
<td>ICAR</td>
<td>Dr. Utpal Kr. Bora</td>
</tr>
<tr>
<td>19</td>
<td>AICRP on Palm</td>
<td>ICAR</td>
<td>Dr. Jogesh Ch. Nath</td>
</tr>
<tr>
<td>20</td>
<td>AICRP on Agro Forestry</td>
<td>ICAR</td>
<td>Dr. Ayub Ali Ahmed</td>
</tr>
<tr>
<td>21</td>
<td>AICRP on Floriculture</td>
<td>ICAR</td>
<td>Dr. Sunil Kr. Borah</td>
</tr>
<tr>
<td>22</td>
<td>AICRP on Spices</td>
<td>ICAR</td>
<td>Dr. Kusum Kr. Deka</td>
</tr>
<tr>
<td>23</td>
<td>AICRP on Maize</td>
<td>ICAR</td>
<td>Mr. Nabajyoti Bhuyan</td>
</tr>
<tr>
<td>24</td>
<td>AICRP on Small Millets</td>
<td>ICAR</td>
<td>Dr. Sunil Kr. Paul</td>
</tr>
<tr>
<td>25</td>
<td>AICRP on Sugarcane</td>
<td>ICAR</td>
<td>Dr. Bijnan Bordoloi</td>
</tr>
<tr>
<td>26</td>
<td>AICRP on Dry land Agriculture</td>
<td>ICAR</td>
<td>Dr. Pallab Kr. Sharma</td>
</tr>
<tr>
<td>27</td>
<td>AICRP on MAP &amp; Betel vine</td>
<td>ICAR</td>
<td>Dr. Bijit Kr. Saud</td>
</tr>
<tr>
<td>28</td>
<td>AICRP on Water Management</td>
<td>ICAR</td>
<td>Dr. Ramani Kanta Thakuria</td>
</tr>
<tr>
<td>29</td>
<td>AICRP on Potato</td>
<td>ICAR</td>
<td>Dr. Promode Ch. Bhagawati</td>
</tr>
<tr>
<td>30</td>
<td>AICRP on National Seed Project (Crops): Breeder Seed Production and Seed Technology Research</td>
<td>ICAR</td>
<td>Dr. Prakash Borah</td>
</tr>
<tr>
<td>31</td>
<td>AICRP on Soybean</td>
<td>ICAR</td>
<td>Dr. Prasanta Kr. Goswami</td>
</tr>
<tr>
<td>32</td>
<td>AICRP on Micro &amp; Secondary Nutrients and Pollutant Elements in Soils and Plants</td>
<td>ICAR</td>
<td>Dr. Anjali Basumary</td>
</tr>
<tr>
<td>33</td>
<td>AICRP on Mushroom</td>
<td>ICAR</td>
<td>Dr. Dilip Kr. Sharma</td>
</tr>
<tr>
<td>34</td>
<td>AICRP on Direct seeded rice (DSR)</td>
<td>AICRP</td>
<td>Dr. Nabab T. Rafique</td>
</tr>
<tr>
<td>35</td>
<td>AICRP on Fruits (CRS, Tinsukia Centre)</td>
<td>ICAR</td>
<td>Dr. Raj Kr. Kakoti</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the Scheme</td>
<td>Funding Agency</td>
<td>In-Charge</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>36</td>
<td>AICRP on Chickpea</td>
<td>ICAR</td>
<td>Dr. Idrish Ali Sheikh</td>
</tr>
<tr>
<td>37</td>
<td>AICRP on Wheat and Barley</td>
<td>ICAR</td>
<td>Dr. Tulsi Pd. Saikia</td>
</tr>
<tr>
<td>38</td>
<td>ICAR Seed Project on Agricultural Crops</td>
<td>ICAR</td>
<td>Dr. Mrinal Saikia</td>
</tr>
<tr>
<td>39</td>
<td>AICRP on Soil Test Crop Response (STCR)</td>
<td>ICAR</td>
<td>Dr. Kulendra N. Das</td>
</tr>
<tr>
<td>40</td>
<td>AICRP on Rice Improvement</td>
<td>ICAR</td>
<td>Dr. Ranjit Kr. Choudhury</td>
</tr>
<tr>
<td>41</td>
<td>AICRP on Weed Management</td>
<td>ICAR</td>
<td>Dr. Iswar Ch. Barua</td>
</tr>
</tbody>
</table>

**B. Network Projects**

1. AINP on Soil Biodiversity-Biofertilizers  
   - ICAR  
   - Dr. Dhruba Jyoti Nath
2. AINP on Soil Arthropod Pests  
   - ICAR  
   - Dr. Badal Bhattacharyya
3. AINP on Conservation of lac insect genetic resources  
   - ICAR-IINRG  
   - Dr. Purnima Das
4. AINP on Jute and Allied Fibres  
   - ICAR  
   - Dr. Pradip Kr. Das
5. AINP on Rodent Control  
   - ICAR  
   - Dr. Ratul Kr. Borah
6. AINP on Project on Economic Ornithology  
   - ICAR  
   - Dr. Prabal Saikia
7. AINP on Precision Farming Development Centres  
   - ICAR  
   - Dr. Pradip Mahanta
8. AINP on Vertebrate Pest Management (VPM)  
   - ICAR  
   - Dr. Prabal Saikia
9. AINP on Agricultural Acarology  
   - ICAR  
   - Dr. Sahidur Rahman

