CELEBRATING 25 YEARS EXCELLENCE

2025 ANNUAL REPORT

वार्षिक प्रतिवेदन 2025

भाकृअनुप
ICAR

भा.कृ.अनु.प.–राष्ट्रीय शूकर अनुसंधान केन्द्र
राणी, गुवाहाटी – ७८१ १३१, असम

ICAR-NATIONAL RESEARCH CENTRE ON PIG
RANI, GUWAHATI - 781 131, ASSAM

भाकृअनुप
ICAR

Glorious

Years

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Cover page theme

The image on the cover page depicts the 10 crossbred pig varieties developed by the institute and AICRP on Pig units during the past 25 years. These improved varieties have empowered pig farmers with higher productivity and income.

Published by

The Director
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Message from Director

Dear Readers,

As ICAR-National Research Centre on Pig celebrates its 25th Foundation Day in 2026, I take immense pride in reflecting on a remarkable journey of scientific excellence, innovation, and service to the nation. Established in 2002 with a modest team of only two scientists, the Institute has evolved into a vibrant national centre with a strength of twenty scientists driving cutting-edge research in pig genetics, health, nutrition, reproduction, biotechnology, and value chain development. Over the past twenty-five years, the Institute has developed and disseminated impactful technologies, generated valuable intellectual property, strengthened entrepreneurship and skill development, and contributed significantly to enhancing farmer incomes and livelihood security. Through strategic national and international collaborations, technology-led interventions, and sustained outreach efforts, the Institute has emerged as a leading institution supporting the growth of a resilient, sustainable, and globally competitive pig sector in India. This milestone year provides an opportunity to celebrate our achievements while reaffirming our commitment to scientific innovation and inclusive development in the years ahead.

It gives me immense pleasure to present the Annual Report of ICAR-National Research Centre on Pig for the year 2025. During the year, the Institute made notable progress in scientific research, technology dissemination, and community engagement. Our efforts remained focused on improving pig productivity, health, nutrition, and genetic resources, while addressing emerging challenges in pig farming and contributing towards the sustainable growth of the pig sector. This report reflects the collective achievements and dedicated efforts of our scientists, technical personnel, administrative staff, and stakeholders.

Our multidisciplinary research initiatives continued to generate meaningful advancements in areas such as genetic improvement, disease management, nutrition, reproduction, and animal welfare. Innovation has remained central to our activities, enabling the development and

dissemination of technologies and best practices aimed at enhancing productivity, profitability, and resilience in pig farming systems.

The Institute continues to coordinate 17 centres under the All India Coordinated Research Project on Pig located across different regions of the country. In addition, the Krishi Vigyan Kendra (KVK) of the Institute actively conducted training programmes, On-Farm Trials (OFTs), and Frontline Demonstrations (FLDs) for farmers, entrepreneurs, and extension personnel in diverse areas including animal science, crop science, fisheries, horticulture, plant protection, farm mechanization, and natural resource management.

Our collaborative engagements with national and international institutions, academia, industry partners, and development agencies have greatly strengthened knowledge exchange, capacity building, and technology transfer initiatives. Such partnerships continue to play a vital role in addressing the evolving needs of the pig farming community.

The continued occurrence of transboundary diseases, particularly African Swine Fever (ASF), posed serious challenges to the pig sector during the year. Nevertheless, the resilience and dedication demonstrated by our scientific community and stakeholders have enabled us to respond effectively and continue our commitment towards safeguarding farmer livelihoods and strengthening food and nutritional security.

On the human resource development front, the scientists and administrative personnel of the Institute received recognition and honours at various national and professional platforms, reflecting their commitment and contributions to agricultural research and development.

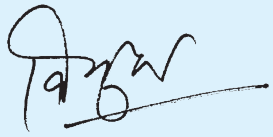
Looking ahead, the Institute remains committed to embracing emerging opportunities and addressing future challenges with renewed enthusiasm. Our priorities include sustainable intensification, digital transformation, value addition, entrepreneurship development, and market integration, with the larger goal of promoting a vibrant, inclusive, and environmentally responsible pig sector.

I wish to express my sincere thanks and gratitude for the constant support and encouragement received from Dr. M.L. Jat, Secretary, DARE & Director General, ICAR and Dr. Raghavendra Bhatta, Deputy Director General (Animal Science). I am thankful to Dr. Ashish Kumar Samanta, ADG (ANP), Dr. Divakar Hemadri, ADG (Animal Health), Dr. G. K. Gaur, Ex-ADG (AP&B) and other staff of Animal Science Division, ICAR, Krishi Bhawan, New Delhi for their continuous support.

In conclusion, I extend my heartfelt appreciation to the dedicated team of scientists, researchers, technical, administrative, and supporting staff of ICAR-National Research Centre on Pig, as well as our collaborators, partners, and farmers, for their unwavering commitment and support. Together, we shall continue striving towards excellence in research and development for the benefit of the pig farming community and the nation.

Thank you for your continued support and trust in our endeavors.

Warm regards



(Vivek Kumar Gupta)
Director

EXECUTIVE SUMMARY

The Annual Research Progress Report of ICAR-National Research Centre on Pig highlights significant advancements made during the reporting period across diverse domains of pig research, including genetics and breeding, production management, reproduction, animal health, nutrition, physiology, biotechnology, extension, and livestock products technology. The institute continued to strengthen its mandate of advancing pig science and supporting sustainable pig production systems in India, particularly in the North Eastern Region.

In the field of animal genetics and breeding, major emphasis was placed on understanding resilience against African Swine Fever (ASF) in indigenous pigs. Research under the Department of Biotechnology-funded project investigated the molecular basis of ASF tolerance, particularly focusing on the RelA gene associated with immune response. Although indigenous pigs did not exhibit the same resistance mutation observed in African warthogs, findings suggested that ASF tolerance in Indian pigs is polygenic and likely linked to alternate innate immune pathways. This has laid the foundation for future genomic and transcriptomic studies aimed at identifying resilient pig populations.

Another important initiative focused on establishing a traceable pork value chain in North East India using artificial intelligence and blockchain technologies. The project mapped pork supply chains in Meghalaya and developed an AI-based porcine identification system known as “e-Varaha” to ensure farm-to-fork traceability and food safety. Socio-economic assessments revealed strong youth participation in the pig sector and increasing inter-state pig movement, particularly during festive seasons.

Several institute-funded projects concentrated on developing high-performing crossbred pigs by combining the adaptability of indigenous breeds such as Ghoongroo with the superior growth traits of exotic breeds like Large White Yorkshire and Duroc. Base populations for scientifically designed crossbreeding programmes were established, and systematic performance evaluations were initiated. In parallel, genome-wide selection signature studies identified important genes associated with immunity, thermotolerance, growth, and reproductive performance in indigenous pig breeds including Ghoongroo, Doom, Mali, Agonda Goan, and Manipuri Black pigs.

Research in livestock production and management addressed critical aspects of piglet survival, nutrition, gut health, and environmental sustainability. Studies on colostrum yield and intake demonstrated breed differences influencing neonatal performance. Research on gut microbiome dynamics evaluated the role of probiotics and enzyme supplementation in improving post-weaning piglet health and productivity. Another important project initiated life-cycle assessment studies to estimate the carbon footprint associated with organized pig farming systems in India, emphasizing the need for environmentally sustainable production systems.

In animal reproduction, several interventions were evaluated to improve reproductive efficiency and farrowing management. Hormonal protocols using prostaglandin and oxytocin were tested to optimize farrowing outcomes and reduce piglet mortality. Artificial insemination programmes successfully established pig multiplier units and demonstrated that lower sperm concentrations could be effectively used without compromising reproductive performance. Research on herbal

therapeutics, particularly using Flemingia vestita, was also undertaken to improve reproductive health in sows. Additionally, genome editing projects targeting genes such as ATP5b and myostatin advanced protocols related to CRISPR-based editing, fibroblast culture, embryo production, and non-invasive embryo transfer in pigs.

Animal physiology studies investigated heat stress responses in indigenous and crossbred pigs by evaluating the expression of heat shock proteins and monocarboxylate transporter genes under varying climatic conditions. These studies provided valuable insights into the adaptive physiology of pigs under tropical environments and may contribute to future climate-resilient breeding strategies.

Animal health research remained one of the institute's major focus areas. Extensive surveillance programmes conducted across North Eastern states identified the circulation of multiple economically important viral diseases such as ASF, Classical Swine Fever, Porcine Circovirus, Japanese Encephalitis, and Porcine Reproductive and Respiratory Syndrome. Serological and molecular diagnostics, including ELISA, PCR, RT-PCR, and lateral flow assays, were extensively utilized. The institute also advanced vaccine development against Porcine Circovirus type 2d (PCV2d) using virus-like particle (VLP) technology. Immunization studies demonstrated promising antibody responses and highlighted the importance of booster timing in achieving durable immunity.

Significant progress was also achieved in antimicrobial resistance surveillance under the All India Network Project on AMR. A large number of bacterial isolates from livestock samples were screened, revealing relatively low to moderate antimicrobial resistance levels and absence of carbapenem resistance among E. coli isolates. Other health-related projects focused on molecular characterization of porcine parasites and development of indigenous ELISA-based diagnostics for Porcine Parvovirus.

Under animal nutrition, researchers developed nano zinc supplements using both green and chemical synthesis methods for improving piglet productivity. Additionally, studies on autochthonous probiotics isolated from indigenous pigs explored sustainable alternatives to antibiotic growth promoters.

A major extension-oriented initiative was the DST-funded STI Hub project aimed at empowering Mising and Bodo tribal women through technology interventions in the pig value chain. The project established institutional linkages between research organizations and tribal communities, promoting entrepreneurship, scientific pig farming, and livelihood enhancement. Research outputs were validated under field conditions to ensure practical applicability and long-term sustainability.

In livestock products technology, researchers developed a rapid point-of-care colorimetric method for assessing meat freshness using dye-based detection systems. Extension education projects focused on technology transfer models, digital learning resources, and image-based growth estimation algorithms using deep learning techniques. E-learning modules and short educational videos were produced to improve outreach and accessibility of scientific pig farming knowledge among farmers. Advanced image segmentation models were also developed for automated growth and weight estimation of pigs using computer vision technologies.

Institute continued to strengthen research, technology transfer, entrepreneurship, and outreach activities during 2025. Major institutional meetings including RAC, IRC, IBSC, and IAEC were conducted to review and guide research and biosafety activities. The Institute actively promoted

innovation through the NAIF-supported ITMU by securing patents, copyrights, technology certifications, and commercialization of diagnostic kits. The ABI Centre supported entrepreneurship, incubation, and skill development in pork processing and value addition. Extensive SCSP outreach programmes benefited nearly 1,450 farmers through training, input distribution, and technology demonstrations.

The Post Graduate Diploma in Pork Value Chain Management offered by ICAR-National Research Centre on Pig in collaboration with ICAR-Indian Veterinary Research Institute is a specialized programme designed to strengthen technical and managerial expertise in the pork sector. The programme covers pork production, processing, preservation, quality control, packaging, hygiene, entrepreneurship, and value addition. Combining theoretical learning with practical exposure, the diploma aims to develop skilled professionals capable of enhancing efficiency, sustainability, and innovation across the pork value chain.

The Krishi Vigyan Kendra (KVK) of ICAR-National Research Centre on Pig continued to play an important role in technology dissemination, capacity building, and farmer empowerment through training programmes, frontline demonstrations, on-farm trials, and awareness campaigns covering animal science, crop production, fisheries, horticulture, and natural resource management.

The Institute also coordinated 17 centres under the All India Coordinated Research Project (AICRP) on Pig across different regions of the country, facilitating location-specific research on pig breeding, health, nutrition, reproduction, and management for improving productivity and sustainability of pig farming systems.

Under the Swachh Bharat initiative, the Institute actively organized cleanliness drives, sanitation awareness programmes, waste management activities, and campus cleaning campaigns involving staff, students, and stakeholders to promote hygiene, environmental sustainability, and public awareness on cleanliness and biosecurity practices.

The Training Cell of ICAR-National Research Centre on Pig actively organized national and regional training programmes, skill development initiatives, exposure visits, and entrepreneurship development programmes for farmers, veterinarians, scientists, students, and extension personnel to promote scientific pig farming, processing, value addition, and biosecurity practices.

The Gender Research and Extension activities focused on empowering rural and tribal women through capacity building, entrepreneurship promotion, and technology interventions in pig husbandry and allied sectors. Special emphasis was given to improving livelihood opportunities, participation of women in pig value chains, and strengthening women-led enterprises under different outreach programmes.

The Hindi Cell of the Institute continued to promote the progressive use of Hindi in official work through Hindi workshops, competitions, observance of Hindi Pakhwada, translation of scientific and administrative materials, and implementation of Rajbhasha policies. These activities significantly contributed towards strengthening institutional communication, outreach, inclusiveness, and human resource development.

Milestones Achieved during 2002 to 2026

INTRODUCTION

The ICAR-National Research Centre on Pig (ICAR-NRCP) was established in 2002 under the aegis of the Indian Council of Agricultural Research (ICAR) to bring in excellence in pig production, health and product processing through innovative research in order to provide technology backstopping for enhanced pork production, employment generation and poverty reduction among socially and economically weaker sections through the medium of pig husbandry. The institute has been trying its level best for popularizing the scientific pig production and post-harvest management in the country since its inception as well as all round development of the piggery sector along with its affiliation units, namely Krishi Vigyan Kendra (KVK), and 17 centres of All India Coordinated Research Project (AICRP) on Pig spread over different parts of the country. All India Coordinated Research Project on Pig is the flagship programmes for which the Institute acts as a nodal agency. Development of region-specific pig production technologies and filling the critical gap of demand for superior pig genetics are the focus of AICRP on Pig programme.

Location

The institute is located at Rani, Guwahati in the state of Assam. The institute is approximately 35 kms away from the Guwahati City Railway Station and 12 kms from the Lokpriya Gopinath Bordoloi International Airport.

Faculty and Staff

The Institute is headed by the Director and currently 21 scientists, 07 administrative/finance/ supporting and 08 technical staffs are in position.

Staff Position

RMP and Scientist Cadre

Sl. No.	Name of the post	Sanctioned post	In-position	Vacant
1	RMP Cadre - Director	01	01	00
2	Principal Scientist	02	00	02
3	Senior Scientist	04	02	02
4	Scientist	18	18	00
	Total	25	21	04

Administrative Cadre

Sl. No.	Name of the post	Sanctioned post		Total	In-position	Vacant
		ICAR-NRC on Pig	KVK-Goalpara			
1	LDC	01	00	01	01	00
2	UDC	01	00	01	00	01

Sl. No.	Name of the post	Sanctioned post		Total	In-position	Vacant
		ICAR-NRC on Pig	KVK-Goalpara			
3	Stenographer Grade III	00	01	01	00	01
4	PA	02	00	02	02	00
5	Assistant	05	01	06	02	04
6	AAO	01	00	01	00	01
7	AO	01	00	01	01	00
8	FAO	01	00	01	01	00

Technical and Skilled Supporting Staff Cadre

Sl. No.	Name of the post	Sanctioned post		Total	In-position	Vacant
		ICAR-NRC on Pig	KVK-Goalpara			
1	T-1	05	02	07	04	03
2	T-3	04	00	04	03	01
3	T-4	00	03	03	03	00
4	SMS/STO/T-6	00	06	06	03	03
5	Skilled Supporting Staff	04	02	06	03	03

PRIORITY SETTING AND MANAGEMENT

The Institute has a high-powered Research Advisory Committee (RAC) comprising of eminent scientists and professors, who guide the research agenda of the institute and set research priorities. Dr. K.M.L Pathak, Former Deputy Director General (Animal Sciences), ICAR is the chairman of the committee. The other members include scientists and professors from the field of Animal Genetics and Breeding, Animal Health, Animal Nutrition, Animal Physiology, Extension and Livestock Products Technology. The Quinquennial Review Team (QRT) of the institute is headed by Dr. V.K. Taneja, Former Vice Chancellor, GADVASU, Ludhiana. The functioning of the institute is supervised by Institute Managemental Committee (IMC) headed by the Director of the institute as Chairman and members drawn from state government, university and public personnel. A number of internal committees such as Purchase, Library, Works, Official Language Implementation, ISO 17025: 2017 and ISO 9001- 2015 Implementation, Grievance, Publication, Priority Setting Monitoring and Evaluation Cell, Staff Welfare Club, IPR Cell, Institute Technology Management Unit, Agri-Business Incubation and ICC (women committee) etc. have been constituted to decentralize the management with developed responsibilities for smooth functioning of the institute. The Institute Joint Staff Council has been constituted for promoting healthy and congenial work environment. The Institute Research Council (IRC) provides a platform for effective professional interactions in respect of review and implementation of various research projects.

VISION

To bring in excellence in pig production, health and product processing through innovative research in order to provide technology backstopping for enhanced pork production, employment generation and poverty reduction among socially and economically weaker sections through the medium of pig husbandry.

MISSION

Performance appraisal and genetic cataloguing of indigenous pigs, development of improved pig variety together with production, health, product processing and pig based integrated farming system technologies to facilitate the pig rearers of the country for achieving household food, nutritional and economic security.

MANDATE

The mandate of the institute is:

- To undertake basic and applied research for enhancing pig production
- To act as a repository of information on pig production
- Capacity building

RESEARCH PROGRAMMES

Programme-1: Conservation, breeding and management of pig genetic resources.

Programme-2: Nutritional, physiological and reproductive interventions for improving efficiency of pig production.

Programme-3: Monitoring, development of diagnostics and management protocols for pig diseases for achieving one health.

Programme-4: Value addition, farm to fork management for food safety, entrepreneurship and skill development among stakeholders.

EXPENDITURE STATEMENT

BUDGET VIS-A-VIS EXPENDITURE 2025-26 **Rs. in lakh**

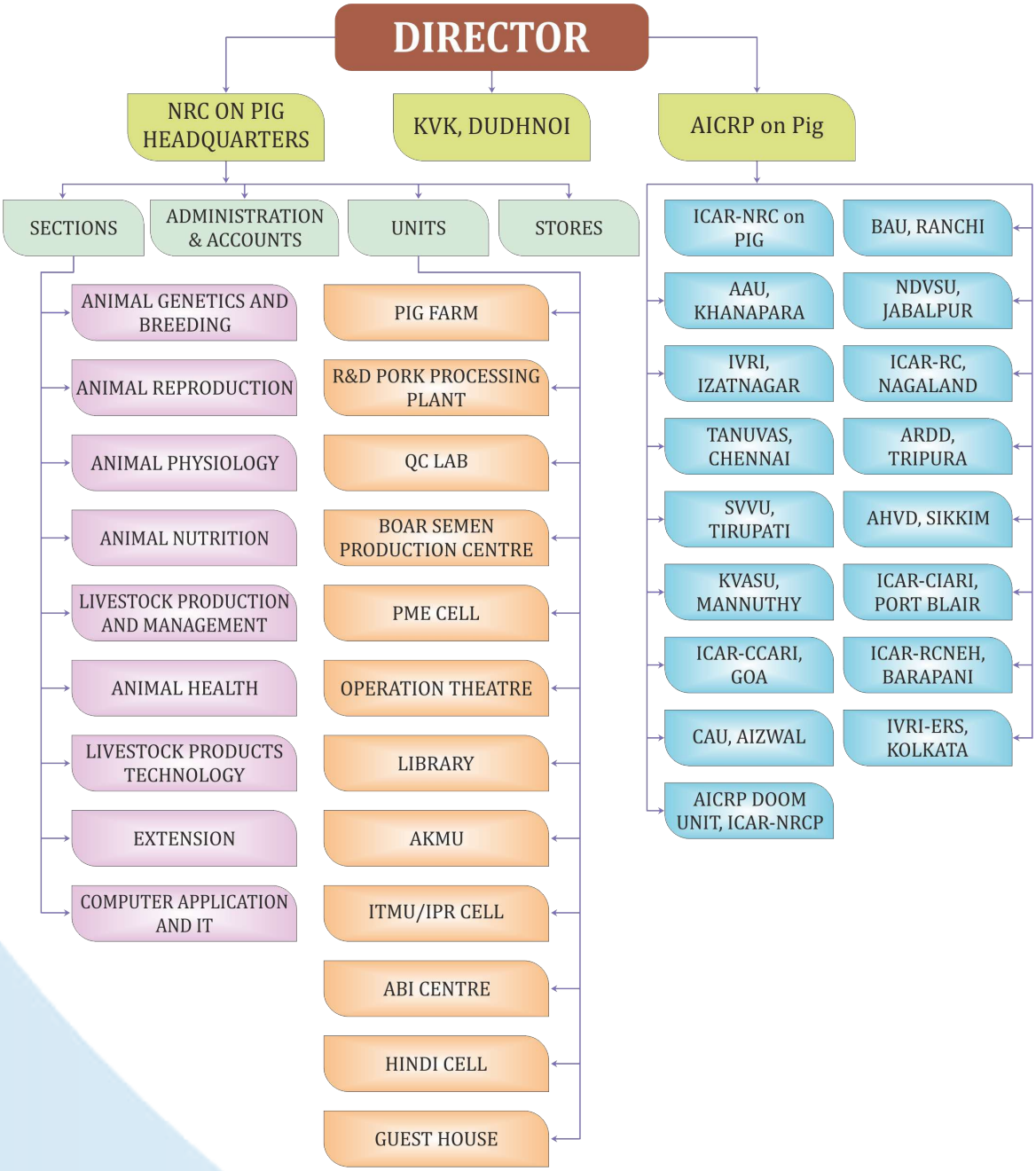
NAME OF THE SCHEME /PROJECT	DETAILED	PAY & ALLOWANCES	GENERAL	CAPITAL	TOTAL
ICAR-NRC ON PIG, MAIN SCHEME	R.E.	874.42	609.50	99.75	1583.67
	EXP.	874.42	609.50	99.75	1583.67
AICRP ON PIG PROJECT	R.E.	29.059	615.05	21.67	665.77
	EXP.	29.059	615.05	21.67	665.77

REVENUE GENERATION

Rs. in lakh

REVENUE TARGET DURING 2025-26	82.00
REVENUE GENERATION DURING 2025-26	109.79

ORGANIZATIONAL SETUP



The matrix mode of management is adopted in the research activities which provide devolved responsibilities for effective implementation of multidisciplinary/ interdisciplinary programmes. Director is the Head of the Institute, supported by administrative and financial wings. To strengthen the local decision-making and research monitoring, Research Advisory Committee, Institute Management Committee, Institute Research Council and PME Cell play a vital role through periodical meetings.

PHYSICAL PROGRESS

Inauguration of Annexe Building

The Annexe Building of ICAR–National Research Centre on Pig was inaugurated on 24 April 2025 by Dr. Raghavendra Bhatta, DDG (Animal Science), ICAR, in the presence of Dr. Vivek Kumar Gupta, Director, along with the scientists, officers and staff members of ICAR–NRC on Pig. The newly constructed Annexe Building is expected to strengthen the institute's research and administrative infrastructure, facilitating enhanced scientific activities and contributing to the advancement of pig research and development in the country.

RESEARCH PROJECTS

Animal Genetics and Breeding

External Funded (DBT) : Cataloguing of Genomic and Transcriptomic Signatures in Indigenous Pigs Tolerant to African Swine Fever Virus

Pranab Jyoti Das, Seema Rani Pegu, Rajib Deb, Satish Kumar, Swaraj Rajkhowa, V.K. Gupta

Investigation of the RelA Gene

During the reporting time the investigation was mainly focused into the molecular basis of African Swine Fever (ASF) tolerance in Indian indigenous pig began by testing hypotheses centred on the RelA gene, a critical subunit of the NF-κB transcription factor previously identified as a key resilience marker in African warthogs. Initial computational analysis using molecular docking identified significant potential interactions between the porcine RELA domain and the A238L protein encoded by the ASFV, a known viral antagonist that subverts host immune signalling. To validate these findings in the field, the project team employed a rigorous multi-platform genotyping approach integrating ARMS-PCR, PCR-RFLP, and Sanger sequencing specifically targeting a high-interest SNP in Exon 10 responsible for a Proline to Alanine substitution. Despite the distinct survival advantages observed in indigenous pig germplasm like the Doom pig, genetic screening revealed a consistent homozygous CC genotype (proline) across all tested indigenous breeds. This pivotal finding demonstrates a clear divergence from the evolutionary resistance mechanisms seen in African warthogs, confirming that the RelA mutation is not the primary driver of survival in the North Eastern Region of India. Consequently, the research underscores that ASF tolerance in Indian indigenous pigs is a sophisticated polygenic trait, likely governed by a network of complex, interconnected pathways rather than a single genetic locus. This shift in understanding directs future efforts toward broader whole-genome and transcriptomic analyses to identify the unique defensive signatures such as those found in the cGAS-STING or alternate innate immune pathways that allow these populations to withstand a virus that remains otherwise fatal to other domestic pig. By mapping these alternate drivers of resilience, the project provides a foundational empirical baseline for developing targeted breeding strategies.

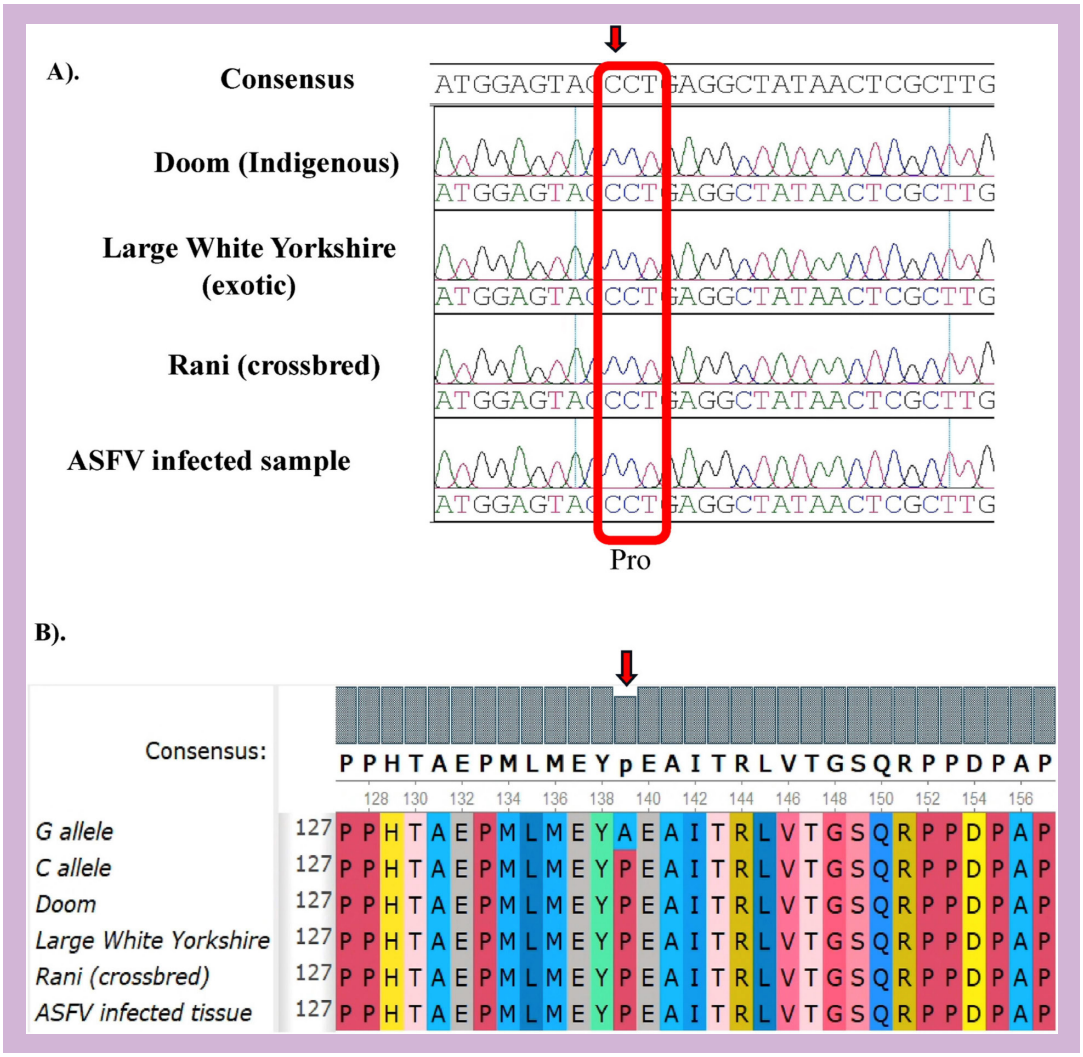


Fig. Validation by Sanger sequencing, A). Alignment of the nucleotide sequence of Doom (indigenous), Large White Yorkshire (exotic), Rani (crossbred) and ASFV- infected samples indicating a homozygous CC genotype across samples. B). Alignment of a deduced amino acid sequence of Doom (indigenous), Large White Yorkshire (exotic), Rani (Crossbred) and ASFV-infected sample compared with the amino acid sequence indicating C and G allele. CC genotype coding for proline amino acid present across all samples.

Transcriptomic Profiling of ASFV Survivors

To decode the underlying biological mechanisms that allow certain indigenous pig populations to survive the devastating effects of ASFV, the project executed a high-resolution Whole Transcriptome Analysis (WTA) focusing on spleen tissues. As the primary lymphoid organ and a central site for ASFV replication and systemic immune modulation, the spleen serves as the critical battlefield for host-pathogen interactions. By comparing the genomic profiles of natural survivors against healthy, non-infected controls, the study sought to isolate the specific molecular blueprints of resilience. The resulting data revealed an unprecedented and massive shift in the genomic landscape of survivor pigs, identifying a total of 10,515 Differentially Expressed Genes (DEGs) that were significantly

altered in response to the viral infection. Within this vast regulatory network, 4,574 genes were found to be upregulated, with the KIF27 gene a member of the kinesin family involved in intracellular transport and potentially viral trafficking exhibiting the highest level of expression. Conversely, 5,941 genes were significantly downregulated, with the most pronounced suppression occurring in the COX1 gene, suggesting a strategic metabolic shift or a specific mitochondrial response to limit viral replication or mitigate oxidative stress during the infection cycle.

Beyond individual gene counts, pathway enrichment analysis provided a comprehensive view of the survivors' defensive strategies, highlighting a sophisticated coordination of biological processes essential for viral clearance. The transcriptomic data pointed toward the heightened activation of innate immunity and autophagy pathways, which facilitate the rapid identification, sequestration, and degradation of ASFV components before they can overwhelm the host. This was complemented by evidence of refined adaptive immune responses, where the fine-tuning of T-cell and B-cell activities likely prevented the typical "cytokine storm" and massive lymphopenia associated with acute ASF mortality. Central to this "survival signature" were key antiviral markers, including IL15, which supports Natural Killer and T-cell homeostasis, and the IFIT family (IFIT2, IFIT3), known for their potent ability to inhibit viral protein synthesis. Additionally, the upregulation of CXCL2 and ILRUN (Inflammation Linked to Regulator of Interferon Response) suggests a precisely calibrated inflammatory response. These findings collectively define a robust, multi-layered genetic framework that characterizes ASFV tolerance in indigenous pig breeds.

Host-Pathogen Interaction

The project is currently validating eight high-priority immunogenic genes to establish a diagnostic panel for resilience.

Table: Summary of key candidate genes and molecular pathways associated with African Swine Fever Virus (ASFV) resilience in indigenous pig populations.

Target Gene	Preliminary Findings
MYD88	Crucial signalling adapter; shows high variance between infected and healthy groups.
IFIT	Significant upregulation in survivors, acting as a primary viral inhibitor.
LDHB	Emerging as a metabolic marker linked to the immune-stress response.
cGAS-STING	Currently being mapped to understand DNA-sensing of ASFV.

These findings establish a robust, multi-layered genetic framework for ASFV tolerance. By defining these specific molecular blueprints, the current research provides an empirical foundation for future genomic selection and diagnostic tools, significantly enhancing the biosecurity and economic sustainability of the regional piggery sector against transboundary viral threats. Consequently, this study maps intricate pathways that differentiate resilient germplasm from susceptible populations, offering actionable insights for long-term livestock protection.

External Funded (NASF): Traceable Value Chain for safe pork in the North Eastern Region of India

Pranab Jyoti Das, Seema Rani Pegu, Satish Kumar, R. Thomas, B.C. Das, V.K. Gupta

The project aims to revolutionize the pork industry in North East India by integrating artificial intelligence, blockchain technology, and standardized veterinary protocols. During 2025-2026) reporting period, the team successfully mapped the complex supply chain in Meghalaya, developed an AI-driven porcine identification system (e-Varaha), and established a decentralized blockchain framework to ensure "farm-to-fork" traceability and food safety.

Value Chain Mapping & Socio-Economic Insights

The project team conducted a systematic mapping of the pork value chain across four key districts in Meghalaya. By identifying critical nodes ranging from primary producers to retailers; the study revealed the following sectors viz. The demographics sector shows strong engagement from the youth, with 38.8% of stakeholders under the age of 30. However, a significant gender imbalance exists in the butchery sector, where male participation stands at 77.8%. The mapping identified high-intensity trans-regional supply routes. Notably, pig is being sourced from as far as Karnataka, Haryana and other states of India. Logistics data showed a 300% (3X) increase in animal traffic during festive periods, providing the empirical baseline required for the architectural workflow of the digital platform.

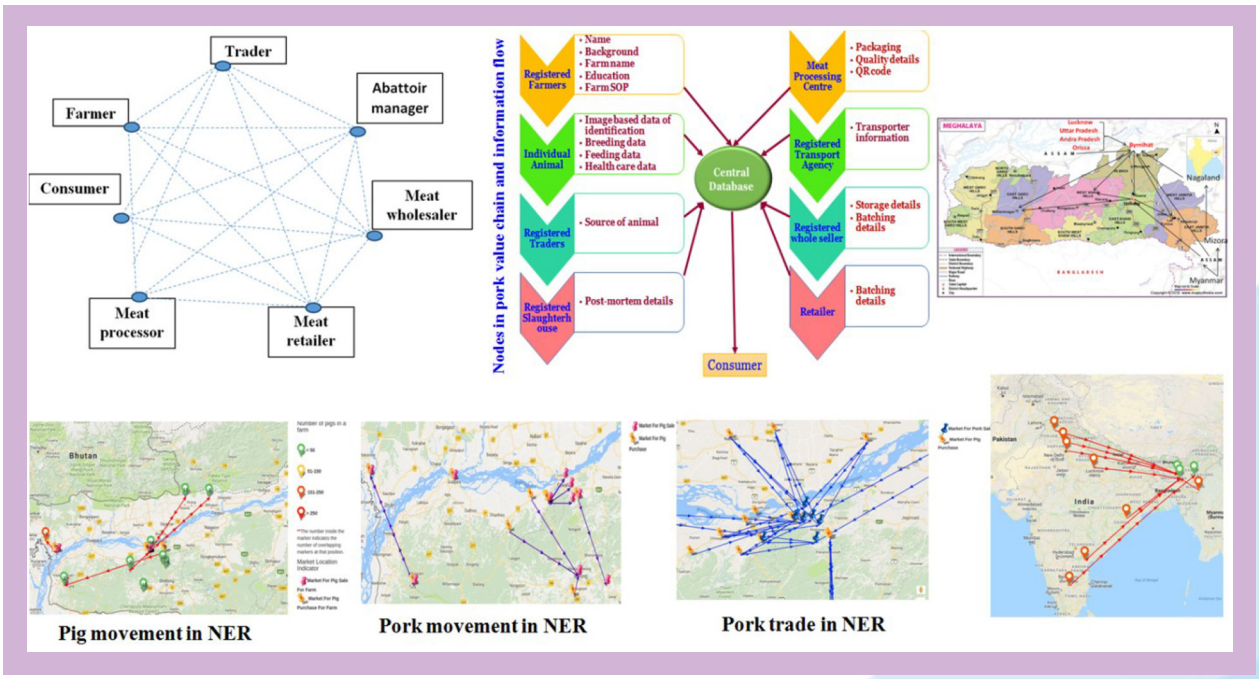


Fig. Architectural Framework and Spatial Dynamics of the Pork Value Chain in the North Eastern Region (NER). The upper panels illustrate the decentralized blockchain network nodes (top left) and the systematic flow of information from primary producers and individual animal biological data into a centralized digital database (top centre). The spatial mapping (top right and bottom panels) details the trans-regional supply routes, depicting the movement of live pigs, pork products, and trade networks across Meghalaya and extended corridors from states such as Karnataka and Haryana.

Technological Innovations: The e-Varaha Ecosystem

To ensure individual animal traceability without invasive tagging, the team developed a AI-based breed Identification system by using face-recognition prototype by means of the MobileNetV2 architecture. A comprehensive library was curated covering five major breeds: Doom, Duroc, Ghoongroo, Hampshire, and Yorkshire. The model was integrated into an Android application, featuring real-time breed identification and bounding box visualization for field use.

Pashu-Aadhaar & Digital Passports

A standardized identification system, Pashu-Aadhaar, was launched. These 19-character alphanumeric code acts as a digital "passport," capturing vital data points viz. breed and country of origin, sex, geographic data (State and District)

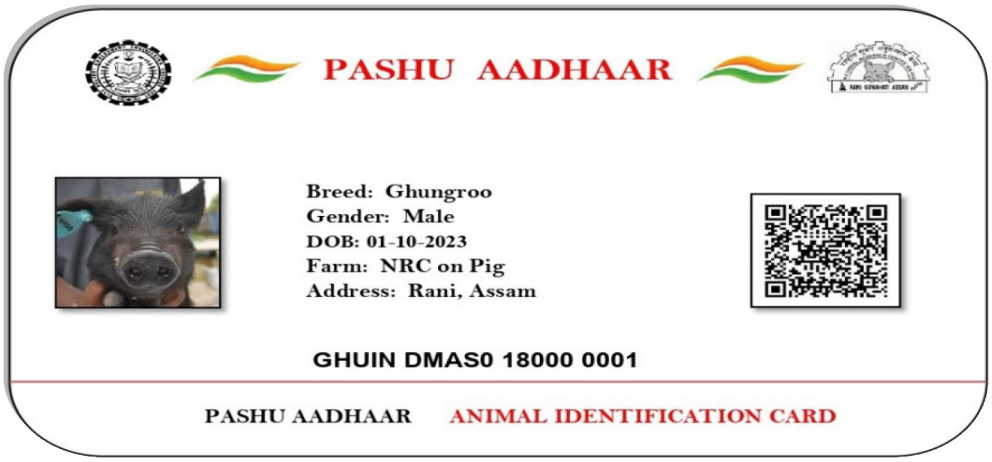


Fig: Pashu Aadhaar (Animal Identification Card) card displays critical traceability data, including a unique identification number, breed specification (Ghungroo), date of birth, and farm location, integrated with a QR code for digital record management.

Blockchain Integration

The project successfully transitioned from traditional data silos to a decentralized framework. A six-node software prototype was developed to link Farmer → Trader → Abattoir → Wholesaler → Retailer → Consumer. This system utilizes KYC-linked authentication for immutable recording. Consumers can now scan a unique Packet ID to verify the entire history of the meat they purchase.

Quality Assurance & Food Safety Protocols

The team established rigorous acceptance Clinical Standards and thresholds for Ante Mortem (AM) and Post Mortem (PM) examinations. A systematic database of lesions across eleven organ systems was tabulated to assist frontline veterinarians in rapid disease detection.

Physiological Safety Metrics

Empirical studies on pork stored at ambient temperatures revealed critical degradation markers namely significant declines in pH and Water-Holding Capacity (WHC), increased lipid oxidation

and reduced extract release volume. These markers are being fed into a Decision Support System (DSS) to provide real-time safety metrics at slaughterhouses.

During 2025-2026 year project has laid the technical and empirical foundation for a secure, transparent pork value chain. The successful deployment of the e-Varaha app and the blockchain marks a shift toward a data-driven livestock economy in the NER.

Institute Project: Performance Evaluation of a Novel LWY (male) X Ghoongroo (female) Crossbred Pig

Satish Kumar, R. Islam, P.J. Das, Kalyan De, Jaya and R. Thomas

The indigenous breeds like Ghoongroo possess excellent adaptability, fertility, and mothering ability, their productivity remains relatively low; conversely, exotic breeds such as Large White Yorkshire (LWY) exhibit superior growth rate, feed efficiency, and carcass quality but often lack resilience under local conditions. To enhance the productivity, adaptability, and profitability of pig farming in India, this project is conceptualized to harness the advantages of both genetic groups through a scientifically designed crossbreeding strategy, aiming to develop a high-performing, resilient crossbred pig suitable for Indian farming systems.

Development of parental base population: The base population for the crossbreeding program was established by incorporating Ghoongroo pigs as the dam line and Large White Yorkshire (LWY) as the sire line. The Ghoongroo piglets were purchased from AICRP Pig farm of ICAR-IVRI, ERS Kalyani. A total of 26 female piglets belongs to 7 different sire lines were procured to act as Dam for the crossbreeding programs. The LWY piglets were procured from AICRP pig Farm of ARDD Tripura. A total of 12 males from 7 different sire lines were selected to act as sire for crossbreeding programme. The body wt. data of all the parental generation pigs were recorded.

Recording of data of parental base population

The data related to growth and reproduction traits were recorded for both parental populations. The birth weight, weaning weight along with the weight at monthly interval were recorded for Ghoongroo as well as LWY pigs. The details of growth traits for both the parental population in given below-

Sl. No.	Age	Ghoongroo (in Kg)	LWY (in Kg)
1	Birth weight	0.76 ± 0.02	1.3 ± 0.02
2	15D	1.26 ± 0.02	4.05 ± 0.38
3	30D	2.6 ± 0.09	6.24 ± 0.21
4	Weaning weight	3.45 ± 0.09	7.84 ± 0.44
5	3M	7.57 ± 1.01	11.4 ± 1.52
6	4M	9.75 ± 0.82	17.61 ± 0.53
7	5M	12.19 ± 0.99	31.49 ± 1.14
8	6M	25.97 ± 2.01	49.86 ± 0.93
9	7M	26.42 ± 2.11	55.8 ± 0.91

Sl. No.	Age	Ghoongroo (in Kg)	LWY (in Kg)
10	8M	28.84 ± 1.77	NA
11	9M	34.52 ± 1.82	67.14 ± 2.34
12	10M	40.94 ± 2.04	71.08 ± 2.37
13	11M	47.5 ± 2.38	79.22 ± 2.6
14	12M	52.68 ± 2.5	86.42 ± 2.37
15	13M	57.9 ± 2.41	101.18 ± 2.49
16	14M	64.42 ± 2.53	103.43 ± 1.77
17	15M	70.41 ± 2.52	108.08 ± 1.74
18	16M	81.52 ± 2.39	114.17 ± 1.74
19	17M	89.81 ± 2.49	119.55 ± 1.77

Development of a Novel Crossbred Pig variety for Improved Growth and Reproductive Performance

Controlled mating of phenotypically superior Ghoongroo females with LWY sires was undertaken to generate the initial crossbred progeny, thereby creating a base population that combined maternal fitness traits with enhanced production potential. This structured approach ensured a balanced genetic architecture, which could be further subjected to performance recording, evaluation, and selection for the development of a sustainable crossbreeding program. The progeny produced by crossing the parental breeds will serve as the parents for the inter-se mating to develop a crossbred pig variety with uniform phenotype and performance. The first crossbred progeny from the mating of Ghoongroo dam with Large White Yorkshire (LWY) sire was successfully produced on 14th August 2025. The farrowing resulted in a total of six piglets, comprising the initial base population of the two-breed cross. The piglets were observed to be healthy, vigorous, and active immediately after birth, indicating good neonatal viability and maternal care. The dam exhibited satisfactory mothering ability, with adequate milk production and protective behaviour towards the litter. This event marks the establishment of the foundational crossbred line, combining the prolificacy and adaptability of the Ghoongroo with the growth potential and carcass quality traits of LWY. To date, four farrowings have been completed, resulting in the production of initial crossbred progeny. A total of thirty-one piglets were born, among them, 12 were male and 17 were female with an overall mean birth weight of 1.25 ± 0.032 kg. The mean birth weight of male piglets was 1.23 ± 0.0504 kg, whereas that of female piglets was 1.26 ± 0.04 kg. The overall mean weaning weight of the crossbred piglets was 7.57 ± 0.16 kg. The mean weaning weights of male and female piglets were 7.58 ± 0.19 kg and 7.56 ± 0.16 kg, respectively.

	Number	Birth weight (kg)	Weaning weight (kg)
Male	14	1.23 ± 0.05	7.58 ± 0.19
Female	17	1.26 ± 0.04	7.56 ± 0.16
Over all	13	1.25 ± 0.03	7.57 ± 0.16

Crossbred Piglets with Dam(Ghoongroo)

Grower Crossbred pigs

Institute Project: Exploration of Genome-Wide Selection Signatures in Ghoongroo and Doom pigs of India

Satish Kumar, P.J. Das, Jaya

Identification of genome wide Selection Signatures within population

The within-population selection signature analysis using the iHS method revealed several genomic regions under selection across different chromosomes in all the studied breeds. In Ghoongroo pigs, significant selection signatures were observed on SSC8, SSC13, SSC9, SSC1, and SSC14. Important genes identified in these regions included SST, RTP2, BCL6, ABCB4, CROT, NOS1, SLIT3, SGCB, ADAMTS7, RORA, DCC, and ORC3, which are associated with growth, metabolism, reproduction, and adaptive traits. In Doom pigs, selection signatures were identified on SSC9, SSC15, SSC14, SSC13, SSC7, SSC3, and SSC6. The candidate genes under selection included MYSM1, SLC10A1, PBX3, CAMTA1, FOXI3, HK2, NRXN1, PTGER4, STIM1, and STXBP3. These genes are known to be associated with immune response, disease resistance, thermotolerance, and reproductive traits. In Agonda Goan pigs, selection signatures were detected across multiple chromosomes, particularly SSC9, SSC7, SSC18, and SSC15. Important genes identified included TLR3, WNT2, CFTR, IRF2, ACSL1, FGFR1, and NRG1, indicating selection for immunity, growth, and adaptation traits. Similarly, in Mali pigs, genes such as IL18BP, NR2F2, ERBB4, TIGIT, and PBX1 were identified under selection, while in Manipuri Black pigs, genes such as BCL2, GPR15, NCOA2, EYA1, and CDH20 were identified, suggesting selection for adaptation, immune response, and reproductive traits.

Identification of genome wide Selection Signatures between population

The between-population selection signature analysis using XP-EHH revealed several genomic regions under differential selection between breeds. Between Ghoongroo and Doom pigs, strong selection signals were detected in multiple genomic regions, particularly on SSC1, SSC13, SSC18, SSC10, SSC5, SSC6, SSC9, and SSC15 in Ghoongroo pigs, while selection signals in Doom pigs were mainly observed on SSC2. Important candidate genes under selection included ATXN7L1, CDHR3, CADPS2, ELMO1, ROBO1, SLC13A1, IRF5, and FLNC in Ghoongroo pigs and F2RL1, S100Z, ENC1, and SV2C in Doom pigs. Between Ghoongroo and Agonda Goan pigs, a large number of genomic regions showed selection signatures, mainly on SSC18, SSC15, SSC9, and SSC7 in Ghoongroo pigs, with candidate genes such as SND1, PAX4, FSCN3, CFTR, WNT2, FGFR1, ACSL1, IRF2, and TLR3. Between Ghoongroo and Mali pigs, selection signatures were identified on SSC8 and SSC7 in Ghoongroo pigs and SSC16 in Mali pigs, with genes such as MAGI2 and GRM4 in Ghoongroo pigs and CDH18, CALN1, and AUTS2 in Mali pigs. Between Ghoongroo and Manipuri Black pigs, strong selection signatures were identified mainly on SSC18 and SSC9 in Ghoongroo pigs and SSC15 and SSC16 in Manipuri Black pigs. Similarly, between Doom and Manipuri Black pigs, selection signatures were identified on SSC1, SSC8, SSC9, SSC16, and SSC17 in Doom pigs. Between Agonda Goan and other breeds, several genomic regions were found under selection, indicating breed-specific adaptation and selection pressure.

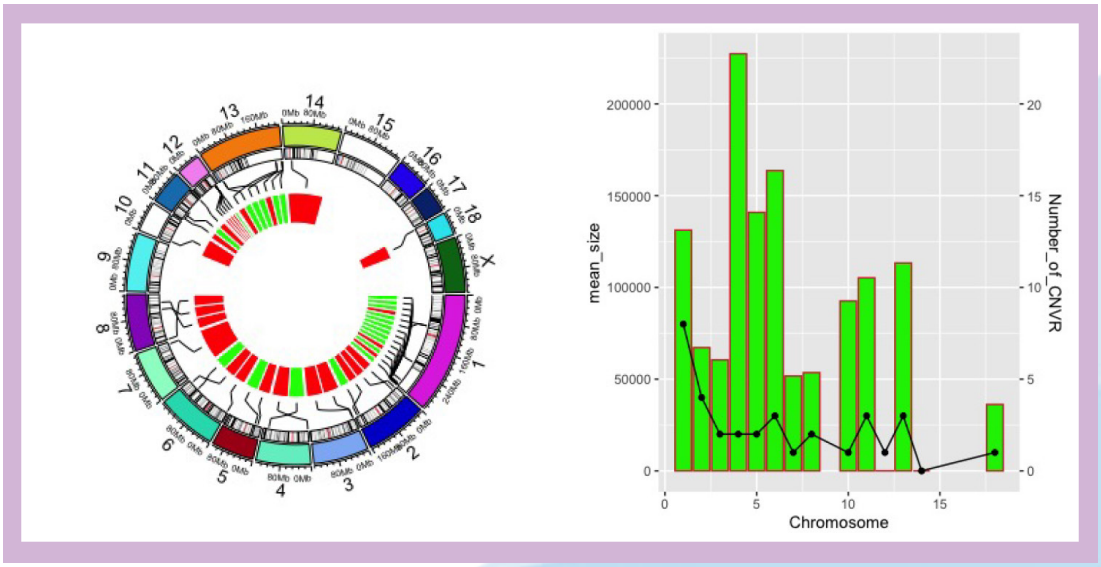
The combined analysis using iHS and XP-EHH methods revealed multiple genomic regions and candidate genes under positive selection in indigenous pig breeds. The identified genes were associated with economically important traits such as growth, reproduction, immune response,

disease resistance, metabolism, and environmental adaptation. The results indicate that both natural selection and artificial selection have contributed to the development of unique genetic architecture in indigenous pig breeds. The genomic regions and candidate genes identified in this study can be utilized in marker-assisted selection, genomic selection, and breed improvement programmes. The findings of this study provide valuable information for conservation and genetic improvement of indigenous pig germplasm and will support the development of improved pig varieties suitable for different agro-climatic conditions.

Detection of Copy Number Variation regions in Ghoongroo Pigs

The CNVs were identified using the PennCNV V.1.0.5, which is based on HMM (Hidden Markov model) principal. The CNVs were called on the basis of LRR and BAF values computed from the signal intensity files of 80K SNP data. All samples had a LRR standard deviation of >0.30, a BAF median of 0.45 to 0.55, a BAF drift <0.01 and a wave fact <0.05.

A total of 217 CNVs comprising 36 gain and 181 loss CNVs were identified by PENNCNV on 18 pairs of autosomal chromosomes. The average number of CNVs per individual was 7.75. After aggregating overlapping CNVs, 33 CNVRs across the pig genome were identified in which 12 were Gain event while 21 were loss CNV. The genes identified within loss CNVR regions were found to be associated with important biological functions including immune response (BPIFC, IL17C, CYBA), growth and development (PRDM4, CDT1, RECQL4, ADD1, SPRY1), metabolism (MVD, MFSD3, SLC39A4), reproduction (ZFPM1), and environmental adaptation (PIEZO1, GNA12). The presence of multiple zinc finger genes indicates regulatory roles in gene expression and adaptation. These results suggest that copy number loss in these regions may influence economically important traits such as growth, immunity, reproduction, and adaptation in pig populations. while the gain event involved genes MYO5B, MBD1, SKA1, PLAC8L1, LARS1, SMARCC2, RNF41, NABP2, SLC39A5, ANKRD52, COQ10A, CS, CNPY2, PAN2, U6, IL23A, STAT2, CELF4, LRRC3B. theses genes were mainly involved in growth, reproduction, immune response, metabolism, and environmental adaptation, indicating selection for productivity and survivability traits in indigenous pig populations.



Institute project: Performance evaluation of a novel Duroc (male) × Ghoongroo (female) crossbred pig

Meera K, P. J Das, Nitin M Attupuram, Satish Kumar, R.Islam, R. Thomas & Lokesha E

Evaluation of Growth and Reproductive Performance of Ghoongroo Pigs

The body weight performance of Ghoongroo pigs at different ages is presented as mean ± standard error. The average birth weight of piglets was 0.789 ± 0.024 kg, which increased to 1.259 ± 0.021 kg at 15 days and 2.599 ± 0.086 kg at 30 days. At 45 days of age, the body weight reached 3.45 ± 0.09 kg.At 3 months, pigs attained a body weight of 7.57 ± 1.005 kg, which further increased to 9.75 ± 0.82 kg at 4 months and 12.186 ± 0.99 kg at 5 months. A marked increase in body weight was observed at 6 months, reaching 26.88 ± 1.93 kg, followed by a slight stagnation at 7 months (26.71 ± 1.81 kg). Thereafter, the body weight showed a consistent upward trend, with values of 30.34 ± 1.81 kg at 8 months and 37.17 ± 1.98 kg at 9 months.The growth continued steadily, with body weights of 42.97 ± 2.199 kg at 10 months and 49.72 ± 2.54 kg at 11 months. At one year of age (12 months), the pigs attained a body weight of 62.10 ± 2.71 kg, which further increased to 66.56 ± 2.63 kg at 13 months and 71.25 ± 2.45 kg at 14 months. By 15 months, the body weight reached 79.78 ± 2.57 kg, and finally, at 16 months, the pigs attained 85.74 ± 2.49 kg.

The reproductive performance of Ghoongroo pigs was evaluated using key parameters such as age at puberty, gestation period, and litter size at birth. The mean age at puberty was 6.69 ± 0.21 months, with a range of 6.03 to 7.63 months, indicating relatively early sexual maturity in this breed.The average gestation period was 114.33 ± 0.42 days, ranging from 113 to 116 days.The mean litter size at first parity was 4.17 ± 0.70 piglets, with a range of 2 to 6 piglets.

