एन डी आर आई

NDRI News

राष्ट्र के डेरी स्वप्नों को समर्पित
Fulfilling Nation's Dairy Dreams

भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल
ICAR-National Dairy Research Institute, Karnal

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From the Director's Desk

In recent years, India has emerged as the 3rd largest startup ecosystem at the global level with an estimated growth rate of 12-15% per annum. At present, there are 65,010 recognized startups in the country along with a sizable number of unicorns. The GDP of unicorns is worth 168 billion US $ which is even more than the figures of certain states. Startup growth has been realized as a catalytic force for sustainable growth of the Indian economy and in meeting the objectivity of certain flagship programmes like "Make in India", "Digital India Mission", "*Swacchh Bharat Mission*'" and "*Atma Nirbhar Bharat*". It is perceived that through innovation, skilling, and scalable technology, startups may assist/ generate impactful solutions and thereby act as vehicles for socio-economic development and transformation.

The Agri-Business Incubation (ABI) was established under the NAIF scheme of ICAR in 2014 to develop a state-of-the-art infrastructure for providing training, assistance in skill improvement, and supporting start-up entrepreneurs with technology, equipment, testing facility, and guidance through appropriate marketing strategies. ABI has been involved in organizing "Innovative Capacity Building Programmes" for farmers, entrepreneurs, unemployed youth, students, and stakeholders in the area of scientific dairy farming and Dairy/ Food processing. Additionally, services on quality evaluation, research and development, and market research are offered under the project.

Several capacity-building programmes on "Scientific Dairy Farming", "Milk and Milk Product Processing" and other specified area are organized to meet the aspirations of different clientele. The main emphasis of the training programme is to provide better opportunities for practical

In this issue	From Director's Desk	Research	Events	Extension Activities	Personalia	राज भाषा एकक	Southern Campus, Bengaluru	Eastern Campus, Kalyani
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exposure and "Hands-on-Training". Follow-up programmes are also organized on regular basis as a part of the hand-holding approach. Moreover, these training programmes assist in identifying the prospective entrepreneurs for in-house incubation and virtual incubation.

Individuals, SHGs, entrepreneurs, and FPOs are willing to establish new ventures and startups in the area of Dairying. They are mentored in developing a business canvas model on certain mutually identified areas/ fields. Further, they are assisted by experts in learning the key skills, encouraged for innovation, and imparted the information critical for their success. Further, the facilities of the pilot plant and laboratories are extended to develop, refine, upscale, and manufacture products in a commercial environment. Most importantly, the facilities can also be utilized to identify the minimum infrastructure and product mix required for the economic viability of a new business venture. The facilities are offered to selected incubators for a period ranging from 6 months to one year by the signing of an MOU between the parties. Majority of innovative products developed lack desired information on packaging system and shelf-stability; hence, the center assists in generating the information on these vital aspects. ABI of NDRI has developed a strong network with incubators within the ICAR and NARS system, other educational institutions and funding agencies.

For promotion of self-employment, 105 Entrepreneurship Development Programmes (EDPs) were organized since its inception in June 2014 in the area of commercial dairy farming, milk and milk products processing, cheese and fermented milk products making and starter culture & fermented foods, attended by 2026 participants from all parts of the country. Six startups namely, Delmos Pvt. Ltd, Karnal; J.V. Food Work Pvt., Ltd., Manesar; Silage Agro Pvt. Ltd., Rajpura; Folercer Services Pvt. Ltd., New Delhi; Mishti Farmers Producer Co. Ltd., Karnal; and Somaras Nutrifoods Pvt. Ltd., Rajkot were jointly incubated with SINED (TBI). Besides, ABI has also nurtured more than **100 entrepreneurs** from different parts of the country in establishing their commercial ventures. ABI has initiated a number of activities to promote entrepreneurship among the students of ICAR-National Dairy Research Institute and other educational institutions located in Haryana. Entrepreneurship Awareness Programme, Brainstorming Sessions, and Interactive Sessions with successful startups are organized and Undergraduate students are being encouraged to develop Business Canvas Model for the identified products or prototypes during experiential learning. These students of ICAR-NDRI have developed the technologies and also business canvas models for Chhana-based Muffins, Goat Milk Cheese, Malt Ice Cream/ Kulfi and Fruit Burfi. Three Ph.D. scholars were selected for BIRAC grant to develop technologies in the area of diagnostics and become entrepreneurs. Startups and students incubated at ABI NDRI have been awarded for their achievements. Mrs. Japna Rishi Kaushik, Co-Founder, Hungry Foal was awarded **Time She Unltd Award-2019** in the food category. Delmos Pvt. Ltd., Karnal has won the **"Eat Right Startup Award"** in the "Food Testing" category organized by FSSAI under "Food Innovation Network to encourage the **"Eat Right India Movement"**. Delmos also figured among the top six social start-ups in the country. ABI of ICAR-NDRI is committed to promote the innovations and strengthen the startup ecosystem in livestock sector.

(Dr. M.S. Chauhan)
Director, ICAR-NDRI

NDRI Developed Cloned Buffaloes Calf (Gantantra and Karnika): An inifiative towards Second White Revolution in India

NDRI Cloned Calves

GANTANTRA (MU-8194)
Cloned male calf of superior bull MU-2501
(Set-16 of Network project)
D.O.B. 26.01.2022

KARNIKA (MU-8184)
Cloned female calf of superior buffalo MU-4316
(produced 6089 kg of milk in 5th lactation)
D.O.B. 20.12.2021

NDRI Developed 2 Cloned Calves:

ICAR- National Dairy Research Institute (**NDRI**) in Karnal has achieved success in buffalo cloning. Two cloned calves (1 Male and 1 Female) have been produced at NDRI. Scientists claim that field implementation of cloning technique envisages faster multiplication of superior genetic buffaloes with the aim to increase the income of farmers.

Milk production in buffaloes born from the semen of cloned animal is 14 to 16 kg per day, which is higher as compared to normal buffalo.

After the approval of the central government, this technology will be delivered to the farmers. Dr. M.S. Chauhan, Director of National Dairy Research, Karnal, said that with this breakthrough moment in the field of cloning, the scientist's research is moving in the right direction. He told that animal husbandry has an important place in the agricultural economy of India. Buffalo contributes about 50% of the total milk production and is playing an important role in the livelihood of the farmers. All this can further boost milk production in the country and lead to second white revolution.

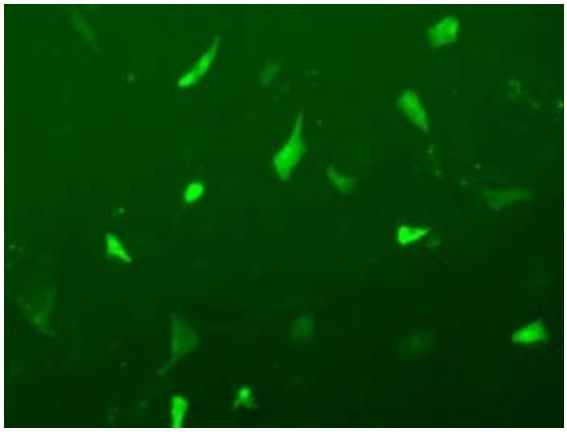
The male calf is named 'Gantantra' since he was born on Republic Day, while the female calf is named 'Karnika' (born on December 20) after the city Karnal. Till date, NDRI has generated over 25 cloned animals.

