

Gomanchali Buffalo: An Indigenous Livestock Heritage of Goa



भाकृअनुप - केन्द्रीय तटीय कृषि अनुसंधान संस्थान

(भारतीय कृषि अनुसंधान परिषद)

ओल्ड गोवा - 403 402, गोवा, भारत

ICAR-CENTRAL COASTAL AGRICULTURAL RESEARCH INSTITUTE

(Indian Council of Agricultural Research)

Old Goa, 403 402, Goa, India

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The dedicated efforts of farmers in maintaining the breedable population of Gomanchali buffalo are gratefully acknowledged. We extend our sincere thanks to the officials and staff of the Department of Animal Husbandry and Veterinary Services, Goa, for their assistance in coordinating farmer participation and facilitating data collection during the survey and characterization studies.

The authors are grateful to the PME and ITMU cells, scientific, administrative, technical, and supporting staff of ICAR–CCARI, Goa, for their cooperation and assistance throughout the research work.

Finally, we express our profound gratitude to the Almighty for His blessings, strength, and guidance in enabling us to undertake this work for the characterization and conservation of valuable indigenous animal genetic resources and for the welfare of farming communities.

(Authors)

FOREWORD



It is a matter of great pleasure to present this technical bulletin entitled “Gomanchali Buffalo: An Indigenous Livestock Heritage of Goa,” prepared by ICAR–Central Coastal Agricultural Research Institute (ICAR–CCARI), Goa, under the Network Project on Animal Genetic Resources of the Indian Council of Agricultural Research. Goa possesses a rich diversity of indigenous agricultural and livestock resources, which have evolved through generations of adaptation to the unique coastal ecosystem. These genetic resources constitute an important component of the state’s agricultural heritage and have significant potential for climate-resilient production, nutritional security, sustainable livelihoods, and the development of agriculture and allied sectors.

The Gomanchali buffalo, traditionally maintained by farming communities of Goa is an important indigenous livestock genetic resource. Its adaptation to the hot and humid coastal environment and its ability to perform under low-input management systems make it particularly relevant to sustainable livestock production in coastal areas. Its recognition as an indigenous buffalo breed of Goa, is a significant achievement in the scientific documentation and conservation of Goa’s livestock biodiversity. The Government of Goa’s vision of “Vocal for Local” provides a strong foundation for promoting locally adapted genetic resources, traditional knowledge, and farmer-led conservation. Conservation and sustainable utilization of Gomanchali buffalo are fully aligned with this vision and can contribute to strengthening local livestock production, value addition, entrepreneurship, and rural livelihoods.

ICAR–CCARI is committed to supporting Goa’s agricultural and allied sectors through research, technology development, capacity building, and effective knowledge dissemination. These efforts complement the broader developmental aspirations of Atmanirbhar Bharat and Viksit Bharat 2047. This bulletin provides comprehensive information on the significance of Gomanchali buffalo.

I congratulate the authors for their dedicated efforts in documenting this valuable indigenous genetic resource. I am sure that this publication will advance awareness on conservation and sustainable utilization of Gomanchali buffalo, strengthening Goa’s livestock heritage and rural livelihoods.

A handwritten signature in blue ink, appearing to read 'S. Kumar'.

Director
ICAR-CCARI, Goa

PREFACE

It gives me immense pleasure to present the technical bulletin entitled “Gomanchali Buffalo: An Indigenous Livestock Heritage of Goa,” prepared by ICAR–Central Coastal Agricultural Research Institute (ICAR–CCARI), Goa, under the Network Project on Animal Genetic Resources of the Indian Council of Agricultural Research (ICAR).



The Gomanchali buffalo is recognized as the 23rd registered buffalo breed of India, with the accession number INDIA_BUFFALO_3500_GOMANCHALI_01023.

India is endowed with rich livestock biodiversity, comprising several indigenous breeds that are well adapted to diverse agro-climatic conditions. These genetic resources are invaluable for sustainable livestock production, climate resilience, and the livelihood security of rural communities. However, many locally adapted livestock populations continue to face challenges due to indiscriminate crossbreeding, changing production systems, and the gradual erosion of traditional livestock-rearing practices.

The Gomanchali buffalo, traditionally reared by farming communities in Goa, represents an important component of the livestock heritage of the western coastal region. Its adaptation to the hot and humid coastal environment, ability to thrive under low-input production systems, and association with traditional livestock-based livelihoods underscore the importance of its scientific characterization, conservation, and sustainable utilization.

This bulletin is a valuable effort to document the origin, distribution, phenotypic characteristics, production and reproductive attributes, management practices, and genetic significance of the Gomanchali buffalo. It will serve as a useful reference for researchers, academicians, extension personnel, policymakers, and livestock keepers engaged in the conservation and improvement of indigenous animal genetic resources.

I congratulate the authors and the entire team of ICAR–CCARI, Goa, for their dedicated efforts in documenting this important indigenous buffalo genetic resource. I am confident that this publication will contribute to greater awareness, scientific conservation, and the sustainable development of the Gomanchali buffalo, thereby strengthening livestock biodiversity and rural livelihoods in Goa.

Director

ICAR-NBAGR, Karnal

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Introduction

India possesses one of the world's richest reservoirs of livestock genetic diversity, comprising numerous indigenous breeds that have evolved through natural selection and farmer-mediated breeding under diverse agro-climatic conditions. These genetic resources represent an important component of the country's biological wealth and contribute substantially to food and nutritional security, rural livelihoods and sustainable agricultural production. Indigenous livestock are particularly valuable because of their ability to withstand locally prevailing environmental stresses, utilize low-quality feed resources, resist endemic diseases and maintain production under low-input management systems. Conservation and sustainable utilization of these locally adapted genetic resources have therefore assumed greater importance in the context of climate change, genetic erosion and increasing intensification of livestock production.