Body weight	Mean ± SE
Average birth wt (Kg)	0.789 ± 0.024
Body wt at 15 days (Kg)	1.259±0.021
Body wt at 30 days (Kg)	2.599 ± 0.086
Body wt at 45 days (Kg)	3.45 ± 0.09
Body wt at 3 months (Kg)	7.57 ± 1.005
Body wt at 4 months (Kg)	9.75 ± 0.82
Body wt at 5 months (Kg)	12.186 ± 0.99
Body wt at 6 months (Kg)	26.88 ± 1.93
Body wt at 7 months (Kg)	26.71 ± 1.81
Body wt at 8 months (Kg)	30.34 ± 1.81
Body wt at 9 months (Kg)	37.17 ± 1.98
Body wt at 10 months (Kg)	42.97 ± 2.199

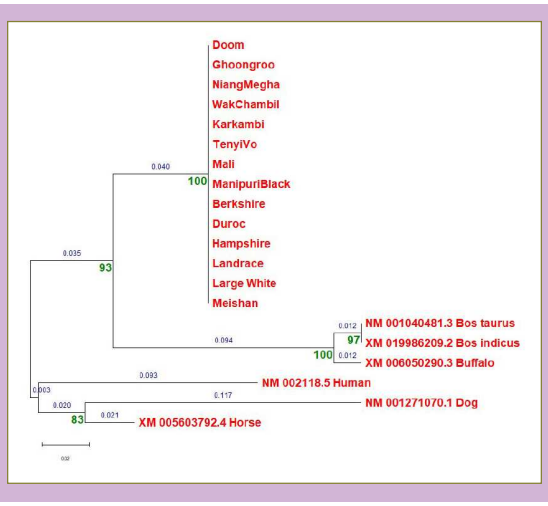
Body wt at 11 months (Kg)	49.72 ± 2.54
Body wt at 12 months (Kg)	62.10 ±2.71
Body wt at 13 months (Kg)	66.56 ±2.63
Body wt at 14 months (Kg)	71.25 ± 2.45
Body wt at 15 months (Kg)	79.78 ±2.57
Body wt at 16 months (Kg)	85.74 ±2.49

	Mean ± S.E	Range
Age at puberty (months)	6.69 ± 0.21	6.03-7.63
Gestation pd (days)	114.33 ± 0.42	113-116
Litter size at birth (No)	4.17 ± 0.70	2-6

Institute project: Exploring the genetic diversity and functional characterization of Swine Leukocyte Antigen (SLA) genes in indigenous pig breeds of India

Meera K, P. J Das, Nitin M Attupuram, Satish Kumar and Rajib Deb

The Swine Leukocyte Antigen (SLA) complex, the porcine equivalent of the Major Histocompatibility Complex (MHC), plays a pivotal role in immune regulation and disease resistance. Understanding the diversity of SLA genes provides valuable insights into population adaptability, pathogen resistance and herd health. The present study aimed to explore the genetic diversity of SLA class I (SLA-1, SLA-2, SLA-11) and class II (DRA, DRB1, DQA, DQB1, DMA, DMB) genes in indigenous pig breeds of India. Genomic DNA was extracted from whole blood samples collected from Ghoongroo, Doom, Niang Megha, Wak Chambil, Tenyi Vo, Mali, Karkambi and Manipuri Black pigs. Target regions of SLA class I and class II genes were amplified using specific primers designed using Primer 3 plus software. The purified PCR products were subjected to Sanger sequencing. The nucleotide sequences were aligned using the MUSCLE algorithm implemented in MEGA 11. Genetic distances among sequences were computed in MEGA 11. Phylogenetic relationships among the indigenous breeds and reference SLA alleles were inferred using the Maximum Likelihood (ML) method with 1000 bootstrap replications to ensure statistical robustness. Sequence alignment and variant analysis revealed extensive allelic polymorphism across the SLA genes, including several novel alleles not previously reported in the IPD-MHC database. An exception was SLA-DMB, which remained highly conserved among all indigenous and exotic pig breeds. Phylogenetic reconstruction demonstrated distinct clustering of indigenous pig breeds, highlighting their unique evolutionary histories and potential adaptation to local disease pressures. These findings highlight the high immunogenetic diversity of Indian indigenous pigs and their value as reservoirs of disease-resilient traits. Since MHC alleles vary in their ability to recognize specific pathogens, this diversity has important implications for disease resistance and herd health. Overall, the study offers key baseline information for integrating SLA diversity into future breeding and conservation strategies.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WakChambil
Karkambi
TenyiVo
Mali
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Hampshire
Landrace
Large White
Meishan
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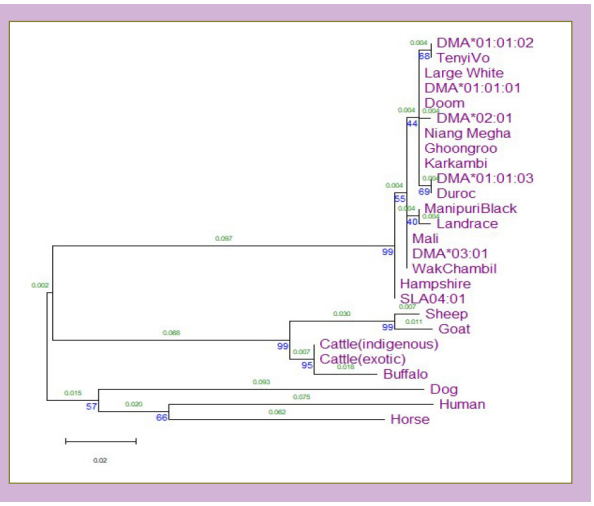
XM 019986209.2 Bos indicus
XM 006050290.3 Buffalo
NM 002118.5 Human
NM 001271070.1 Dog
XM 005603792.4 Horse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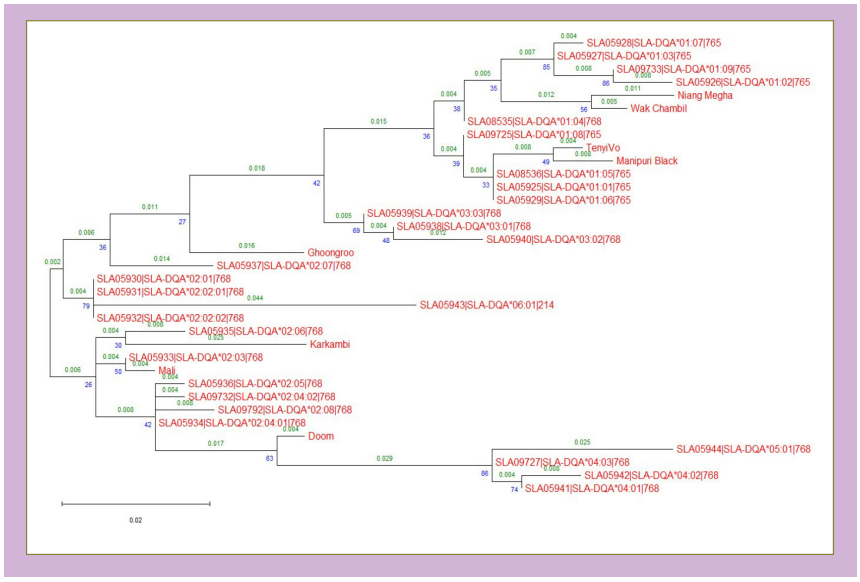
Large White
DMA*01:01:01
Doom
DMA*02:01
Niang Megha
Ghoongroo
Karkambi
DMA*01:01:03
Duroc
ManipuriBlack
Landrace
Mali
DMA*03:01
WakChambil
Hampshire
SLA04:01
Sheep
Goat
Cattle(indigenous)
Cattle(exotic)
Buffalo
Dog
Human
Horse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Niang Megha
Wak Chambil
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SLA09725|SLA-DQA*01:08|765
TenyiVo
Manipuri Black
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Ghoongroo
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Mali
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Doom
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Livestock Production and Management

Institute project: Association of farrowing and piglet traits vis-a-vis colostrum characteristics with neonatal performance in pigs

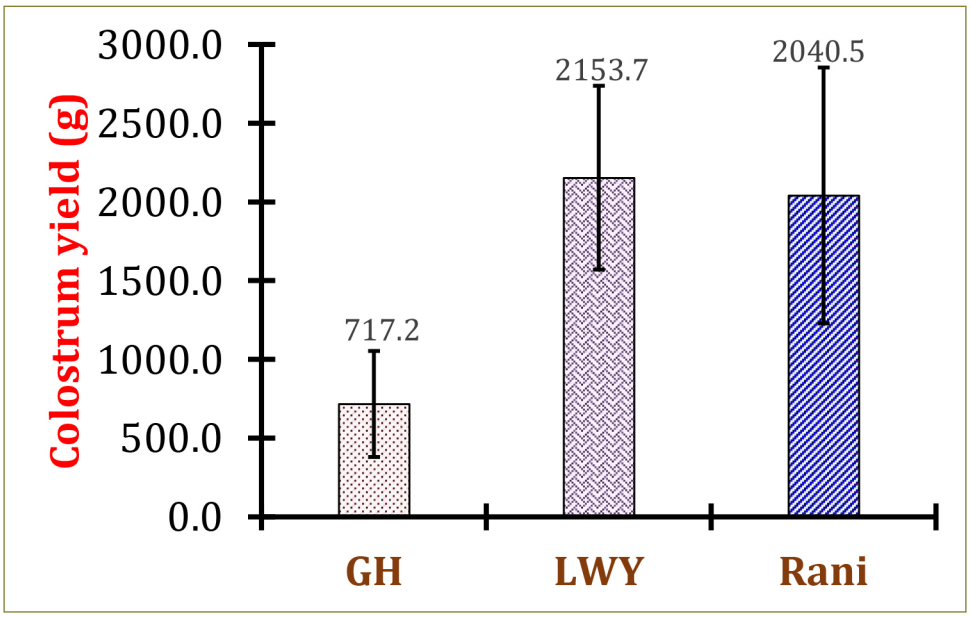
Kalyan De, Nitin M Attupuram, Jaya, Lokesh E

Colostrum yield and colostrum intake of Ghoongroo, Large white Yorkshire and Rani pigs: The colostrum intake after birth plays a major role in the early life survival and growth of a piglet. The present study investigated colostrum yield (CY) of Ghoongroo (GH), Large White Yorkshire (LWY) and Rani sow; and colostrum intake (CI) of their piglets. The study involved 57 sows and their 466 live-born piglets from the Institute farm. The farrowing of sows was monitored and immediately after farrowing the birth weight of each piglet were recorded and again 24 hours after their birth, the piglets were weighed. Based on these information colostrum intake and sow colostrum yield was calculated. The colostrum yield of Ghoongroo, LWY and Rani sow were 717.2±384 g, 2153.7±271.5 g and 2040.5±113.2 g, respectively. The CY was significantly ($P<0.05$) lower in GH sow as compared to LWY and Rani sow. Similarly, the CI was significantly ($P<0.05$) lower in GH piglets as compared to Rani and LWY piglets. The colostrum intake of GH, LWY and Rani piglets were 191.2±28.9 g, 249.2±5.7 g and 238.5±13.2 g; respectively.

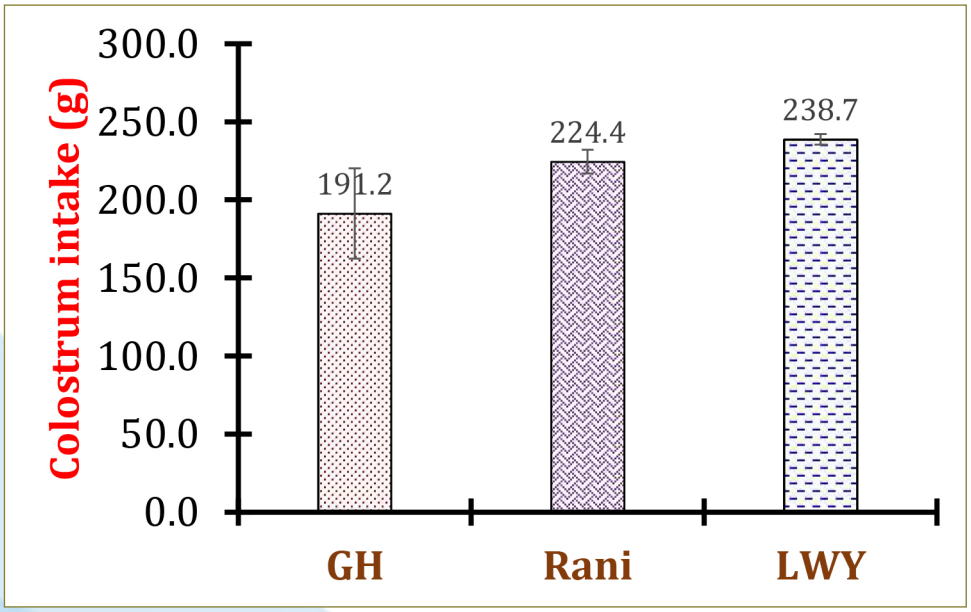
Association of colostrum intake of Rani piglets with neonatal traits, farrowing traits and neonatal performance: To establish the relationship between colostrum intake with neonatal traits, farrowing traits and neonatal performance in Rani piglets, various data were recorded from 365 neonatal Rani piglets. Immediately after birth; sex of the piglets, birth weight and crown-rump length, as well as rectal temperature one hour after birth were recorded. Body mass index (BMI) and ponderal index (PI) were also calculated. The piglets were weighed again at exactly 24 hours, and the weight gain between birth and 24 hours was used to estimate individual colostrum intake, based on an equation developed by Theil et al. (2014). The piglets were then divided into two groups based on their average colostrum intake: a low CI group (<250g) i.e. the piglets consumed less than 250 grams of colostrum and a high CI group (>250g) i.e. the piglets consumed more than 250 grams of colostrum. As expected, the colostrum intake of the two groups differed significantly ($P<0.001$). The low CI group consumed 196.1±5.6 g of colostrum, while the high CI group consumed 351.6±8.26 g. The birth weights of the two groups also differed significantly ($P<0.01$), with the low CI group weighing 1.0±0.02 kg and the high CI group weighing 1.1±0.02. Furthermore, the rectal temperature of piglets that consumed more colostrum was also higher ($P<0.05$) compared to those that consumed less one hour after birth. Birth order and cumulative birth interval was also significantly ($P<0.01$) higher in low CI group. The neonatal performance in terms of weight 24 h after birth and weight gain in 24 hr was significantly ($P<0.01$) higher in high CI group Rani piglets.

Association of colostrum intake of LWY piglets with neonatal traits, farrowing traits and neonatal performance: Immediately after farrowing data related to neonatal traits, farrowing traits and neonatal performance were collected from 60 LWY piglets to assess the association with colostrum intake. The LWY piglets with higher birth weight consumed more colostrum ($P<0.01$) as the birth weight of the high CI group was 1.4±0.04 kg; whereas in the low CI group was 1.2±0.03 kg. However, other neonatal traits did not differ between high and low colostrum intake LWY piglets. The birth

order of higher CI in LWY piglet was 4.0±0.62; while in low CI group of LWY piglet was 6.0±0.47. The neonatal performance of LWY piglets was better (P<0.01) in the LWY with high CI group as compared to the low CI.



GH, Ghoongroo; LWY, Large white Yorkshire
Fig.: Colostrum Yield of sows of different breeds



GH, Ghoongroo; LWY, Large white Yorkshire
Fig.: Colostrum intake of piglets of different breeds

Table: Association of colostrum intake with neonatal traits in Rani piglets

	Birth Weight (kg)	RT (° C)	Body length (cm)	BMI (kg/m^2)	PI (kg/m^3)
Overall Mean	1.1±0.01	95.6±0.12	22±0.18	22.2±0.28	105.6±2.13
High CI (>250 g)	1.1±0.02	96±0.2	22.6±0.3	21.9±0.46	100.3±3.53
Low CI (<250 g)	1.0±0.02	95.2±0.14	21.3±0.2w	22.6±0.31	111±2.4
P value	<0.01	<0.01	<0.01	0.22	0.01

CI, colostrum intake; RT, rectal temperature after 1 hr of birth; BMI, body mass index; PI, ponderal index

Table: Association of level of colostrum intake of Rani piglets with farrowing traits of sow

	Birth Interval (min)	Cumulative Birth Intervals (min)	Birth order
Overall Mean	7.6±1.11	32.3±2.11	5.1±0.17
High CI (>250 g)	5.7±1.84	24.4±3.49	4.7±0.28
Low CI (<250 g)	9.6±1.25	40.3±2.36	5.4±0.19
P value	0.08	<0.01	0.027

CI, colostrum intake

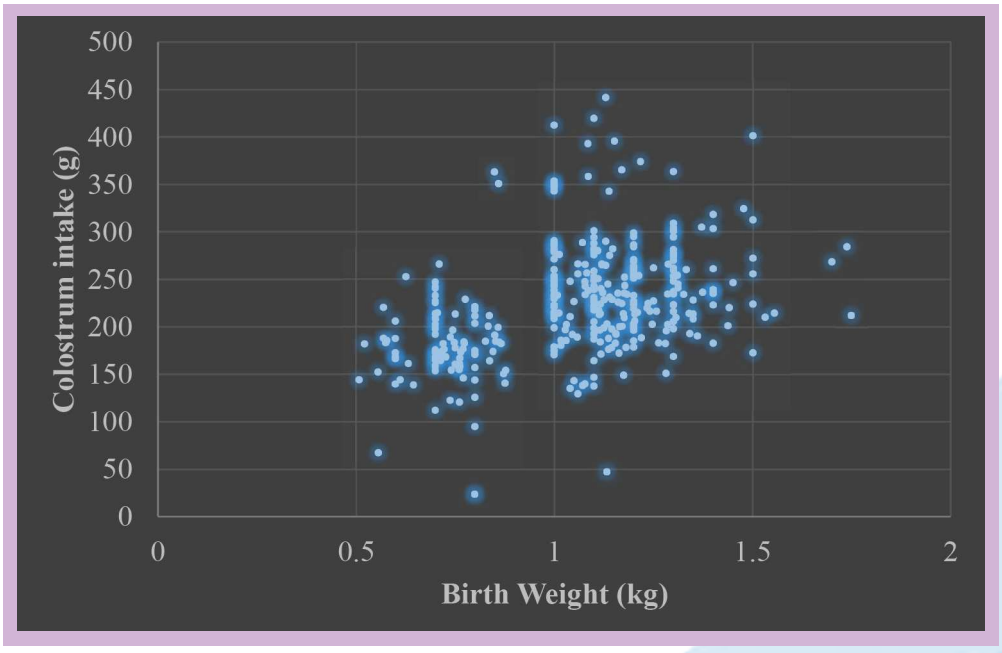


Fig.: Scatter Plot Showing the Association Between Colostrum Intake and Birth Weight of Rani Piglets.

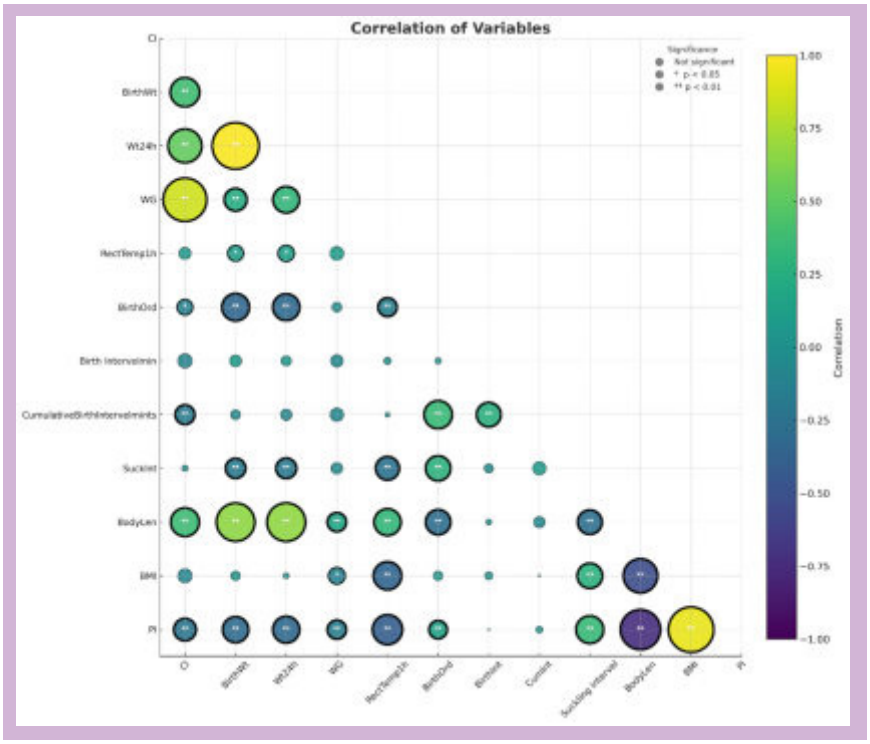


Fig.: Correlation matrix for different factors and colostrum intake of Rani piglets

Table: Association of colostrum intake with neonatal traits in LWY piglets

	Birth Weight (kg)	RT (°C)	Body length (cm)	BMI (kg/m^2)	PI (kg/m^3)
Overall Mean	1.3±0.03	95.7±0.24	25.3±0.33	20.7±0.45	83.5±2.57
High CI (>250 g)	1.4±0.04	95.7±0.38	25.7±0.53	21.1±0.72	83.4±4.1
Low CI (<250 g)	1.2±0.03	95.7±0.29	24.8±0.4	20.4±0.55	83.7±3.12
P value	0.004	0.885	0.16	0.413	0.958

CI, colostrum intake; RT, rectal temperature after 1 hr of birth; BMI, body mass index; PI, ponderal index

Table: Association of colostrum intake with piglet performance of LWY piglets

	CI (g)	Weight at 24 Hours	Weight gain (g)
Overall Mean	258.6±6.39	1.4±0.03	66.8±4.99
High CI (>250 g)	292±10.18	1.5±0.04	88.4±7.95
Low CI (<250 g)	225.1±7.74	1.3±0.03	45.1±6.05
P value	<0.01	<0.01	<0.01

CI, colostrum intake

Institute project: Performance Evaluation of a Novel Large White Yorkshire (female) X Ghoongroo (male) Crossbred Pig

Kalyan De; Satish Kumar, N.M. Attupuram, Meera K., Jaya, R. Thomas; R. Islam

Development of base population: The base population for the crossbreeding programme was established by utilizing Ghoongroo pigs (GH) as the sire line and Large White Yorkshire (LWY) as the dam line. Ghoongroo pigs, recognized for their high prolificacy, strong mothering ability, and adaptability to tropical agro-climatic conditions, were chosen as the foundational breeding stock. The Ghoongroo piglets were procured from the AICRP Pig Farm of ICAR-IVRI, ERS, Kalyani. A total of 14 male piglets, representing five different sire lines, were selected to serve as sires in the crossbreeding programme. Large White Yorkshire (LWY) pigs, an improved exotic genotype known for superior growth rate, feed efficiency, and desirable carcass traits, were used as the dam line. The LWY piglets were procured from the AICRP Pig Farm of ARDD, Tripura. A total of 21 female piglets, belonging to seven different sire lines, were selected as dams for the crossbreeding programme. Body weight data of all parental generation animals were systematically recorded for further evaluation.

Recording of data of base population: Data pertaining to growth and reproductive traits were systematically recorded for both parental populations. Growth parameters, including birth weight, weaning weight, and body weight at monthly intervals, were recorded for both Ghoongroo and Large White Yorkshire (LWY) pigs. The details of the growth traits for the parental populations are presented below.

Sl. No.	Age	Ghoongroo (in Kg)	LWY (in Kg)
20	Birth weight	0.76 ± 0.02	1.3 ± 0.02
21	15 days	1.26 ± 0.02	4.05 ± 0.38
22	30 days	2.6 ± 0.09	6.24 ± 0.21
23	Weaning weight	3.45 ± 0.09	6.84 ± 0.44
24	3 months	7.57 ± 1.01	10.4 ± 1.52
25	4 months	9.75 ± 0.82	12.69 ± 1.88
26	5 months	12.19 ± 0.99	13.44 ± 2.15
27	6 months	25.97 ± 2.01	16.25 ± 3.12
28	7 months	26.42 ± 2.11	16.55 ± 1.89
29	8 months	28.84 ± 1.77	NA
30	9 months	34.52 ± 1.82	67.14 ± 2.34
31	10 months	40.94 ± 2.04	71.08 ± 2.37
32	11 months	47.5 ± 2.38	79.22 ± 2.6
33	12 months	52.68 ± 2.5	86.42 ± 2.37
34	13 months	57.9 ± 2.41	101.18 ± 2.49
35	14 months	64.42 ± 2.53	103.43 ± 1.77
36	15 months	70.41 ± 2.52	108.08 ± 1.74
37	16 months	81.52 ± 2.39	114.17 ± 1.74
38	17 months	89.81 ± 2.49	119.55 ± 1.77
39	18 months	94.18 ± NA	125.19 ± 1.72

Performance Evaluation of Initial Crossbred Progeny: Controlled mating between phenotypically superior Ghoongroo sires and Large White Yorkshire (LWY) dams was carried out to produce the initial crossbred progeny. This approach aimed to combine the desirable maternal traits of Ghoongroo pigs with the enhanced production potential of LWY, thereby establishing a robust base population. Such a structured breeding strategy ensures a balanced genetic architecture, which can be further utilized for systematic performance recording, evaluation, and selection in the development of a sustainable crossbreeding programme. To date, two farrowings have been completed, resulting in the production of initial crossbred progeny. A total of thirteen piglets were born, with an overall mean birth weight of 1.25 ± 0.07 kg. Among them, six were male and seven were female. The mean birth weight of male piglets was 1.43 ± 0.11 kg, whereas that of female piglets was 1.10 ± 0.04 kg. The overall mean weaning weight of the crossbred piglets was 7.6 ± 0.21 kg. The mean weaning weights of male and female piglets were 7.66 ± 0.23 kg and 7.45 ± 0.36 kg, respectively.

The data are presented as follows:

	Number	Birth weight (kg)	Weaning weight (kg)
Male	6	1.42±0.11	7.66±0.23
Female	7	1.1±0.04	7.45±0.36
Over all	13	1.25±0.07	7.6±0.21

Institute project: Dynamics of gut microbiome to dietary management and antibiotic treatment in pigs

Nitin M Attupuram, Kalyan De, R. Thomas, S.R. Pegu, R. Islam

The gut microbiome is a central determinant of health, productivity, and disease resistance in pigs. In the post-weaning phase, piglets experience substantial physiological and microbial stress, often resulting in dysbiosis, reduced feed efficiency, and increased incidence of diarrhoea. Probiotics such as Saccharomyces boulardii and Bacillus subtilis have emerged as promising candidates due to their ability to stabilize gut microbial communities, enhance intestinal barrier function, and improve nutrient assimilation. Additionally, exogenous enzymes like xylanases and amylases can enhance feed digestibility by breaking down complex polysaccharides, thereby indirectly influencing microbial fermentation dynamics. Our objective was to standardize the effective probiotic dosage based on gut health indicators and evaluate the effects of *Bacillus subtilis* and *Saccharomyces boulardii*, with and without enzyme supplementation, on growth performance.

Activity 1: Probiotic dose standardization trial - A preliminary trial of 2-week duration was conducted in eight groups of piglets to determine the optimal probiotic dosage of *Bacillus subtilis* and *Saccharomyces boulardii*. Piglets were assigned to graded probiotic dosages of 20 billion CFU, 5 billion CFU, 2 billion CFU, 1 billion CFU. Probiotics were administered along with feed. Parameters recorded were faecal scores, body condition scores and general clinical observations. The results clearly demonstrated a non-linear response to probiotic supplementation. 1 billion and 2 billion CFU had lowest faecal scores with improved body condition scores in piglets. Other groups demonstrated increased incidence of loose faeces indicating dysbiosis.

Activity 2: Comparison of growth performance under probiotic supplementation - The experiment was conducted using Rani breed piglets aged 4 months, maintained under standard management conditions. A total of 30 weaners were used in the main feeding trial, with 6 animals per group, ensuring statistical uniformity in terms of initial body weight and health status. The different groups were compared Group 1 - (Control); Group 2 (Supplementation with *Bacillus subtilis*); Group 3 (Supplementation with *Bacillus subtilis* and enzymes xylanase & amylase); Group 4 (Supplementation with *Saccharomyces boulardii*); Group 5 (Supplementation with *Saccharomyces boulardii* and enzymes xylanase & amylase). Feeding management was performed for a duration of 1 month with ad libitum access to feed and water. Probiotics and enzymes were incorporated into the basal diet. Growth performance parameters like body weight (kg) and average daily gain (ADG; kg/day) were compared.

Results indicated that growers supplemented with *Bacillus subtilis* exhibited improved body weight compared to the control group. The inclusion of enzymes further enhanced this effect as indicated by the highest average daily gain within this subset. Supplementation with *Saccharomyces boulardii* resulted in improved body weight relative to control. The Group 5 (*S. boulardii* + enzymes) recorded the highest overall average daily gain.

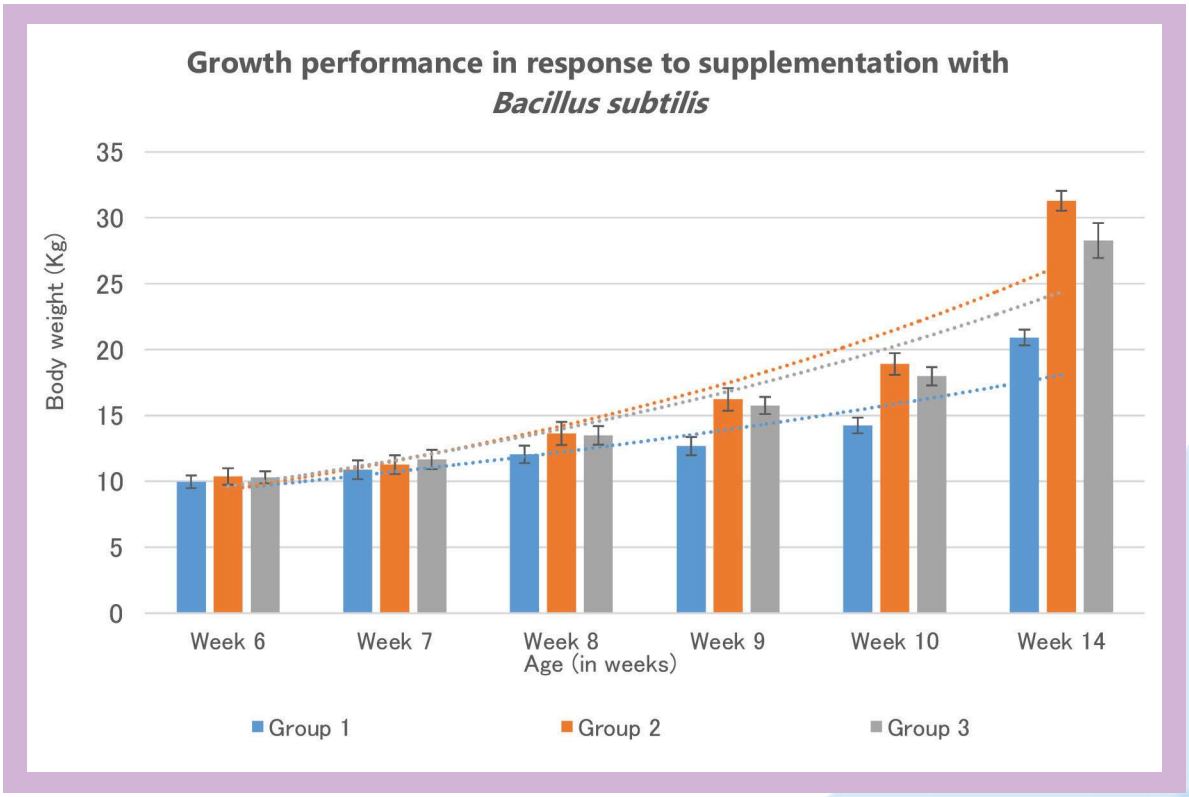


Fig: Body weight in response to supplementation with Bacillus subtilis and enzymes in growers

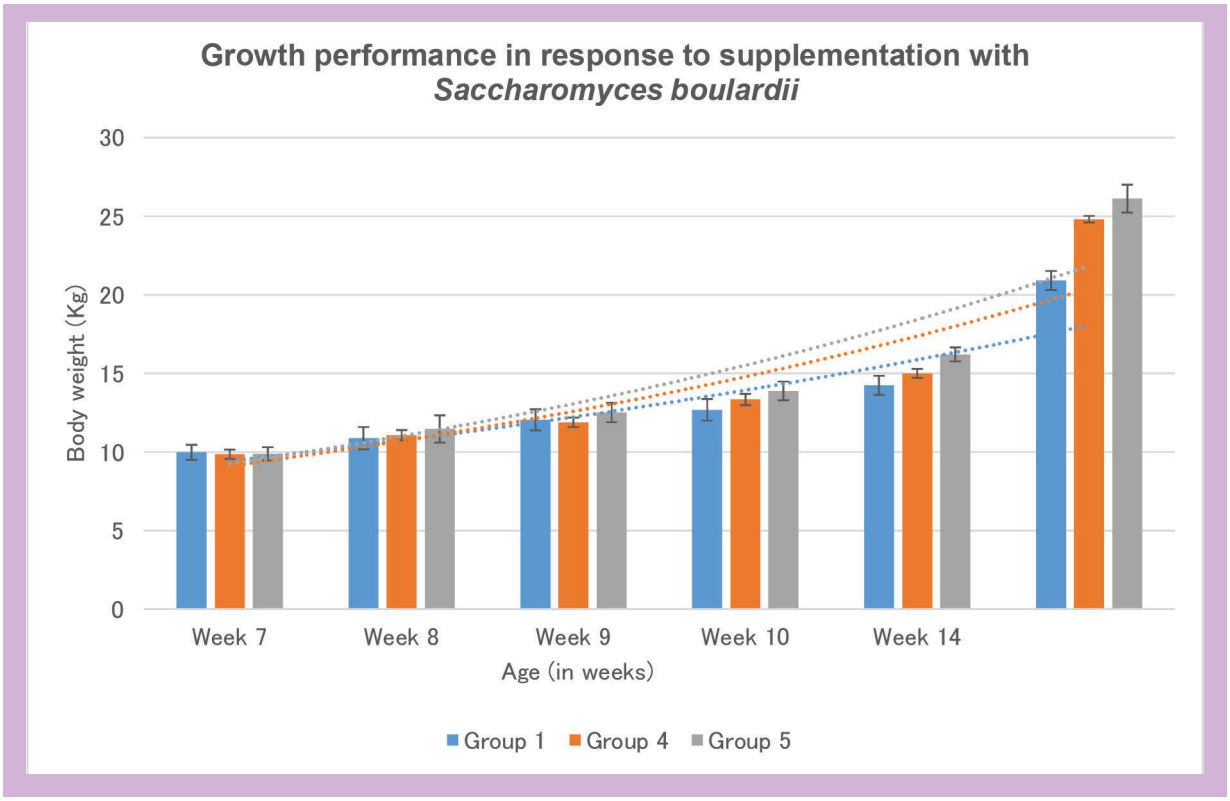


Fig: Body weight in response to supplementation with Saccharomyces boulardii and enzymes in growers

Activity 3: Comparison of growth performance under microencapsulated probiotic supplementation – Microencapsulation of probiotic was achieved through elephant apple peels derived pectin. Calcium chloride beading for encapsulation of resuspended probiotics in pectin medium was attempted. The feeding trial was conducted using in Rani finishers aged 6 months, maintained under standard management conditions. A total of 18 finishers were used with 6 animals per group, ensuring statistical uniformity in terms of initial body weight and health status. The different groups were compared Group 1 - (Control); Group 2 (Supplementation with microencapsulated *Bacillus subtilis*); Group 3 (Supplementation with *Bacillus subtilis* and XOS). The result shows better growth performance on supplementation with microencapsulated probiotics. The addition of prebiotics has shown to yield better results.

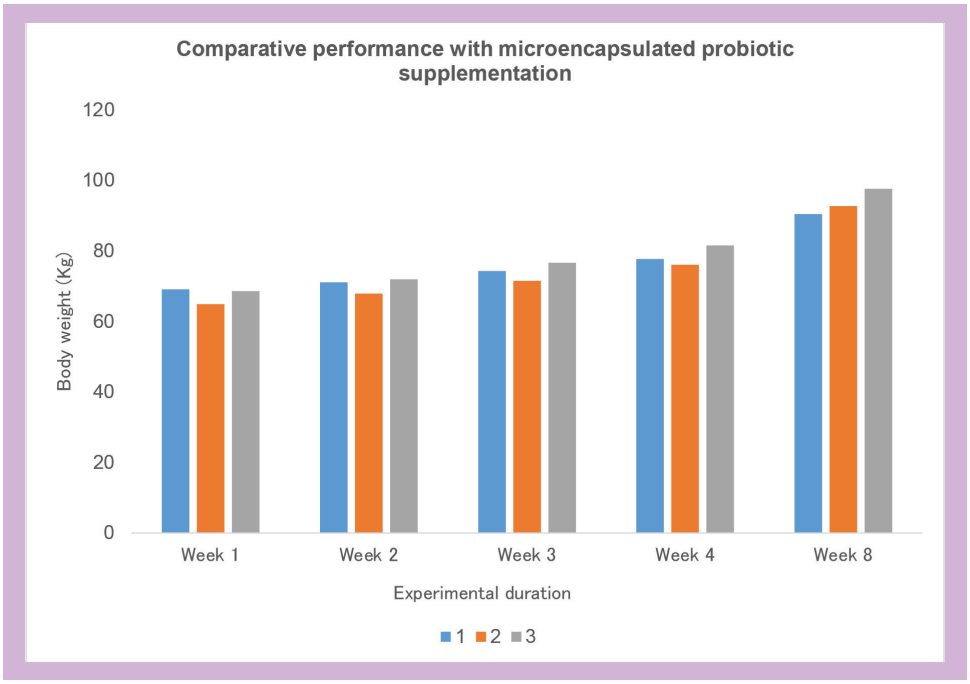
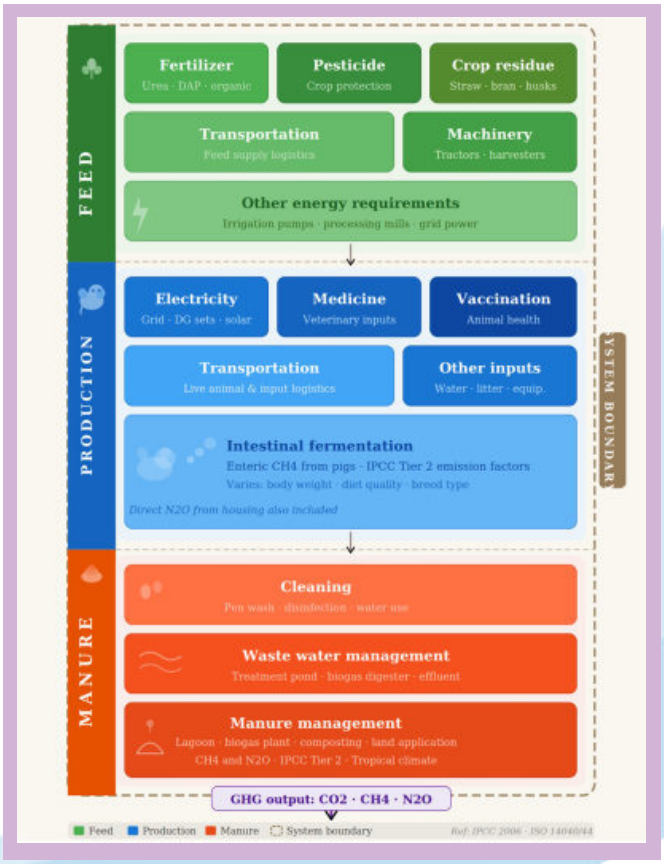


Fig: Body weight in response to supplementation with microencapsulated probiotic and prebiotics

Institute project: Assessment and optimization of the water footprint in pig production and processing

Nitin M Attupuram, Kalyan De, R. Thomas



Activity: Estimation of carbon footprint in organized pig production - Greenhouse gas emissions play a significant role in global warming and climate change. The swine production is emerging as a major sector of the livestock production and there is a pressing need to quantify and mitigate the environmental footprint of organized pig farming systems. The baseline data generation under Indian swine production systems, associated with its entire value chain starting from feed production, manure management and energy consumption is required. Carbon footprint is a vital estimate which delivers a quantitative assessment of greenhouse gas emissions and the life cycle assessment (LCA) methodology offers a comprehensive framework for estimating environmental impacts throughout every phase of production, stretching from feed production to waste management.

Primary data for the study were collected over a period of three years, ensuring temporal robustness and capturing seasonal variations in production and resource utilization. The breeds like Large White Yorkshire, Ghoongroo and crossbred Rani pigs, were studied. The carbon footprint estimation was performed using the Life Cycle Assessment (LCA) approach, following standard methodological steps: goal and scope definition, life cycle inventory analysis, impact assessment, and interpretation of results. The functional unit was defined as 1 kg of live pig weight at the farm gate. A "cradle-to-farm gate" system boundary was adopted, encompassing all processes from the production of feed ingredients to the point where the live pig exits the farm. This boundary included both upstream processes (such as feed production and transportation) and on-farm activities (including animal rearing, manure handling, and energy use). System boundary incorporated upstream processes like feed production, processing, logistics etc., and on-farm emissions factors. The details of system boundary are indicated in the figure below. The environmental impact was assessed in terms of global warming potential (GWP), expressed as kg CO_2-equivalent per kg of live pig weight produced. All greenhouse gases were converted into CO_2-equivalents using methodology described in IPCC guidelines. The study revealed that the finisher production units have lower carbon footprint in the production process compared to the breeder units. The indigenous pigs reared under organized pig production system had higher carbon footprint compared to exotic and crossbred pigs. The results are indicated in the graph below.

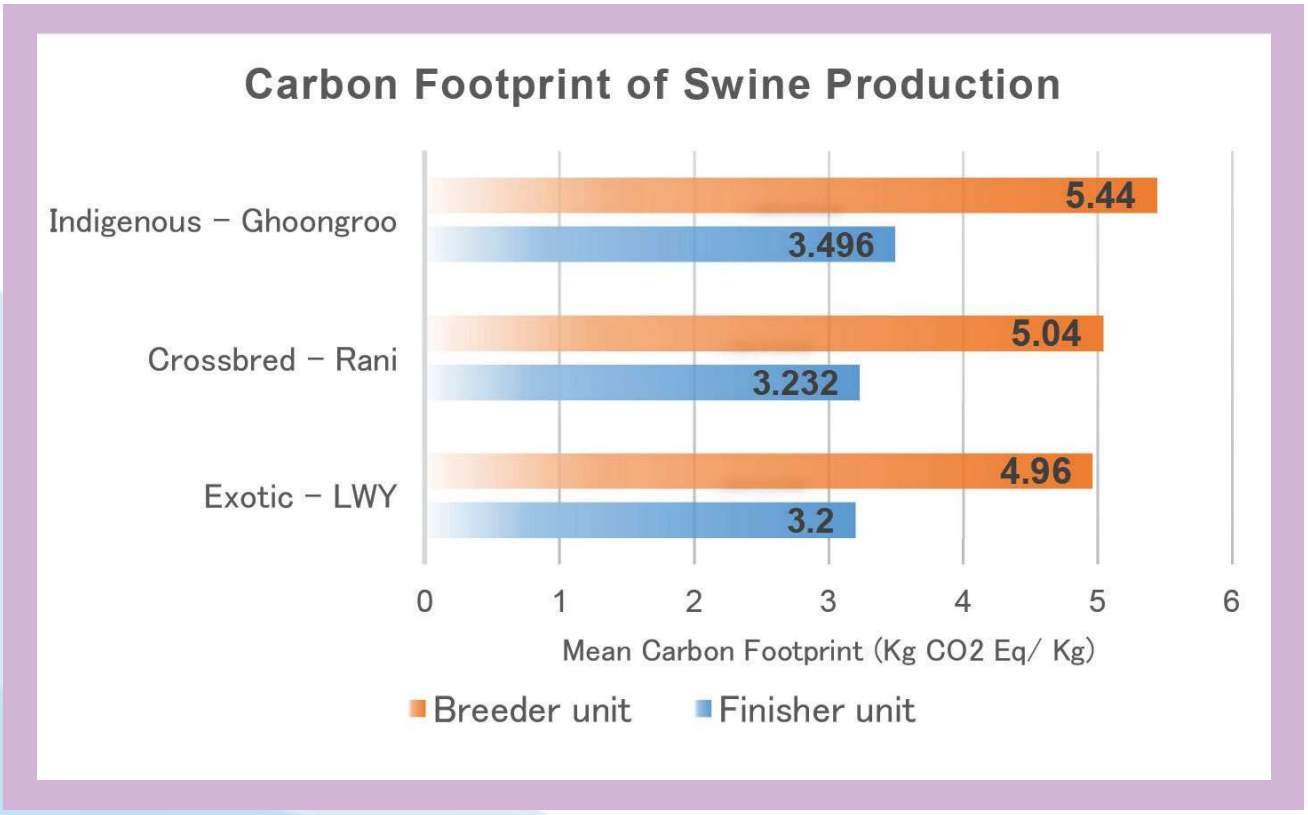


Fig: Mean carbon footprint (Kg CO2 Eq/ Kg) of pig production

Animal Reproduction

Institute Project: Hormonal and herbal interventions for optimizing eutocic farrowing in pigs

Rafiqul Islam, Sunil Kumar, Jaya and Lokesha E.

Effect of prostaglandin-based protocol with different level of oxytocin on the farrowing outcomes in pigs: Prolonged farrowing is a common condition in pigs due to their large litter size. Delays in the farrowing process may lead to fetal mortality and the birth of weak piglets. Such complications generally arise from excessive uterine contractions exerted on the fetus, which may result in compression of the umbilical vessels and subsequent asphyxia in piglets. Proper and timely management of farrowing is therefore essential to improve piglet survival rates and to maintain maternal reproductive health. Effective management during parturition not only reduces piglet mortality but also prevents the occurrence of post-farrowing uterine disorders, thereby helping to maintain normal fertility in the sow. For the present study, pregnant Rani pigs were selected from the ICAR-National Research Centre on Pig (ICAR-NRC on Pig) farm. To induce and synchronize farrowing, the pregnant sows were administered a prostaglandin $F_2\alpha$ analogue, cloprostenol sodium (PG), on the 113th day of gestation. This treatment was followed by the administration of oxytocin (OXT) 24 hours later at two different dose levels, namely 5 IU and 10 IU (Table 1). The animals were closely monitored during farrowing to evaluate the effectiveness of the treatment in expediting the farrowing process, with the objective of reducing piglet mortality and improving the birth of healthy piglets.

Blood samples were collected at three different time points: seven days before the expected date of farrowing (−7 day, EDF), on the day of farrowing (0 day), and seven days after farrowing (+7 day). The collected blood samples were processed for plasma separation, and the plasma was harvested and stored under appropriate conditions for subsequent biochemical and hormonal analysis.The live litter size did not differ significantly among the treatment groups). The number of male and female piglets also did not vary between the groups. The gestation length (days) was significantly ($P<0.05$) lower in the treatment groups 4 (114.37±0.26) and 5 (114.12±0.22) than the control group 1 (115.56±0.26). However, the gestation length did not differ significantly between the treatment groups 4 and 5. This observation may be attributed to the fact that farrowing in all experimental groups occurred within the normal physiological range during the study period. However, in cases of prolonged gestation, the likelihood of piglet mortality is generally higher, which may be effectively mitigated through faster initiation and completion of farrowing with PG–OXT treatment.

Simultaneously, group 5 followed by group 4 pigs took significantly $p<0.05$) less time (h) to start the delivery of piglet than Group 1 pigs. However, the difference in time for inducing farrowing between the groups 4 and 5 was non-significant. The treatment for group 5 (29.51a±4.86) initiated the farrowing faster and delivered the first piglets significantly earlier than in group 1 (56.79b±6.32) and group 4 (34.01ab±8.26). However, the numerically use of 10 IU of Oxytocin with PG injection (Group 5) took much lower time to initiate farrowing than oxytocin 5 IU in combination with the PG injection (Group 4). Total duration to complete the farrowing was significantly ($p<0.05$)

lower for Group 4 than the control group. The time required to complete the delivery of piglets (minutes) was significantly ($p < 0.05$) lower in Group 4 (35.12 ± 8.11), followed by Group 5 (47.50 ± 7.10), compared to the untreated control group (63.08 ± 4.82). However, the difference was non-significant between Group 4 and 5 and between Group 1 and 5. The results clearly indicate that prostaglandin administration is effective in inducing farrowing and significantly reduces the time required to complete the delivery process while given an oxytocin (OXT) injection 24 h later. Furthermore, the combination of PG with OXT 5 IU was observed to be more effective in shortening the duration of delivery compared to PG -OXT 10 IU.

The faster induction of farrowing and reduced duration of the delivery process may play an important role in minimizing the incidence of stillbirths and weak piglets, particularly in cases of prolonged gestation and prolonged labor in pigs. Such interventions are therefore beneficial in facilitating the delivery of healthy and viable piglets. It indicates that treatment with 150 µg PG and 10 IU OXT (group 5) was more effective in inducing the farrowing in comparison to PG in combination of 5 IU OXT inj (group 4). Farrowing induction can be successfully achieved and effectively managed within a shorter duration through the administration of 150 µg PG in combination with 5 IU OXT. Although oxytocin was administered at two different dose levels (5 IU and 10 IU) after 24 hours of 150 µg cloprostenol sodium injection, the lower dose of OXT (5 IU) appeared to be both economical and effective in initiating and completing the farrowing process more rapidly. Overall use of Oxytocin in combination of PG injection was found to be beneficial in initiating the farrowing and also for faster completion of the farrowing. This will definitely help in delivering healthy piglets during farrowing as well as in managing the prolonged gestation cases.

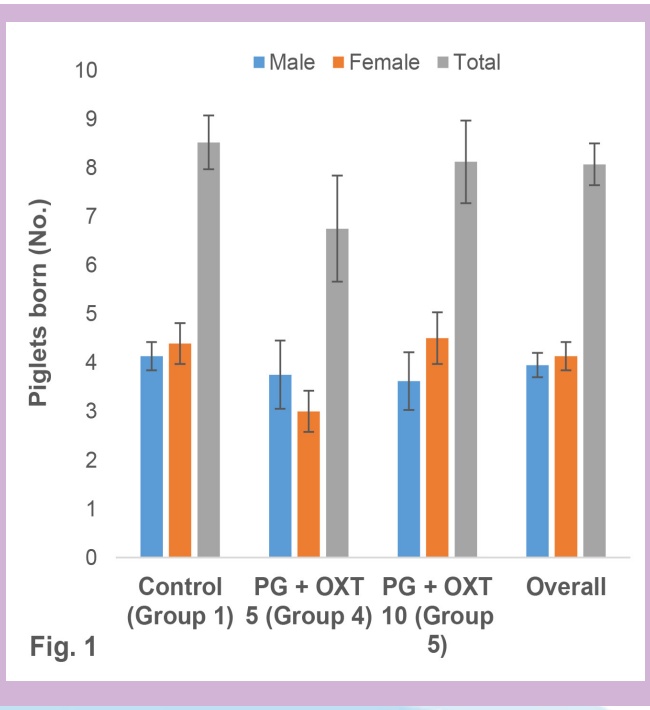


Fig. 1

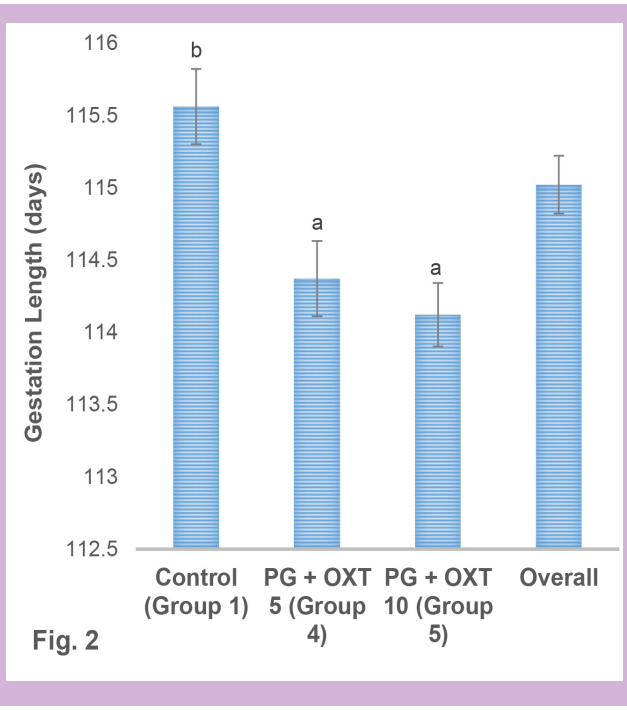


Fig. 2

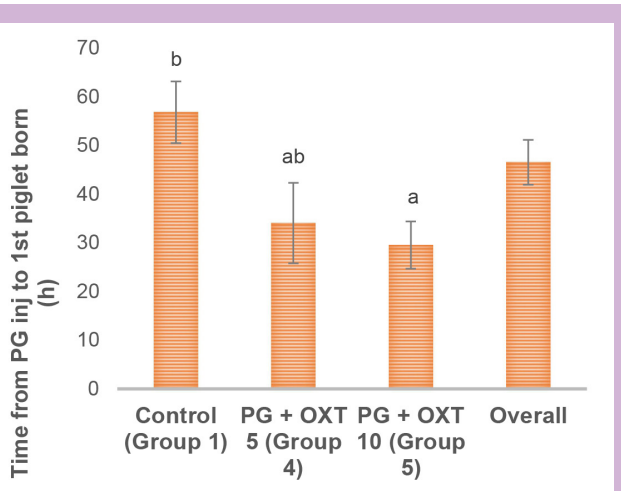


Fig. 3

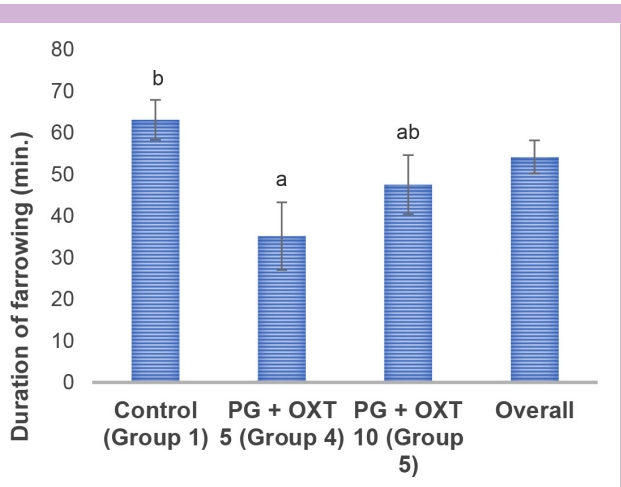


Fig. 4

Means bearing different superscripts (a, b) differ significantly, p≤0.05

Service Project: Artificial Insemination in Pigs

Rafiqul Islam and Sunil Kumar

During 2025, the following services were extended to stakeholders under the Service Project on "Artificial Insemination in Pigs." These efforts collectively aimed to improve pig production through the supply of superior boar semen doses; build the capacity of farmers, entrepreneurs, and inseminators in artificial insemination techniques; promote the adoption of modern AI practices; and ensure that farmers receive continuous support for effective reproductive management of pigs on their farms.

Supplied liquid boar semen doses for AI: A total of 6681 liquid boar semen doses were produced and supplied by the Institute for artificial insemination in pigs at the farmers' field and organized farms during January to December, 2025. The boar semen doses were produced from the 685 ejaculates collected from healthy boars during the year which consists of 315 ejaculates from Rani, 186 from Large White Yorkshire and 184 from Hampshire boars. Out of this, 588 doses were given to tribal farmers under TSP, 94 to scheduled caste farmers under SCSP, 301 to organized farm and rest 5698 boar semen doses were sold to other category of farmers.

Throughout the year, the program significantly expanded its reach by training 443 new entrepreneurs and farmers in porcine artificial insemination (AI) using liquid boar semen, empowering them to provide these services locally for self-employment. Additionally, 20 new farmers registered with ICAR-NRC on Pig, Rani, to receive liquid semen and apply these techniques on their own farms. Educational outreach included 13 comprehensive three-day training programs and three specialized one-day technology demonstrations for progressive farmers. AI lectures and demonstrations were also integrated into various SCSP, TSP, and EDP initiatives. To ensure long-term success, the institute provided ongoing advisory services covering infertility management, optimal insemination timing, and post-procedural care through on-site visits, office consultations, and telephonic support.

Ms. Manika Rabha, Khopdia, Hatidonga;
Litter size: 15 (Male: 7, Female: 8)

Mr. Ratul Nath, Ojapara;
Litter size: 9 (Male: 6, Female: 3)

Mr. Dinesh Kachari
Litter size: 15 (Male: 7 Female: 8)

Mr. Dinesh Kachari;
Litter size: 6 (Male: 4 Female: 2)

Mr. Ganaga Daimary, Village: Nabapur, Rani; Litter size: 07

Mr. Paban Rabha, Village: Ratanpur; Litter size: 6 (Male: 3, Female:3)

Mr. Paban Das, Parakuchi, Litter size: 9

Mr. Rakesh Boro, Gossaihat, Pir Para; Litter size: 07 (Male: 6, Female:1)

Mr. Rakesh Boro, Gossaihat, Pir Para; Litter size: 07 (Male: 6, Female:1)

Ms. Janaki Rabha, Gathiapara, Litter size: 9 (Male: 5 Female: 4)

Institute Project: Propagation of Artificial Insemination for establishment of multiplier units and optimizing reproductive efficiency in pigs at farmers' field

Sunil Kumar, Rafiqul Islam and P.J. Das

Under the objective for pig multiplier units establishments, 26 units were successfully established. Work on effect of reduced number of spermatozoa per dose (1/2/3 billion per dose) was carried out. Production parameters in AI with reduced sperm concentration were estimated. In results, it was found that 2 billion sperm/dose can be successfully used instead of 3 billion sperm per dose. The RPP III of the project was presented and submitted to the IRC.

Parameters	Low insemination Dose (1billion sperm/dose)	Moderate insemination Dose (2 billion sperm/dose)	Control insemination Dose (3 billion sperm/dose)
No of inseminations	8	13	15
Conception rate (%)	3/8(37.5)	10/13(77)	12/15(80)
Litter size at birth	11.33±0.57	11.±0.69	10±0.57
Litter size range	11 to 12	7 to 14	8 to 14

External Funded (DBT): Augmenting pig production by accretion of reproductive efficiency and artificial insemination for generating livelihood security and Entrepreneurship in NER

Sunil Kumar, Rafiqul Islam and Vivek Kumar Gupta

Reproductive efficiency is one of the most important facets in swine production. Limited hormones, poor ovarian dating and unavailability of fertile boar/semen cause economic percussions to piggery stakeholders particularly under backyard production systems.

Effect of Flemingia vestita on reproductive efficiency in gilts and sows

For the purpose of augmenting the reproductive efficiency in sows, one bioresource was identified as Flemingia vestita. Firstly, Flemingia vestita therapeutics at the standardized therapeutic regimen was used in gilts and sows affected with reproductive disorders. Secondly, proximate composition of control feed, dried powder of Flemingia vestita and dried powder of Flemingia vestita mixed with feed was estimated.

Table: Effect of Flemingia vestita feeding on reproductive and productive characteristics of gilts and sows.

Parameters Gilt/Sow (n)	Delayed Puberty		Anestrus		Summer infertility	
	Control	Treatment	Control	Treatment	Control	Treatment
	6	6	6	6	6	6
Estrus induced (%)	33.33 (2/6)	66.66 (4/6)	33.33 (2/6)	83.33 (5/6)	33.33 (2/6)	66.66 (4/6)
EEI (1/2/3/4) (Estrus expression intensity)	0.75± 0.39^{b}	2.66±0.55	0.75±0.39	2.66± 0.55	0.75± 0.39^{b}	2.83± 0.60^{a}
ITEE (Days) Interval from treatment to first estrus expression	20± 5.00^{a}	13.2±0.96^{b}	22.5±2.5^{a}	12.6± 0.92^{b}	23.5± 1.5^{a}	14.2± 0.80^{b}
IFTSH (days) Interval from first to second estrus expression	24.5± 0.5	20.6±0.50	24.5±0.50	20.40± 0.67	24.5± 0.5	20.4± 0.67
Pregnancy Rate (PR) %	50 (1/2)	100 (4/4)	50 (1/2)	80.00 (4/5)	50 (1/2)	100 (4/4)
Repeat Breeding Rate (RBR)%	50 (1/2)	75.00 (3/4)	50 (1/2)	20.00 (1/5)	50 (1/2)	00
Litter Size at Birth (LSB)	7.50± 0.28	8.75±0.20	8.00±0^{b}	12.25± 0.77^{a}	8.00± 0.57^{b}	11.5±0.97^{a}

Values with different superscripts differs significantly between different groups among the columns ($p<0.05$)

Table: Proximate composition of control feed, dried leaves powder of Flemingia vestitia and dried tubers of Flemingia vestitia mixed with feed ($p<0.05$)

Parameter	Control Feed	Treatment Feed (control feed+ Dried powder of *Flemingia vestitia*)	Dried powder of *Flemingia vestitia*
CF (%)	11.70±0.20^{b}	9.10±0.75^{a}	8.23±0.81^{a}
CP (%)	16.15±0.03^{b}	16.73±0.12^{b}	8.50±0.20^{a}
OM (%)	88.56±0.22	90.93±1.10	89.70±1.68
Ash (%)	11.44±0.22^{a}	13.86±1.22^{b}	13.03±0.39^{b}
EE (%)	5.06±0.09^{b}	12.63±0.55^{a}	10.53±0.48^{a}
NFE (%)	55.64±0.47	56.23±0.49	52.73±1.73

Values with different superscripts differs significantly between different groups among the columns ($p<0.05$)

In conclusion, *Flemingia vestitia* supplementation enhanced reproductive and production performance in gilts and sows.

