Buffalo Newsletter

Number 42 February 2025

BULLETIN OF THE FAO-ESCORENA INTER-REGIONAL COOPERATIVE RESEARCH NETWORK ON BUFFALO AND OF THE INTERNATIONAL BUFFALO FEDERATION – INCLUDES SHORT COMMUNICATIONS, RESEARCH PAPERS, TECHNICAL NOTES, ONGOING RESEARCHES

Buffalo Newsletter - Number 42 February 2025

Editor: Antonio Borghese
antonio.borghese@email.it

Editorial Committee
Vittoria L. Barile, Antonella Chiariotti
CREA, via Salaria 31, 00015 Monterotondo (Roma) – Italy

IBF Secretariat
Antonio Borghese, Vittoria L. Barile, Antonella Chiariotti, Carlo Boselli, Federico Infascelli, Anna Chiacchierini, Olimpia Barbato

Network Co-ordination Centre, to which correspondence is to be sent:
internationalbuffalofed@gmail.com
IBF, via Salaria 31, 00015 Monterotondo (Roma) – Italy

Graphic Design
Francesca Cerioni

ISSN 3006-5798

FROM THE EDITORIAL COMMITTEE

In the Report section, synthetic descriptions of the 11th Asian Buffalo pre-congress training course on Buffalo Reproductive Biotechnology & Animal Recording and of the 11th Asian Buffalo Congress are included on page 6.
Two ongoing projects, BUFFALO & Co. -Transfer of technical innovations for improving buffalo farming and dairy processing of buffalo and other species a CREA-AICS collaboration for the development of buffalo production in Cuba described briefly on page 16, and the Innovative breeding and processing technologies for the Lazio Region Buffalo Meat Qualitative Enhancement (INNOBUF project) at page 19.
A report about the first International Conference on Buffalo Mozzarella and Milk Products, held in Naples in September 2024 gives an overview of the main topics addressed during the conference (page 22).

In the Scientific Focus section, we are presenting the abstract of the invited and keynote lectures presented at the 11th Asian Buffalo Congress held in Dhaka, Bangladesh in October 2024 page 25 and a paper about the situation of buffalo farming in Bangladesh (page 38).

In the Upcoming Event section, you have the invitation for the XI Congress of Buffalo of the Americas and Europe to be held in Santa Cruz, Bolivia in September 2025, and the invitation for the 14th World Buffalo Symposium to be held in Italy in 2026.
A presentation of the next IBF-CREA technical course on Buffalo is at page 46.
The IBF Secretariat worked to maintain connections and support to associates. Other requests to become members were examined, reaching 181 IBF associates, representing 36 countries.
Enjoy

The Editorial Committee

INSIDE THIS ISSUE

REPORTS

SCIENTIFIC FOCUS

UPCOMING EVENTS

IBF ORGANIZATION

Partecipants group at the Buffalo Research Farm

REPORTS

TRAINING COURSE ON BUFFALO REPRODUCTIVE BIOTECHNOLOGY & ANIMAL RECORDING

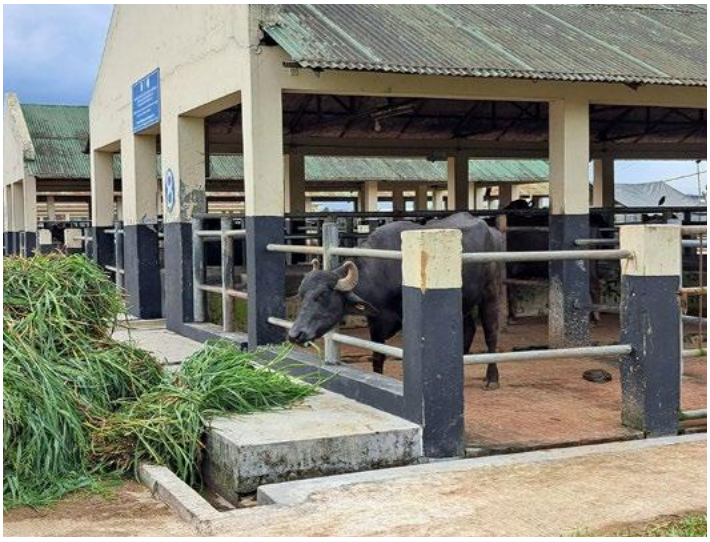
Vittoria Lucia Barile[1], Olimpia Barbato[2]

During the two days (October 23-24, 2024) preceding the 11th Asian Buffalo Congress, a training course on Buffalo Reproductive Biotechnology & Animal Recording was offered to provide the participants with an international approach to the study and the application of modern reproductive biotechnologies to the buffalo.
The course was held at the Bangladesh Buffalo Breed-

Ovum Pick Up technique

[1]Council for Agricultural Research and Economics (CREA). Research Centre for Animal Production and Aquaculture, Monterotondo, Italy
[2] University of Perugia. Department of Veterinary Medicine. Perugia Italy

Buffalo at the Research farm



ing and Development Farm, in Savar. A total of 15 keen participants from Bangladesh and Nepal attended the event including buffalo farm managers, scientific officers, lecturers, PhD students, and progressive farmers.

The course was organized by Prof. Dr. Md. Omar Faruque, President of the Local Organizing Committee 11th Asian Buffalo Congress, and coordinated by Mr. Shahed Hossain, Senior Assistant Director of the Buffalo Breeding and Development Farm.

Prof. Faruque opened the session by describing the current reproductive status of buffaloes in Nepal and Bangladesh.
The program delivered by Dr Vittoria Lucia Barile from CREA Research Centre for Animal Production and Aquaculture (Italy) and Prof. Olimpia Barbato from the Department of Veterinary Medicine, University of Perugia (Italy) included the following theoretical and practical topics:

- Oestrus synchronization and fixed-time artificial insemination in buffalo
- Reproductive ultrasonography
- Female reproductive tract practice
- Laboratory methods for pregnancy diagnosis in buffalo

Course group

Buffalo at the Research farm

- ELISA application to hormonal detection

The practical demonstration which included the ultrasound examination of the buffalo female tract and an Ovum Pick up (OPU) session simulation, was performed in the Buffalo Research Farm of the Bangladesh Livestock Research Institute. The opportunity to follow up on the practical sessions at the end of the theoretical lectures allowed the participants to strengthen the aspects taught by the trainers in their lessons and to enrich the question and answer sessions, where participants interacted with questions and curiosity.

We had an enthusiastic, active, dynamic and interested group of participants, who made a very positive impression on the panel of trainers.

11TH ASIAN BUFFALO CONGRESS WAS HELD IN DHAKA, BANGLADESH

The three-day long 11th Asian Buffalo Congress was held on October 25-27, 2024 in BCDM, Savar, Dhaka, Bangladesh. The Asian Buffalo Association (ABA), in collaboration with the Bangladesh Buffalo Association (BBA), the Department of Livestock Services of Bangladesh, Bangladesh Livestock Research Institute, and Bangladesh Agricultural University jointly organized the congress. This congress brought together 150 participants from nine countries (Japan, China, Thailand, Bangladesh, Nepal, India, Pakistan, Italy and Canada) including academicians, researchers, farmers, and policymakers. **The theme of the congress was "Buffalo for Safe Food and Sustainable Production".** The congress was a hybrid one as participants were present physically and virtually.

Farida Akter, Honourable Adviser, Ministry of Fisheries and Livestock, Bangladesh inaugurated the 11th Asian Buffalo Congress and addressed the scientists and stakeholders involved in buffalo research and industry across Bangladesh, Asia, and globally. She recognized the importance of buffalo and said the Ministry of Fisheries and Livestock, Bangladesh will take various steps for increasing the production of buffalo in coming days.

Prof. Dr. Md. Omar Faruque, President of Asian Buffalo Association, acknowledged the opportunity for the scientists and stakeholders to know the present status of buffalo in Asia and world, to share and exchange scientific knowledge among scientists and stakeholders and finally to form a network between Bangladesh and international communities through this congress. Dr. Ashok Kumar Balhara, secretary of Asian Buffalo Association, Dr. TK Datta, director of ICAR CIRB, India, Professor Antonio Borghese, Secretary General of International Buffalo Federation, Italy, Dr. Sayeed Mahmood Belal Haider, secretary of Ministry of Fisheries and Livestock, Dr. Md. Reajul Huq, director general of Department of Livestock Services, Dr. SM Jahangir Hossain, director general of Bangladesh Livestock Research Institute, Dr. Hiranmoy Biswas, secretary of Local organizing committee also addressed at the inauguration session.

Dr. TK Datta, director of ICAR CIRB, India presented the theme paper of the congress whereas Dr. Antonio Borghese, Secretary General of International Buffalo Federation and Dr. Inderjeet Singh of India, Vice President of Asian Buffalo Association, presented the present status of buffaloes in the world and Asia, respectively. Prof. Dr. Metha Wanapat of Thailand, presented the invited paper entitled “Feeding of buffaloes based on local feed resources to enhance rumen fermentation efficiency and mitigate methane emission”.
Country report of Bangladesh, Nepal, India, Thailand and China was presented by Prof. Dr. Md. Ruhul Amin,

Fig 1. 11th Asian Buffalo Congress opening session (photo Faruque, 2024)

11th Asian Buffalo Congress technical session (photo Faruque, 2024)

Dr. Neena Amatya Gorkhali, Dr. Ashok Kumar Balhara, Professor Dr. Skorn Koonawootrittriron and Professor Chengjian Yang, respectively.

Participants of the congress presented 85 scientific research papers through oral and poster presentations covering various topics such as Buffalo ecology, climate, welfare and sustainability, Buffalo breeding and reproduction, Buffalo feeding and nutrition, Buffalo products processing technology, Buffalo genomics and biotechnology, Buffalo health and adaptability and Buffalo management, economy and sociology.

Dr. Antonella Chiariotti from Italy, Professor Dr. Nasim Ahmed from Pakistan, Dr. Sachin Kumar from India, Dr. Takashi Tsuji from Japan, Dr. Ranjit Singh Kataria from India, Dr Praveen Malik from India and Professor Dr. Kazunobu Ikeya from Japan presented the keynote paper in Buffalo ecology, climate, welfare and sustainability, Buffalo breeding and reproduction, Buffalo feeding and nutrition, Buffalo products processing technology, Buffalo genomics and biotechnology, Buffalo health and adaptability and Buffalo management, economy and sociology discipline, respectively.

The congress ended with prize distribution ceremony of best presenters.

Finally, Asian Buffalo Association assembly was held with selection of Prof. Dr. Muhammad Ijaz as the next President of Asian Buffalo Association. He was assigned to organize the 12th Asian Buffalo Congress in Pakistan.

