

NIANP News & Views



Save Water

Save the planet



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Published by

Raghavendra Bhatta
Director, ICAR-NIANP

Director's Desk

Dear Readers,

The nation has entered an era of modern agriculture through the realization of Green Revolution during the 1960's. Considerable progresses have been made since then in various sectors of agriculture including animal husbandry. Today, we are a proud nation in terms of being self-sufficient in terms of agricultural commodities and also major exporter of many of them. However, after realizing green revolution, during the last 50 years new challenges have come up with the changing socio-economical-environmental scenarios worldwide. We have redefined the scale of success, quality, environmental protection, health hazards and economics of the agricultural practices and profession. One of the major challenges of the agricultural scientists, policy makers and administrators in recent times is to produce sufficient agricultural products for over 1.3 billion population of the country. Such a challenging milieu demands more efficient planning and out of the box research efforts and technologies for producing sufficient agricultural produce from the gradually shrinking natural resources.

The concept of livestock farming has also changed over the years. At present in India, a very complex scenario exists for this sector. Considering the socio-economical importance of livestock farming at rural level, the importance of small scale animal farming is still relevant for the small and marginal farmers for ensuring their livelihood security. Simultaneously, we need to introduce organized animal farms as a component of integrated farming for the large farmers for more efficient utilization of natural resources. Moreover, considering the knowledge, technologies and consumer market available in the country at present, there is a huge scope for introducing technology-intensive industrialized animal farming involving the educated youth. I strongly believe that this sector is yet to experience a True Revolution in terms of organized farming and the days are not distant.

During the last 20 years since inception, ICAR-NIANP has proven itself to be a leading Institution in the area of Animal Nutrition and Physiology. We are persistently working towards ensuring nutritional security by augmenting livestock production performance using the available natural resources in an environment friendly manner. Being an ISO 9001-2008 certified Institute, we believe in hard work and continuous improvement in the quality of our work and planning. We are relentlessly trying to develop appropriate knowledge and technologies to improve the quality of life of the livestock farmers and entrepreneurs at regional and National level considering the changing global scenario in the animal sector.

Raghavendra Bhatta



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Research News

Database on state wise enteric methane emission

Methane is second most important greenhouse gas after carbon dioxide and represents a concentration of 1.8 ppm in the troposphere. The total annual methane emission from both natural and anthropogenic sources is about 574 Tg; whilst 536 Tg is being removed through various sinks and therefore leaving 38 Tg in the atmosphere. Among various anthropogenic sources, livestock production is one of the largest methane emitting sectors dispensing between 90-105 Tg annually. Annual enteric methane emission from Indian livestock is estimated by various agencies in the range of 6-18 Tg and there is a huge disparity between different estimates which gives misleading information and make amelioration attempts extremely difficult. One of the major causes for such inaccurate estimate is the lack of suitable and validated methodologies for emission measurement.

Methane is generated as resultant by-product of microbial digestion in the rumen (enteric fermentation) and represents the primary sink for metabolic hydrogen removal away from the rumen. Rumen methanogenesis is therefore generally referred as necessary but wasteful process. At one hand, the high global warming potential (25 times of CO₂) of methane makes it more fatal than carbon dioxide, while its shortest half life extend the opportunities to tackle the burning issue of global warming in short time on the other hand.

In addition to the significant role in global warming, enteric methane emission from livestock has another dark face of depriving host animal from the sizable fraction of usable biological energy (8-12% of intake). On an average, about 55.65 mega joules energy is lost for the emission of one kilogram of enteric methane from livestock. Thus, these two crucial issues called for a meaningful reduction in enteric methane emission from livestock to stabilize the global warming and improving productive performance by making availability of additional energy. The country based database for accurate enteric methane emission is required to 1) explore the trend and identify that how much is being contributed by different livestock species 2) identifying the hotspots which need immediate attention of the researchers 3) devising of effective ways to mitigate the emission and 3) confirmation of the effectiveness of strategies used for the intended purpose of reduction.