Metabolomics of extract of *Flemingia vestitia*

MS analysis for identification of compounds in the extract of *Flemingia vestitia* was carried out. The present study is the first report where identification of compounds in *Flemangia vestita* was done using MS. Most important compounds affecting reproductive functions were identified as pregnane-3,17,20-triol, androstan-17-ol, decanoic acid, hexadecanoic acid, prostaglandin E2, 4-octanone, decanedione, isoflavone and eicosanoic acid. These compounds reported to have hormonal, antioxidant and pheromonal in nature to affect the ovarian biology.

Effect of local bioresources on in vitro sperm functions

The impact of different phytoextracts on sperm function and microbial characteristics in fresh and extended boar semen were compared. Phytoextracts of *Terminalia arjuna* (T1), *Saracaasoca* (T2) and *Ricinus communis* (T3) in comparison to semen samples extended with (T4) and without (C: Control) added antimicrobials were tested. Fresh ejaculates were extended with different phytoextracts and preserved at 17ºC for further microscopic and microbial evaluation. In results, sperm functions tests and SPC count were within the acceptable limits in the collected fresh ejaculates. There was a significant ($p<0.05$) impact of the phytoextracts (T1, T2) on preserving sperm quality than control (C). There was no significant difference ($p>0.05$) between addition of phytoextracts (T1, T2) and antimicrobials (T4) on sperm function tests and bacterial count over the duration of preservation in the study. In conclusion, *Terminalia arjuna and Saraca asoca* have the potential to reduce the number of bacterial count in extended semen.

In conclusion, the studied bioresources can be used to improve boar sperm preservation.

Comparative antimicrobial efficacy of bioresources

Bacterial contamination of boar semen poses a major challenge in artificial insemination (AI) systems by impairing sperm quality, reducing storage life, and potentially lowering fertility outcomes. The routine use of antibiotics in semen extenders has contributed to the emergence of antimicrobial resistance, necessitating alternative antimicrobial strategies. This study evaluated the antibacterial efficacy of five medicinal plants- *Nyctanthes arbor-tristis, Mikania micrantha, Phlogacanthus thyrsiformis, Phyllanthus emblica,* and Psidium guajava- against bacterial contaminants isolated from boar semen. Gel-free semen samples were aseptically collected and cultured, resulting in the isolation of four bacterial contaminants (two Gram-positive and two Gram-negative). All isolates were catalase-positive, while nitrate reduction activity was observed only in one Gram-negative isolate. Antibiotic susceptibility testing against six standard antibiotics revealed variable resistance patterns. Streptomycin (up to 28.0 ± 0.08 mm) and tetracycline (up to 28.06 ± 0.17 mm) showed the highest antibacterial efficacy, whereas sulphatriad exhibited

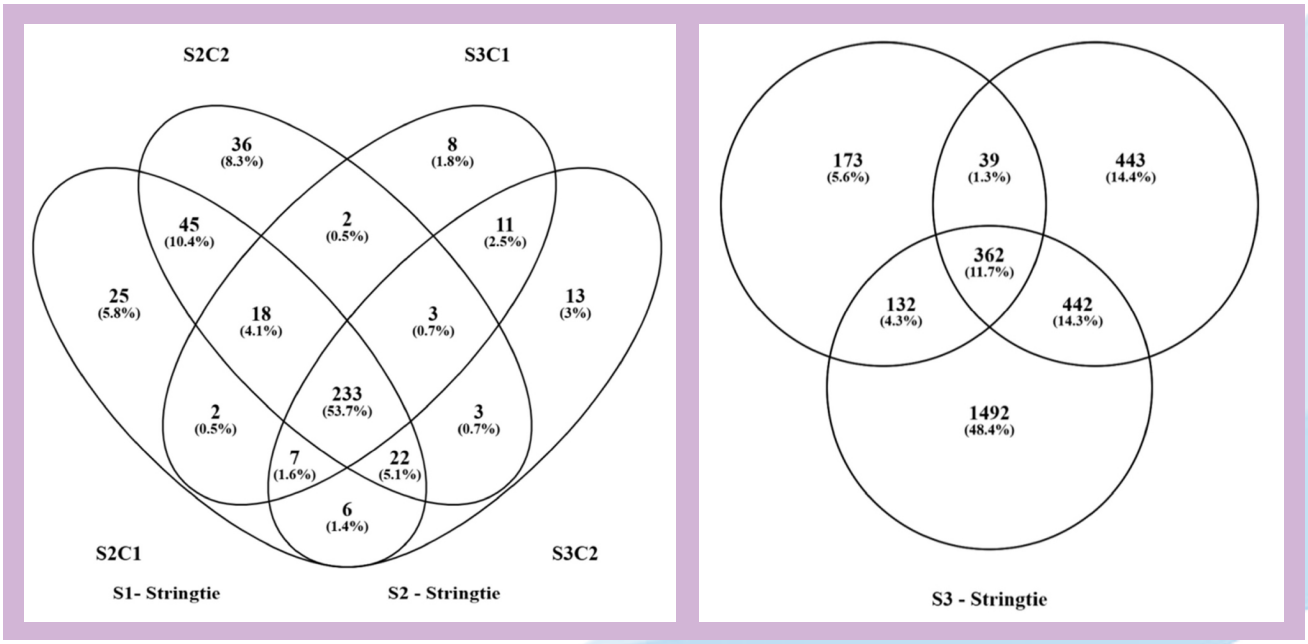
complete resistance in all isolates. Antibacterial activity of methanolic, ethanolic, and aqueous plant extracts (0.04 g/mL) was evaluated using the disc diffusion method. *N. arbor-tristis* showed inhibitory activity against multiple isolates, with aqueous extract producing a maximum zone of inhibition of 14.4 ± 0.28 mm against Isolate 1. *M. micrantha* methanolic extract inhibited Isolate 1 and Isolate 4 with zones of 10.6 ± 0.20 mm and 9.6 ± 0.43 mm, respectively. Ethanolic extract of *P. thyrsiformis* exhibited notable activity against three isolates, producing inhibition zones up to 13.2 ± 0.24 mm. *P. emblica* methanolic extract demonstrated consistent antibacterial activity, with inhibition zones ranging from 7.4 ± 0.16 mm to 11.3 ± 0.32 mm. P. guajava ethanolic extract showed broad-spectrum activity, achieving a maximum inhibition zone of 14.1 ± 0.21 mm. In conclusion, the studied medicinal plants exhibited measurable antibacterial activity against antibiotic-resistant boar semen contaminants, highlighting their potential as natural alternatives to synthetic antibiotics in semen extenders.In conclusion, compounds identified in the bioresources may be explored further for semen preservation for fertility and antimicrobial activity

External Funded (NLM): Self-sustainable Cooperative Models for Propagation of Liquid Semen Artificial Insemination and Envisaging Cryopreservation of Spermatozoa in Pig

Sunil Kumar, R.Islam, P.J. Das, Mohan N.H. (upto 24 April, 2025) and V.K. Gupta

Transcriptomic analysis of boar semen samples

Transcriptomic analysis of the boar semen samples was done. It was found that 2111 genes were unique in transcriptomic analysis associated with freezing of different semen samples. Further, 845 genes were found common in findings in the semen samples. The ven diagram representation of the transcriptomic analysis of the semen samples is shown.



Metabolomics analysis of boar semen samples

Samples prepared and submitted for metabolomic and proteomic analysis. A preliminary analysis of metabolomics indicated that there is difference in the metabolites in the semen of boars with different fertility indices. Accordingly, the post thaw quality of the semen also varied. Label-free quantification (LFQ) in proteomics using liquid chromatography-mass spectrometry was done in the semen samples. The peptide abundance was filtered with Q value < 10 which translates to peptide spectrum match significance < 0.1 and selected matched found significantly in target (TARGET == TRUE). Total Intensity of proteins were obtained by taking the sum of all the peptide of a particular protein in the filtered data. Differential Expression Analysis was carried out between control and Treated sample For each comparison. Intensity Data of the proteins were log transformed for normalization and differential comparison was carried out using limma package from Bioconductor. T test was used to compare the Treated Sample against Control Sample. A significance cutoff of 0.05 was used to select significant differential expression of PTMs in treated sample from the result of the t test. Log2 Fold Change above +2 and -2 was taken as upregulated and downregulated respectively.

The analysis showed dramatic changes in abundance and sample-specific variation for identified proteins, supporting their biological relevance and the robustness of detection. For example, AKAP4's intense enrichment in reproductive tissues suggests superior sperm motility, while PSP-I's high representation is linked to optimal seminal plasma function and fertility. High AKAP4 and PSP-I support sperm motility and successful fertilization; their abundance serves as a proxy for male fertility or reproductive system integrity. In context to disease, Viral polymerase upregulation flags outbreaks or subclinical infection. Trypsin elevation might relate to tissue stress, dietary adaptation, or inflammatory states. Differential expression enables identification of health, fertility, or disease biomarkers, with PCA and heatmap analyses confirming reproducibility and strong signal-to-noise separation. The report's data, combined with GO/pathway databases (as recommended in literature), enables pathway-centric interpretation for candidate proteins-such as sperm maturation, digestion, immune signaling, and viral defense. Consistently regulated proteins (across samples) should be further validated as diagnostic or monitoring biomarkers; outliers or sharply up/down regulated entities merit mechanistic study and pathway mapping. This integrated dataset and interpretation shows swine researchers to dissect underlying mechanisms of fertility, tissue adaptation, immune response, and infection risk. It also helps us to select candidate proteins for downstream validation, diagnostics, or molecular breeding. Our study suggests a major group-wise differences to molecular pathways which is supporting both exploratory and translational research. Future steps should include functional enrichment, targeted quantification (e.g., using SRM/mass spec standards), and cross-comparison with transcriptomic or metabolomic data for robust multiomics insight.

To estimate the effect of nanoparticles on boar sperm preservation at frozen state

Gel free ejaculates were collected by double gloved hand method. Satisfactory semen samples were subjected to evaluation. Different types of nanoparticles prepared from different sources were added in the extender used for freezing of boar semen as per standard procedures. Extended semen was stored at frozen state. Sperm function post-thaw parameters, were estimated in the study. Although not acceptable, yet a significant ($p<0.05$) difference was observed in the post-thaw motility of the samples extended with nanoparticles

Effect of PUFAs on sperm cryopreservation

In the preliminary results, it was found the PUFAs feeding improved the sperm function parameters in fresh and cooled semen significantly than control group. However, a non significant improvement in the post thaw quality was noted, without acceptable limits in the semen quality. Further, experiments are in progress.

Long term extender for liquid semen preservation

A long term extender for liquid semen preservation was developed. In extended samples, sperm quality and kinetics was estimated at time intervals (48h, 72h, 96h, 120h) of preservation. In the prepared extender, better sperm quality and kinetics were observed in stored samples than control. The results indicated that the developed long-term extender supports sperm survival and functionality over 120 h of preservation.

ICAR-Network Project (NPGET): Generation of sex specific phenotypes in pig using genome editing

Sunil Kumar, N.H. Mohan, Jaya, P.J. Das, Juwar Doley, R. Islam and V.K. Gupta

During the period of report, gene to be edited was identified as ATP5b, a vital gene necessary for functioning of cellular metabolism/respiration. The invitrogen true design, crisprscan and chopchop online softwares were used to design the gRNA sequences. The protocol for isolation and culture of primary fibroblast cell line was standardized. The plasmid vector containing specific gRNA with OFP/ CD4 marker was synthesized followed by transfection into competent E.coli cells through heat shock. The competent cells were subsequently allowed to multiply, followed by selection of positive clones through antibiotic selection. Plasmids were isolated from the E.coli cells. The transfection of plasmids were attempted through two different approaches a. using lipid based reagent (Lipofectamine 3000) and b. electroporation using a commercial system. Plasmid DNA at a concentration of 1 to 5 µg/µL in deionized water with 100000 cells. One pulse with 1000v with a width of 40s was used. No significant expression of transgene is observed so far with a cell viability of 24% only. The oocytes were isolated from the slaughterhouse collected ovaries using needle aspiration technique. Following maturation in specific media, the oocytes were subjected to *in vitro* fertilization with precapacitated boar sperm. The embryos were under evaluation for progress of growth under in vitro conditions. Non invasive procedure for embryo transfer in pig was standardized.

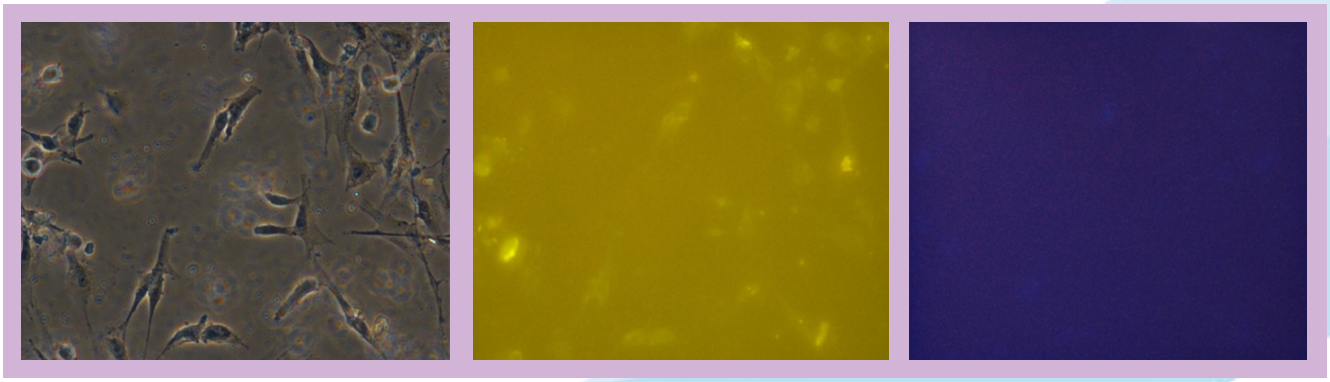


Fig. The isolation and culture of primary fibroblast cell line

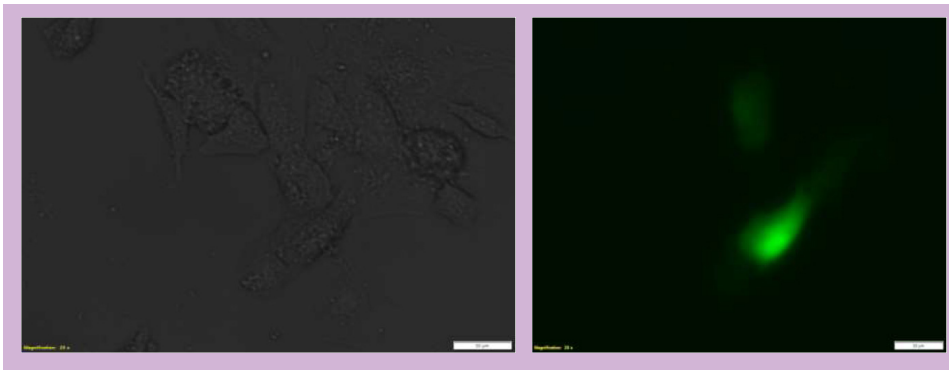


Fig. Lipofectamine 3000 based transfection

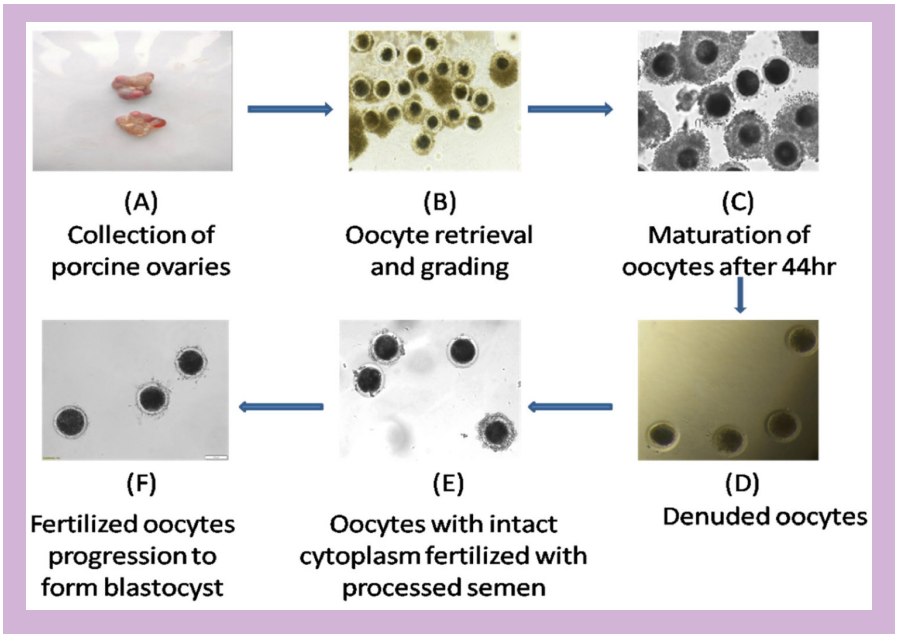


Fig. Standardization of porcine embryo production

Institute project: Biobanking of reproductive and somatic germplasm of porcine origin

Sunil Kumar, R. Islam and Meera K.

Biobanking of genetic diversity in livestock breeds needed to ensure sufficient genetic flexibility to meet future husbandry challenges. The new opportunity for maintenance, relocation and rederivation of swine genetics mainly depended on development of biobanking for somatic and reproductive germplams in pigs. The process relies on cryopreservation, primarily at -196°C in liquid nitrogen, and supported by advanced assisted reproductive technologies to restore genetics when needed. Among the cell types used, fibroblasts are the most widely used somatic cell type. In the reported year, process for collection, isolation, culture and preservation of fibroblasts was standardized. Also, as isolated parts from testis, epididymis and ovaries were also collected from the doom, LWY, and crossbred pigs. The process of cryopreservation of fibroblast, isolated parts from testis and ovaries was developed during the reported period. Further collection of samples for different cells and tissues is in progress.

Animal Physiology

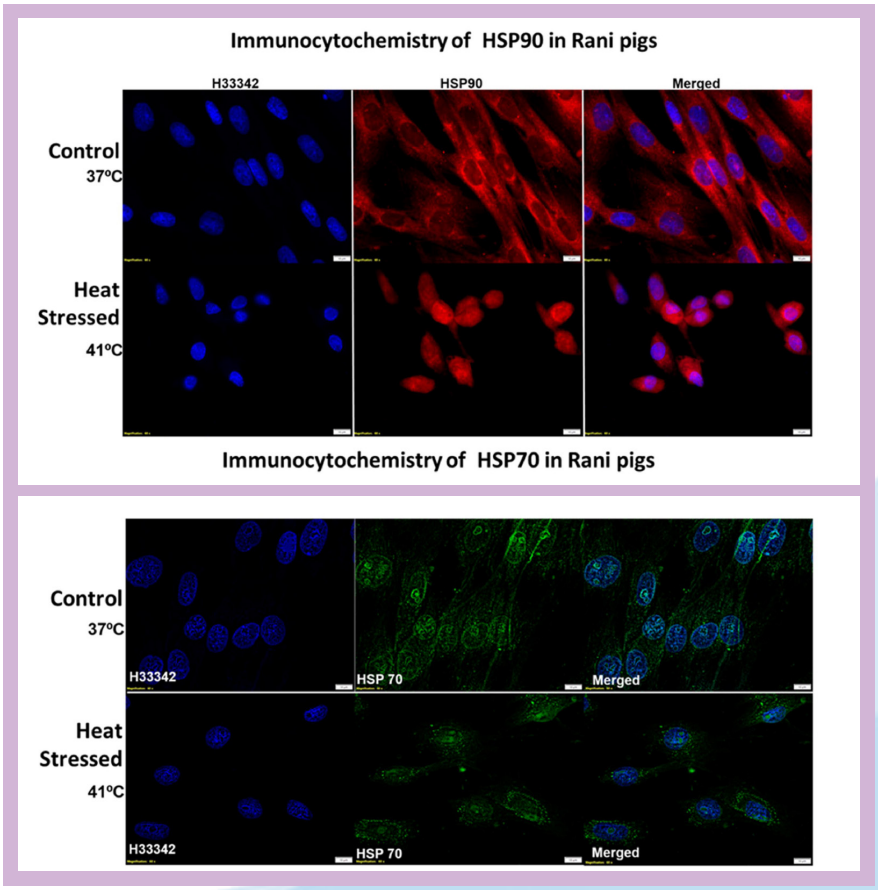
Institute Project: Physio-genomic responses and MCT profiling of exotic and Indigenous pig breeds in heat stress during different seasons

B C Das, Jaya, K. De, J. Doley, N.M. Attupuram

In order to evaluate the expression trend of various heat stress responsive HSP and MCT genes in the thigh muscle and colon tissue under various seasonal conditions in indigenous Mali and Ghoongroo and crossbreed Rani pigs, samples were collected from local slaughter places. The relative mRNA expression was determined using delta-delta Ct method. The temperature humidity index (THI) was calculated from all round the year metrological data for year 2022-2023 using the following formula.

THI= [(1.8T) + 32]-[0.55(RH/100)] X [((1.8T) + 32)-58], where T= Air Temperature in oC and RH = Relative Humidity in %

The relative changes in the copy number of HSP90 mRNA was significantly upregulated ($P<0.05$) in thigh muscle and colon tissue during both winter and summer season compared to that of thermo-neutral control season in Rani pig. With the increase in THI the relative mRNA expression of HSP70 was found to be increased in thigh muscle during summer season as compared to that of thermoneutral season. In colon tissue expression was highest during summer THI and least during thermoneutral THI (Fig. 7).



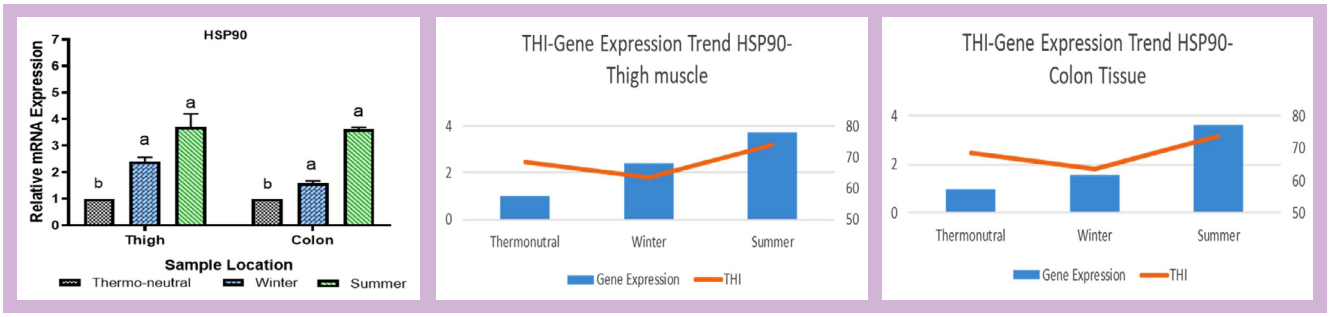


Fig.: Expression trend of HSP90 genes with THI in Rani pigs

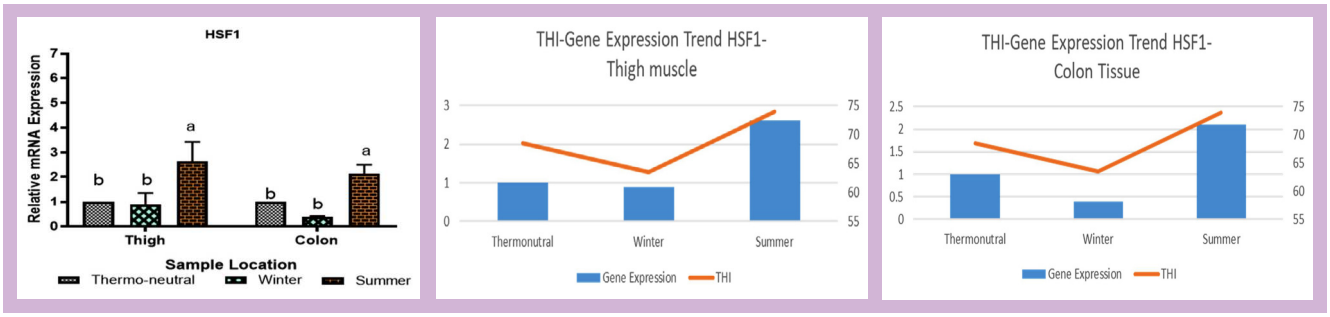
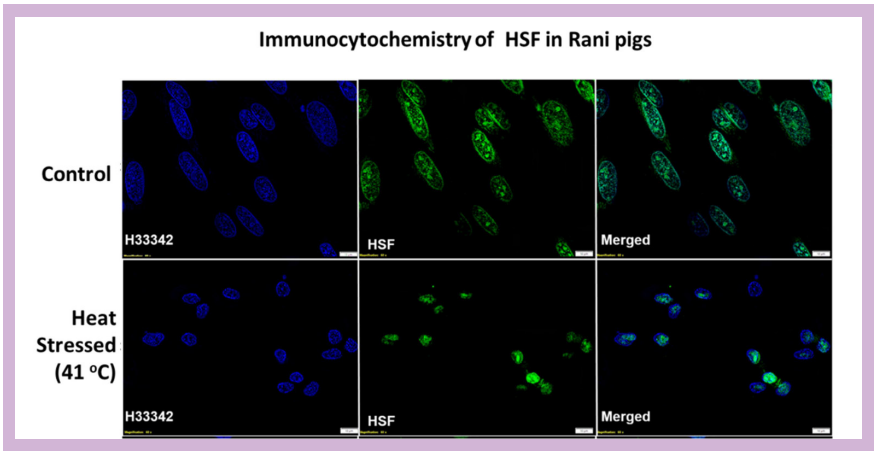


Fig.: Expression trend of HSF1 genes with THI in Rani pigs



ICAR-Network Project (NPGET): Development of myostatin knock-out pigs

Jaya, Satish Kumar, Sunil Kumar, R. Islam

Optimization of media and culture conditions for in vitro maturation of porcine cumulus oocyte complexes: For achieving greater maturation rate of the cumulus–oocyte complexes (COCs), a series of experiments with different media composition were conducted. The COCs were aspirated from the collected ovary and graded for their quality. Only grade A and B grade COCs were picked under stereo zoom microscope, washed in droplets of POE-CM maintaining a temperature of 38.5 °C and then transferred into droplets of maturation medium (MM) at a density of 25 COCs per 100 µl droplet layered with mineral oil in a Centre well type IVF Plate. The COCs were subjected to two phase maturation in a humidified CO2 incubator at 38.5 °C and 5% CO2. A series of different maturation media was tested for the maturation process with the base medium as Basic Medium for Porcine Oocyte Maturation (POM) media *(Cosmo Bio Co. Ltd- CK021)* or Medium 199 *(Gibco-11150-059)* supplemented with FBS, antibiotics and hormones, as shown in the table below:

Components	MM1	MM2	MM3	MM4	MM5	MM6	MM7
Base Media	POM			Medium 199			
Hormone (10 IU/ml)	Serum Gonadotrophin (FOLLIGON®) HCG (CHORULON®)	FSH LH	FSH LH	Serum Gonadotrophin (FOLLIGON®) HCG (CHORULON®)	FSH LH	FSH LH	FSH LH
β-Estradiol	-	-	1 µg/ml	-		1 µg/ml	1 µg/ml
FBS	-	-	-	-	10%	10%	10%
Antibiotics	Anti-Anti	Anti-Anti		Anti-Anti	Anti-Anti	Anti-Anti	Anti- Anti Gentamycin
Follicular Fluid	-	-	-	-	-	-	10% Follicular Fluid

For the first 22 hours, all the media were additionally supplemented with Dibutyryl-cAMP. After 22 hours the oocytes were washed with POE-CM and placed in 100 µl of POM media with only base media without hormones and Dibutyryl-cAMP used in the first 22 hours of maturation. Based on the maturation percentage the MM7 was selected and further modified and optimized with the final composition mentioned in the table below:

Maturation Media Components	Stock Concⁿ	Volume (µl)	Final Concⁿ
Medium 199 (*Gibco-11150-059)*		4050	
Sodium Pyruvate *(Gibco-11360070)*	100 mM	50	1mM
D-(+)- Glucose* *(Sigma-Aldrich-G7021)*	400 mM	50	4 mM
Caffeine** (*Sigma-Aldrich-C0750)*	300 mM	50	3 mM
Epidermal Growth Factor* (*Sigma-Aldrich-E4127)*	1 µg/ml	50	10 ng/ml
Cysteamine* (*Sigma-Aldrich- M9768)*	15mM	50	150 µl
FBS *(Gibco- A5256701)*		600	12%
Anti- Anti (*Gibco- 15240-062)*	100 X	50	1 X
Gentamycin** *(HiMedia-A010)*	1 mg/ml	50	10 µg/ml

For each 90 µl of Maturation media droplet, the following hormones were added and supplemented with 10% Follicular Fluid collected from porcine preovulatory follicles.

Hormones and Other Additives	Stock Concⁿ	Volume (µl)	Final Concⁿ
Follicle Stimulating Hormone*** *(Sigma-Aldrich- F4021)*	1000 IU/ml	1	10 IU/ml
Luteinizing Hormone*** (*Sigma-Aldrich- L6420)*	1000 IU/ml	1	10 IU/ml
β-estradiol ****	500 µg/ml	1	5 µg/ml
Dibutyryl-cAMP ** *(Sigma-Aldrich D0260)*	50 mM	1	500 µM

* Dissolved in Medium 199

** Dissolved in DPBS (Gibco-14190136)

*** Dissolved in DPBS, 1mg/ml BSA, 0.1% Sodium Azide (pH- 7.4)

****Dissolved in Ethanol

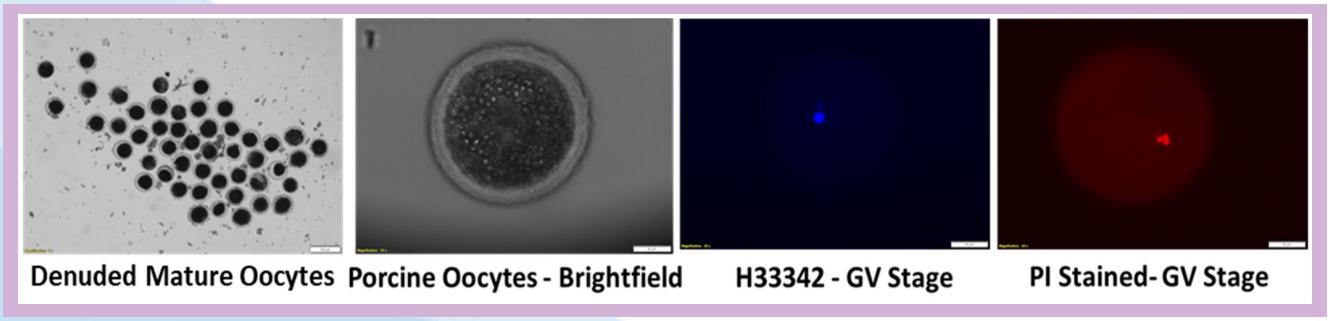
After a 22 hours incubation in the above-mentioned maturation media the oocytes were washed with POE-CM thrice and incubated in the same maturation media without Dibutyryl-cAMP and follicular fluid for another 22 hours. We obtained greater rate of maturation of COCs with the caffeine, cysteamine and EGF based media.

Standardization of semen processing protocols for successful in vitro fertilization

Fresh semen was collected from the Institute farm and incubated at room temperature for 1 hour in the dark for the swimming up of motile sperm cells and settling of the dead cells and other debris. Then 3 ml of semen was collected from the top and equal volume of DPBS containing 0.1% BSA (*HiMedia*- TC348), 10µg/ml Gentamycin and 1X Anti- Anti was added to it and mixed properly by pipetting. The mixture was then centrifuged @ 900g for 5 minutes at room temperature. The pellet was washed twice following the same steps using DPBS containing 0.1% BSA, 10µg/ml Gentamycin and 1x Anti- Anti and finally the pellet was divided and dissolved in a set of semen capacitation medium (200 µl each) with or without 40 µl Sperm Diluent for IVF (SEM-5X) as listed below:

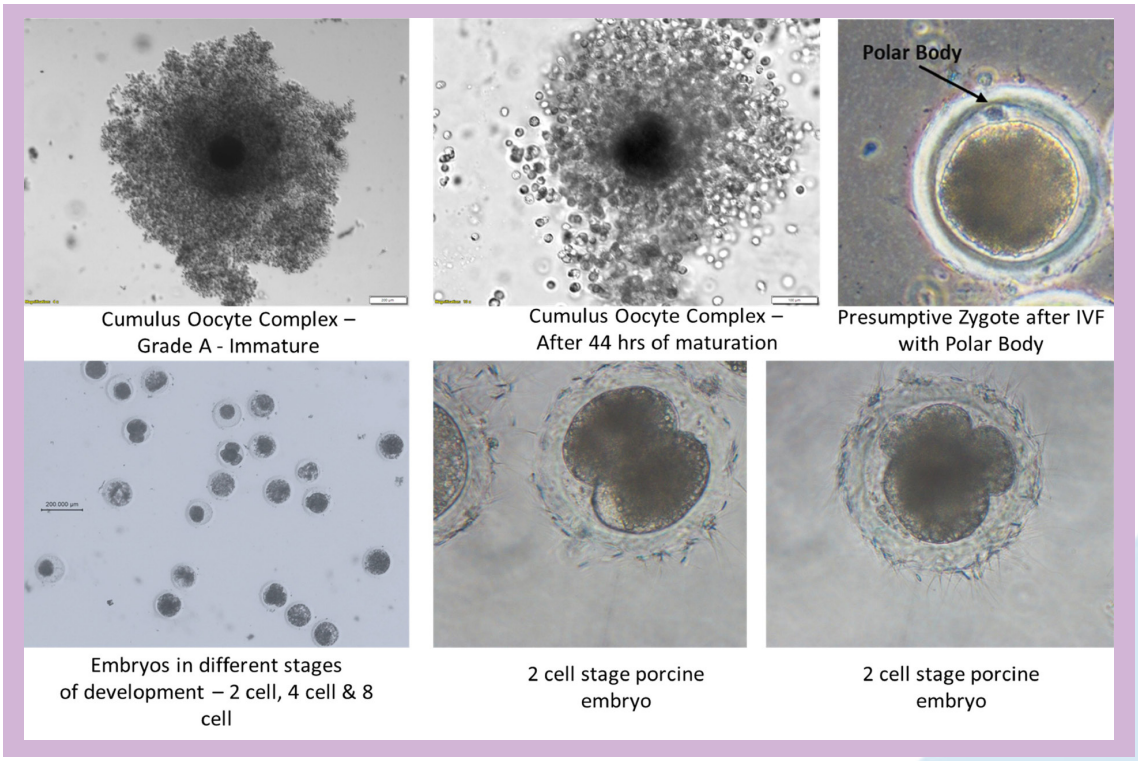
Components	C1	C2	C3	C4	C5	C6	C7	C8
Base Media	Porcine Fertilization Media (PFM)				Embryomax® HTF			
Sodium bicarbonate	25mM	25mM	15mM	15mM	15mM	15mM		
Heparin	10µg/ml	10µg/ml	10µg/ml	10µg/ml	10µg/ml	10µg/ml	10µg/ml	10µg/ml
Caffeine	2 mM	3 mM	2 mM	3mM	2mM	3mM	2mM	3mM
Anti-Anti	1X	1X	1X	1X	1X	1X	1X	1X
Gentamycin	10µg/ml	10µg/ml	10µg/ml	10µg/ml	10 µg/ml	10µg/ml	10µg/ml	10µg/ml

A100 µl droplet containing sperm cells (~ 5 x 105) from each composition were layered with mineral oil in a Centre well type IVF Plate and placed in a humidified CO2 incubator at 38.5 °C and 5% CO2 for 30 minutes.



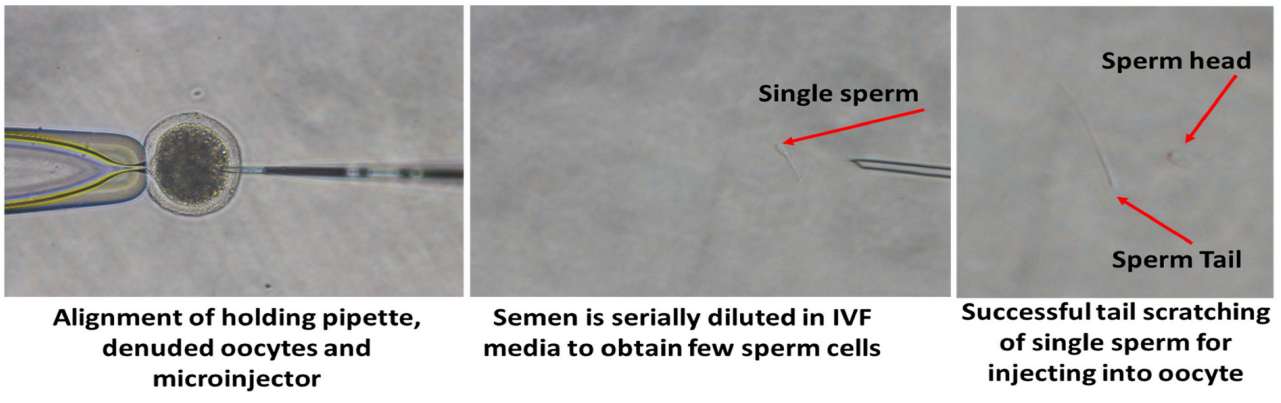
In vitro fertilization and embryo development: The mature oocytes were picked from the maturation medium washed 3 times with POE-CM and finally washed twice with PFM or Embryomax® HTF based on the base IVF media used for semen capacitance. Twenty-five

oocytes along with loosely attached cumulus cells were placed into the previously prepared 100 µl pre-warmed droplet containing sperm cells for in vitro fertilization. Based on the fertilization percentage C8 media with SEM-5X was selected and further fortified with 50 µl/ml Kanamycin and was used in the subsequent IVF experiments. The sperm and matured oocytes were co-incubated for 10-12 hours in a humidified CO2 incubator at 38.5 °C and 5% CO2. After 10-12 hours post IVF the oocytes were picked and washed in POE-CM twice and transferred to a 15 ml centrifuge tube containing 1 ml POE-CM with 1 mg Hyaluronidase and 1X Anti-Anti and vortexed for 4 minutes to remove the adhered cumulus cells and sperm cells. The presumptive zygotes were then imaged under microscope and the polar body were observed. The representative image is shown in Figure. The presumptive zygotes were washed with POE-CM twice and subsequently twice with defined medium for Porcine Embryos (PZM-5). Around 20 oocytes were placed in 100 µl drop of PZM-5 fortified with different antibiotics or combination of antibiotics. Similarly, the same procedures were followed without the hyaluronidase treatment steps. Post 20-22 hours of IVF the plates with embryos in the PZM-5 medium were placed in a Ibidi live imaging system attached to Olympus IX83 inverted fluorescence microscope, maintaining 37.5oC, 5% CO2, 80-90% humidity and observed for cell division. Two cell and 4 cell zygotes were observed at 20-22 hours post IVF.



Standardization of microinjection and intra-cytoplasmic sperm injection (ICSI) of oocytes for IVF: To increase the efficiency of genomic edit in the presumptive zygotes, the methodology to microinject the presumptive zygotes with RNP complex (Cas9 and SgRNA) has been standardized with the micromanipulator system. To avoid polyspermy during the co-incubation of oocyte with the sperm, the ICSI protocol for IVF was also optimized. One single sperm cell was targeted and was immobilized by rubbing the tail with the injecting needle, which results into either bending of the tail or removal of a part of the tail. The immobilized sperm cell was pulled into the injecting needle and was moved to a drop containing denuded oocytes. The oocyte was pulled and held

using the holding tip and slightly rotated with the injecting needle to visualize the polar body, if any. After the identification of the polar body, the oocyte was rotated such that the polar body is either in a 6'clock or 12'clock position. The injecting needle was inserted into the oocyte through the zona and after pulling in a small portion of the ooplasm, was injected back along with the sperm cell into the oocyte. All the oocytes were similarly checked and injected and finally washed with POE-CM and placed in 100 µl drop of PZM-5 with antibiotics, layered with mineral oil in a Centre well type IVF Plate and placed in a humidified CO2 incubator at 38.5 °C and 5% CO2 for embryo development.

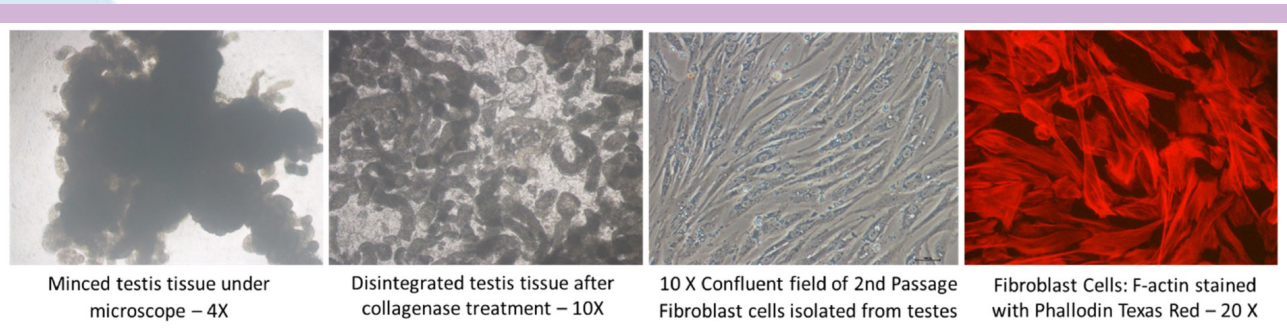


Alignment of holding pipette, denuded oocytes and microinjector

Semen is serially diluted in IVF media to obtain few sperm cells

Successful tail scratching of single sperm for injecting into oocyte

Primary fibroblast cell culture from porcine testes: Testes from 35 to 45 days old weaners were collected and epididymis was removed from the testes. An incision was made in the tunica albuginea on the opposite side and the tissue was washed two to three times with DPBS. Small portions of internal tissue attached to the tunica albuginea were excised, and seminiferous tubule-containing tissue was minced into fragments of approximately 2–3 mm in size. Two to three fragments were transferred into 2 ml centrifuge tubes and subjected to enzymatic digestion by adding 1 ml of DMEM-HG containing Collagenase Type II (1 mg/ml), along with DNase I, to each tube. Adherent cells, primarily fibroblasts, were observed and the culture medium was replaced with fresh DMEM-HG containing 10% FBS the medium, supplemented with Epidermal Growth Factor (10 ng/ml) and Fibroblast Growth Factor (5 ng/ml). After 3-4 days 50 % of the media was replaced with fresh media and at 80% confluency the cells were sub-cultured.



Minced testis tissue under microscope – 4X

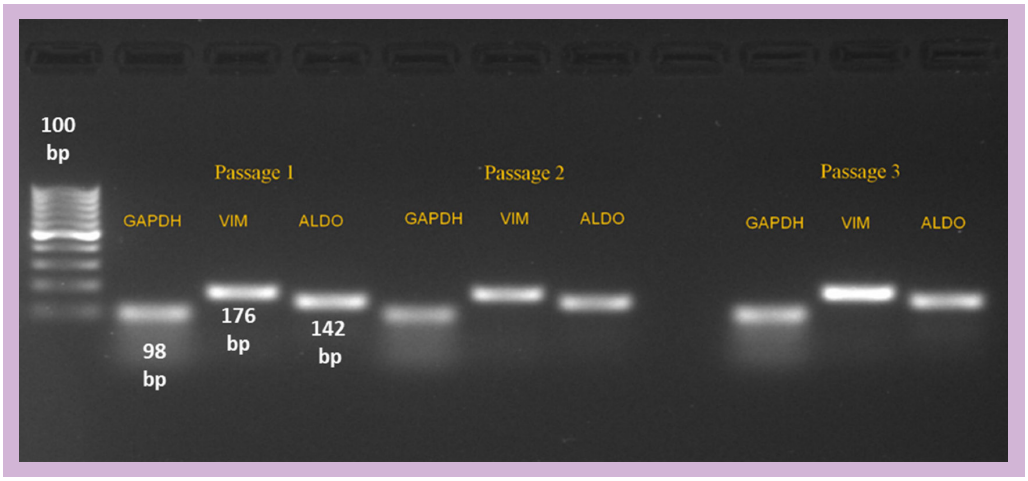
Disintegrated testis tissue after collagenase treatment – 10X

10 X Confluent field of 2nd Passage Fibroblast cells isolated from testes

Fibroblast Cells: F-actin stained with Phallodin Texas Red – 20 X

Molecular characterization of fibroblast cells from testis: Total RNA was extracted by using the Trizol method from different passages of primary fibroblast isolated from testes. Cells were harvested after every passage, lysed in 1 ml of Trizol reagent followed by Chloroform phase separation. RNA was precipitated by adding Isopropanol, washed with ethanol and resuspended in

nuclease free water. RNA was quantified using a spectrophotometer (NanoDrop Lite Plus Thermo Scientific) and 1 µg of total RNA was used for synthesis of cDNA by using the RevertAid First Strand cDNA Synthesis Kit (Thermo Scientific, K1621). Gene specific primer for VIM (Vimentin), GAPDH and ALDO-A (Aldolase, fructose-bisphosphate A) was designed from mRNA/complementary DNA sequences retrieved from NCBI database using primer designing tool.



Optimization of Electroporation of in Porcine Fibroblasts

Testicular fibroblast cells were harvested by trypsinisation and subsequently resuspended at a final density of approximately 10^7 cells/ml in a set of electroporation buffer listed below:

	Medium	Supplement
EB1	1x DPBS	Anti-Anti
EB2	OptiMEM	Anti-Anti
EB3	DMEM-HG	Anti-Anti
EB4	DMEM 1g/l D-Glucose	Anti-Anti
EB5	OptiMEM + DMEM (1:1 ratio)	Anti-Anti
EB6	DMEM-HG	5% FBS, Anti-Anti
EB7	DMEM	5% FBS, Anti-Anti

Aliquots of 400 µL of the cell suspension were transferred into sterile electroporation cuvettes with a 2 mm gap width *(BTX-41-0135).* Plasmid DNA containing Monster Green® Fluorescent Protein in a mammalian expression vector (10 µg) was added to each cuvette, mixed gently and incubated at room temperature for 10 minutes. The cells were then seeded in pre- warmed DMEM-HG in a 24 well plate with or without Fibroblast Growth Factor (5 ng/ml). Cells were observed after 24 hours for cell attachment and observed after 48 hours for expression of Monster Green® Fluorescent Protein.

Single cell plating and culture: The electroporation with EB2 media was performed in duplicate and after following all the steps until resuspension of the cell pellet in DMEM-HG the cells suspension was spread in a 90 mm petri plate and single cells were picked under a stereo zoom microscope and seeded in a 96 well plate containing pre- warmed DMEM- HG with 10% FBS, Fibroblast Growth Factor (5 ng/ml) and Epidermal Growth Factor (10 ng/ml). The plate was observed for growth of single cells and their colonies.

Animal Health

External Funded (DBT): Establishment of a Consortium for One Health to address Zoonotic and Transboundary Diseases in India, including the Northeast Region

S. Rajkhowa, S. R. Pegu, J. Doley, S. Paul, R. Deb and V. K. Gupta

During the reported period, the project completed its serological screening using commercial ELISA kits, which revealed that while samples were negative for cysticercosis and PRRS, there was a recorded positivity rate for ASF (1.33%), cryptosporidiosis (11.11%), and salmonellosis (11.11%). To supplement this screening, researchers conducted molecular analysis on 45 blood samples, 34 pooled tissue samples, and 32 nasal swabs collected from clinical outbreaks. PCR and RT-PCR testing confirmed the presence of ASFV in 7 blood and 9 tissue samples, while PRRSV was detected in 4 blood and 6 tissue samples. Notably, all samples tested negative for JEV and SIV.

External Funded (DBT): SWINOSTICS- A platform for development and validation of diagnostics of important pig pathogens in NE region of India for commercial exploration

Seema Rani Pegu,S.Rajkhowa, Rajib Deb, P.J.Das and V.K.Gupta

During the reported period, the project achieved a significant milestone by commercializing two multiplex PCR-based diagnostic technologies: the Piggyplex(D) ASFV, PCV & PPV assay kit and

the Piggyplex® CSF, JE & PRRS assay kit. These technologies were brought to market through AgrInnovate India Limited and licensed to Genes4Life Pvt. Ltd. in Bangalore. By enabling the rapid, sensitive, and cost-effective detection of six major swine viral diseases—including African Swine Fever (ASF), Classical Swine Fever (CSF), and Porcine Reproductive and Respiratory Syndrome (PRRS)—these assays significantly strengthen disease surveillance and early control strategies for improved swine health management.

Service Project: Surveillance and Monitoring of Swine Diseases in NER

S.R. Pegu, S. Rajkhowa, S.Paul, J. Doley, R. Deb, V.Rai

Under the Service Project on Surveillance and Monitoring of Swine Diseases, active surveillance was conducted across Assam, Arunachal Pradesh, Meghalaya, and Tripura to monitor major viral and bacterial pathogens affecting pig health and productivity. A total of 190 pig serum samples were collected/received and screened for important viral pathogens. The screening revealed 9 samples (4.74%) positive for Japanese Encephalitis Virus (JEV), 12 samples (7.19%) positive for Porcine Circovirus-2 (PCV2), 8 samples (4.21%) positive for African Swine Fever Virus (ASFV),

and 17 samples (8.95%) positive for Classical Swine Fever Virus (CSFV), indicating circulation of multiple economically important viral pathogens in the region.

Further surveillance was carried out in backyard pig farms of Kamrup district, Assam, a known Japanese Encephalitis endemic area. Investigation revealed co-infection of Japanese Encephalitis Virus (JEV) and Swinepox Virus (SWPV) in three backyard pig farms. Molecular characterization showed that JEV isolates were closely related to previously reported Indian and neighboring regional strains, indicating ongoing circulation of the virus. Phylogenetic analysis of SWPV isolates formed a distinct Indian lineage, suggesting localized viral evolution in backyard pig populations. The detection of JEV and SWPV co-infection highlights the importance of monitoring multiple viral infections in backyard production systems. These findings emphasize the need for continuous surveillance and molecular monitoring in JEV-endemic regions of Assam to support early disease detection and control.A total of 273 clinical samples, comprising 152 fecal samples/rectal swabs and 121 nasal swabs, were collected from backyard and organized pig farms of Kamrup, Dhemaji, Jorhat, and Sonitpur districts of Assam for bacterial disease surveillance. Screening of these samples revealed the presence of several important bacterial pathogens. Pathogenic *Escherichia coli* (ETEC/EPEC/STEC) was detected in 8 cases, followed by *Pasteurella multocida* in 5 cases and Streptococcus suis in 5 cases. These pathogens were mainly associated with diarrhoea, respiratory infections, septicaemia, and mortality in affected pigs. In addition, other commonly detected bacterial pathogens included Staphylococcus aureus in 7 cases and *Salmonella* spp. in 3 cases. The findings indicate the continued circulation of bacterial pathogens in pig populations of Assam and highlight the importance of routine bacterial surveillance and timely intervention to reduce disease-associated losses in both backyard and organized pig farms. During the reporting period, 14 post-mortem examinations were conducted on deceased pigs. Post-mortem examination of deceased pigs revealed gross pathological lesions including accumulation of blood-tinged straw-colored fluid in the pericardial sac with severe cardiac congestion, marked epicardial hemorrhages, congested and consolidated lungs suggestive of acute pneumonia, and congested, distended intestines with fluid-filled loops consistent with hemorrhagic enteritis. Mandibular lymph nodes were enlarged, dark, and congested, while the spleen showed splenomegaly with severe congestion and dark discoloration. Kidneys appeared enlarged and congested, along with accumulation of serosanguinous fluid in body cavities, indicating acute systemic infection in affected pigs.

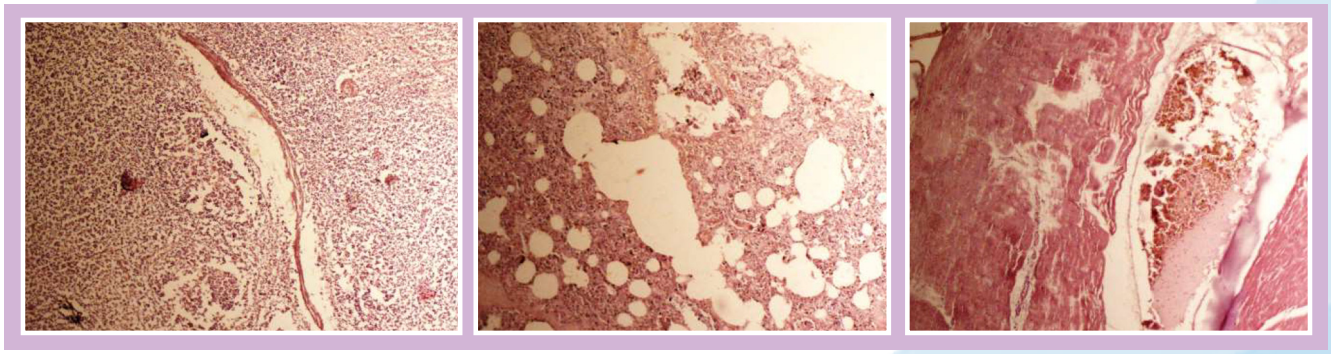


Fig.: Histopathological Changes Observed: (A) Lymphoid depletion in the follicular areas of lymphoid organs, (B) Hemorrhage and edema in the cardiac muscle, (C) Interstitial pneumonia in lung tissue.

A total of 37 samples collected from slaughterhouses in Assam and Meghalaya were examined for helminth parasites. Of these, 22 samples tested positive for ascariasis, with all positive cases observed in pigs belonging to the 4–9 months age group. Adult Trichuris suis worms were also

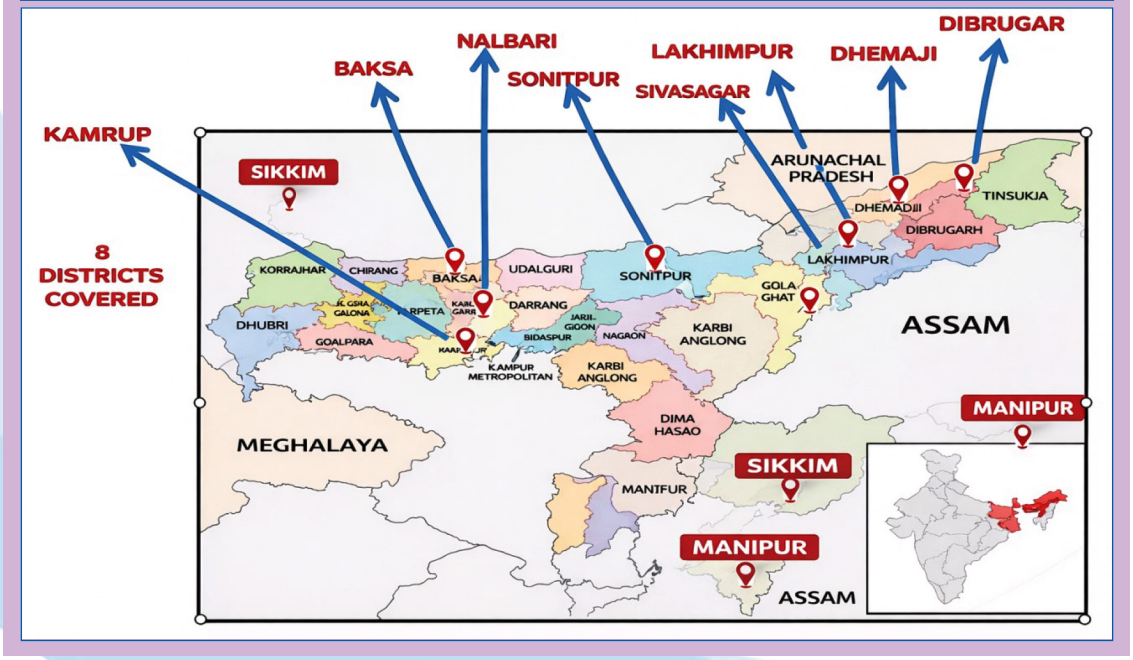
identified, indicating whipworm infection in the examined animals. Additionally, lungworm infection was detected, highlighting the presence of multiple helminth parasites in pigs from the region.

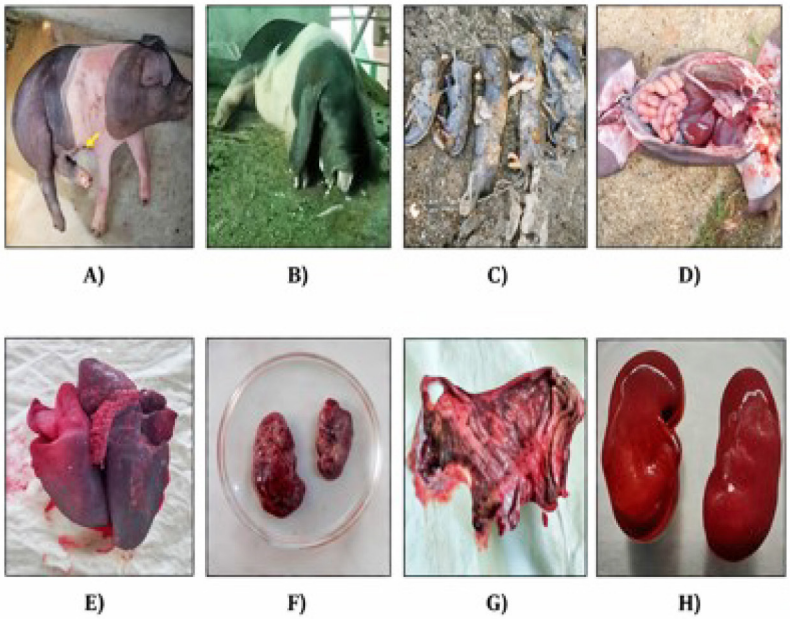
ICAR-Network Project (AINP-CEDA): All-India Network Project on Challenging and Emerging Diseases of Animals

Seema Rani Pegu, Juwar Doley, Souvik Paul, Vishal Rai

A total of 362 biological samples were collected from four North Eastern Region (NER) states (Assam, Arunachal Pradesh, Manipur, Sikkim and Meghalaya) for the detection of important swine viral pathogens. These comprising 151 tissue samples, 60 blood, 44 serum samples, 25 nasal swab, 32 rectal swab and 50 faecal samples. State-wise Distribution of Samples were presented below in table 1. All the collected samples were analysed using ELISA, PCR and Lateral Flow Assay (LFA) techniques to detect the presence of African Swine Fever Virus (ASFV), Porcine Circovirus (PCV), Porcine Reproductive and Respiratory Syndrome Virus (PRRSV),Porcine Parvo Virus, Classical Swine Fever Virus (CSFV), and Japanese Encephalitis Virus (JEV) and other associated pig viruses. Among the analyzed porcine samples, molecular screening revealed the presence of multiple viral pathogens. Specifically, 3 samples tested positive for African Swine Fever Virus (ASFV), 6 samples were positive for Porcine Circovirus type 2 (PCV2), and 2 samples showed the presence of Porcine Circovirus type 3 (PCV3). Additionally, Porcine Parvovirus (PPV) was detected in 2 samples, Japanese Encephalitis Virus (JEV) in 1 sample, and Classical Swine Fever Virus (CSFV) was identified in 5 samples. None of the samples tested positive for PRRSV during this round of screening. Notably, co-infections were observed in several cases: two samples showed concurrent infection with ASFV and PCV2, while two others exhibited co-infection with PPV and PCV. These findings highlight the co-circulation and potential interaction of multiple swine viruses within the tested population in the region, necessitating continued surveillance and disease management interventions.