Professor Dr. Md. Omar Faruque
President, Organizing Committee,
11th Asian Buffalo Congress,
Dhaka, Bangladesh

Prize distribution ceremony (photo Faruque, 2024)

PRESENT STATUS OF BUFFALO IN BANGLADESH AND FUTURE PROSPECTS

Mohammad Ashiqul Islam[1], Md. Ruhul Amin[2], Gautam Kumar Deb[3], Md. Mohsin Tarafder Razu[4], Q. M. Emdadul Huque[5], Sharif Ahmed Choudhury[6] and Md. Omar Faruque[7]

Livestock play an important role in the national economy of Bangladesh through supply of high quality protein in food and employment generation. Buffalo, once used for draught power, is being nowadays used as dairy animal and honoured for supplying quality milk and meat, dung as fuel and fertilizer, hide and employment generation. The number of buffalo increased from 1960 to 1996, then declined until 2019. After 2019, the number of buffalo is increasing gradually. The country has no recognized breed.

The buffalo population can be classified in to (i) indigenous river type buffaloes, (ii) indigenous swamp buffaloes, (iii) migrated Indian non- descriptive river type, (iv) imported Indian Murrah and (v) crossbred buffaloes (Indigenous buffalo x Murrah/Nili-Ravi). The dairy buffaloes are concentrated in the attached char of river Padma- Brahmanputra and off-shore islands of Bay of Bengal whereas swamp buffaloes are reared only in the north-eastern part of Bangladesh. The dairy buffaloes in the attached char and offshore islands are reared in extensive system under nomadic or transhumant system, the other buffaloes are reared under semi-intensive system. The practice of intensive system for buffaloes in Bangladesh is rare. The milk yield and reproductive efficiency of indigenous buffaloes are low as compared to recognized buffalo breeds. However, the government and private sector have come forward to improve the indigenous buffaloes to increase their milk and meat yield. Artificial insemination of buffaloes has been established and is being used for producing cross bred buffaloes.

Buffalo farming and buffalo products are being popularized, however there are a number of constrains at policy level, farmer level and marketing aspect and these are to be solves for sustainable buffalo production in Bangladesh.

Keywords: Bangladesh, buffalo, present status, future development

Prof Ruhul Amin (Bangladesh)

[1] Department of Dairy Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh
[2] Department of Animal Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh
[3] Biotechnology Division, Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh
[4] Department of Livestock Services, Krishi Kamar Sarak, Farmgate, Dhaka, Bangladesh
[5] Lal Teer Livestock Development (BD) Ltd, 108 Bir Uttam CR Datta Road, Dhaka, Bangladesh
[6] PKSF Bhavan, Plot No.E/44-B, Agargoan Administrative Area, Shr-e- Bangla Nagar, Dhaka, Bangladesh
[7] Department of Animal Breeding and Genetics, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

CURRENT STATUS OF BUFFALO PRODUCTION IN CAMBODIA

Khy Youkheng

Livestock production is one of the main agricultural activities which are defined as a diversified rural farming system. The animal production system is divided into two systems; smallholder and commercial farm. Smallholder operations has been and still is the predominant system for the last 5 years despite smallholder farms being on a significant decline and commercial production system being on a steady rise.

Buffalo, specifically, is a highly valued agricultural animal for smallholders, but the production of this species has unfortunately declined in recent decades due to rising farm mechanization. While swamp buffalo still plays a role in farmland cultivation, this species' purposes has shifted from draft power to meat, and hide production. Rice straw and natural grass are the main feed for cattle/buffalo, and the majority of cattle/buffalos receive natural breeding services, but AI for cattle is being widely promoted and supported by the General Directorate of Animal Health and Production (GDAHP). Low nutrient intake, low productivity breed, and infectious disease occurrence are the main constraints leading the producers to lose their profit from the business.

However, the incomes earned from animal production include direct income, indirect income and other income through animal activities and its products have largely contributed. Direct income in this report refers to the income collected by the state as tax payment. Taxes include: animal tax, sanitary inspection tax (hygiene/health inspection tax) and meat inspection tax collected at slaughterhouses. Indirect income refers to the income obtained from sale of animals and its products received by the farmers or owners of animal. As for other income through animal activities and animal products, it refers to the use of animals for draft, for plowing and harrowing, transporting, and providing of a hundred thousand metric tons of animal manure each year which in this report was not calculated or transformed into monetary figures but has been included as the other income earned from animal activities and their products. Income earned from animal production and its products such as hide, etc has not been estimated in this report.

Keywords: buffalo production, smallholder and commercial farm, cattle/buffalo breed type in Cambodia

Department of Animal Production of General Directorate of Animal Health and Production (GDAHP), St. 371, Trea village, Sangkat/Khan Stueng Mean Chey, Phnom Penh, Cambodia

PRESENT STATUS OF BUFFALO IN CHINA AND PROSPECTS

Fang Xie[1], Shijian Li[2], Zhenghua Tang[1], Kelong Wei[1], Chengjian Yang[1]*

China has 30 buffalo breeds, mostly swamp buffalo. River buffalo excel in milk, while swamp buffalo serve draught. As mechanization advances, buffaloes shift to meat, dairy, or both.

China's dairy buffalo industry grew rapidly, reaching 6 billion yuan in 2023, yet contributes only 1.54% to total animal husbandry, suggesting vast expansion potential. Four farming models exist, with elephant grass, corn stalks, etc. as common feeds. China has crossbred and genetically improved buffaloes since 1957, achieving good results, and is implementing a national genetic improvement plan.

China's buffalo milk industry clusters in the south, especially Guangxi Province, with 22 manufacturers offering over 20 dairy products. Offline sales dominate at about 60%, while online sales take about 40%. Challenges include poor germplasm, feed scarcity, low milk yield, and brand/quality issues. Government, research institutions, and breeding enterprises must collaborate to enhance breeding, quality, and industry development

Keywords: buffalo milk, genetic improvement, buffalo nutrition, feeding models, marketing strategies.

Prof Chengjian Yang (China)

[1] Guangxi Buffalo Research Institute, Nanning, 530001, China;
[2] Royal Group Co., Ltd., Nanning, 530009, China.
*Correspondence: ycj0746@sina.com

PRESENT STATUS OF BUFFALOES IN INDIA AND FUTURE TRENDS

Ashok Kumar Balhara[1], TK Datta[1] and Inderjeet Singh[2]

India stands as a pivotal player in global agriculture, significantly contributing to the world's milk production and animal product exports. With a substantial livestock population and progressive government policies, India is poised to enhance its agricultural outputs and economic growth.

The country's robust buffalo farming and dairy sectors are crucial to its agricultural economy, contributing 24% to global milk production and producing 230.58 million metric tonnes (MMT) of milk in 2022-23, with buffalo milk accounting for 45% of the total. Buffalo meat exports reached 1.55 million tonnes (MT) in 2023, with a forecasted increase to 1.64 MT in 2024. The top five milk-producing states, Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat, and Andhra Pradesh, collectively contribute 53.08% of India's total milk production. Government initiatives, such as support for dairy development and technological advancements in milk procurement networks, have bolstered the sector.

The National Dairy Development Board (NDDB) aims to increase India's share in the global milk market, targeting Southeast Asia, Sri Lanka, Bangladesh, and West Asia. India's milk production has grown at a compound annual growth rate (CAGR) of 6%, compared to the world average of 2%.
Despite challenges like the need for unconventional feed resources and aflatoxin contamination, initiatives like Dairy Connect, which focus on better feeding, breeding, and disease prevention, offer improvement opportunities. Buffaloes, integral to India's livestock sector, produce about 45% of the nation's milk and are pivotal in meat production, with India being the third-largest exporter of buffalo meat globally. Their ability to thrive in diverse agro-climatic conditions and support smallholder farming systems underscores their importance in rural income and poverty reduction.

Dr Inderjeet Singh (India)

[1]ICAR-Central Institute for Research on Buffaloes, Hisar, India
[2]Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India
*Correspondence: balharaak@gmail.com

THE STATUS, CHALLENGES, AND DEVELOPMENT OF BUFFALO PRODUCTION IN LAOS

Vongpasith Chanthakhoun[1]*, Thanousin Khandee[1], Visam Vilaisack[1], Amphonephet Sisouvong[2], and Metha Wanapat[3]

In Lao PDR, the buffalo is important for small and marginal farmers' livelihoods and economic development as a source of food, work animals, and tourist attractions. Therefore, buffaloes needed an in-depth study to examine the challenges and opportunities for buffalo development in Laos. The buffalo population in Laos has significantly increased by an average of 4.2% per year from 2018 (1,200,040 heads) to 2023 (1,250,174 heads). The most proportionate increase from 2018 to 2023 has occurred in the northern regions, where buffalo numbers have increased by 11.4%, in the central region by 4.1%, and in the southern region by -1.9%, respectively.

There are three types of farm systems: extensive, intensive-commercial, and semi-intensive. The buffalo population was slowly increasing due to slow breeding, and the mortality rate of buffaloes is generally high. Buffaloes are generally spread in various agroclimatic conditions, which has led to the development of breeds or strains adapted to specific environmental conditions. Crossbreeding took place only on one dairy buffalo farm. Therefore, the government must implement research on the potential and challenges of buffalo in Laos. It is vital to have a thorough understanding of local markets, social structures, and neighboring countries before providing new policies to smallholder farmers.

Keywords: Buffaloes, dairy buffalo, production system, markets, farm system, Lao PDR

[1] Faculty of Agriculture and Forest Resource, Souphanouyong University, Lao PDR
[2] Department of Animal Husbandry and Fishery, Ministry of Agriculture and Forestry, Lao PDR.
[3] Department of Animal Science, Khonkaen University, Thailand.
* Corresponding author: vongpasith@yahoo.com

PRESENT STATUS OF BUFFALOES IN NEPAL AND FUTURE PROSPECTS

Neena Amatya Gorkhali[1]*, Saroj Sapkota[1], Yogendra Bikram Rana[1,2] and Aashish Dhakal[3]

The livestock sector has emerged as the great contributor to agriculture, accounting for approximately 25.7 percent of the agriculture value added and 6.40 percent of the national GDP during the year 2021. Buffaloes in Nepal significantly contribute to the national economy by providing milk, meat, hides, and draught power and contributed 11.54% in AGDPP in the same time. Buffalo number and buffalo product (milk and meat) increased steadily from 2000 to 2013, then deceased until 2022. Buffalo rearing is common in all over the country. The buffalo are common in the terai (plain) region followed by mid hills and high hills and mainly raised for milk and nowadays, it is becoming popular for meat. There are about 5.1 million buffalo in Nepal of which 65% is estimated to be indigenous and 35% are exotic (either pure or crossbred) breeds. Four indigenous buffalo breeds have been identified namely Lime, Parkote, Gaddi, and Terai and are characterized in phenotypic, chromosomal, and molecular levels and their production performance has been well-documented.