Among India's indigenous livestock resources, the domestic buffalo (*Bubalus bubalis*) occupies a particularly important position. India harbours one of the world's largest buffalo populations, with approximately 109.85 million animals, constituting about 20.45% of the country's total livestock population according to the 20th Livestock Census (2019). Buffaloes make a major contribution to India's milk economy, particularly because of their high milk fat content, efficient utilization of fibrous feed resources and adaptability to a wide range of production environments. They also contribute to meat production, manure generation and household income, making buffalo husbandry an important component of smallholder farming systems. The conservation of indigenous buffalo populations is therefore essential for maintaining genetic diversity and ensuring the availability of climate-resilient genetic resources for future livestock development.

India has historically maintained considerable diversity in buffalo populations, with recognized breeds distributed across different geographical and agro-ecological regions. However, several locally adapted populations remain inadequately characterized and are commonly categorized as "non-descript." Such classification can limit their scientific recognition, conservation and inclusion in breed improvement programmes. The Government of India's "Mission Towards Zero Non-Descript Animal Genetic Resources" seeks to address this issue through systematic identification, characterization and registration of indigenous animal populations possessing distinct phenotypic, productive, reproductive and adaptive attributes. The scientific breed characterization and registration are consequently important not only for genetic

resource documentation but also for developing breed-specific conservation and improvement strategies.

The registration of a livestock breed involves a systematic scientific assessment of the target population. Comprehensive field surveys are undertaken to establish its geographical distribution and population status, followed by standardized phenotypic and morphometric characterization. Information on coat colour, body conformation, horn characteristics, tail switch, udder and teat morphology, milk production, reproductive performance, management practices and adaptive attributes is documented using established descriptors. The resulting evidence is evaluated for distinctiveness, consistency and geographical association and subsequently submitted to the Breed Registration Committee (BRC) of the ICAR–National Bureau of Animal Genetic Resources (NBAGR), Karnal. Successful registration provides formal recognition of the population as an indigenous breed and establishes a foundation for its conservation, sustainable utilization and genetic improvement.

The western coastal region of India represents an important repository of livestock populations adapted to high rainfall, elevated humidity, seasonal heat stress and predominantly low-input production systems. Goa, although geographically small, possesses considerable livestock genetic diversity associated with its distinctive coastal agro-ecological conditions. The state has already gained recognition for indigenous livestock genetic resources through the registration of Shweta Kapila cattle and Agonda Goan pig. These achievements have demonstrated the importance of systematic exploration and scientific documentation of other locally adapted livestock populations in the state.

In this context, the indigenous buffalo population of Goa represents a valuable but previously under-recognized genetic resource. These buffaloes are traditionally maintained by small and marginal farmers under low-input management systems, with considerable dependence on grazing and locally available feed resources and relatively limited supplementary feeding. The animals have persisted under Goa's hot and humid tropical environment and exhibit characteristics suggestive of adaptation to local climatic and production conditions. Their contribution to household milk production and livelihood support, together with their ability to perform under resource-constrained management, indicates considerable potential for sustainable livestock production in the coastal ecosystem. Nevertheless, the population had historically remained largely classified as non-descript, and systematic information regarding its phenotypic characteristics, production performance, reproductive traits, distribution

and adaptive attributes was limited.

Recognizing this gap, the ICAR–Central Coastal Agricultural Research Institute (ICAR–CCARI), Goa, under the Network Project on Animal Genetic Resources (AnGR) supported by ICAR–NBAGR, Karnal, initiated systematic surveys and scientific characterization of the indigenous buffalo population of Goa and adjoining regions. Extensive field investigations were undertaken to document the geographical distribution, population characteristics, management practices, phenotypic and morphometric traits, production and reproductive performance, and adaptive features of these animals. The investigations covered buffalo-keeping households and farming systems across different geographical areas, thereby providing a comprehensive dataset for evaluating the uniqueness and consistency of the population.

The characterization studies revealed a distinct indigenous buffalo population possessing a recognizable combination of morphological, productive, reproductive and adaptive attributes. The animals were predominantly maintained under low-input production systems and demonstrated the ability to utilize locally available feed resources while sustaining milk production. Their adaptation to the hot and humid coastal environment, together with their distinctive phenotypic characteristics and production potential, provided scientific justification for considering them as a unique indigenous buffalo genetic resource.

Based on the systematic characterization and scientific evaluation undertaken by ICAR–CCARI in collaboration with ICAR–NBAGR, the population was recognized as a distinct indigenous buffalo breed and registered as “Gomanchali.” The recognition of Gomanchali represents an important milestone in the documentation of Goa’s livestock biodiversity and strengthens the scientific basis for conservation and sustainable utilization of the state’s indigenous animal genetic resources. It also provides an opportunity to develop breed-specific strategies for genetic conservation, selection and improvement while retaining the adaptive attributes that have evolved under the local coastal environment.

The recognition of Gomanchali buffalo is particularly relevant in the present context of climate-resilient livestock production. Indigenous breeds possessing environmental adaptability, disease tolerance and efficient utilization of locally available resources can provide valuable genetic material for developing sustainable production systems under changing climatic conditions. Systematic conservation and characterization of Gomanchali buffalo can therefore contribute not only to preservation of Goa’s livestock heritage but also to sustainable milk production, livelihood enhancement

and long-term genetic improvement.

The present study documents the phenotypic, morphometric, productive, reproductive, management and adaptive characteristics of Gomanchali buffalo, with particular emphasis on its geographical distribution and distinguishing attributes. The findings provide a scientific foundation for understanding this newly recognized indigenous buffalo breed and for developing appropriate strategies for its conservation, sustainable utilization and genetic improvement in the coastal agro-ecosystem.