ASF Outbreak Locations and Field Surveillance Coverage Across Districts of Assam and other NER states





GROSS PATHOLOGICAL OBSERVATIONS

A) ASF affected pig with Skin lesion (arrow) & respiratory distress.

B) Posterior weakness recorded in a pig farm of Dhemaji District, Assam.

C) Stillborn piglets in a pig farm of Sivasagar District, Assam.

D) Grower pig showing serosanguinous fluid accumulation inside the body cavity.

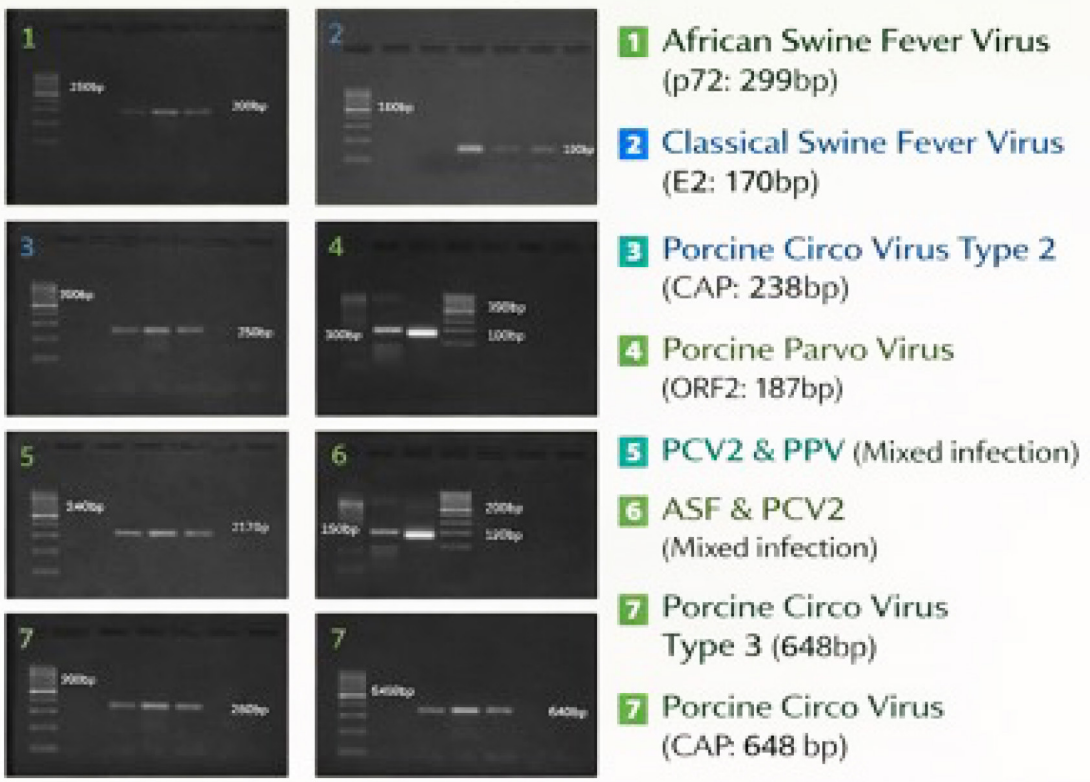
E) Consolidated lungs indicative of severe pneumonia.

F) Enlarged and hemorrhagic peripheral lymph nodes.

G) Hemorrhagic enteritis with congested and inflamed intestinal mucosa.

H) Enlarged and congested kidneys showing marked cortical hemorrhages.

PCR based detection of Major Viral Pathogens in Pig



Institute Project: Isolation and characterization of porcine Muscle Stem Cells for development of 3D culture

Juwar Doley, N.H. Mohan, Jaya, Rajendran Thomas, Souvik Paul, Vishal Rai

To Identify and characterize pig muscle stem cells markers, Immunocytochemical analysis of the cultured cells was conducted according to the methodology described by Kitajima et al. (2016). The cultured cells were immunostained using Pax7 (red) as a specific marker, with nuclear counterstaining performed using DAPI (blue). Images of porcine muscle stem cells immunostained for Pax7 (red) and counterstained with DAPI (blue) were captured and merged with phase-contrast microscopy images.

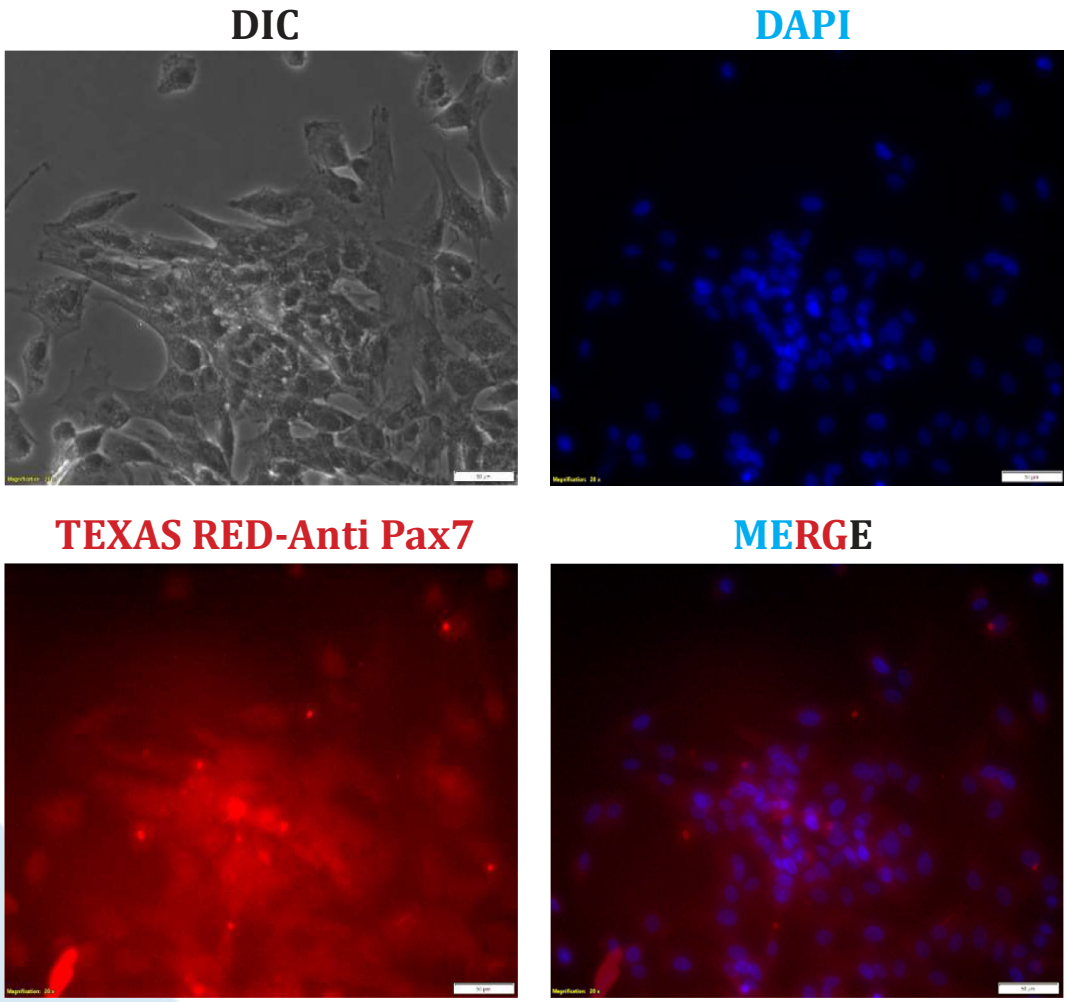


Fig: Immunocytochemistry of Porcine muscle stem cells isolated from the biceps femoris muscle of 16 weeks old pigs. The expression pattern of nuclei and Pax7 in pig muscle stem cells as determined by immunostaining.

External Funded (DBT): Development of a virus like particle-based vaccine against Indian isolate of Porcine circovirus

Rajib Deb, Swaraj Rajkhowa, Juwar Doley and Hemanta Maity

In vivo immunization studies in porcine model demonstrated that the developed PCV2d VLP

vaccine candidate induces a strong PCV2-specific IgG response, which was further enhanced by the use of an adjuvant. A prime–boost strategy was employed to evaluate antibody kinetics, with animals primed at month 0 (P_0) and boosted either at an early interval (B_1; PoB_1) or a delayed interval (B_3; PoB_3). Longitudinal serum analysis showed that PoB_1 elicited a rapid and higher peak IgG response; however, antibody levels declined more quickly, indicating a shorter duration of immunity. In contrast, PoB_3 generated a more sustained antibody response over time, suggesting improved memory B-cell maturation and more durable immunity with a longer priming–boosting interval. Virus neutralization test (VNT) results further confirmed the development of functional antibodies. Neutralizing activity against PCV2d in PK15 cells was low at 7 days post-immunization (PI) but increased markedly by days 14 and 28. The highest neutralizing titers were observed at days 35 and 42 PI, indicating progressive maturation and strengthening of the protective immune response. Overall, the results highlight the importance of booster timing in achieving sustained and effective immunity against PCV2d. Challenge studies against the developed vaccine candidate is further ongoing at ABSL3 laboratory, TANUVAS, Chennai.

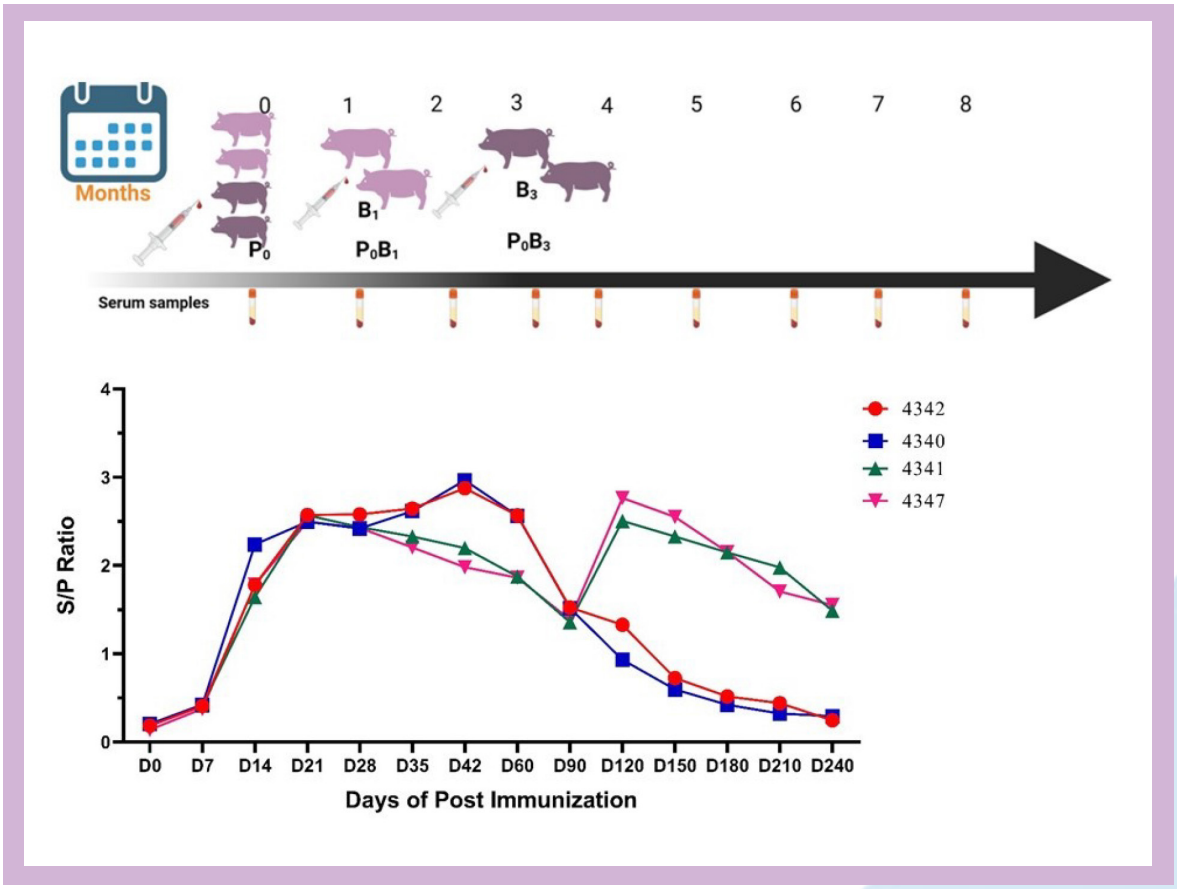


Fig.: Prime–boost immunization strategy and antibody response over time. Pigs were primed at month 0 (P_0) and boosted either early (B_1; P_0B_1) or later (B_3; P_0B_3), with serum samples collected at indicated time points. IgG antibody levels (S/P ratio) increased after priming and boosting in all animals. The early boost (P_0B_1) induced a rapid but transient antibody peak, whereas the delayed boost (P_0B_3) generated a more sustained and longer-lasting antibody response. P0B1: 4342, 4340; P0B3: 4341,4347

External Funded (NLM): Development of multiserotypic virus-like particle based vaccine candidates against porcine circovirus disease of pig in India

Rajib Deb, Seema Rani Pegu, Swaraj Rajkhowa, Vivek Kumar Gupta, Hemanta Maity and Sachin Kumar

Porcine circovirus type 2d (PCV2d) is an emerging genotype associated with severe circovirus-associated diseases in swine. Development of marker (DIVA-compatible) vaccine candidate is essential for effective disease surveillance and control. In the present study, an HSV-tagged PCV2d capsid (ORF2) expression construct was designed, cloned, expressed in insect cells, and characterized for virus-like particle (VLP) formation. The recombinant capsid protein was successfully expressed in Sf9 cells using a baculovirus expression system and self-assembled into VLPs, as confirmed by Western blot analysis, in silico structural modeling, and transmission electron microscopy (TEM). These findings demonstrate the potential of HSV-tagged PCV2d VLPs as a marker vaccine candidate.

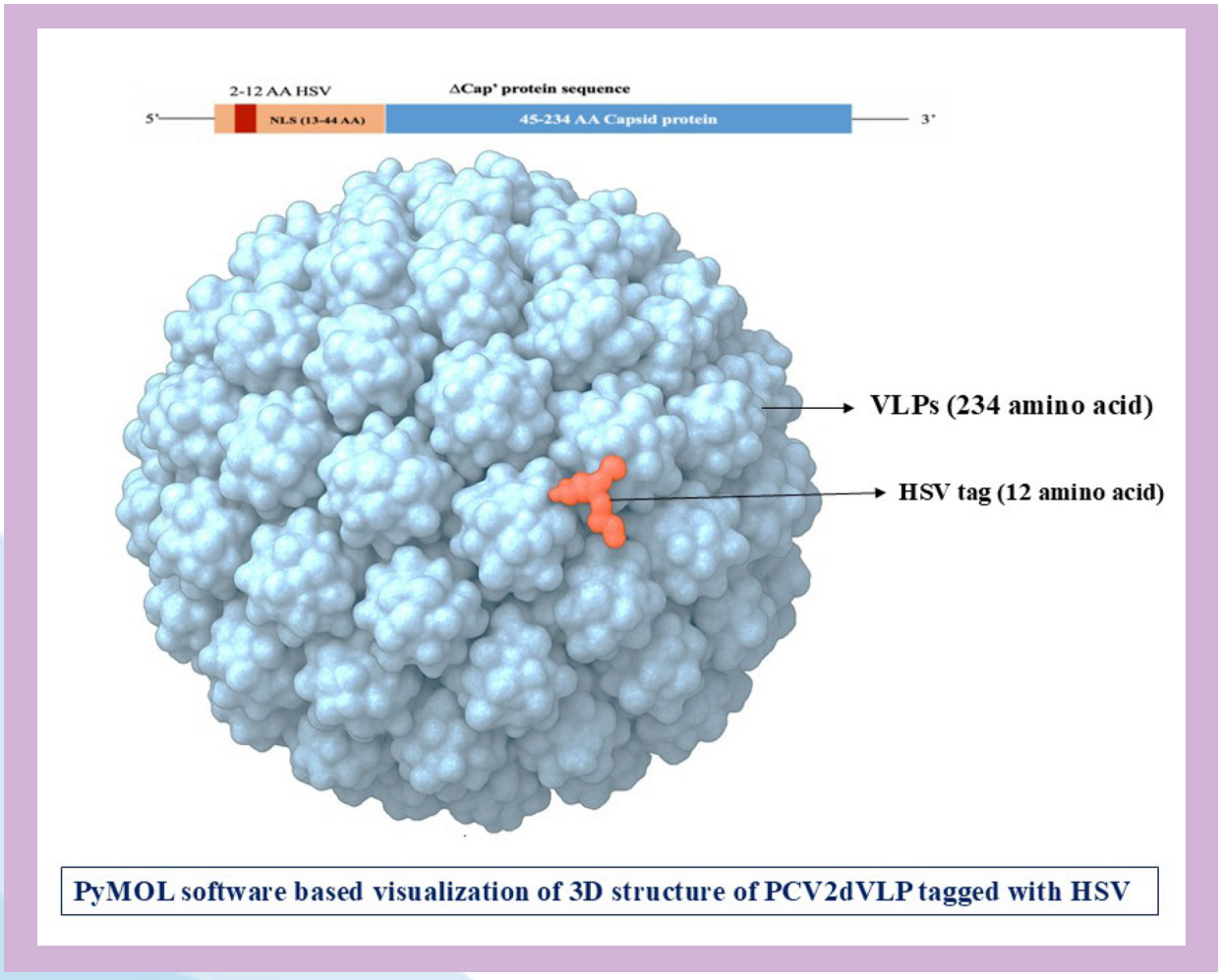


Fig.: The three-dimensional structure of the HSV-tagged PCV2d capsid protein was modelled using PyMOL software. The HSV tag was positioned at the N-terminal region of the capsid protein to ensure surface exposure without interfering with VLP assembly.

ICAR-Network Project (INFAAR): All India Network Project on AMR in fisheries & livestock

Rajib Deb and Seema Rani Pegu

During the reporting period (2024–25), a total of 231 livestock samples comprising milk, rectal, cloacal, and nasal swabs were collected from different animal species, primarily from Dhemaji district, Assam. These samples were screened for Escherichia coli, Staphylococcus aureus, and Coagulase-negative Staphylococci (CONS). Out of the total samples screened, 155 bacterial isolates were recovered, including 95 E. coli, 32 S. aureus, and 28 CONS. E. coli isolation was highest from rectal swabs, particularly from pigs, cows, goats, and poultry, whereas S. aureus and CONS were predominantly isolated from cow milk and pig nasal swabs. No samples were obtained from buffaloes and sheep during this period. Antimicrobial susceptibility testing of 95 E. coli isolates revealed an overall low to moderate level of resistance. Resistance was mainly observed against β-lactam antibiotics, including amoxicillin-clavulanic acid, ceftazidime, ceftriaxone, cefoxitin, cefpodoxime, and aztreonam. Importantly, all isolates were 100% susceptible to imipenem, indicating absence of carbapenem resistance. Isolates from cow milk and cow rectal swabs showed comparatively higher intermediate resistance, particularly to aztreonam and cephalosporins. E. coli isolates from pigs and goats exhibited low resistance with a higher proportion of intermediate susceptibility, while isolates from poultry cloacal swabs remained largely susceptible to all tested antimicrobials. Phenotypic screening for Extended Spectrum β-Lactamase (ESBL) production identified 13 cephalosporin-resistant E. coli isolates, of which 19 isolates were tested for ESBL production. Further molecular screening by PCR for ESBL-associated genes (blaTEM, blaSHV, blaOXA, blaCTX-M groups) in milk and rectal isolates did not detect the presence of ESBL genes. Similarly, screening for other antimicrobial resistance genes (ARGs) related to quinolones, sulphonamides, and tetracyclines did not yield positive results during this reporting year. A total of 32 S. aureus isolates recovered from cow milk and pig nasal swabs were subjected to antimicrobial susceptibility testing. High resistance was observed against penicillin G and cefoxitin, particularly among pig nasal isolates. In contrast, all isolates were susceptible to linezolid, erythromycin, and trimethoprim-sulfamethoxazole. Phenotypic screening using the cefoxitin disk diffusion method identified 19 presumptive MRSA isolates. Molecular confirmation by PCR revealed the presence of the mecA gene in 11 isolates, including 4 from cow milk and 7 from pig nasal swabs. The mecC gene was not detected in any isolate. A total of 28 CONS isolates were recovered and analyzed. Overall resistance levels were low, with occasional resistance observed to penicillin G. All CONS isolates were susceptible to linezolid, erythromycin, chloramphenicol, and tetracycline. Phenotypic and molecular screening for methicillin resistance (MR-CONS) revealed no cefoxitin-resistant CONS and no detection of mecA or mecC genes.

During the reporting period, four Staphylococcus aureus isolates (Depositor's ID: AS17-25-10, AS17-25-11, AS17-25-12 and AS17-25-13) submitted to the National Centre for Veterinary Type Cultures (NCVTC), ICAR–National Research Centre on Equines, Hisar, were successfully processed and authenticated. All cultures were confirmed as Staphylococcus aureus and found to be nuc-positive and mecA-negative, indicating methicillin sensitivity. Antibiotic susceptibility testing showed sensitivity to chloramphenicol (CHL) and linezolid (LZD) in all isolates, with additional sensitivity to tetracycline (TET) in one isolate and erythromycin (ERY) in another.

One AMR awareness and training program was successfully organized during the reporting period on 04 September 2024 at Paat Gaon, Mataikhar, Kamrup, Assam. The program was attended by

80 women farmers. The session focused on judicious use of antimicrobials, risks of antimicrobial resistance, and good animal husbandry practices.

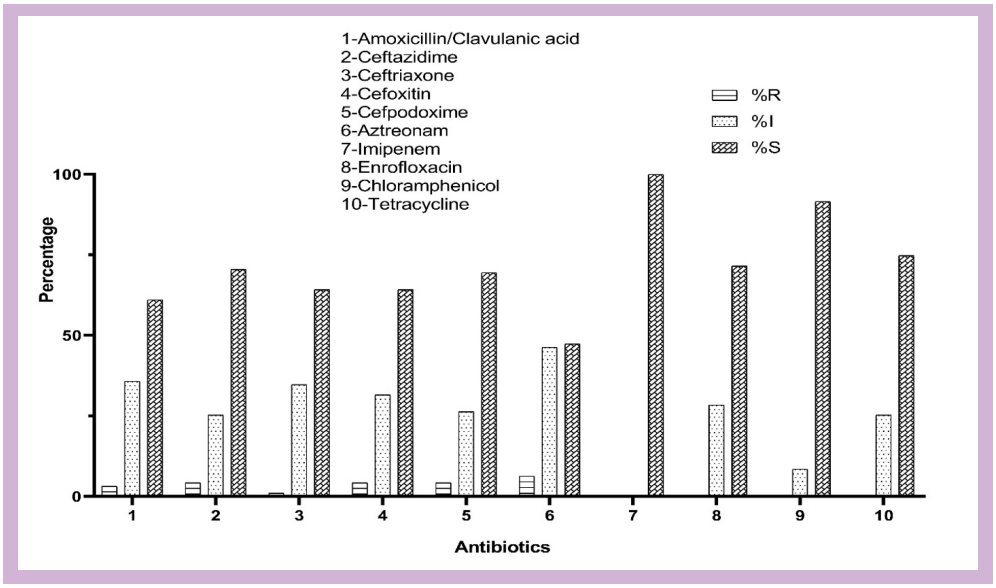


Fig.: Antimicrobial susceptibility testing (AST) profile of Escherichia coli isolates recovered from livestock during 2024–25. Bars represent percentage of resistant (%R), intermediate (%I), and susceptible (%S) isolates against tested antibiotics: (1) Amoxicillin/Clavulanic acid, (2) Ceftazidime, (3) Ceftriaxone, (4) Cefoxitin, (5) Cefpodoxime, (6) Aztreonam, (7) Imipenem, (8) Enrofloxacin, (9) Chloramphenicol, and (10) Tetracycline.

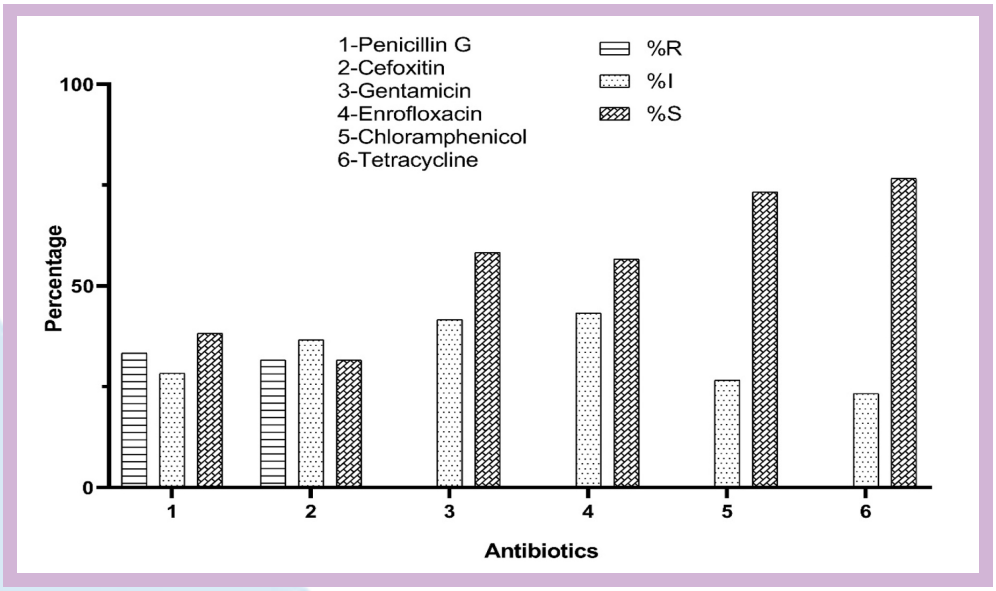


Fig.: Antimicrobial susceptibility testing (AST) profile of Staphylococcus aureus isolates recovered from livestock during 2024–25. Bars indicate percentage of resistant (%R), intermediate (%I), and susceptible (%S) isolates against tested antibiotics: (1) Penicillin G, (2) Cefoxitin, (3) Gentamicin, (4) Enrofloxacin, (5) Chloramphenicol, and (6) Tetracycline.

Institute Project: Molecular Characterization of Porcine Parasites

Souvik Paul, J. Doley, P.J. Das, Vishal Rai, Jaya

Ascaris suum: It is the most frequently observed GI nematode , with prevalence rates reaching up to 60 % in the North eastern states of India. The presence of adult worms in the intestines can significantly hinder the growth rate of young pig and thus contribute to the economic loss of the farmers. The samples (worms) were collected from various slaughter points at different market places in North eastern states of India including. All collected worms were washed carefully in normal saline solution, identified tentatively by studying its morphological characters and kept in 70 % ethanol for further study. The molecular characterization of Ascaris worms was carried out using polymorphic markers such as nuclear ribosomal internal transcribed spacer (ITS, ITS 1 and ITS 2) and mitochondrial genome such as Cytochrome c oxidase subunit 1 (COX 1), Cytochrome c oxidase subunit 2 (COX 2) and NADH dehydrogenase sub unit 1 (NAD 1).

Table: Primers used for gene amplification of ITS-2 & COX-1

Targeted gene	Primer sequence (5' - 3')		Product length (bp)	Reference
ITS-2	F	TAG CGG TGG ATC ACT CGG	550	(Sadaow *et al.*, 2018)
	R	AAG GAT TCA GCG TTG GGC		
COX-1	F	TTT TTT GGG CAT CCT GAG GTT TAT	450	(Luo *etal.*, 2017)
	R	TAA AGA AAG AAC ATA ATG AAA ATG		

Amplification of Internal Transcribed Spacer-2 (ITS-2) gene : PCR was performed targeting the ITS- 2 region of Ascaris suum. The amplification was carried out in VeritiPro96 Well Thermal Cycler (Thermo Fisher Scientific, USA) using a 10 µl reaction volume containing 5µl of 2x MasterMix (DreamTaq Green), 0.5µl of each primer (10 µM), 2µl of NFW and 2 µl of DNA, about 50 ng/µl of template DNA was taken for each reaction.For the effective amplification of the desired region of the gene, initial denaturation was performed at 95°C for 3min followed by 35 cycles of 95°C for 20sec, 58°C for 20sec and 72°C for 20 sec. The amplification concluded with a final extension at 72°C for 10 min. The amplified PCR product was visualized in 1.5% Agarose gel electrophoresis under UV gel documentation system (GelDoc, BIO-RAD, USA). PCR assay was performed on all samples to amplify ITS-2 gene. An amplicon of 550 bp was observed. The PCR products were analyzed on a 1.5% agarose gel using a BIORAD horizontal electrophoresis system and visualized under a Gel Documentation System (BIORAD, USA). A total of 8 samples were bulk amplified, gel purified and submitted for sequencing.

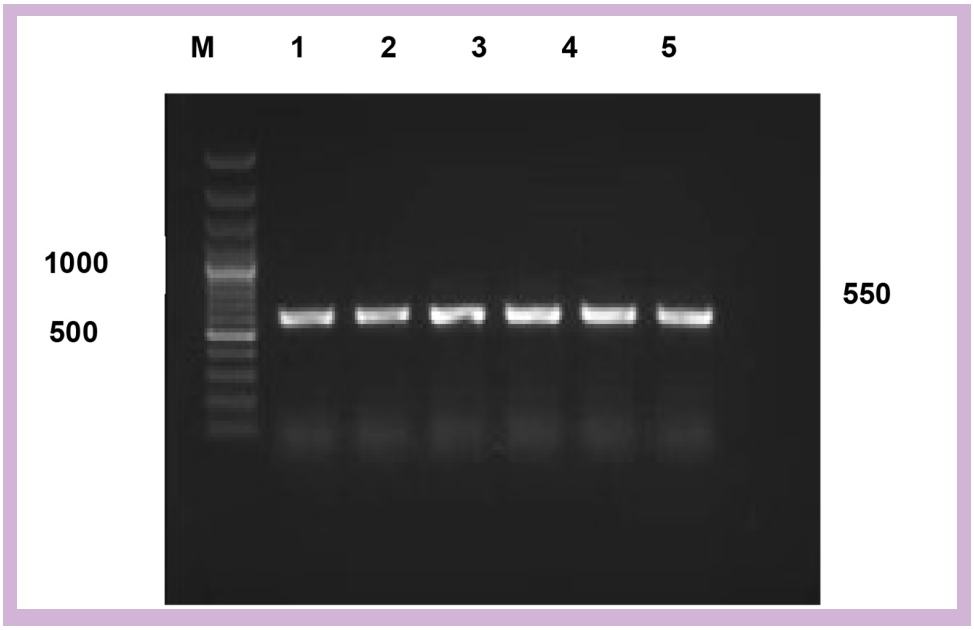


Fig.: Representative gel displaying PCR amplification of ITS-2gene, LANE A: 100bp plus DNA Ladder LANE 1-6: Amplicon of 550 bp, LANE N: Negative Control

Amplification of Cytochrome C Oxidase Subunit 1 (COX-1) gene : PCR was performed targeting the COX-1 region of *Ascaris suum.* The amplification was carried out in VeritiPro96 Well Thermal Cycler (Thermo Fisher Scientific, USA) using a 10 µl reaction volume containing 4µl of 2x MasterMix (DreamTaq Green), 0.5µl of each primer (10 µM), 2µl of NFW and 3 µl of DNA, about 50 ng/µl of template DNA was taken for each reaction. For the effective amplification of the desired region of the gene, initial denaturation was performed at 95°C for 3min followed by 35 cycles of 95°C for 20sec, 52°C for 20sec and 72°C for 20 sec. The process was concluded with afinal extension at 72°C for 10 min.The amplified PCR product was visualized in 1.5% Agarose gel electrophoresis under UV gel documentation system (GelDoc, BIO-RAD, USA).

Nucleotide sequencing: All the amplicons obtained from different isolates (2 from Jaintia Hills, 2 from Khasi Hills, 2 from Garo Hills and 2 from Rani) were gel purified (Gel Purification Kit, Qiagen, Germany) and sent for direct sanger sequencing using both forward and reverse primers at Nucleome, India. Sequencing results were assembled, analysed by using NCBI-BLAST to identify the *Ascaris* species. The quality of the result was checked, trimmed using FinchTV software. The Basic Local Alignment Search Tool (BLAST, NCBI https://blast.ncbi.nlm.nih.gov/Blast.cgi) was used to check similarity with *Ascaris* sequences. Orthologous sequences representing the diversity of *Ascaris* spp. were retrieved from GenBank (NCBI, https://www.ncbi.nlm.nih.gov/nucleotide/) and added to the analyses. Ascaris spp. nucleotide sequences were aligned using the multiple sequence alignment ClustalW with other available related nucleotide sequences in National Center for Biotechnology Information (NCBI) and then submitted to NCBI GenBank for allotment of assession numbers.

Sequence Analysis of ITS-2 gene: The homology between the newly generated sequences ranged from 99.8% to 100% in terms of nucleotide identity. On alignment of these sequences, a total of 550 nucleotides were compared in all eight newly generated sequences of *A. suum* isolates.

Substitution of nucleotide A with C at position 185 was present in the 1B.*ITS-2* (West Jaintia hills isolate) and additionally, deletion of T at the 495 position of 2B.*ITS-2* (West Khasi hills isolate) were observed. The pairwise sequence comparison of the *ITS-2* gene among the isolates obtained in the present study revealed a very high degree of similarity, ranging from 99.8–100%. Among the *ITS-2* sequences analyzed, West Jaintia Hills isolate (1B.*ITS2*) showed 99.8% similarity with all the other isolates, whereas all the remaining isolates exhibited 100% nucleotide identity with each other. This indicates that the population is highly conserved, with only a minor single nucleotide variation observed in isolate 1B.*ITS2*. When compared with the reference sequence KY964445 (*A. suum*), the present isolates displayed 99.6–99.8% similarity, confirming their close genetic relatedness with *A. suum*.

Table: Pairwise Nucleotide sequence comparison of the ITS-2 gene among various Ascaris suum isolates from Meghalaya compared to the reference A. suum sequence (KY964445) from China.

	1A.*ITS-2*	1B.*ITS-2*	2A.*ITS-2*	2B.*ITS-2*	3A.*ITS-2*	3B.*ITS-2*	4A.*ITS-2*	4B.*ITS-2*	KY964445	
1A.*ITS-2*		99.8	100.0	100.0	100.0	100.0	100.0	100.0	99.8	**1A.*ITS-2***
1B.*ITS-2*	0.2		99.8	99.8	99.8	99.8	99.8	99.8	99.6	**1B.*ITS-2***
2A.*ITS-2*	0.0	0.2		100.0	100.0	100.0	100.0	100.0	99.8	**2A.*ITS-2***
2B.*ITS-2*	0.0	0.2	0.0		100.0	100.0	100.0	100.0	99.8	**2B.*ITS-2***
3A.*ITS-2*	0.0	0.2	0.0	0.0		100.0	100.0	100.0	99.8	**3A.*ITS-2***
3B.*ITS-2*	0.0	0.2	0.0	0.0	0.0		100.0	100.0	99.8	**3B.*ITS-2***
4A.*ITS-2*	0.0	0.2	0.0	0.0	0.0	0.0		100.0	99.8	**4A.*ITS-2***
4B.*ITS-2*	0.0	0.2	0.0	0.0	0.0	0.0	0.0		99.8	**4B.*ITS-2***
KY964445	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2		**KY964445**
	1A.*ITS-2*	**1B.*ITS-2***	**2A.*ITS-2***	**2B.*ITS-2***	**3A.*ITS-2***	**3B.*ITS-2***	**4A.*ITS-2***	**4B.*ITS-2***	**KY964445**	

Analysis of the phylogenetic linear and radial dendrograms demonstrate clear clustering patterns that align with the geographic distribution of the sampled populations. Samples from West Khasi Hills (W_Khasi), and the Rani region (Rani1 and Rani2) form a tight clade, indicating strong genetic similarity and suggesting either a shared ancestral lineage or recent genetic exchange facilitated by geographic proximity and possible livestock movement between these areas. The Garo Hills samples show a split: West Garo Hills (W_Garo) groups more closely with the Khasi–Rani cluster, whereas East Garo Hills (E_Garo) forms a separate branch, implying moderate genetic divergence, possibly due to natural barriers or reduced interaction between eastern and western parts of Garo Hills. East Khasi Hills (E_Khasi) is positioned as a separate but related branch, showing moderate divergence from the W_Khasi–Rani–Garo cluster. The Jaintia Hills group (W_Jaintia and E_Jaintia) are the most genetically distinct, branching off earlier from all other groups, consistent with long-term isolation and limited genetic exchange. This early divergence suggests long-term isolation and limited gene flow with other regions, potentially driven by topographic separation, limited movement of hosts, or historical population differentiation.

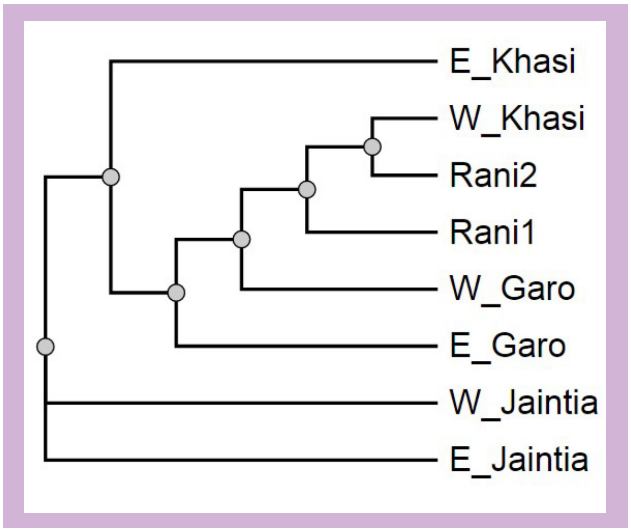


Fig.: Phylogenetic linear dendrogram based on the ITS-2 gene, depicting the evolutionary relationships among different isolates from Meghalaya

Radial dendrogram illustrates that the Meghalaya isolates (E_Khasi, W_Khasi, E_Jaintia, W_Jaintia, E_Garo, W_Garo, Rani1, Rani2) form a tight and well-supported monophyletic cluster, indicating their close genetic relatedness and regional homogeneity, most likely reflecting localized transmission cycles. These isolates are positioned within the Ascaris lumbricoides/Ascaris suum complex, clustering in proximity to the Korean reference sequence (AF182298_A. lumbricoides, Korea), suggesting strong genetic similarity. The broader topology of the tree demonstrates that human- and pig-derived isolates from different countries (Japan, China, Myanmar, Laos, Thailand, Australia, Germany, Czech Republic, Brazil) cluster together without strict host segregation. This pattern reinforces the lack of rigid host specificity and highlights the possibility of cross-transmission between pigs and humans, supporting the view that A. lumbricoides and A. suum represent host-adapted variants of a single species complex. Isolates from wild hosts (wild boar, orangutan, and black bear) are interspersed within the Ascaris clade, showing their genetic affinity to pig and human isolates, which indicates potential zoonotic linkages and cross-species transmission. In contrast, outgroup taxa such as Toxocara vitulorum (cattle, India), Baylisascaris transfuga (black bear, China), and Parascaris univalens (horse, China) occupy distinct clades, thereby validating the evolutionary distinctness and monophyly of the Ascaris group.

Sequence Analysis of COX-1 gene: The homology between the newly generated sequences ranged from 95.7 % to 100 % in terms of nucleotide identity. On alignment of *COX-1* gene sequences, a total of 440 nucleotides were compared in all eight newly generated sequences of *A. suum* isolates. Several sequence variations were detected, with those from the Khasi isolates exhibiting the most number of changes relative to other Meghalayan isolates. Substitution of nucleotide G with A at positions 69 and 126, A with G at 156 and C with T at 162 were some of the observed changes in the East and West Khasi hills isolates.

The pairwise sequence similarity analysis of the *COX-1* gene among *Ascaris suum* isolates revealed consistently high levels of genetic similarity, ranging from 95.7% to 100%. Isolates originating from the same geographical regions exhibited complete sequence identity, such as those from East

and West Jaintia, and from East and West Garo, underscoring pronounced genetic homogeneity within each region. By contrast, inter-regional comparisons demonstrated moderately high levels of similarity, generally between 95.7% and 99.8%. Specifically, Jaintia isolates shared 96.4% similarity with Khasi isolates, 96.8–100% with Garo isolates, and 96.1–99.8% with Rani isolates. Similarly, Khasi and Garo isolates exhibited 96.4% similarity, Khasi and Rani isolates ranged from 95.7% to 96.1%, while Garo and Rani isolates displayed 96.1–100% similarity. Although a degree of genetic divergence was evident among regions (3.3–4.5% variation), all isolates consistently clustered within a closely related lineage, indicative of a common ancestral origin. Collectively, these findings emphasize strong intra-regional conservation and moderately high inter-regional similarity, reflecting both localized differentiation and overall genetic relatedness among *A. suum* isolates from Meghalaya.

Table: Pairwise Nucleotide sequence comparison of the COX-1 gene among various Ascaris suum isolates from Meghalaya compared with global Ascaris isolates.

Percent Identity

Divergence

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1		99.0	97.7	96.8	95.0	95.0	96.1	94.3	95.0	95.0	95.0	95.8	97.1	98.4	95.6	98.1	97.9	97.7	98.1	1
2	1.1		97.7	98.2	95.6	96.1	97.4	95.6	95.6	95.6	96.1	99.2	97.1	97.9	95.6	97.9	97.9	97.7	97.9	2
3	2.4	2.4		99.5	95.8	95.3	99.2	95.8	95.8	95.8	95.3	98.4	99.0	99.2	94.3	99.7	99.7	99.5	99.7	3
4	1.9	1.9	0.5		96.8	96.4	99.3	95.9	96.8	96.8	96.4	98.2	99.0	99.7	94.8	99.5	99.7	99.5	99.5	4
5	3.8	4.6	4.4	3.3		96.1	96.1	98.9	100.0	100.0	96.1	95.5	95.3	96.6	94.5	96.2	96.1	96.4	96.2	5
6	3.8	4.1	4.9	3.8	3.8		95.7	95.0	96.1	96.1	100.0	95.5	94.8	96.1	99.2	95.8	95.6	95.8	95.8	6
7	2.6	2.7	0.8	0.7	4.0	4.5		95.2	96.1	96.1	95.7	97.5	99.7	99.0	94.0	99.3	99.5	99.2	99.3	7
8	3.8	4.6	4.4	3.3	0.0	3.8	4.0		99.1	98.9	95.0	94.6	95.3	96.6	94.5	96.2	96.1	96.4	96.2	8
9	3.8	4.6	4.4	3.3	0.0	3.8	4.0	0.0		100.0	96.1	95.5	95.3	96.6	94.5	96.2	96.1	96.4	96.2	9
10	3.8	4.6	4.4	3.3	0.0	3.8	4.0	0.0	0.0		96.1	95.5	95.3	96.6	94.5	96.2	96.1	96.4	96.2	10
11	3.8	4.1	4.9	3.8	3.8	0.0	4.5	3.8	3.8	3.8		95.5	94.8	96.1	99.2	95.8	95.6	95.8	95.8	11
12	0.7	0.8	1.6	1.6	4.7	4.5	2.3	4.7	4.7	4.7	4.5		97.9	98.7	95.3	98.8	98.7	98.4	98.8	12
13	3.0	3.0	1.1	1.1	4.9	5.5	0.3	4.9	4.9	4.9	5.5	2.1		98.7	93.7	99.2	99.2	99.0	99.2	13
14	1.6	2.1	0.8	0.3	3.5	4.1	1.1	3.5	3.5	3.5	4.1	1.3	1.3		95.0	99.5	99.5	99.2	99.5	14
15	4.3	4.3	5.8	5.2	5.2	0.8	6.1	5.2	5.2	5.2	0.8	4.6	6.3	4.9		94.5	94.5	94.8	94.5	15
16	1.9	2.1	0.3	0.5	3.9	4.4	0.7	3.9	3.9	3.9	4.4	1.2	0.8	0.5	5.5		100.0	99.7	100.0	16
17	2.1	2.1	0.3	0.3	4.1	4.6	0.5	4.1	4.1	4.1	4.6	1.3	0.8	0.5	5.5	0.0		99.7	100.0	17
18	2.4	2.4	0.5	0.5	3.8	4.3	0.8	3.8	3.8	3.8	4.3	1.6	1.1	0.8	5.2	0.3	0.3		99.7	18
19	1.9	2.1	0.3	0.5	3.9	4.4	0.7	3.9	3.9	3.9	4.4	1.2	0.8	0.5	5.5	0.0	0.0	0.3		19
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

AB591803_As_Pig_Japan
AJ968342_As_Wild_Boar_China
ATCTTGATTTKF719129_As_Pig_Phillipines
COX1_E.Garo
COX1_E.Jaintia
COX1_E.Khasi
COX1_Rani1
COX1_Rani2
COX1_W.Garo
COX1_W.Jaintia
COX1_W.Khasi
HQ70490_As_Pig_China
KF719100_Ascaris_sp._Human_Bangladesh
KF719125_As_Pig_Uganda
KF719142_As_Pig_UK
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MK143379_As_Pig_Brazil

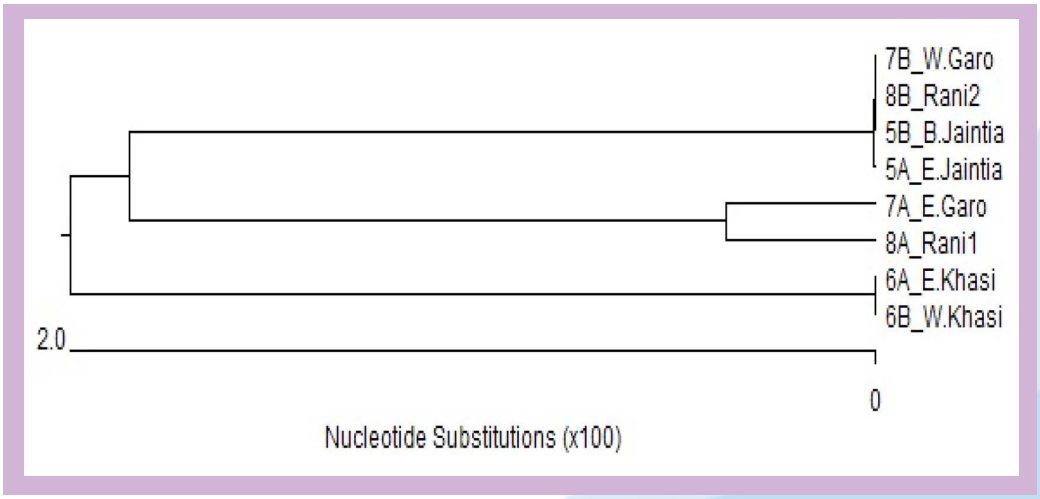


Fig.: Phylogenetic Tree of COX-1 gene sequences of different isolates from Meghalaya with nucleotide substitution.

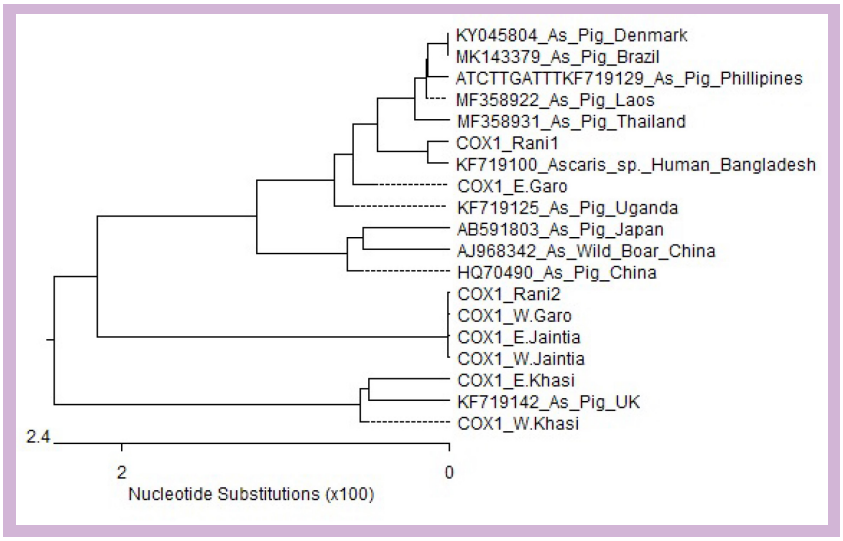


Fig. : Phylogenetic Tree of COX-1 gene sequences of Ascaris isolates from Meghalaya along with global sequences, showing nucleotide substitution.

Institute Funded: Development of recombinant VP2 protein based indirect ELISA for serodiagnosis of Porcine parvovirus

Vishal Rai, Juwar Doley, Seema Rani Pegu

Porcine Parvovirus (PPV) is a major reproductive pathogen of swine, causing significant economic losses due to reproductive failures such as stillbirths, fetal mummification, embryonic death, infertility, neonatal mortality, and abortions. At present, no indigenous diagnostic assay or vaccine is available in the country, and limited seroprevalence data exist due to the high cost of imported ELISA kits. Therefore, the present study was undertaken to develop an affordable, indigenous recombinant VP2 protein–based indirect ELISA for serodiagnosis of PPV.

During the current reporting period, further advancements were made towards the development of a recombinant VP2 protein–based indirect ELISA for the serodiagnosis of Porcine Parvovirus (PPV). In continuation of the previous work, the N-terminal fragment of the PPV VP2 gene that had been amplified earlier was cloned into the pET-28 expression vector. However, despite successful cloning, expression of the recombinant protein could not be achieved. To address this limitation, a detailed bioinformatic analysis of the VP2 gene was undertaken. Epitope prediction and sequence analysis revealed that several immunologically critical epitopes were predominantly located in the C-terminal region of the VP2 protein.

Based on these findings, the C-terminal fragment of the VP2 gene was gene-synthesized and subsequently cloned into the pET-28a(+) expression vector. The correct orientation and integrity of the insert were confirmed through restriction enzyme digestion and nucleotide sequencing. The recombinant construct was then transformed into OverExpress™ E. coli C41 (DE3) competent cells for protein expression. Expression of the recombinant C-terminal VP2 protein was confirmed by SDS-PAGE analysis, followed by immunoreactivity verification using Western blotting with anti-His tag antibodies. Solubility analysis indicated that the recombinant protein was predominantly expressed in the insoluble (pellet) fraction. As a result, purification under native conditions using imidazole was not feasible. Several attempts were made to achieve soluble expression of the

recombinant protein by optimizing induction parameters, including incubation temperature, IPTG concentration, and post-induction incubation time. However, despite these optimization efforts, the protein continued to be predominantly expressed in the insoluble fraction.

The recombinant VP2 protein was therefore purified under denaturing conditions using 8 M urea. Following purification, the protein was subjected to dialysis for gradual removal of urea. The dialyzed protein was analyzed by SDS-PAGE and further confirmed by Western blotting using anti-His antibodies, validating the successful expression and purification of the target recombinant protein. The purified recombinant VP2 protein will be utilized for animal experimentation to raise hyperimmune serum. Subsequent standardization and optimization of an indirect ELISA for PPV antibody detection are planned in the next phase of the project.

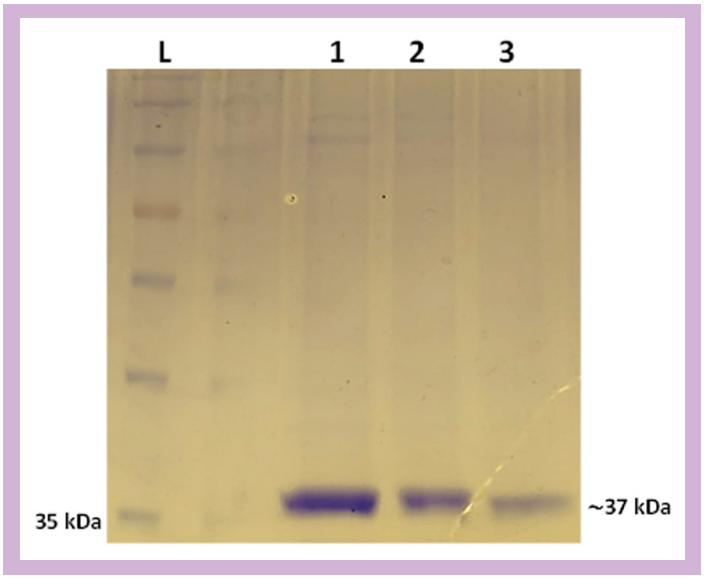


Fig.: SDS-PAGE analysis of different purified fractions of recombinant VP2
(L: Pre-stained protein ladder, 1:3 Different eluates of recombinant VP2)

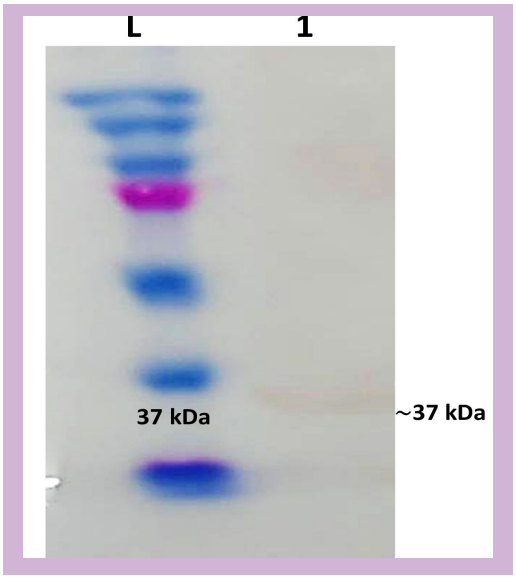


Fig.: Western blot analysis of the purified recombinant VP2
(1: Purified VP2, L: Pre-stained protein ladder)

External Funded (DHR): Serological and Molecular Surveillance of Swine Influenza in Pigs Coupled with Knowledge, Attitude and Practices (KAP) Studies to Explore Community Insights in Northeast India

Vishal Rai, Swaraj Rajkhowa, V. K. Gupta

Swine Influenza (SI) is an acute, highly contagious viral respiratory disease of pigs caused by influenza A viruses, characterized by high morbidity and significant economic losses due to reduced growth, poor feed conversion, and increased susceptibility to secondary infections. Importantly, pigs serve as potential "mixing vessels" for influenza viruses of avian, human, and swine origin, facilitating genetic reassortment and the emergence of novel influenza strains with zoonotic and pandemic potential. The northeastern region of India, where pig rearing is an integral component of rural and tribal livelihoods and is largely practiced under backyard and semi-intensive systems, presents a unique ecological interface for influenza virus transmission. Despite this, systematic data on the serological and molecular prevalence of Swine Influenza in pigs from this region are limited. Furthermore,

inadequate awareness and suboptimal biosecurity practices among pig-rearing communities may contribute to silent circulation and spread of the virus. In this context, the present project aims to generate comprehensive epidemiological data through serological and molecular surveillance, while simultaneously assessing community knowledge, attitudes, and practices (KAP), to support evidence-based disease control and public health preparedness in Northeast India.

As part of the first objective, systematic collection of pig samples (serum, swabs, organs) was undertaken from different northeastern states, including Assam, Arunachal Pradesh, Meghalaya, Manipur, and Tripura, representing diverse pig production systems. A total of 98 serum samples has been screened so far for Swine Influenza specific antibodies using the INgezim Influenza Porcina Indirect ELISA kit. Out of these, 8 samples were found to be seropositive, indicating a seroprevalence of 8.16% in the sampled population. The detection of antibodies suggests prior exposure or circulation of Swine Influenza virus among pig populations in the region. Further serological screening of additional samples is ongoing to obtain a more representative estimate of regional prevalence. Molecular surveillance studies are planned to be initiated shortly using the already collected clinical samples. These investigations will focus on the detection of Swine Influenza virus RNA and molecular characterization of circulating strains, which will provide insights into viral diversity, strain distribution, and potential zoonotic risks associated with Swine Influenza in Northeast India.

Under the second objective, a Knowledge, Attitude and Practices (KAP) survey was conducted among pig-rearing communities to assess awareness, perceptions, and on-field practices related to Swine Influenza and general biosecurity measures. A total of 160 respondents from various northeastern states, including Meghalaya, Arunachal Pradesh, Tripura, Nagaland, Manipur and Assam, have been interviewed using a structured questionnaire. Preliminary observations indicate varying levels of awareness regarding respiratory diseases in pigs, limited knowledge about Swine Influenza and its zoonotic implications, and inconsistent adoption of recommended biosecurity and disease prevention practices. Detailed analysis of the KAP data is currently in progress and will help identify critical gaps in knowledge and practices, which can be addressed through targeted awareness and capacity-building programs.