The buffalo production system can be categorized into two systems: traditional subsistence milk production system and market linked commercial/semi-commercial milk production system. Lactation yield in standard 305 days' ranges from 961 kg to 1067 kg for indigenous breed whereas that stands 1540 kg for crossbred buffalo. Annual milk production in Nepal is 2,566,614 MT and per capita milk availability is 89 liters per year (MoALD, 2023). Of the total milk produced in the country, 65% is consumed at household level while only 35% is marketed through informal (20%) and formal (15%) sectors. The meat value chain is not as distinct as that for the milk value chain in buffaloes. In the recent decade, the Nepal government significantly intensified efforts to boost buffalo productivity through various initiatives managed by Department of Livestock Services and Nepal Agricultural Research Council. These initiatives encompass a broad range of programs such as genetic improvement of buffaloes, genetic selection, community-level distribution of buffalo bulls, artificial insemination, forage development, conservation strategies, specialized nutrition programs for newly calved buffaloes, and male buffalo fattening for meat production across numerous regions of the country. Furthermore, long term breeding strategies with special references to present and future farming system should be focused.

Keywords: Nepal, buffalo, present status, future development

Prof Neena Amatya Gorkhali (Nepal)

[1] Director, National Animal Science Research Institute (NASRI) and Principal Scientist (Animal Breeding, Genetics and Reproduction) Nepal Agricultural Research Council (NARC), Khumaltar, Nepal
[2] University of Agriculture and Forestry, Chitwan, Nepal
[3] Nepal Polytechnic Institute, Chitwan, Nepal
* Corresponding author: neenagorkhali@narc.gov.np; neenagorkhali@hotmail.com

BUFFALOES IN PAKISTAN:
Keystone of Agricultural Economy and Pathway to Sustainable Growth

Dr. Talat Naseer Pasha

The livestock sector has emerged as the largest contributor to agriculture, accounting for approximately 60.84 percent of the agricultural value added and 14.63 percent of the national GDP in 2024. Animal husbandry is a critical economic activity for rural dwellers in Pakistan, with over 8 million rural families engaged in livestock production and driving 35 to 40 percent of their income from this sector. Buffaloes in Pakistan significantly contribute to the national economy by providing milk, meat, hides, and draught power.

Buffaloes also form a major capital reserve of farming households, provide security, and generate cash incomes for rural populations. Accounting for approximately 60% of the country's total milk production, the high-fat content of buffalo milk makes it ideal for traditional dairy products. The buffalo population has driven up from 20 million in the early 1990s to more than 46.3 million by 2024, with the majority distributed in Punjab and Sindh provinces. Buffalo farming practices have progressed from conventional extensive approaches to more profitable semi-intensive and intensive systems. Simultaneously, the productivity and welfare of buffalo have increased through developments in nutrition and healthcare driven by initiatives from the public and commercial sectors. Breeding programs, emphasizing artificial insemination and genetic enhancement, aim to meet the rising demand for buffalo products. Furthermore, the marketing strategies are focused on both domestic consumption and export opportunities, particularly to the Middle East, China, and Southeast Asia.

As a way forward, public-private collaborations are crucial for future advancements, utilizing resources and expertise to advance breeding, health management, and market access. For the long-term growth of the buffalo industry, the implementation of sustainable practices and climate resilience will provide Pakistani farmers with better economic opportunities and means of livelihood.

Keywords: Buffalo, milk and meat production, nutrition, breeding programs, genetic enhancement, export opportunities, sustainable practices, climate resilience

Prof Muhammad Jiaz on behalf of Prof Talat Pasha (Pakistan)

Corresponding email: tnpasha@uvas.edu.pk

PRESENT STATUS OF BUFFALO IN THAILAND AND FUTURE PROSPECTS

Skorn Koonawootrittriron[1,4]*, Thanathip Suwanasopee[1], Sarochita Saengjong[1], Warangana Toros[2], Supachai Panya-ake[3]

Buffaloes play a crucial role in Thailand's livestock sector, agricultural economy, and cultural heritage by providing draught power, meat, and milk, thereby supporting rural livelihoods and food security. Despite a decline in population from 5.5 million in the 1970s to 1.3 million in 2023 due to modernization and urbanization, recent initiatives and increased demand for buffalo meat have spurred a resurgence in farming. Currently, Thailand manages 1,784,160 buffaloes across 310,751 households. Buffalo farming systems have transitioned from traditional practices to semi-intensive and intensive approaches, integrating improved housing, nutrition, and healthcare. Nutrition and veterinary services are critical for productivity, with buffaloes primarily consuming fibrous plants supplemented during low-forage periods. Genetic improvement programs focus on enhancing Thai swamp buffaloes (*Bubalus bubalis carabanesis*) for growth, milk production, and disease resistance through genetic evaluation and advanced breeding techniques. Conservation efforts aim to maintain genetic diversity for sustainability. Buffalo products are vital to Thailand's agricultural economy; despite low daily milk production (2.0 ± 0.9 kg per cow), high butterfat content makes it valuable in niche markets.

Buffalo meat, with dressing percentages of 53%-60%, is increasingly sought after. Live imports peaked at 23,332 heads in 2021, while exports reached 61,966 heads. Future improvements should address infrastructure, enhance market linkages, and leverage genetic advancements. Sustainable practices, supportive policies, and technological integration are crucial for resilience, preserving cultural heritage, and supporting rural economies in Thailand.

Keywords: Buffalo farming, Thailand, genetic improvement, livestock sector, sustainability

Prof Koonawootrittriron (Thailand)

[1] Tropical Animal Genetic Special Research Unit (TAGU), Department of Animal Science, Faculty of Agriculture, Kasetsart University, Bangkok 10900, Thailand.
[2] Division of Livestock Extension Development, Department of Livestock Development, Ministry of Agriculture and Cooperatives, Bangkok, Thailand.
[3] Bufalo Modern Farm project, Charoen Pokaphan Foundation, CP Tower, Bangkok, Thailand.
[4] Animal Husbandry Association of Thailand under the Patronage of His Majesty the King, Bangkok, Thailand.
*Corresponding author. E-mail address: agrskk@ku.ac.th

CREA- AICS COLLABORATION FOR THE DEVELOPMENT OF BUFFALO PRODUCTION IN CUBA

Antonella Chiariotti[1], Vittoria Lucia Barile[1], Giuliano Palocci[1], Roberto Giuliotto[2], Luigi Partenza[2], Robier Hernanadez[2]

A team from the Research Centre for Animal Production and Aquaculture at the Council for Agricultural Research and Economics (CREA), comprising Vittoria Lucia Barile, Antonella Chiariotti and Giuliano Palocci, researchers with a long experience in buffalo production, undertook an exploratory mission in Havana, Cuba from 26 November to 4 December 2024 to establish collaborative opportunities within the buffalo supply chain as part of the project '**Productive Diversification and Strengthening of the Local Food System in the Municipality of Guanabacoa** (AICS Initiative AID 12935)', financed by the Italian Agency for Development Cooperation (AICS).

The initiative in the Guanabacoa municipality aims to facilitate the long-term sustainability of the local food system achieved by enhancing the management of the dairy supply chain in the area through an integrated approach based on agroecological practices, efficient management of natural resources, and the promotion

Visit to the cooperative "26 de Julio", one of the project' benificiaries

[1]Council for Agricultural Research and Economic (CREA). Research Centre for Animal Production and Aquaculture, Monterotondo, Italy
[2] Italian Agency for Development Cooperation (AICS), La Habana, Cuba

Meeting the Italian Ambassador in Cuba

of business networks and the local economy.
The AICS intervention focuses on bolstering the governance capacity of the agrifood sector by providing support to local authorities in devising local development strategies and policies that foster the involvement of supply chain stakeholders and the formation of public-private collaborations. The objective is to facilitate socio-economic advancement and a stable, sustainable local food supply, particularly in light of prevailing food security concerns and economic crises in the municipality of Guanabacoa. The primary short- to medium-term outcome is to reinforce the advancement of the dairy value chain, thereby contributing to the diversified management of the local food system. The improvement of the supply chain is intended to increase and diversify the availability of products derived predominantly from buffalo milk.

In this scenario, the CREA has been tasked with contributing to the buffalo development through the sub-project **"BUFFALO & Co. - Transfer of technical innovations for improving buffalo farming and dairy processing of buffalo and other species' milk."** Its specific aim is to strengthen the technical capacity in the livestock production sector, especially in terms of increasing production and diversifying dairy products. This initiative will be articulated within the intervention AID 12935 and divided into two outcomes: 1) Increased capacity in buffalo farm management and milking techniques and 2) Increased technical capacity of personnel involved in dairy processing - to transfer knowledge and good practices to the Cuban context.

The CREA has considerable expertise in research on buffalo breeding, encompassing domains such as reproduction, nutrition, genetic enhancement, sustainability, and the production of milk and meat products as well as milk processing.

The CREA experts participated in numerous technical meetings with the project's benificiaries, organized by the Cuban partner ACTAF (Asociación Cubana de Técnicos Agrícolas y Forestales) and the support of the AICS.

The meetings were attended by administrative personnel, representatives of the Ministries of Agriculture and Industry, and the deans of major research institutions in the field. The discussion addressed the current status of buffalo farming in Cuba, focusing on the municipality of Guanabacoa. The potential growth opportunities within the milk chain, based on fruitful technical-scientific collaboration to transfer innovations for improving buffalo breeding and dairy processing were discussed.
The project's action will be achieved through direct technical support to local actors and training to facilitate

Meeting with the Guanabacoa Municipality

the acquisition of knowledge and skills that provide services to agricultural enterprises and cooperatives, focusing on buffalo breeding and dairy processing. The training activities will also aim to improve techniques and good practices for milk collection, storage, and processing, adding value to the process, encouraging production diversification, and improving quality standards.

The mission concluded with a meeting with the Ambassador of the Italian Republic in Cuba, Dr. Roberto Vellano, providing an invaluable opportunity to present CREA's activities, with a particular focus on the extensive experience of the CREA Research Centre in the buffalo sector. It also highlighted the collaborative endeavours undertaken with select Cuban research institutions, notably ICA and CIMA GT, along with the recent partnership with AICS.
Upon the conclusion of the mission, a comprehensive assessment of local capabilities and infrastructure was conducted, paving the way for the formulation of future collaborative strategies in conjunction with local partners.

AICS, ACTAF and CREA staff meeting

INNOVATIVE BREEDING AND PROCESSING TECHNOLOGIES FOR LAZIO REGION BUFFALO MEAT QUALITATIVE ENHANCEMENT (INNOBUF PROJECT)

Michela Contò

The **Innovative breeding and processing technologies for Lazio Region (central Italy) buffalo meat qualitative enhancement (INNOBUF)** project focuses on enhancing the value of buffalo meat by improving the competitiveness of buffalo farms through innovative technologies in breeding and processing.

Despite a general decline in red meat consumption, due to rising prices and misinformation, the buffalo sector has seen. Growth buffalo calf slaughter has increased by 3% from 2018 to 2021 with also a rise of 4% in the live weight at slaughter. This is an important indicator, reflecting the reduction in the slaughter of male calves destined for pet food, and the growing trend of raising calves for human consumption. In the Lazio region, where there are many buffalo farms the total beef/buffalo slaughtering increasing from 0.13% in 2019 to 0.19% in 2021, with a rise in slaughter weight, although the number of animals has decreased.
Market research indicates that consumers value buffalo meat for its tenderness and flavour, but awareness of its versatility as a food product remains limited. The fluctuations in buffalo meat production, which often fail to meet consumer demand, are partly due to production costs not always being covered by sales. These sales tend to target a niche market, which further limits its potential. In the other hand the buffalo meat holds untapped potential because of its exceptional nutritional and organoleptic qualities.