**C. Ad hoc Research Projects**

**C1. Ongoing Research Project (Continuing)**

1. Farmers’ Innovation-Decision Pattern in relation to Recommended Rice Production Technology - A Study in Upper Brahmaputra Valley Zone of Assam.  
   - AAU  
   - Dr. Utpal Barman
2. Participatory technology assessment for enhancing farming system productivity and developing entrepreneurship for sustainable rural livelihood.  
   - ICAR  
   - Dr. Prasanna Kr. Pathak
3. Augmentation of Agriculture through Efficient Resource Utilization Stress Tolerance Rice For Poor farmers in Africa and South Asia (Phase 3) and Eastern India Rainfed Lowland Shuttle Breeding Programme with Participatory Approach.  
   - OIL India, Duliajan  
   - Dr. Mrinal Saikia
4. Development of gamma ray induced mutant strain of honeybees resistant to insecticides  
   - BRNS-GOI  
   - Dr. Mukul Kr. Deka
5. Field evaluation of wettable powder formulation of an indigenous strain of Beauveria bassiana (Bals.) Vuill. against Cnaphalocrocis medinalis (Guenee) and Nymphula depunctalis (Guenee).  
   - DST-GOI  
   - Dr. Purnima Das
6. Development of Leaf Folder (Cnaphalocrocis medinalis) resistance rice variety through mutation breeding.  
   - BRNS-GOI  
   - Dr. Purnima Das
7. Word Bank Financed Assam Agri-Business and Rural Transformation Project (APART), Govt. of Assam.  
   - World Bank  
   - Dr. Kalyan Pathak
8. Development of stem borer (Scirpophaga incertulus) resistance jaha rice variety through mutation breeding.  
   - BRNS-GOI  
   - Dr. Anjumoni Devee
   - IMD  
   - Dr. Rafiul Hussain
10. Forecasting Agricultural output using Space, Agrometeorology and Land-based observations (FASAL).  
    - IMD  
    - Dr. Rajib L. Deka
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Estimation of loss in culture fisheries and their management during and after flood in and around Jorhat.</td>
<td>AAU</td>
<td>Mr. Dipanjan Kashyap</td>
</tr>
<tr>
<td>12</td>
<td>Prospect of Marketing of Medicinal Plants in the state of Assam.</td>
<td>AYUSH-NMPB</td>
<td>Dr. Nivedita Deka</td>
</tr>
<tr>
<td>13</td>
<td>Resource Use Planning for Sustainable Agriculture</td>
<td>ICAR</td>
<td>Dr. Nivedita Deka</td>
</tr>
<tr>
<td>14</td>
<td>Establishment and Management of AAU Data Bank.</td>
<td>RKVY</td>
<td>Dr. Nivedita Deka</td>
</tr>
<tr>
<td>15</td>
<td>Understanding mechanisms of tolerance to low light stress in rice.</td>
<td>ICAR</td>
<td>Dr. Bhagawan Bharali</td>
</tr>
<tr>
<td>16</td>
<td>Development of improved moisture stress tolerant variety in Indian Mustard through mutation breeding.</td>
<td>BRNS-GOI</td>
<td>Dr. Ranjan Das</td>
</tr>
<tr>
<td>17</td>
<td>Crop condition assessment under abiotic stress of few selected major crops of NER using remote sensing technique.</td>
<td>ISRO</td>
<td>Dr. Ranjan Das</td>
</tr>
<tr>
<td>18</td>
<td>Study of diversity of Rice in Karbi Anglong district of Assam: Implication for biodiversity conservation under changed climate condition.</td>
<td>GBPNIHESD</td>
<td>Dr. Ranjan Das</td>
</tr>
<tr>
<td>19</td>
<td>Tapping Of Carbon Dioxide In Rice Ecosystem Through Azolla Cultivation.</td>
<td>RKVY</td>
<td>Dr. Ranjan Das</td>
</tr>
<tr>
<td>20</td>
<td>Design and performance evaluation of solar tunnel type dryer for on-farm post-harvest processing of high value horticultural products of NE region.</td>
<td>MoHRD</td>
<td>Er. Manas J. Barooah</td>
</tr>
<tr>
<td>21</td>
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<td>118</td>
<td>Development of next gen nano-bioformulation of seed treatment of major agricultural crops</td>
<td>RKVY</td>
<td>Dr. Pranab Dutta</td>
</tr>
<tr>
<td>119</td>
<td>Mission for Integrated Development of Horticulture (MIDH)</td>
<td>DASD</td>
<td>Mr. Sanjib Sharma</td>
</tr>
<tr>
<td>120</td>
<td>Integrated approach to understand agarwood formation and value addition of Agarwood (Aqualaria malaccensis)</td>
<td>DBT-GOI</td>
<td>Dr. Madhumita Barooah</td>
</tr>
<tr>
<td>121</td>
<td>Bio-prospecting of some indigenous medicinal plants of NE region of India with special reference to Anti-inflammatory properties</td>
<td>DBT-GOI</td>
<td>Dr. Iswar Ch. Barua</td>
</tr>
<tr>
<td>122</td>
<td>Advanced breeding of carps through enhancement of environmental temperature by using UV stabilized LDPE film</td>
<td>RKVY</td>
<td>Dr. Bibha Chetia Borah</td>
</tr>
<tr>
<td>123</td>
<td>Technology show casing on integrated three tier poultry-pig-fish farming system</td>
<td>RKVY</td>
<td>Dr. Bibha Chetia Borah</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the Scheme</td>
<td>Funding Agency</td>
<td>In-Charge</td>
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</tr>
<tr>
<td>124</td>
<td>Low cost Aquaponics system as a component of integrated livestock fish farming</td>
<td>RF of FRC, AAU</td>
<td>Dr. Bibha Chetia Borah</td>
</tr>
<tr>
<td>125</td>
<td>Development of Automatic fish seed grader cum counter</td>
<td>DIC-IIT, Guwahati</td>
<td>Dr. Bibha Chetia Borah</td>
</tr>
<tr>
<td>126</td>
<td>Induced breeding and seed production of indigenous climbing perch (<em>Anabas testudineus</em>)</td>
<td>RF of FRC, AAU</td>
<td>Mr. Biswajyoti Bordoloi</td>
</tr>
</tbody>
</table>

### C2. Ad Hoc Research Project (New)

1. Molecular dissection of defense against sigatoka infection in Banana; Exploitation of Musa germplasm of North East for development of sigatoka resistant hybrid
   - Funding Agency: DBT-GOI-NER
   - In-Charge: Dr. Priyadarshini Bharali

2. Whole Genome and Transcriptome study of stress – Tolerant banana Cultivars
   - Funding Agency: DBT-GOI
   - In-Charge: Dr. Mohendra Kr. Modi

3. Development of mutant with novel characteristics in Gladiolus through irradiation
   - Funding Agency: DAE-GOI
   - In-Charge: Dr. Reena B. Phookan

4. Integrated approach to under syandnagarhood formation and value addition of Agarwood
   - Funding Agency: DBT-GOI
   - In-Charge: Dr. Madhumita Borooah