Looking at the necessity, the institute has initiated the efforts to develop a country wide database on enteric methane emission from Indian livestock. The state and district wise NIANP database considered the livestock population (19th census), feeding practices, seasonal variability in feed resources availability, sex of the animal and physiological stage (growth, lactation, reproduction etc.). Unlike others, the NIANP database is principally derived from the methane production potential of different feed resources/feeding practices. More than thousand feed resources have been evaluated in the laboratory by *in vitro* gas production technique for generating the primary data on methane production potential to develop the database. The estimate by NIANP revealed Uttar Pradesh as most enteric methane emitting state (1.52 Tg/y); while states such as Rajasthan, Madhya Pradesh, Maharashtra, Gujarat and Bihar stands next in the list of major methane emitting states. The hilly states like Jammu & Kashmir, Uttarakhand and Himachal Pradesh contribute negligible (<0.10 Tg) to the country's annual enteric methane emission.

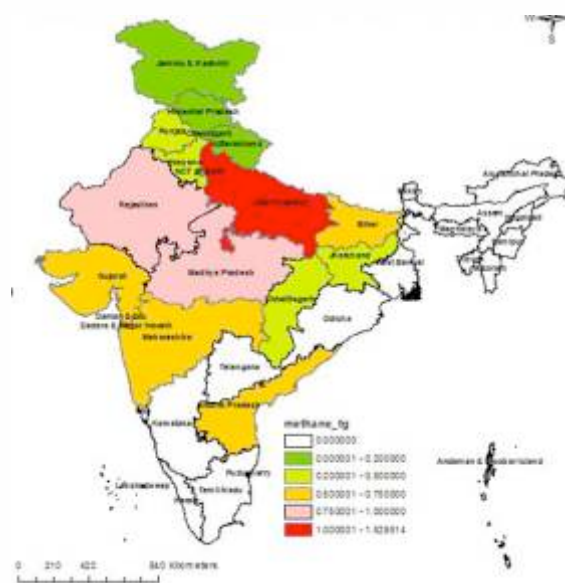


Fig. 1: State wise enteric methane emission database

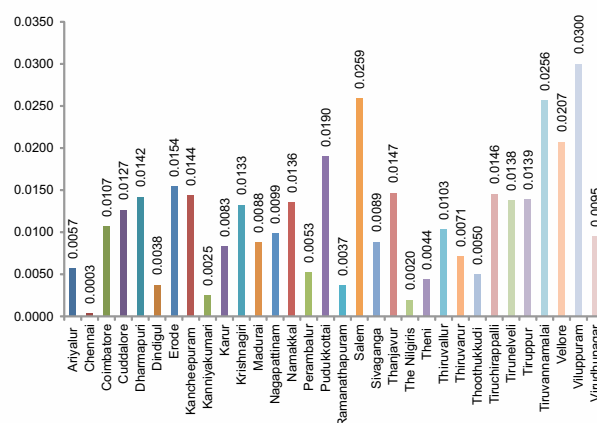


Fig 2: District wise enteric methane emission in Tamil Nadu state

Events



IMC Meeting on 04-02-2016



International Yoga Day celebration on 10-06-2016



Foundation Stone Laying Ceremony of Laboratory animal house on 19-05-2016



RAC Meeting on 02-02-2016



SSS Training on 16-03-2016



MICROHD 2016 and 19th ADNAT Convention from 23-25 February, 2016



Feed base review meeting on 28-06-2016



Inauguration of Industrial Experience training programme on 01-06-2016



Republic Day celebration on 26-01-2016



Feed assist training programme on 03-06-2016



Institute Animal Ethics Committee meeting on 23-04-2016

Mera Gaon Mera Gaurav Programme



As directed by the ICAR, the Institute implemented the Mera Gaon Mera Gaurav (MGMG) programme for the benefit of farmers. Ten teams were made comprising of 3-4 scientists with one scientist as the team leader. Fifty villages within 100 km of radius of the Institute were adopted under this scheme. Each team periodically visited the villages to collect base line data, discuss with farmers about the existing problems and provide the suggestions/inputs for overcoming the problems related to animal husbandry. Capacity building and skill development in the form of workshops and demonstrations were conducted in the villages.