Several weaknesses in the sector have been identified, including the excessive fragmentation and discontinuity of the buffalo meat market, the limited ability to establish a consistent and recognizable product that can expand beyond its production area, and the inability to effectively communicate the organoleptic and nutritional uniqueness of buffalo meat to consumers.

CREA -Council for Agricultural Research and Economics. Research Centre for Animal Production and Aquaculture, Monterotondo, Italy

Young buffalo males in intensive system (photo M. Contò)

The INNOBUF project seeks to address these challenges by creating a sustainable and diversified supply chain. One key strategy is to use the dairy female buffalo at the end of its dairy chain career (traditionally discarded and does not valorized) and convert it into a valuable resource as meat production.

Additionally, the project promotes the rearing of male calves for meat instead of using them for pet food. This approach would help stabilize dairy farm economies. The project builds on key strengths, such as the nutritional quality of buffalo meat, positioning it as a functional food rich in high-level nutrients and a healthier alternative to other meats. Moreover, the territorial concentration of buffalo farms in Lazio could facilitate the creation of regional production consortia, further strengthening the sector.

To support these objectives, the project focuses on improving buffalo nutrition. The buffalo finishing phase involves feeding a balanced diet made from local forages, legumes like fava beans and protein peas, and flaxseed. These ingredients enrich the meat with omega-3 fatty acids, improve the omega-6/omega-3 ratio to recommended levels, and reduce methane emissions, all while enhancing both meat quality and environmental sustainability.

In terms of processing, the project applies innovative aging technologies, such as dry aging and wet aging, to improve tenderness and flavor. Dry aging, for example, enhances the organoleptic profile by promoting proteolysis, which produces amino acids and volatile compounds that create a more intense and distinctive flavor. However, challenges remain, such as myoglobin oxidation, which causes discoloration during storage, especially due to the high iron content in buffalo meat a nutritionally beneficial but preservation-sensitive component.

Nutritionally, buffalo meat stands out for its favourable lipid profile, particularly its omega-3 fatty acid content, including docosapentaenoic acid (DPA), which offers anti-inflammatory benefits and protection against chronic diseases. Buffalo meat also contains low levels of 5-glycolyl neuraminic acid (Neu5Gc), which reduces inflammation risks, and high concentrations of 5-acetyl neuraminic acid (Neu5Ac), essential for neural development and cell preservation. The favourable Neu5Ac/

Fresh meat from young buffalo (photo M. Contò)

Young male on pasture (photo M. Contò)

Neu5Gc ratio (6:1) makes buffalo meat a healthier and safer alternative to other red meats.

To further raise consumer awareness, the INNOBUF project promotes educational campaigns that highlight the benefits of buffalo meat, emphasizing its suitability as a functional food ideal for a balanced diet. By enhancing product quality and fostering collaboration between breeders, processors, and researchers, the project aims to position buffalo meat as a sustainable, high-value product capable of meeting market demands while enhancing the economic and cultural identity of the Lazio region.

Buffalo cow meat in dry ageing package (photo M. Contò)

REPORT ON FIRST INTERNATIONAL CONFERENCE ON BUFFALO MOZZARELLA AND MILK PRODUCTS (BMMP24)

Dr Angela Salzano[1]

Buffalo farming boasts a global population of approximately 200 million animals, mostly concentrated in Asia and South America. However, Italy, with only 431,000 buffaloes, has developed a unique economic model centred around this exceptional animal. In particular, in Italy, the Buffalo Mozzarella PDO[2] sector includes 1,400 farms, and 150 consortium members, and generates an annual revenue of € 1.2 billion. In light of this, during the celebration of the 800 years of Federico II University, the Department of Veterinary Medicine and Animal Production and the Department of Agriculture of University of Naples, Federico II, together with the Consorzio Tutela Mozzarella di Bufala Campana DOP and the Istituto Zooprofilattico Sperimentale del Mezzogiorno (IZSM), collaborated to organize the First International Conference on Buffalo Mozzarella and Milk

BMMP Conference hall

[1]Department of Veterinary Medicine and Animal Production University of Naples "Federico II" Italy
[2]The European Commission grants a Protected Designation of Origin (PDO) to regional products originating in a given region, provided that the quality or other characteristics of the product are essentially attributable to the particular geographical environment of the place of origin

Products (BMMP24), that has been hold in Naples on 24-25th September 2024. The event brought together researchers, veterinarians, breeders, producers and technicians from the dairy sector to exchange ideas, foster collaborations and update innovations across all aspects of the buffalo dairy supply chain from farm to fork.

The conference featured six work sessions, thirty speakers, nine international guests from five continents and more than thirty oral communications. After the opening remarks by Prof. Matteo Lorito (Dean of the University of Naples, Federico II), Domenico Raimondo (President of the "Consorzio Tutela Mozzarella di Bufala Campana DOP") and Francesco Lollobrigida (Minister of Agriculture, Food Sovereignty, and Forestry), the conference have foreseen the participation of national and international figures in the sector.

Among the national participants there were Prof. Giuseppe Campanile (University of Naples, Federico II), Prof. Antonio Borghese (International Buffalo Federation), Dr. Antonio Limone (IZSM) and other important figures of the scientific world and the buffalo dairy industry.

On the international front, there were experts such as Prof. Rupinder Singh Sodhi (Indian Dairy Association), Prof. Michael D'Occhio (University of Sydney), and Dr. Jaime Castaneda (U.S. Dairy Export Council). The debates of these national and international experts enriched the discussions and provided valuable insights into the present and future of the dairy sector.

Over the two-day event, discussions revolved around three main themes: animal husbandry, production techniques and economics, emphasizing their interconnectedness within the dairy industry.

The first-day sessions addressed buffalo dairy products and dairy processing. Discussions included the state of the art in buffalo breeding and how breeders and technicians could improve the breeding techniques to obtain more sustainable buffalo mozzarella and dairy products. While traditional techniques were emphasized, the sessions also highlighted a forward-looking approach with the rise of precision livestock farming.

The round table focused on the nutraceutical qualities of buffalo milk, discussing how improvements in farming and production technologies could enhance product quality. Researchers from Federico II and Campania Universities examined the role of health-promoting biomolecules in buffalo milk, such as carnitine and betaines in preventing certain forms of cancer and chronic and metabolic diseases.

In the afternoon session, the discussion first turned to dairy technology, highlighting the quality and distinctive features of buffalo mozzarella and the innovations

Prof Borghese. General Secretary of International Buffalo Federation

Conference invited guest

that have made this buffalo product so unique. Then, comparisons were drawn with other products such as lab-grown foods and those derived from alternative protein sources. Questions were raised about the positioning of the agri-food system and the potential impact of novel foods on quality of life, their nutritional quality and social implications, as they would concentrate food production in the hands of a few owners of resources and technologies.

During the second day, the economic theme was discussed. In particular, the third session explored economic and social topics, such as local and global markets, value creation in agri-food chains, and sustainability (environmental, economic, and social).

In conclusion, the conference confirmed the status of buffalo mozzarella as an excellent example of production, with a rapidly growing economy. While traditional techniques have driven the product's growth and popularity, adopting new farming methods is essential to remain competitive and address modern challenges.

11th ABC invited lecture

BUFFALO FOR SAFE FOOD AND SUSTAINABLE DEVELOPMENT

Tirtha Kumar Datta and Supriya Chhotaray

The global food crisis has intensified, with nearly 282 million people facing acute food insecurity in 2023, driven by factors like extreme weather and inflation. This crisis is most severe in the Asia and Pacific region, where rising costs have made a healthy diet unaffordable for 232.8 million people. India, with around 200 million malnourished individuals, illustrates the growing demand for safe and nutritious food. Buffaloes have emerged as vital in combating hunger, contributing ~45% to India's milk production and significantly to meat production. Buffalo meat, is known for its high protein and low-fat content, and buffalo milk, rich in essential nutrients, offers substantial health benefits. Sustainable farming practices, including efficient feed utilization and lower greenhouse gas emissions, further enhance buffaloes' role in food security. India's buffalo improvement programs over the past fifty years have significantly increased productivity through genetic advancements.

Despite challenges such as smallholder farming constraints and low productivity, opportunities exist for expanding buffalo meat exports and value-added dairy products. Embracing precision dairy farming and advanced breeding programs can revolutionize India's dairy industry, enhancing global competitiveness and sustainability.

Keywords: buffaloes, food insecurity, genetic improvement, milk and meat production, sustainable farming

Dr. Datta (India)

ICAR-Central Institute for Research on Buffaloes, Sirsa Road, Hisar. Author email: tirthadatta@gmail.com

THE POTENTIAL OF BUFFALO IN WORLD AGRICULTURE:
Challenges and opportunities

Antonio Borghese[1], Vittoria Lucia Barile[1,2], Antonella Chiariotti[1,2]

Buffalo species (*Bubalus bubalis*) plays a pivotal role in the world economy, providing high nutraceutical value proteins of animal origin, fundamental for children's growth. Buffalo can convert fibre into energy and adapt to difficult environments, from cold climates to hot and humid ones, including wetlands, producing milk and meat respecting the sustainability of typical ecosystems, where the other ruminants cannot survive.

Buffalo represents a unique opportunity to produce resources either for people in rural villages or for large farms in specific environments: marshlands (Iraq, Bangladesh, Indonesia, Amazonia, Colombia, Argentina) and humid savannah (Venezuela, Brazil, Paraguay), extensive pastures (Sumatra, Sri Lanka, Brazil, Argentina, Costa Rica, Bolivia, Mexico, Paraguay, Cuba, Australia), family farms (Thailand, Iran, Nepal, Bangladesh, Vietnam, Laos, Malaysia, Philippines, China, Egypt), also maintaining biodiversity, typical habitat, and cultural traditions. Different challenges are posed by intensive farming (diffused in Italy, India, Pakistan, China and other American and Asian countries), accused of being responsible for a strong impact on climate change.

However, different strategies have been studied and adopted to reduce the negative effects of intensive farming: livestock genetic improvement, sustainable agricultural practices, better utilization of local and feed resources (including by-products), manure management (including renewable energy production) and animal health and welfare improvement.

Keywords: marshlands, humid savannah, family farms, extensive farming, intensive farming.