5. Development, standardization and dissemination of cultivation package of medicinal plant of commercial importance in foot hill region of Eastern Himalaya
   - Funding Agency: AYUSH
   - In-Charge: Dr. Hemen Choudhury

6. Mainstreaming agricultural biodiversity conservation and utilization in agricultural sectors to ensure ecosystem services and reduce vulnerability
   - Funding Agency: GEE
   - In-Charge: Dr. Dhruba Jyoti Nath

7. Policy imperatives for promoting value chains Agricultural commodities in India
   - Funding Agency: ICAR-NIAP
   - In-Charge: Dr. Ramen Kr. Sarmah

8. Production of Healthy Planting Materials of Orange (*Citrus reticulata* Blanco) & Assam Lemon (*Citrus lemon* (Linn. Burmann) through budwood certification programme and its distribution to growers in Assam and other northeastern states
   - Funding Agency: DBT-GOI
   - In-Charge: Dr. Amrit Ch. Borbora

9. Improved crop management and Strengthened seed Supply system for drought prone rain-fed lowlands in South Asia
   - Funding Agency: IRRI-IFAD funded project
   - In-Charge: Dr. Khagen Kurmi

10. Biotechnological Interventions through RNAi Approach for Management of Banana Bunchy Top Virus (BBTV) in Northeast Region of India
    - Funding Agency: DBT-GOI
    - In-Charge: Dr. Palash Deb Nath

11. Management of low temperature and soil moisture deficit stresses in banana grown in North Eastern India
    - Funding Agency: DBT-GOI
    - In-Charge: Dr. Prakash Kalita

12. Harnessing the potential of endophytes against root knot nematode, Meloidogyne incognita in Banana
    - Funding Agency: DBT-GOI
    - In-Charge: Dr. Bhabesh Bhagawati

13. Biotechnological interventions through RNAi approach for management of Banana Bunchy Top virus (BBTV) in Northeast Region of India
    - Funding Agency: DBT-GOI
    - In-Charge: Dr. Priyabrata Sen

14. Screening of Banana Germplasm from the N. E. for Fosarium wilt resistance and molecular characterization in contrasting genotypes
    - Funding Agency: DBT-GOI
    - In-Charge: Dr. Ashok Bhattacharyya
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Downstream processing for utilization of banana wastes for natural fibre extraction, fiber based products, biomass briquettes &amp; utility compounds</td>
<td>DBT-GOI</td>
<td>Dr. Pritom Kr. Borthakur</td>
</tr>
<tr>
<td>16</td>
<td>Development of Citrus tristeza virus (CTV) resistant elite mandarin genotypes through RNAi approach to revive citrus industry in Northeast India</td>
<td>DBT-GOI</td>
<td>Dr. Palash Deb Nath</td>
</tr>
<tr>
<td>17</td>
<td>Engineering of CRISPR/Cas 9-mediated potato virus Y (PVY) resistance in Bhut Jolokia (Capsicum chinense)</td>
<td>DBT-GOI</td>
<td>Dr. Ratna Kalita</td>
</tr>
<tr>
<td>18</td>
<td>Identification of the Genetics Associated with Resistant Starch Content in Rice for nutraceutical benefits</td>
<td>DBT-GOI</td>
<td>Ms. Bhaswati Sarmah</td>
</tr>
<tr>
<td>19</td>
<td>Establishment of Biotechkishan hub at Assam Agril. University, Jorhat</td>
<td>DBT-GOI</td>
<td>Dr. Sarat Saikia</td>
</tr>
<tr>
<td>20</td>
<td>Regional-Cum-Facilitation Centre (RCFC)</td>
<td>AYUSH</td>
<td>Dr. Iswar Ch. Baruah</td>
</tr>
<tr>
<td>21</td>
<td>Multifaceted exploration of edible molluscs of North East India</td>
<td>DBT-GOI</td>
<td>Dr. Badal Bhattacharyya</td>
</tr>
<tr>
<td>22</td>
<td>Optimizing resources for identification of potential sorghum forage hybrids using Genomic selection</td>
<td>DBT-GOI</td>
<td>Dr. Ramendra Nath Sarma</td>
</tr>
<tr>
<td>23</td>
<td>Study the virome RNAome and leaf curl diseases manifestation in BhutJolokia (C. chinense) and C. fruitescens of North East India</td>
<td>DBT-GOI</td>
<td>Dr. Basanta Kumar Borah</td>
</tr>
<tr>
<td>24</td>
<td>Exploring rhizospheric microbiome (PGPR and AM Fungi) for regulating the expression of Zinc transporter genes (ZRT) in rice to augment the Zinc nutrition</td>
<td>DBT-GOI</td>
<td>Dr. Dhruba Jyoti Nath</td>
</tr>
<tr>
<td>25</td>
<td>Engineering resistance against cucumber mosaic virus in king chilly/chilli through RNA silencing technology</td>
<td>DBT-GOI</td>
<td>Dr. Munmi Borah</td>
</tr>
<tr>
<td>26</td>
<td>Introgression of Phosphorus stress tolerant and multiple disease resistance genes into rice through market assisted selection</td>
<td>DBT-GOI</td>
<td>Dr. Akashi Sarma</td>
</tr>
<tr>
<td>27</td>
<td>Bio prospecting of some indigenous medicinal plants of NE Region of India with special reference to Anti Inflammatory properties</td>
<td>DBT-GOI</td>
<td>Dr. Iswar Ch. Baruah</td>
</tr>
<tr>
<td>28</td>
<td>Improved mechanization in post-harvest to reduce losses and improve quality</td>
<td>ICAR-IRRI</td>
<td>Dr. Pradip Ch Dey</td>
</tr>
<tr>
<td>29</td>
<td>Exploring diversity, genomic and transcriptome profiling and phytosystemicochemicals of Banana pest complex in NER Region-An ecological and molecular approach</td>
<td>DBT-GOINER</td>
<td>Dr. Inee Gogoi</td>
</tr>
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</table>