Knockout of the β-lactoglobulin gene in buffalo mammary epithelial cells by CRISPR/Cas9
(Satish Kumar, Vinay K. Mehra, Shubham Loat, Abhishek Takur, Sikander Saini, D. Malakar)

Beta lactoglobulin (βLG), a whey milk protein, is considered as the major allergen of the milk to the infants and children worldwide. Milk allergy is reported to cause gastrointestinal (e.g. diarrhoea), skin and respiratory problems. In order to reduce the milk allergic problems, several approaches (heat treatment, fermentation, enzymatic hydrolysis, glycation, RNAi etc.) have been

used over the past years to minimize the βLG protein content in the milk. However, such approaches can not solve this problem thoroughly. In the recent years, genome editing technologies such as zinc finger nuclease (ZFN), transcription activator like effector nuclease (TALEN), and clustered regularly interspaced short palindromic repeats (CRISPR) systems have been developed and used to knock out the gene of interest with precise manner. Research efforts have been made at NDRI to knock out the βLG gene in buffalo mammary epithelial cells (BuMECs) through clustered regularly interspaced short palindromic repeats CRISPR/ Cas9 system.

Results of T7 E1 assay showed that the BuMECs transfected with sgRNA4_ pX458_GFP gene construct had the editing events. Sequencing results showed that transfected BuMECs had 8 bp deletions in the exon 1 of βLG gene. Quantitative PCR analysis showed that the mRNA expression of βLG gene in knockout BuMECs (sgRNA4 modified cells) was decreased significantly ($p<0.001$) as compared to wild type (Naïve) BuMECs, however no significant difference was observed between edited (sgRNA4) and wild type cells. Such modified BuMECs can be used as donor cells to produce genome edited buffaloes for improving the milk quality.



Buffalo mammary epithelial cells showing the GFP expression

Institute Technology Management Unit (ITMU)

1) Detail of Patents Filed during January, 2022 to March, 2022

Title of Patent	Inventors	Date of Filling	Application Number
i) Label for indicating freshness of Indian Dairy Products and preparation method thereof	P.N. Raju, Rakesh Kumar Raman, Karpurapu Uma, Ashish Kumar Singh and Sangita Ganguly	February 2, 2022	202111004590
ii) Label for indicating freshness of Milk Millet composite complent food & preparation method thereof	P.N. Raju, Rakesh Kumar Raman, Karpurapu Uma, Ashish Kumar Singh and Sangita Ganguly	-do-	202111004587
iii) Ghee-Residue powder and process of preparing the same	Ganga Sahay Meena, Aakash Gill, Yogesh Khetra, Ashish Kumar Singh and Sumit Arora	March 30, 2022	202211019096

2) Detail of Patents granted during January, 2022 to March, 2022

Title of Patent	Inventors	Application Number	Date of Filling	Grant No. & Grant Date
i) A process for manufacture of low-fat chakka and Shrikhand by using exopolysaccharides producing bacteria	Pradip V. Behare, Sanket Borad, Harisha and S.K. Tomar	201811033236	September 9, 2018	388158 & January 31, 2022

3) The technology titled **"Strip based technology for early detection of sub-clinical and clinical mastitis"** developed by Dr. Naresh Kumar, Principal Scientist, Dairy Microbiology was released during the AGM meeting held at New Delhi on March 26, 2022.

Technology titled "Strip based technology for early detection of sub-clinical and clinical mastitis" released during AGM Meeting in ICAR on March 26, 2022

Hill Cattle Development in Uttrakhand

Director NDRI along with his scientists visited the Nainidanda block, Simlimali and Biyasi villages of Haldukhal under the NDRI-IRC approved project "Productivity enhancement in Hill cattle (Badri) conserved by SC, ST and other communities of Uttrarakhand". During the visit on 11.03.2022, a Kisan Sangosthi was organized in the Haldukhal village in collaboration with HitoPahad and National Seed Corporation. Around 200 farmers participated in the event. ICAR-NDRI distributed the general purpose veterinary medicine kit including enzyme and calcium supplement, dewormer, antiseptic spray, uterine tonic, mineral mixture, water purifier etc. to support the dairying in Hill cattle, Badri.

किसानों ने लिया प्रधानमंत्री किसान सम्मान निधि कार्यक्रम में भाग

कृषक उत्पादक संगठन के माध्यम से प्राकृतिक खेती को बढ़ावा दें: प्रधान मंत्री मोदी का आव्हान

जनवरी 1, 2022 नव वर्ष के दिन राष्ट्रीय डेरी अनुसंधान संस्थान में डॉ. मनमोहन सिंह चौहान, निदेशक के मार्गदर्शन में कृषि विज्ञान केंद्र, में प्रधानमंत्री किसान सम्मान निधि कार्यक्रम का ऑनलाइन प्रसारण एवं आयोजन किया गया जिसमें करनाल जनपद के कृषकों, महिला कृषकों एवं कृषि विज्ञानं केंद्र के सदस्यों सहित लगभग 121 लोगों ने भाग लिया। कार्यक्रम की अध्यक्षता करते हुए संस्थान के संयुक्त निदेशक डॉ. धीर सिंह ने कृषकों एवं महिला कृषकों को संबोधित करते हुए कहा कि माननीय प्रधानमंत्री जी द्वारा देश के छोटे किसानों की जरूरतों को ध्यान में रखते हुए प्रधानमंत्री किसान सम्मान निधि योजना साल 2018 में शुरू की गई थी। उन्होने बताया कि योजना के तहत प्रधानमंत्री महोदय ने देश के लघु एवं सीमान्त श्रेणी के लगभग 82 फ़ीसदी कृषकों को सशक्त बनाने की निरंतर प्रतिबद्धता और संकल्प के अनुरूप वित्तीय लाभ की 10वीं किस्त जारी करेंगे। संयुक्त निदेशक ने किसानों को बताया कि राष्ट्रीय डेरी अनुसंधान संस्थान कृषि विज्ञान केंद्र, करनाल के माध्यम से निरंतर किसानों के लिए उपयुक्त कृषि प्रद्योगिकी मूल्यांकन, प्रदर्शन एवं तकनीकी आदान उत्पादन के साथ-2 प्रशिक्षण के द्वारा कौशल विकास के लिए कार्य कर रहा है। प्रधानमंत्री किसान सम्मान निधि ऑनलाइन कार्यक्रम की शुरुआत में केंद्रीय कृषि एवं किसान कल्याण मंत्री श्री नरेंद्र तोमर ने प्रधानमंत्री एवं किसानों का नववर्ष पर स्वागत किया। कृषि मंत्री ने कहा कि इस योजना का उद्देश्य किसानों के परिवारों की विभिन्न प्रकार की वित्तीय जरूरतों को पूरा करना है। माननीय प्रधानमंत्री श्री नरेंद्र मोदी ने योजना के तहत 10 करोड़ से अधिक लाभार्थी किसान परिवारों को 20 हजार करोड़ रुपये की राशि हस्तांतरित की। उन्होने कहा कि उचित फसल स्वास्थ्य और उचित पैदावार सुनिश्चित करने के लिए इस योजना के तहत लाभार्थी परिवारों को प्रति परिवार रुपए 6,000 प्रतिवर्ष की राशि केंद्र सरकार द्वारा जारी की जाती है। प्रधानमंत्री ने लगभग 351 किसान उत्पादक संगठनों को 14 करोड़ से अधिक का इक्विटी अनुदान भी जारी किया, इससे 1.24 लाख से अधिक किसानों को लाभ प्राप्त होगा। प्रधानमंत्री महोदय ने गुजरात, उत्तर प्रदेश, उत्तराखंड , पंजाब एवं तमिलनाडु के विभिन्न कृषक उत्पादक संगठन के सदस्यों से विभिन्न गतिविधियों के साथ भविष्य की योजनाओं पर भी जानकारी प्राप्त की । प्रधानमंत्री महोदय ने बताया कि कृषक उत्पादक संगठन के द्वारा कृषि उत्पादन के लागत आदानों को थोक में खरीद कर उत्पादन को खुदरा मूल्य पर बेचने से लाभ अच्छा मिलता है, नवोन्मेषण के साथ-2 बड़े व्यापार के अवसर मिलते तथा साथ ही चुनोतियों का सामना आसानी से होता है। कृषक उत्पादक समूह बाज़ार में मांग के हिसाब से आपूर्ति करने के साथ बाज़ार में वस्तुओं की मांग पैदा करने की क्षमता भी रखते हैं। अतः मेरा आग्रह है कि देश के सभी लघु एवं सीमान्त श्रेणी के कृषक भाई-बहिन कृषक उत्पादक संगठन के माध्यम से प्राकृतिक खेती को बढ़ावा दें जिससे कि खेती-किसानी में उत्पादन गुणवत्तापूर्ण एवं लाभप्रद हो। फसल अवशेष से जैव इर्धन, गोबर गैस से उत्तम खाद बनाने के साथ-2 पशुधन का घर पर इलाज, कृत्रिम गर्भाधान, कामधेनु योजना, डेरी इंफ्रास्ट्रक्चर तथा एक जनपद-एक उत्पाद के विषयों पर भी संवाद किया। प्रधानमंत्री महोदय के कार्यक्रम के दौरान प्राकृतिक खेती विषय पर एक फिल्म का प्रदर्शन भी किया गया जिसमें बीज उपचार हेतु बीजामृत, मृदा स्वास्थ्य हेतु जीवामृत एवं घनामृत उत्पादन एवं उपयोग के बारें में दिखाया गया। कृषि विज्ञान केंद्र के प्रधान वैज्ञानिक एवं अध्यक्ष डॉ. पंकज कुमार सारस्वत ने केंद्र द्वारा किसानों के लिए में निरंतर आयोजित किए जा रहे प्रशिक्षण कार्यक्रमों जैसे डेरी पालन, खेती, मत्स्य पालन, मधु मक्खी पालन, बागवानी, केंचुआ खाद के बारे में जानकारी दी एवं सभी से उनमें भाग लेने का आह्वान किया।