Animal Nutrition

Institute project : Development, characterization, and validation of nano zinc supplement for improving piglet productivity

Lokesha E, Meera K, S.R.Pegu, and R. Thomas

Freshly collected neem leaves were washed thoroughly with distilled water and dried at room temperature. The dried leaves were then used for the preparation of plant extracts at different concentrations (2%, 5%, 10%, 15%, and 30%). These extracts were used for the green synthesis of zinc oxide (ZnO) nanoparticles. For nanoparticle synthesis, 0.1 M zinc nitrate solution was mixed with the neem leaf extract, and the pH was adjusted to 9 and 12. The reaction mixture was allowed to form a precipitate, which was collected, dried, and subsequently calcined in a muffle furnace to obtain ZnO nanoparticles. The resulting nanoparticles were dispersed in distilled water and characterized by UV–Visible absorption spectroscopy. Particle size distribution and zeta potential were determined using Dynamic Light Scattering (DLS). As an alternative to green synthesis, a chemical method was also employed for ZnO nanoparticle preparation. In this method, 0.5 M zinc nitrate solution was used as the precursor, 1% carboxymethyl cellulose (CMC) was added as a stabilizing agent, and 1 M sodium hydroxide was added dropwise under constant stirring to maintain controlled precipitation. Stirring was continued after complete addition to ensure uniform reaction. The formed precipitate was centrifuged, dried, and calcined for further characterization. The results obtained from both synthesis methods are presented below. Based on yield and particle size characterization, ZnO nanoparticles synthesized by the chemical method showed an average particle diameter of 90.4 nm and were therefore selected for in vivo testing in animals.

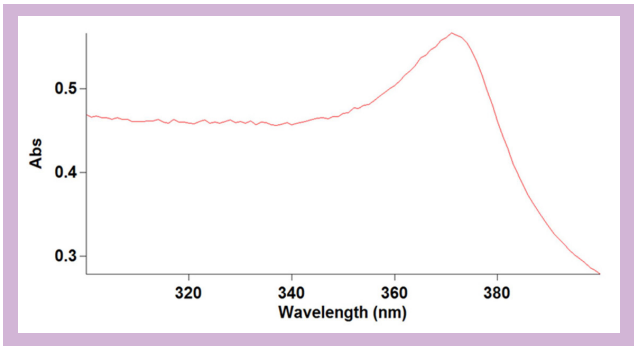


Fig.: UV–Visible absorption spectrum of synthesized zinc oxide (ZnO) nanoparticles.

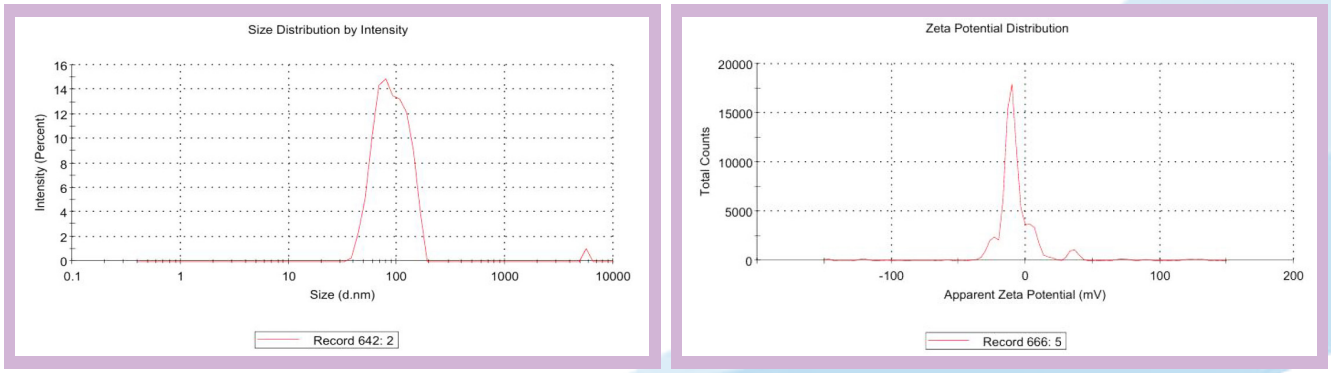


Fig.: Particle size distribution and zeta potential of nano-Zn synthesized using neem leaf extract and 0.01 M zinc nitrate at pH 9.

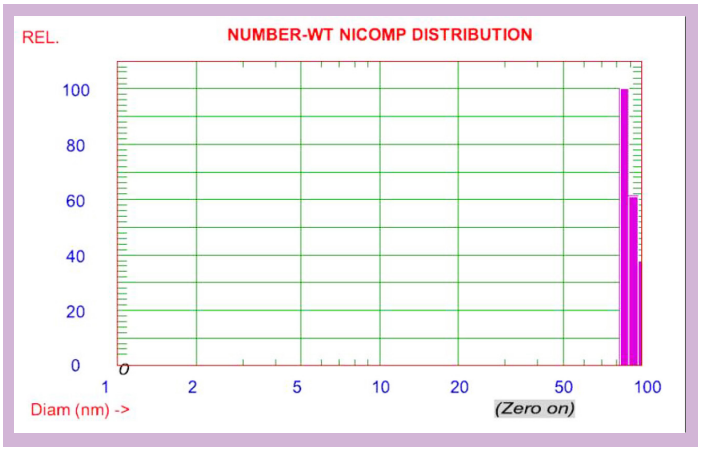


Fig.: Particle size distribution of nano-Zn synthesized by the chemical method.

External funded (DHR): Novel Autochthonous Probiotic Bacterial Isolates from Indigenous Pigs as Sustainable Alternatives to Antibiotic Growth Promoters

Lokesha E, Vishal Rai, and V.K. Gupta

Fecal samples were aseptically collected directly from the rectum of piglets around weaning from indigenous pig breeds, Doom and Ghungroo, to isolate autochthonous probiotic bacteria as potential alternatives to antibiotic growth promoters. The samples were homogenized in sterile physiological saline, serially diluted and spread-plated on MRS agar for the selective isolation of lactic acid bacteria (LAB), followed by incubation at 37 °C for 24 h. Distinct colonies were purified by repeated streaking and preliminarily characterized by Gram staining, catalase test, and vancomycin resistance assay. Gram-positive, catalase-negative, and vancomycin-resistant isolates were preserved in MRS broth containing 50% glycerol at −20 °C. Molecular identification was performed through genomic DNA extraction followed by amplification of the 16S rRNA gene using genus-specific primers, with confirmation by 2% agarose gel electrophoresis. The confirmed isolates were further evaluated for probiotic potential using an acid tolerance assay (pH 2.0) conducted over 0–3 h. Survival was assessed by serial dilution, pour plating on MRS agar, incubation at 37 °C for 24 h, and enumeration of viable counts expressed as log CFU/mL. Among the tested isolates, two exhibited significant acid tolerance, maintaining viable counts under simulated gastric conditions.

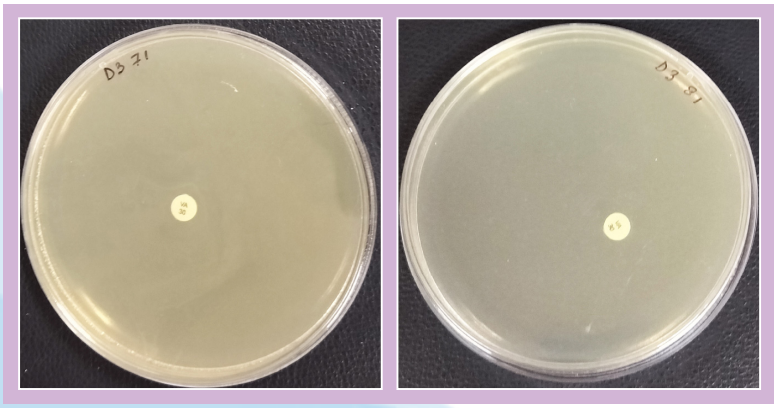


Fig.: Vancomycin susceptibility test of bacterial isolates determined by disc diffusion assay

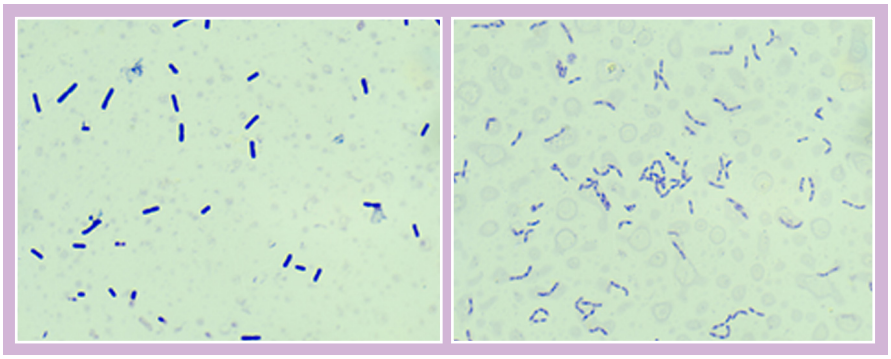


Fig.: Morphological identification of Gram-stained bacterial isolates observed under at 1000× magnification

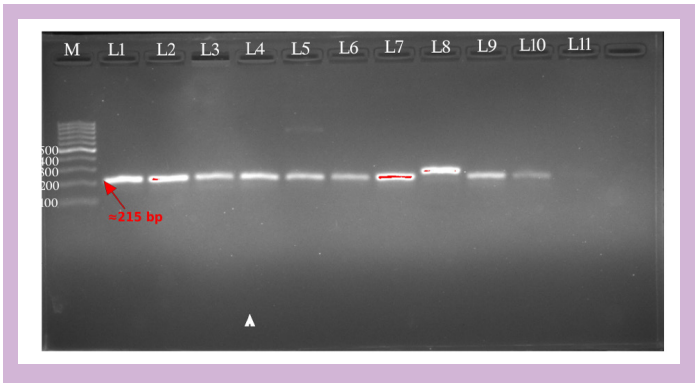


Fig.: Gel electrophoresis image of 16S rRNA gene fragments (~215 bp) on 2% agarose gel.

Table: Acid tolerance of *Lactobacillus* isolates at 0 and 3 h showing viable counts, log reduction and percentage survivability.

Sl No.	Isolate	CFU count		Log reduction	% Survivability
		0 hr (N_0)	3 hr (N_t)		
1	D381	11.49	10.74	0.75	93.47
2	D372	11.64	10.86	0.78	93.29

Livestock Products Technology

Institute Project: Development of a Point-of-Care colorimetric method for detection of meat freshness

R. Thomas, J. Doley and V. K. Gupta

Assessment of meat freshness is often carried out using microbial counts; however, this method is time-consuming due to the incubation period required for bacterial growth. Freshness declines as a result of microbial activity, chemical changes, residue contamination, and postmortem processes such as glycolysis, proteolysis, and lipolysis. Conventional techniques for evaluating meat quality, including detection of pathogens, residues, and contaminants, are effective but generally costly,

time-intensive, and dependent on advanced instruments and skilled personnel.

In contrast, point-of-care detection methods offer a rapid, cost-effective, and portable alternative with high specificity and ease of use. In the present study, a colorimetric point-of-care method was developed to assess meat freshness using ABTS and TMB dyes targeting ATP degradation products. Different muscles-*Longissimus dorsi, Psoas major, Biceps femoris*, Trapezius, and *Triceps brachii*-from electrically and percussion stunned pigs were analyzed for key physicochemical parameters such as pH, sarcomere length, drip loss, color, and ATP concentration. The results are presented below.

ABTS (2,2′-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) is oxidized by hydrogen peroxide in the presence of horseradish peroxidase (HRP) to form the ABTS•$^{+}$ radical cation, which has an intense green colour. It has been observed that with H2O2 standards, ABTS (25mM) reacts in presence of HRP enzyme to produce green colour both in liquid and paper medium till 5µM concentration of H2O2. When tried with meat juice spiked with H2O2, the solution showed green colour till 250 µM spiking concentration of H2O2 in the solution. But when tried with meat juice without spiking, the solution did not show any change in colour. Therefore, ABTS dye has not been used further for the study.

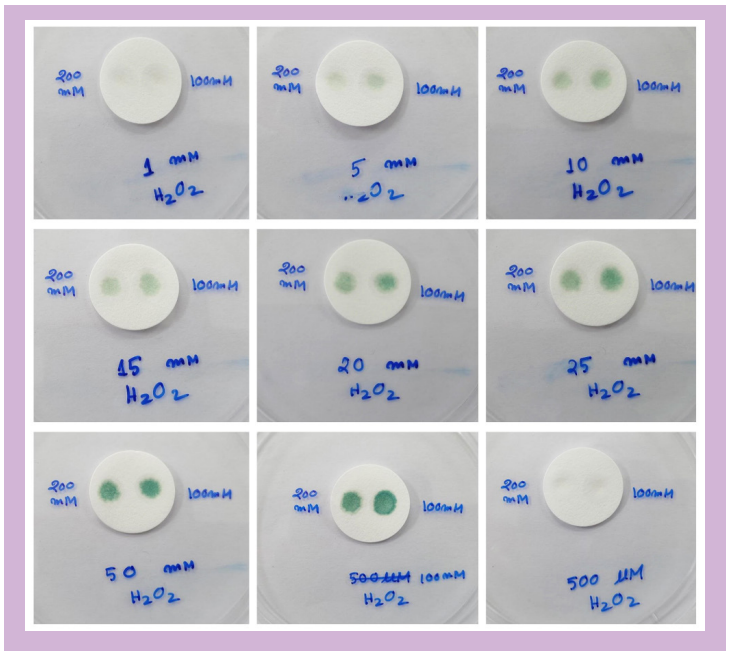


Fig.: Development of colour at different concentrations of H2O2

Cataloguing the dynamics and interplay of proteins, microbial flora and metabolites in post mortem pig muscle

Changes in pH: The postmortem pH trajectory exhibited distinct muscle-specific patterns between abattoir-slaughtered and backyard-slaughtered pigs, reflecting the complex interplay of muscle fiber composition, glycolytic flux, and slaughter-induced physiological perturbations. In backyard-slaughtered animals, initial pH values (6.3 to 6.5 at 1 h) declined heterogeneously, with the *Musculus trapezius* demonstrating the most rapid acidification (to 5.3), followed by the *Psoas*

major (5.4), whereas the *Biceps femoris* showed a pronounced but more gradual decline from 6.4 to 5.6 over 24 h. During refrigerated storage, this divergence persisted, with the *Musculus trapezius* reaching a terminal pH of 5.1 and the *Triceps brachii* stabilizing at 5.5.

Drip loss: Drip loss evaluation over 24 h revealed pronounced muscle- and slaughter-condition–specific differences, with *Longissimus dorsi et lumborum* exhibiting the highest exudative loss (~3 % under backyard slaughter and ~1.5 % under abattoir slaughter), while *Triceps brachii* consistently showed minimal drip loss (0.5 % and 0.8 %, respectively). All other muscles ranged between 0.5–1.5 % in abattoir-slaughtered carcasses and 0.8–2.8 % in backyard-slaughtered carcasses.

ATP degradation profile: ATP degradation profiles in both abattoir slaughter and backyard slaughter pork displayed a characteristic post-mortem decline, albeit with pronounced muscle-specific and slaughter method–dependent variations. In abattoir-slaughtered carcasses, *Psoas major* exhibited the highest initial ATP concentration (6.8 nmol/g), followed by a rapid degradation phase and subsequent stabilization at approximately 1 nmol/mg from day 4 onwards.

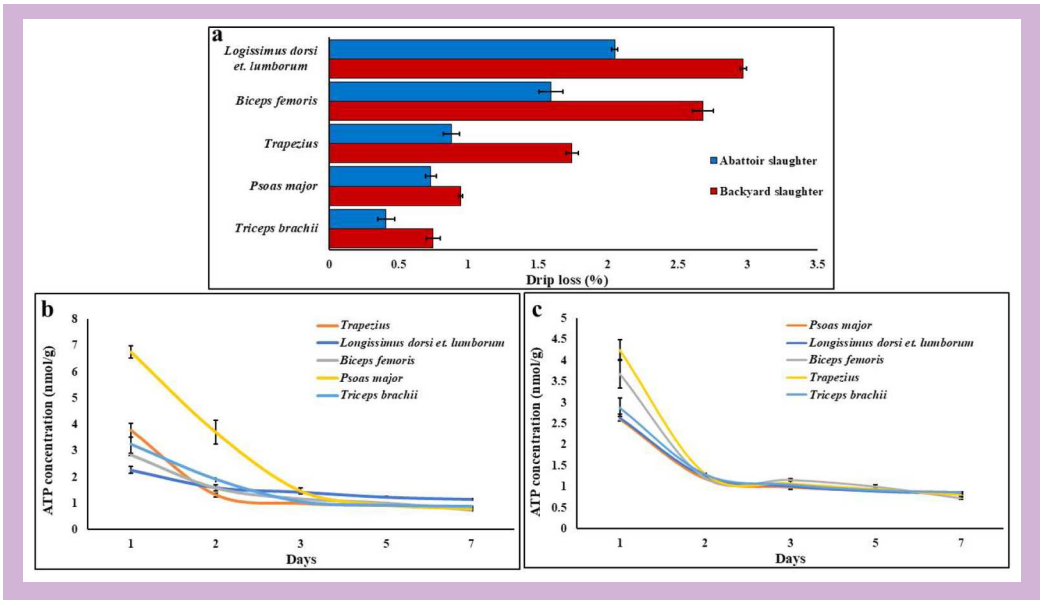


Fig.: Percentage drip loss and day-wise changes in ATP concentration

Changes in muscle colour: Instrumental colour profiling of the five porcine muscles over 7-day storage at 4±1 °C demonstrated pronounced muscle- and slaughter-condition–dependent trajectories across L*, a*, b*, chroma, and hue angle. Lightness (L*) in abattoir-slaughtered carcasses declined uniformly from 63–72 on day 1 to 30–45 by day 7, with *Psoas major* exhibiting the highest and *Triceps brachii* the lowest initial L* values.

Changes in length of sarcomere: Hourly and daily assessment revealed distinct temporal patterns in sarcomere dynamics across the five porcine muscles during refrigerated storage. Hourly measurements indicated an initial contraction phase, with all muscles exhibiting progressive sarcomere shortening from 1 h to 8–12 h postmortem and subsequently elongated by 24 h. *Psoas major* consistently exhibited the longest sarcomeres (3.044 µm at 1 h; 2.057 µm at 24 h), whereas *Longissimus dorsi et lumborum* recorded the shortest sarcomere lengths during the contraction phase (minimum of 1.417 µm at 8 h).

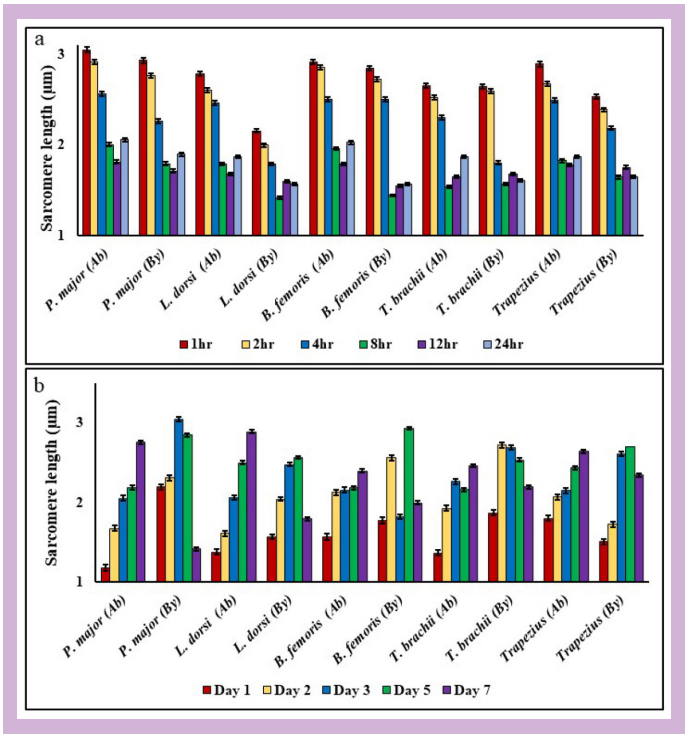


Fig. Hourly (a) and daily (b) changes in sarcomere length

WB shear force: Texture profiling through work of shear and Warner–Bratzler blade (WBB) shear force demonstrated distinct temporal tenderization patterns between abattoir-slaughtered and backyard-slaughtered pork during 7 days of storage. In abattoir-slaughtered carcasses, *Triceps brachii, Longissimus dorsi et lumborum,* and *Biceps femoris* exhibited early shear maxima at 6 h (18, 14, and 13 N•s), while *Psoas major* peaked at 4 h, indicating a rapid onset of postmortem firmness followed by accelerated softening. *Musculus trapezius* displayed a delayed peak at 120 h (11 N•s), reflecting later connective tissue tightening. WBB shear force showed a parallel trend, with early peaks at 6–12 h followed by a progressive decline, and *Psoas major* consistently exhibited the lowest shear resistance.

Tyrosine value: Tyrosine release exhibited distinct temporal patterns between pork obtained from abattoir slaughter and backyard slaughter during 7 days of chilled storage, reflecting differential proteolytic progression among muscles. In abattoir-slaughtered meat, all muscles demonstrated a uniform early increase interrupted by a characteristic dip on day 3- except *Psoas major,* which showed continuous elevation-followed by a marked rise from days 4 to 7.

TBARS value: TBARS analysis revealed a consistent increase in lipid oxidation across all five muscles in pork obtained from both abattoir slaughter and backyard slaughter conditions during 7 days of refrigerated storage. In carcasses subjected to abattoir slaughter, initial TBARS values ranged from 0.43 mg MDA/kg in *Psoas major* to 0.72 mg MDA/kg in *Triceps brachii,* with *Biceps femoris* exhibiting the highest terminal value (2.61 mg MDA/kg), while *Longissimus dorsi* recorded the lowest (2.02 mg MDA/kg) at the end of storage.

Changes in microbial load: Microbiological profiling of the five porcine muscles revealed distinct patterns in standard plate count (SPC), coliforms, and *Staphylococcus aureus* between abattoir

slaughter and backyard slaughter carcasses during 7 days of chilled storage. In pork obtained from abattoir slaughter, SPC exhibited a relatively uniform incremental trend, with *Triceps brachii* and *Musculus trapezius* showing the highest initial load and *Musculus trapezius* the lowest, while by day 7 *Musculus trapezius* recorded the highest SPC and *Longissimus dorsi et lumborum* the lowest.

Metagenomics analysis: Metagenomic profiling provided a high-resolution taxonomic and functional context for the microbial dynamics observed in pork derived from abattoir and backyard slaughter during early postmortem storage. In abattoir-slaughtered samples, the SPC, coliform and *Staphylococcus aureus* trajectories demonstrated a uniform and progressive increase, which corresponded closely with the dominance of spoilage-associated taxa identified in the Krona charts. The predominance of Firmicutes- particularly *Staphylococcaceae* and *Streptococcaceae* - accounted for the sustained rise in *Staphylococcus* counts, while the enrichment of Enterobacteriaceae mirrored the steady increase in coliforms, confirming that these families constituted the primary contaminants proliferating under refrigerated storage.

Metabolomics analysis: Multivariate metabolomic analyses (OPLS-DA, PCA, and PLS-DA) demonstrated a clear and consistent metabolic separation between pork samples obtained from abattoir slaughter and backyard slaughter on day 1, with these distinctions showing strong concordance with physicochemical and structural quality attributes. The OPLS-DA score plot revealed distinct clustering of samples, reflecting divergent early postmortem metabolic trajectories associated with differences in slaughter environment and associated physiological stress. Backyard slaughter, which was characterized by higher drip loss, reduced sarcomere length, increased shear force, and more rapid colour deterioration (lower a* and higher b* values), exhibited a broader and more dispersed metabolomic profile, indicative of accelerated structural disorganization and heightened oxidative activity.

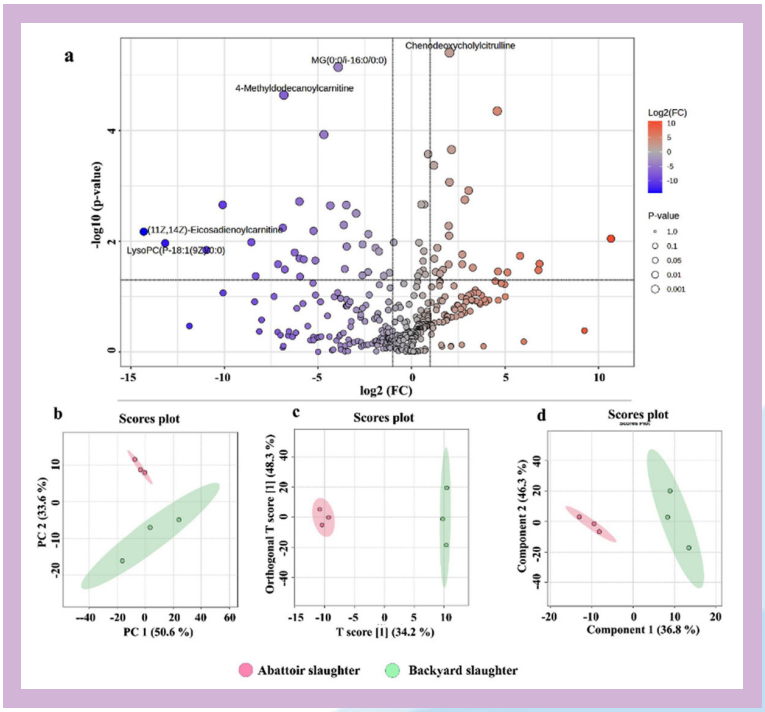


Fig.: Multivariate metabolomic analysis of samples from abattoir and backyard slaughter

Proteomics analysis: Proteomic multivariate analyses (OPLS-DA, PLS-DA and PCA) demonstrated a pronounced divergence between abattoir slaughter and backyard slaughter pork on day 1, reflecting early postmortem molecular differences that corresponded closely with physicochemical, biochemical and microbiological observations. The OPLS-DA and PLS-DA score plots showed clear clustering separation, with backyard slaughter positioned further from abattoir slaughter, indicating accelerated proteome remodeling and stress-associated protein turnover in backyard-slaughtered meat.

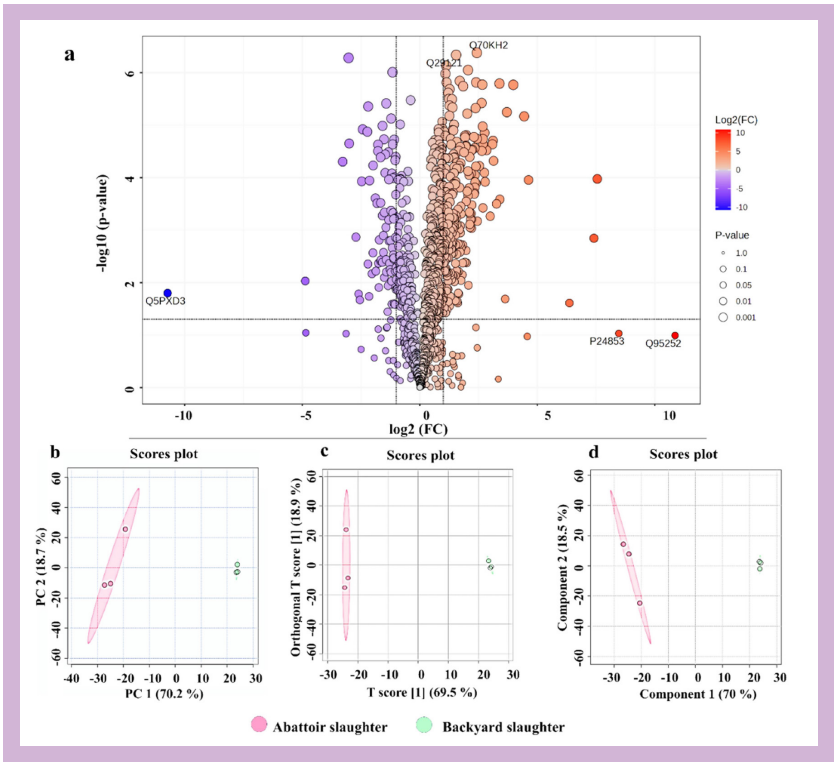


Fig.: Differential proteomic analysis comparing abattoir and backyard slaughter samples

Multi-omics integration revealed congruent molecular signatures: backyard slaughtered pork exhibited enriched pathways for glycolysis, lipid oxidation and amino-acid degradation, along with pronounced proteome remodeling and functional microbial shifts, whereas abattoir slaughtered samples maintained greater metabolic and structural stability. Together, these findings confirm that abattoir slaughter coupled with electrical stunning mitigates postmortem deterioration, while percussion stunning under low-hygiene backyard slaughter conditions amplifies oxidative, proteolytic and microbial degradation, thereby significantly compromising meat quality.

External Funded (DST): Establishment of STI Hub for Mising and Bodo Women of Assam for Economic Empowerment through Technology Interventions in the Pig Value Chain

R. Thomas, J. Doley, V.K. Gupta

The Science, Technology and Innovation (STI) Hub initiative of the Department of Science and Technology (DST), Government of India, under the SEED–Tribal Sub Plan (TSP), was conceptualized to address persistent structural inequities faced by Scheduled Tribe (ST) communities through the

targeted application of science and technology. Women constitute the backbone of many tribal livelihood systems, particularly in livestock rearing, yet their contribution remains undervalued and inadequately rewarded within prevailing market structures. The STI Hub model offered an appropriate institutional mechanism to integrate research, technology refinement, extension, and enterprise development within a single operational framework. The project was therefore conceived not as a standalone development activity, but as a comprehensive, system-oriented intervention aimed at strengthening the pig value chain while centering tribal women as primary stakeholders and beneficiaries.

One of the primary objectives of the project was the establishment and operationalization of a functional STI Hub system comprising a Central Hub at ICAR–National Research Centre on Pig and an Extension Hub within the project area. This objective addressed the institutional gap identified during baseline assessment, wherein beneficiaries lacked sustained access to specialized scientific support for pig value chain development. The establishment of the STI Hub system aimed to create a permanent interface between research institutions and tribal communities. By institutionalizing this interface, the project sought to ensure continuity of knowledge exchange, technology refinement, and advisory services beyond the project period. The hub system also served as the organizational foundation for implementing all subsequent objectives.

The implementation strategy of the STI Hub project was guided by the principle that sustainable livelihood transformation requires phased, adaptive, and institutionally anchored action. Rather than adopting a rigid, linear implementation plan, the project followed a flexible strategy that allowed activities to evolve in response to field realities while remaining aligned with sanctioned objectives. This approach was particularly relevant in the flood-prone and disease-sensitive context of Dhemaji and Lakhimpur districts, where external shocks and logistical constraints frequently affect project timelines.

All research and technology development activities under the project were institutionally anchored at the ICAR–National Research Centre on Pig, which served as the STI Central Hub. The institute's specialized mandate in pig research, coupled with its laboratory facilities and trained scientific manpower, enabled development and refinement of technologies spanning the pig value chain. The research approach adopted by ICAR–NRCP emphasized translational science. Laboratory-based experimentation was closely linked with pilot-scale validation and field-level adaptation. Technologies were not finalized until their feasibility, safety, and usability had been assessed under conditions representative of beneficiary environments. This approach ensured that research outputs were relevant and deployable rather than remaining theoretical constructs.

Strengthening production systems through scientific decoding of indigenous practices: One of the foundational objectives of the project was to augment the production performance and systemic efficiency of pig germplasm within the target clusters while retaining the ecological wisdom and cultural relevance of indigenous rearing practices. This objective was operationalized through an extensive baseline characterization exercise that served as a diagnostic entry point for all subsequent interventions. The baseline assessment systematically documented herd composition, feeding strategies, housing designs adapted to flood-prone landscapes, disease occurrence patterns, hygiene practices, and labor allocation within households. Importantly, this

process treated indigenous knowledge not as static tradition but as an adaptive system shaped by generations of experiential learning under conditions of environmental uncertainty.

Enabling women's access to processing infrastructure through micro pig abattoir technology: A structurally transformative achievement of the STI Hub lies in the transfer and operationalization of Micro Pig Abattoir technology within a women-led community enterprise framework. Historically, women pig farmers in Assam have been confined to the production end of the value chain, while slaughter, processing, and marketing have remained firmly under the control of male-dominated trader networks. This exclusion has not only constrained income realization but has also reinforced occupational invisibility and social stigma associated with pig farming. The introduction of a community-level micro abattoir directly challenged this structural imbalance by enabling women producers to access processing infrastructure that had previously been beyond their reach.

Enhancing food safety and consumer trust through digital meat inspection systems: Another critical objective of the project addressed the long-standing deficit of consumer trust and food safety assurance in the pork value chain. Despite high levels of pork consumption in Assam, consumers have traditionally had little or no information regarding animal health status, slaughter conditions, or hygiene standards. To address this gap, the STI Hub introduced and operationalized a first-of-its-kind remotely monitored ante-mortem and post-mortem inspection system, later conceptualized as Meat Spec 1.0. This system leveraged digital connectivity and IoT-enabled tools to enable real-time oversight of slaughter and inspection processes by trained personnel at the central hub.

Digital transformation as a strategic enabler in informal pig value chains

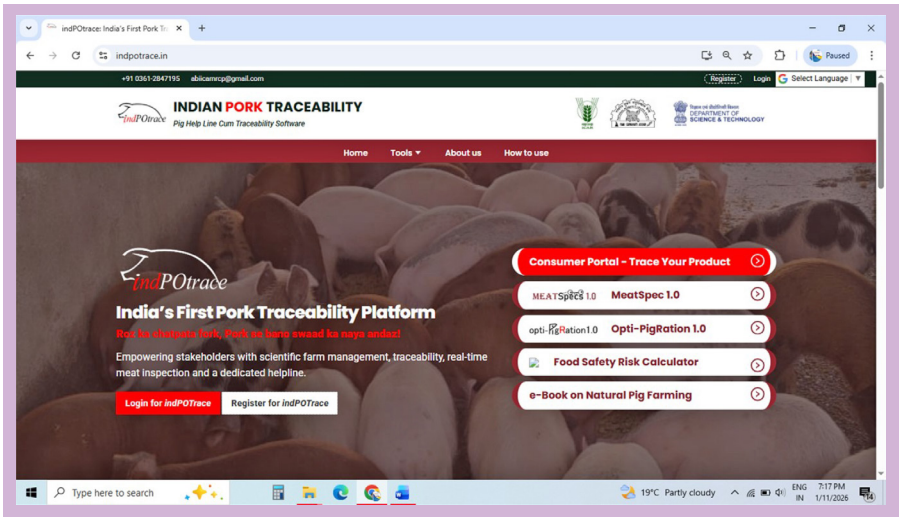
India's first national pork traceability platform: At the heart of the project's digital transformation is https://indpotrace.in, a web-based platform developed exclusively under the STI Hub project as India's first national digital traceability system specifically for the pig and pork value chain. Widely documented in the project's institutional reporting, the platform was purpose-built to capture, store, and visualize data relevant to pig production, management, processing, and distribution - all of which was previously unrecorded or paper-based in informal systems. This digital platform offers integrated provisions for both farm management and marketing of pig-based produce.

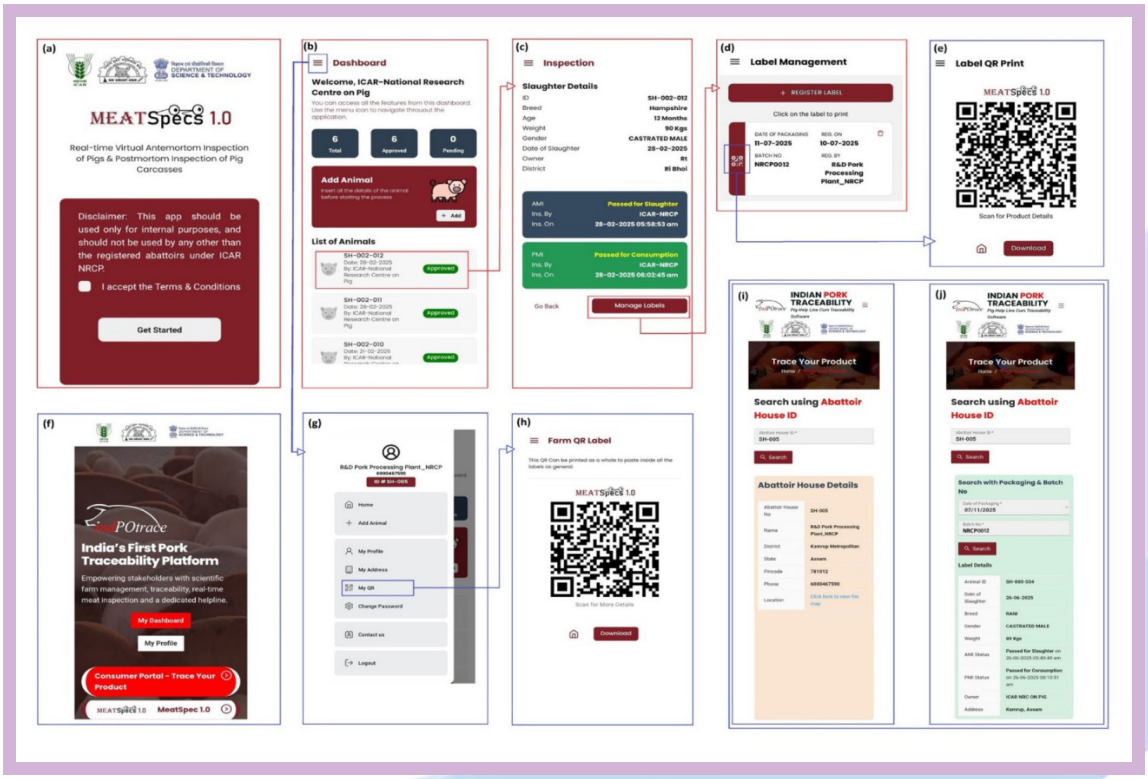
QR-enabled consumer transparency- Trust at the end-point: A breakthrough feature of indpotrace.in is its QR-based consumer transparency mechanism, which allows final consumers to scan a code on pork products and access verified information about their origin, processing history, and inspection status. QR-linked traceability has become a global standard for assuring food safety and building consumer trust. In the pork sector internationally, QR codes have been used to share comprehensive production journey information including feed history, animal welfare data, and certification status.

MeatSpec 1.0: Complementing traceability, the project developed Meat Spec 1.0, India's first real-time virtual meat inspection system for pigs, covering both ante-mortem inspection (AMI) and post-mortem inspection (PMI). This tool is significant for multiple reasons. It brings scientific rigor into the inspection process without necessitating full-scale abattoir infrastructure. In doing so, it expands coverage of meat safety checks and ensures that hygienic standards are met regardless of geographic location or resource level.

FoSaRiCa: The indPOtrace platform has been thoughtfully designed to go beyond traceability by integrating additional innovative features for diverse stakeholders. One such feature is the "Food Safety Risk Calculator," a practical tool tailored for food safety officers, researchers, and quality control professionals to estimate and manage risks associated with different categories of foods based on scientific parameters.

Opti-PigRation 1.0: Another valuable module embedded in the platform is "Opti-PigRation 1.0," a farmer-friendly tool that allows pig farmers to estimate the energy and protein levels of the feed they provide. By entering simple details like ingredient types and quantities, farmers can quickly determine nutritional adequacy without fully relying on costly and time-consuming laboratory analysis.





Extension Education

Institute Project: Development of technology transfer models through Participatory Rural Appraisal in the piggery sector

Priyajoy Kar, P.J. Das, K. Dey, N.M. Attupuram, S. Jayachitra Devi

This project seeks to examine the major determinants that encourage farmers to adopt new livestock technologies, along with the principal constraints that slow their dissemination. It will focus on bridging the common gaps found in the livestock technology adoption pathway. In addition to evaluating economic outcomes, the study will also explore the wider social and developmental impacts of these technologies. Based on consultations with key stakeholders, the project has also identified the most relevant technologies across different states.

Social and Economic Assessment of the Technology domains:

The processing and marketing landscape reveals a clear divide between urban and rural districts, with urban areas exhibiting higher trade volumes and a growing market for value-added products. While fresh pork remains the primary preference across regions, processed items like sausages see slow adoption in rural areas, accounting for only 2-3% of the market due to limited availability. Challenges persist in the supply chain, as processing infrastructure and meat hygiene practices are largely inadequate, meeting standards only 7-8% of the time. Interestingly, consumer preference studies indicate a premium market for pork from indigenous breeds, which commands higher prices, particularly within rural communities.

Health and Biosecurity:

On-farm biosecurity is strikingly poor: <10% have fenced farms, <2% use footbaths, < 4% have quarantine facility. Critical gaps in quarantine, waste disposal, rodent control and veterinary reporting remain.

Table: Condenses the adoption of biosecurity best practices in urban and rural areas

Biosecurity Measure	Urban/Peri-urban (%)	Rural (%)
Fencing	9.40	3.40
Footbath	1.40	0.26
Restricted access	27.80	6.60
Quarantine sick animals	3.60	0.40
Use disinfectant	14.80	5.40
Rodent control	8.00	2.34
Safe disposal of dead pigs	22.40	8.00

The comparative assessment of pig production economics across the northeastern states of India reveals that feed cost remains the dominant expenditure in all states, typically accounting for 60–70% or more of the total production cost. This trend confirms the critical role of feed availability, price volatility, and local resource utilization in shaping profitability across the region. States such as Assam, Meghalaya, and Mizoram reflect this pattern clearly, where feed constitutes the major cost driver, followed by labour and housing. The high dependence on purchased feed underscores the need for region-specific feed innovations, such as incorporation of local feed resources, community feed mills, and improved feeding regimes to reduce cost burdens. Profitability indicators show considerable variation across states, highlighting differences in market access, production scale, input availability, and institutional support systems. Assam demonstrates a strong Benefit–Cost Ratio (1.8–2.0), suggesting efficient production systems and favourable market linkages. Meghalaya, with a net return of approximately ₹23,679 per sow in the 10+1 model, also indicates overall profitability, particularly for smallholder setups integrating local resources.

On the other hand, Arunachal Pradesh shows a relatively low BCR (0.80–1.0), reflecting structural constraints such as higher input prices, limited economies of scale, and weaker market integration. In contrast, Nagaland's marketing efficiency of 2.13 highlights the strength of its market channels despite cost pressures from transportation and animal procurement. Mizoram and Tripura exhibit positive financial feasibility with internal rates of return greater than 10% and 15%, respectively, particularly for small and medium-scale farms. These higher IRR values suggest that targeted investments, supportive state programs, and organized value chains contribute to profitability.

Table: Cost-Benefit Comparison: Improved Piggery Units in N-E region

State	Key Cost Components	Profitability Indicators
Assam	Feed major cost (about 60-70%), procurement, labour, housing	Benefit-Cost Ratio (BCR) ~1.8 to 2.0
Meghalaya	Feed >70% of cost; veterinary care, housing, labour	Net return per sow ~Rs23,679 (10+1 model); profitable overall
Arunachal Pradesh	Feed, labour	Benefit-Cost Ratio (BCR) ~0.80-1
Nagaland	Feed, Transportation, animal purchase, labour	Marketing efficiency reported as 2.13
Mizoram	Feed cost, animal procurement, labour	Financially viable for small and medium scale farms; IRR >10%
Tripura	Feed, animal procurement; labour	Financially viable for medium scale farms; IRR >15%

Farmers who trailed artificial insemination saw an 83% farrowing rate and increased income (Rs.9.94 lakh from one village cycle). Biosecurity enhancements (where adopted) corresponded to lower on-farm mortality and disease transmission. Community-based veterinary training, feed

trials, and promotion of local best practices resulted in incremental, location-specific gains in productivity and disease resilience.

Table: Adoption status of Technological Innovations

Innovation	Benefits	Adoption Status
Artificial Insemination	Higher litter size, genetic improvement, reduced cost	10-12% diffusion in the region.
Adoption of Crossbreeds	Higher Body weight; High price	12-15%diffusion in the sampled area
Farm-level Biosecurity Kits	Lower disease risk, reduced mortality	Only 5-6% adoption in the field level.
Improved Commercial/ Local Feeds	Faster growth, better health	Commercial feed 35-45% Non-conventional feed-based solutions-10-15%
Waste Management and Processing	Sustainable sanitation, added value	Only Early adopters (5-6%)

The model results indicate that farmers' preferences are strongly influenced by attributes directly linked to economic gains and market security. Increased yield, output contracts, and price premiums exhibit highly significant positive coefficients, suggesting that farmers value technologies or interventions that enhance productivity and ensure assured markets with better returns. Conversely, the negative and significant coefficient of initial cost implies that higher upfront investment discourages adoption, reflecting farmers' sensitivity to financial risk. The positive and significant Alternative Specific Constant (ASC) further indicates an overall preference for improved options over the status quo.

Among respondent characteristics, gender, education, age, and income significantly influence choices, highlighting the role of socio-economic heterogeneity in decision-making. The model fit statistics, including a significant Wald chi-square and likelihood ratio test, confirm the robustness of the estimated model. Overall, the findings suggest that interventions reducing initial costs while enhancing yield and market assurance are likely to achieve higher adoption rates. A robust, participatory and contextually adaptive framework for technology transfer is essential to uplift piggery stakeholders in the North Eastern region. Emphasis on capacity building, institutional support and extension services, informed by data on determinants of adoption, will accelerate progress towards sustainable livelihoods and sector growth.

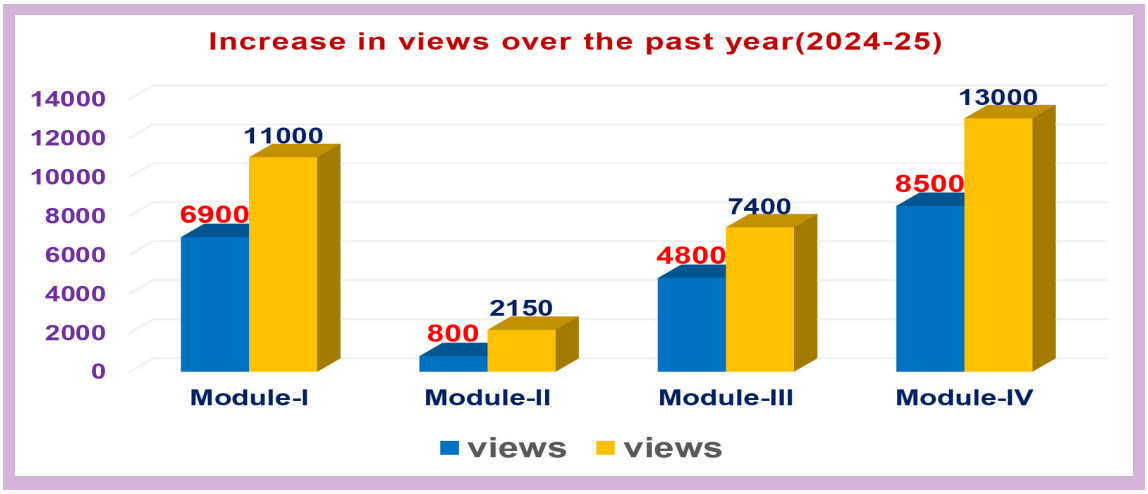
Service Project: Development of e-learning knowledge products on scientific pig production

Priyajoy Kar, Nitin. M. Attupuram, S. Jayachitra Devi

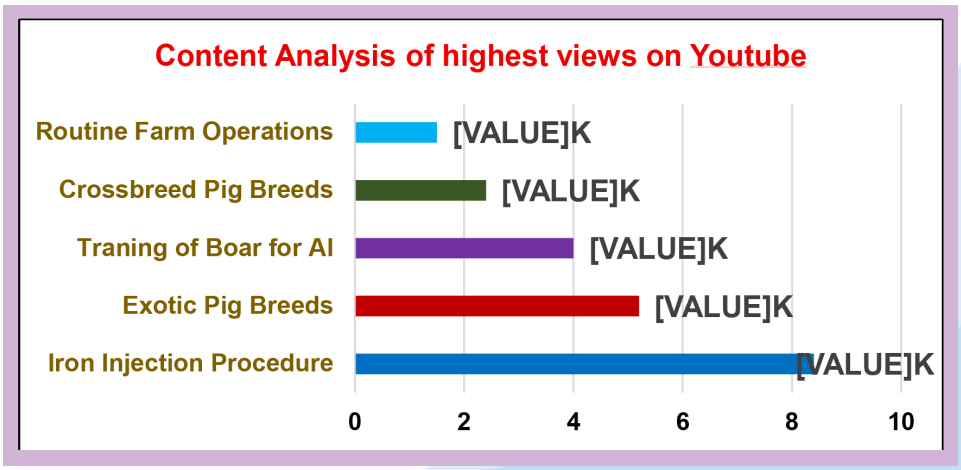
The project aims to address key issues in the piggery sector by utilizing digital tools to deliver knowledge, support sustainable production methods, and strengthen farmer capabilities. It

supports the modernization of the livestock industry while enhancing the long-term sustainability of pig farming. Through the creation of digital learning materials, the initiative enables fast and extensive information sharing, helping close existing knowledge gaps and offering farmers up-to-date guidance. These e-resources can be accessed remotely across multiple devices, ensuring that even farmers in distant or marginalized regions can benefit.

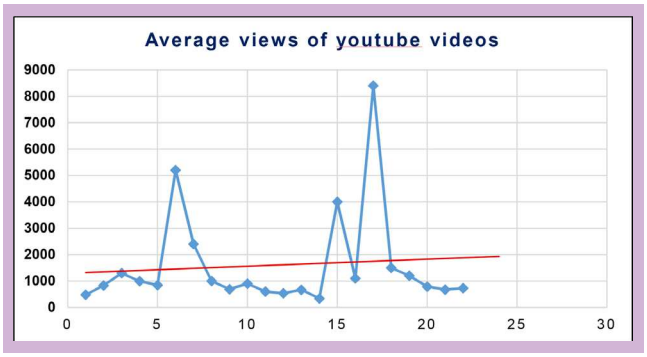
The project addresses critical needs in the piggery industry by leveraging digital technology



to disseminate knowledge, promote sustainable practices and empower farmers. It aligns with the goals of modernizing livestock industry and ensuring the long-term viability of the pig farming sector. Developing e-content allows for efficient and widespread dissemination of knowledge, bridging the knowledge gap and ensuring that farmers have access to up-to-date information. E-content can be accessed remotely through various digital devices, making it accessible to farmers in remote and underserved areas. The project team is focussing on making reels which are generally 60-90 seconds videos in the different aspects of pig production, processing and management. Video making/content creation is already ongoing and 22 videos are uploaded in the YouTube Channel of the institute. The team is focussing on developing contents on the aspects of biosecurity, feeding, routine farm operations, farrowing, breed identification, different trainings and outreach programs of the institute.



(Data source: Institutes YouTube channel)



(Data source: Institutes YouTube channel) (Average view per video- ≈1.6K)

A marked exponential rise in the number of views was observed this year compared to the previous year, indicating a substantial increase in audience engagement. Content analysis, conducted using R Studio software, identified distinct video categories that attracted the highest viewership, with the top five categories highlighted herein. The analysis further revealed that the average view count across the video modules was approximately 1,600 views per video. These findings underscore the growing interest of piggery stakeholders in accessing and utilizing scientific information effectively, while also emphasizing the need for wider dissemination strategies to maximize outreach.

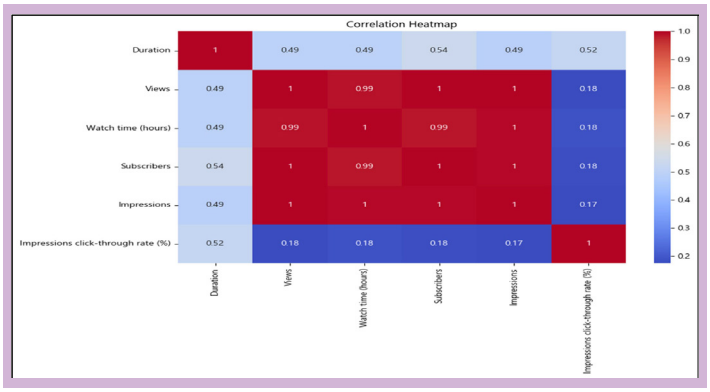


Fig.: Correlation heatmap illustrating the relationships between various YouTube content performance metrics

The correlation heat map of YouTube content performance metrics displays the relationships among various parameters such as Duration, Views, Watch Time (hours), Subscribers, Impressions, and Impressions Click-Through Rate (%). A strong positive correlation is observed between Views, Watch Time, Subscribers and Impressions (correlation coefficients close to 1), indicating that an increase in any one of these metrics is likely associated with an increase in the others. Duration also shows a moderate positive correlation with all these metrics. In contrast, Impressions Click-Through Rate (%) has a weak correlation with other variables, suggesting it is relatively independent and influenced by different factors.

Inter-Institutional Project: Development of pig seed village in Assam (With ICAR-ICAR-Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh

Priyajoy Kar, Chandrakanta Jana, Hitu Chowdhury

ICAR–National Research Centre on Pig (NRCP), Rani, in collaboration with the ICAR–Indian Veterinary Research Institute (IVRI), Izatnagar, and Krishi Vigyan Kendra (KVK), Goalpara,

Assam, organized a series of training programs under the Seed Village Program during December 2024, January 2025, and June 2025. These programs focused on enhancing the knowledge and technical competencies of progressive pig farmers in quality piglet production. The training modules covered six key thematic areas: (i) improved pig breeds, (ii) housing management, (iii) feeding practices, (iv) breeding plans, (v) major swine diseases, and (vi) biosecurity measures. Practical sessions were conducted on the preparation of disinfectant solutions, disinfection of pig housing, and clinical identification of healthy versus diseased animals. A total of 113 farmers and farm women from the host and neighbouring villages participated in the programs held at KVK, Goalpara. Interactive discussions addressed field-relevant issues such as sample collection, laboratory diagnosis of diseases, farm-level biosecurity measures for African swine fever (ASF), piglet mortality and reproductive disorders including abortion.

The ICAR–National Research Centre on Pig (NRCP), Rani, in collaboration with the ICAR–Indian Veterinary Research Institute (IVRI), Izatnagar, and Krishi Vigyan Kendra (KVK), Goalpara, Assam, implemented field demonstrations under the Pig Seed Village program. The initiative included hands-on training sessions for farmers on the preparation and application of disinfectant solutions, sanitary management of pig housing and clinical recognition of health and diseases of pigs. Beneficiaries were sensitized to scientific piglet-rearing practices and fundamental farm-level veterinary interventions. As part of the programme, experts conducted individual farm visits to demonstrate best practices directly within the beneficiaries' production systems, thereby facilitating practical adoption of improved management techniques.

Over the past year, a total of four awareness camps and input distribution programmes were conducted under the Pig Seed Village initiative. The first cohort of beneficiaries were selected following training on various scientific aspects of pig production. Subsequently, they were provided with the initial batch of piglets along with essential inputs. The distributed inputs included disinfectants, buckets, iodine and potassium permanganate solutions, aprons, and mineral mixtures, aimed at promoting improved piglet management. The piglets are being reared in accordance with recommended scientific management practices, with the project team conducting regular monitoring, growth assessments and systematic data recording.

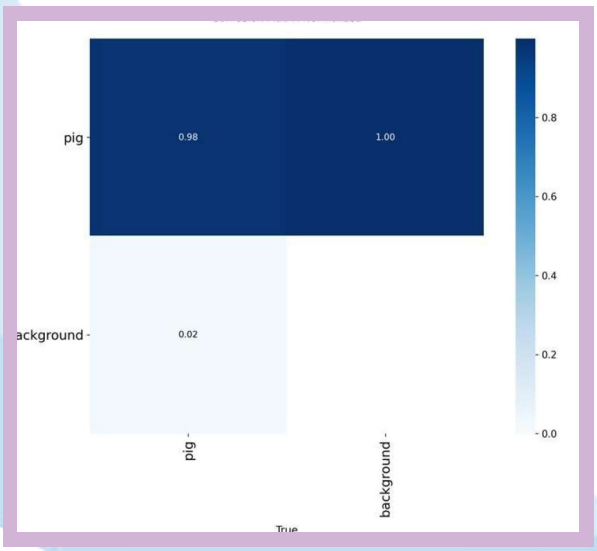
Fig: Glimpses of Activities undertaken under Seed Village Project:

Computer Application & IT

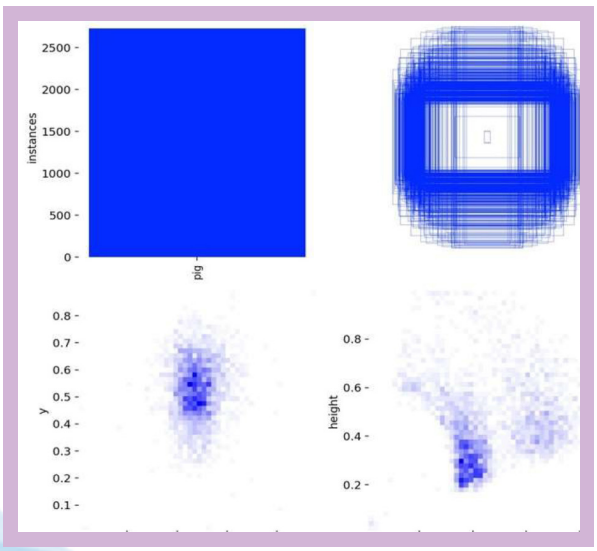
Institute Funded: Design and development of Image based growth rate estimation algorithm for different categories of pigs

Salam Jayachitra Devi, Kh. M. Singh, R. Islam, Sunil Kumar and J. Doley

Development of Segmentation Models for Pig Top-View Body Area Segmentation: Accurate estimation of pig growth rate requires precise isolation of the animal body from complex farm backgrounds. A comprehensive deep learning–based segmentation pipeline was developed to support non-invasive pig growth and weight estimation using image data. The work includes systematic dataset preparation and annotation. Pig images collected under controlled and farm conditions were manually annotated using YOLO-format polygon masks, ensuring accurate pixel-level representation of pig body boundaries. The annotated dataset was organized into training, validation and testing subsets and underwent preprocessing steps such as image resizing, normalization and data augmentation to improve model generalization across variations in posture, lighting and environmental conditions. Subsequently, multiple state-of-the-art segmentation architectures were implemented and evaluated, including YOLOv8n-seg, YOLOv8m-seg, YOLOv8l-seg, YOLOv8x-seg and the latest YOLO11-seg model. These architectures were selected to analyse performance across different model scales, balancing segmentation accuracy and computational efficiency. Each model was trained using optimized hyperparameters and periodic checkpoints were generated and saved during training to capture the best-performing segmentation weights. Each model was trained using the AdamW optimizer for 100 epochs with periodic checkpoints saved to capture the best-performing segmentation weights. The trained segmentation models demonstrated reliable and consistent delineation of pig body regions, producing high-quality segmentation masks. The best checkpoints obtained from each model are being preserved and will be utilized in subsequent stages of the project for automated feature extraction. From the segmented pig body regions, key morphological features such as body area, body length, body width, perimeter are extracted. These quantitative features form the basis for downstream growth rate analysis and regression-based pig weight estimation models.