Fig. Gomanchali buffalo with calf

Habitat and Population Status of Gomanchali buffalo

Habitat of Gomanchali buffalo

The survey was conducted across twelve talukas in all the three districts of Goa. The ecological richness of this Konkan region is characterized by the diverse flora and fauna creating an ideal environment for livestock farming. Gomanchali buffaloes are distributed throughout the state of Goa, covering an area of approximately 3,702 km², and are found across both coastal and inland agro-ecological zones. The population is relatively denser in Tiswadi (194 km²), Bardez (263 km²) and Bicholim (238 km²) in North Goa, and Salcete (616 km²), Sanguem (777 km²) and Quepem (290 km²) in South Goa. In addition, appreciable populations occur in Pernem, Canacona, Ponda and Dharbandora, indicating a broad distribution across the state.

Gomanchali buffaloes are predominantly reared by small and marginal farmers under low-input, grazing-based and semi-intensive production systems. Animals are commonly maintained in mixed crop–livestock farming systems and depend largely on natural grazing, locally available grasses, crop residues and other farm resources, with limited supplementary feeding. They are well adapted to the hot and humid tropical climate, high seasonal rainfall and variable agro-ecological conditions prevailing along the western coast.

The occurrence of Gomanchali buffaloes across coastal, intermediate and inland areas, together with their ability to sustain production under relatively low-input management, indicates considerable environmental and adaptive resilience. Their established geographical distribution, characteristic phenotype and adaptation to local production environments collectively reinforce their importance as a distinct indigenous buffalo genetic resource of Goa.

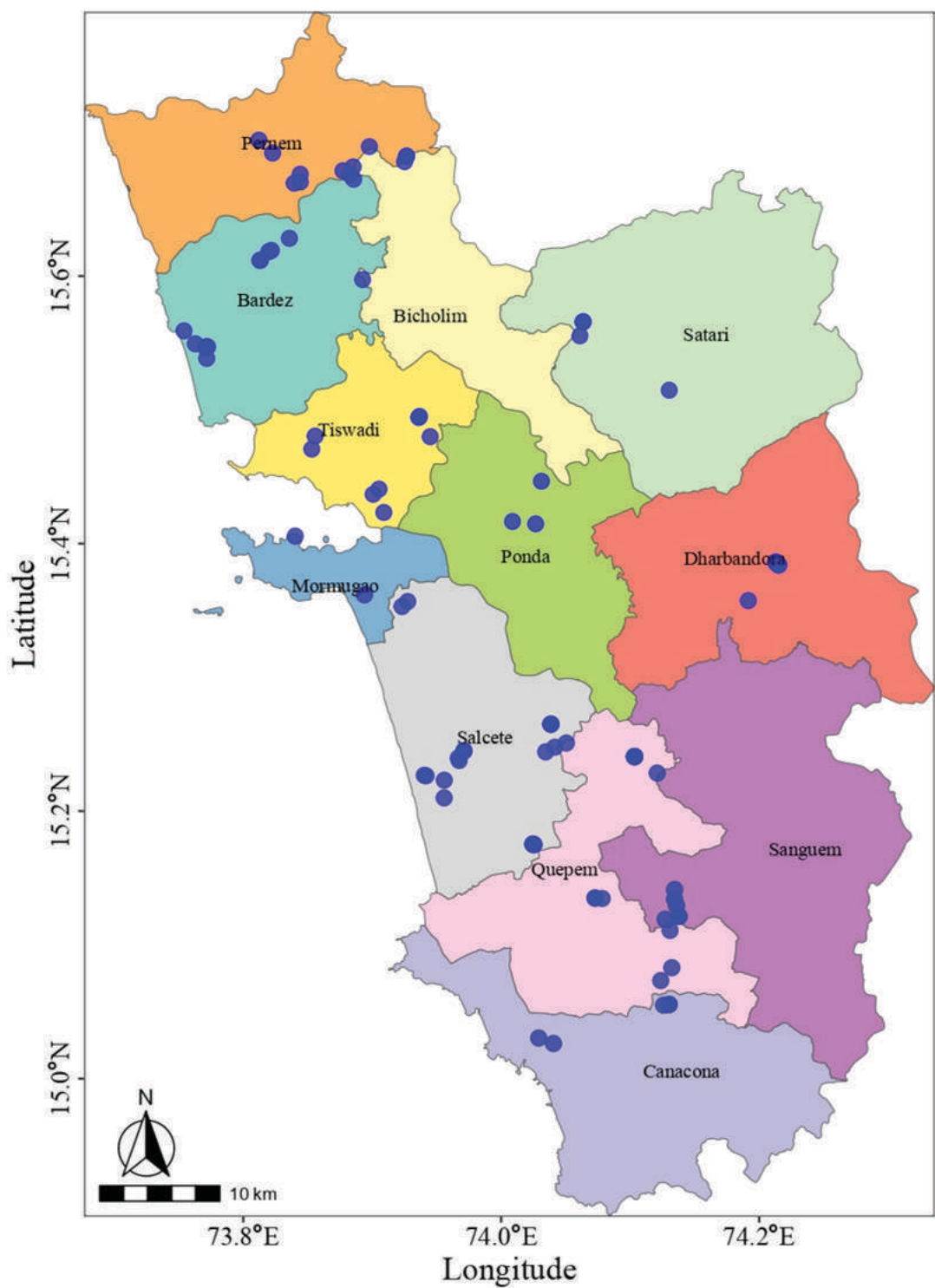
These animals sustain extreme rainfall and have been well adapted to the hot and humid coastal climate and perform well under minimum inputs in farmers' field. The animals sustain maximum temperature up to 35°C and the minimum temperature of around 20°C. Buffaloes also sustain the relative humidity is generally >85% from June to September, <60% from December to January and between 65-75% for rest of the months over the years. The annual rainfall varies from 2400 mm to 4800mm with an average of 3400 mm.

Geographical Distribution of Gomanchali buffalo

The Gomanchali buffaloes are predominantly distributed in all three districts of Goa. A detailed survey was conducted to find these locations inhabited by Gomanchali buffalo population and corresponding GPS coordinates are mentioned below.