The 73rd Republic day of India celebrated at ICAR-National Dairy Research Institute

The 73rd Republic day of India was celebrated at ICAR-National Dairy Research Institute under strict Covid guidelines. The Director of the Institute, Dr. Manmohan Singh Chauhan hoisted the National Flag. Dr. Chauhan said the sacrifices made by all our freedom fighters should not be forgotten and he paid tributes to Dr. B.R. Ambedkar and others for their contribution to the Constitution. He said that NDRI has developed high protein ice-cream and produced *Ghan jeevamrut (organic fertilizer).* The institute received grants worth Rs. 1000 lakhs under various externally funded projects, generated Rs. 300 lakhs through revenue, filed 11 patents out of which 7 have been granted and also commercialized 6 technologies during last year. Dr. Chauhan applauded the contribution of all the staff members for making NDRI, the top agricultural university of the country for fifth time in a row. The program was attended by all the student and staff members of the Institute. On this occasion, the Director felicitated NCC cadets, Women researchers under the GATI (Gender Advancement for Transforming Institutions) program and the staff members of NDRI who worked day and night during the Covid pandemic.

Felicitation of GATI Logo Award Winners

ICAR-National Dairy Research Institute, Karnal organized GATI logo competition. The students from B.Tech., M.Tech. and Ph.D. participated in the event. In total, four prizes were given after the selection by GSAT. First prize was awarded to Mr. Sachidananda Hota, B.Tech. student; second prize was won by Mr. Shivam Bhardwaj, PhD scholar; third prize was won by Ms. Arushi Rozra, B.Tech. student. GSAT also decided to give one consolation prize which was awarded to Mr. Akash Rathod, PhD scholar. The students were awarded during Republic day celebrations by Honorable Director and Vice- Chancellor, NDRI, Karanl- Dr. Manmohan Singh Chauhan.

Pictures of Prize Winners **Logo**

Mr. Sachidananda Hota- First Prize

Mr. Shivam Bharadwaj- Second Prize

Ms. Arushi Rozra- Third Prize

Akash Rathod- Consolation Prize

National Science Day

ICAR-National Dairy Research Institute, Karnal organized National Science Day on February 28, 2022 under the aegis of Gender Advancement for Transforming Institution (GATI)-a pilot project of Department of Science and Technology (DST) and Azadi Ka Amrit Mahotsav. This day is celebrated on February 28, 2022 to remember the Raman Effect discovery made by Sir Chandrasekhara Venkata Raman who received a Nobal Prize in the year 1930 in the field of Physics. Dr. Manmohan Singh Chauhan, Hon'ble Director, ICAR-NDRI presided over the programme. On this occasion, a lead lecture on "Enviornmental Issues and Sustainable Approaches" was delivered in virtual mode by Dr. S. Lakshmi Devi, Founder Principal of Shaheed Rajguru, College of Applied Sciences, University of Delhi.

On this occasion, Dr. Manmohan Singh Chauhan, Director of ICAR-NDRI informed that Science day is celebrated throughout India to bring awareness among people to popularize Science and Technology in our daily life. Dr. Chauhan further told that NDRI has contributed significantly in the area of Animal Reproductive technologies like Ovum pick up, cloning and also developed many unique dairy products. Apart from providing education to the students, many farmers and dairy industrialists have benefitted from NDRI technologies over the last decades. Dr. Chauhan also emphasized the importance of zero budget natural farming as it promotes chemical free agricultural practices and involves low cost input. Dr. Dheer Singh, Joint Director (Research), apprised about the theme of the National Science Day-2022 i.e. Integrated Approach in Science and Technology for Sustainable Future and talked about its relevance in today's lifestyle.

Winter school on Advances in Agricultural Extension Research

ICAR- NDRI organized a 21 day Winter School on "Advances in Agricultural Extension Research" from Janurary 28, 2022 to February 17, for teachers and scientists working in National Agricultural Research System.

Dr. M.S. Chauhan, Director & Vice-Chancellor of the NDRI urged the participants to learn the extension techniques in order to respond to various issues being faced by farming community. Dr. A.K. Singh, Deputy Director General (Agricultural Extension) of ICAR delivered the keynote address. He elaborated the various burning issues in agriculture especially yield gap, adoption gap and technology gap. He advocated convergence model, feedback mechanism, experimental research design, project development skills and ICT enabled technology transfer in order to create strong evidence for the technologies being promoted. Dr. K.Ponnusamy the Course Director of Winter School briefed about the programme.

The winter school was attended by 35 participants (Male-21 and Femae-14) from SAUs & ICAR across 13 states of India covering North India, South India, West India, East India and North-east India. About 75 lectures were delivered by the senior experts in the field of agriculture along with hands-on training using SPSS, Excel and R software. Since it was a virtual training, 16 experts across the country delivered their expert lecture on areas like IoT, PPP model, digital agriculture tools, technology application models, impact assessment, farmer empowerment models, gender mainstreaming in agriculture.

Dr. Dheer Singh, Joint Director (Research) during the valedictory function on February 17, 2022 congratulated for the successful organisation of winter school. He suggested designing new ICT tools and methods by the extension scientists for the transfer of technology, on the line of social media like facebook and WhatsApp. The quick delivery of response to demand of farmers would enhance the credibility of extension personnel.

Industry Meet

ICAR-National Dairy Research Institute, Karnal organized an Institute-Industry Meet on March 23, 2022. While inaugurating the Meet, Dr. M.S. Chauhan, Director, NDRI indicated that main purpose of the meet was to reduce the technological gap between research institute and industries. He said that over the last 12 years, NDRI has developed 156 no. technologies and 85 no. technologies have been commercialized to dairy industries, animal feed manufactures as well as to entrepreneurs. On this occasion, NDRI supported start-ups and entrepreneurs (15 no.) were also felicitated.

During the Meet, a new innovative technology for rapid detection of sub-clinical and clinical mastitis in dairy animals was also released. Dr. Chauhan said that mastitis is a disease of udder and statistics indicate that 30-35% of dairy animals are suffering from clinical & sub-clinical mastitis in India, which causes huge loss to dairy industry. He said that in the developed technology, diagnostic of diseases is done through milk and thus, is a non-invasive method and requires less than 1 ml of milk sample. Test is cost effective also and has been validated.