(a)



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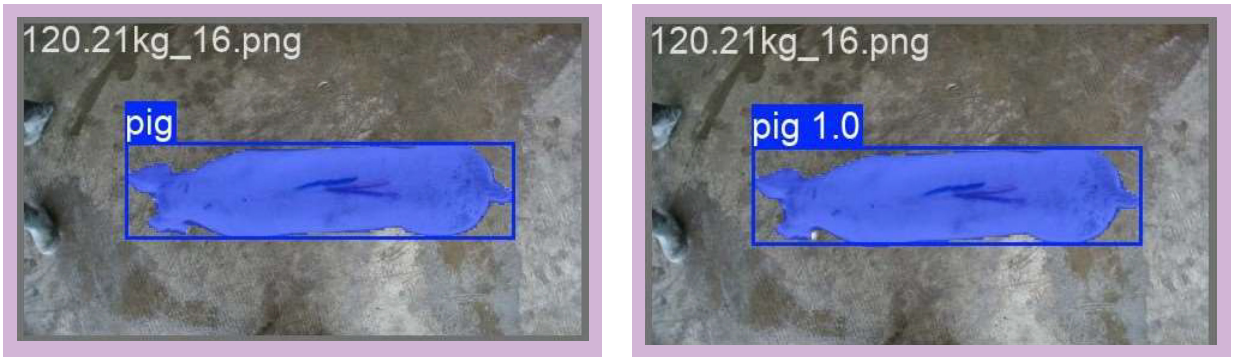


(c) (d)

Fig.: (a) Normalized confusion matrix for pig vs. background classification (b) Distribution of pig annotations: instance count, bounding box overlap, center locations (x–y), and width–height statistics across the dataset (c) image with pig segmentation mask and bounding box overlay used for model training and evaluation (d) Top-view pig body area segmentation result with detected pig region highlighted.

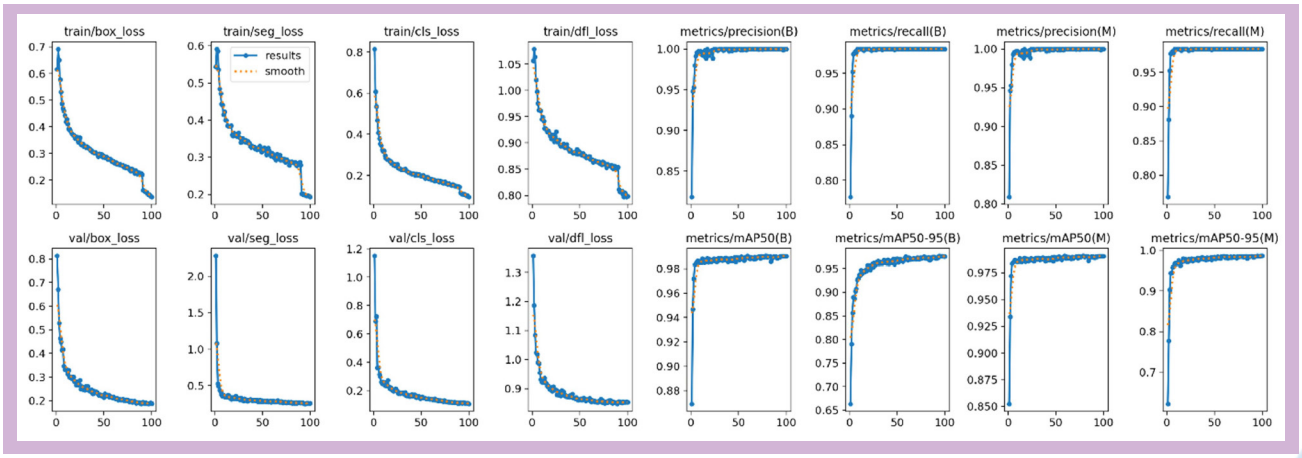


Fig.: (e) Training and validation curves showing convergence of loss functions and performance metrics (precision, recall and mAP) for pig body detection and segmentation model.

OUTREACH PROGRAMMES

Tribal Sub Plan Program

Incharge: Dr. Pranab Jyoti Das, Principal Scientist

The Tribal Sub-Plan (TSP) implemented by the ICAR-National Research Centre on Pig stands as a definitive cornerstone for socio-economic transformation across India's North Eastern Region and other vital tribal belts. Central to this mission is the "Sustainable Pig Husbandry for Livelihood Security" programme, which has emerged as the most impactful extension model conducted by the institute. Far more than a simple distribution drive, this initiative represents a comprehensive, holistic intervention specifically designed to transition tribal pig farmers from traditional, low-productivity scavenging systems toward scientific, semi-intensive pig rearing practices. The success of this programme is rooted in its foundational stage of participatory rural appraisal, where scientists engage directly with tribal communities to identify localized constraints such as high pig mortality, low growth rate, poor germplasm quality, and the high cost of commercial feed. By involving the community in the initial planning, the programme ensures cultural alignment and high adoption rates. This is followed by intensive scientific capacity building, where education acts as the primary catalyst for change through three-to-five-day hands-on training modules. These sessions prioritize practical skills over theory, teaching farmers to construct modern, low-cost sty using local materials like bamboo, and providing training for health management, including deworming and the recognition of other prevalent viral and bacterial diseases of pig . Furthermore, farmers are taught innovative feeding strategies, such as formulating balanced rations using kitchen waste supplemented with local resources. To lower entry barriers, the programme provides a "Starter Kit" featuring improved germplasm, such as the Rani crossbred or other high grade exotic piglets, alongside essential medicine kits and a transitional supply of concentrate feed. Perhaps the most visionary aspect of this extension strategy is the "Satellite Pig Nursery" model, which empowers lead farmers to maintain breeding boars and sows. This decentralizes the availability of quality piglets and fosters a self-sustaining ecosystem within tribal clusters. The socio-economic impact of these efforts is profound; participating households frequently report a 60% to 80% increase in annual income, alongside improved nutritional security and significant women's empowerment. Ultimately, the ICAR-NRC on Pig's TSP model demonstrates how blending scientific intervention with traditional wisdom can move communities beyond a reliance on subsidies toward true, resilient self-reliance, turning piggery into a powerful engine for rural prosperity. In the year 2025 a total of 22 such programs were conducted in the tribal-dominated area of Assam Arunachal Pradesh, Meghalaya, Nagaland and Tripura in which a total of 2576 numbers of tribal Pig farmers directly benefited through these programmes. Among these farmers, Pig feed, mineral mixture and different small inputs like Semen doses, Medicine, LED lights, Umbrella, Rain coat, Torch, Steel buckets, Gumboots, Pig for breeding, mixer and different scientific leaflets on piggery management in local languages were distributed. Among the 22 capacity-building programs, two nos. of demonstration programs, five nos. of three days residential training programs, one four days training program, ten

awareness camps and field days program, three Research-Extension-Farmers interface meetings, four Pig Germplasm distribution programs and two health camp. The maximum numbers of the programs were conducted at farmers' fields and scientists and staff of the institute directly interacted with farmers to propagate scientific knowledge among the pig farmers for sustainable scientific piggery development in the region.

Tribal Sub Plan Program 2025

Sl. No	Date	Program Name	Place	Co-ordinators	No. of beneficiaries
1	08.04.2025	Research-Extension-Farmers Interface Meeting and Input Distribution Programme	Jalyiah Village, Ladrymbai Bypass, Khliehriat Block, East Jaintia Hills, Meghalaya	Dr. J. Doley DR.Pranab J. Das Dr. V.K.Gupta	150
2	16.06.2025	Research-Extension-Farmers Interface Meeting and Input Distribution Programme	Hajonbari, Kamrup(R), Assam	Dr. N.M. Attupuram DR. Pranab J. Das Dr. V.K.Gupta	146
3	25-26.06.2025	Artificial Insemination and other Applied Farming Practices for Propagation of Rani pig in Goalpara District	KVK Gaolpara, Dhudhnoi, Goalpara, Assam	Dr. Rafiqul Islam Dr. Satish Kumar	45
4	26.06.2025	Pig Germplasm Distribution and Awareness Camp on Scientific Piggery	Madang Village, Goalpara, Assam	Dr. Rafiqul Islam Dr. Stish Kumar Dr. Santosh K.Baishya Dr. Hitu Choudhury Er.Benjamin Kaman	40
5	28.07.2025	Free Health Camp for the Tribal Pig Farmers	ICAR-NRC on Pig, Rani, Guwahati, Assam	Dr. Seema R. Pegu Dr. S.J. Devi Dr. Meera K	31
6	29.07.2025	Health cum Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme	Gosaihat, Kamrup(R), Assam	Dr. Seema R. Pegu Dr. S. J. Devi Dr. N. M. Attupuram Dr. Meera K	114

Sl. No	Date	Program Name	Place	Co-ordinators	No. of beneficiaries
7	30.07.2025	Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme0	Kanubari, KVK, Longdeng, Tirap, Arunachal Pradesh	Dr. Juwar Doley Dr. Priyojay Kar Dr. Lokesha E.	300
8	12.08.2025	Demonstration of the technology on Artificial Insemination to the Tribal Farmers and Feed distribution	Maduki Kamrup(R), Assam	Dr. Sunil Kumar, Dr.B.C Das	37
9	12.08.2025	Awareness Camp on scientific piggery cum Input Distribution Program	Dirang, West Kameng, Arunachal Pradesh	Dr. V.K. Gupta Dr. Pranab J. Das	100
10	09.09.2025	Field Day cum Input Distribution Program	Rajkani, Unakati, Tripura	Dr.Rajib Deb Dr.Kayan De Dr.Priyojiay Kar	250
11	15-17.09.2024	Scientific Production and Health Management of Pigs for Profitable Farming	KVK-East Khasi Hill, Khasi Hill, East Khasi Hill, Meghalaya	Dr. Juwar Doley Dr. Vishak Rai Dr. Rajib Kumar Das	63
12	17.09.2025	Scientist–Farmers Interface and Input Distribution Programme	KVK-East Khasi Hill, East Khasi Hill, Meghalaya	Dr. Juwar Dole, Dr. Vishak Rai, Dr. Rajib Kumar Das	64
13	08-11.10.2025	Three Days Residential Training Programme on “Improving production in pig farms by application of AI in Pigs	ICAR-NRC on Pig Rani, Guwahati, Assam	Dr. Sunil Kumar, Dr. Rafiqul Islam, Dr. S. Rajkhowa	13
14	09.10.2025	Field Day cum Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme	Rajapanichanda Kamrup(R), Assam	Dr. Sunil Kumar, Dr. Rafiqul Islam, Dr. S. Rajkhowa, Dr. Lokesha E.	400

Sl. No	Date	Program Name	Place	Co-ordinators	No. of beneficiaries
15	04.11.2025	Technology Demonstration on Silage Making and Storage for Feeding of Pigs to Tribal Farmers	Jupangbari, Rani, Kamrup(R), Assam	Dr. Lokesha E Dr. Rajib Deb Dr. Juwar Doley	35
16	06-07.11.2025	Breeding and Health Management techniques for profitable pig farming	KVK, Dhudhnoi, Goalpara, Assam	Dr. N.M. Attupuram, Dr. Satish Kumar, Dr. Souvik Paul	38
17	10.11.2025	Field awareness Camp on Scientific Piggery and Pig Feed Distribution Programme	Kalyanpur Goalpara, Assam	Dr. Rafiqul Iskam Dr. Sontosh Baishya Dr. Satish Kumar, Dr. Hitu Choudhury Dr. Rajib K. Das, Er. Benjamin Kaman	303
18	10.11.2025	Health cum Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme	Kolongpur, Sonapur, Kamrup, Assam	Dr. Seema R. Pegu & KVK Guwahati	157
19	14.11.2025	Pig Germplasm Distribution and Awareness Camp on Scientific Piggery	ICAR-NRC on Pig Rani, Guwahati, Assam	Dr. Rafiqul Islam Dr. Pranab J. Das Dr. Sunil Kumar Dr. Anil Das Dr. Rajib K. Das Dr. Gagan Bhuyan	40
20	01-04.12.2025	Profitable pig farming through artificial insemination and other management techniques" for the tribal farmers	ICAR-NRC on Pig Rani, Guwahati, Assam	Dr. Rafiqul Islam Dr. S. J. Devi Dr. Lokesha E	25
21	15.12.2025	Feed distribution to multiplier unit, Umsur, Palashbari, Kamrup	ICAR-NRC on Pig Rani, Guwahati, Assam	Dr. S.R. Pegu Dr. Juwar Dole Dr. Pranab J. Das	5

16th June 2025, Research-Extension-Farmers Interface Meeting and Input Distribution Programme, Hajonbari, Kamrup, Assam.

26th June 2025, Pig Germplasm Distribution and Awareness Camp on Scientific Piggery, Madang Village Goalpara, Assam

18th September 2025, Scientist-Farmer Interface and Input Distribution Programme held at Upper Shillong, Meghalaya

9th October 2025, Field Day cum Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme held at Rajapanichanda, Kamrup(R), Assam

8-10th October 2025, Three Days Residential Training Programme on "Improving production in pig farms by application of artificial insemination in pigs held at ICAR-NRC on Pig Rani, Guwahati

10th November 2025, Health-cum-Awareness Camp on Scientific Piggery and Pig Feed Distribution Programme held at Kolongpur, Sonapur, Kamrup, Assam

22nd December 2025, Technology Demonstration of Artificial Insemination in pigs to the tribal farmers held at Hathibanda, Kamrup, Assam

29th December 2025, Pig Germplasm Distribution and Awareness Camp on Scientific Piggery held at Tarapara village, Dhudhnoi, Goalpara, Assam

Scheduled Caste Sub Plan

Incharge: Dr. Kalyan De, Senior Scientist

The ICAR–National Research Centre on Pig, Rani, Assam, actively implemented the Scheduled Caste Sub-Plan (SCSP) during the year 2025 with the primary objective of enhancing livelihood security, reducing poverty, and generating sustainable income opportunities among Scheduled Caste (SC) pig farmers. The programme focused on capacity building, input support, technology dissemination, and strengthening scientific pig farming practices among beneficiaries.

To achieve these objectives, a series of extension and development activities were carried out throughout the year, including farmers' field days, awareness camps, research-extension-farmer interface meetings, training programmes, technology demonstrations, and input distribution initiatives. These interventions were designed to address key challenges faced by SC farmers, such as lack of technical knowledge, poor biosecurity practices, limited access to quality inputs, and disease management issues. A total of 11 major programmes were conducted across seven different districts, namely Kamrup, Chirang, Tamulpur, Darrang, Goalpara, Hailakandi, and Udalguri, along with several activities organized at the institute campus. Through these initiatives, approximately 1,441 SC farmers were directly benefited. A Significant emphasis was given on providing critical inputs to strengthen pig farming activities under SCSP. During the year, approximately 178 tonnes of pig feed were distributed to support nutritional requirements of the pigs in farmers' fields. Around 2,060 kg of mineral mixture was provided to improve animal health and productivity. Approximately 160 units of health kits were distributed to promote disease prevention and hygiene, which include anthelminthic oral suspension, antidiarrheal powder, herbal liver tonic, disinfectant powder, antiseptic solution and thermometer. Furthermore, Essential farm utilities such as steel buckets 300 units, emergency lights 200 units, umbrellas 350 units and rain coats 160 units were supplied to enhance farm management and biosecurity practices. To improve the genetic potential and productivity of pig farms, multiple piglet distribution programs were organized. A total of 93 Rani piglets were distributed among 47 SC farmer families through different programs conducted at the institute. Notably, specialized demonstrations were conducted on artificial insemination in pigs, preparation of low-cost feed and silage among 55 SC farmers. These programs enhanced farmers' technical knowledge and encouraged the adoption of improved practices. Dedicated programs on pig entrepreneurship development were organized at Darrang and Udalguri districts to motivate farmers towards commercial pig farming. Additionally, ICT-based extension programs and participatory research-extension activities facilitated effective technology transfer and farmer engagement. The SCSP interventions during 2025 significantly contributed to strengthen livelihood opportunities among SC pig farmers, enhance scientific knowledge and skill development, improve farm productivity and biosecurity practices, promote the adoption of improved germplasm and feeding practices.

Overall, the programme successfully supported nearly 1450 SC farmers, leading to improved income generation, better farm management, and upliftment of socio-economic conditions of the targeted community.

Program details:

Sl. No.	Date of Program	Program Name	No of Beneficiaries	Venue
1	31/07/2025	Farmers Field Day and Input Distribution Program	210	Sidli Block, Chirang District
2	10/10/2025	Awareness Camp cum input distribution program	140	Singimari, Shipajhar, Darrang
3	7/11/2025	ICT-Based Extension cum Input Distribution Program	265	Nagrijuli Block,Tamulpur District
4	10/12/2025	Participatory Farmer Research Extension cum Input Distribution Program	250	Kothakuth, Goalpara District
5	8/8/2025	Piglet Distribution Program	15	ICAR- NRC on Pig, Rani
6	3/11/2025	Pig Germplasm Distribution Program	16	ICAR- NRC on Pig, Rani
7	30/12/2025	Pig Germplasm Distribution Program	15	ICAR-NRc on Pig, Rani
8	4/8/2025	Technical Demonstration on Artificial Insemination in Pig	18	ICAR- NRC on Pig, Rani
9	3/11/2025	Technology Demonstration to the Scheduled Caste farmers on Preparation of Low-Cost Feed and Silage for Feeding of Pigs	17	ICAR- NRC on Pig, Rani
10	10/10/2025	Promotion of Pig Entrepreneurship Program	20	Singimari, Shipajhar, Darrang
11	09–12 December 2025	Training Programme “Accelerating production in pig farms with the application of Artificial Insemination”	18	ICAR- NRC on Pig, Rani

VIKSIT KRISHI SANKALP ABHIYAN

The Viksit Krishi Sankalp Abhiyan (VKSA) is a nationwide initiative launched by the Ministry of Agriculture and Farmers Welfare alongside the Indian Council of Agricultural Research (ICAR) to modernize Indian agriculture and boost farmers' incomes through a proactive "Lab-to-Land" approach. ICAR-NRC on Pig has taken active steps during 29 May, 2025 to 11 June, 2025 in collaboration with ICAR-ATARI Zone VI to bridge the gap between scientific research and field application. Institute activities were focused on promoting climate-resilient pig farming, balanced fertilizer use, and organic practices, while directly educating farmers across villages (Kamrup, Goalpara, Barpeta) in Assam. Ultimately, this comprehensive feedback-driven campaign served as a critical stepping stone toward achieving a self-reliant and highly advanced agricultural and animal husbandry sectors by 2047.

ALL INDIA COORDINATED RESEARCH PROJECT ON PIG

The AICRP on pig was launched in IVth Five Year Plan (1970-1971) with the objective to study the performance of pigs in different agro-climatic condition of the country. Subsequently, the project was mandated to develop region-specific package of practices including quality germplasm. Few centres are mandated for conservation of indigenous germplasm. Presently the programme is continuing in fifteen different centres across the country. During the year 2024-25, the AICRP on Pig project was executed at 17 centres in different agroclimatic zones of India.

ICAR-National Research Centre on Pig is regularly monitoring the progress of AICRP on Pig project through technical and financial monitoring in consultation with the council and conduction of review meet. The Annual Review Meeting of ICAR-AICRP on Pig for the year 2024-25 was held at Agartala, Tripura, during 16-17 September 2025, under the Chairmanship of Dr. Raghavendra Bhatta, Deputy Director General, Animal Science, ICAR.

Assam Agricultural University, Khanapara, Guwahati

The ICAR-AICRP on pig, AAU, Khanapara centre is maintaining HD-K75 crossbred germplasm having 75% exotic inheratance of Hampshire. The herd strength of HD-K75 was 193 and total 328 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 8.20 ± 0.85 and 7.85 ± 0.85, respectively. The litter weight at birth and weaning were found as 8.62 ± 0.80, 89.72 ± 0.50 Kg respectively. The average individual body weight at birth, at weaning, and slaughter (kg) were found to be 1.05 ± 0.55, 11.43 ± 0.74, and 79.97 ± 0.78 Kg, respectively.

Kerala Veterinary and Animal Science University, Mannuthy, Kerala

The AICRP on Pig centre at KVASU is maintaining Mannuthy White crossbred pig variety. During the year 24-25, a total of 710 piglets were produced and 497 piglets were distributed to 76 beneficiaries. A revenue of 24.12 lakhs was generated by the centre during the period. The Feed conversion efficiency of 3.65 was achieved during the period. The herd strength was 178 and total of 710 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 11.30±0.20 and 10.14±0.15, respectively while litter weight at birth and weaning were 11.10±0.20 and 81.69±0.50 Kg respectively. The average individual body weight at birth, weaning and slaughter was 1.07±0.25, 8.43±0.45 and 103.50 ± 2.70 respectively.

Sri Venkateshwara Veterinary University, Tirupati

The AICRP on Pig centre, at College of Veterinary Science, Tirupati is engaged in performance evaluation of SVVU-T17 crossbred pig variety. The herd strength was 185 and total 455 piglets were produced during 2024-25. About 242 pigs were sold to the farmers. The average litter size at birth and weaning were found as 8.72±0.38 and 7.44±0.13, respectively while litter weight at birth and weaning were 9.52±0.35 and 62.59±1.69 Kg respectively. The average individual body weight at birth, weaning and slaughter was 1.21±0.04, 8.69±0.02 and 79.00±4.00, respectively.

ICAR-Central Coastal Agricultural Research Institute, Goa

The CCARI centre of AICRP has developed crossbred pig variety 'Goya' with inheritance of 75% Large White Yorkshire and 25% Agonda Goan. The variety was released by Hon'ble DDG (AS), ICAR, in the Annual Review Meeting of AICRP on Pig on 19th September 2024 at ICAR-CCARI, Goa. The herd strength was 161 and total of 255 piglets were produced during 2024-25 while 156 pigs were sold to the farmers. The average litter size at birth and weaning were found as 8.07±0.46 and 7.46±0.53, respectively while litter weight at birth and weaning were 8.38±0.55 and 71.00± 2.36 Kg, respectively. The average individual body weight at birth, weaning, and at slaughter was 1.11±0.42, 7.00± 0.13 and 74.15±0.42 Kg, respectively. During the year 6 breeder farmers developed. A total of 255 piglets were produced, and about 40 piglets were died due to various reasons.

Indian Veterinary Research Institute, Izatnagar, Bareilly

The IVRI Centre of AICRP on Pig is maintaining Landly crossbred pig with 75 % exotic inheritance of Landrace. The herd strength of Landly was 183 and total of 334 piglets were produced during 2024-25. A total of 205 pigs/piglets were sold to farmers of different part of the country for strengthening /establishing their herd. The average litter size at birth and weaning were found as 8.81±0.41and 7.8±0.52, respectively while litter weight at birth and weaning were 9.25 ±0.46 and 49.84±3.91 Kg, respectively. The average individual body weight at birth, weaning and slaughter was 1.05±0.02, 6.32 ± 0.20 and 82.60±1.10 kg respectively. Average daily gain of pre-weaning and post weaning piglets was 161.14 and 348.01 gm/d, respectively in 75% crossbreds.

Tamil Nadu Veterinary and Animal Science University, Kattupakkam

The AICRP centre at TANUVAS is maintaining TANUVAS KPM Gold crossbred pig variety. The herd strength of crossbred pigs was 322 and total 600 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 8.44 ± 0.186 and 8.11 ± 0.202, respectively while litter weight at birth and weaning were 10.83 ± 0.303 and 59.95 ± 1.65 Kg, respectively. The average individual body weight at birth, weaning and slaughter was 1.28 ±0.009, 7.77±0.013 and 83.28± 5.17 kg, respectively.

College of Veterinary Sciences & Animal Husbandry, CAU, Mizoram

Zovawk pigs are maintained at the farm to conserve as well as genetic improvement. The herd strength of Zovawk was 77 and total of 116 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 5.71± 0.42 and 5.50± 0.65, respectively while litter weight at birth and weaning were 3.19± 0.22 and 19.18± 2.45 Kg respectively. The average individual body weight at birth, weaning and slaughter was 0.56±0.02, 3.49±0.06 and 34.17±0.30 kg respectively.

SASARD, Nagaland University, Medziphema, Nagaland

The Centre is conserving and propagating Tenyi Vo pig breed through selective breeding. The herd strength was 212 and total of 188 piglets were produced during 2024-25. A total 119 piglets were sold/distributed. The average litter size at birth and weaning were found as 6.43±0.38 and 5.25±0.23, respectively while litter weight at birth and weaning were 3.21±0.29 and 17.31±0.47 Kg respectively. The average individual body weight at birth, weaning and slaughter was 0.49±0.06, 3.10±0.18 and be 24.50 kg respectively.

ICAR-Central Island Agricultural Research Institute, Port Blair

The herd strength was 110 and total of 257 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 7.33 ±0.18 and 6.83±0.19, respectively while litter weight at birth and weaning were 11.03 ± 0.48 and 43.23 ± 0.54 Kg, respectively. The average individual body weight at birth, weaning and slaughter was 1.62 ± 0.10, 6.36 ± 0.21and be 64.16 ±1.23 kg, respectively.

College of Agricultural, CAU, Imphal, Manipur

The AICRP on Pig, Manipur Centre, is maintaining Manipuri Black Pig for genetic improvement in body weight gain, litter traits, survivability at weaning, disease resistance, sexual maturity. The total herd strength at the end of financial year was 65 and total 49 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 6.12±1.10 and 6.0±1.14, respectively while litter weight at birth and weaning were 6.28±1.11 and 29.47±3.11 Kg respectively. The average individual body weight at birth, weaning and slaughter was 1.03±0.02, 6.16±0.09 and be 63.00±0.74 kg respectively.

ICAR Research Complex for NEH Region, Barapani

AICRP on Pig, ICAR-RCNEH has developed a crossbred pig variety named Lumsniang for hill ecosystem of the NER. The total herd strength of Lumsniang pig 143 and total 658 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 9.33±0.99 and 8.55±0.89, respectively while litter weight at birth and weaning were 8.90±0.54 and 82.36±0.82 Kg, respectively. The average individual body weight at birth, weaning and slaughter was 0.83±0.39, 9.48±0.64 and be 90.56±2.25 kg respectively

ICAR-IVRI, eastern Regional Station, Kolkata

ICAR-IVRI, Eastern Regional Station, Kolkata was entrusted to implement ICAR-AICRP on Pig, as an indigenous Ghoongroo pig germplasm conservation centre and to develop an elite flock of Ghoongroo germplasm through selective breeding, propagate and supply the superior germplasm to cliental which will indirectly increase the pork production. The total herd strength at the end of the year is 106, and total of 357 piglets produced during 2024-25. The average litter size at birth and weaning were found as 9.94±0.55and 9.01±0.62, respectively while litter weight at birth and weaning were 8.645 ± 0.235 and 55.883±2.545 Kg respectively. The average individual body weight at birth, weaning and slaughter was 0.869±0.119, 6.209±0.254 and be 57.80±1.85 kg respectively.

AICRP, DOOM Unit, ICAR-NRC on Pig

Doom pig is a unique indigenous germplasm of Assam, which is adaptable to local climatic conditions and thrives with very low to negligible nutritional input. Further, it can survive in the

migratory scavenging system, which makes it very popular among local communities of the state for rearing. The herd strength at the end of financial year was 40 and total of 61 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 5.58±0.07 and 4.64±0.16, respectively while litter weight at birth and weaning were 4.29±0.09 and 14.68±0.42 Kg respectively. The average individual body weight at birth, weaning and slaughter was 0.81±0.03, 3.22±0.13 and be 41.64±2.58 kg respectively.

Birsa Agricultural University, Ranchi, Jharkhand

BAU centre of AICRP on Pig has developed JHARSUK variety, this variety was observed to be revolution in pig farming in Jharkhand. Total herd strength 149. The herd strength at the end of financial year was 149 and total of 658 piglets were produced during 2024-25. A total of 653 piglets were sold/distributed to farmer's field. The average litter size at birth and weaning were found as 7.83±0.18 and 7.77±0.17, respectively while litter weight at birth and weaning were 8.44±0.19 and 46.67±1.20 Kg respectively. The average individual body weight at birth, weaning and slaughter was 1.09±0.12, 7.17±0.10 and 74.96±0.25 kg respectively.

ICAR RC for NEH Centre, Nagaland

The centre is maintaining Rani crossbred pig variety and has distributed a total of 8341 no. of piglets till date for promotion of breeding in Nagaland, Assam, Manipur and Arunachal Pradesh. Through use of artificial insemination, a total of 12686 piglets were produced in the farmers' field during 2024-25. Total herd strength at the end of financial year was 276. Total 769 piglets were produced and 711 piglets were sold/distributed.

Animal Resources Development Department, Tripura

The centre is maintaining Landrace and Large White Yorkshire. Total herd strength at the end of financial year was 274. A total 396 piglets were produced and 184 piglets were sold/distributed. The average litter size at birth and weaning were found as 6.95 ± 0.26 and 4.77 ± 0.19, respectively while litter weight at birth and weaning were 8.71 ± 0.30 and 27.79 ± 1.24 Kg respectively. The average individual body weight at birth, weaning and slaughter was 1.2 kg, 9.5 kg and 63.94±0.40 kg, respectively.

Animal Husbandry and Veterinary Sciences, Sikkim

ICAR-AICRP on pig project at Animal Husbandry and Veterinary services department, Government of Sikkim is mandated for Phenotypic characterization of local indigenous breed of Sikkim of which the center has submitted the application. The centre is maintaining HDK-75 and Punhri. Total herd strength at the end of reporting year was 281. Total 431 piglets were produced and 440 piglets were sold/distributed. The herd strength was 281 and total of 448 piglets were produced during 2024-25. The average litter size at birth and weaning were found as 7.61±0.57 and 7.55±0.49, respectively while litter weight at birth and weaning were 1.33±0.53 and 7.28±0.76 Kg, respectively. The average individual body weight at weaning and slaughter was 10.15±0.78 and 70.54±0.54 kg, respectively.

Nanaji Deshmukh Veterinary Science University, Jabalpur

The AICRP on Pigs centre at NDVSU, Jabalpur reported 134 crossbred pigs (50% Large white Yorkshire) as their herd strength. A total of 511 piglets were produced and 405 piglets were sold/distributed. The average litter size at birth and weaning was found to be 8.81±0.08 and 7.94±0.10, respectively. The litter weight at birth and weaning was 9.82±0.12 and 56.67±1.41 Kg, respectively. The average individual body weight at birth, weaning and slaughter was 1.09±0.12, 7.17±0.10 and 70.12±1.28 kg respectively.

ICAR-National Research Centre on Pig, Guwahati

The AICRP on Pig unit at ICAR-National Research Centre on Pig, Rani, Guwahati is one of the newest units under the AICRP framework, the Rani unit plays a strategic role in addressing region-specific challenges and opportunities in pig husbandry, particularly in the North Eastern Region (NER) of India, where pig farming is integral to rural livelihoods. The unit focuses on the genetic improvement of pigs through structured breeding programs involving indigenous and exotic breeds. Emphasis is laid on developing crossbred lines with high production potential and adaptability to local agroclimatic conditions. Alongside, the unit actively engages in developing and demonstrating best practices in nutrition, management, health care, climate resilience, and biosecurity. The unit also works towards the dissemination of superior germplasm, promotion of entrepreneurship and value addition through integrated pork production models. With a multidisciplinary approach, the AICRP on Pig – NRCP, Rani unit is committed to supporting the transformation of piggery into a viable, sustainable, and profitable enterprise for rural communities.

ICAR-KRISHI VIGYAN KENDRA (GOALPARA)

KVK Goalpara effectively implemented various mandated activities through On Farm Testing (OFT) to assess the location specificity of agricultural technologies under various farming systems, frontline demonstrations (FLDs) to establish production potential of technologies on the farmers' fields, capacity development of farmers and extension personnel to update their knowledge and skills on modern agricultural technologies. It works as a Knowledge and Resource Centre of agricultural technologies for supporting initiatives of public, private and voluntary sector in improving the agricultural economy of the district and it also provides farm advisories using ICT and other media means on varied subjects of interest to farmers.

In addition, KVK produces quality technological products (seed, planting material, bio-agents, livestock) and make it available to farmers, organize frontline extension activities, identify and document selected farm innovations and converge with ongoing schemes and programmes within the mandate of KVK. During the reported period from January to December, 2025 the following activities were carried out by the KVK.

Capacity development and training programme

For capacity building of farmers, rural youth and extension functionaries, a total of 52 training programmes on different thrust areas in the disciplines of Horticulture, Animal Science, Community Science, Fishery Science and Agricultural Engineering were conducted covering 1466 number of participants during the year. The training programmes conducted for farmers and farm women were 28 nos. covering 778 participants; training for rural youth were 18 nos. covering 522 participants; training for extension functionaries were 06 nos. covering 166 participants; long duration sponsored trainings were 4 nos. covering 104 participants.

Vocational trainings

- 10 days skill development training on "Extraction, Processing and Value addition of Non conventional natural fibres" sponsored by ICAR-National Institute of Natural Fibre Engineering and Technology, Kolkata.

- 2 nos. of 05 days skill development training on "Indigenous Fish Culture – From Scientific Practices to Sustainable Income" sponsored by ICAR-National Bureau of Fish Genetic Resources, Lucknow.



- 05 days training programme of Community Resource Persona (CRP) on Natural farming under National Mission on Natural Farming.



Technology Assessment through On farm testing (OFT)

The On farm Testing conducted by Krishi Vigyan Kendra Goalpara on different agricultural technologies are as follows:

OFT 1: Performance assessment of micronutrient formulation - Banana Shakti for higher yield

An OFT was conducted on assessment of micronutrient formulation - Banana Shakti for higher yield to solve the problem of deficiency in micronutrients (B, Mn & Zn) which leads to poor quality & yield of banana. The programme is conducted in 03 locations covering 0.5 ha area.

Details of Technology:

TO1: Banana Shakti: Fe :4.75%; Zn: 5.25%; B: 2.50%; Mn: 4.50%; Cu: 2.40%.

Mode of application: 10g Banana Shakti/plant at 3rd, 5th & 7th MAP.

TO2: Arka Banana Special : consist of Zn, Fe, B, Cu, Mn and Mo and three secondary nutrients viz., Ca, Mg and S.

Mode of application: 5g/litre per plant at 5th, 6th & 7th MAP.

TO3: (Local check) without micronutrient

Results:

Parameter	TO1	TO2	TO3
Bunch weight (kg)	13.60	12.80	11.65
Hands per bunch	7.6	7.0	6.8
Yield (q/ha)	408	384	349.5
B:C ratio	4.71	4.58	3.92

Organoleptic Test

Treatment	Colour & appearance	Texture	Taste & flavour	Overall acceptability
TO1	9	9	9	9
TO2	9	8	9	9
TO3	8	7	8	8

OFT 2: Assessment of Arecanut based Multi-storied Cropping System under Natural Farming

An OFT was conducted on assessment of Arecanut based Multi-storied Cropping System under Natural Farming to address the issue of low yield, high cost of cultivation and poor soil quality. The programme was conducted in 03 locations covering 1.0 ha area.

Details of Technology:

TO1: Natural Farming techniques in existing bari system of farmer

TO2: Farmer Practice (FYM)

Crop diversification:

Main Crop: Arecanut

Companion Crops: Assam Lemon & black pepper

Major Natural farming practices accomplished:

1. Multiple cropping

2. Nutrient management with Jivamrit & Ghanjivamrit

3. Plant protection with Neemastra, Agniastra & Brahmastra

4. Organic mulching.

Parameters of Assessment

P^H	5.49
OC	1.80%
Available N	629.33 kg/ha
Available P	31.74 kg/ha
Available K	163.52 kg/ha
Growth and Yield	Crops in gestation period

The programme is in progress.



OFT 3: Assessment of shoot pruning and GA3 application for higher yield during winter in Assam Lemon

An OFT was conducted on assessment of assessment of shoot pruning and GA3 application for higher yield during winter in Assam Lemon to address the issue of low yield, high cost of cultivation and poor soil quality. The programme is conducted in 03 locations covering 1.0 ha area.

Details of Technology:

TO1

- Plants > 5 years old
- Shoot pruning up to 15 cm with 50 ppm GA 3 spray during January and August
- 100:100:100g N: P: K/plant/year in two split doses in February-March and October-November.
- Pitcher drip irrigation

TO2 (Local check)

- Plants > 5 years old
- 100:100:100g N: P: K/plant/year in two split doses in Feb-March and Oct-Nov.

Parameters of assessment

1. Av. Number of flowers per plant
2. Av. Number of fruits per plant
3. Yield/plant/year
4. 4. B:C ratio

The programme is in progress.


OFT 4: Assessment of supplementation of "Centella asiatica"(Assamese: Manimuni, Hindi: Brahmamandooki) in feed to reduce piglet mortality

An OFT was undertaken on assessment of supplementation of "Centella asiatica" (Assamese: Manimuni, Hindi: Brahmamandooki) in feed to reduce piglet mortality to address the issue of Piglet mortality due to diarrhoea. 05 trials are conducted.

Details of Technology:

Technology Assessment: Addition of 0.002% **"Centella asiatica"** in feed for suckling and weaned piglets.

Farmer's trial: Feeding of starter feed without centella asiatica powder

Parameters to be assessed:

i. Incidence of piglet diarrhoea (%)
ii. Mortality rate (%)
iii. Body wt gain (kg)
iv. BC ratio

The programme is in progress.



OFT 5: Assessment of growth and egg production of Rainbow Rooster bird in Goalpara district

An OFT was conducted on assessment of growth and egg production of Rainbow Rooster bird in Goalpara district to address the issue of Minimum growth and egg production of local bird. 20 trials are conducted.

Parameters to be assessed:

i. Growth parameters
ii. Age at first egg laying iii.
iii. Monthly egg production
iv. Feed conversion ratio
v. Mortality
vi. BC ratio

Results:

Variety of poultry	Comparative growth performance of 3 varieties of poultry (Av. in kg)									
	1 month		2 month		3 months		4 months		5 months	
	M	F	M	F	M	F	M	F	M	F
Rainbow roster bird	8	0.7	1.3	0.9	1.65	1.3	2.3	1.75	3.0	2.35
Vanaraja bird	0.7	0.6	1	0.8	1.3	1	1.8	1.4	2.5	1.8
Local poultry	0.2	0.15	0.3	0.2	0.45	0.3	0.57	0.42	0.7	0.6

Monthly egg production of Rainbow rooster bird is in progress



OFT 6: Growth performance of GI Amrit Catla in composite fish culture system

An OFT is in progress on Growth performance of GI Amrit Catla in composite fish culture system to solve the issue of moderate growth of local Catla. The programme is being conducted in 3 locations in 0.35 ha pond area.

Details of Technology:

TO1: Culture of Amrit Catla (30%), Rohu (20%), Silver carp (15%), Mrigal (15%), Common Carp (10%) and Grass carp (10%) @ 8000 nos./ha.

TO2:Farmers practice (culture of local Catla and other carps)

Results:

Parameter	TO1	TO2
Initial Weight of Fish	5g	4g
Growth rate of Amrit Catla (6 months)	150g	100g
Total Yield of IMC	180 kg	120 kg
B:C ratio	Ongoing	



OFT 7 : Assessment of Colour and Textural Properties of Cookies by Addition of Roselle Seed Flour

An OFT was conducted on assessment of colour and textural properties of Cookies by addition of Roselle Seed Flour to address the problem of post-harvest losses and lack of knowledge on value addition. The programme was conducted in 5 locations.

Results:

Ingredients	Control	Flour Replacement		
		15%	20%	25%
Flour	100	15:85	20:80	25:75
Sugar	40	40	40	40
Refined	50	50	50	50
Water	20	20	20	20
Salt	2	2	2	2

Organoleptic evaluation of cookies prepared from Roselle Seed Flour

Treatment	Appearance	Flavour	Crispiness	Taste	Overall acceptability
T1 (15%)	8.15	8.06	8.43	8.37	8.18
T2(20%)	8.26	8.14	8.50	8.42	8.27
T3(25%)	8.00	8.45	8.25	8.34	8.12
Control	7.50	7.20	7.19	7.26	7.23

OFT 8: Assessment of Ready to Cook Green Jackfruit

An OFT was conducted on Assessment of Assessment of Ready to Cook Green Jackfruit to address the problem of post harvest loss of Jackfruit due to lack of processing techniques. The programme is conducted in 3 locations.

Details of Technology

TO1: Ready to cook green jackfruit: Blanching treatment in brine solution and Citric acid

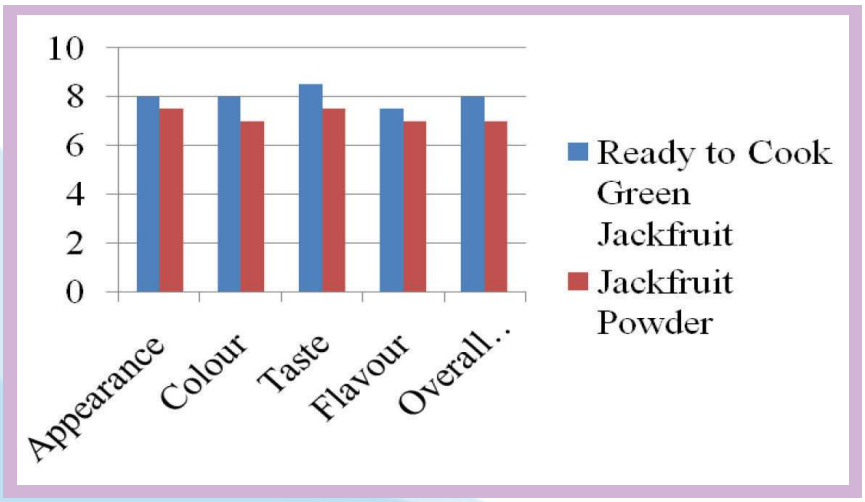
TO2: Jackfruit Flour: Sun drying of bulbs and milling.

TO3: FP: Raw Jackfruit

Results:

Parameters	Ready to Cook Green Jackfruit (TO1)	Jackfruit Flour (TO2)	Raw Jackfruit (TO3)
Product recovery	400 gm/kg	150 gm/kg	700 gm
Shelf life	6 months	6 months	1 week
BC ratio	2.5:1	4.0:1	

Organoleptic Quality (9-point hedonic scale)




Demonstration of newly proven technology for large scale adoption through Front Line Demonstration (FLD)

The Front-line demonstration conducted by Krishi Vigyan Kendra Goalpara on different agricultural technologies are as follows:

FLD 1: Popularization of cauliflower cultivation using organic sources of nutrient

An FLD was conducted on Popularization of cauliflower cultivation using organic sources of nutrient in 1.0 ha of area involving 03 farmers.

Details of Technology:

Biofertilizers: Azotobacter and Phosphate solubilizing bacteria @ 7.5 gm each per 100 gm of seeds

Manuring: Vermicomposting 5t/ha+Rock phosphate 375 kg/ha

Source of Technology: AAU,2019 Area: 1 ha No. of demo: 3

Cropping System: Rice -Rabi vegetables-Summer Vegetables

Date of sowing: 22.11.2024

Date of transplanting: 23.12.2024

Results:

Demonstration Yield (t/ha)			Yield of local Check	% increase	Gross Cost (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B:C Ratio (GR/GC)
H	L	A						
42.38	30.37	36.38	29.6	23	137000	545700	408700	3.98


FLD 2: Promotion of Balijana brinjal under Natural Farming

An FLD was conducted on Promotion of Balijana brinjal under Natural Farming in 0.5 ha of area involving 15 farmers.

Details of Technology:

- Crop: Balijana brinjal
- Seed rate: 700g/ha, Spacing: 75 cm x 60 cm
- Seed treatment: Beejamrit
- Nutrient Management: Jivamrit: Soil application @ 500 l/ha
- Organic Mulching
- Source of Technology: RVSKVV, Gwalior, 2022

Results:

The programme is in progress.

Date of sowing	28/09/2025
Date of transplanting	31/10/2025
Days to harvest	78 days
Average fruit weight	342 g
Yield/plant (kg)	Harvesting on progress
Yield	Yet to be calculated
B C ratio	Yet to be calculated

FLD 3: Popularization of stage wise application of N & K in Banana (var. Chenichampa) for higher yield

An FLD was conducted on Popularization of stage wise application of N & K in Banana (var. Chenichampa) for higher yield in 0.6 ha of area. involving 15 farmers.

Details of Technology

Fertilizer dose: 110gN, 33gP2O2, 330g K/plant

Nitrogen Fertilizer:

- 60% N at planting to 5 month stage
- 20% N at shooting

- 20% N at last hand opening

Potassium:

- 40% K at shooting to last hand opening.
- 60% of K at last hand opening to one month before harvest stage

The programme is in progress.

FLD 4: Promotion of Lumsniang crossbred pig

An FLD was conducted on Promotion of Lumsniang crossbred pig. The demonstration is conducted in 04 locations.

Parameters to be assessed:

i. Growth parameters of grower pigs at 4, 6, 8, 10 and 12 months
ii. Age at first heat
iii. Age at first conception
iv. Age at first furrowing
v. Litter size at birth
vi. Litter size at weaning
vii. BC ratio

Results:

Parameters	Average growth and reproductive performances of Lumsniang pigs									
Av. Growth parameters of Lumsniang pig (in months)	4 months		6 months		8 months		10 months		10 months	
	M	F	M	F	M	F	M	F	M	F
	16.21 ± 0.72	14.32± 0.64	35.36±0.81	28.28± 0.76	53.45± 1.34	46.27± 1.09	72.46± 1.48	66.27± 1.32	81.37± 1.54	77.31± 1.42
Av. Reproductive parameters	Age at first heat (in Months)		Age at conception (in Months)		Age at first furrowing (in Months)		Litter size at birth (in no.)		Litter size at weaning (in no.)	
	8.72±0.51		10.87±0.68		14.67±0.85		8.31±0.48		Going on	


FLD 5: Promotion of Kamrupa poultry birds under backyard system

An FLD was conducted on Promotion of Kamrupa poultry birds under backyard system involving 10 farmers.

Parameters to be assessed:

i. Body wt. gain (kg)

ii. Egg production

iii. FCR

v. BC ratio

Results:

Variety of poultry	Comparative growth performance of Kamrupa and Local varieties (Desi) of poultry (in kg)									
	1 month		2 month		3 months		4 months		5 months	
	M	F	M	F	M	F	M	F	M	F
Kamrupa	0.63± 0.04	0.52± 0.03	0.81± 0.05	0.78± 0.03	1.27± 0.05	0.98± 0.03	1.52± 0.06	1.13± 0.02	1.68± 0.06	1.36± 0.08
Local poultry (Desi)	0.43± 0.02	0.37± 0.02	0.49± 0.02	0.44± 0.02	0.55± 0.02	0.51± 0.02	0.64± 0.03	0.61± 0.03	0.71± 0.04	0.65± 0.03


FLD 6: Multiple stocking and Multiple harvesting of carp

An FLD is in progress on Multiple stocking and multiple harvesting of crop involving 03 farmers.

Details of Technology:

Fish species: Catla-15%, Rohu-30%, Mrigal-25%, Grass carp-10%, Silver carp-15%, Common carp-5%

Stocking Density of fishes 2,0000 Nos./ha

Size of fishes: 2cm to 2.5cm (4-5g)

Feeding: @ 4-5% body weight of fish

The programme is in progress.

FLD 7: Popularization of Genetically improved Rohu 'Jayanti rohu' in Fish Polyculture

An FLD was conducted on Popularization of Genetically improved Rohu 'Jayanti rohu' in Fish Polyculture. The demonstration is conducted in 03 locations.

Details of Technology:

Fish species: Catla-15%, Rohu-30%, Mrigal-25%, Grass carp-10%, Silver carp-15%, Common carp-5%

Stocking Density of fishes 2,0000 Nos./ha

Size of fishes: 2cm to 2.5cm

Feeding: @ 4-5% body weight of fish

Results:

Parameter	TO1	TO2
Initial weight of fish	5g	4g
Final growth of Jayanti Rohu (6 Months)	130g	90g
Production data/ha	333 kg	100 kg
B:C ratio	2.08	1.44


FLD 8 : Establishment of Nutrition Garden under Nutri Smart village

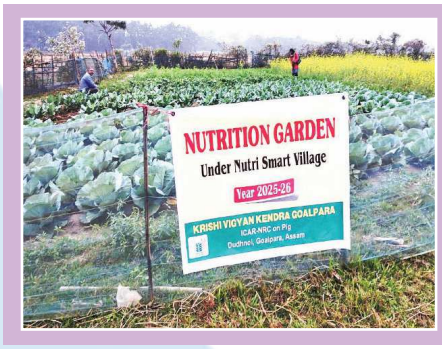
An FLD was conducted on Establishment of Nutrition Garden under Nutri Smart village in 0.1 ha of area involving 25 farmers.

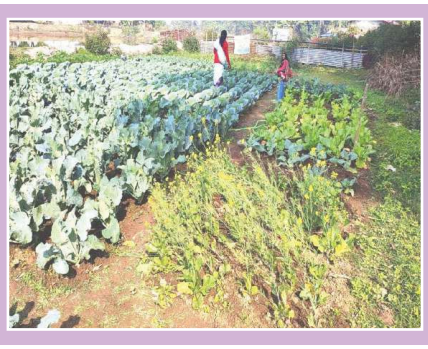
Technology demonstrated:

Diversified vegetables (cucurbits, brinjal, chilli, tomato, okra, bean and GLV (Spinach, jute etc) with FYM

Results:

Average cumulative productivity (q/ha)		Gross Cost (Rs/ha)	Gross Return (Rs/ha)	B.C Ratio
Demo	Check			
104.2	4.5	68000	183600	2.7



FLD 9: Popularisation of Posola candy prepared from central core of banana pseudo stem

An FLD was conducted on Popularisation of Posola candy prepared from central core of banana pseudo stem. Demonstration is conducted in 05 locations.

Details of technology

Pre treatment of Banana pseudo stem with KMS and citric acid. Cubes are soak in sugar syrup till 70 degree brix. Dried and packed in HDPE bag.

Results:

Treatments	Taste & flavour			Overall acceptability		
	Days after storage					
	Initial	30	60	Initial	30	60
FP	7.12	6.97	6.84	7.88	7.78	7.68
Tech	8.38	8.26	8.16	8.97	8.85	8.97

Product	Product recovery (1 kg of posola)	Income	Shelf life	B.C Ratio
Candy	250 gm	Rs.200/-	6 months	3:1

FLD 10: Demonstration of Improved Sickle for drudgery reduction

An FLD was conducted on demonstration of Improved Sickle for drudgery reduction. Demonstration is conducted in 05 locations.

Details of Technology

Improved Sickle with serrated blade and raised wooden handle to reduce drudgery during paddy harvesting

Results (Drudgery reduction):

Improved Sickle	Conventional Sickle
Special shape of handle gives protection to fingers and palm from getting rubbed to soil.	No safety to palm and fingers.
Low physiological pressure due to less pushing force with improved sickle.	Back pain, neck ache and shoulder ache with conventional sickle.

Parameters	Improved Sickle	Conventional Sickle
Average heart rate (beats/min)	112	109
Field capacity (ha/h)	0.016	0.012
Output	Increase in output by 33 %	

FLD 11: Demonstration of drone for agricultural operation

An FLD was conducted on demonstration of drone for agricultural operation to overcome the problem of laborious fertilizer and pesticide application. Demonstration is conducted in 03 locations.

Results

Parameter	Technology	Traditional practice
Field capacity	0.8 ha/hr	0.0067 ha/hr
Efficiency	99%	100%
Cost of operation	1500.00 Rs/ha	7500.00 Rs/ha
BC Ratio	In progress	

Advantages

Field capacity

Economy of operation

Averts health issues from chemicals

Disadvantages

Size of the device for transport

Sensitive to weather - rain, wind, warm condition

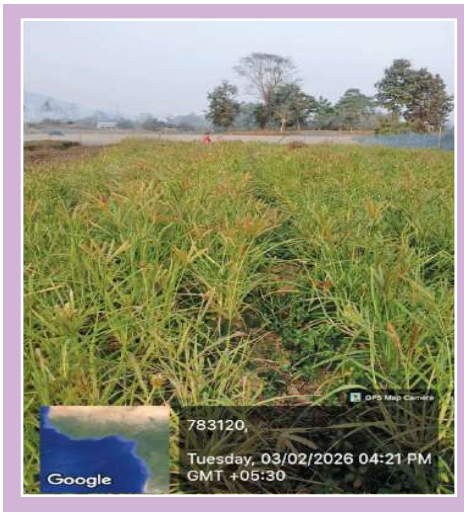
Demands utmost care during operation

Less Battery backup time

The programme is in progress.

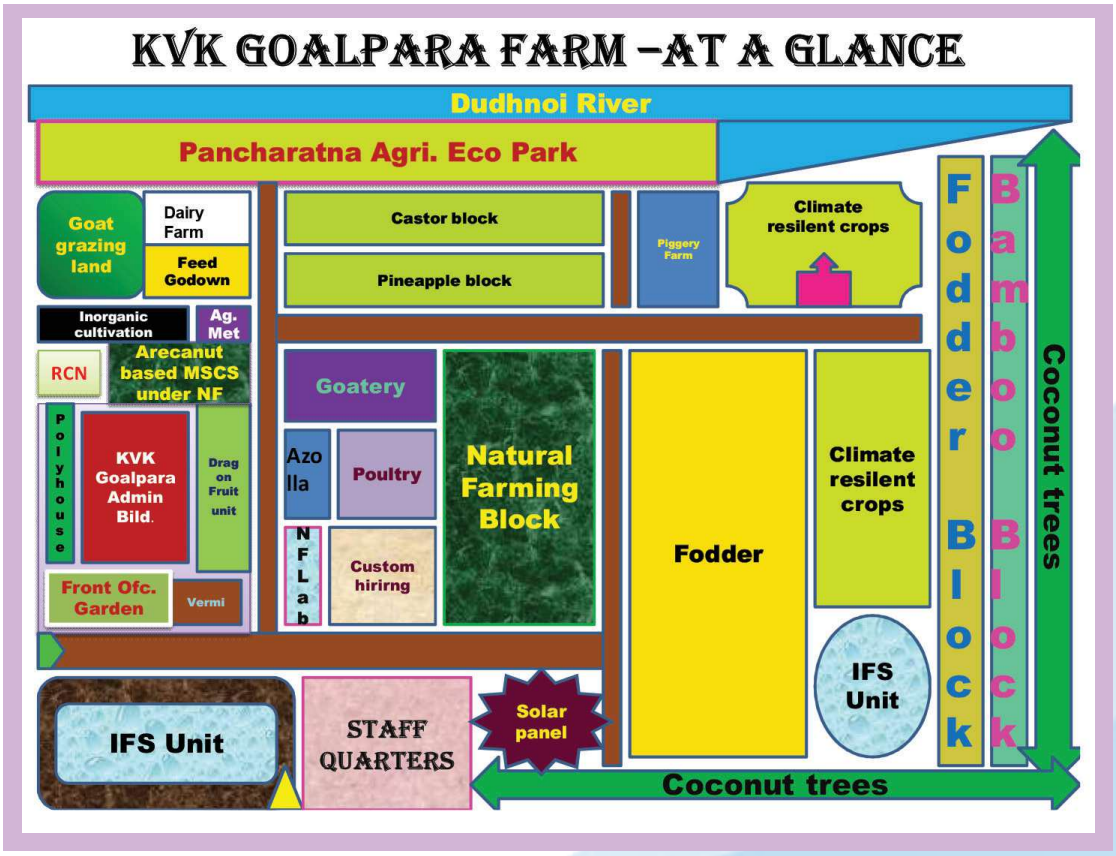
FLD 12 : Use of Millet Thresher

An FLD was conducted on use of Millet Thresher to overcome the problem of laborious and time consuming threshing of Millets. Demonstration is conducted in 03 locations.



KVK Goalpara demonstration Farm Activities

KVK Goalpara demonstration farm is primarily devoted to showcase various agricultural techniques and technologies, new or improved crops to the farmers. Keeping this in view, a number of demonstration units have been established and maintained at KVK Goalpara farm.



Fish-Duck-Horticulture and Fish Pig Horticulture Integrated Farming System

An area of 0.15 ha has been utilized for a Fish-Duck-Horticulture Integrated Farming System Unit comprising 2400 nos. under composite fish culture, 40 nos. of ducks, 04 nos. pig and horticultural crops like arecanut, coconut, cocoa, moringa, assam lemon and banana.