C3. Ad Hoc Research Project (Completed)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>DBT project Biodiversity Studies of Aromatic Rice of North East India</td>
<td>DBT-GOI</td>
<td>Dr. Mohendra Kr. Modi</td>
</tr>
<tr>
<td>2</td>
<td>DBT project Genome and transcriptome sequencing of Aromatic Rice of North Eastern Region</td>
<td>DBT-GOI</td>
<td>Dr. Mohendra Kr. Modi</td>
</tr>
<tr>
<td>3</td>
<td>Mapping and soil testing of macro and micronutrients for precise fertilizer recommendation to the farmers of Assam</td>
<td>RKVY</td>
<td>Dr. Devajit Bhattacharyya</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the Scheme</td>
<td>Funding Agency</td>
<td>In-Charge</td>
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</tr>
<tr>
<td>4</td>
<td>Mapping and soil testing of macro and micro nutrients for precise fertilizer recommendations to the farmers of Assam</td>
<td>RKVY</td>
<td>Regional Agricultural Research Station, North Lakhimpur</td>
</tr>
<tr>
<td>5</td>
<td>Provisioning of livelihood security in sand and silt deposited areas of Assam</td>
<td>RKVY</td>
<td>Regional Agricultural Research Station, North Lakhimpur</td>
</tr>
<tr>
<td>6</td>
<td>Farmers’ Innovation-Decision Pattern in relation to Recommended Rice Production Technology - A Study in Upper Brahmaputra Valley Zone of Assam</td>
<td>AAU</td>
<td>Dr. Utpal Barman</td>
</tr>
<tr>
<td>7</td>
<td>Elucidating the role of bacterial endosymbionts in phytopathogenic fungi for toxin production and pathogenesis.</td>
<td>DBT-GOI</td>
<td>Dr. Robin Ch. Boro</td>
</tr>
<tr>
<td>8</td>
<td>Gold nanoparticles-based dipstick system for quick detection of mushroom toxins</td>
<td>DBT-GOI</td>
<td>Dr. Robin Ch. Boro</td>
</tr>
<tr>
<td>9</td>
<td>Rapid On-Field Detection of Citrus Tristeza Virus by Gold Nanoparticle-Based Dipstick Method</td>
<td>DST-GOI</td>
<td>Dr. Robin Ch. Boro</td>
</tr>
<tr>
<td>10</td>
<td>Rapid on-field detection of Ratoon stunting disease of sugarcane by gold nanoparticle-based dipstick method</td>
<td>DST-GOI</td>
<td>Dr. Robin Ch. Boro</td>
</tr>
<tr>
<td>11</td>
<td>Molecular Mapping and Construction of linkage map for Yellow Mosaic Virus (YMV) Resistance in Soybean</td>
<td>AYUSH, NPMB</td>
<td>Dr. Monoj Sarma</td>
</tr>
<tr>
<td>12</td>
<td>Market feasibility study for tissue culture banana in Assam</td>
<td>ARIASP</td>
<td>Dr. Jayanta Pd. Hazarika</td>
</tr>
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</table>

**D. Ad Hoc Research Project Under DBT**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
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<tbody>
<tr>
<td>1</td>
<td>Gene technology for crop management</td>
<td>DBT-GOI</td>
<td>Dr. Bidyut Kr. Sarmah (PL)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Dr. Sumita Acharjee (PI)</td>
</tr>
<tr>
<td>2</td>
<td>Molicular characterization and gene mining in rice</td>
<td>DBT-GOI</td>
<td>Dr. Mohendra Kr. Modi (PL)</td>
</tr>
<tr>
<td>3</td>
<td>Bioprospecting of doil microbes for acid tolerance gene</td>
<td>DBT-GOI</td>
<td>Dr. Madhumita Barooah (PL)</td>
</tr>
<tr>
<td>4</td>
<td>Biofertilizer programme</td>
<td>DBT-GOI</td>
<td>Dr. Rajen Barooah (PC)</td>
</tr>
<tr>
<td>5</td>
<td>Biopesticide programme</td>
<td>DBT-GOI</td>
<td>Dr. Lohit Ch. Bora (PC)</td>
</tr>
<tr>
<td>6</td>
<td>Prospecting of agricultural weeds and wastes from Assam as the potential energy sources for lignocellulosic alcohol production</td>
<td>DBT-GOI</td>
<td>Dr. Tankaswar Nath (PI)</td>
</tr>
<tr>
<td>7</td>
<td>Transfer of unique antioxidant potential of coloured rice of Assam to elite high yielding rice line by utilizing flavonoidbiosynthesis gene based marker assisted breeding’</td>
<td>DBT-GOI</td>
<td>Dr. Bidyut Kr. Sarmah</td>
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</table>

**D1. Ad-Hoc Research Projects under DBT**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
<th>In-Charge</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of high yielding, non-lodging and biotic resistance varieties of Black scented rice of Manipur and Joha rice of Assam through Biotechnological intervention</td>
<td>DBT-GOI</td>
<td>Dr. Bidyut Kr. Sarmah</td>
</tr>
<tr>
<td>2</td>
<td>Study of mitochondrial electron transport chain (ETC) dysfunction that modulates aging and development in C. elegans through CEP-1, the worm homolog of mammalian p 53</td>
<td>DBT-GOI</td>
<td>Dr. Aiswarya Baruah</td>
</tr>
<tr>
<td>3</td>
<td>Genetic studies to understand mitochondrial electron transport chain dysfunction using Caenorhabditis elegans</td>
<td>DBT-GOI</td>
<td>Dr. Aiswarya Baruah</td>
</tr>
<tr>
<td>4</td>
<td>Functional validation of yield related genes in rice</td>
<td>DBT-GOI</td>
<td>Dr. Prasanta Kr. Das</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the Scheme</td>
<td>Funding Agency</td>
<td>In-Charge</td>
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<tr>
<td>5</td>
<td>Understanding the molecular mechanism of anaerobic germination in hypoxia tolerant rice germplasms of Assam through functional genomics study</td>
<td>DBT-GOI</td>
<td>Dr. Prasanta Kr. Das</td>
</tr>
<tr>
<td>6</td>
<td>Screening of the indigenous rice germplasms of Assam for tolerance to anaerobic condition during germination and marker assisted introgression of the trait to elite variety</td>
<td>DBT-GOI</td>
<td>Dr. Prasanta Kr. Das</td>
</tr>
<tr>
<td>7</td>
<td>Studies on role of endophytes in variation of acaricidal properties of two acaricide producing plant species NBA 22/FI and NBA18/DI from North Eastern States</td>
<td>DBT-GOI</td>
<td>Dr. Tankeswar Nath</td>
</tr>
<tr>
<td>8</td>
<td>Efficacy evaluation of encapsulated fungal formulation for improving crop phosphorus nutrition</td>
<td>DBT-GOI</td>
<td>Dr. Tankeswar Nath</td>
</tr>
<tr>
<td>9</td>
<td>Elucidating the role of bacterial endosymbionts in phytopathogenic fungi for toxin production and pathogenesis</td>
<td>DBT-GOI</td>
<td>Dr. Tankeswar Nath</td>
</tr>
<tr>
<td>10</td>
<td>Seed less Plant Production and Mass Scale Propagation of Musa balbisiana (Bhimkol Banana) of NER using in vitro approach</td>
<td>DBT-GOI</td>
<td>Mr. Manab Bikash Gogoi</td>
</tr>
</tbody>
</table>