Prof Borghese (Italy)

[1] General Secretariat International Buffalo Federation, via Salaria 31, 00015 Monterotondo, Italy
[2] Council for Agricultura Research and Economics (CREA) -Research Centre for Animal Production and Aquaculture, via Salaria 31, 00015 Monterotondo, Italy

BUFFALO FOR SUSTAINABLE DAIRYING

Inderjeet Singh

Buffalo is native to the Northern River basin plains of India and Pakistan, where the best buffalo breeds of the world have evolved and produce high-quality milk that is not only more suitable for Indian sweets but also saves on the cost of transportation and processing as it contains 6 to 7 percent unit less water content as compared to exotic cow milk. In other terms, we can also say that the availability of total milk solids, including fat, in Buffalo milk is over 40% higher than Holstein Friesian cow milk. Buffalos are resistant to several endemic diseases as well as to emerging diseases as witnessed last year's lumpy skin disease outbreak. Buffalo has much higher longevity and normally gives 10 to 15 lactations in its lifetime. With routine management, the incidence of mastitis is much lower as compared to HF cows. Hoof disorders are unheard of. Even the surplus animals which have outlived their productive life also fetch handsome amounts to the owners through producing good quality meat. Therefore, it is no surprise that there is no stray buffalo on the streets.

Buffalo thrives even in adverse climatic conditions with little management intervention. At the same time, Buffaloes are often blamed for certain inadequacies like late maturity, long inter-calving periods, low lactation yields, high calf motility and strong mothering instinct with somewhat problematic milk letdown. However, recent experiences reflect the round-the-year breeding ability of buffaloes when given appropriate balanced diets and management practices, particularly heat stress alleviation. Improved buffalo germplasm is now becoming available through government and private breeders and frozen semen centres. In the case of Murrah buffaloes, states like Andhra Pradesh have made great strides in Buffalo Improvement with a favourable policy framework put in place. Regular organization of the National Livestock and Milking Championship and incentivizing superior animal owners can make quicker progress in buffalo development. The major shortcoming in the past has been deficiencies in proper bull selection thus compromising on genetic gain in future generations. Now with Information Network for Animal Productivity & Health recording of production data, proper CMU-accredited frozen semen production and incorporation of genomic breeding value have made bull selection more scientific and authentic.

The benefit of In vitro fertilization - embryo transfer technology has been percolating slowly to buffalo breeding but is not as efficient as for cattle. Sexed semen production for buffaloes has been initiated already and needs to be incorporated into progeny testing programs for faster and cheaper progeny testing. The private sector is making inroads into the application of these technologies in buffalo development. Breed multiplication farms being supported by the Govt. of India are promising for the conservation and propagation of superior buffaloes. Mechanization, including machine milking, is becoming a norm in larger buffalo farms. The application of artificial intelligence is increasingly visible and helps various farming operations including dairying. However, in dairy farming, these applications are developed for dairy cattle, which are usually not fully applicable to dairy buffaloes due to different behaviour and physiology. So, to develop such tools to aid in precision buffalo dairy farming, which will not only economize the feeding and management but also help realize the optimal output, such technologies need to be invested in.

In peri-urban dairies, good quality freshly calved animals are housed or purchased from rural areas. The calves (both males and females) are neglected to die due to consideration of milk costs, which results in the loss of superior germplasm. There is an urgent need to retain the heifers to ensure the supply of replacement

Guru Angad Dev Veterinary & Animal Sciences University (GADVASU) Ludhiana, Punjab, India

heifers to farmers. Therefore, there is a need to establish buffalo nurseries that will have the advantages of preservation of quality germplasm, more intensive genetic selection, lowering of age at first calving by 8-9 months, employment generation to rural youth and enhanced income.

Overall, there is a need to embark upon a mega-program on the Rastriya Buffalo Mission, on the lines of the Rastriya Gokul Mission, so as to take the best advantage of this virtuous species native to Indian subcontinent and a strength of our dairying.

Dr. Inderjeet Singh (India)

FEEDING OF BUFFALOES BASED ON LOCAL FEED RESOURCES TO ENHANCE RUMEN FERMENTATION EFFICIENCY AND MITIGATE METHANE EMISSION

Metha Wanapat, Chaichana Suriyapha, Gamonmas Dagaew, Maharach Matra, Srisan Phupaboon, Sukruthai Sommai, Sunisa Pongsub and Uswatun Muslykhah

Buffaloes are one of the important ruminants contributing to food security in the forms of meat and milk, as well as their by-products such as skin, horn and manure. The buffalo's meat, milk and their products have been revealed with high nutritious values, especially the protein and amino acids profiles and some essential bioactive compounds for health and well-being. Above all, the buffaloes are smart ruminants in converting the high fibrous feeds, in particular agricultural biomass and industrial by-products, by enhancing the rumen fermentation end-products via the anaerobic Embden Meyerhof Parnas pathway while mitigating rumen

Tropical Feed Resources Research and Development Center (TROFREC), Department of Animal Science, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand. Corresponding author: metha@kku.ac.th

methane emission. Concerning the rumen microbiomes of buffaloes, it has been reported that they were highly diversified and relatively higher-abundant as compared to those of cattle, leading to enhanced total volatile fatty acids (VFAs), microbial protein synthesis and lower methane production.

With current advanced analysis using Next-Generation Sequencing (NGS) of rumen microbiomes offered a more insightful understanding of their ability to degrade more fibrous feeds, especially agricultural crop residues, low-quality roughages and some plastic materials. Relative abundances of the predominant bacterial population have been found under the phyla: Firmicutes and Bacteroidetes such as Ruminococcus albus, *Ruminococcus flavefeciens, Fibrobacter succinogenes, Prevotella ruminocola*, and *Pseudomonas aeruginosa*. Furthermore, current experiments have revealed predominant *P. aeruginosa* in the rumen digesta of swamp buffaloes, capable of degrading fibrous feeds as well as plastic wastes. Since, enormous agricultural biomass have been commonly available globally, as a result of crop cultivation especially those of straws, stovers, vines and tops, as well as the industrial by-products such as pineapple peels, cassava pulp, sugar-cane bagasse, sorghum residues etc.

Simple and practical pre-treatment such as the urea-lime (2+2% U-lime) has been successfully exploited to enhance the crude protein content and digestibility of nutrients while mitigating the rumen methane production. The U-lime treated rice straw and supplementation of phytonutrient fruit-peel pellets (MARABAC) be significantly beneficial to improve the rumen fermentation in the ruminants. Therefore, dietary manipulation based on the pre-treatment of the fibrous feeds and supplementation of phytonutrient pellets should be more intervened on-farm to improve ruminant productivity.

Furthermore, the feeding interventions based on the use of locally available resources should be extensively exploited focusing on the hands-on establishment (E), development (D), utilization (U), and sustainability (S) (EDUS), for all engaged stakeholders of farm level up to the industrial platform. Hence, the buffalo production scenario would be economically viable, technically feasible and practically sustainable.

Keywords: Agricultural biomass, phytonutrient, methanogenesis, ruminal degradability, *Bubalus bubalis,* ruminant

BUFFALO CONTRIBUTES TO SUSTAINABILITY DURING THE CLIMATIC CHANGE ERA

Antonella Chiariotti

Rapid urbanization, increased purchasing power and changing diets drive demand for richer diets and animal-based proteins, leaving more than 868 million undernourished people worldwide, 850 million of whom live in developing countries. Food security for a large population can be achieved through livestock production and promotion to sustain food demand. The demand for animal products, increasing with economic progress and the world population, is estimated to reach more than 9 billion by 2050.

However, there are concerns about ruminant livestock production, as ruminants produce methane (5.8% of total anthropogenic emissions) contributing to climate change. Ruminant livestock provides nutrient-rich meat and milk together with hides, fibre, manure and animal power for agriculture and transport in many countries. They use grasses and leguminous plants that are inedible for humans or live on land that is not suitable for cultivation. They contribute to biodiversity and the livelihoods of many rural populations. The buffalo (*Bubalus bubalis*), with a total of 204 million head (5.1% increase over the last ten years), could play a strategic role in the world economy and society due to its specific characteristics: its rusticity, its high capacity to convert fibre into energy, its adaptation to extreme areas with hot, humid climates where other ruminants cannot thrive, and its longevity.

A massive global research effort has explored different mitigation strategies, and long-term studies are needed for accurate quantitative estimation under different livestock production systems. Addressing livestock environmental issues requires a multidisciplinary approach including environment, livestock management, animal health and welfare, nutrition and rumen microbiome.

Keywords: sustainability, methane, buffalo, GHG mitigation strategies

Dr. Antonella Chiariotti (Italy)

Council for Agricultural Research and Economics, Research Center for Animal Production and Aquaculture. Rome, Italy
Corresponding author: antonella.chiariotti@crea.gov.it

Scientific Session: Buffalo breeding and reproduction

IMPROVING REPRODUCTIVE PERFORMANCE IN DAIRY BUFFALO:

Major Constraints and Achievements

Nasim Ahmad[1*], Ali Husnain[1], Mubbashar Hassan[2], Talha Ashraf[1] and Manzoor Ahmad[1]

The population of buffalo exceeds 200 million globally, 90% of them are housed in India, Pakistan, China, and Bangladesh. In South Asia, buffalo is an integral component of the rural economy. Despite having promising contributions to milk and meat production, reproduction is challenging. A shortage of breeding bulls (recommended 1:30 vs. existing 1:140) makes reproduction and genetic exploitation difficult. In addition, infertility in buffalo bulls is reported to be 35% including genetic, infectious, and management causes. Standards for puberty (22 months), body growth, sexual behaviour, scrotal circumference, semen quality, and fertility were comprehensively developed. Numerous research works have been published in buffalo semen processing and cryopreservation for improved post-thawed quality and leading to commercialization.

Despite this intensive work, the adoption of artificial insemination (AI) in buffalo remained low. Although, Pakistan and India have well-structured progeny testing programs as compared with other buffalo-rearing countries. However, the paucity of well-organized buffalo breeding associations, commercial farming, and poor implementation of breeding policies are the major hindrances. Buffalo females are generally considered to be sluggish reproducers due to delayed age of puberty, poor estrus expression (lack of homosexual behaviour), low fertility, and higher incidence of pregnancy losses. Typically, buffaloes are not seasonal, however, peak breeding happens in July to September in South Asia and late summer to early autumn in China and Italy. Melatonin is an emerging trend to overcome the seasonal pattern and to improve pregnancy in buffaloes.

Surprisingly, pregnancy rates using natural services are around 63% in the breeding season, which dropped to 48% in the low breeding season. Interestingly, the pregnancy by artificial insemination (PAI) is 45% in the breeding season compared with 35% in the low breeding season. The higher (53%) PAI was achieved when buffaloes were inseminated 24 hours after the onset of standing estrus, which led to the development of the AM-AM rule. Estrus induction was possible by administration of prostaglandin F2 alpha with acceptable PAI (40%) but effective only in cyclic buffaloes. With the advent of progesterone-based devices, several protocols emerged with reasonable fertility (~40%), even during the low breeding season. The PAI was improved when new follicle waves were initiated or ovulation-inducing agents were incorporated into the CIDR protocol.