Natural Farming system model

A Multiple crop-based cropping system is established with the principle of "One field, three crops-Naturally". Major cropping sequence followed is Paddy (Black Rice+ Purple Rice + Joha Rice) →Toria + Pulses (Lentil & Pea) + Rabi vegetables→Summer Vegetables (Okra, French bean) + Black gram. Under paddy, demonstration on Rice cafeteria with three types of rice varieties viz. Black Rice, Purple Rice and Joha Rice was carried out. The demonstration included application of all natural farming inputs along with Azolla-based Biological Mulching which acts as live mulch, biofertilizer and weed suppressor. Parameters recorded are as follows:

Parameters	Joha Rice	Purple Rice	Black Rice
Plant Height	1.42 m	1.33 m	1.5 m
Panicle length	21 cm	18.33 cm	20 cm
No. of grains/panicle	175	153	101
Productive tillers	16	9	9.33
Crop duration	120 days	125 days	123 days
Yield	26.25 q/ha	33.75 q/ha	24.75 q/ha

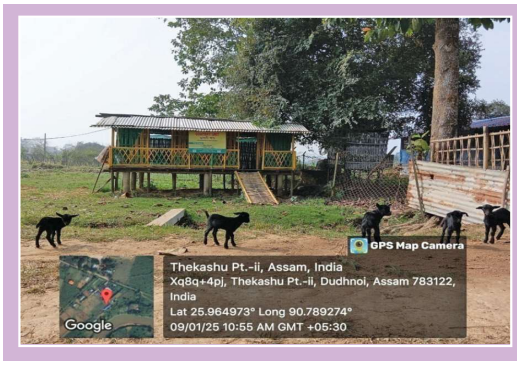
Agri-Eco Park

KVK Goalpara is putting special effort on three major principles in the agri-eco park initiated in the KVK demonstration farm viz. strengthening natural farming making it sustainable and regenerative, utilizing various renewable energy sources and reuse wastes to create a closed-loop system. Highlighting the present scenario, the various ongoing developmental activities accomplished are enlisted below:

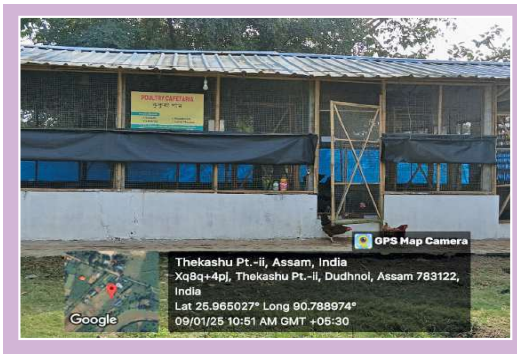
- **Development of orchard block:** An orchard block has been developed with 107 nos. various fruit plants like Mango (var. Amrapalli, Subarnarekha, Himsagar), Litchi (var. Shahi), Guava (var. VNR Guava, Alahabad Safeda, Lalit), Apple Ber (var. Kashmiri, Green)
- **Practicing Triple cropping system:** Triple cropping system has been practiced with an aim to increase farm productivity by growing multiple crops on the same land in a single year
- **Roadside development in Ecopark:** Around 300 nos. of various fruit and avenue trees have been planted along the farm road of Eco-park which includes some exotic fruit varieties like Miazaki mango and high yielding varieties like Red lady papaya.
- **Exposure visits:** Through this Agro Eco park, ICAR- KVK Goalpara is offering an excellent platform for students as exposure visit to this farm can combine nature-based learning, recreational activities, and educational exhibits. Till now around 1000 students have visited this site and have experienced this holistic educational approach.


Indigenous Dairy Cattle Unit: An Indigenous dairy cattle unit has been established at ICAR KVK Goalpara farm which is an integral part of natural farming. It comprises of 3 nos. of Indigenous cattle breed viz. Gir, Shahiwal and Lakhimi with a total of 11 nos. of animals. During the reported period, 5048.50 litres of milk has been produced with a revenue generation of Rs. 3, 53, 395/-.

Goatery Unit: ICAR-KVK Goalpara is having a demonstration unit of Goat with two nos. of breeds viz. Assam Hill Goat and Black Bengal consisting of 22 nos. of animals to promote scientific, sustainable, and profitable goat rearing among local farmers.



Poultry Unit: A demonstration unit on Poultry birds has been maintained in ICAR-KVK Goalpara farm. It comprises 04 nos. of poultry breeds viz. Vanaraja, Srinidhi, Kamrupa and Kadaknath with a total of 53 birds producing a total of 2937 nos. of eggs. During the reported period, revenue of Rs. 44594/- was generated from this demonstration unit.



Piggery Unit: A piggery demonstration unit has been established during the reported period to demonstrate scientific pig rearing, management, and breeding techniques to the farmers and showcase the methods to transform pig farming from a traditional, low-return activity into a profitable, commercial enterprise. This unit comprises of a total of 45 nos. of animals of the breeds viz. White Yorkshire, HDK 75%, HS 75%, Rani and Lumsniang and has generated a revenue of Rs 1,69,000/-.


Hybrid Napier Based Fodder Intercrop Model: A high-yielding, nutritious fodder system with Hybrid Napier as base crop has been established at KVK farm in an area of 01 acre. It is paired with Maize/Rina during Kharif season and Maize/Oats during rabi season as intercrops.

Demonstration on cultivation of groundnut: A demonstration on cultivation of groundnut variety K1812 under ground nut area and production expansion programme in NEH Region of ICAR-IIGR, Junagarh was carried out in an area of 0.13 ha generating a yield of 15 Q/ha.

Regional Coconut Nursery: A Regional Coconut nursery has been developed at KVK Goalpara farm in collaboration with Coconut Development Board, Guwahati. A total of 500 seed nuts were sown, out of which 231 nos. germinated showing germination percentage of 53.8%.


Extension Models developed by KVK Goalpara

KVK G Mart – Sale outlet at KVK campus

A sale outlet is established at KVK campus for sale of farm produce and processed agricultural products produced by KVK Goalpara, SHGs, FPOs and farmers. The outlet also offers essential inputs like planting materials, bio-agents, and other technological products developed by KVK Goalpara.

Sl. No.	Product	Quantity	Price (Rs.)
1.	Fresh Cow Milk (A2)	500 ml	Rs. 40.00
2.	Paneer	250 gm	Rs. 110.00
3.	Curd	500 gm	Rs. 70.00
4.	Poultry Egg	1 pc	Rs. 9.00
5.	Duck Egg	1 pc	Rs. 9.00
6.	Pickles (Mango, Chilli, Bamboo shoot, Bamboo flower, Olive, Ber, Mixed vegetable etc.	1 kg	Rs. 280.00
7.	Turmeric powder	1 kg	Rs. 250.00
8.	Bael Tea	50 gm	Rs. 50.00
9.	Roselle Tea	25 gm	Rs. 100.00
10.	Tomato	1 kg	Rs. 15.00
11.	Potato (Small)	1 kg	Rs. 30.00
	Potato (Big)	1 kg	Rs. 15.00
12.	Cabbage	1 kg	Rs. 40.00
13.	Cauliflower/Broccoli	1 kg	Rs. 50.00
14.	Knolkhol	1 kg	Rs. 40.00
15.	Leafy veg	1 kg	Rs. 20.00
16.	Brinjal	1 kg	Rs. 50.00
17.	Green Chilli	1 kg	Rs. 80.00
18.	Tapioca	1 kg	Rs. 20.00
19.	Pineapple	1 pair	Rs. 40.00
20.	Vermicompost	1 kg	Rs. 15.00
21.	Millet Ladoo	1 pc	Rs. 8.00
22.	Millet Flour	1 kg	Rs. 150.00
23	Banana Chips	100 gm	Rs. 70.00

Custom Hiring Center of KVK

The Custom Hiring Center (CHC) at KVK Goalpara was established with funds received under Sub Mission on Agricultural Mechanization from Ministry of Agriculture & Farmers Welfare, Govt. of India. Various machineries and implements for land preparation up to post harvest operations are available on hire basis. It also serves as knowledge center & demo unit for farmers, youths and school children.

Mostly hired implements

Multicrop Thresher

Shrub Master

Disc Plough

Rotavator

Sl.No.	Name of Implement/Machinery	Hiring charge (Rs)
1	Rotavator	Rs. 500/ Bigha
2	Self propelled Rice Transplanter	Rs. 500/ Bigha
3	Power Tiller	Rs. 500/ Bigha
4	Power Weeder	Rs. 150/ Hour
5	Tractor drawn Seed cum Fertilizer Drill	Rs. 500/ Bigha
6	Self propelled Reaper cum Binder	Rs. 300/ Bigha
7	Multicrop Planter	Rs. 500/ Bigha
8	Disc plough with Tractor	Rs. 350/ Bigha
9	Disc plough without Tractor	Rs. 800/ Day
10	Ridge Former	Rs. 250/ Bigha
11	Mini Dal Mill	Rs. 80/ Hour
12	Multicrop Thresher	Rs. 500/ Hour
13	Animal Drawn Potato Digger	Rs. 300/ Day
14	Adjustable Row Marker	Rs. 50/ Day
15	Shrub Master with Tractor	Rs. 600/ Hour

Technology Showcasing Unit

A Technology Showcasing Unit (TSU) was established to display, demonstrate, and promote technologies developed in the field of agricultural and allied disciplines to farmers and other visitors visiting KVK Goalpara with the following objectives:

- Technology demonstration
- Bridging gap between research & application
- Capacity building



Fig.: Other programmes implemented by KVK Goalpara

Pre Kharif Campaign - Viksit Krishi Sankalp Abhiyan

The 15 days "Viksit Krishi Sankalp Abhiyan" a nationwide campaign was organised during the Pre-Kharif 2025 session on 29th May, 2025 across the nation to modernize Indian agriculture through scientific outreach, sustainable practices and farmer empowerment. Krishi Vigyan Kendra Goalpara organised the national campaign at Goalpara district of Assam in collaboration with Department of Agriculture, Department of Veterinary & Animal Husbandry, Department of Fisheries, Assam State Rural Livelihood Mission and other line departments of Goalpara district. 50 clusters covering 26 gram panchayats of all 8 development blocks and 150 villages are covered. A total of around 16500 farmers directly participated and witnessed the 15 day long Viksit Krishi Sankalp Abhiyan.

Objective

- Awareness creation among farmers about location specific sustainable technologies of Kharif crops.
- Promotion of use of Soil Health Cards based nutrient application.
- Dissemination of information about various government schemes.
- Feedback from farmers on various issues related to agriculture and allied sectors.






গোৱালপাৰাত ‘বিকশিত কৃষি সংকল্প অভিযান’ৰ আয়োজন


Swachhata Abhiyan

Under Swachh Bharat Abhiyan, a no. of programmes were conducted, such as trainings, workshop for school children on hygiene and sanitation, jungle cleaning programme, publication of extension materials. One village named Madang - III is adopted as Vermi village and training, demonstrations and inputs distributed accordingly.



Vikshit Bharat – Guarantee for Rozgar and Ajeevika Mission (Gramin) Bill 2025

KVK Goalpara conducted a series of programmes to sensitise the farmers regarding the newly introduced Vikshit Bharat – Guarantee for Rozgar and Ajeevika Mission (Gramin) Bill 2025, replacing the existing Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) by creating a new framework for rural employment. Awareness programme was held at villages. Banner and hoardings were also displayed at various public places for awareness.



Kisan Samman Diwas

KVK Goalpara celebrated Kisan Samman Diwas and awareness programme on Viksit Bharat- G RAM G Bill, 2025 on 23rd December 2025 at its Committee Hall. To celebrate the day, five progressive famers of Goalpara district were felicitated in recognition of their outstanding dedication to sustainable agriculture and community service. Mrs. Mamoni Das, Mr. Bipul Rabha, Mr. Tilok Basumatary, Mr Satyajit Rabha and Mr Lebhi Sangma were felicitated with an Assamese Gamusa and Certificate of Appreciation. A total of around 162 numbers of farmers and officials participated in the programme.



Tribal Farmers' Conclave cum Exhibition

KVK Goalpara participated in Tribal Farmers' Conclave cum Exhibition organized by ICAR-ATARI, Zone VI, Guwahati in collaboration with KVK Dima Hasao at Haflong, Dima Hasao from 7th to 8th November, 2025. 03 officials from KVK Goalpara and 05 progressive farmers from Goalpara district participated in Conclave cum exhibition. Mr. Debabrat Rabha, a progressive farmer from Goalpara district received the Best Progressive Farmer for his contribution in the field of agriculture.


Celebration of important events

KVK Goalpara celebrated a number of events along with the rest of the nation to commemmorate different important days and webcasting of launching of new cmapaigns and initiatives by Govt. of India.


Jan Jatiya Gaurav Pakhwada | *Vigilance Awareness Week* | *Live webcasting of launching of "Pradhan Mantri Dhan Dhanya Krishi Yojana" (PMDDKY)*



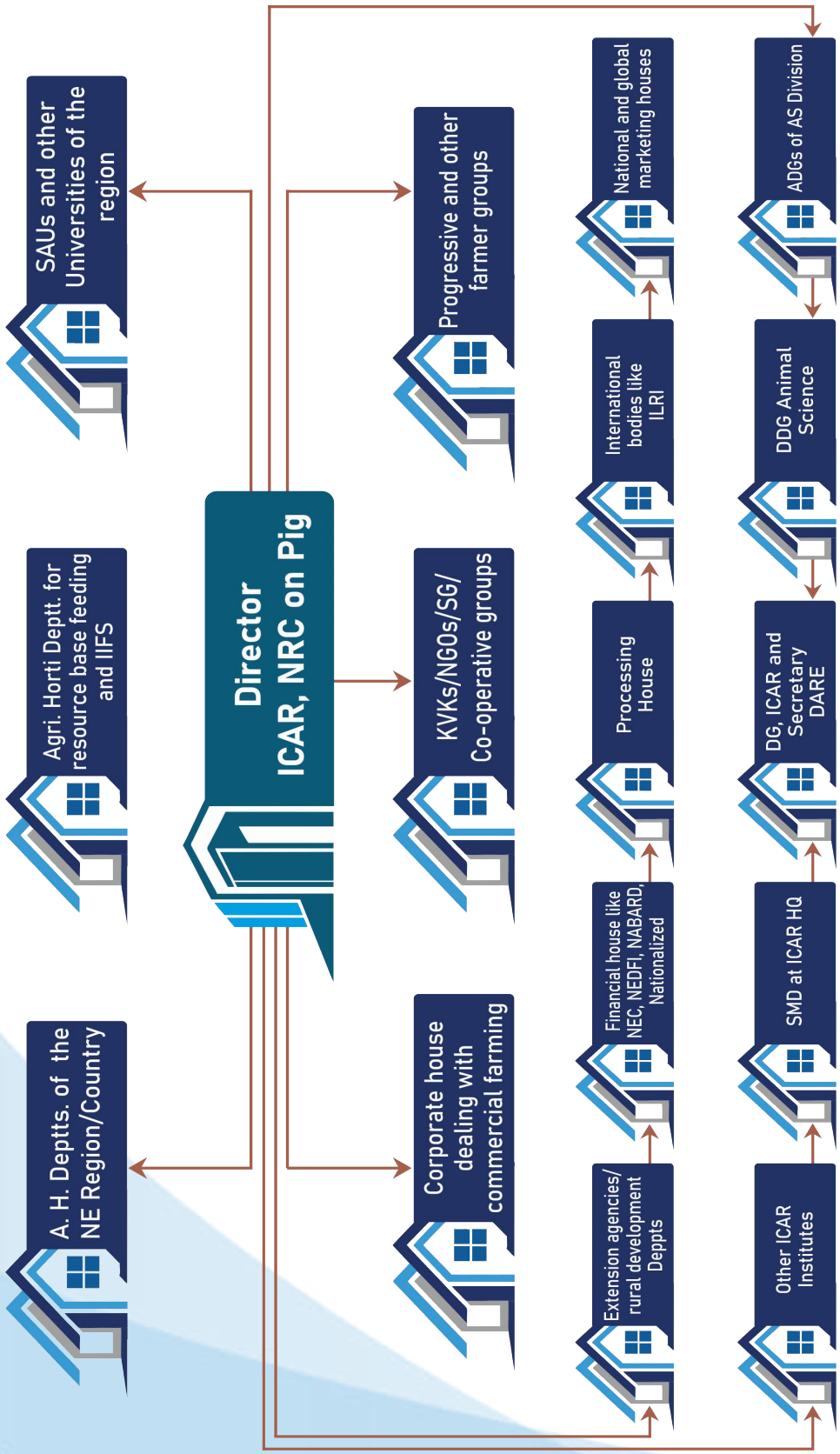
National Unity Day *Release of 20th and 21st Instalment of PM Kisan Nidhi*

Extension Activities carried out by KVK Goalpara

A number of extension activities were carried out for dissemination of agricultural technologies and information by the KVK during this period.

Sl. No.	Activity	Nos.
1.	Field Visits	192
2.	Advisory Services	204
3.	Celebration of Important Days	8
4.	Exposure Visits	4
5.	Exhibitions	4
6.	Farmer's Visit to KVK	2690
7.	Field day	4
8.	Awareness camp	18
10.	Newspaper Coverage	12
11.	Seed distribution programmes	8
12.	Programme for School Children	16

LINKAGES AND COLLABORATIONS OF ICAR-NRC ON PIG



NATIONAL AGRICULTURE INNOVATION FUND (NAIF)

Institute Technology Management Unit: National Agriculture Innovation Fund (NAIF)

Vishal Rai, Lokesha E, R. Thomas

During 2025, the Institute Technology Management Unit (ITMU) of ICAR–National Research Centre on Pig actively advanced initiatives related to technology certification, protection, and commercialization. With financial support from the National Agriculture Innovation Fund–I (NAIF-I), the unit focused on strengthening intellectual property creation and protection, encompassing patents, industrial designs, copyrights, and trademarks.

Over the year, the institute successfully generated and obtained approvals for multiple technologies, entered into Memoranda of Understanding (MoUs) with various stakeholders, and showcased its innovations through participation in four national and regional exhibitions. The technologies developed across diverse domains are expected to reinforce the intellectual property ecosystem within ICAR, promote effective technology transfer, and significantly contribute to improving the livelihoods and economic well-being of pig farmers through innovation-led interventions.

Management of IP portfolio

IPRs	Application/ Registration No.	Name of Innovation/ Technology/ Product/ Plant Variety	Date of application Filed/ submitted	Date of Application Granted/ Registered**
Patent	202511012989	A biosensor-based lateral flow assay (LFA) system/kit for detection of African swine fever virus (ASFV)	14.02.2025	Complete specification filed on 14.02.2025
Patent	202411060519	Virus-like particles and antibodies against Indian isolate of porcine circovirus 2d	08.08.2025	Complete specification filed on 08.08.2025
Copyrights	33533/2024-CO/L	Data card for performance evaluation of growers and finishers	24.10.2024	Registration no. L-160977/2025, registered on 19.02.2025
	33535/2024-CO/L	Boar Select Aid: Smart decision aid for boar selection and furthermore evaluation	24.10.2024	Registration no. L-160978/2025, registered on 19.02.2025
	33534/2024-CO/L	Sow select-Aid: Smart decision aid for sow selection and performance evaluation	24.10.2024	Registration no. L-158596/2024, registered on 30.12.2024

IPRs	Application/ Registration No.	Name of Innovation/ Technology/ Product/ Plant Variety	Date of application Filed/ submitted	Date of Application Granted/ Registered**
Copyrights	12256/2022-CO/ CF	Biosecurity in scientific pig production (Hindi)	09.06.2022	Registration no. CF-202505963, registered on 03.07.2025
	LD-26346/2025-CO	Tribal Prosperity through Piggery: Pathways to Wealth and Welfare	02.07.2025	Registration no. LD-20250176205, registered on 21.10.2025
	LD-26361/2025-CO	Technology Inventory	02.07.2025	Registration no. LD-20250172802, registered on 29.08.2025
	LD-26334/2025-CO	Piggery for progress: Transforming livelihood of Scheduled caste communities	02.07.2025	Registration no. LD-20250172801, registered on 29.08.2025
	LD-26355/2025-CO	Package of Practices: Biosecurity Measures in Scientific Pig Production	02.07.2025	Registration no. LD-20250179288, registered on 30.12.2025
	AT-30058/2025-CO	NRCP insignia	28.07.2025	Awaiting registration
Design	476068-001	Apparatus for methodical postmortem inspection of head and viscera of pig	07.10.2025	Awaiting registration
	476067-001	Hygienic poultry dressing apparatus	07.10.2025	Awaiting registration

Technology certification by ICAR:

1. Boar Semen Preservation Cabinet
2. Boar Semen Preservation and Transportation Box
3. Device for manual retort pouch filling
4. NUCLEOFAST Viral DNA isolation kit
5. Dirrocure- herbal antidirrhoeal feed supplement
6. Pig hair based biocomposite

Professional Services

S No	Name of Institute	Name of Technology/ Know-How/ Service Provided	IP Protection (Yes/ No)*	Name of Contracting Party	Date of MoU/ MoA Signing	Revenue Earned (₹)
1	ICAR-NRCP	Exchange of Resources	No	SAAR Pig Producer Company	10.09.2025	NA

Commercialization of Technologies

Sl. No.	Name of Technology/ Know-How	IP Protection (Yes/ No)*	Name of Contracting Party	Date of TCAC	Wether done through Agrinnovate India Ltd. (AgIn.) (Yes/No)	Date of Licensing	Revenue Earned (in Rs.)
1.	Piggyplex ® CSF, JE & PRRS Assay Kit: Product	Yes (Copyright and trademark)	Genes4Life Pvt. Ltd., Ernakulam	08.03.2024	Yes	16.07.2025	Rs. 3,00,000/- + GST (Total licensing fees)
2.	Piggyplex (D) ASFV, PCV &PPV assay kit: Product	Yes (Copyright and trademark)	Genes4Life Pvt. Ltd., Ernakulam	08.03.2024	Yes	16.07.2025	

Transfer of Piggyplex® CSF, JE & PRRS Assay Kit and Piggyplex (D) ASFV, PCV & PPV Assay Kit to GENES4 LIFE PRIVATE LIMITED, Ernakulam on the occasion of ICAR Foundation Day, 2025

Government Development Schemes Expo-Interantional Organic & Agri Horti expo-2025 at Maniram Dewan Trade Centre, Guwahati from 17.03.2025 to 19.03.2025

Golden Jubilee celebration cum farmers expo, 2025 at ICAR-NEH, Umiam from 09.01.2025 to 10.01.2025

19th National Conference of the Indian Association of Women Veterinarians (IAWV) at college of Veterinary Science Khanapara from 27.11.2025-28.11.2025

International conference on "The pursuit of sustainable hill farming: Innovations for profitability and ecological balance to ensure future livelihood (PASEL-2025) from 20.11.2025-21.11.2025

Agri-Business Incubation Centre

R. Thomas, Lokesha E

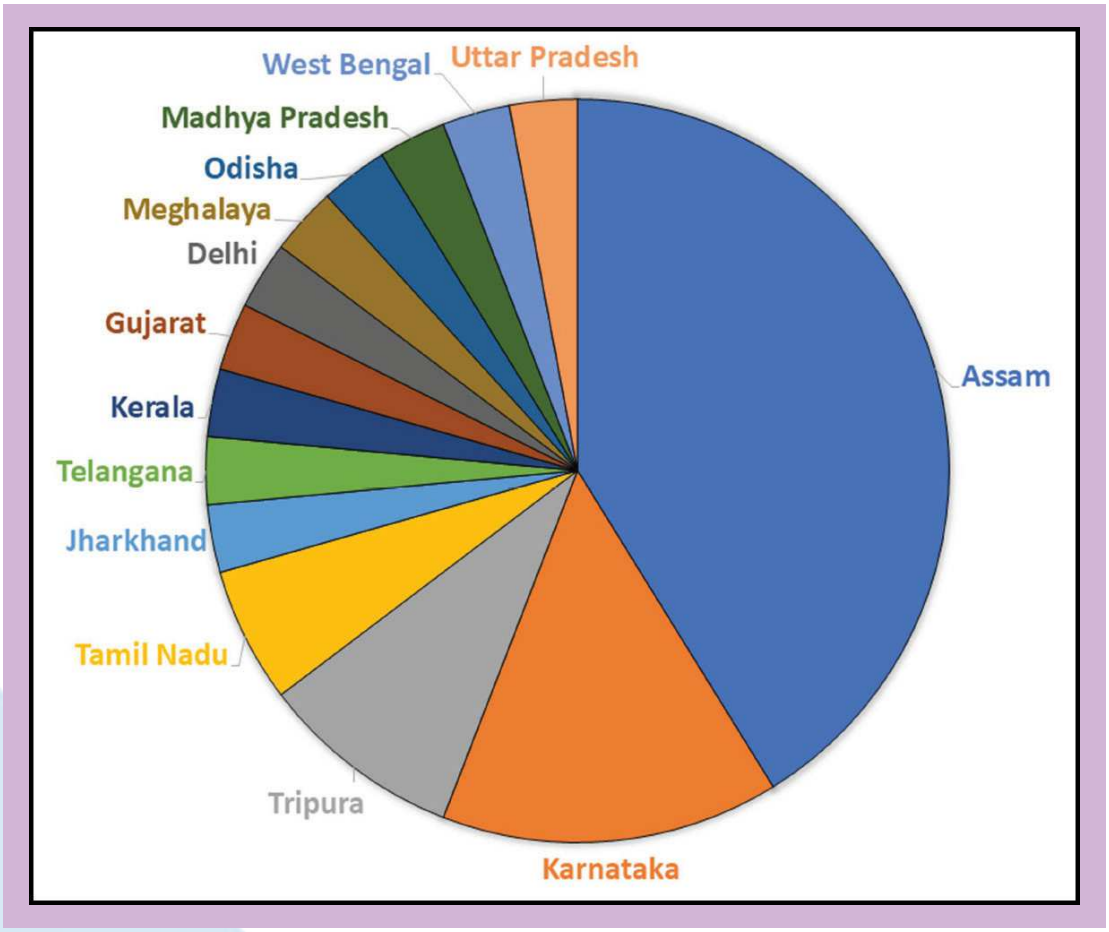
The Agri-Business Incubation (ABI) Centre of ICAR–National Research Centre on Pig plays an important role in promoting entrepreneurship and technology commercialization in the piggery sector. Since its establishment in 2019, the ABI Centre has been actively supporting start-ups and entrepreneurs by providing technical mentorship, access to institute infrastructure, training facilities, and business development support to facilitate the growth of sustainable pig-based enterprises. Through its structured incubation programme, the centre has enabled entrepreneurs to adopt scientific pig production practices, develop value-added pork products, and establish market-oriented business models. The ABI Centre has developed significant infrastructure to support entrepreneurs, including pork processing facilities, training laboratories, and demonstration units (Fig. Infrastructure facilities of ABI Centre). Through these facilities, entrepreneurs receive hands-on exposure to scientific processing, packaging, quality control, and product diversification. The centre has also supported entrepreneurs through various technological interventions. Also, technology/support extended to entrepreneurs) and has incubated enterprises from multiple states across India.

During the reporting period, the ABI Centre also conducted capacity-building programmes with participants representing multiple states and diverse age groups, demonstrating its national outreach. The distribution of trainees according to state of residence and age groups indicates strong participation from the North-Eastern region, particularly Assam, along with representation from other parts of India. The majority of trainees belonged to the young and middle entrepreneurial age groups, reflecting the growing interest of youth in scientific pig farming and pork processing enterprises. Through these initiatives, the ABI Centre continues to strengthen the pig value chain by bridging the gap between research, technology, and entrepreneurship.

Table: Entrepreneurs incubated under ABI centre in the year 2025

S. No.	Name	Address
1	Integrated Agricom Foundation	Bangalore, Karnataka
2	Royal Pork	Guwahati, Assam
3	Immemo Dkhar	Meghalaya
4	Alok Pradhan	Odisha
5	Bhanu Gulati	Bhopal, Madhya Pradesh
6	Joyant Hazarika	Kamrup, Assam
7	Palash Jyoti Hukai	Morigaon, Assam
8	Ajit Sharma	Alipurduar, West Bengal
9	Hemanth Kumar R.	Bengaluru, Karnataka
10	Porkish Delight	Ghaziabad, Uttar Pradesh
11	Assam Centre for Rural Development	Guwahati, Assam

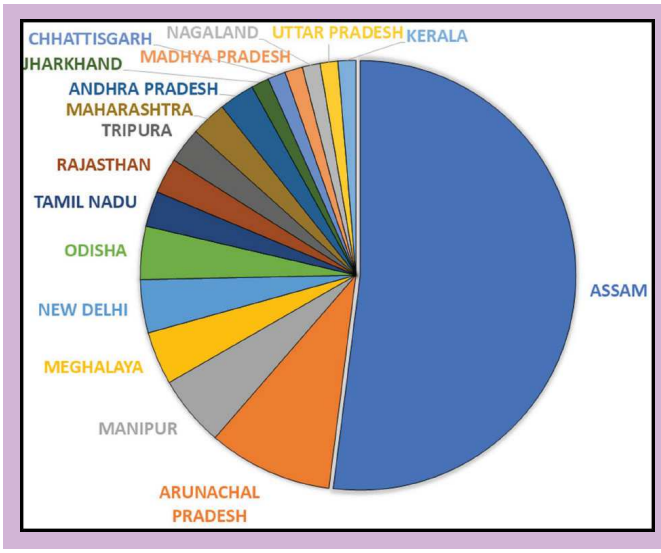
The ABI Centre has provided comprehensive technological support to entrepreneurs covering scientific pig production, processing technologies, product development, and enterprise management. The support system includes technical consultancy, access to institute technologies, demonstration of scientific practices, and guidance on regulatory and quality standards required for commercialization. The centre has also facilitated technology transfer related to pork processing, value addition, and hygienic meat handling practices. Entrepreneurs were trained in modern processing techniques, packaging technologies, and shelf-life enhancement strategies to improve the commercial viability of their products. The ABI Centre has successfully incubated entrepreneurs from different parts of the country including Assam, Karnataka, Tamil Nadu, Tripura, Meghalaya, and other states. The incubated entrepreneurs include individual start-ups, private companies, farmer groups, and government organizations working in pig production, pork processing, and allied sectors.



Trainings conducted

During the reporting period, the ABI centre has organized three Entrepreneurship Development Programmes (EDPs) aimed at promoting scientific pig production and pork value addition. These programmes were designed to strengthen entrepreneurial skills, promote technology adoption, and encourage start-up development in the pig sector.

Fig. Hands on training on pork processing and brand building activities of entrepreneurs



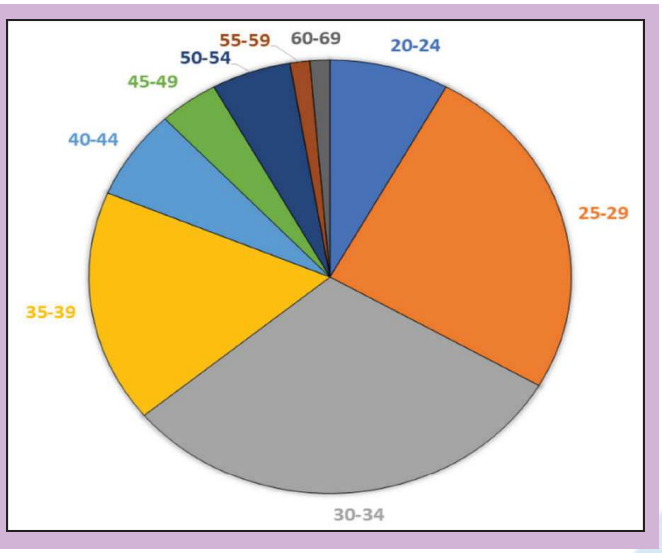


Fig. Distribution of trainees according to State of residence (left) and age group (right)

Success story: ABI incubatee facility launched in Guwahati

A new pork processing facility established by the institute's Agri-Business Incubation (ABI) incubatee, M/s Royal Pork, was inaugurated at Kahikuchi, Azara, Guwahati on 13 January 2026. The facility has been set up with technical guidance and incubation support from ICAR–National Research Centre on Pig (ICAR-NRCP) under its ABI programme. Royal Pork, a Guwahati-based enterprise, aims to promote hygienic pork processing, value-added products, and organized marketing to meet the growing urban and regional demand. The initiative underscores the institute's sustained efforts towards promoting value addition, entrepreneurship development, and formalization of the pork sector. The inauguration represents an important milestone in strengthening organized pork processing, improving market linkages, and enhancing livelihood opportunities in the region. The facility was inaugurated by Dr. Vivek Kumar Gupta, Director, ICAR-NRCP.


PURE PORK
ESTD. 2025
ROYAL PORK
PURE PORK
PERFECT TASTE
Introducing you to
ROYAL PORK
Azara, Kalitapara,
Kahikuchi Road, GHY:17
KNOWLEDGE PARTNER
ICAR NRC ON PIG, RANI, ASSAM:781131


SHAKTI
VINOD INDUSTRIES

POST GRADUATE DIPLOMA IN PORK VALUE CHAIN MANAGEMENT

Course Director: Vivek Kumar Gupta, Director, ICAR-NRC on Pig

Course Coordinators: R. Thomas, Priyajoy Kar, Lokesha E, Nitin M Attupuram, Juwar Doley, Sunil Kumar, Satish Kumar

About the programme

The Post Graduate Diploma in Pork Value Chain Management is a specialized academic programme offered by ICAR-National Research Centre on Pig in collaboration with ICAR-Indian Veterinary Research Institute. The programme provides a comprehensive understanding of the pork value chain, with emphasis on production, processing, preservation, quality control, and marketing. It is designed to equip professionals with the necessary technical and managerial skills to enhance efficiency, sustainability, and value addition within the pork industry.

Programme structure and coverage

The diploma programme spans two semesters and encompasses a broad range of thematic areas that combine theoretical knowledge with practical exposure. The curriculum is structured to develop a holistic understanding of pork production systems, processing technologies, and business opportunities across the value chain.

Semester I: Foundations of the pork value chain

The first semester focuses on the fundamental aspects of pork production and processing. It begins with an overview of the pork value chain, covering stages from farm to consumer, including breeding, feeding, and farming practices, while emphasizing quality and sustainability. The programme further introduces advancements in pig abattoir practices, highlighting humane slaughter methods, hygienic operations, and efficient fabrication of pork cuts.

In addition, students gain knowledge of further processing and value addition techniques such as curing, smoking, drying, and fermentation, enabling the development of products like sausages, ham, and bacon. Packaging and labelling aspects are also covered, focusing on materials, preservation methods, and regulatory standards to ensure product safety and marketability. The semester concludes with an emphasis on clean pork production, stressing hygiene, contamination prevention, and best practices to maintain product quality.

Semester II: Advanced techniques and business opportunities

The second semester advances into technical, quality control, and business dimensions of the pork value chain. It begins with an understanding of spoilage mechanisms, including microbial and enzymatic deterioration, and factors affecting product quality. Students are then introduced to preservation techniques such as refrigeration, freezing, curing, and canning, along with the utilization of pork by-products for value-added applications.

Quality control and personnel hygiene form a critical component, with focus on monitoring systems, safe handling practices, and implementation of standards such as Hazard Analysis Critical Control Points (HACCP). The programme also explores business opportunities within the pork sector, covering entrepreneurship, market trends, and value-added product development. Finally, students are trained in quality assessment methods, including sensory evaluation, chemical analysis, and microbiological testing to ensure compliance with standards and consumer expectations.

Overall, the Post Graduate Diploma in Pork Value Chain Management provides a comprehensive and industry-oriented education covering all stages of the pork value chain. By integrating scientific knowledge with practical skills and business insights, the programme prepares graduates to contribute effectively to production, processing, quality assurance, and enterprise development. It plays a significant role in strengthening the pork sector by promoting efficiency, sustainability, and innovation.

SWACHH BHARAT ABHIYAN ACTIVITIES

The Swachhta Hi Seva campaign 2025 was celebrated as "Swachhotsav" at the ICAR- NRC on Pig from 16th September to 2nd October 2025. Emphasizing community participation, hygiene awareness, and environmental responsibility, the ICAR-National Research Centre on Pig actively took part in this initiative through a series of activities and outreach programmes.

Details of activities under Swachhata Pakhwada 2025: The Swachhotsav 2025 at ICAR-NRC on Pig was conducted from 17th September to 2nd October 2025 with a series of impactful activities promoting cleanliness, hygiene, and community participation. The event commenced with a Swachhata Pledge administered online by the Hon'ble Secretary, DARE & DG, ICAR, followed by banner displays and a farm cleaning drive. A plantation drive under "Ek Ped Maa Ke Naam" and a Swachhata Ki Pathshaala engaged school students through awareness and competitions. Outreach programmes, including cleanliness drives at Kopili Ganesh Mandir and Rani Market, encouraged community involvement. Health and safety initiatives such as Safai Mitra Suraksha Shivir, occupational hazard awareness, and biosafety programmes were organized for staff and workers. Activities like human chain formation, Clean Green Utsav, plogging events, and farm sanitation drives reinforced the importance of collective responsibility and hygiene. Cultural programmes and selfie points enhanced participation and awareness. The campaign concluded on 2nd October with Swachh Bharat Diwas celebrations, including a campus cleaning drive and distribution of safety kits to sanitation workers, recognizing their vital contribution and ensuring their well-being.

Swachhata Pakhwada 2025: ICAR-National Research Centre on Pig organized a comprehensive Swachhata Pakhwada from 16th–31st December, 2025. The programme encompassed institutional cleanliness drives, laboratory and farm sanitation, environmental initiatives, and community outreach programmes to promote hygiene and sustainable practices. Special emphasis was laid on awareness generation among students, farmers, and the general public through participatory events, training, and campaigns.

Glimpses of activities


SWACHHTA PAKHWADA
2025

MEETINGS AND OTHER ACTIVITIES

Research Advisory Committee

The Research Advisory Committee (RAC) meeting of ICAR–National Research Centre on Pig was convened on 23rd June 2025 under the chairmanship of Dr. K.M.L. Pathak. The meeting reviewed the ongoing research activities of the Institute and provided valuable guidance and recommendations for strengthening future research programmes.

Institute Research Council

The Annual Institute Research Council (IRC) Meeting of ICAR-NRC on Pig was held during 20–22 August, 2025 under the chairmanship of Dr. V.K. Gupta, Director, ICAR-NRC on Pig, Rani. In his opening address, the Chairman, IRC, highlighted the IRC meeting as the annual scientific festival of the Institute, where every scientist presents and discusses achievements, shortcomings, project progress, and critical review of ongoing research, and emphasized that IRC proceedings are used for various evaluation purposes, therefore due care should be taken while presenting results. Dr. Satish Kumar, Member Secretary, IRC and I/C PME Cell, presented an overview of the PME Cell, including institutional and externally funded projects and major achievements of the scientists. The Chairman appreciated the achievements of the scientists in terms of externally funded projects, IP portfolio particularly Copyrights & Designs, ISBN books, ICAR-certified technologies, publications in high impact journals, as well as publications on TSP and SCSP success stories and training manuals. During the meeting, all the projects were critically reviewed and several recommendations were made, including publishing research findings in good impact factor journals, timely submission of information and publications to the PME Cell, mandatory acknowledgement of ICAR in all publications, submission of annual reports and relevant documents of externally funded projects to PME Cell.

The midterm IRC meeting of ICAR–NRC on Pig was conducted on 26 November 2025 in the committee hall of the Institute under the chairmanship of Dr. V. K. Gupta, Director, ICAR–NRC on Pig for evaluation of the revised project proposals. In the meeting several new project proposals were presented and approved by the IRC.

Institutional Bio Safety Committee

The Institutional Biosafety Committee (IBSC) of ICAR-National Research Centre on Pig, Guwahati convened two meetings during the calendar year 2025 in compliance with the guidelines of the Department of Biotechnology, Government of India. The meetings were held on 30.06.2025 and 24.12.2025. All proposals received by the Committee were thoroughly reviewed and approved in accordance with the prescribed guidelines. Emphasis was placed on biosafety compliance, containment practices, waste management, and adherence to national regulatory frameworks, ensuring that all ongoing and new research activities were conducted as per established biosafety norms.

Institutional Animal Ethics Committee

The Institute Animal Ethics Committee meeting of ICAR -NRC on Pig was organized on afternoon session of 6th August 2025 from 3.00 pm to 5.00 pm. The meeting was chaired by Dr. Vivek Kumar Gupta, Chairman, IAEC and Director, ICAR-NRC on Pig. The meeting was attended by Dr. Birendra Nath Bhattacharyya (Main Nominee of CCSEA), Dr. Arundhati Phookan, (Link Nominee of CCSEA), Dr. Pavan Kumar Samudrala (CCSEA Nominee), Mr. Bikash Saikia (Socially aware nominee of CCSEA), Dr. Rafiqul Islam (Farm in charge and Member, IAEC), Kalyan De (Scientist from biological discipline and Member, IAEC), Dr. Anil Kumar Das (Veterinarian and Member, IAEC) and Dr. Nitin M Attupuram (Member Secretary, IAEC. The programme started by a brief update on the status of 23 ongoing projects having CCSEA approval and findings of animal facility inspection. The Committee

reviewed new proposals and required rectifications were incorporated by the concerned principal investigators. After thorough deliberations eight (8 numbers) new proposals were recommended by the committee. Member Secretary offered vote of thanks to all members present in the meeting.

Inspection of Large Animal House Facility registered with CCSEA

The annual inspection of the Large Animal House Facility registered with the Committee for the Control and Supervision of Experiments on Animals (CCSEA) (Registration No. 1658/GO/RBi/L/12/CCSEA) at ICAR–National Research Centre on Pig was conducted on 30th December 2025. The inspection was carried out by the Main Nominee of CCSEA, Dr. Birendra Nath Bhattacharyya, who reviewed the pig farm facilities and provided suggestions for further improvement. During the inspection, relevant records pertaining to feeding, care, and management of animals were thoroughly examined and validated. CCSEA nominee interacted with members of the farm management committee, including Dr. Rafiqul Islam (Farm In-charge), Dr. Kalyan De (Senior Scientist, LPM), and Dr. Nitin M. Attupuram (Scientist, LPM). Detailed clarifications were sought from the Farm Manager, Dr. Anil Kumar Das (Veterinarian and Technical Officer), particularly focusing on animal welfare practices. The biosecurity measures in place at the facility were also assessed. Overall, the inspection team expressed satisfaction with the management practices and animal welfare standards maintained at the CCSEA-registered large animal house facility.

Reception of Hon'ble Minister of Agriculture and Farmers' Welfare

The Hon'ble Minister of Agriculture and Farmers' Welfare, Shri Shivraj Singh Chouhan, was received at Guwahati Airport on 14 May 2025 by the Director, ICAR–National Research Centre on Pig, Guwahati.

Visit of the Secretary, DARE and Director General, ICAR

The Secretary, DARE and Director General, ICAR visited ICAR–National Research Centre on Pig during the year. During the visit, he interacted with scientists and staff of the Institute and reviewed the ongoing research and developmental activities. He appreciated the efforts of the Institute and motivated all staff to continue working with dedication and commitment towards achieving excellence in research and service to the farming community. He also visited the NEC building and toured the Institute campus to assess the infrastructure and facilities.

Visit of DDG, Animal Science

Dr. Raghavendra Bhatta, DDG (Animal Science), ICAR, visited the ICAR–National Research Centre on Pig on 24 April 2025. During his visit, he inspected the ICAR Experimental Farm Unit and the AICRP Doom Unit. He reviewed the ongoing research and farm activities and interacted with the scientists and staff, providing valuable guidance for strengthening research and development programmes of the Institute.

Visit of pig farmers from Belgium

A delegation from the French Embassy visited ICAR–National Research Centre on Pig on 2 September 2025. During the visit, a meeting was held with the Director and Principal Scientist of the Institute to discuss areas of mutual interest and potential collaboration. The delegation also toured the Boar Semen Laboratory and the Quality Control Laboratory, where they were briefed on the ongoing research and technical activities of the Institute.

CELEBRATIONS

New Year Celebrations

ICAR–National Research Centre on Pig celebrated New Year 2025 with great enthusiasm. The programme included a cake-cutting ceremony, where scientists, officers, and staff exchanged New Year greetings and wishes. On the occasion, the Director, Dr. V.K. Gupta, delivered a brief motivational speech, encouraging everyone to work with dedication, teamwork, and commitment towards achieving the Institute's goals.

Republic Day

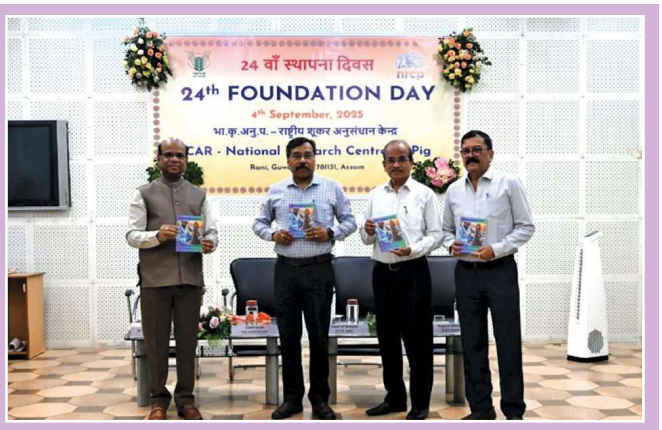
ICAR–National Research Centre on Pig celebrated Republic Day on 26 January 2025 with patriotic fervour and enthusiasm. The programme began with the hoisting of the National Flag, followed by the singing of the National Anthem. Scientists, officers, staff members, and students assembled to commemorate the occasion and pay tribute to the values enshrined in the Constitution of India. On the occasion, the Director addressed the gathering and highlighted the significance of Republic Day, emphasizing unity, integrity, and dedication towards nation-building. He encouraged all staff members to uphold constitutional values and contribute sincerely to the advancement of agricultural research.

Independence Day

ICAR–National Research Centre on Pig observed Independence Day on 15 August 2025 with pride and respect. The programme included the unfurling of the National Flag and singing of the National Anthem, with staff and students paying tribute to the nation's freedom fighters. The Director addressed the gathering, highlighting the spirit of freedom and responsibility towards national development.

Foundation Day

ICAR–National Research Centre on Pig celebrated its 24th Foundation Day on 4 September 2025 under the guidance of the Director, Dr. V.K. Gupta. The programme was graced by the Chief Guest, Prof. Ramesh Ch. Deka, Vice Chancellor, Cotton University, Guwahati. On the occasion, an exhibition was organized showcasing the Institute's technologies, value-added products, and various agricultural innovations. Progressive farmers were honoured in recognition of their contributions to the farming community. As part of the celebrations, Certificates of Excellence were awarded to Dr. P. J. Das for Best Scientific Publication and Dr. Gagan Bhuyan as Employee of the Year. The event marked a celebration of scientific achievements and strengthened the Institute's commitment to research and farmer welfare.



Vigilance Awareness week

ICAR–National Research Centre on Pig, Rani, Guwahati, Assam observed Vigilance Awareness Week–2025 from 27th October to 2nd November 2025 on the theme "Vigilance: Our Shared Responsibility." The programme began with the Integrity Pledge, followed by talks highlighting the importance of vigilance. During the week, various activities such as sensitization programmes, awareness events in a local school, essay and elocution competitions, a grievance redressal camp, and an Awareness Gram Sabha in village Pirpara were conducted. Awareness campaigns and banner displays were also organized. The week was observed with active participation and enthusiasm from all staff members.

National Unity Day

ICAR–National Research Centre on Pig observed National Unity Day (Rashtriya Ekta Diwas) on 31 October 2025 to mark the birth anniversary of Sardar Vallabhbhai Patel. The programme began with the National Unity Pledge, reaffirming commitment to the unity and integrity of the nation. Staff members and students participated in the observance.

Prime Minister Dhan Dhaanya Krishi Yojna

ICAR-National Research Centre on Pig, Guwahati, Assam participated in the PM Dhan Dhaanya Krishi Yojna held on 11 October 2025 at Pusa, New Delhi by organising a live telecast at the Institute's auditorium. Farmers from various villages of Kamrup district attended the event.

PM-KISAN 20th Instalment Release

ICAR–National Research Centre on Pig, Guwahati, Assam organized a live viewing of the release of the 20th instalment of PM-KISAN by the Hon'ble Prime Minister on 2nd August 2025 at the Institute's auditorium. Farmers from nearby villages, along with scientists and staff members, attended the programme.

PM-KISAN 21st Instalment Release

ICAR–National Research Centre on Pig, Guwahati, Assam actively participated in the live telecast of the release of the 21st instalment of PM-KISAN for the period August 2025 to November 2025 on 19th November 2025. The event was organized at the Institute's auditorium, where farmers from different villages of Kamrup district, Assam, along with other participants of the Institute attended the programme.

International Yoga Day

ICAR–National Research Centre on Pig celebrated the International Day of Yoga on 21 June 2025 with enthusiastic participation from scientists, technical officers, administrative staff, and supporting personnel of the Institute. The programme was organized in accordance with the Common Yoga Protocol, emphasizing the importance of yoga in promoting physical fitness, mental well-being, and a healthy lifestyle.

Celebration of Janjatiya Gaurav Diwas

ICAR–National Research Centre on Pig observed "Janjatiya Gaurav Diwas 2025" from 1st to 15th November 2025 through a series of thematic programmes aimed at empowering tribal communities. The activities covered awareness of ongoing Government schemes, infrastructure development, promotion of art and GI-tagged crafts, and sustainable piggery practices focusing on animal nutrition, AYUSH awareness, and disease screening. The main event was held on 9th November 2025 at Nampara, Assam, with active community participation. Programmes also emphasized livelihood and entrepreneurship promotion, SHGs and start-ups, education and skill development, and socio-economic awareness, paying tribute to Bhagwan Birsa Munda and reinforcing the institute's commitment to inclusive tribal development.


Celebration of World Environment Day

World Environment Day 2025 was celebrated on 5th June at ICAR–NRC on Pig, Rani, Guwahati, with a cleaning drive and tree plantation programme.


राजभाषा प्रकोष्ठ

राजभाषा हिन्दी के सुचारु कार्यान्वयन हेतु भा.कृ.अनु.प.-राष्ट्रीय शूकर अनुसंधान केंद्र, गुवाहाटी में राजभाषा कार्यान्वयन समिति गठित है। इस समिति के अध्यक्ष डॉ. विवेक कुमार गुप्ता, निदेशक, भा.कृ.अनु.प.-राष्ट्रीय शूकर अनुसंधान केंद्र तथा सदस्य सचिव डॉ. सतीश कुमार, वैज्ञानिक एवं प्रभारी, राजभाषा प्रकोष्ठ हैं। समिति कार्यालय में राजभाषा हिन्दी के प्रभावी कार्यान्वयन तथा निर्धारित लक्ष्यों की प्राप्ति हेतु आवश्यक दिशा-निर्देश प्रदान करती है। राजभाषा कार्यान्वयन समिति की बैठक प्रत्येक तिमाही में आयोजित की जाती है, जिसमें हिन्दी के प्रचार-प्रसार हेतु सुझाव दिए जाते हैं तथा विगत तिमाही की प्रगति रिपोर्ट की समीक्षा की जाती है। कार्यालय द्वारा निर्धारित समय पर राजभाषा विभाग एवं परिषद को तिमाही प्रगति रिपोर्ट प्रेषित की जाती है।

वर्ष के दौरान राजभाषा कार्यान्वयन समिति की चार बैठकों का आयोजन किया गया, जिनकी अध्यक्षता निदेशक, डॉ. विवेक कुमार गुप्ता द्वारा की गई। बैठकों के कार्यवृत्त एवं अनुपालन प्रतिवेदन परिषद को सूचनार्थ प्रेषित किए गए। इसके अतिरिक्त, संस्थान गुवाहाटी नगर राजभाषा कार्यान्वयन समिति का सदस्य है तथा संस्थान के निदेशक एवं राजभाषा अधिकारी द्वारा नगर राजभाषा कार्यान्वयन समिति की सभी दो बैठकों में भाग लिया गया। संस्थान द्वारा प्रत्येक तिमाही में एक राजभाषा कार्यशाला का आयोजन किया गया तथा हिन्दी दिवस के अवसर पर हिन्दी पखवाड़ा 2025 का भी आयोजन किया गया। राजभाषा विभाग के निर्देशानुसार वार्षिक कार्यक्रमों, राजभाषा अधिनियमों तथा समय-समय पर जारी अन्य आदेशों/निर्देशों का कार्यालय द्वारा सफलतापूर्वक अनुपालन किया गया।

राष्ट्रीय शूकर अनुसंधान केंद्र, राणी, गुवाहाटी में हिंदी पखवाड़ा-२०२५ का आयोजन

भा.कृ.अनु.प.-राष्ट्रीय शूकर अनुसंधान केंद्र, रानी, गुवाहाटी में दिनांक 16 सितंबर, 2025 से 30 सितंबर, 2025 तक हिन्दी पखवाड़ा 2025 का सफलतापूर्वक आयोजन किया गया। हिन्दी पखवाड़ा का शुभारम्भ निदेशक, भा.कृ.अनु.प.-राष्ट्रीय शूकर अनुसंधान केंद्र, रानी, डॉ. विवेक कुमार गुप्ता द्वारा किया गया। अपने उद्घाटन संबोधन में निदेशक महोदय ने हिन्दी भाषा के महत्व तथा शासकीय कार्यालयों में इसके प्रभावी उपयोग पर प्रकाश डाला एवं सभी अधिकारियों/कर्मचारियों से अधिकाधिक कार्य हिन्दी में करने का आह्वान किया। तत्पश्चात प्रभारी राजभाषा अधिकारी एवं वैज्ञानिक, डॉ. सतीश कुमार द्वारा राजभाषा हिन्दी के उद्भव एवं विकास संबंधी ऐतिहासिक पृष्ठभूमि की जानकारी दी गई। उन्होंने हिन्दी पखवाड़ा के दौरान आयोजित की जाने वाली विभिन्न प्रतियोगिताओं एवं कार्यक्रमों की रूपरेखा से सभी को अवगत कराया। इस अवसर पर उपस्थित सभी अधिकारियों एवं कर्मचारियों द्वारा राजभाषा प्रतिज्ञा भी ग्रहण की गई। उद्घाटन कार्यक्रम के दौरान भारत सरकार के माननीय कृषि एवं किसान कल्याण मंत्री, श्री शिवराज सिंह चौहान का शुभकामना संदेश भी वाचन कर सुनाया गया।

हिंदी पखवाड़ा के अंतर्गत निम्नलिखित कार्यक्रम का आयोजन किया गया

दिनांक	कार्यक्रम	कार्यक्रम समन्वयक
16/09/2025	हिंदी निबंध प्रतियोगिता	डॉ जयचित्र देवी
18/09/2025	श्रुतिलेख प्रतियोगिता	डॉ सतीश कुमार
19/09/2025	हिंदी कार्यशाला (वक्ता: डॉ सतीश कुमार) विषय: हिंदी टिप्पणी लेखन एवं हिन्दी पत्राचार	डॉ लोकेश ई
22/09/2025	समयस्फूर्त भाषण (Extempore) प्रतियोगिता	डॉ सतीश कुमार
23/09/2025	विद्यार्थियों के लिए आशुभाषण प्रतियोगिता, स्थान: पातगाँव प्राथमिक विद्यालय	डॉ प्रियजय कर
24/09/2025	विद्यार्थियों के लिए हिंदी निबंध प्रतियोगिता, स्थान: पातगाँव प्राथमिक विद्यालय	डॉ लोकेश ई
25/09/2025	राजभाषा कार्यशाला (मुख्य अतिथि: श्री बिपिन बिहारी)	श्री उत्पल घोष
26/09/2025	टंकण प्रतियोगिता (यूनिकोड से हिंदी टाइपिंग) गूगल फार्म पर	डॉ सलाम जयचित्र देवी
29/09/2025	काव्य पाठ प्रतियोगिता	डॉ विशाल रॉय
30/09/2025	हिन्दी कार्यशाला (विशेष आमंत्रित अतिथि) एवं समापन समारोह	डॉ सतीश कुमार

राष्ट्रीय शूकर अनुसंधान केंद्र में १५ दिनों से चल रही हिंदी पखवाड़ा का सफलतापूर्वक समापन दिनांक ३०.०९.२०२५ को हुआ। इस समारोह के मुख्य अतिथि, महानिदेशक लेखापरीक्षा का कार्यालय (केंद्रीय) के गुवाहाटी शाखा के उपनिदेशक, श्री बिपिन बिहारी जी थे। उन्होंने हिन्दी भाषा के योगदान एवं उत्तरपूर्वी भारत में हिन्दी भाषा के विकास की चर्चा की एवं हिन्दी भाषा के उपयोग के विभिन्न पहलुओं पर विस्तार से चर्चा की। उन्होंने हिन्दी भाषा के कवियों एवं लेखकों के योगदान को भी याद किया। संस्थान के निदेशक महोदय ने हिंदी का प्रयोग सिर्फ सिर्फ हिंदी पखवाड़ा तक सीमित न रखकर उसे वर्ष भर अधिक से अधिक प्रयोग पर बल दिया जिससे हिंदी भाषा का अधिक से अधिक प्रसार एवं प्रचार हो सके। संस्थान के प्रभारी राजभाषा अधिकारी एवं वैज्ञानिक डा. सतीश कुमार ने हिंदी पखवाड़ा के आयोजन का उद्देश्य हिंदी का अधिक उपयोग कर राजभाषा का विकास करना बताया। उन्होंने हिंदी पखवाड़ा में बढ़-चढ़ कर भाग लेने के लिए संस्थान के सभी कर्मचारियों एवं वैज्ञानिकों का आभार प्रकट किया एवं राजभाषा के विकास में योगदान देने के लिए सभी को प्रेरित किया। हिंदी पखवाड़ा में विभिन्न प्रकार के प्रतियोगिताओं का आयोजन किया गया जिसमें हिंदी श्रुति लेखन, निबंध प्रतियोगिता, वाद-विवाद प्रतियोगिता, हिन्दी टंकण प्रश्नोत्तरी आदि शामिल थे। इसके अलावा दो हिंदी कार्यशाला का आयोजन किया गया जिसमें हिंदी वर्णमाला, हिन्दी बोलचाल में पुल्लिंग एवं स्त्रीलिंग का सही प्रयोग एवं कार्यालय आवेदन पत्रों के प्रारूप की जानकारी दी गई। प्रतियोगिता के विजेताओं को प्रमाण-पत्र एवं पारितोषिक राशि देकर सम्मानित किया गया। इस अवसर पर वर्ष भर हिन्दी में कार्य करने के लिए विशेष पुरस्कार योजना के तहत संस्थान से दो कर्मियों को प्रशस्ति पत्र एवं नकद राशि देकर सम्मानित किया गया।

TRAINING CELL

Nodal Officer: Rafiqul Islam, Principal Scientist

The institute conducts regular training programmes for pig farmers and entrepreneurs focusing on scientific pig management, artificial insemination, reproductive management, and pork processing with value addition, along with customized modules on pig health and productivity. Training programmes are offered under multiple categories, including sponsored programmes supported by government agencies, KVKs, and NGOs; self-sponsored programmes for individuals; and institute-sponsored programmes for SC and ST beneficiaries under various schemes. Additionally, one-day exposure visits provide practical insights into pig farming, while online training programmes offer flexible learning opportunities. These programmes vary in duration, participant capacity, and format, ensuring accessibility, skill development, and knowledge dissemination among stakeholders.