Dr. M. S. Chauhan, Director felicitating a successful entrepreneur during the NDRI-Industry Meet on March 23, 2022

Participants during the organization of NDRI-Industry Meet on March 23, 2022

On this occasion of Industry Meet, Dr. Dheer Singh said that NDRI has been quite successful in commercializing its technologies and even during the pandemic period, NDRI was able to commercialize 24 no. technologies developed at the Institute. He further said that impact analysis of some of the NDRI technologies such as milk adulteration detection kit and anionic mineral mixtures have also been done and results are very encouraging, which have been noticed by the policy makers.

During the Meet, NDRI technologies having relevance in milk quality, milk safety, health foods, fortified milk products, dairy equipments, animal nutrition etc. were presented before officials from industries as well as prospective entrepreneurs. An exhibition displaying technologies/ prototypes by NDRI Scientists was attended by around **100 participants** including personnel from industries, newly start-ups, entrepreneurs, faculty & students of NDRI and other institutes.

The purpose of the event was to provide information and raise awareness about diary based technologies (products and processes) developed by NDRI.

EXTENSION ACTIVITIES

Dairy Extension Division

Capacity building of SC farm women on scientific dairying

The training-cum-interaction meet was organized in Pinjauri and Malimajara villages of Saraswat Nagar block in Yamunanagar district on March 29, 2022. About 100 female and 25 male farmers belonging to SC category participated in the programme. Dr.A. K. Misra, Head and Principal Investigator of the project explained the important techniques in dairy production. Dr. K. Ponnusamy demonstrated preparation of value-added milk products such as paneer, whey drink, ghee and channa murghi and urged participating women to form Self-help groups with local market tie-ups for earning higher income. Dr. Jitender Rana, ACTO, explained about the importance of improved varieties of wheat, oat and berseem and their package of practices to the participating farmers. Dr. Chand Ram, Nodel Officer (Development Action Plan for Scheduled Caste) explained about fermented dairy products, and strategies for prevention of mastitis in dairy animals. At the end, various critical inputs such as multi-nutrient block, mineral mixture, deworming medicines and rooted slips of Bajra napier perennial fodder were distributed as part of innovative technological interventions. The program was organized with the cooperation of Shri Lal Singh, Surpanch, Pinjauri.

Extension Activities / Transfer of Technologies:

- A team consisting of Dr. Rajan Sharma, Er. Ankit Deep, Dr. Naresh Selokar, and Dr. Rakesh Tonk exhibited practices followed at ICAR-NDRI, Karnal by field extension activities during “Mera Gaon Mera Gaurav” programme on March 26, 2022 and also newspaper coverage was reported in two Hindi news papers at Tikari and Tikari Kailash village of Karnal Block.

- A team consisting of Dr. Chitranayak, Dr. Rubina Kumari Baithalu, Dr. Manju Ashutosh, Mr. Dheeraj Kumar, and Dr. Hans Ram Meena, exhibited practices followed at ICAR-NDRI, Karnal by field extension activities during “Mera Gaon Mera Gaurav” programme at Johar and Majra village of Indri Block.

KRISHI VIGYAN KENDRA

- KVK organized a live telecast of **PM-Kisan interactive session** at the KVK, NDRI, Karnal on January 1, 2022. Around 121 participants including farmers, farmwomen and village youth participated in the event. Dr. Dheer Singh, JD (Research), ICAR-NDRI presided over the event.

- **National girl child day** was celebrated at KVK on January 24, 2022 and 45 girls participated. An awareness lecture on girl child nutrition, education and their empowerment was delivered followed by an interactive session on career options. Hon'ble Director, NDRI graced the occasion and encouraged the female participants to be strong and educated so that they might succeed in life and contribute to a healthy society. The participants were also taken to the demonstration units of KVK and the expert gave a brief lecture on the working of these units.

- Scientific Advisory Committee (SAC) of KVK was held at Pinaki hall in NDRI on February 2, 2022 in online as well as offline mode. Joint Director of Research, Dr. Dheer Singh chaired the event. Director ATARI, Jodhpur joined the session virtually and gave suggestions and recommendations. Progressive farmers from nearby villages were also invited. Representatives from other nearby ICAR Institutes also participated.
- **International women's Day 2022** was organized by KVK on March 8, 2022 at Dr. Sundaresan auditorium, ICAR-NDRI and 186 women participants attended the event. Dr. Sudheer Singh (Delhi University), the chief guest of the event delivered a talk on gender equality for women empowerment.

- **KVK organized World Pulse Day 2022** on February 8, 2022 in which 50 farmwomen and 11 school students participated. Dr. Anurag Saxena was the chief guest of the function.

- KVK organized **World Water Day** on March 22, 2022 at KVK, NDRI campus. An expert lecture was delivered on water conservation technique in Agriculture. Around 50 farmers and farm women have participated.

- **Other activities:**

Sl. No.	Activities	Place	Number of farmers/ farm women/ youth	Date
1)	CRM field Visit	Nabipur	15	February 7, 2022
		Phurlak	10	February 11, 2022
2)	One day awareness programme on In-Situ CRM	Kamalpur Rodan	20	February 21, 2022
		Kachwa	18	March 13, 2022
3)	Awareness against CRB and/or CRM and field visit	Dabri	20	March 19, 2022

- **Off-campus training**

Sl. No.	Title of training	Place	Number of farmers/ farm women/ youth	Date
1)	Off-campus training on Dairy animal health management	Phurlak	12	February 11, 2022
2)	Off-campus training on VATICA and NARI	Madanpura	15	March 31, 2022

- **On-Campus Training**

Sl. No.	Activities	Place	Number of farmers/ farm women/youth	Date
1)	मधुमक्खी पालन	KVK	47	March 21-24, 2022
2)	सिलाई कटाई	KVK	31	February 22-26, 2022
3)	वैज्ञानिक विधि से पशुपालन में प्रशिक्षण	KVK	24	March 25-27, 2022
		KVK	28	March 21-23, 2022
4)	डेरी प्रसंस्करण प्रशिक्षण कार्यक्रम	KVK	39	March 24-26, 2022

Training programmes conducted by KVK

- **Frontline Demonstrations (FLDs/OFTs)**

1) **Oilseeds and pulses:** KVK, ICAR-NDRI organized FLDs in various villages of Karnal district to encourage farmers to grow oilseeds and pulses,. During the Rabi season 2021-22, a total of 103 FLDs of mustard variety RH 725, RH 761 and Pusa Mustard 32 in 41.8ha area and 63 FLDs on gram variety H.C.-5 and H.C -7 in 24.3ha area were laid under irrigated conditions to generate the data

Activities on (FLDs)

Sl. No.	Activities	Place	Number of farmers/ farm women/ youth	Date
1)	FLD Mustard field visit	Kunjpura	12	February 7, 2022
		Uplana	12	March 7, 2022
2)	FLD gram field visit organized	Phurlak	12	February 11, 2022
3)	FLD garlic field visit	Kunjpura	15	March 24, 2022
4)	FLD capsicum field visit	Daha	15	March 31,2022

Around 657 farmers from eight states, namely Uttar Pradesh, Delhi, Rajasthan, Gujarat, Jammu & Kashmir, Jharkhand and Chhattisgarh visited KVK, ICAR-NDRI, Karnal during January to March, 2022.

Dairy Engineering Division

New Initiatives:

- Uploaded five videos recorded during live online theory/ practical classes by Dairy Engineering Divisional faculty.