Visitors



Dr AS Ninawe, former Vice Chancellor, MAFSU, Nagpur visited on 09-03-2016



Students of Oxford college visited on 09-03-2016



Dr AK Rawat, Joint Director, DBT, New Delhi visited on 07-01-2016



Dr Nagasundara Ramanan, Senior Lecturer, Monash University, Malaysia visited on 19-02-2016



Dr BN Tripathi, Director, ICAR, CIRB, Hisar visited on 14-01-2016



Dr Gene Wijffels, Principal Research Scientist, CSIRO, Australia visited on 23-06-2016



International trainees of CPDOTI, Bengaluru visited on 05-03-2016



Prof. Claire AUBRON and Mr. Damien GAROYAN, Montpellier SupAgro, FRANCE visited on 16-04-2016

Seminar/Lectures/Others

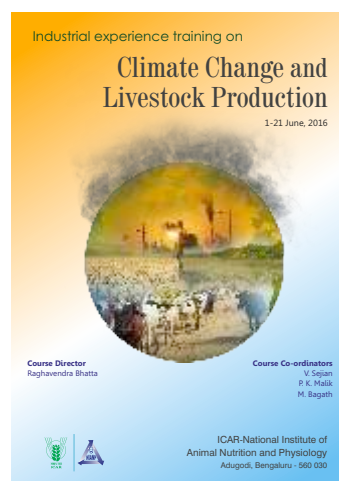
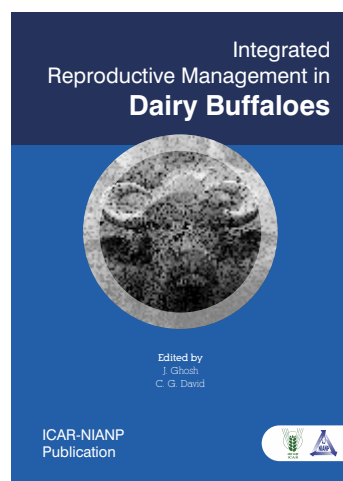
Sl No	Date	Talk	Speaker
1	27 th Jan, 2016	KRISHI: Knowledge based Resources Information Systems Hub for Innovations in Agriculture	Dr D. Rajendran, Senior Scientist, Animal Nutrition Division, NIANP
2	27 th Jan, 2016	Segregation plan for Laboratory Waste disposal	Dr J. Ghosh, Sr. Sci., A P Division and Nodal officer Bio-waste Disposal
3	15 th March, 2016	Adaptation of feedlot cattle to chronic heat stress and modeling of GHG in livestock farms	Dr V. Sejian, Senior Scientist, Animal Physiology Division, NIANP
4	17 th June, 2016	Work done report and sharing the experience of deputation under Australian Govt sponsored Endeavour Executive Fellowship	Dr S. Nandi, Principal Scientists, Animal physiology Division, NIANP
5	22 nd June 2016	Inflammatory responses in the feedlot cattle over summer in Queensland, Australia and Nebraska, USA	Dr Gene Wijffels, Principal Research Scientist, CSIRO, Australia
6	23 rd June 2016	A Metabolomic study of <i>Haemonchus contortus</i> infection in genetically susceptible and resistant sheep	Dr Gene Wijffels, Principal Research Scientist, CSIRO, Australia

Field Workshops



Workshop on improved dairy farming	01 January, 2016	Puttur, Dakshina Kannada
Mineral mixture for sheep and goat	02 January, 2016	BS Doddi, Bengaluru Rural
Balance feeding of dairy cattle	05 January, 2016	Kuguru, Bengaluru Rural
Technology in livestock feeding	12 January, 2016	Bandaralahalli, Kolar
Reproductive problems	13 January, 2016	T Nagenahalli, Bengaluru Rural
Feed chart and ration balancing	18 January, 2016	Angalapura, Bengaluru Rural
Fish farming in villages	19 January, 2016	Katharenahalli, Tumkur
Rabi campaign workshop	23 January, 2016	KVK, Hirehalli, Tumkur
Improving milk quality	23 January, 2016	Handenahalli, Bengaluru Rural
Management of reproductive problems	26 February, 2016	Ragihalli, Bengaluru Rural
Workshop on balanced feeding and improvement of green fodder production	10 March, 2016	Balenhalli, Tumkur
Feeding of dairy cattle	10 March, 2016	Balenhalli, Kolar