2. Faculty of Community Science

A. All India Coordinated Research Projects

1. AICRP on Home Science
   a. Dynamics & performance of women’s group in agricultural and allied sector (Extn Component) ICAR Dr. Manoshi Baruah Deka
   b. Drudgery Assessment and Mitigation (FRM Component) ICAR Dr. Ruplekha Borah
   c. Functional clothing to combat occupational hazards of farm workers and utilization of plant sources and animal fibers for textile applications (CT component) ICAR Dr. Nabaneeta Gogoi
   d. Capacity building of Agrarian families (CD Component) ICAR MoFPI Dr. Mala Handique
   e. Food and nutritional strategies to combat nutritional problems among farm families (FN Component) ICAR MoFPI Dr. Pranati Das

2. Reproductive Health care in Agrarian families ICAR-CIWA Dr. Mala Handique

3. Comprehensive use of underutilized natural fibres and plant sources for sustainable livelihood of farm families ICAR Dr. Nabaneeta Gogoi

4. Project on Capacity building: A social pursuit through popularization and product diversification of ethnic crafts on textiles with ICT application ICAR Dr. Nabaneeta Gogoi

5. Drudgery reducing farm technologies for gender equity ICAR Dr. Nandita Bhattacharyya

6. Ergonomics for Work Improvement and gender equity in Agro-Enterprise ICAR Dr. Nandita Bhattacharyya

7. Reproductive Health care in Agrarian families ICAR-CIWA Dr. Jinamoni Saikia

8. Development of Parenting Index for Rural Families (PIRF) ICAR-CIWA Dr. Jinamoni Saikia

B. Ad-hoc Research Projects

B1. Ad-Hoc Research Projects

1. Early language acquisition – An approach to alphabet learning in Assamese language MHRD-GOI Dr. Juri Baruah
<table>
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<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
<th>Funding Agency</th>
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<tbody>
<tr>
<td>2</td>
<td>Efficiency Innovation For Pounding of Rice</td>
<td>MHRD-GOI</td>
<td>Dr. Ruplekha Borah</td>
</tr>
<tr>
<td>3</td>
<td>Consumption pattern of foods and food products/items high in fat, salt and sugar among selected cities/town and rural population of India</td>
<td>ICMR</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>4</td>
<td>Promotion of agriculture centric sustainable livelihood security for tribal farmers of Assam Under Schedule Tribe Community (STC), TSP project</td>
<td>ICAR</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>5</td>
<td>Development and evaluation of dehydrated and irradiated jackfruit (<em>Artocarpus heterophyllus</em>) products</td>
<td>BRNS-GOI</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>6</td>
<td>Development of region-specific therapeutic foods for prevention of diabetes</td>
<td>ICAR</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>7</td>
<td>Dietary approach for management of dual burden of malnutrition among farm women</td>
<td>ICAR</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>8</td>
<td>Tribal Sub Plan Project on Home Science</td>
<td>ICAR</td>
<td>Dr. Pranati Das</td>
</tr>
<tr>
<td>9</td>
<td>Design approaches for occupational wellness of pluckers engaged in manual tea plucking activity</td>
<td>MHRD-GOI</td>
<td>Dr. Nandita Bhattacharyya</td>
</tr>
<tr>
<td>10</td>
<td>Design Innovation Centre DIC, IIT, Guwahati</td>
<td>GoA</td>
<td>Dr. Nandita Bhattacharyya</td>
</tr>
<tr>
<td>11</td>
<td>Ergonomic Design approaches for occupational wellness of pluckers engaged in manual tea plucking activity</td>
<td>IIT</td>
<td>Dr. Nandita Bhattacharyya</td>
</tr>
<tr>
<td>12</td>
<td>Diversification of Handloom Products for entrepreneurial development</td>
<td>ICAR</td>
<td>Dr. Nabaneeta Gogoi</td>
</tr>
<tr>
<td>13</td>
<td>Management of Green Waste for Economic Benefit and Women Empowerment</td>
<td>DBT-GOI</td>
<td>Dr. Bijoylaxmi Bhuyan</td>
</tr>
</tbody>
</table>
# APPENDIX- II

Externally Funded Research Projects in operation in the Faculty of Veterinary and Faculty of Fishery Science during 2018-19