Pregnancy loss was higher in buffaloes, especially in the low breeding season. Strategies to reduce pregnancy losses by ovulation-inducing agents or progesterone administration after insemination showed promising results. The reproductive biotechnologies like MOET were attempted in buffaloes but not with favorable outcomes, likely because of less primordial follicle reserves. On the other hand, sex semen and OPU-IVP are expanding commercially and have a promising future for the genetic progress in buffalo. Buffalo cloning has been demonstrated successfully at the experimental

[1]Department of Theriogenology, University of Veterinary and Animal Sciences, Lahore, Pakistan
[2]Department of Clinical Sciences, College of Veterinary and Animal Sciences, Jhang, Pakistan
*Corresponding author; nasimahmad@uvas.edu.pk

level. Taken together, the solutions to reproductive problems are available with acceptable fertility. However, their application to smallholder buffalo farming remains challenging. Alternatively, in future, the modernization and innovations in buffalo reproduction will be dependent on the commercialization of its products.

Keywords: male & female reproduction, artificial insemination, synchronization, pregnancy losses, reproductive biotechnologies, buffaloes

Scientific Session: Buffalo genomics and biotechnology

OMICS FOR UNDERSTANDING REPRODUCTIVE PERFORMANCE OF BUFFALO BULLS UNDER HEAT-STRESS

Ranjit Singh Kataria[1*], Ankita Gurao[1], Rashi Vasisth[1], Meenakshi Chitkara[1], Mahesh Shivanand Dige[1], Manishi Mukesh[1] and Pawan Singh[2]

Buffalo being an integral part of livestock keeping in Asia, is gaining global importance as a meat and dairy animal. With a population of 109.85 million, India possesses the largest buffalo numbers, with significant contribution to livestock output and livelihood of the farmers. Reared under tropical conditions, buffaloes suffer environmental stresses, reflected in the production and reproduction performance of the animals.

In males, the summer stress with THI reaching up to 90, has a catastrophic effect on semen quality with multiple parameters issues, affecting the supply of quality semen as part of the AI program, to augment the animals' productivity.
Different omics tools available nowadays are helping us to have deep insights into the genes/pathways as well as mechanisms by which heat stress plays a role in compromising the reproductive performance of the animals. Here we discuss epigenomics, transcriptomics and whole genome sequencing work being initiated to understand the heat stress impact on Murrah buffalo bulls' reproduction. Considering the volume of work reported in buffalo, there is a need to put extensive efforts into exploiting the potential biomarkers, identified using these techniques, to ensure the selection of animals, capable of producing quality semen throughout the seasons.

Keywords: Buffalo, Murrah bulls, Heat stress, Semen quality, Epigenomics, Transcriptomics, Genome sequencing.

[1] ICAR- National Bureau of Animal Genetic Resources, Karnal-132 001 (Haryana), India.
[2] ICAR-National Dairy Research Institute, Karnal-132 001 (Haryana), India.
*Presenting Author Email: katariaranji@yahoo.co.in

Scientific Session: Buffalo health and adaptability

OPTIMIZING BUFFALO HEALTH:
Understanding the Interplay with Adaptability

Praveen Malik

Buffalo (*Bubalus bubalis*) are renowned for their adaptability, thriving in diverse environments and management systems. However, their health is crucial for optimal productivity, welfare, and sustainability. This presentation delves into the complex relationship between buffalo health and adaptability, exploring how their adaptability influences their health and vice versa. We discuss the impact of environmental factors, nutrition, and management practices on buffalo health, highlighting the importance of understanding their adaptability in response to stressors, diseases, and nutritional challenges. The following key areas are identified for improving buffalo health:

- Nutritional strategies to enhance immune function and disease resistance
- Effective parasite control and disease management
- Optimal husbandry practices to minimize stress and promote welfare
- Breeding programs to enhance genetic resilience and adaptability

By considering the interplay between buffalo health and adaptability, we can develop targeted interventions to optimize their health, productivity, and sustainability, while harnessing their remarkable adaptability to thrive in diverse settings.

Keywords: buffalo, health, adaptability, productivity, sustainability, welfare

Principal Scientist, ICAR and CEO, Agrinnovate India Limited, New Delhi
Corresponding author: malikpdr@gmail.com

WATER BUFFALO MILK USE IN INSULAR SOUTHEAST ASIA:

Cases from the Philippines and Indonesia

Takashi Tsuji

This study examines the uses of domestic water buffalo milk in the Philippines and Indonesia, one of the few areas where the rare practice of milking animals occurs in Insular Southeast Asia. In these countries, both milking domestic water buffalo and making milk products are practiced. Milking activity is one of the side jobs for small scale farmers. The research was thus conducted into the breeding and milking of domestic water buffalo and the making of milk products in limited areas in the Philippines and Indonesia, using participant observation, interviews, and questionnaires, to understand the actual condition of milk uses of the local communities.

The culture was originally brought by the colonizers. However, the culture is limited to particular provinces and not nationwide. Swamp buffaloes are used for milking. Fermented and heated milk products, such as cheese and candy milk are produced, probably because fresh milk risks lactose intolerance. Investigating such unique uses of milk in Insular Southeast Asia attests to an evident culture of milking domestic water buffalo in the research areas and the relationship between the people and their livestock.

Furthermore, although the riverine buffaloes are rapidly replacing the domestic water buffaloes, due to their higher milk yield, across Southeast Asia, the latter remains predominant in the area. Since the Philippine Carabao Center (PCC) was established in 1996, water buffalo and milk uses have been modernized. Riverine buffaloes are imported from Bulgaria or India by PCC for higher milk production to support small scale farmers. In Indonesia, the government is learning the way and the Philippines is becoming a center of water buffalo dairy culture in Southeast Asia. It is a big concern if the water buffalo can improve the culture of both nations to bring equality or fairness to the small-scale farmers.

Keywords: swamp buffalo, riverine buffalo, dairy culture, the Philippines, Indonesia, Insular Southeast Asia

International Research Centre for Intangible Cultural Heritage in the Asia-Pacific Region (IRCI), Osaka, 590-0802, Japan
Corresponding author: tsuji-t9w@nich.go.jp

Scientific Session: Buffalo management, economy and sociology

THE DIVERSITY OF BUFFALO BREEDING AND ITS FORMATIVE FACTORS IN ASIA

Kazunobu Ikeya

The water buffalo, which was probably domesticated in India about 5,000 years ago, has since been used mainly in Asia for agriculture, transportation, and meat and milk. Three different methods of buffalo rearing have been introduced in Asia. The first is the buffalo barn-keeping method. In South Asia and Japan, buffaloes have been reared in sheds with a few buffaloes and fed to produce milk for cash. The next is buffalo grazing. This form of grazing is widespread from Southeast Asia (Lombok Island, Indonesia) to South Asia (Assam, India).

In this case, herders may or may not be present in herds of several dozen or more than a hundred head. Finally, there is migratory herding. In the coastal areas of Bangladesh and the mountain area of the Himalayas, camps have been established for buffalo rearing, and a form of seasonal migration of herders and buffalo herds is known as the case of the Gujjars people. This study aims to understand where in Asia the diversity of buffalo rearing is found in India and to examine the factors that give rise to such diversity. We will also consider the significance of the practice of crossbreeding between buffalo and wild buffalo during buffalo grazing.

Keywords: buffalo, breeding, barn-keeping. grazing, migratory herding, crossbreeding, Asia

Dr. Kazunobu Ikeya (Japan)

National Museum of Ethnology, 10-1 Expo Park, Suita, Osaka 565-8511, Japan
Corresponding author ikeya@minpaku.ac.jp

BUFFALO FARMING IN BANGLADESH

Tishita Sen Ape[1,2*], Unusing Marma[1,2], Hasnat Jahan Rumi[1,2], Sirajul Islam Sagor[1,2], Shuvo Singha[2], Vittoria Lucia Barile[3], Md. Mizanur Rahman[1,2]

Abstract

Bangladesh's agricultural economy is heavily focused on agriculture and livestock production, which contributes by creating employment opportunities and making sure people can get enough proteins. Water buffalo are especially important for food security and improving the lives of economically vulnerable populations in rural areas, especially draught purpose and meat production. However, in Bangladesh, water buffaloes have not been fully exploited for milk production. These animals can be found in the coastal areas, river basins, islands and shoal areas (haor in Bengali), where they have adapted very well to the harsh local climates and low-input systems, which means they need minimal investment for feed resources. Despite its potential, water buffalo in Bangladesh has been left behind compared to other livestock like cattle and goats, facing problems like poor breeding programs, limited access to quality feed, lack of modern management practices, and weak veterinary support, which are holding this sector back. There is also a lack of a dedicated buffalo product chain and limited policy focus, constraining its development. However, the government and other organizations are starting to recognize the importance of buffalo farming. They are putting in place things like better breeding programs, targeted policy support, better extension services, and farmer training programs to deal with these issues and get the full potential of buffalo farming.

Keywords: buffalo production, coastal areas, development constraints

Buffalo population and production

Buffalo population is increasing more rapidly in South-Asian countries, than in the rest of the world due to its easy adaptability in coastal areas, disease resilience and utilization of minimal feed sources available[1].

Despite having the same climate conditions, the growth of the buffalo population in Bangladesh is lower than in the neighbouring countries especially India, Pakistan and Nepal which might be due to the absence of high milk-yielding buffalo breed, lack of appropriate breeding and development plans, and less popularity of buffalo products[2].

According to the Department of Livestock Services (DLS), the total population of buffalo is approximately 1.5 million in Bangladesh. In the Agricultural Census 2019, the buffalo population was 636,926, in which buffalo reported in rural and urban areas were 90% and 10%, respectively. The distribution of buffalo population varies significantly across regions, in coastal regions, such as Bhola, Noakhali, Cox's Bazar, and Barishal districts have the highest concentrations of buffalo[3].

These areas provide suitable grazing lands and are less affected by seasonal fodder shortages.

Then riverine areas, including the shoals and floodplains in Sylhet, Mymensingh, and parts of Khulna, also share substantial buffalo populations due to the availability of natural grazing facilities. Other regions,

[1] Department of Medicine and Surgery, Chattogram Veterinary and Animal Sciences University, Chattogram-4225, Bangladesh;
[2] Udder Health Bangladesh, Khulshi, Chattogram-4225
*Corresponding author: tishitasen@student.cvasu.ac.bd
[3] CREA, Research Centre for Animal Production and Aquaculture, Monterotondo, Italy

Figure 1. A Bangladeshi indigenous non-descriptive type of water buffalo in free-range rearing system wallowing in Coastal area. (Source: Udder Health Bangladesh)

such as Rajshahi and Rangpur, have limited buffalo populations, primarily in intensive farming practices. Buffalo population of most of the areas comprise indigenous breeds, which are well-suited to the local climate and management systems but have lower milk yield[4] (**Figure 1**).

To enhance productivity, some areas adopted crossbred buffaloes, which combine traits of indigenous and high-yielding breeds and are known for comparatively higher milk yield per animal (e.g., Murrah, Nili-Ravi).

Buffalo rearing system

There are five main types of buffalo rearing systems in the country: free-range or bathan, semi-free-range or semi-bathan, intensive, semi-intensive, and household.

Figure 2. Different types of rearing system of buffalo in Bangladesh A. Extensive or bathan, B. Semi-bathan, C. Intensive, D. Semi-intensive, and E. Household. Photo (Source: UHB and Internet)

(**Figure 2**). The herd size ranges from 1-3 heads for the household system to 50-200 heads for the free-range/bathan and intensive systems.