Publications



Personnel

Relieving: Shri Anbu R Relieved from the post of Assistant on 31-03-2016 to join the post of Assistant Registrar at Indian Maritime University, Chennai

Joining: Dr G Krishnan Joined as Scientist on 03-02-2016, after transferred from ICAR-NRC on Yak, Dirang, Arunchal Pradesh

Awards/ Recognitions / Visits Abroad

V Sejian

DN Mullick Memorial Award for the outstanding contribution in the field of Animal Physiology by (SAPI), 21 Jan, 2016.

Endeavour Research Fellowship of the Australian Government for six months (24 August, 2015 to 24 February, 2016) at The School of Agriculture and Food Sciences, The University of Queensland, Australia.

Letha Devi G

Best oral paper presentation award 8th GCRA International Conference 5-7 Jan, 2016 at UAS, Bengaluru

M Chandrasekharaiah

Fellow of Animal Nutrition Society of India (FANSI), 2016.

Ashish Mishra

Best oral presentation award in XXIV SAPI conference, 21-22 Jan, 2016, AAU, Guwahati

Manpal Sridhar

Second best oral paper presentation award XVI Biennial Animal Nutrition Conference 6-8 Feb, 2016, NDRI, Karnal.

Dr. Raghavendra Bhatta

Attended 6th Greenhouse Gas and Animal Agriculture (GGAA) conference, 14-18 Feb, 2016, Melbourne, Australia and delivered an invited talk on “Enteric methane mitigation using plant secondary metabolites”.

International Symposium on Microbiome in Health and Disease (MICROHD2016)

The Institute, jointly with the “Association for the Promotion of DNA Fingerprinting and other DNA Technologies (ADNAT), Hyderabad” organized the “International Symposium on Microbiome in Health and Disease (MICROHD2016)” during the period of 23-25 February, 2016. The symposium was attended by 170 delegates including 11 international speakers, nine national speakers and delegates from Roslin Institute, Edinburg University and Commonwealth Veterinary Association.

The symposium focussed on the importance of animal and human associated microbiome in maintaining animal and human health and performance. Dr Kalidas Shetty, Associate Vice President for International Partnerships and Collaborations and Professor (Plant Metabolism and Food Security), North Dakota State University, USA delivered the Keynote address. Dr Shetty described how fermented food systems with enriched diversity for beneficial microbiome can offer unique processing and nutritional solutions towards addressing global food and nutritional security challenges. Dr Srini V Kaveri, Director, Immunopathology and Therapeutic Immunointervention, Centre de Recherche des Cordeliers, France emphasized the need of investigating the interaction of gut microbes and the host immune system to understand the molecular and cellular basis of the pathogenesis of autoimmune diseases and design novel therapeutic strategies. Other speakers of the symposium described the latest technological developments for characterizing microbiome, role of microbiome in performance and health with a special emphasis on rumen metabolism and possible strategies to manipulate microbiome for benefits. Scientific abstracts were also presented in the symposium by the students, academicians and scientists, which emphasized the various aspects of microbiome research and applications in animal and human.



Popular lecture on Genetically Engineering Livestock: How and Why

The Institute organized a popular lecture by the world renowned scientist Prof. Bruce Whitelaw, Deputy Director and Head of Division of Developmental Biology, The Roslin Institute, University of Edinburgh, UK on “Genetically Engineering Livestock: How and Why” for the benefit of young researchers and general public on 21 February, 2016. The event was organized in collaboration with the “Association for the Promotion of DNA Fingerprinting and other DNA Technologies (ADNAT), Hyderabad and Department of Biotechnology, Govt of India, New Delhi. In the lecture, he discussed how to apply this technology in the field of animal biotechnology, specifically novel ways to combat infectious disease in animals, evaluate strategies to enhance overall reproductive efficiency and explore opportunities to develop new treatments of disease through appropriate genetically engineered animal models. Prof. Bruce emphasized that genetically engineered animals are the solutions for many problems in animal and medical sciences. Nearly 100 participants attended the lecture.