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Scheme</th>
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<tbody>
<tr>
<td>1</td>
<td><strong>Faculty of Veterinary Science</strong></td>
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<tr>
<td>2</td>
<td>A. All India Coordinated Research Projects (AICRP)</td>
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<tr>
<td>3</td>
<td>1. AICRP on Epidemiological Studies on FMD</td>
<td>ICAR</td>
<td>Dr. Krishna Sharma</td>
</tr>
<tr>
<td>4</td>
<td>2. AICRP on Pig</td>
<td>ICAR &amp; State</td>
<td>Dr. Dhireswar Kalita</td>
</tr>
<tr>
<td>5</td>
<td>3. Mega Seed Production of Pig under AICRP on Pig</td>
<td>ICAR</td>
<td>Dr. Dhireswar Kalita</td>
</tr>
<tr>
<td>6</td>
<td>4. AICRP on Nutritional and Physiological Approaches for Enhancing Reproductive Performance in Animal</td>
<td>ICAR</td>
<td>Dr. Kutubuddin Ahmed</td>
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<tr>
<td>7</td>
<td>5. AICRP on Post Harvest Engineering &amp; Technology( Meat and Meat products)</td>
<td>ICAR</td>
<td>Dr. Mineswar Hazarika</td>
</tr>
<tr>
<td>8</td>
<td>6. AICRP on Poultry Breeding</td>
<td>ICAR</td>
<td>Dr. Niranjan Kalita</td>
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<td></td>
<td>7. AICRP on Goat Improvement</td>
<td>ICAR</td>
<td>Dr. Naba Nahardeka</td>
</tr>
<tr>
<td></td>
<td>8. AICRP on Disease Monitoring and Surveillance(PD-ADMAS)</td>
<td>ICAR-NIVEDI</td>
<td>Dr. S.K. Das</td>
</tr>
<tr>
<td>9</td>
<td><strong>B. Network/Outreach Projects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1. ORP on Ethno Veterinary medicine</td>
<td>ICAR</td>
<td>Dr. Chandana Choudhury Barua</td>
</tr>
<tr>
<td>11</td>
<td>2. Outreach programme on Livestock Related Environmental Pollutants, Contaminants &amp; Toxicants (Monitoring of Drug Residues and Environmental Pollutants)</td>
<td>ICAR</td>
<td>Dr. D.C. Roy</td>
</tr>
<tr>
<td>12</td>
<td>3. Outreach programme on Zoonotic diseases</td>
<td>ICAR</td>
<td>Dr. A. G. Baruah</td>
</tr>
<tr>
<td>13</td>
<td>4. Network Project on Swamp Buffalo</td>
<td>ICAR</td>
<td>Dr. G.C. Das</td>
</tr>
<tr>
<td>14</td>
<td>5. Network Project on 'Gastro-Intestinal Parasitism'</td>
<td>ICAR</td>
<td>Dr. Kanta Bhattacharjee</td>
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<td>15</td>
<td>6. DBT Network Project on Brucellosis</td>
<td>DBT</td>
<td>Dr. Girindra Kumar Saikia</td>
</tr>
<tr>
<td>16</td>
<td>7. Molecular characterization and development of breed signatures for indigenous sheep of northeast India</td>
<td>ICAR</td>
<td>Dr. Arundhati Phookan</td>
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<td>17</td>
<td><strong>C. Ad-hoc Research Projects</strong></td>
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<td>18</td>
<td>C1. Ad-hoc Research Projects</td>
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<td>19</td>
<td>1. DBT-NER Centre for Advanced Animal Disease Diagnosis and Management Consortium (ADMaC).</td>
<td>DBT, GOI</td>
<td>Dr. S.K. Das</td>
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<tr>
<td>20</td>
<td>2. Epidemiological studies on emerging infectious diseases of elephants (Elephus maximus) with special reference to tuberculosis (TB) and elephant endotheliotropic herpes virus (EEHV).</td>
<td>DBT, GOI</td>
<td>Dr. Gauranga Mahato</td>
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<td>21</td>
<td>3. Aflatoxin – tolerant duck production through genetic and epigenetic approaches.</td>
<td>ICAR-NASF, NEW DELHI</td>
<td>Dr. Nikhil Ch. Nath</td>
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<tr>
<td>22</td>
<td>4. Creation of Online repository of Biotechnology &amp; Bioinformatics resources of north east India (BABRONE).</td>
<td>DBT, GOI</td>
<td>Dr. Probodh Borah</td>
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<tr>
<td>23</td>
<td>5. Development of nanoparticle or micro particle adjuvanted subunit oral vaccine against poultry Salmonellosis.</td>
<td>NER-BPMC (DBT, New Delhi)</td>
<td>Dr. Shantanu Tamuly</td>
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<td>24</td>
<td>6. Sero servellance of Leptospira infection in animals of North Eastern region of India.</td>
<td>DBT, GOI</td>
<td>Dr. Durlav Prasad Bora</td>
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<td>25</td>
<td>7. Study on persistence of Japanese encephalitis in reservoir host pig in JE endemic area of Odisha, Manipur and Assam.</td>
<td>DBT, GOI</td>
<td>Dr. Prabodh Bora</td>
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<tr>
<td>26</td>
<td>8. Development of subviral particle of Infectious Bursal Disease virus as a potential vaccine and diagnostic candidate.(in collaboration with GADVASU), Ludhiana.</td>
<td>DBT, GOI</td>
<td>Dr. Sutopa Das</td>
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<td>27</td>
<td>9. “Molecular Epidemiology of Group A rotavirus (RVA) infections in the North Eastern Region (NER)&quot;.</td>
<td>DBT, GOI</td>
<td>Dr. Sutopa Das</td>
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<tr>
<td>10</td>
<td>Seroservillance, isolation and molecular characterization of bluetongue virus in sheep and goats of Tripura and Assam states.</td>
<td>DBT, GOI</td>
<td>Dr. Nagendra Nath Barman</td>
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<td>11</td>
<td>Development and evaluation of DIVA based vaccine utilizing an Indian isolate of classical swine fever virus.</td>
<td>DBT, GOI</td>
<td>Dr. Nagendra Nath Barman</td>
</tr>
<tr>
<td>12</td>
<td>Veterinary Type Culture.</td>
<td>ICAR</td>
<td>Dr. A.K. Hazarika</td>
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<tr>
<td>13</td>
<td>Exploring selected natural plant sources of North East parts of India as potential therapeutic agents useful for the treatment of cancer.</td>
<td>DBT, GOI</td>
<td>Dr. Chandana Choudhury Barua</td>
</tr>
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<td>14</td>
<td>Modulation of lipo polysaccharide-induced depressive behavior by few indigenous plants of North East India and their molecular mechanism.</td>
<td>DRDO-LSRB</td>
<td>Dr. Chandana Choudhury Barua</td>
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<td>15</td>
<td>Characterization of Kisspeptin and KiSS1 gene during reproductive cyclicity and pregnancy in Assam local and crossbred cows.</td>
<td>DBT, GOI</td>
<td>Dr. Anubha Baruah</td>
</tr>
<tr>
<td>16</td>
<td>Enhancing pig productivity by optimizing bio molecular expression through nutritional intervention in the existing system of pig farming.</td>
<td>DBT, GOI</td>
<td>Dr. Sanjib Bora</td>
</tr>
<tr>
<td>17</td>
<td>Conservation of indigenous pig of Assam through handmade cloning technique.</td>
<td>DBT, GOI</td>
<td>Dr. Nikhil Ch. Nath</td>
</tr>
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<td>18</td>
<td>Isolation, characterization and development of a culture method for long term preservation of spermatogonial stem cell from doom pig.</td>
<td>DBT, GOI</td>
<td>Dr. Arpana Das</td>
</tr>
<tr>
<td>19</td>
<td>Molecular characterization of fecundity genes in Assam Hill Goat.</td>
<td>DBT, GOI</td>
<td>Dr. Farzin Akhtar</td>
</tr>
<tr>
<td>20</td>
<td>Capacity building and awareness generation for enhanced productivity of pig through assisted reproductive biotechnology and conservation of biodiversity in North Eastern Region through community participation.</td>
<td>DBT, GOI</td>
<td>Dr. Kutubuddin Ahmed</td>
</tr>
<tr>
<td>21</td>
<td>A detailed study on “Seasonal influences on Broiler Production Practices, Economics and its role on self employment in 5 BRGF District of Assam.</td>
<td>SIRD</td>
<td>Dr. B.K. Sarmah</td>
</tr>
<tr>
<td>22</td>
<td>Empowerment of the rural women through capacity building in improved biotechnological innovation and application.</td>
<td>DBT-GOI</td>
<td>Dr. Bikash Borthakur</td>
</tr>
<tr>
<td>23</td>
<td>Pig Farming through promotion of farmers Producer Organization, Tamulpur Sub division, Baska (BTAD) District, Assam’ .</td>
<td>ASTEC</td>
<td>Dr. Kamaleswar Kalita</td>
</tr>
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<td>24</td>