Sl. No	Location	Taluka	District	Latitude	Longitude
1	Khorjuve, Aldona	Bardez	North Goa	15.597386°	73.892616°
2	Corlim	Tiswadi	North Goa	15.494216	73.936116
3	Corlim	Tiswadi	North Goa	15.49513°	73.936659°
4	Agaciam	Tiswadi	North Goa	15.436866°	73.900744°
5	Nevra Pikne	Tiswadi	North Goa	15.440738°	73.905281°
6	Kujra, Velem	Tiswadi	North Goa	15.47063°	73.853172°
7	Bamboli	Tiswadi	North Goa	15.480418°	73.855786°
8	Cortorem Vp	Sattari	North Goa	15.514641°	74.130268°
9	Agacaim	Tiswadi	North Goa	15.42329°	73.909018°
10	Dargal	Pernem	North Goa	15.691936°	73.822796°
11	Dargal	Pernem	North Goa	15.676093°	73.844179°
12	Pernem	Pernem	North Goa	15.701386°	73.812006°
13	Pernem	Pernem	North Goa	15.701535°	73.812184°
14	Sal	Bicholim	North Goa	15.68956°	73.926656°
15	Sal	Bicholim	North Goa	15.68956°	73.926656°
16	Calangute	Bardez	North Goa	15.538461°	73.771704°
17	Calangute	Bardez	North Goa	15.547109°	73.77139°
18	Pirna	Bardez	North Goa	15.672387°	73.885621°
19	Menkure	Bardez	North Goa	15.696682°	73.897856°
20	Kolval	Bardez	North Goa	15.619147°	73.821792°
21	Mapusa	Bardez	North Goa	15.618213°	73.819852°
22	Tivim	Bardez	North Goa	15.628187°	73.835828°
23	Honda	Sattari	North Goa	15.565817°	74.063491°
24	cudnem	Bicholim	North Goa	15.54177°	74.02149°
25	Kasarpal	Bicholim	North Goa	15.672518°	73.941186°
26	Sal	Bicholim	North Goa	15.688324°	73.926245°
27	Qulosem	Mormugoa	South Goa	15.356704°	73.927504°
28	Chicalim	Mormugoa	South Goa	15.40564°	73.840351°
29	Cansaulim	Mormugoa	South Goa	15.36173°	73.89401°
30	Nagve	Mormugoa	South Goa	15.352975°	73.923132°

31	Curti	Ponda	South Goa	15.414739°	74.02673°
32	Bandiwada	Ponda	South Goa	15.416499°	74.008765°
33	Khandepar	Ponda	South Goa	15.4466°	74.031216°
34	Gansua	Salcete	South Goa	15.30711°	73.911662°
35	Nuvem	Salcete	South Goa	15.297416°	73.947862°
36	Navelim	Salcete	South Goa	15.245152°	73.971145°
37	Veroda	Salcete	South Goa	15.175359°	74.02439°
38	Varca	Salcete	South Goa	15.226405°	73.941761°
39	Varca	Salcete	South Goa	15.223138°	73.95586°
40	Khandepar	Ponda	South Goa	15.444499°	74.031957°
41	Agapur	Ponda	South Goa	15.380179°	73.96169°
42	Wadi	Ponda	South Goa	15.372892°	73.975953°
43	vodlemol, cacora	Quepem	Kushavati	15.228462	74.120903
44	Dhangar wadi	Quepem	Kushavati	15.13474°	74.07826
45	Coloumb	Sanguem	Kushavati	15.13419°	74.134456°
46	Pirla	Sanguem	Kushavati	15.119124°	74.127116°
47	Pirla	Sanguem	Kushavati	15.110849°	74.130909°
48	Colomb	Sanguem	Kushavati	15.121305°	74.137759°
49	Karmaliwada	Quepem	Kushavati	15.240784°	74.1034005°
50	Karmaliwada	Quepem	Kushavati	15.240784°	74.1034005°
51	Molem	Dharbandora	Kushavati	15.38614°	74.21287°
52	Molem	Dharbandora	Kushavati	15.384002°	74.215056°
53	Sangod	Dharbandora	Kushavati	15.357368°	74.191597°
54	Mulem	Quepem	Kushavati	15.24432°	74.03451°
55	Chandor	Quepem	Kushavati	15.247811°	74.04157°
56	Chandor	Quepem	Kushavati	15.250932°	74.050491°
57	Guirdolim	Quepem	Kushavati	15.264985°	74.038676°
58	Netravali	Sanguem	Kushavati	15.05495	74.12592
59	Netravali	Sanguem	Kushavati	15.08297	74.13229
60	Canacona	Canacona	Kushavati	15.030401°	74.029101°
61	Vaki, Kulem	Dharbandora	Kushavati	15.332209°	74.221315°
62	Shigoa, Kulem	Dharbandora	Kushavati	15.332751°	74.225235°



Geographical distribution of Gomanchali buffalo in Goa

Gomanchali buffalo farmers' locations



Mr. Kistod Cardozo
(Mob: 9370712039)



Mr. Francis Pereira
(Mob: 8975726855)



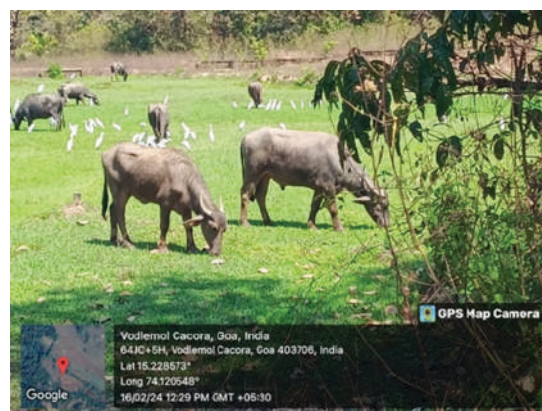
Mr. Krishna Y Naik
(Mob: 9404699878)