SN	Title	Duration	Published	Video Link
1)	Food Engineering- Food Freezing Time	0:34:10	January 7, 2022	https://youtu.be/uRtgnHFxuEw
2)	Refrigeration Tutor Practical(s)	0:31:39	January 14, 2022	https://youtu.be/1nG1hY0rPTs
3)	Radial Drilling Machine	0:09:29	Febraury 20, 2022	https://youtu.be/4EPiZHbSlBY
4)	Heat Transfer - Basics	0:47:27	March 2, 2022	https://youtu.be/Syb9RzkdFlI
5)	Bench Drilling Machine	0:05:00	March 12, 2022	https://youtu.be/Or_3xYx879I

Consultancy Services Rendered/ BPD Activities:

- Inspection of 15 GPIs (Grossly Polluting Industries) located in Karnal and Kurukshetra region were conducted with the NDRI team members: Dr. Chitranayak, Senior Scientist & Nodal Officer, Dr. P.S. Minz, Scientist, Rohit Hietsh Kumar & Mukul Sain, Research Scholars and Shri Shailender Arora, SPCB, RO under the consultancy project.

PERSONALIA

Joining/ Appointments/ Promotions

- Dr. M.S. Chauhan, Director was re-employed for the Post of Director, NDRI vide office order No. 39(1)/2017-Per. III dated 29.12.2021 and joined vide office order No. 13/Dir./2022 dated February 1, 2022(FN).
- Sh Subhash Kumar, Assistant was promoted for the post of AAO vide office memorandum No. 6-33/20/DPC/E-I/(S)/Vol.VI/717-19 dated February 3, 2022 and joined on the same day at Purchase Section.
- Smt. Santosh Kumari, Assistant was promoted for the post of AAO vide office memorandum No. 6-33/20/DPC/E-I/(S)/Vol.VI/717-19 dated February 3, 2022 and joined on the same day at E-IV Section.
- Dr. Gopal Ramdasji Gawane, Scientist was promoted as Senior Scientist of Animal Genetics & Breeding Division.
- Sh. Vivek Purwar, CAO was promoted to the post of CAO (SG) vide council office order No.Admn./6-2/2019-Estt. I dated March 16, 2022 and joined on the same day at NDRI.
- Dr. Mahendra Singh, Former Principal Scientist (AP) joined as ICAR-Emeritus Professor in the Animal Physiology Division, NDRI on January 19, 2022.

Transfers/ Retirements/ Relieving

- Dr. Vairat Amita Dinkar, Scientist DE Division transferred from NDRI to SRS Bangalore vide office order No. 12-60/11/E-I(S)-Vol.II/897-908 dated February 23, 2022.
- Dr. D.N. Das, Pri. Scientist, SRS, Bangalore transferred vide council order No. 11-1/2021-Pers.II (IV) dated March 16, 2022.

- Dr. R.R.B. Singh, Joint Director (Academic), National Dairy Research Insitute, Karnal retired on March 31, 2022.

Additional Responsibility

- Dr. Dheer Singh, Principal Scientist & Joint Director (Research) took over the charge of Joint Director (Academic) on March 31, 2022 office order No.1-44/2016/E-I(S)/Vol.II dated March 31, 2022.

- Dr. Bimlesh Mann, Principal Scientist, DC Division took over the charge of PI, NAHEP on March 31, 2022 vide office order No. 1-44/2016/E-I(S)/Vol.II dated March 31, 2022.

Permission granted to the following Administrative/ Scientific Staff for attending Workshop/ Seminar/ Symposia/ Conference/ Training during the period from January, 2022 to March, 2022

Name & Designation	Title of the Training	Period
Sh. Sukhdev Singh, AAO, ERS, Kalyani	Training on "Pension and Retirement benefits for Officers & Staff of ICAR" through Virtual mode from January 12-14, 2022 organised by ICAR-NRRI, Cuttack.	January 12-14, 2022
Sh. Gurjeet Singh, AAO, C&B Section	-do-	-do
Dr. Latha Sabikhi, PS, DT Division	Delivered a talk in online mode at the International conference on Water, Agriculture, Dairy and Food processing for Sustainable Economy held in a hybrid mode during March 25-26, 2022 by Verghese Kurien Centre of Excellence (VKCoE), Institute of Rural Management Anand (IRMA), Anand (Gujarat).	March 25-26, 2022
Dr. D. Malakar, PS, ABTC	Deliveed presentation in the National Conference on "Animal Breeding Strategies in the Era of Genomics and Ohenomics at NBAGR, Karnal.	December 17-18, 2022
Dr. K. Ponnusamy, PS, Extension Division	Training programme on National Facilitators Development programme (NFDP) at MANAGE, Hyderabad.	January 17-22, 2022
Dr. Kamal Gandhi, PS, DC Division	28th Indian Convention of Food Sci & Technologies at Aurangabad Maharashtra.	January, 20-22, 2022
Dr. G. S. Meena, Scientist, DT Division	-do-	-do-
Dr. Heena Sharma, Scientist, DT Division	ICAR Winter School on "Prescribing Human Health Using Foods of Animal Origin at ICAR-IVRI, Izatnagar.	February 8-28, 2022

संसदीय राजभाषा समिति के द्वारा निरीक्षण

संसदीय राजभाषा समिति की दूसरी उप समिति के माननीय संयोजक एवं सांसद, श्री प्रदीप टम्टा जी एवं अन्य सांसदों के द्वारा विज्ञान भवन, नई दिल्ली में दिनांक फरवरी 22, 2022 को संस्थान में राजभाषा हिन्दी के कार्यान्वयन आदि का निरीक्षण किया गया तथा समिति के द्वारा संस्थान के कार्यों को सराहा गया।

संसदीय राजभाषा समिति के द्वारा निरीक्षण

संसदीय राजभाषा समिति की दूसरी उप समिति के माननीय संयोजक एवं सांसद, श्री प्रदीप टम्टा जी एवं अन्य सांसदों के द्वारा विज्ञान भवन, नई दिल्ली में दिनांक फरवरी 22, 2022 को संस्थान में राजभाषा हिन्दी के कार्यान्वयन आदि का निरीक्षण किया गया तथा समिति के द्वारा संस्थान के कार्यों को सराहा गया।

संस्थान राजभाषा कार्यान्वयन समिति की तिमाही बैठक

डा. एम.एस. चौहान, निदेशक की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की 94वीं तिमाही समीक्षा बैठक दिनांक मार्च 15, 2022 को प्रातः 11 बजे से कोविड संबंधी निर्देशों की पालना के साथ संस्थान के पिनाकी सभाकक्ष में आयोजित की गयी। इस बैठक में संस्थान की विभिन्न हिन्दी प्रतियोगिताओं (2021-22) के मूल्यांकन समिति गठन हेतु कार्रवाई करने, प्रभारी, राजभाषा एकक द्वारा प्रभागों/अनुभागों/केन्द्रों का रूटीन/औचक राजभाषा निरीक्षण जारी रखने एवं बेंगलूरू/ कल्याणी क्षेत्रीय केन्द्रों की तिमाही प्रगति रिपोर्ट की समीक्षा कर पत्र के माध्यम से उन्हें सूचित करने, आगामी प्रबंध मंडल की बैठक की कार्यसूची(एजेण्डा) का प्रस्तुतीकरण (प्रजेन्टेशन) द्विभाषी/ हिन्दी में तैयार करने, विभिन्न परियोजनाओं एवं संस्थान बजट के अंतर्गत की जाने वाली भर्ती परीक्षा के संक्षिप्त विज्ञापन तथा अन्य सभी विज्ञापनों जैसे नीलामी, निविदा आमंत्रण आदि को द्विभाषी तैयार कर समाचार पत्रों/वेबसाइट पर प्रकाशित करने, 2022-23 में संस्थान के द्वारा एक राष्ट्रीय स्तर की हिन्दी तकनीकी वैज्ञानिक संगोष्ठी आयोजित करने एवं मंत्रालयिक कर्मचारियों को हिन्दी नोटिंग में आने वाली समस्याओं के निराकरण के लिए उन्हें यथोचित मात्रा में हिन्दी भाषा में उपलब्ध नियमों की पुस्तकें पर्याप्त संख्या में खरीद कर संबंधितों को जारी करने का निर्णय लिया गया।

fgUnh dk;Z'kkyk dk vk;kstu

संस्थान के डा. एन.एन.दस्तूर सभागार में दिनांक फरवरी 25, 2022 को''राजभाषा हिन्दी : प्रचार–प्रसार एवं कार्यान्वयन'' विषय पर एक दिवसीय हिंदी कार्यशाला का आयोजन किया गया जिसमें 09 अधिकारी एवं 11 कर्मचारी शामिल हुए।