The Bathan is the saline coastal region where buffaloes are reared in a natural grazing system without a feed supply. In the semi-free-range/semi-bathan system, buffaloes (4-15 head/farm) are kept in the household during the rice growing season and in inland, islands and wetlands during the rest of the year; buffaloes are supplied with roughage and small amounts of concentrates.

In the intensive rearing system, animals are reared in barns and fed in stalls with Napier, German, Jumbo, rice straw and concentrate mixtures. Typically, farms in this system are privately owned, such as Lal Teer Livestock Development Limited and American Dairy Limited, whose primary objective is the improvement of dairy and beef buffaloes through the production and distribution of high-quality semen.

Finally, the household system is characterized by very few head of buffalo reared in the backyard of houses, grazing for 6-7 hours with little or no feed supplementation[4,5].

Buffalo product potential and marketing

Buffalo milk is popular for its high nutritional value, with more fat, protein, and total solids compared to cow milk, making it perfect for making products like yogurt, butter, ghee, and cheese.
Fermented milk and yogurt from the Bhola and Noakhali districts are particular favourites. Buffalo milk is most popular in Mymensingh, Bhola, Noakhali, Natore and Pabna districts because of the high-fat content and chhana (acid curd of milk) that is produced during the processing[6,7]. Even so, buffalo milk production in Bangladesh is only 0.04% of the global total, which shows that there is a lot of potential to increase the amount of milk produced per animal through better farm management.[8]

In Bangladesh, there are many channels involved in the trade of buffalo milk, including middlemen, milk collection centres, and milk product shops. Buffalo farms are often located far from the places where the milk is processed, and there is not much adherence to hygienic practices. This is because of the poor handling of milk and the long transportation time of the milk without any cooling facilities. As a result, the food safety and quality of the buffalo milk is often compromised[9]. This can lead to contamination by foodborne pathogens, like *Staphylococcus aureus, Escherichia coli*, and other enteropathogenic organisms[10].
So, it is crucial to improve udder health with proper hygiene practices in all the channels of buffalo milk production to enhance the safety and quality of buffalo milk.

Buffalo meat, also known as "carabeef," is a leaner and healthier alternative to traditional beef, due to the lower fat and cholesterol content.
The carabeef contributes approximately 0.95% to the


D

national meat production. It is not as popular in Bangladesh, mainly because people there are not used to eating it, and they do not have much knowledge about how good it is for their health.
However, carabeef is popular in some districts, such as Jamalpur, Rangpur, Chattogram, Cox's Bazar, Comilla and Pabna, where some buffalo meat is produced[2].


E

There is no special supply chain for buffalo products like there is for cattle in Bangladesh. This means that there is less choice for consumers, farmers have less profit, and consumers have to pay more for the product. Having a separate supply value chain could help to ensure the authenticity and availability of the buffalo products to the consumers.

Prospects and Constraints of Buffalo Farming

Buffaloes could play a big role in meeting the country's growing demand for protein. As the population grows, there are more and more opportunities to explore high-quality buffalo products such as meat and milk.

Buffaloes can thrive in many different climates, including flood-prone coastal and riverine areas, making them perfect for using land that has limited agricultural potential. They can also convert low-quality food into valuable products, which makes them important for sustainable farming systems.

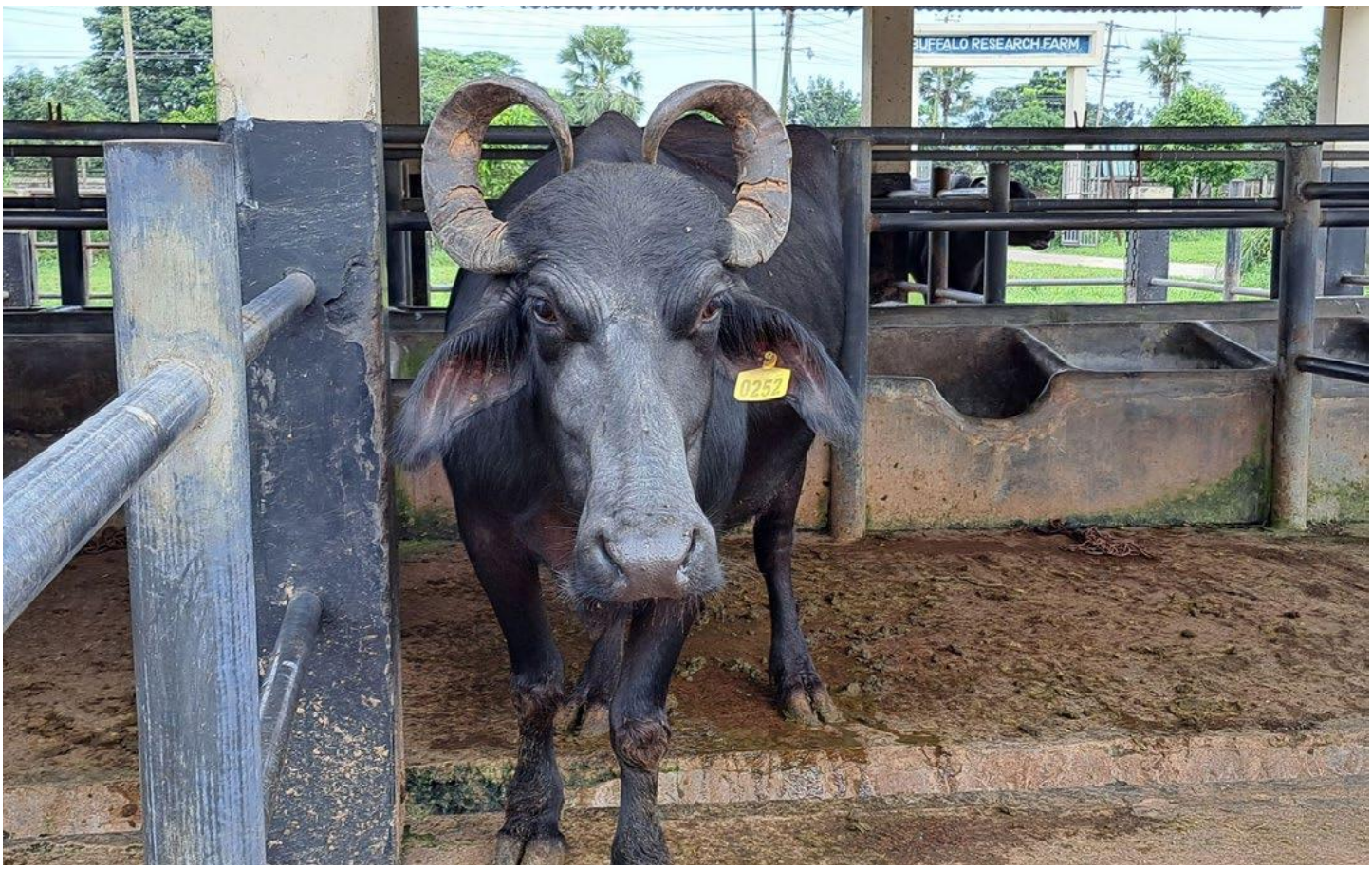
Buffalo farming in Bangladesh faces several constraints that retain its growth and production. The main problem is the low genetic potential of indigenous buffalo breeds. There is a lack of organized breeding infrastructure and potential initiatives for genetic improvement. As a result, the production performance of indigenous buffalo in Bangladesh has lower milk and meat yields compared to riverine or other high-yielding breeds.

Another big issue is that there is insufficient availability of feed and fodder, which makes it hard for farmers to provide adequate and quality nutrition year-round. Poor management practices, including lack of technical knowledge among farmers and inadequate housing, further limit productivity. Health-related issues, such as disease prevalence and limited access to veterinary services, exacerbate the problem.
Additionally, market-related challenges include poorly organized markets for buffalo products and the absence of separate value chains hinder the profitability of the buffalo products.

The fact that there is a lack of technical and logistic support for the buffalo farmers, for example, in terms of programs to help develop the sector, as well as a shortage of research and extension work, and a lack of collaboration between the different stakeholders related to buffalo, is hampering the long-term development of the buffalo sector. Addressing these constraints through strategic interventions is crucial to exploring the potential of buffalo farming in Bangladesh.

Conclusions

Buffalo farming in Bangladesh faces challenges in farming practices, suitable breeds, udder health, production, and reproduction.



Technical interventions and institutional support are needed to overcome these constraints and unlock buffalo farming's potential. Initiatives like selective and crossbreeding through artificial insemination (AI) with quality semen from high-yielding breeds, along with skilled AI technicians, are essential. High bulk milk somatic cell count and bacterial contamination are challenges to udder health and milk quality issues, worsened by poor cleaning, storage, and transportation. Adopting better technologies, disease management, and farmer awareness will help sustain profitable buffalo farming in Bangladesh.

References

[1] Siddiky, M. N. A. & Faruque, M. O. Buffaloes for dairying in South Asia: potential, challenges and way forward. SAARC Journal of Agriculture 15, 227-239 (2018). https://doi.org:10.3329/sja.v15i2.35167

[2] Hamid, D. M., Ahmed, S., Rahman, M. & Hossain, K. Status of Buffalo Production in Bangladesh Compared to SAARC Countries. Asian Journal of Animal Sciences 10, 313-329 (2016). https://doi.org:10.3923/ajas.2016.313.329

[3] BBS. Statistical yearbook Bangladesh 2022. 21 January 2025 https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b2db8758_8497_412c_a9ec_6bb299f8b3ab/2023-06-26-09-19-2edf60824b00a7114d8a51ef5d8ddbce.pdf.

[4] Samad, M. A systematic review of research findings on buffalo health and production published during the last six decades in Bangladesh. Journal of Veterinary Medical and One Health Research 2 (2020). https://doi.org:10.36111/jvmohr.2020.2(1).0016

[5] Sagor, S. et al. Buffalo Farming in Bangladesh: A Guide for Buffalo Farmers, Veterinarians and Veterinary Students. (2024).

[6] Habib, M. et al. Status of the buffalo milk trade and dairy manufacturing business at Bhola district of Bangladesh, and opportunities for buffalo milk products branding. Research in Agriculture Livestock and Fisheries 8, 301-310 (2021). https://doi.org:10.3329/ralf.v8i3.57405

[7] Habib, M. et al. Characteristics of buffalo traders and their business status at Bhola district in Bangladesh. (2021). https://doi.org:10.47440/JAFE.2021.2304

[8] Chakravarty, A. K. High Yielding Dairy Buffalo Breed. Strategies for genetic improvement of buffaloes through production of quality male germplasm in SAARC countries. (2013).