Mr. Suresh Kolapte
(Mob: 9637824950)



Mr. Rajesh Shelke
(Mob: 9370686996)



Mr. Santosh Shelke
(Mob: 8530418485)



Mr. Rue Menzes
(Mob: 9850458478)



Mr. Anil Bhandari
(Mob: 8830147267)



Mr. William Afonso
(Mob: 7798845515)



Mr. Subhash Morajkar
(Mob: 9049600112)



Mr. Everest Fernandes
(Mob: 7776066916)



Mr. Arjun B Parwar
(Mob: 8830651064)

Population Status of Gomanchali buffalo

Total buffalo population was 27,207 as per 20th Livestock Census (2019), in which non-descript buffalo population, so called Gomanchali breed is 24,500. This breed has been evolved through selective breeding by the farmers, Gawli samaj, Gosevaks and Goshalas in different localities in Goa. The field survey and characterization work completed for 1,883 non-descript buffaloes (Gomanchali), including 1,124 females, 207 males, 358 female calves, and 194 male calves from 135 households in all the talukas of Goa. The average herd size was 18 animals, comprising 56% breeding females, 22% replacement females (1–3 years), 15% calves, 5% breeding bulls, and 2% replacement males (1–3 years), while bullocks were rarely present. The estimated population comprises 14,200 breedable buffalo cows and 1,600 breedable buffalo bulls.



Nanda lake, Quepem



Valpoi Goshala, Sattari



Sal, Bicholim



Veroda, Salcete

Farmers rearing Gomanchali

The list of the farmers rearing buffalo along with the number of animals are given in the table below.

Sl.	Name of the farmer	Address	No. of animals
1	Narendra Dhasratha Polle	Khorjuve, Aldona, Bardez Goa	16
2	Tome Rodrigues	Qulosem, Verna, Goa	2
3	Rue Menzes	Chicalim, Vasco da gama, Goa	11
4	Nitesh Naik	Corlim, Old Goa, Tiswadi, Goa	20
5	Kashinath Goude	Corlim, Old Goa, Goa	10
6	Shamsundar Naik	Cansaulim, Marmugoa, Goa	9
7	Udaya Sawant	vodlemol, Cacora, Goa	4
8	Dinesh Gokar	Gadiwada, Vodlemol, Cacora	70
9	Suresh Kolapte	Dhangar wadi, Vdlemol, Cacora	55
10	Ramu shinde	Dhangar wadi, Vdlemol, Cacora	13
11	Vithoba Madekai	Dhangar wadi, Vdlemol, Cacora	8
12	Prashant Velip	Coloumb, Goa	3
13	Santosh Ram Adnekar	Coloumb, Goa	3
14	Uday Faldesai	Pirla, Sanguem, Goa	3
15	Dilip Faldesai	Pirla, Sanguem, Goa	3
16	Ratanakar Faldesai	Pirla, Sanguem, Goa	15
17	Niwas Faldesai	Pirla, Sanguem, Goa	8
18	Pradeep Kakodakar	Colamb, Sanguem, Goa	12
19	Ramchandra Bhiva Velip	Colomb, Goa	3
20	Anil Bhandari	Corlim, Goa	28
21	Shuhas P Sawant	Karmaliwada, Kudchaden, Goa	22
22	Prachi Desai	Karmaliwada, Kudchaden, Goa	22
23	Shashikala Desai	Karmaliwada, Kudchaden, Goa	34
24	Sumitra Desai	Karmaliwada, kudchaden Goa.	7
25	Manoj Sawant	Karmaliwada, kudchaden Goa.	29
26	Belu Gawas	Agaciam, Goa.	2
27	Prakash Krishnath Naik	Nevra Pikne, Goa,	19
28	Joaquim S Periera	Kujra Velem Bhat Goa	18
29	Kanchana Jagdish Velunar	Bamboli, Goa.	10
30	Dhulo Junglee	Mollem, Goa,	3
31	Injo Junglee	Mollem, Goa,	20
32	Bomo Yamkar	Mollem, Goa,	28

33	Jani Hedge	Mollem, Goa,	4
34	Babu Hedge	Mollem, Goa,	5
35	Dhuku Suzare	Sangod, Goa,	13
36	Kistod Cardozo	Mulem, qupem, Goa,	20
37	Andrew D'siliva	Chandor, Goa,	15
38	Krishna Rama Parabudesai	Chandor, Goa,	9
39	Subham Nistani	Guirdolim, Goa,	6
40	Hiroji Nistani	Guirdolim, Goa,	36
41	Paru Ranu Nistani	Guirdolim, Goa,	17
42	cleton fernandez	nagve,verna,Goa,	18
43	Akhil Vishva Jai Shri Ram Gosanvardhan Kendra	Cortorem Vp, Volpoi, Sattari, Goa	26
44	Subhash Satarkar	Curti, Ponda, Goa	31
45	Krishna Dahinde	Bandiwada, Ponda, Goa	20
46	Nandesh Talmi	Khandepar, Ponda, Goa	14
47	Willam Afonso	Agacaim, Tiswadi, Goa	10
48	Domnic Perera	Gansua, Salcete, Goa	34
49	Alex Fernandes	Nuvem, Salcete, Goa	21
50	Remi Fernandes	Nuvem, Salcete, Goa	25
51	Dilip Dargalkar	Dargal, Pernem, Goa.	10
52	Ranjan S salgaonkar	Dargal, Pernem, Goa	16
53	Satish A Shiroadkar	Dargal, Pernem, Goa	7
54	Vishnu Morajkar	Pernem, Goa	21
55	Subhash A Morajkar	Pernem, Goa	8
56	Arjun Babbani Parwar	Sal, Bicholim, Goa	24
57	Shivbun Shiva Roa	Sal, Bicholim, Goa	9
58	Meghnath Ramdev Rao	Sal, Bicholim, Goa	34
59	Sudkar Kalangutkar	Sal, Bicholim, Goa	11
60	Arjun Parab	Sal, Bicholim, Goa	6
61	Babbi Babbani Parwar	Sal, Bicholim, Goa	6
62	Salvador Pereira	Navelim, Salcete, Goa	25
63	Robert Pereira	Navelim, Salcete, Goa	16
64	Francis Pereira	Navelim, Salcete, Goa	22
65	Francis Dias	Navelim, Salcete, Goa	18
66	Shisha Tris	Navelim, Salcete, Goa	5
67	Krishna kanurkar	Calangute, Bardez, Goa	4
68	Raguveer Gadekar	Calangute, Bardez, Goa	3