Laboratory Profile

Animal Biotechnology Laboratory

Concept

- Understanding the mechanisms and modulation of oocyte and embryo development for improving fertility and techniques for rapid multiplication of elite germ plasm

Approach

- Identification of factors and optimizing the environment for oocyte development for better culture conditions to improve in vitro fertilization and embryo yield
- Environmental, toxicological and other stress factors affecting follicle function and germ cell development and strategies for amelioration
- Nutritional factors influencing follicle and oocyte development, including expression of genes

Findings

- Embryo produced from IVF of oocyte derived from *in vitro* cultured buffalo preantral follicle
- Ultrasound guided oocyte pickup, IVM and IVF successfully adopted in local breeds of buffalo
- Deleterious effects of some commonly used pesticides and heavy metals on oocyte development
- Energy supplementation with locally available feed ingredients could regulate BUN and post partum fertility in cattle and buffalo at farm-gate level
- Azolla as feed supplement shown to augment follicle development

Work contemplated

- Techniques for better *in vitro* production of embryos
- Amelioration of deleterious effects of environmental pollutants on germ cell development and reproduction
- Nutritional modulation for better follicular development and fertility
- Understanding nutrient-gene interaction in embryo development for reducing early embryonic mortality





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India and Edinburgh - a shared genetic research future?

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FEB

By Prof Bruce Whitelaw, The Roslin Institute, the University of Edinburgh



Following my participation in the excellent brain-storming workshop on Transgenic Livestock, in Bengaluru, organised by the Indian Government's Department of Biotechnology's (DBT) and the Indian Council of Agricultural Research (ICAR), I attended the Association for the Promotion of DNA FingerPrinting and other DNA Technologies (ADNAT) sponsored MICROHD2016. I am participating in the 19th ADNAT Convention, as I am a member of the Indian ADNAT Society, a linkage facilitated by Dr Satish Kumar who is both the General Secretary of ADNAT and a proud alumnus of the University and Edinburgh.

This convention was held at the National Institute of Animal Nutrition and Physiology (NIANP) in Bengaluru and therefore gave me the pleasant opportunity to meet again Dr Raghavendra Bhatta, the Director of NIANP. As part of ICAR, NIANP gives India a huge capability across the whole agricultural sector. This sector literally sustains India – and is also the basis for much of Indian life and culture. Agriculture in India is extremely diverse, representing a massive opportunity for genetic science. The University of Edinburgh is very strong in this discipline and it is not surprising that we have such strong relationships with our Indian colleagues across the agricultural and veterinary sciences. This interaction focuses through The Roslin Institute and Royal (Dick) School of Veterinary Sciences at the University's Easter Bush Campus.

This is the fourth ADNAT Convention I have attended and it was as illuminating as ever, being wonderfully organised by Drs Arindam Dhali and Atul Kolte. This excellent conference focused on the microbiome and the impact that next generation sequencing (NGS) is likely to make. The sequencing revolution is not passing India by and, importantly, India is poised to take a lead role in utilising this technology.

It is timely for significant advances in overall agricultural productivity in India. More and more technologies are becoming available and I sense a real enthusiasm to embrace new tools and strategies to maintain food security in this big country. I see huge opportunities here – both academic and commercial. I strongly believe that we at the University of Edinburgh can make valuable contributions to and be part of this growth, through scientific collaboration, training of students and entrepreneurship.

As I return back to wintry Edinburgh, my mind is full of the opportunities that exist in India.

<http://www.mediablog.ed.ac.uk/wp/india/2016/02/29/india-and-edinburgh-a-shared-genetic-research-future/>

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