Çgnh dk;Z'kkyk dh >yd

SOUTHERN CAMPUS, BENGALURU

Research

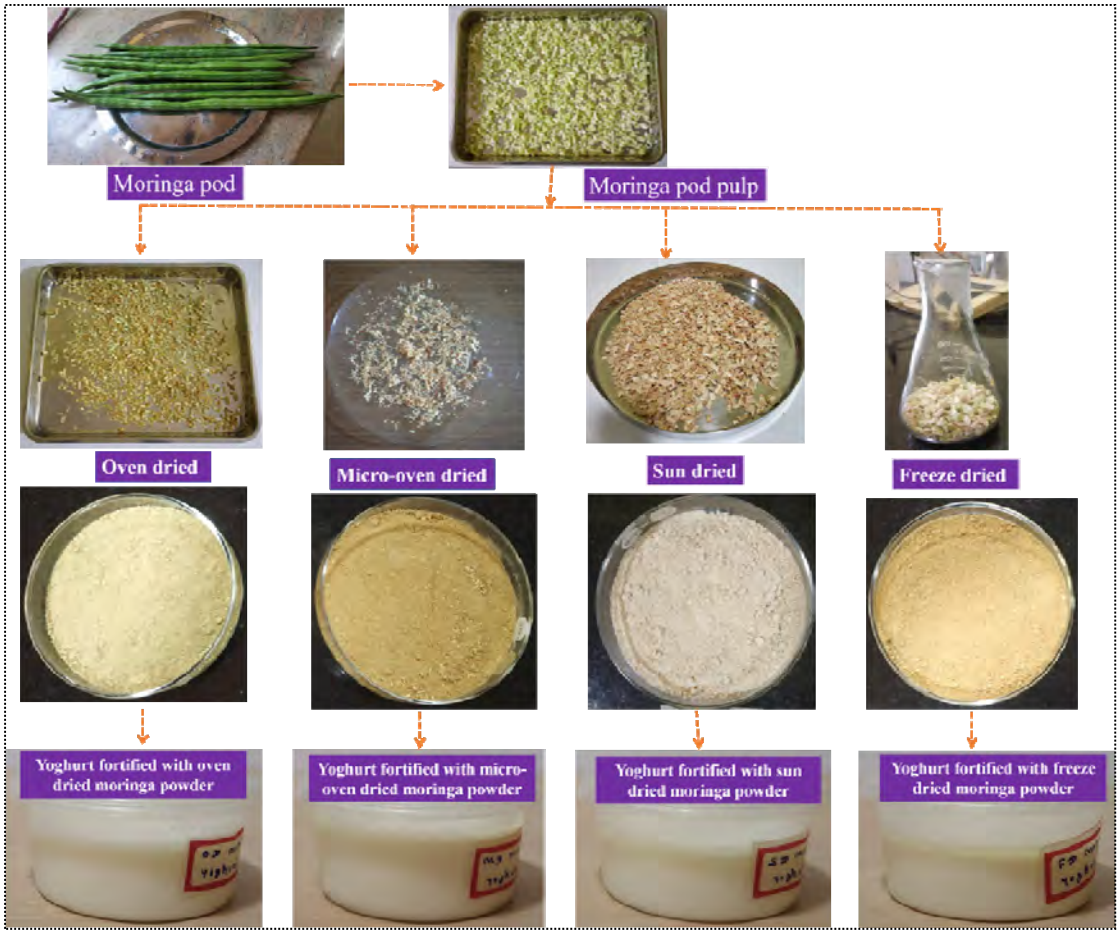
Development of sorghum incorporated protein rich composite dairy dip
(Jayaraj Rao. K., Devaraja HC, Monika Sharma and Sathish Kumar MH)

The milk-millet based protein rich composite dairy dip was developed using sorghum malt and dairy ingredients. The trials were conducted using- optimal mixture design technique. The responses recorded were sensory acceptance scores and textural parameters of the dip. The data were fitted to first order polynomial model and the responses studied by response surface plots and contour plots. It was observed that the hardness of the composite dip increased with increase in milk protein concentrate and sorghum malt proportions. This was because of the strong gel formation by MPC. The developed composite dip has protein, fat, carbohydrate, ash, crude fibre content of 9.45%, 12.21%, 6.12%, 2.93%, 270 mg/100gm respectively. The studies indicated that the composite dip had a good shelf life up to 15 days at refrigerated temperature.

Yoghurt enriched with Moringa pod pulp powder and its bio-functionality
(*Sonu K Shivanna, Laxmana Naik N., Priyanka Singh Rao, Sathish Kumar M.H., and Heartwin P Amaldhas)*

Milk and milk products offer great opportunity to be used as delivery vehicles for the functional ingredients. Yoghurt is popular and widely consumed fermented dairy product and ideally suited for the incorporation of *Moringa oleifera* pod. In the present study, moringa pod powder was

prepared using different drying methods like freeze drying, hot air oven tray drying, micro-oven drying and sun drying. The prepared ingredient was analyzed for both physicochemical and bio-functional properties. Further, prepared functional ingredient was incorporated into yoghurt to achieve functional yoghurt. Superior body and texture with firm curd coagulum with enhanced biofunctional properties and shelf life was observed in the developed product.



Yoghurt fortified with Moringa pod pulp prepared using hot air oven drying, micro-oven drying, sun drying and freeze-drying process.

Extension Activities

Advisory Services

The profile of advisory services comprised of online advisory to twenty-five clientele through digital connects and off line to three persons who visited the institute. The information profile included balanced feeding, management of dairy cows, improved fodder varieties, training programme on preparation of newer milk products and marketing of milk and milk products. Advisory Service was also provided to a Start-up on indigenous breeds of the region, technical information on scientific breeding, feeding and management of indigenous dairy cattle.

Visits Organized

During the period under report, 103 visitors in two batches comprising of students from various educational institutes, visited the institute. The students were briefed about the institute profile and ongoing research, academic and extension activities followed by visits to sections as per their needs.

Farmer First Project

In the Farmer FIRST project, an Animal Infertility & Health camp was organized in Chikkelegowdana Doddi and Kebbe Doddi villages of Kanakapura taluk, Ramnagara district in collaboration with ICAR-IIHR. The animals brought for the health camp included 106 dairy cattle, 50 calves, 53 Sheep and 20 goats of forty-six beneficiaries and the problem profile included mineral deficiency, mastitis, infertility and other related problems. Corrective measures comprised mineral mixture supplements, rumen yeast powder and curative medicines and de-wormers for the healthcare of the dairy cattle, to benefit beneficiary farm families of the two adopted villages.

On-Farm Outreach Programme under SCSP Project

As a part of celebration of 'Azadi-ka-Amrit Mahotsav', an 'Animal Health Camp' and 'Farmers Interaction Session' was organized on February 18, 2022 for the benefit of dairy farmers in the adopted villages for the benefit of SC farmers in the adopted villages (Jiganathimmanahalli and Thoralakki) of Kolar District, Karnataka State, under DAPSC funded project. More than 45 dairy farmers have actively participated in the interaction meeting and the queries related to various aspects of improved dairy farming practices were addressed during the meeting. In the Animal health camp, more than 55 crossbred cattle and 104 sheep were treated for mastitis, wounds, infertility issues and worm infestations. During the event, nutritional supplements like, chelated mineral mixtures and extension literatures on improved dairy farming and clean milk production practices were distributed for the benefit of the farmers.