69	Promod desai	Calangute, Bardez, Goa	2
70	Vaibhav Desai	Calangute, Bardez, Goa	5
71	Vishal desai	Calangute, Bardez, Goa	3
72	Atamaram Desai	Calangute, Bardez, Goa	2
73	Gajanan Vengurlkar	Calangute, Bardez, Goa	2
74	Pralahad T Gadekar	Pirna, Bicholim, Goa	4
75	Vithal V Ambes	Pirna, Bicholim, Goa	20
76	Kamalkand P Chodenkar	Pirna, Bicholim, Goa	22
77	Krishna Y Naik	Pirna, Bicholim, Goa	21
78	Ashok N Naik	Menkure, Bicholim, Goa	4
79	Mahadev Govali	Kolval, Mapusa, Goa	32
80	Santosh Govali	Mapusa, Goa	20
81	Kapil M Langoti	Mapusa, Goa	26
82	Damodar Langoti	Mapusa, Goa	25
83	Santosh Mahala	Tivim, Bardez, Goa	7
84	Ganesh Laxaman Shalke	Veroda, Cuncolim, Goa	31
85	Rajesh Shelke	Veroda, Cuncolim, Goa	40
86	Jimmu Kolekar	Veroda, Cuncolim, Goa	53
87	Santosh Shelke	Veroda, Cuncolim, Goa	18
88	Vitto Shalke	Veroda, Cuncolim, Goa	27
89	Balatadar D'costa	Varca, Salcete, Goa	18
90	Everest Fernandes	Varca, Salcete, Goa	24
91	Anthony Jose Rebelo	Varca, Salcete, Goa	23
92	Sheldon Martin's	Varca, Salcete, Goa	19
93	Dev Bhat	Netravali, Sanguem, Goa	26
94	Rajan Naik	Netravali, Sanguem, Goa	11
95	Janu Kulekar	Netravali, Sanguem, Goa	21
96	Babu Jathu Yadgo	Netravali, Sanguem, Goa	30
97	Bhaiva Zure	Netravali, Sanguem, Goa	25
98	Nirmala D	Canacona, South Goa, Goa	115
99	Babu kormapakar	Canacona, South Goa, Goa	34
100	Sanjok Kharwal	Honda, Sattari, Goa	42
101	Janu Manu Fale	Honda, Sattari, Goa	23
102	Babu Manu Fale	Honda, Sattari, Goa	29
103	Rama kolvekar	cudnem, bicholim,	30
104	Sudakar Kalangutakar	Kasarpal, Bicholim	14
105	Ratankar kautakar	Sal, Bicholim	8

106	Devu Navalu Zuro	Sal, Bicholim	15
107	Sagun Vithal Rao	Sal, Bicholim	40
108	Premaanand Parab	Sal, Bicholim	13
109	Mangesh Parwar	Sal, Bicholim	5
110	Tulshidas Jalmi	Khandepar, Ponda	12
111	Rohini Gaude	Khandepar, Ponda	18
112	Dina Naik	Khandepar, Ponda	15
113	Kalu Pingle	Zariwada, Mollem, Dharbandora	14
114	Babu Shelke	Vaki, Kulem, Dharbandora	13
115	Raghav Zuro	Vaki, Kulem, Dharbandora	5
116	Dudhasagar Krish Udyog Farm	Shigoa, Kulem, Dharbandora	17
117	Maya Lambor	Kulem, Dharbandora	5
118	Mahadev Fadete	Agapur, Ponda	25
119	Prashant Naik	Wadi, Agapur, Ponda	5

Breed Characteristics of Gomanchali buffalo

Morphological characteristics

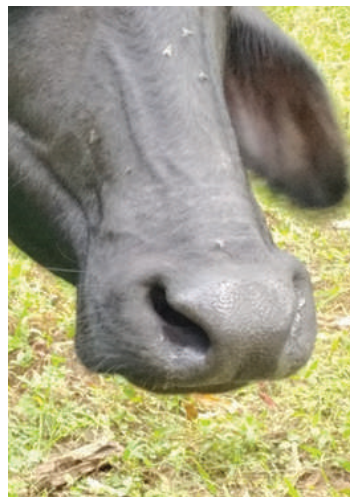
The Gomanchali buffaloes exhibited a distinct and relatively consistent set of morphological characteristics, with minor variations in colour, horn configuration, ear orientation, head structure and other external features. The animals predominantly possessed a black to grey coat and dark skin, with occasional lighter shades. The horns were characteristically curved and extended backward before turning upward, resembling a sickle shape. The hooves were predominantly black, while the muzzle and eyelids were mainly black, with occasional variation towards grey or lighter pigmentation. The head was generally medium broad with a convex forehead. Small, horizontally positioned ears, small humps, naval flaps and dewlaps were observed in both sexes. White markings were occasionally present on the forehead, head and tail switch. A distinct neck band was observed in some Gomanchali buffaloes, contributing to their characteristic neck conformation. The stalking on the knee was observed in some animals, representing a notable morphological feature of the breed.