List of the training programmes conducted during January to December, 2025

Sl. No.	Name of the Training Program	Date	Participants	
			Detail	No.
1	Technology demonstration on Silage making and storage for feeding of pigs to the Scheduled caste farmers	January 3, 2025	Farmers	30
2	Technology Demonstration on Artificial Insemination in pigs to tribal farmers	January 6, 2025	Farmers	51
3	Scientific pig farming for livelihoods and nutritional Security of tribal farmers	January 8-10, 2025	Farmers	23
4	Modern Pig Production Practices	January 20-24, 2025	Veterinary Officers	18
5	Application of Artificial Insemination and other production techniques in commercial pig farming	January 28-30, 2025	Farmers	22
6	Training on “Boar semen processing for artificial Insemination in Pig”	January 28-30, 2025	Veterinary Officers and Paravets	04
7	Reproductive management and artificial insemination in pigs for entrepreneurship development and livelihood security	February 3-5, 2025	Farmers	29
8	NPGET-SCSP sponsored national training programme on “The know-how of genome editing technology in animals”	February 10-17, 2025	Students	11

Sl. No.	Name of the Training Program	Date	Participants	
			Detail	No.
9	Entrepreneurship Development Programme on Scientific Pig Production Practices and Value Addition of Pork	Feb 19-21, 2025	Entrepreneurs	19
10	Exposure visit/ training session on "scientific methods of pig farming and management" for the Livestock Business Councillors (LBCs)/Pashu Sakhis	Feb 20, 2025	Farmers	28
11	Scientific Pig Farming and Artificial Insemination	February 24-26, 2025	Farners	25
12	National training programme on "Laboratory Techniques for Genome Editing Workflow in Animals"	March 3-7, 2025	Students	21
13	"Reproductive management and Artificial Insemination in Pig	March 10-12, 2025	Veterinary Officer	24
14	Commercial pig farming using artificial insemination	April 22-24, 2025	Entrepreneurs	20
15	Scientific Management and Treatment of Pigs	April 28-May 02, 2025	Veterinary Officers	20
16	Scientific Management and Treatment of Pigs	May 05-09, 2025	Veterinary Officers	20
17	Exposure visits and training programme on "Scientific pig rearing practices" for Farmers A& N Islands	June 03-05, 2025	Farmers	25
18	Scientific Management and Treatment of Pigs	17-19 June 2025	Veterinary Officers	14
19	Scientific production practices for propagation of 'Rani' pig in the field.	June 25-26, 2025	Farmers	45
20	Reproductive management and Artificial Insemination in pigs	July 8-10, 2025	Farmers	24
21	Reproductive management and Artificial Insemination in pigs	July 15-17, 2025	Farmers	19
22	Scientific pig production and health management practices for large scale pig farming	July 22-24, 2025	Entrepreneurs	19
23	Reproductive management and Artificial Insemination in pigs	July 29-31, 2025	Farmers	22

Sl. No.	Name of the Training Program	Date	Participants	
			Detail	No.
24	Reproductive management and Artificial Insemination in pigs	August 5-7, 2025	Farmers	25
25	Demonstration of technology on Artificial Insemination in pigs to the tribal farmers	August 12, 2025	Farmers	37
26	Modern Pig Farming	September 01-04, 2025	Paravets	19
27	Modern Pig Farming	September 09-12, 2025	Paravets	17
28	Scientific production and health management of pigs for profitable farming	September 16-18, 2025	Farmers	63
29	Scientific Pig Farming with special reference to control and management of common diseases	September 22-26, 2025	Veterinary Officers	20
30	Improving production in pig farms by application of artificial insemination in pigs	October 8-10, 2025	Farmers	19
31	Scientific Pig Farming and breeding management using Artificial Insemination technology	October 13-15, 2025	Entrepreneurs	14
32	Scientific Pig Production Practices and Value Addition of Pork	October 17, 2025	Entrepreneurs	26
33	Scientific pig production and health management practices for commercial pig farming	October 29-31, 2025	Farmers	24
34	Technology demonstration to the Scheduled caste farmers on preparation of low-cost feed and Silage for pigs	November 03, 2025	Farmers	17
35	Technology demonstration on Silage making and storage for feeding of pigs to the tribal farmers	November 4, 2025	Farmers	35
36	Breeding and health management techniques for profitable pig farming	November 6-7, 2025	Farmers	38
37	Pig Farming - a profitable enterprise	November 11-13, 2025	Paravets	18

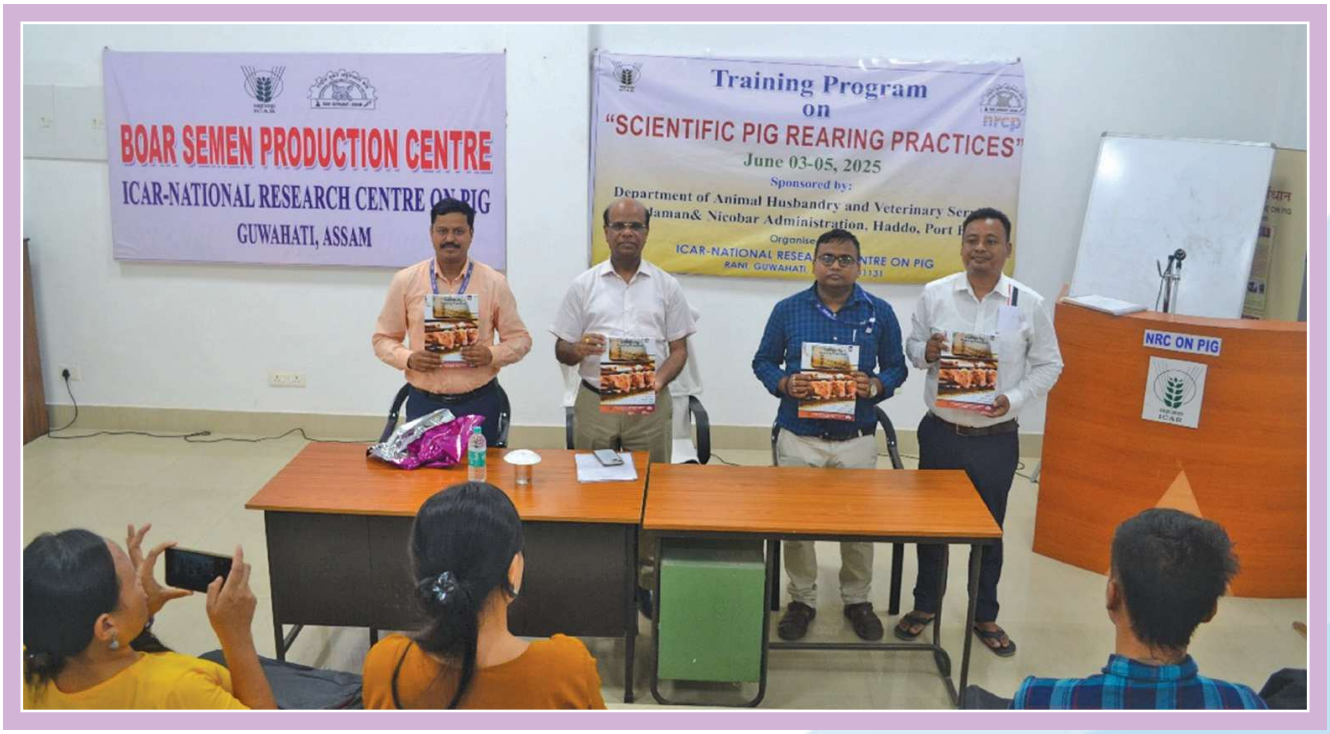
Sl. No.	Name of the Training Program	Date	Participants	
			Detail	No.
38	Farmers'/ Entrepreneurs' Training on "Pig Farming - a profitable enterprise"	November 18-20, 2025	Paravets	14
39	Reproductive management and artificial insemination in pig farming for entrepreneurship development and livelihood security	November 25-27, 2025	Farmers	39
40	Profitable pig farming through artificial insemination and other management techniques	December 01-04, 2025	Farmers	25
41	Accelerating production in pig farms with the application of Artificial Insemination	December 09-12, 2025	Farmers	18
42	Technology Demonstration on Artificial Insemination in pigs to tribal farmers	December 22, 2025	Farmers	122
				1123

Dr. Raghavendra Bhatta, Honourable Deputy Director General (Animal sciences)- ICAR, New Delhi and Dr. Vivek Kumar Gupta, Director, ICAR-NRC on Pig, Rani with the participants of the Self-sponsored Training Programme dated April 22-24, 2025

Director, ICAR-NRC on Pig, Rani with the participants of the Self-sponsored Training Programme dated April 22-24, 2025

Dr. Raghavendra Bhatta, Honourable Deputy Director General (Animal sciences)- ICAR, New Delhi was interacting with the participants of the Self-sponsored Training Programme dated April 22-24, 2025

AH&VS, Govt. of Sikkim sponsored Training of Veterinary Officers on "Reproductive management and Artificial Insemination in Pig" conducted during March 10-12, 2025



Release of Training Manual for the Exposure visit and training programme on "Scientific pig rearing practices" for Farmers A& N Islands conducted during June 03-05, 2025

GENDER RESEARCH AND EXTENSION

Organized Health Camp at ICAR-NRC on Pig

A free health camp was organized at the ICAR-National Research Centre on Pig (ICAR-NRC on Pig), Rani, Guwahati, by the women scientists and staff of the institute under the leadership of Dr. Vivek Kumar Gupta, Director, ICAR-NRC on Pig, and Dr. Pranab Jyoti Das, Principal Scientist and TSP In-charge. The camp was held in collaboration with Peerless Hospital, Guwahati (Ayursundra Super Speciality Hospital) and featured the participation of two expert medical practitioners. The primary objective of the health camp was to offer free medical check-ups, consultations and health awareness to tribal farming communities particularly those involved in pig rearing as well as to ensure the well- being of the institute's staff and their families. A total of 117 individuals participated in the camp, including 32 tribal pig farmers from surrounding areas. The remaining participants comprised ICAR-NRC on Pig staff members and their family members. The medical team from Peerless Hospital conducted health screenings, medical consultations and offered basic advice on hygiene, women's health and managing common ailments related to physically demanding rural lifestyles.

AWARDS AND HONOURS

Dr. Swaraj Rajkhowa, Pr. Scientist, received Fellow of the National Academy of Agricultural Sciences

Dr. Swaraj Rajkhowa, Pr. Scientist, received Fellow of Indian Association of Hill Farming

Dr Rajib Deb, Senior Scientist, received INSA Associate Fellowship 2025

Dr Meera K., Scientist, received best Oral Presentation award in IAWV 2025

Dr. Lokesha E, Scientist has received the Dr. S.K. Talapatra Award 2025

Dr Rajib Deb, Senior Scientist, received best poster award in IAVMICON

Oral/poster presentation awards

Dr. Seema Rani Pegu, Senior Scientist, has received the Best Oral Presentation Award for the research paper entitled "Silent Reservoirs and Monsoon Peak: Japanese Encephalitis Virus Detection in Pigs Amid Human Cases in Kamrup, Assam" at the International Conference on Science, Technology Innovation and Policy for Global Health and Sustainability (ICSTIP-2025), held during 27–29 October 2025 at Assam down town University, Panikhaiti, Guwahati, Assam, India.

Dr. Lokesha E, Scientist has received the Third Prize – Best Poster Presentation Award at the conference "Livestock Nutrition and Health Care: Translating to Human Well-being" held on 16–17 October 2025 at ICAR–National Institute of Animal Nutrition and Physiology, Bengaluru, for the presentation of research outcomes titled "Assessment of Effective Inclusion Level of Corn Dried Distillers' Grains with Solubles (DDGS) in Grower Pigs."

Dr. Meera K, Scientist has received the best Oral presentation Award for research paper entitled "Genetic Diversity of SLA Genes in Indigenous Pig Breeds of India" in XIX National Convention of the Indian Association of Women Veterinarians (IAWV) and Technical Conference on Role of Women Veterinarians in Strengthening One Health through Innovations in Animal Husbandry, Clinical Practices and Wildlife Domain" held on 27-28th November, 2025.

Dr. Vishal Rai, Scientist has received the 3rd Best oral presentation award at the XXX annual convention of ISVIB and international conference on "Envisioning livestock production and protection under the one health landscape" held at ICAR-IVRI, Mukteswar, under the aegis of ISVIB from November 06-08, 2025.

Recognitions

Dr. R. Islam

- Reviewer Excellence Certificate awarded by Agricultural Research Communication Centre, Karnal for reviewing research articles for the Journal "Indian Journal of Animal Research".
- Reviewed 2 manuscripts for "Indian Journal of Animal Sciences" and one manuscript for Indian Journal of Animal Research" during 2025.
- Attended as Technical Expert on 23 July 2025 for site selection and establishment of a Boar Semen Laboratory in the Govt Pig breeding farm, Rani under Animal Husbandry and Veterinary Department, Government of Assam.
- Editor, Animal Reproduction, Gynaecology & Obstetric Section for "Journal of Advanced Veterinary and Animal Research, https://bdvets.org/JAVAR/editorial-board.html
- Editorial Board Member for "Asian Pacific Journal of Reproduction", https://www.apjr.net/editorialboard.asp, Official Publication of Hainan Medical University, Hainan -571100, China. Published by Wolters Kluwer – Medknow.

Dr. Pranab Jyoti Das

- Invited reviewer for Genomics is an open access, peer-reviewed high impact international journal published by Elsevier (2024).

- Invited reviewer for Microbial Pathogenesis is an open access, peer-reviewed high impact international journal published by Elsevier (2025).
- Invited reviewer for Frontiers in Immunology is an open access, peer-reviewed high impact international journal published by Lausanne: Frontiers Research Foundation (2025).
- Invited reviewer for PLoS one is an open access, peer-reviewed high impact international journal published by PLoS (2025).
- Invited reviewer for Virulence is an open access, peer-reviewed high impact international journal published by Taylor & Francis (2025).
- Invited reviewer for Scientific Report is an open access, peer-reviewed high impact international journal published by Nature (2025).
- Invited reviewer for Animal Science is an open access, peer-reviewed high impact international journal published by ICAR (2024).
- Invited reviewer for Psychiatric Genetics is an open access, peer-reviewed high impact international journal published by Lippincott Williams & Wilkins (2025).
- Technical committee member of revisiting the Assam Pig breeding Policy-2019, Govt. of Assam.
- External Expert Member of the Task Force for formulation of national Yak breeding Policy.
- Act as external member of PhD Viva Voce Examination held on 22 April 2025 on the research topic "Sustainability and competitiveness of small-scale pig farms of Assam" Assam Don Bosco University, Tapesia Gardens, Kamarkuchi, Sonapur-782402, Assam
- Act as member breed selection subcommittee of Animal husbandry and Veterinary Department Assam and participated meeting held on 27th August 2025 at Chenikuthi, Guwahati Assam.
- Acts as observer by the ASRB to conduct Combined NET-2025 and Preliminary Examination for ARS, SMS (T-6) and STO (T-6) -2025 held during 12.11.2025 & 13.11.2025
- Act as a selection committee member for post of Assistant Professor, Animal Husbandry, Department of Animal Science, Visva- Bharati, Santiniketan, West Bengal to be held on 12th September, 2025 in the Palli Siksha Bavana, Visva- Bharati, West bengal.

Dr. R. Thomas

- Received Fellow of Indian Meat Science Association in the year 2025.

Dr. Seema Rani Pegu

- Served as External Examiner for the evaluation and viva voce examinations of M.V.Sc. and Ph.D. theses at the College of Veterinary Science, Assam Veterinary and Fishery University, Khanapara, Assam.

Dr. Rajib Deb

- Delivered invited talk/ Lead paper on "Disease dynamics and control strategies for African Swine Fever in India's Piggery Sector" during the international conference on "The pursuit of sustainable hill farming: Innovations for profitable future livelihood" organized by

ICAR-NEH Region, Tripura Centre, Agartala in collaboration with Indian association of Hill Farming on 20th November, 2025.

- Delivered invited talk on "Addressing livestock health and food safety using cutting edge molecular tools" during the 91st general body meeting of Indian National Science Academy at IIT-Delhi during 3rd-4th December, 2025.
- Delivered invited lecture on "Point-of-Care (PoC) Diagnostics for Livestock Disease Diagnosis" at the ICAR-NPGET (SCSP)–sponsored 21-day Winter School on "Basic Biotechnology Tools & Techniques", ICAR-Central Sheep & Wool Research Institute, Avikanagar, Rajasthan (10 Feb–3 Mar 2025).
- Participated in celebration of World Science Day for peace and development on 10th November 2025 organized by International Science Council
- Served as an invited expert for the International Science Council (ISC), Paris, France, in the evaluation of articles for the Frontiers Planetary Prize (4th Edition)
- Deputed by the Agricultural Scientists Recruitment Board (ASRB) as Observer (Server) for Combined NET-2025 and ARS/SMS/STO (T-6) Preliminary Examination, Guwahati (12–13 November 2025).
- Coordinated the INSA Remote Area Lecture on "Will antibiotics stop working? – The story of superbugs" at Government Higher Secondary School, Kanubari, Longding, Arunachal Pradesh, on 22 October 2025, sponsored by the Indian National Science Academy (INSA).
- Served as Expert Project Evaluator for the Anusandhan National Research Foundation (ANRF) under the Advanced Research Grant (ARG) scheme (2025).
- Coordinated a one-day Biotechnology Popularization and Skill Development Workshop for School Children on 8 August 2025 sponsored by the Biotech Research Society, India (BRSI)
- Acted as Resource Person and Organizing Committee Member at the INYAS Technical Symposium and Mid-Year Meeting (ASTSF-2025) on Advances in Science and Technology for Sustainable Future from 18th-20th September, 2025 at Vellore Institute of Technology, Vellore, Chennai
- Nominated as Organizing Committee Member for INYAS National-Level Online Competitions, including National Competition for Research Excellence (NCRE) and SARANSH - Thesis Competition for PhD students- 2025
- Invited as Special Guest to the Field Day cum Input Distribution Programme under Tribal Sub Plan (TSP) of ICAR-NRCP, jointly organized with Animal Resources Development Department, Govt. of Tripura, at Unakoti District, Tripura (9 September 2025).
- Served as Selection Committee Member for evaluation of applications under the Indian National Young Academy of Science (INYAS–INSA) Membership Drive, Batch 2026.
- Invited as Resource Person to deliver a lecture at the IPR National Seminar on "The Role of IPR in Research and Innovation", organized by ICAR-NRC on Mithun, Nagaland, under the NAIF-funded TMU project (September 2025).

- Featured as "Promising Young Scientist of North East" in BioNE – E-zine of Biological Sciences (ISSN: 2456-7264), 30th Issue, published on 24 June 2025.
- Nominated as Returning Officers for IVRISC Election 2024-25, ICAR-Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India.
- Received Letter of appreciation for acting as core team member in INYAS's selection as an IAP Young Affiliate 2025
- Delivered an online invited lecture as Resource Person on "Recent Advancements in Diagnosis and Development of Vaccine Candidates against Swine Viral Diseases" on 19 July 2025, organized by the Institutional Biotech Hub, Bahona College, Jorhat, Assam (Entrepreneurship Lecture Series).
- Invited Associate Editor- Scientific Reports, PLOS One, PLOS Pathogenesis
- Selected as Member- International Science Council Forum on Publishing and Research Assessment, 2025

Dr. Satish Kumar

- Recognized Peer reviewer for several research manuscripts for journals Gene, Tropical Animal Health and Production, Journal of Meat Science, Indian Journal of Animal Sciences, Nucleus.

Dr. S.J.Devi

- Reviewer of the papers in the "3rd International Conference On Networks And Cryptology (NETCRYPT-2025)" organized by School of Computer and Systems Sciences, Jawaharlal Nehru University, New Delhi, India from 29 May to 31 May, 2025.
- Associate editor for American Journal of Electrical and Computer Engineering.

Dr. Priyajoy Kar

- Invited as a reviewer for Indian Journal of Extension Education and Indian Farming.

Dr. Lokesha E

- Served as a Rapporteur in a scientific session at the conference "Livestock Nutrition and Health Care: Translating to Human Well-being" held on 16–17 October 2025 at ICAR–National Institute of Animal Nutrition and Physiology, Bengaluru.
- Served as a peer reviewer for research manuscripts submitted to the Journal of Experimental and Laboratory Medicine, Animal Nutrition and Feed Technology, and Chemical and Biological Technologies in Agriculture.
- Nominated as a Member of the Selection Committee for the recruitment of one Senior Research Fellow (SRF) under the ARYA Project at ICAR–Agricultural Technology Application Research Institute Zone VI, Guwahati, held on 12 December 2025.
- Served as a Reviewer for SARANSH – Thesis Competition for Ph.D. Students 2025 (Category C: Life Sciences), organized by the Indian National Young Academy of Sciences (INYAS), as part of the fifth edition of the SARANSH Thesis Competition

HUMAN RESOURCE DEVELOPMENT

Dr. Vivek Kumar Gupta

- Attended the review meeting organized under the chairmanship of DDG (Animal Science) on 02.04.2025
- Attended the meeting on Vikshit Bharat conducted under the chairmanship of DG, ICAR on 09.05.2025
- Attended the review meeting held under the chairmanship of Union Agriculture Minister Shivraj Singh Chouhan, focusing on the research aspects on 12.05.2025
- Participated in the Directors' Conference held at National Academy of Agricultural Sciences Complex, New Delhi on 20.05.2025
- Attended the meeting with DDG (Animal Science) for review of staff cases of ICAR-NRC on Pig under FR 56(J) at NAC, New Delhi on 19.06.2025
- Participated in the Directors' and Vice-Chancellors' Conference held at Maharashtra Animal and Fishery Sciences University, Nagpur on 07.07.025
- Attended the NAVS General Council Meeting on 14.07.2025
- Attended the ICAR Foundation Day held at National Academy of Agricultural Sciences Complex, New Delhi on 16.07.2025
- Attended the meeting under the chairmanship of Union Agriculture Minister Shivraj Singh Chouhan for review of ongoing research projects.
- Attended the meeting on implementation of Pandemic Funding projects at ICAR-NRC on Pig in collaboration with FAO and DAHD
- Attended the Viksit Krishi Sankalp Abhiyan (VKSA) meeting conducted under the chairmanship of DG, ICAR. On 06.09.2025
- Attended the meeting with Secretary, DAHD and DDG to review institute progress at National Academy of Agricultural Sciences Complex, New Delhi. On 23.09.2025
- Reviewed the progress of AICRP Units at Tirupati and Tamil Nadu Veterinary and Animal Sciences University, Chennai on 08.09.2025
- Attended the meeting organized by NITI Aayog at Indian Institute of Technology Guwahati for preparing the roadmap for future research in the North Eastern Region on 15-16.10.2025
- Attended the meeting under the chairmanship of DG, ICAR to review ongoing research activities on 28.10.2025
- Attended the Annual Convention of the Hill Farming Society at Agartala and chaired a scientific session on 20-21.11.2025
- Attended the meeting organized jointly by DAHD and ICAR at New Delhi focusing on research-oriented initiatives on 27.11.2025

Dr. Swaraj Rajkhowa

- Attended General body meeting and Foundation Day programme of NAAS held at NASC complex, New Delhi during 4-5th June, 2025.
- Attended the Institute Biosafety Committee Meeting (IBSC), of Assam Don Bosco University (online) on 30th July, 2025.
- Attended Site Selection Committee Meeting of KVK, Arunachal Pradesh held at ICAR ATARI, Zone VI on 23rd of August, 2025.
- Attended the IMC meeting of ICAR-NRC on Yak, Dirang, Arunachal Pradesh held on 13th October 2025 (on-line).
- Attended State level Workshop on Strategies for ASF control and containment at Assam Administrative staff college, Khanapara, Guwahati on 15th October, 2025.
- Attended the meeting of Expert committee constituted for the final and mid-term evaluation of research proposals funded by DBT held at the Department of Animal Biotechnology, CVSc, Khanapara on 15th November, 2025.
- Attended International Conference (PASEL-2025) organized by the ICAR Research Complex for NEH Region, Tripura Centre, Lembucherra, from November 20th to 21st 2025.

Dr. Pranab Jyoti Das

1. As Scientist-in-Charge, AICRP on Pig, the following activities have been performed:

- SVVU, Tirupati and TANUVAS, Kattupakkam (October 7–11, 2026): Led the inter-state performance review and technical inspection of the AICRP on Pig units at Sri Venkateswara Veterinary University (SVVU), Andhra Pradesh, and the Kattupakkam unit of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). The mission focused on assessing regional breeding progress and operational efficiency.
- IVRI, Eastern Regional Station (ERS), Kolkata (December 15–16, 2025): Conducted a formal performance review and site inspection of the AICRP on Pig unit at IVRI, Kolkata. Key activities included interactive consultations with the Head of Department, faculty, and the project team (PI and Co-PIs) to align regional research outputs with national coordinated objectives.
- NDVSU, Jabalpur and DSVCKV, Durg (January 27–31, 2026): Executed a dual-purpose mission involving the performance audit of the existing unit at Nanaji Deshmukh Veterinary Science University (NDVSU), Jabalpur, and a critical feasibility assessment at Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya (DSVCKV), Durg. The latter focused on evaluating existing infrastructure for the strategic establishment of a proposed new AICRP unit in Chhattisgarh.
- ICAR Research Complex for NEH Region, Dimapur, Nagaland (March 23–24, 2026): Conducted a comprehensive performance review and statutory inspection of the AICRP on Pig unit. The engagement included interactive technical sessions with the Principal Investigator and regional scientists, alongside an in-depth evaluation of the unit's

specialized laboratory facilities and research infrastructure.

- Participated in a high-level brainstorming meeting and formal MoU signing ceremony aimed at establishing a joint platform for academia, institutions, and policymakers to drive S&T-led development across the eight North Eastern states on 17th March 2026 and also attended the inauguration of "RICH-NE" (Research and Innovation Cluster Hub of NE India) held on 18th March 2026 alongside the 66th Foundation Day celebrations of CSIR-NEIST, marking a milestone in regional research and resource utilization.
- Attended "Conclave on Development of Dairy Sector, Animal Husbandry and Co-operatives in Assam" held on 3rd & 4th November, 2025 at Room No. 308, Assam Administrative Staff College, Khanapara, Guwahati.

Dr. Rafiqul Islam

- Attended an online Training dated 18 August 2025 on E Office E-file Module organized by ICT Unit, ICAR HQRs, NIC and RailTel.
- Attended a user Awareness Programme on 19 August 2025 on "One Nation One Subscription and INFLIBNET Services" organized by INFLIBNET Centre, Gandhinagar Gujrat in collaboration with Assam College Librarians' Association at National Law University and Judicial Academy, Hajo, Assam.
- Attended an online Training session on 16 September 2025 organized by ONOS on "How to access the research Journals of Oxford University Press through ONOS".
- Attended a Webinar on 30 September 2025 organized by ONOS Team on "How to access the research Journals of Taylor & Francis group through ONOS".
- Attended a Webinar on 28 November 2025 organized by ONOS Team on "How to Access e-resources under One Nation One Subscription (ONOS)".

Dr. R. Thomas

- BIS: Member of Scientific Panel (FAD 18 and FAD 32)
- FSSAI: Member of Scientific Panel (SP-13, Meat and Meat Products)
- CPCB: Member of Expert Committee for finalization of draft EnvironmentalGuidelines and categorization for Piggery Units

Dr. Seema Rani Pegu

- Attended the International Conference on Science, Technology Innovation and Policy for Global Health and Sustainability (ICSTIP-2025), organized by the Faculty of Science, Assam down town University, held from 27–29 October 2025 at Assam down town University, Panikhaiti, Guwahati, Assam, India, and presented a research paper entitled *"Silent Reservoirs and Monsoon Peak: Japanese Encephalitis Virus Detection in Pigs Amid Human Cases in Kamrup, Assam."*
- Attended the Technical Conference on Role of Women Veterinarians in Strengthening One Health through Innovations in Animal Husbandry, Clinical Practices and Wildlife Domain,

held during 27–28 November 2025 at the College of Veterinary Science, Assam Veterinary and Fishery University, Khanapara, Guwahati-781022, organized by the Indian Association of Women Veterinarians, and presented a research paper entitled *"When Viruses Converge: One Health Insights into JEV–Swinepox Coinfection in Pigs of Assam.*

Dr. Satish Kumar

- Attended the Foundation Day Lecture of ISAGB "Understanding epigenetics towards a more sustainable animal production system". delivered by Dr. Trilochan Mohapatra, Chairperson, PPVFRA, New Delhi.

Dr. S. J. Devi

- Attended a one-day Space Technology Meet titled "Research and Development in Space Technology for Agricultural Transformation by ICAR" held at A.P. Shinde Symposium Hall, NASC Complex, New Delhi, on 23 August 2025.
- Attended the Grow Further Town Hall & Grant Writing Workshop held on 12 July 2025.

Dr. Lokesha E

- Participated in a self-sponsored training programme on "Advances in Application of Nanotechnology" held from 10–14, November 2025 at ICAR–Central Institute for Research on Cotton Technology, Mumbai.
- Participated in a 21-day International Online Training Programme on "Advanced Nutritional Strategies for Enhancing Farm Efficiency and Eco-Friendly Poultry, Fish, and Animal Production" conducted from 01–26 March 2025, organized by the Department of Animal Nutrition, College of Veterinary and Animal Sciences, Kishanganj, under Bihar Animal Sciences University, Patna.

Dr. Meera K

- Attended XIX National Convention of the Indian Association of Women Veterinarians (IAWV) and Technical Conference on Role of Women Veterinarians in Strengthening One Health through Innovations in Animal Husbandry, Clinical Practices and Wildlife Domain held at CVSc Khanapara from November 27 to 28, 2025.
- Attended 21 days CAFT National training programme on "Applying genomic models in prediction of breeding values using BLUPF90 software" at ICAR-National Dairy Research Institute, Karnal from January 10 to January 30, 2025.

Dr. Vishal Rai

- Attended and presented poster at VIROCON-2025 organized by Indian Council of Medical Research-National Institute of Virology, Pune and Indian Virological Society from 8th-10th December, 2025 at Pune, Maharashtra.
- Attended online workshop on "From ideas to assets: Demystifying IPR for innovators" organized by ICAR-NRC on Grapes, Pune on 25th July, 2025.

- Served as Assistant Centre Coordinator for the conduct of online CBT for combined NET-2025 and Preliminary examination for ARS, SMS (T-6) and STO (T-6) held during 12.11.2025 and 13.11.2025.
- Attended online workshop on "Protocol Development for Systematic Reviews" on 4th November 2025 organized by Cochrane Affiliate Centre, Indian Council of Medical Research (ICMR), New Delhi.
- Coordinated a workshop on "Biotechnology Popularization and Skill Development Workshop for School Children" sponsored by Biotechnology Research Society of India at ICAR-NRC on Pig on 08.08.2025.
- Co-convenor for World AMR Awareness Week (WAAW) programs from 18th to 24th November 2025 on the theme "Act Now: Protect our present, secure our future" at ICAR-NRC on Pig.
- Co-convenor of One-Day "INSA Societal Awareness program" on the theme "Will Antibiotics Stop Working? – The Story of Superbugs" at Longding, Arunachal Pradesh on 22.10.2025.
- Co-convenor of One-Day Workshop on "Little Scientists, Big Mission: Beat AMR!" organized at ICAR-NRC on Pig on 18.11.2025.
- Coordinator for "Exposure visit for students from Brahmaputra Valley English Academy School, Guwahati" on 9th December, 2025 at ICAR-NRC on Pig.

RESEARCH PROGRAMMES AND PROJECTS

List of External funded projects at ICAR-NRC on Pig during 2025

Sl. No.	Name of Project	Funding Agency	PI and CoI
1	Traceable Value Chain for safe pork in North Eastern Region of India	NASF	P.J. Das, Satish Kumar, S.R. Pegu, R. Thomas, B.C. Das, V.K. Gupta
2	Cataloguing of genomic and transcriptomic signature in indigenous pig tolerant to African swine fever virus	DBT	P.J. Das, Satish Kumar, R. Deb, S.R. Pegu, S. Rajkhowa, V.K. Gupta
3	Development of Myostatin Knock Out Pigs	Network Project	Jaya, Satish kumar, Sunil Kumar, R. Islam, N.H. Mohan
4	Generation of sex-specific phenotypes in pig using genome editing	Network Project	N.H. Mohan, Jaya, Sunil Kumar, J. Doley, R. Islam, P.J. Das, V.K. Gupta
5	Development of thermo-tolerant pig through bio-marker assisted selection	ICAR-NF	NH Mohan
6	Augmenting Pig production by accretion of reproductive efficiency and artificial insemination for generating livelihood security and Entrepreneurship in NER.	DBT	Sunil Kumar, R Islam, VK Gupta
7	Self-sustainable cooperative model for propagation of artificial insemination and envisaging cryopreservation of spermatozoa in pig	NLM, DAHD	Sunil Kumar, R Islam, Pranab J Das, VK Gupta
8	Establishment of a Consortium for One Health to address Zoonotic and Transboundary Diseases in India including North-East Region	DBT	Swaraj Rajkhowa, S.R. Pegu, J. Doley, S. Paul, R. Deb
9	SWINOSTICS: A platform for development and validation of on-field diagnostics of important pig pathogens in NE Region of India for commercial exploration	DBT	Seema Rani Pegu, S. Rajkhowa, P.J. Das, R. Deb, V.K. Gupta,

Sl. No.	Name of Project	Funding Agency	PI and CoI
10	Development of a virus like particle-based vaccine against Indian isolate of porcine circovirus	DBT	Rajib Deb, S. Rajkhowa, J. Doley, H. K. Maity
11	Development of multi-serotypic virus like particle-based vaccine against porcine circovirus disease of pig in India	NLM, DAHD	R. Deb, Hemanta Maity, Sachin Kumar, S.R. Pegu, S. Rajkhowa, V.K. Gupta,
12	Indian Network for Fisheries and Animal Microbial Resistance (INFAAR)	Network Project	Rajib Deb, S.R. Pegu
13	Network Program on Challenging and Emerging Diseases of Animals (CEDA)	Network Project	S.R. Pegu, Juwar Doley, Vishal Rai, Souvik Paul
14	Establishment of STI Hub for Mising and Bodo womenof Assam for economic empowerment through technology interventions in pig value chain	DST	R. Thomas, J. Doley, V.K. Gupta
15	Advancing Nipah Virus Control: Combined Surveillance and Diagnostic Tool Development for Pigs	NASF	Vishal Rai, J. Doley, V.K. Gupta
16	Serological and molecular surveillance of Swine Influenza in pigs coupled with Knowledge, Attitude, Practices studies to explore community insights in Northeast India	DHR	Vishal Rai, Swaraj Rajkhowa, Vivek Kumar Gupta
17	Novel Autochthonous Probiotic Bacterial Isolates from Indigenous Pigs as Sustainable Alternatives to Antibiotic Growth Promoters	DHR	Lokesha E., Vishal Rai, V.K. Gupta

List of Institute funded projects at ICAR-NRC on Pig during 2025

Sl. No.	Name of Project	PI and CoI
1	Exploration of Genome-Wide Selection Signatures in Ghoongroo and Doom pigs of India	Satish Kumar, P.J. Das, Jaya
2	Performance Evaluation of a Novel LWY (male) X Ghoongroo (female) Crossbred Pig	Satish Kumar, P.J. Das, Kalyan De, Jaya, R. Islam, R. Thomas
3	Performance Evaluation of a Novel Duroc (male) X Ghoongroo (female) Crossbred Pig	Meera K., P.J. Das, N.M. Attupuram, Satish Kumar, R. Thomas, R. Islam, Lokesha E.
4	Performance Evaluation of a Novel LWY (female) X Ghoongroo (male) Crossbred Pig	Kalyan De, Satish Kumar, NM Attupuram, Jaya, Meera K. R. Islam, R. Thomas
5	Performance Evaluation of a Novel Duroc (female) X Ghoongroo (male) Crossbred Pig	N.M. Attupuram, Kalyan De, Satish Kumar, Meera K, PJ Das, R. Islam, R. Thomas, Lokesha E
6	Exploring the genetic diversity of Swine Leukocyte Antigen (SLA) genes in indigenous pig breeds of India	Meera K., P.J. Das, Satish Kumar, N.M. Attupuram
7	Functional characterization of genes regulating reproduction in sows	Jaya, B.C. Das, N.H. Mohan, Satish Kumar
8	Design of recombinant multi-epitope protein(s) and their expression for assay development	N.H. Mohan, V.K. Gupta, Jaya, S. Jayachitra
9	Development of proteomic and transcriptomics atlas of porcine olfactory system	N.H. Mohan, Jaya, S. Jayachitra, N.M. Attupuram
10	Physic-genomic responses and MCT profiling of exotic and Indigenous pig breeds in heat stress during different seasons	BC Das, Jaya, K. De, J. Doley, N.M. Attupuram, A. Paul, N.H. Mohan
11	Artificial Insemination in Pigs	R. Islam, Sunil kumar
12	Hormonal and herbal intervention for optimizing eutocic farrowing in pigs	R. Islam, Sunil Kumar, Jaya, Lokesha E.
13	Propagation of Artificial Insemination for establishment of multiplier units and optimizing reproductive efficiency in pigs at farmers' field.	Sunil Kumar, R. Islam, P.J. Das,
14	Development, characterization, and validation of nano zinc supplement for improving piglet productivity	Lokesha E, Meera K, S.R. Pegu, Rajendran T, Mohan N.H
15	Surveillance and Monitoring of Swine Diseases	S.R. Pegu, S. Rajkhowa, J. Doley, S. Paul, R. Deb, V. Rai
16	Epidemiology and Molecular Epidemiology of African Swine Fever Virus (ASFV) in North-Eastern region of India (Inter-institutional project)	J. Doley, G. K. Sharma, S. Rajkhowa, S.R. Pegu, P.J. Das, S.J. Devi, N.H. Mohan, S. Paul

Sl. No.	Name of Project	PI and CoI
17	Isolation, Characterization of Porcine Muscle Stem Cells for development of 3D culture	J. Doley, Jaya, R. Thomas, Vishal Rai and S. Paul
18	Development of recombinant VP2 protein based indirect ELISA for serodiagnosis of Porcine parvovirus	Vishal Rai, Juwar Doley, S.R. Pegu
19	Development of e-learning knowledge products in scientific pig production.	P. Kar, N. M Attupuram, S. Jayachitra Devi
20	Development of pig seed village in Assam	P. Kar, C. Jana
21	Development of technology transfer models through participatory rural appraisal in the piggery sector	P. Kar, P.J. Das, Kalyan De, N.M Attupuram, S. Jayachitra Devi, N. H. Mohan
22	Development of a point of care colorimetric assay for detection of meat freshness	R. Thomas, J. Doley, V.K. Gupta
23	Association of farrowing and piglet traits vis a vis colostrum characteristic with neonatal performance in pigs	Kalyan De, Jaya, N.M. Attupuram, Lokesha E.
24	Assessment and optimisation of the water footprint in pig production and processing	N.M. Attupuram, Kalyan De, R. Thomas, N.H. Mohan
25	Dynamics of gut microbiome to dietary management and antibiotic treatment in pigs	N.M. Attupuram, K. De, R. Thomas, S.R. Pegu, R. Islam, N.H. Mohan
26	Design and development of Image based growth rate estimation algorithm for different categories of pigs	S.J Devi, Kh. M. Singh, R. Islam, Sunil Kumar, J. Doley
27	Machine learning assisted identification of different cells of porcine origin	S.J Devi, Jaya, N. H. Mohan
28	Biobanking of reproductive and somatic germplasm of porcine origin	Sunil Kumar, Meera K., R. Islam, V.K. Gupta
29	Exploring the genetic diversity and functional characterization of Swine Leukocyte Antigen (SLA) genes in indigenous pig breeds of India	Meera K., P.J. Das, N.M Attupuram, Satish Kumar, Rajib Deb
30	Investigations on cytokine mediated stress pathways and development of managemental protocols for optimal growth and social well-being in weaned piglets	B.C. Das, Jaya, K. De, N.M. Attupuram, Lokesha E.
31	Molecular Characterisation of Porcine parasites	Souvik Paul, J. Doley, P.J. Das, Vishal Rai, Jaya
32	Development of a herbal anti-diarrhoeal formulation for pigs	Swaraj Rajkhowa, S.R. Pegu, Souvik Paul, Lokesh E.

PERSONNEL

ICAR-National Research Centre on Pig

RMP and Scientist Cadre

Dr. Vivek Kumar Gupta
Director

Dr. Bikash Chandra Das
Principal Scientist
(Animal Physiology)

Dr. Swaraj Rajkhowa
Principal Scientist
(Veterinary Medicine)

Dr. Rafiqul Islam
Principal Scientist (Animal Reproduction & Gynaecology)

Dr. Pranab Jyoti Das
Principal Scientist
(Animal Genetics and breeding)

Dr. Rajendran Thomas
Senior Scientist
(Livestock Products & Technology)

Dr. Seema Rani Pegu
Senior Scientist
(Veterinary Pathology)

Dr. Juwar Doley
Senior Scientist
(Animal Biotechnology)

Dr. Souvik Paul
Senior Scientist
(Veterinary Parasitology)

Dr. Rajib Deb
Senior Scientist
(Animal Biotechnology)

Dr. Kalyan De
Senior Scientist
(Livestock Production Management)

Dr. Sunil Kumar
Scientist (Animal Reproduction and Gynaecology)

Dr. Jaya
Scientist
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(Animal Genetics & Breeding)

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Scientist (Livestock Production Management)

Dr. Priyajoy Kar
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Dr. Lokesha E
Scientist
(Animal Nutrition)

Dr. Vishal Rai
Scientist
(Veterinary Microbiology)

Dr. Meera K.
Scientist
(Animal Genetics and Breeding)

Dr. Sadhana Ojha
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(Livestock Products Technology)

Administrative Cadre

Shri. Utpal Ghosh
Finance and Accounts Officer

Shri. Rupesh Sabhrawal
Administrative Officer

Shri.Kundan Kumar
Assistant

Mrs. Jonali Nath
Assistant

Ms. Hiramoni Thakuria
Personal Assistant

Mrs. Kabyawati Rabha
Personal Assistant

Shri. Ratul Baishya
Lower Divisional Clerk

Technical Cadre

Dr. Rajib Kumar Das
Technical Officer

Dr. Anil Das
Technical Officer

Dr. Gagan Bhuyan
Technical Officer

Shri. Siba Chandra Deka
Senior Technical Assistant

Shri. Rana Pratap Kakati
Technical Assistant

Shri. Kailash Choudhury
Sr. Technician

Supporting Staff Cadre

Shri. Naren Chandra Deka
Skilled Supporting Staff

Krishi Vigyan Kendra, Goalpara

Dr. Santosh Kumar Baishya
Principal Scientist and Head (Animal Reproduction and Gynaecology

Dr. Hitu Choudhury
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(Animal Science)

Mrs. Poli Saikia
SMS
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Shri. Shiva Rajak
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(Fisheries Science)

Er. Benjamin Kaman
Technical Officer (Soil & Water Conservation Engineering)

Mrs. Minakshi Borah Kaman
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(Community Science)

Mrs. Mousumi Bhuyan
Technical Officer
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Shri. Jayanta Choudhury
Sr. Technician

Shri. Jitumoni Kalita
Skilled Supporting Staff

Shri. Drubha Lochan Rabha
Skilled Supporting Staff

PUBLICATIONS

Research Articles

Arutkumaran, S., Deb, R., Shanmathi, S., Chakravarti, S., Das, P. J., Sengar, G. S., Pegu, S. R., Singh, I., Kumar, S., Meera, K., Rajkhowa, S., Kumar, P., & Gupta, V. K. (2025). Investigating the RelA gene's role in African swine fever tolerance: A study of Indian pigs. *Microbial Pathogenesis,* 206, 107744.

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Rakshit, S., Aiswarya, S., Kar, P., Panja, A., Shubha, K., Mukherjee, A., ... & Sahoo, A. K. (2025). Global carbon market: Policy pathways for low carbon emissions in the agriculture sector. In Agriculture Toward Net Zero Emissions (pp. 61-81). Academic Press.

Abstracts

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Devi, S. J., Jaya and Gupta, V.K. "Deep Learning for Automated Assessment of Cell Viability in Biomedical Imaging". In the 10th International Conference on Information and Communication Technology for Competitive Strategies held at Jaipur, India during 15-17 December 2025.

Devi, S. J., Kar, P., Doley, J., and Gupta, V.K. "ICT in Agricultural Extension: A bibliometric and Analytical Overview". In 12th National Seminar on "Futuristic Agriculture: Technology, Sustainability and Beyond" (22-24 May, 2025) organised by Society for Community Mobilization for Sustainable Development (MOBILIZATION), New Delhi.

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Lokesha, E., Das, P. J., Islam, R., Rai, V., De, K., Nitin, M. A., & Gupta, V. K. (2025). Assessment of effective inclusion level of corn dried distillers' grains with solubles in grower pigs. In Compendium of Abstracts, Conference on "Livestock Nutrition and Health Care: Translating to Human Well-being" (pp. 38–39). ICAR–National Institute of Animal Nutrition and Physiology, Bengaluru.

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Veterinarians in Strengthening One Health through Innovations in Animal Husbandry, Clinical Practices and Wildlife Domain

Pranab Jyoti Das Deliver an invited talk on the topic entitled "Animal Biodiversity and Conservation in the Genomic Era: Science, Innovation, and Policy for Global Sustainability" at the *International Conference on Science, Technology, Innovation and Policy for Global Health and Sustainability (ICSTIP 2025),* scheduled on 27th- 29th October 2025 organized by, Assam down town University, Guwahati, Assam.

Priyajoy Kar. Participated Oral presentation in 12th National Seminar on "Futuristic Agriculture: Technology, Sustainability and Beyond" (22th-24th May, 2025) organized by Society for Community Mobilization for Sustainable Development New Delhi.

Seema R. Pegu presented a research paper entitled "Silent Reservoirs and Monsoon Peak: Japanese Encephalitis Virus Detection in Pigs Amid Human Cases in Kamrup, Assam" at the International Conference on Science, Technology Innovation and Policy for Global Health and Sustainability (ICSTIP-2025), organized by the Faculty of Science, Assam down town University, held from 27–29 October 2025 at Assam down town University, Panikhaiti, Guwahati, Assam, India.

Seema R. Pegu presented a research paper entitled "When Viruses Converge: One Health Insights into JEV–Swinepox Coinfection in Pigs of Assam" at Conference on Role of Women Veterinarians in Strengthening One Health through Innovations in Animal Husbandry, Clinical Practices and Wildlife Domain, held during 27–28 November 2025 at the College of Veterinary Science, Assam Veterinary and Fishery University, Khanapara, Guwahati-781022, organized by the Indian Association of Women Veterinarians.

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SOCIAL MEDIA

অসমীয়া প্ৰতিদিন

E-PAPER গুৱাহাটী অসম ৰাষ্ট্ৰীয় আন্তঃৰাষ্ট্ৰীয় কনক্লেভ ২০২৫ উত্তৰ-পূব ক্ৰীড়া-জগত বিনোদন জীৱন শৈলী স্বাস্থ্য অৰ্থনীতি সম্পাদনা মেজ

চিৰাঙৰ সুন্দৰীত হিতাধিকাৰীৰ মাজত গাহৰিৰ খাদ্য বিতৰণ

বৃহস্পতিবাৰে চিৰাং জিলাৰ সুন্দৰীত ৰাষ্ট্ৰীয় গাহৰি অনুসন্ধান কেন্দ্ৰৰ উদ্যোগত অনুসূচীত জাতিৰ হিতাধিকাৰীসকলৰ মাজত গাহৰিৰ খাদ্য বিতৰণ কৰা হয়

Asomiya Pratidin

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শেহতীয়া প্ৰৰক্ষসমূহ

পৰ্বতঝোৰাত ভোটাধিকাৰ সাব্যস্ত কৰি দাবী কৰিলে প্ৰসেন কুমাৰ ব্ৰহ্মই

কাইলে জুবিনৰ অন্তিম সংস্কাৰ : হাতীমুৰা যুদ্ধকালীন তৎপৰতা...

জুবিনৰ কাষত পাপন...

আমাৰ নিউজলেটাৰত চাবস্ক্ৰাইব কৰক!

বিশেষ অফাৰ আৰু নতুন খবৰ পোৱাৰ প্ৰথমজন হওক

আপোনাৰ নাম

ইমেইল ঠিকনা

চাবস্ক্ৰাইব কৰক

ডিজিটেল সংবাদ, চিৰাং : বৃহস্পতিবাৰে চিৰাং জিলাৰ সুন্দৰীত ৰাষ্ট্ৰীয় গাহৰি অনুসন্ধান কেন্দ্ৰৰ উদ্যোগত অনুসূচীত জাতিৰ হিতাধিকাৰীসকলৰ মাজত গাহৰিৰ খাদ্য বিতৰণ কৰা হয়। গুৱাহাটীৰ ৰাণীস্থিত গাহৰি অনুসন্ধান কেন্দ্ৰ নামৰ সংস্থাৰ উদ্যোগত চিৰাং জিলাৰ চিদলী-চিৰাং উন্নয়ন খণ্ডৰ অন্তৰ্গত সুন্দৰী এম ই স্কুলত গোঁহদত গাহৰি পালনৰ ওপৰত এক সজাগতামূলক সভা অনুষ্ঠিত কৰে।

সজাগতা সভাত গাহৰিৰ পালনৰ ওপৰত বক্তব্য প্ৰদান কৰে সংস্থাৰ পশু চিকিৎসক ডাঃ কল্যাণ দে আৰু ডাঃ সতীশ কুমাৰে। গাহৰি পালকসকলৰ সহায়ক হ'ব পৰাকৈ বিভিন্ন পৰামৰ্শ আগবঢ়োৱা হয়।

সজাগতা সভাত গাহৰি পালকসকলেও বিভিন্ন প্ৰশ্ন কৰি সহযোগ কৰে। আজিৰ এই সজাগতামূলক সভাত উন্নয়ন খণ্ড এলেকাৰ বাচনিভুক্ত ২১০ গৰাকী অনুসূচীত জাতিৰ হিতাধিকাৰীসকলৰ মাজত দুই বস্তাকৈ গাহৰি খাদ্য আৰু এটাকৈ জৰুৰীকালীনভাৱে ব্যবহাৰ কৰিব পৰা বিজুলী বাতি বিতৰণ কৰা হয়।

PIB in Assam
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BIS Guwahati organized a workshop on "Quality Assurance & Standardization in the Food Sector" along with Manak Manthan on IS 1723:2023 – Pork Specification. Stakeholders from ICAR-NRCP, entrepreneurs, and students actively participated in discussions on the role of standards in ensuring food quality and safety.

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4:00 PM · Sep 15, 2025 · **52** Views

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निंचाई व्यवस्था का विस्तार
किसानों को ऋण की सुविधा
कृषि उत्पादन एवं उत्पादकता में वृद्धि
केंद्र एवं राज्य योजनाओं का बेहतर समन्वय
भंडारण एवं प्रसंस्करण सुविधाओं का विकास
फसल विविधीकरण और टिकाऊ कृषि पद्धतियों को बढ़ावा
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43
Highland Post
by HP News Service — September 20, 2025
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SHARES
Shillong, Sep 20: A training programme on 'Scientific Production and Health Management of Pigs for Profitable Farming', along with a scientist-farmer interface and input distribution programme was held in Upper Shillong.
The event held during September 16 to 18 was organised in collaboration with ATMA, East Khasi Hills under the Tribal Sub Plan (TSP) of ICAR-National Research Centre on Pig, Rani, Guwahati.
The training focused on crucial aspects of modern pig farming, covering topics such as breeding, reproduction,
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18 December 2025
ICAR–NRC on Pig observed the Swachhata Pledge programme on 16 December 2025 at the institute premises, marking the formal commencement of Swachhata Pakhwada 2025. Scien... See more
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3 December 2025
Exhibition stall of ICAR–NRC on Pig at the XIX National Convention of IAWV and Technical Conference on "Role of Women Veterinarians in Strengthening One Health through ... See more
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ICAR-National Research Centre on Pig
13 November 2025
The ICAR–National Research Centre on Pig, Rani, Guwahati, in collaboration with Krishi Vigyan Kendra (KVK), Dhudhnoi, Goalpara organized a day-long "Field awareness Cam... See more
Janjatiya Gaurav Diwas
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23 October 2025
An awareness programme titled "Will Antibiotics Stop Working? The Story of Superbugs" was successfully conducted at the Government Higher Secondary School, Kanubari on ... See more
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28 November 2025
A Three days residential training program on Reproductive Management and Artifical Insemination in pig farming for entrepreneurship development and livelihood security ... See more
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Donyi Farm
Thanks for the Training NRCP Staff and manager


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'विकसित कृषि संकल्प अभियान' के तहत माननीय केंद्रीय कृषि एवं किसान कल्याण तथा ग्रामीण विकास मंत्री श्री @ChouhanShivraj का आप सभी किसान बहनों और भाइयों के लिए एक महत्वपूर्ण संदेश। #ViksitKrishi #OneICAR #ICAR @icarindia
0:57
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Media coverage on ViksitKrishiSankalpAbhiyan of ICAR-NRC on Pig and KVK Goalpara.
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ICAR-National Research Centre on Pig
Media coverage on #ViksitKrishiSankalpAbhiyan by ICAR-NRC on Pig scientist with KVK officials
DD News
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ICAR-National Research Centre on Pig, Rani, Guwahati, successfully organized a three-day Tribal Sub Plan (TSP) sponsored residential training programme on "Scientific P... See more
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ICAR-NRC on Pig, in collaboration with Peerless Hospital, Guwahati, successfully conducted a Free Health Check-up and Awareness Program for tribal farmers and s... See more
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19 December 2025
Swachhata Pakhwada 2025 | Cleanliness Drive at ICAR-NRC on Pig
A... See more
ICAR-National Research Centre on Pig, Gu...
@nr... · Jun 6, 2025
World Environment Day was celebrated on 5th June 2025 at ICAR-NRC on Pig, Rani, Guwahati with a cleaning drive and plantation programme. Staff and scientists actively participated, supporting the global theme #BeatPlasticPollution.
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ICAR-National Research Centre on Pig, Gu...
@nr... · Apr 24, 2025
Annexe Building of ICAR-NRC on Pig was inaugurated by Dr. Raghavendra Bhatta, DDG (Animal Science), ICAR on 24 April, 2025 in presence of Dr. Vivek Kumar Gupta, Director and other staffs of the Institute. @icarindia #ICAR
The Shillong Times
Sep 21 Shillong Page 3
Completed Smart City projects await opening
Call for inter-agency synergy to combat wildlife crimes in state
Mukul calls for reforms in India's education sector
Prog boosts hort skills of JH farmers
Group cites RTI to prove illegal land allocation to BSF in SWKH
GH group slams NEHUTA for 'hindering' NEHU Tura's devp
Shillong, Tura pay rich tributes to Zuheen Garg
Prog equips locals with pig farming know-how
By Our Reporter
SHILLONG, Sep 20: A training programme on 'Scientific Production and Health Management of Pigs for Profitable Farming', along with a 'Scientist-Farmer Interface and Input Distribution Programme', focusing on crucial aspects of pig farming, was held in Upper Shillong from September 16 to 18.
According to a statement here, the programme was organised in collaboration with ATMA, East Khasi Hills, under the Tribal Sub Plan (TSP) of ICAR-National Research Centre on Pig, Rani, Guwahati, and was led by Dr. Vivek Kumar Gupta, Director of ICAR-NRC on Pig.
The training covered essential areas of modern pig farming, including breeding, reproduction, health management and production techniques.
Farmers were equipped with scientific knowledge and practical skills aimed at enhancing efficiency and profitability in piggery.
Furthermore, interactive sessions enabled farmers to directly engage with experts, seeking practical advice and solutions to challenges faced in the field.
It may be mentioned that as part of the outreach initiative, 10 tons of pig feed were distributed to 63 tribal farmers. This support seeks to promote sustainable, science-based pig (Contd on P-7)
ICAR-National Research Centre on Pig
5 June 2025
On Day 8 of #ViksitKrishiSankalpAbhiyan, ICAR-NRC on Pig and KVK Goalpara engaged farmers at Buduchara, Goalpara. Drone demo, tree plantation, and participation of 120-... See more
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10 June 2025
Day 13 #ViksitKrishiSankalpAbhiyan
ICAR-NRC on Pig & KVK Goalpara scientists engaged with farmers at Habangiri, Damra GP, Dudhnoi block, Goalpara.
Di... See more
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13 August 2025
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13 August 2025
Awareness & Support for Pig Farmers
A day-long "TSP Programme on AI Demonstration and Feed Distribution" was held on 12th August 2025 at Muduli, Kamrup, Assam... See more

Sitting (L to R): Dr. B.C. Das (Pr. Sci.), Dr. R. Thomas (Pr. Sci.), Shri Rupesh Sabarwal (AO), Shri Utpal Ghosh (F&AO), Dr. Pranab Jyoti Das (Pr. Sci.), Dr. R. Islam (Pr. Sci.), Dr. V.K. Gupta (Director), Dr. Swaraj Rajkhowa (Pr. Sci.), Dr. Seema Rani Pegu (Sr. Sci.), Dr. Juwar Doley (Sr. Sci.), Dr. Rajib Deb (Sr. Sci.), Dr. Satish Kumar (Sci.), Dr. Jaya (Sci.), Dr. Vishal Rai (Sci.)

Standing (L to R): Dr. Sunil Kumar (Sci.), Dr. Souvik Paul (Sr. Sci.), Shri Rana Kakati (Tech. Assistant), Dr. Nitin M. Attupuram (Sci.), Shri Naren Chandra Deka (SSS), Dr. Rajib Kumar Das (TO), Dr. Anil Kumar Das (TO), Shri Siba Chandra Deka (Sr. Tech. Assistant), Shri Ratul Baishya (LDC), Dr. Meera K. (Sci.), Dr. S. Jayachitra Devi (Sci.), Dr. Sadhana Ojha (Sci.), Smt Jonali Nath (Assistant), Dr Lokesha E (Sci.), Dr. Priyojoy Kar (Sci.), Shri Kailash Choudhury (Sr. Technician), Dr. Gagan Bhuyan (TO), Dr. Kalyan De (Sr. Sci.).

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