<td>Understanding the etiology of infertility associated with prolonged follicle dominance in bovine and its therapeutic management</td>
<td>DBT-GOI</td>
<td>Dr. Manjyoti Bhuyan</td>
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<td>25</td>
<td>Molecular characterization and development of breed signatures for indigenous sheep of northeast India</td>
<td>ICAR</td>
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<td>26</td>
<td>An Integrated Approach to explore and exploit the Innate and Adaptive immune response in Indigenous Duck Breeds of North Eastern and South India</td>
<td>DBT-GOI</td>
<td>Dr. Dhruba Jyoti Kalita</td>
</tr>
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<td>Analysis of Gut Metagenome of Duck (Anas platyrhynchos) with special reference to Identification of Bacteria having Probiotic Potential</td>
<td>DBT-GOI</td>
<td>Dr. Probodh Borah</td>
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<td>28</td>
<td>Molecular Platform for Epidemiology, Disease Mapping and Development of Diagnostics for Economically important Diseases of Ducks</td>
<td>DBT-GOI</td>
<td>Dr. Sulekha Choudhury Phukan</td>
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<td>29</td>
<td>Genetic Up Breeding of duck production to strengthen livelihood security in NER of India by converging conventional and molecular techniques</td>
<td>DBT-GOI</td>
<td>Dr. Purabi Kaushik</td>
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<td>30</td>
<td>An integrated omics approach to characterize circulating Newcastle disease virus and intervention strategies to control Newcastle disease in North East India</td>
<td>DBT-GOI</td>
<td>Dr. Pankaj Deka</td>
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<td>31</td>
<td>Development of DIVA diagnostics and marker vaccine against duck plague virus</td>
<td>DBT-GOI</td>
<td>Dr. Sutopa Das</td>
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<td>32</td>
<td>Biotechnological interventions to augment productive performance of pigs on horticultural by product based diet</td>
<td>DBT-GOI</td>
<td>Dr. Robin Bhuyan</td>
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<td>33</td>
<td>Regulation of Corpus Luteum Function by Locally Produced Angiogenic Growth Factors in Pigs (Sus scrofa)</td>
<td>DBT, MoS&amp;T</td>
<td>Dr. Sanjib Borah</td>
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<td>34</td>
<td>Technology Intervention in Household Piggeries for doubling farmers’ income by setting up rural transformation Clusters</td>
<td>DBT-GOI</td>
<td>Dr. K. Ahmed</td>
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<td>35</td>
<td>Genetic Characterization of Antibiotic Resistant Clostridium perfringens and Clostridium difficile, and their Public Health Significance</td>
<td>DBT-GOI</td>
<td>Dr. Rajeev Kumar Sharma</td>
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<td>36</td>
<td>Development of Iron-Enriched Spent Hen Meat Products for boosting layer Industry and Entrepreneurship</td>
<td>NABARD</td>
<td>Dr. Deben Sapcota</td>
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<td>37</td>
<td>Molecular Epidemiology of Canine Tuberculosis in Assam, neighboring States and its Containments</td>
<td>DBT-GOI</td>
<td>Dr. Acheenta Gohain Barua</td>
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<td>38</td>
<td>Prevalence and drivers of select zoonotic pathogens and use of antimicrobials in livestock farms in North-East region: A mixed methods study</td>
<td>ICMR, New Delhi</td>
<td>Dr. S. K. Das</td>
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<td>39</td>
<td>Value Chain On Processing of Novel Duck Meat and Egg Products under Existing Farming Systems of NER for Entrepreneurship Development</td>
<td>DBT-GOI</td>
<td>Dr. Mineswar Hazarika</td>
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<td>40</td>
<td>Attempt to Develop Diagnostic and Preventive measure for Suspected Fish Viral Diseases encountered in Assam</td>
<td>DBT-GOI</td>
<td>Dr. Sailendra Kumar Das</td>
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<td>41</td>
<td>Strategic inclusion of different varieties of dietary nano-iron and zinc particles for better health and production of designer meat</td>
<td>DBT-GOI</td>
<td>Dr. Bibekananda Saikia</td>
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<td>42</td>
<td>Indigenous development of a new suture mediated closure of arterial access site to achieve instant haemostasis following catheter angiography</td>
<td>DBT-GOI</td>
<td>Dr. Subramoni Konagraj</td>
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<td>43</td>
<td>Value Chain On Processing of Novel Duck Meat and Egg Products under Existing Farming Systems of NER for Entrepreneurship Development</td>
<td>DBT-GOI</td>
<td>Dr. Mineswar Hazarika</td>
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<td>Technology Intervention in Household Piggeries for doubling farmers’ income by setting up rural transformation Clusters</td>
<td>DBT-GOI</td>
<td>Dr. K. Ahmed</td>
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<td>45</td>
<td>Procurement of progeny tested Bucks for improved semen production.</td>
<td>RKVY</td>
<td>Dr. S. Sinha</td>
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<td>46</td>
<td>Outreach Programme on Ethno-veterinary Medicine</td>
<td>ICAR, GOI</td>
<td>Dr. Chandana Choudhury Barua</td>
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<td>47</td>
<td>Exploring Selected Natural Plant Sources of North east of India as Potential Therapeutic Agents useful for the treatment of cancer</td>
<td>DBT-GOI</td>
<td>Dr. Chandana Choudhury Barua</td>
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<td>Evaluation of neuroprotective potential of selected Phytoconstituents on Experimental Diabetic</td>
<td>DBT-GOI</td>
<td>Dr. Chandana Choudhury Barua</td>
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<td>49</td>
<td>Outreach programme on &quot;Monitoring of Drug Residues and Environmental Pollutants&quot;</td>
<td>ICMR, New Delhi</td>
<td>Dr. D.C. Roy</td>
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<tr>
<td>50</td>
<td>Epidemiological studies on emerging infectious diseases of Elephants (Elephas maximus) with special reference to tuberculosis (TB) and elephant endotheliotropic herpes virus (EEHV)</td>
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<td>Dr. G. Mahato</td>
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<td>52</td>
<td>Outreach Project on Zoonotic Disease</td>
<td>ICMR, New Delhi</td>
<td>Dr. A. Gohain Barua</td>
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<td>53</td>
<td>Advanced Animal Disease Diagnosis and Management Consortium (ADMaC)</td>
<td>Department of Biotechnology</td>
<td>Dr. N N Barman</td>
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<td>54</td>
<td>Prevalence and drivers of select zoonotic pathogens and use of antimicrobials in livestock farms in North-East region: A mixed methods study</td>
<td>ICMR</td>
<td>Dr. G.K Saikia</td>
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<td>55</td>
<td>Species identification of wild herbivores based on molecular, microscopic and ultrastructural characterization of hair samples</td>
<td>DBT, New Delhi</td>
<td>Dr. (Ms) Munmun Sarma</td>
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<td>56</td>
<td>Creation of Bioinformatics Infrastructure Facility (BIF) for the Promotion of Biology Teaching through Bioinformatics (BTBI) Scheme of BTISnet”</td>
<td>DBT, GOI</td>
<td>Dr. Probodh Borah</td>
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<td>57</td>
<td>M.V.Sc. Programme in Animal Biotechnology</td>
<td>DBT, GOI</td>
<td>Dr. Probodh Borah</td>
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<td>58</td>
<td>Online journal access facility under DBT’s eLibrary Consortium (DeLCON)</td>
<td>DBT, GOI</td>
<td>Dr. Probodh Borah</td>
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<td>59</td>
<td>State Level Biotech Hub for the State of Assam</td>
<td>DBT, GOI</td>
<td>Dr. Probodh Bora</td>
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C2. Ad-hoc Research Projects