Coat and Skin Colour: The Gomanchali buffalo predominantly exhibits coat colours ranging from dark black (86.40%) to light grey or copper shade (13.60%). Although black was the principal colour, some animals exhibited dark grey to light grey shades. The skin similarly ranged from black or dark grey to light grey. The predominance of dark pigmentation was observed in both male and female buffaloes and represents an important external characteristic of the population.



Coat colour

Muzzle: The muzzle was predominantly black in both sexes. Some individuals showed variation in pigmentation from black to grey, while a few animals had white spots on the maxilla and mandible. These variations represented minor phenotypic differences within the population.



Muzzle

Eyelid: The eyelids were predominantly black in both males and females. Occasional grey or whitish pigmentation was observed in some animals. The predominantly dark eyelid colour was consistent with the overall dark pigmentation pattern of the population.



Eyelid

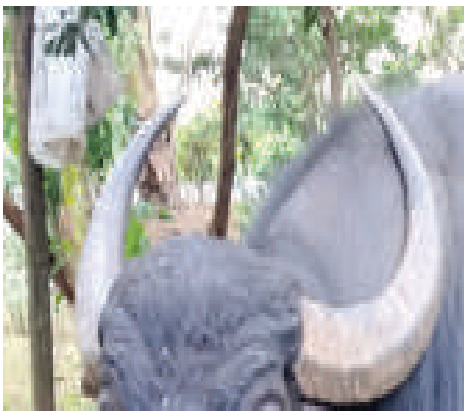
Tail Switch: The tail switch showed variation from black to white in both male and female buffaloes, although dark pigmentation was commonly observed. Occasional white tail switches contributed to the observable colour variation within the population.



Tail switch



Hooves



Horns shape and orientation



Ears

Hooves: The hooves were predominantly black in both sexes. Although a few animals exhibited lighter shades, black hooves were the characteristic feature recorded in the studied buffalo population.

Horns colour, Shape and Orientation: Horn characteristics were among the prominent morphological features of the Gomanchali buffalo. The horns were predominantly black in both male and female animals and were curved rather than straight. Their orientation was characteristically backward followed by an upward curve, giving them a distinct sickle-shaped appearance. The horn size was 52.50 cm in males and 52.38 cm in females. The similarity in horn configuration between the sexes indicates a consistent external characteristic of the population. The combination of black horn colour, curved shape and backward-upward orientation provides an important descriptive feature for the morphological characterization of Gomanchali buffaloes.

Ears: The ears were relatively small and predominantly horizontal in orientation. The recorded ear length was 27 cm in males and 25.5 cm in females. Although horizontal positioning was predominant, a few animals displayed drooping ears. The relatively compact ear size and horizontal orientation contributed to the characteristic head morphology of the animals.

Head: The head was generally medium broad, with a convex forehead being the predominant feature in both male and female buffaloes. A smaller number of animals showed variation in forehead configuration, including straight foreheads. A few individuals also had white patches on the forehead. The combination of a medium broad head and convex forehead was a consistent feature of the studied population.

Body: Both male and female buffaloes possessed small-sized humps, naval flaps and dewlaps. The male buffaloes also exhibited a small penis sheath flap. These anatomical features, together with the characteristic coat colour, horn configuration and head structure, contributed to the overall morphological description of the Gomanchali buffalo.

Udder Shape and Size: The female buffaloes showed distinct and relatively consistent udder characteristics. The udder was predominantly round in shape, with a medium-sized fore-udder and comparatively large rear-udder. The teats were cylindrical with rounded tips. These characteristics facilitate effective milk removal during hand milking and may also be suitable for machine milking. Rounded teat tips may help minimize the risk of teat injuries and associated infections, thereby supporting udder health and functional longevity. Milk vein development was not prominent in the majority of animals. Although prominent milk veins are often associated with high milk-producing animals, their inconspicuous development in Gomanchali buffaloes may reflect genetic and regional differences in udder vasculature.



Head



Body



Udder shape and size

Housing and Management practices for Gomanchali buffalo

The buffaloes are traditionally housed in open sheds constructed using locally available materials such as clay, laterite stone, and wood. This traditional housing system is well adapted to the hot, humid, and high-rainfall conditions of Goa. The use of locally sourced materials makes the sheds economical, easily repairable, and environmentally sustainable. Most of the sheds have sloping clay-tiled roofs, which facilitate efficient rainwater runoff during the monsoon and provide natural insulation against heat. The open-sided design, generally supported by sturdy pillars, allows continuous air circulation and helps reduce heat accumulation inside the shed. This feature is particularly important under Goa's humid coastal climate, where adequate ventilation is essential for maintaining animal comfort and reducing heat stress.

The flooring is generally made of mud or compacted earth, providing a relatively soft and comfortable resting surface for the buffaloes. Mud flooring also has the capacity to absorb moisture, although appropriate maintenance is necessary during the monsoon to prevent excessive dampness and slipperiness. In several traditional sheds, the available space is informally divided into areas for feeding, resting, and calf management. Such arrangements facilitate routine husbandry operations and enable farmers to manage different categories of animals according to their requirements. The proximity of trees and natural vegetation around the sheds provides additional shade and contributes to a cooler microenvironment. Overall, the traditional housing system represents a locally adapted, low-cost, and climate-resilient approach to buffalo management under Goa's coastal conditions.

Most farmers rear buffaloes under a free-ranging system, allowing animals to utilize locally available grazing resources. Grazing is generally undertaken during the early morning and evening hours when ambient temperatures are relatively lower. The animals commonly graze in harvested paddy fields, riverbanks, fallow lands, and other community or locally accessible grazing areas. In particular, the *Khazan* areas, which are low-lying saline wetlands traditionally utilized for agriculture and livestock-related activities in Goa, provide important grazing resources. The utilization of these areas reduces dependence on purchased feed and enables farmers to maintain buffaloes under relatively low-input production systems.