Farmers were provided with various critical inputs including feed supplements viz. Concentrated feeds (30 MT), Chelated mineral mixture (2 MT), UMMBs (1000nos), Calf starter (2MT), improved hybrid fodder crop seeds viz, maize, sorghum (1.5 MT), improved varieties of poultry chicks (2500 nos) and rubber mats to enhance their animal productivity and income from livestock farming. Further, extension literature depicting monthly advisories on various aspects of improved dairy farming practices was also distributed for the benefit of the farmers.

Training Wrokshop

As a part of celebration of 'Azadi-ka-Amrit Mahotsav', a Training Workshop on 'Augmentation of Milk Productivity and Quality in Dairy Cattle' was organized by SRS of ICAR-NDRI, Adugodi, Bengaluru on March 28, 2022 with the support of Indian Dairy Association, South Zone, Bengaluru. A total 50 Field Veterinarians and Extension Officers from Karnataka Milk Federation participated in a day long session. Eight different topics of interest were delivered by the eminent speakers and at the end of the session, an Interaction cum feedback session was organized to clarify their concerns and elicit the views of the field extension functionaries on implementation of various strategies for enhanced milk production.

Out Reach Programme

Outreach Services of Judging a calf rally was provided by Subject Matter Specialist (SMS) of Extension. Calf Rally was organized at Vyjakur MPCS, Chintamani Taluk, by Kolar Chikkaballapur Milk Union (KOCHIMUL), Kolar District and an expert talk was delivered by the SMS on scientific feeding of calves and good management practices of calf-rearing.

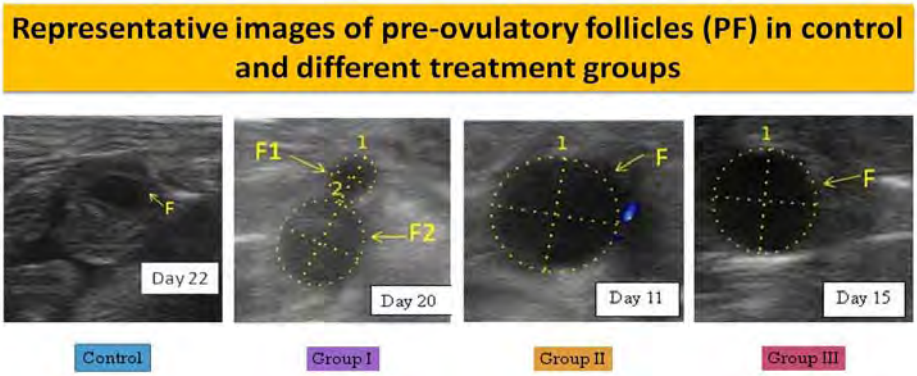
EASTERN CAMPUS, KALYANI

RESEARCH

Effect of exogenous kisspeptin-10 and GnRH analogue (buserelin) on follicular characteristics and wave patterns in black Bengal goats

(Indranil Mukherjee, Jayashree Gogoi, Piyali Kuri, S K Das, M Karunakaran and M Mondal)

Summer infertility cannot be ignored particularly in the tropical goat breeds. GnRH analogue (Buserelin) is the drug of choice for treatment of anestrus or infertility related problems in this species. The new reproductive GnRH secretagogue like kisspeptin (KP), which is much more potent than its analogue, is an alternative to treat the reproductive problems in livestock species in general and goats in particular. Therefore, the aim of the present study was to compare the effects of exogenous kisspeptin-10 vis-à-vis GnRH analogue (Buserelin) on different follicular characteristics and wave patterns in Bengal goats. For the purpose, a total of 24 cyclic does selected from the goat farm of ICAR-National Dairy Research Institute, Eastern Regional Station were randomly

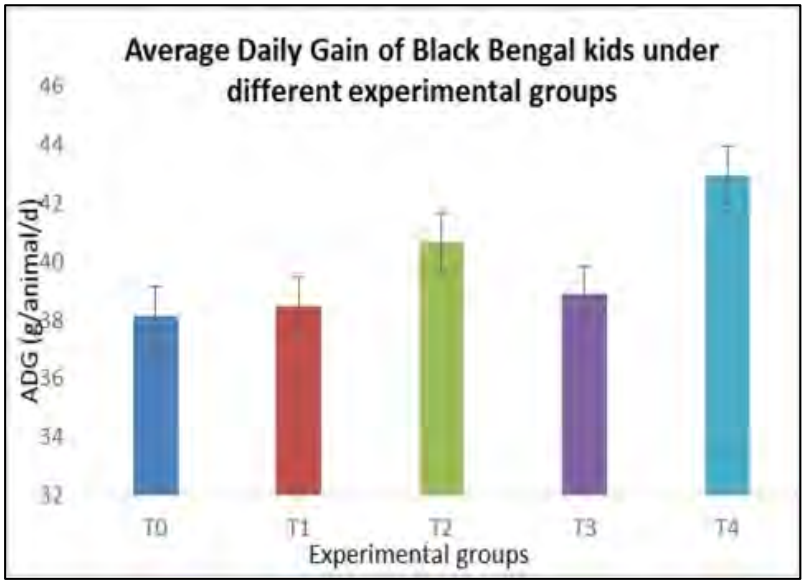


divided into four groups. Animals of the respective groups were administered with specific treatment on day 3 and/or 7 of the estrous cycle. Both GnRH and Kisspeptin-10 reduced the number of waves, but impact of kisspeptin (one/two waves) was considerably stronger than GnRH (three waves). In comparison to GnRH-treated and control animals, Kisspeptin-10 increased the mean diameter of the preovulatory follicle. In terms of wave emergence, the second wave appeared substantially earlier in all animals of treatment groups than that of control does; whereas no such observation was made on other waves. Our results indicated that effect of kisspeptin on several follicular characteristics and wave emergence was much more pronounced than similar effect of GnRH analogue.

Effect of ChromiumSupplementation on Feed Intake, Nutrient Digestibility and Growth Performancein Black Bengal Kids

(Melody Lalhriatpuii, Anupam Chatterjee, T.K. Dutta, Asif Mohammad, S. Rai, C. Bhakat , D.K. Mandal and M. Karunakara)

In the present experiment, the effect of chromium (Cr) supplementation on growth performance and carcass characteristics in Black Bengal goats were studied. Thirty number of Black Bengal kids (average age 3-5 months) were divided into five groups. Control group (T0) was fed basal diet and the rest of groups were kept as T1: Basal diet + 1.0 ppm inorganic chromium, T2: Basal diet + 1.5 ppm inorganic chromium, T3: Basal diet + 1.0 ppm organic chromium and T4: Basal diet + 1.5 ppm organic chromium. The duration of growth trial was 150 d followed by a 7 d digestibility trial. Supplementation of inorganic and organic chromium did not affect the roughage and concentrate intake of Black Bengal kids. Total DM intake as well as total CP intake at fortnightly interval and overall average total dry matter intake of different groups were statistically similar. The DM digestibility of Black Bengal kids under 0, inorganic Cr (1.0, 1.5 ppm), organic Cr (1.0, 1.5 ppm) supplemented groups were 60.37, 61.67, 64.22, 63.05, and 64.60 %, respectively. The 1.5 ppm organic Cr and 1.5 ppm inorganic Cr group supplemented groups had significantly higher DM digestibility coefficients in comparison to other groups (P=0.037). Similarly, nutrient utilization in the 1.5 ppm inorganic Cr and 1.5 ppm organic Cr supplemented groups were better with a higher digestibility coefficient for crude protein, ether extract, organic matter, total carbohydrate, and hemicellulose (P<0.05) when compared with the remaining groups. Average daily gain(ADG) of Black Bengal kids under T0, T1, T2, T3, and T4 groups were found to be 38.13±3.32, 38.46±2.78, 40.67±4.94, 38.87±4.85, and 42.95±3.83 g, respectively. ADG in T2 and T4 groups were significantly (p=0.039) higher than the control group. A period effect was also observed (p<0.01), without any significant interaction between treatment and period (p=1.00). The FCR (kg DMI/kg weight gain) in treatment groups were better than the control group (p=0.09). The FCR/CPI (kg CPI/kg weight gain) of the treatment groups T2, T3, and T4, were also superior (p=0.023) compared to T1 and control groups.