[9] Singha, S. et al. Factors influencing somatic cell counts and bacterial contamination in unpasteurized milk obtained from water buffalo in Bangladesh. Tropical Animal Health and Production 55 (2023). https://doi.org:10.1007/s11250-023-03644-x

[10] Singha, S. et al. Foodborne bacteria in milk and milk products along the water buffalo milk chain in Bangladesh. Scientific Report 14, 16708 (2024). https://doi.org:10.1038/s41598-024-67705-3

UPCOMING EVENTS

FEDERACIÓN AMERICANA DE CRIADORES DE BÚFALOS

FEDERACIÓN AMERICANA
DE CRIADORES DE BÚFALO

ASOCIACIÓN DE CRIADORES DE BÚFALOS - BOLIVIA -

Santa Cruz de La Sierra, 30 de enero, 2025

Dr (a).
Dear BUFALERO. ,

I am writing to you in my capacity as president of the American Buffalo Federation and as president of the Bolivian Buffalo Breeders Association, to invite you to our upcoming XI AMERICAS AND EUROPE - BOLIVIA 2025 Buffalo Symposium to be held in Santa Cruz de La Sierra, Bolivia in September 20-26, 2025.

We are very interested in your company, your experience and expertise and believe that your participation would greatly enrich the experience of our attendees.

Between September 20 and 21, 2025 would be the Pre-Symposium with topics on the elaboration of artisan cheeses and topics on assisted reproduction.

On September 22, 23 and 24, 2025, the main event will be the XI SYMPOSIUM OF BUFFALO OF THE AMERICAS AND EUROPE in which we will have keynote lectures on both meat and milk. We expect an important attendance of buffalo farmers from America, Europe and why not say the WHOLE WORLD, including farmers and buffalo farmers from Bolivia.

And on the 25th and 26th will be the Buffalo Tours.

This would be a great opportunity for you to share your experience and connect with other producers from other countries.

We invite you to participate and register for the XI SIMPOSIO DE BÚFALOS DE LAS AMERICAS Y EUROPA - BOLIVIA 2025 through our website.
https://simposiodebufalos.com

Thank you in advance and we hope to have your presence at the XI SIMPOSIO DE BÚFALOS DE LAS AMERICAS Y EUROPA - BOLIVIA 2025

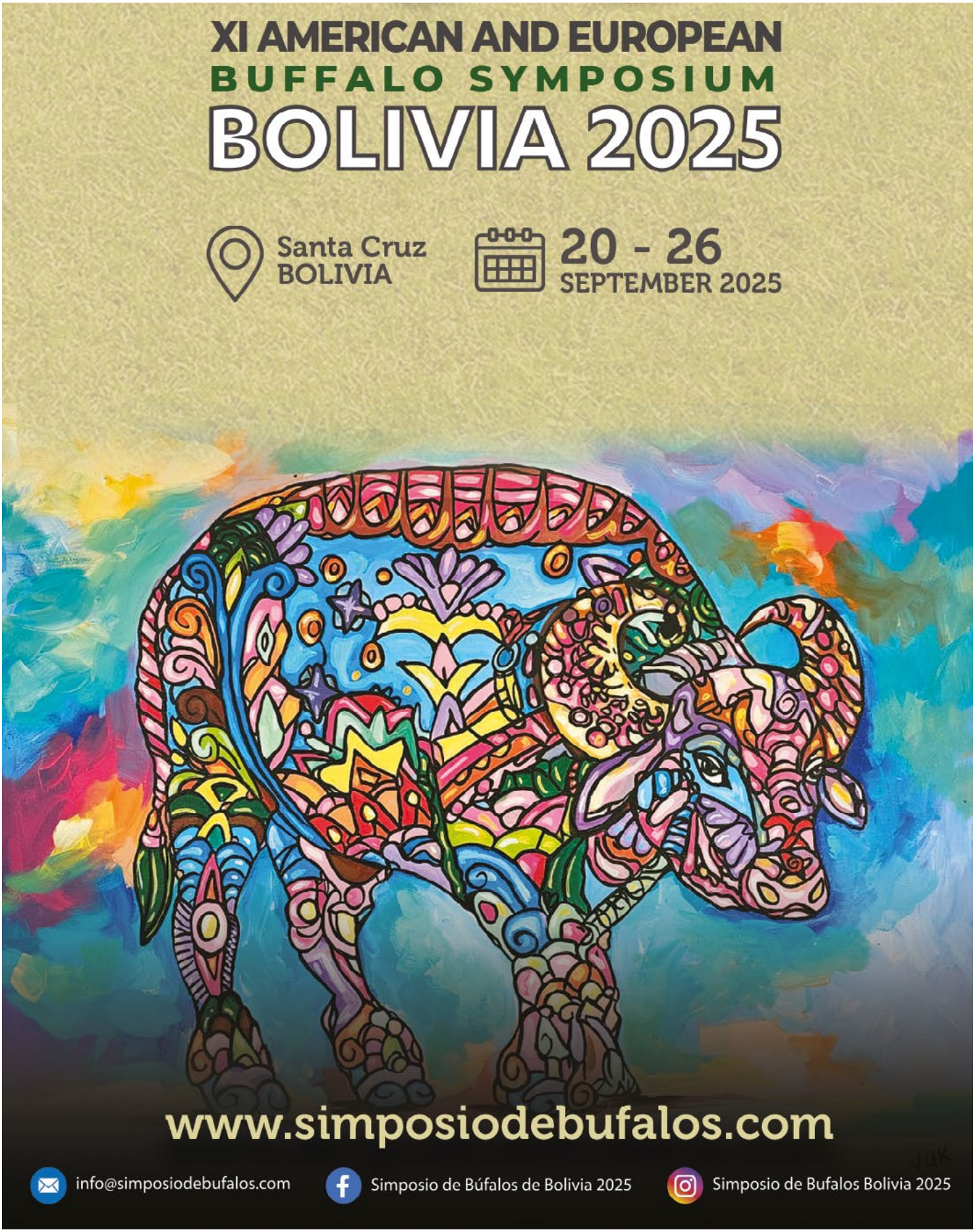
Ing. Luis Quiles Skorc
Presidente Federación Americana de Criadores de Búfalos.
Presidente de la Asociación de Criadores de Búfalos de Bolivia.
https://simposiodebufalos.com

XI SIMPOSIO DE BÚFALOS DE LAS AMERICAS Y EUROPA BOLIVIA 2025

INTERNATIONAL BUFFALO FEDERATION

FEDERACIÓN AMERICANA DE CRIADORES DE BUFALOS

+591 62186757
info@simposiodebufalos.com
https://simposiodebufalos.com
Simposio de Búfalos de Bolivia 2025
Simposio de Búfalos de Bolivia 2025


XI AMERICAN AND EUROPEAN
BUFFALO SYMPOSIUM
BOLIVIA 2025
Santa Cruz
BOLIVIA
20 - 26
SEPTEMBER 2025
www.simposiodebufalos.com
info@simposiodebufalos.com
Simposio de Búfalos de Bolivia 2025
Simposio de Bufalos Bolivia 2025

Dipartimento
Medicina Veterinaria
Produzioni Animali

14TH WORLD BUFFALO CONGRESS ITALY, 2026

Dear IBF members,

receive cordial greetings from Italy on behalf of our community, all gathered around water buffalo constituted by academicians, scientists, the National Association of Buffalo Breeders (ANASB), the RIS Bufala Association and The Consortium of Safeguarding of Mozzarella di Bufala Campana Cheese.

On this occasion, we are pleased to host the 14th World Buffalo Congress in 2026. Italy has many years of experience and tradition in buffalo breeding and will organize a great and prestigious event. Moreover, this event will be within the celebration of the 800 years of our main University, the "Federico II"—eight hundred years of training, tradition, innovation, and counting. Federico II University will begin projects and events that will develop along the entire path that will accompany it to reaching the historic goal. In this context, we are delighted to host the next IBF conference during these celebrations.

Buffalo farming in Italy is still growing, has a thriving market and is one of the most technologically advanced in the world with brand new technologies such as i) automated milking systems to control milk quantity and quality, ii) electric feeders able to give the precise amount of food required, iii) wearable or environmental sensors to monitor animal health and welfare. These systems allow scientists, technicians, and breeders to control all aspects of the herd.

The Department of Veterinary Medicine and Animal Production of Federico II University of Naples is also the place where the first course of precision livestock farming (PLF) in the world was born. The course is held in English and in a residential form, at the Regional farm "Improsta".

We are confident that hosting this event will be a great stimulus to keep strengthening and developing buffalo production across the country and spread the Italian Mediterranean Buffalo breed around the world. Our common region is eager to receive, exchange, and promote knowledge, ideas, advances, and new technologies about water buffalo management, development, production, and industry, implying an incredible milestone for the growth, buildup, and water buffalo impact on our society.

We would be delighted to host you to visit our beautiful land, rich in history and tradition, marvellous places and delicious food to meet our people, exchange culture, and simultaneously witness buffalo farming activities in the place where the Italian Mediterranean Buffalo breed is born and raised.

Sincerely yours,

Prof. Giuseppe Campanile
President
of the International Buffalo Federation (IBF)

6TH IBF TRAINING COURSE ON BUFFALO MANAGEMENT AND INDUSTRY MAY 2025

Dear All,

International Buffalo Federation and CREA - Animal Production and Aquaculture of Monterotondo (Rome) are organizing the 6th **IBF TRAINING COURSE ON BUFFALO MANAGEMENT AND INDUSTRY** which will take place in Italy on **5-16 May 2025.**
The course will give the participants a general overview of the main Italian industrial, commercial, and research entities.
The topics addressed during the course will be:

- Genetic selection and improvement with new molecular approaches
- Reproductive biotechnologies
- Management & feeding
- Health and animal welfare
- Quality of products (milk and meat) and processing
- Sustainability

The provisional program include:

	Morning	Afternoon
Tuesday 6	Registration and welcome	CREA farm and research centre visit (Monterotondo)
Wednesday 7	Lectures at CREA (Monterotondo)	D'Angelo Farm and cheese plant Visit (Monterotondo)
Thursday 8	Italian Breeder Association (AIA)(Roma)	
Friday 9	Chiacchierini bull center (Perugia)	
Saturday 10	Campagna Amica Market (farmer's market- Rome)	free
Sunday 11	Free or Visit to an archaeological site (on demand)	
Monday 12	La Roana farm Visit (Latina)	Casabianca farm Visit (Latina)
Tuesday 13	Fattorie Garofalo - Farm and cheese factory Visit (Caserta)	Giulio Cesare Iemma's Farm and RIS
Wednesday 14	Improsta Regional Buffalo farm (Salerno) and a practical approach to "Pasta filata" cheese production - visit to Paestum temples	
Thursday 15	Vannulo farm and cheese factory Visit (Salerno)	
Friday 16	ISZM - National Reference Centre for Hygiene and Technologies of Water Buffalo Farming and Productions, (Naples)	Closing Ceremony and farewell dinner at CREA (Monterotondo)

INTERNATIONAL BUFFALO FEDERATION

The IBF's complete organisational chart can be viewed at the link below.

https://internationalbuffalofed.org/about-us/

International Buffalo Federation
c/o CREA

via Salaria 31
00015 Monterotondo
Italy

https://internationalbuffalofed.org

info@internationalbuffalofed.org

Facebook link

YouTube: link