1. Modulation of lipo polysaccharide-induced depressive behavior by few indigenous plants of North East India and their molecular mechanism. DRDO-LSRB Dr. Chandana Choudhury Barua

2. Designing, Synthesis and Characterization of Antimicrobial Peptides. DBT-GOI Dr. Dhruba Jyoti Kalita

3. Modulation of Lipopolysaccharide induced depressive behaviour by few indigenous plants of NE India and their molecular mechanism. DRDO-LSRB, GOI, New Delhi Dr. Chandana Choudhury Barua

4. Studies on Antibiotic Usage and Bovine Tuberculosis in Small Holder Peri-Urban Dairy Farms. PHFI, Gurgaon Dr. R.A.Hazarika

2. Faculty of Fishery Science

A. College of Fisheries, Raha

A1. Ad-hoc Research Projects

1. Socio economic uplift men of fish farmers of Kamrup and Morigaon districts through culture and propagation of Monopterus cuchia, a farmers participatory approach. ASTEC Dr. Kamaleswar Kalita

2. National Surveillance Programme for Aquatic Animal Diseases (NSPAAD). NBFGDR Dr. Binod Kalita

3. Assessment of Environment, Health and Ichthyofaunal Biodiversity of Tirap and Tissa Rivers of Arunachal Pradesh and Promotion of Fish Centric Supplementary Livelihood Options through a Participatory Approach, Govt. of India. NMHS, MoEF Dr. Rajdeep Dutta

4. Sustainable Livelihood promotion through Integrated Farming System (IFS) in Schedule Tribal (ST) dominated areas of Central Brahmaputra Valley, Assam DBT-GOI Mr. Manas Pratim Dutta

5. Refinement of Process Protocol for Preparation of Traditional Fermented Fish Products of Northeast India by using Biotechnological Tools and its Process Mechanization. DBT-GOI Dr. Bipul Kumar Kakati

6. Development Of Sustainable Rural Livelihood Options Through Hygienic Fish Drying Activities By Establishment Of Technology Demonstration Centre DBT-GOI Dr. Bipul Kumar Kakati
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<td><strong>B.  Fisheries Research Centre, Jorhat</strong></td>
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<tr>
<td>1</td>
<td>Advanced breeding of carps through enhancement of environmental temperature by using UV stabilized LDPE film</td>
<td>RKVY</td>
<td>Dr. Bibha Chetia Borah</td>
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<td>2</td>
<td>Technology show casing on integrated three tier poultry-pig-fish faring system</td>
<td>RKVY</td>
<td>Dr. Bibha Chetia Borah</td>
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<tr>
<td>3</td>
<td>Low cost Aquaponics system as a component of integrated livestock fish farming</td>
<td>RF of FRC, AAU</td>
<td>Dr. Bibha Chetia Borah</td>
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<td>4</td>
<td>Development of Automatic fish seed grader cum counter</td>
<td>DIC-IIT, Ghy</td>
<td>Dr. Bibha Chetia Borah</td>
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<td>5</td>
<td>Induced breeding and seed production of indigenous climbing perch (Anabas testudineus)</td>
<td>RF of FRC, AAU</td>
<td>Dr. Bibha Chetia Borah</td>
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<td><strong>B2. Ad-hoc Research Project</strong></td>
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<td>1</td>
<td>Refinement of breeding technology of (Clarias magur)</td>
<td>RF of FRC, AAU</td>
<td>Dr. Bibha Chetia Borah</td>
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</table>