Organisation of 'Livestock and Agriculture mela' under TSP and SCSP projects

The Institute organized Livestock-cum-Agriculture Mela under both TSP and SCSP Project components of NDRI on March 3, 2022 at Hatrusulganj Football ground, Raipur-Supur Gram Panchayet, Near Bolpur, Birbhum in collaboration with Bolpur Manab Jamin (NGO), Bolpur, Birbhum. Different activities were organized in order to attract resource poor ST and SC farmers including women farmers in the Mela for scientific rearing of different livestock (cattle, goats, piglets) and poultry birds with integrated system of farming. Several Direct Benefit Transfers (DBTs) like goats, poultry chicks and ducklings were distributed to large group of ST farmers for boosting the farming system and to enhance the livelihood security, family income and nutritional status of family members. Sufficient quantity of feeds (75 quintals) for such animals and birds, mineral mixture, supplements, feeders and waterers for poultry birds etc. were also

distributed to the beneficiary farmers for scientific rearing of animals/birds and increasing the production potential of such animals. Total of 70 goats, 2400 chicks, 2400 ducklings of elite breeds were distributed to 275 Tribal farmers along with other inputs. Under SCSP component 68 goats and 25 quintals feeds were also distributed to 34 new and 16 old SC beneficiary farmers. Health-cum-vaccination camp was also organized in the Mela Ground for vaccination of animals against different diseases of livestock/birds and treatment of diseased animals/birds reared by the SC and ST farmers of the area. More than 700 farmers (SC & ST) participated and benefited from the programme.

Organization of Camp at Assam under NEH project

ICAR-NDRI, ERS, Kalyani, West Bengal organized programmes on "Livelihood improvement through livestock interventions" at Chapar, Dhubri, in collaboration with KVK, Dhubri, Assam on March 8, 2022. A total of 47 Beetal crossbred Male goats were distributed to 47 goat keepers and 51 piglets (Hampshire and Ghungroo) to 51 pig farmers. Goat feed, minerals mixture, medicines, vitamins and veterinary first aid kit etc. were also distributed to the beneficiary farmers. A total of 101 dairy farmers were given cattle feed, minerals mixture, medicines, vitamins etc. to enhance the productivity of dairy animals. A total of 251 beneficiary farmers

attended the Scientists-farmers interaction meeting. At Morigoan KVK a total of 81 Assam local female goats distributed to 40 goat keepers and 51 piglets (Ghungroo) to 51 pig farmers. Goat feed, minerals mixture, medicines, vitamins, veterinary first aid kit etc are distributed. A total of 68 dairy farmers were given cattle feed minerals mixture, vitamins, medicines etc. A total number of 200 beneficiaries along with 41 other farmers are attended scientist-farmer interaction meeting. One day training for each category of farmers (goat & pig) was also organized at Morigaon, KVK campus.

Activities organized in Tripura

ICAR-NDRI, ERS, Kalyani, West Bengal organized one day programme on "Livelihood Improvement NEH Farmers through Livestock Interventions" at the Grampanchayet of South Bagma, Udaipur district, Tripura on March 15, 2022 under NDRI-NEH Project Component. A *Scientists-Farmers' Interaction-cum-Training* (off-campus) programme on livestock rearing at the area was conducted where more than 150 NEH farmers participated. Animal husbandry inputs viz. live goats (30 nos, 10-12 kg body weight), piglets (30 nos, 10-12 kg body weight), chicks (1000 nos, 35 days old), feed for goat (1500 kg), pig feed (1500 kg), poultry feed (2500kg) and cattle feed (2500kg) were distributed among the farmers. In this programme 137 farmers were the direct beneficiaries of livestock inputs. The overall purpose of the programme was to improve socio-economic conditions of resource-poor farmers of Tripura through input support and technological interventions in livestock sector.

Extension Activities:

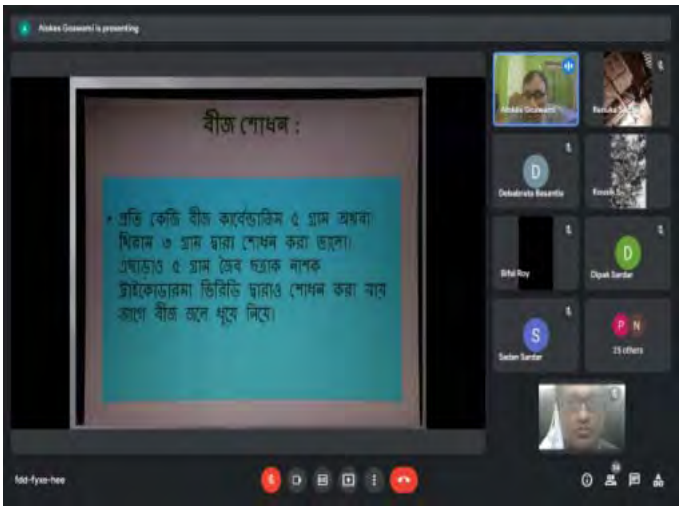
Celebration of National Girl Child Day

On January 24, 2022, 'National Girl child Day' has been celebrated by Eastern Regional Station of ICAR-National Dairy Research Institute and KVK-Additional, Nadia. On the occasion, an online training programme was organised on importance of proper nutrition and balanced diet

for young girl child. Scientist and technical officer of the Institute delivered lecture on different aspects of woman empowerment and nutritional security of the girl child. The program was started with interaction with the participants about importance of proper nutrition and the participants of the training programme actively interacted with the experts. A total of 63 farm woman inclusive of 20 girl students actively participated in the event.

Celebration of 'World Pulses Day'

An online training programme was organised by ERS of ICAR-NDRI and KVK (additional) Nadia on February 10, 2022. In the training programme scope of pulse crop cultivation in the district was discussed. Experts from KVK Additional Nadia and ERS of ICAR-NDRI delivered detailed lectures on scientific management of green gram pulse crop, black gram variety etc. Experts emphasised on importance of cluster demonstration on pulses crop. A total no of 65 progressive farmers virtually participated from Banamalipara, Sutra, Mahanala, Ichhapur, Jatrapur, Kalibazer and Huda village of Nadia district.



Celebration of 'International Women's Day'

An off-campus programme was organized on the occasion of International Women Day at Phulia, in Santipur block of Nadia district on March 8, 2022. In this programme, various issues pertaining to women empowerment, gender equality and importance of farm women in agricultural farm operation were discussed. Queries raised by farm women were answered and

some input support for farming operation was also distributed among the farming community. A total of 65 farm women from SC (7) and OBC (58) community actively participated in the event and benefited from the interaction with the experts.

Off campus training-cum-awareness programme on 'off-season vegetables cultivation technique'

Training-cum-awareness programme on off-season vegetable cultivation was organized on March 21, 2022 at Bishnupur village of Krishnagar-1 Block in Nadia district of West Bengal by KVK (Additional) Nadia. Expert from the KVK delivered the lecture on different aspects of off-season vegetable cultivation technique and importance of natural farming. The awareness cum training programme helped the farmers to increase their knowledge about cultivation of off-season vegetable for higher profitability. A total of 35 Progressive farmers participated in this training program. The farmers appreciated the initiative and promised their involvement in vegetable cultivation in future.

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