Although grazing constitutes the major component of feeding, supplementary concentrate feeding is also practiced by a few farmers, particularly when additional nutritional support is required. The concentrate mixture generally consists of groundnut

cake, ground maize, rice polish, and cotton seed cake. The availability and quantity of concentrate supplementation depend on the economic capacity of the farmer, availability of feed ingredients, physiological status of the animals, and prevailing seasonal conditions. Lactating animals and animals requiring additional nutritional support may receive supplementary feed in addition to the available grazing resources.

Healthcare management is largely dependent on government veterinary services. Farmers utilize these services for periodic deworming, vaccination, diagnosis, and treatment of sick animals. Veterinary support plays an important role in maintaining herd health, particularly in a production system where animals are frequently exposed to communal grazing areas and varying environmental conditions. In addition to formal veterinary services, ethnoveterinary practices are occasionally used by farmers for the management of minor ailments. Such traditional knowledge forms an important component of the indigenous livestock management system and has generally been transmitted through generations. However, serious illnesses and conditions requiring specialized treatment are managed with the assistance of veterinary professionals.

Housing of Buffaloes

Traditional open cattle shed with a sloping tiled roof supported by thick pillars is commonly used for housing buffaloes. The structure is constructed using locally available materials such as clay, laterite stone, and wood, which are well suited to the Goan climate. The open and naturally ventilated design, together with the surrounding vegetation and tree cover, provides a favourable microenvironment for the animals. The housing arrangement reflects the farmers' traditional knowledge of adapting livestock shelters to the hot, humid, and high-rainfall conditions prevailing in Goa.

Key Features of the Buffalo Shed:

- 1. Sloping Roof with Clay Tiles** – The sloping roof facilitates rapid rainwater runoff during the monsoon season and provides natural insulation, thereby helping maintain a relatively comfortable environment inside the shed during hot and humid conditions.
- 2. Open Sides with Pillars** – The open-sided construction ensures continuous natural ventilation and facilitates the movement of air through the shed. Adequate air-flow helps dissipate accumulated heat and moisture and contributes to maintaining animal comfort under humid climatic conditions.
- 3. Mud Flooring and Plastered Pillars** – Traditional mud flooring provides a rela-

tively soft and comfortable surface for resting and has the ability to absorb moisture. Proper maintenance of the floor is important during periods of heavy rainfall to minimize excessive wetness and slipperiness.

4. **Partitioned Areas** – The presence of separate sections within the shed provides space for feeding, resting, and possible calf management. Such partitioning facilitates organized husbandry and allows farmers to manage different categories of animals according to their requirements.
5. **Natural Shade from Trees** – The sheds are often surrounded by vegetation and trees, providing additional natural shade and helping to create a cooler microenvironment. Tree shade is particularly beneficial for buffaloes under Goa's hot and humid conditions.

Uniqueness for Goan Conditions:

- The housing design makes extensive use of **local materials** such as laterite stone, clay tiles, and wood, which are readily available in Goa and contribute to natural temperature regulation.
- The **open-sided construction** promotes ventilation and reduces excessive heat and moisture accumulation inside the shed, making it suitable for the region's humid coastal climate.
- The housing system is **sustainable and cost-effective**, as it relies on locally available materials and traditional construction practices, thereby reducing dependence on expensive modern infrastructure.
- The **sloping tiled roof** is particularly suitable for Goa's high rainfall, facilitating efficient drainage while providing protection from intense sunlight and rain.
- The integration of **natural vegetation and tree shade** around the animal shelter further improves the microclimatic conditions and provides protection from direct solar radiation.

Overall, the traditional buffalo housing and management system represents a practical adaptation to Goa's coastal agro-climatic conditions. The combination of open-sided sheds, locally available construction materials, natural shade, grazing-based feeding, limited concentrate supplementation, and access to government veterinary services enables farmers to maintain buffaloes under a relatively low-input production system. These practices also reflect the accumulated indigenous knowledge of livestock keepers and contribute to the maintenance, productivity, and conservation of the local buffalo population under the prevailing environmental conditions.



Housing structures

Managerial practice of buffaloes

Indigenous Gomanchali buffaloes are generally recognized for their calm and docile nature, which makes them suitable for dairy farming and routine household-level management. The studied buffalo population was also observed to possess a predominantly docile temperament. The animals could be handled and managed comfortably by family members, including during routine activities such as feeding, milking, movement, and basic healthcare. Their manageable temperament is particularly advantageous under the traditional smallholder production system, where buffaloes are generally maintained as an integral component of the household livelihood system.

The observed population also exhibited considerable morphological diversity, particularly with respect to horn shape and forehead structure. Such variation indicates the existence of phenotypic diversity within the buffalo population. At the same time, the animals shared several morphological characteristics commonly associated with Murrah buffaloes, particularly black coat coloration and a docile temperament. The combination of these characteristics with adaptation to local environmental conditions highlights the importance of documenting and conserving the buffalo population

maintained by farmers in Goa.

The management system is predominantly characterized by low external input, dependence on locally available feed resources, family labour, and traditional knowledge. The animals are maintained under grazing-based conditions and are brought back to the household sheds for shelter, feeding, milking, and routine management. Such a system minimizes production costs while utilizing locally available natural resources. The ability of the buffaloes to thrive under these conditions also contributes to their importance in the livelihood systems of small and marginal farmers.

Socio-economic status of buffalo farmers

Buffalo rearing forms an important component of the rural livelihood system of farmers maintaining these animals. The relatively low-input nature of the production system enables farmers to maintain buffaloes using locally available feed resources, family labour, and traditional housing facilities. Grazing in harvested paddy fields, riverbanks, fallow lands, and *Khazan* areas reduce expenditure on purchased feed, while the use of locally available construction materials reduces housing costs.

Buffaloes provide farmers with milk and contribute to household nutritional security and income generation. The maintenance of buffaloes also represents an important form of livestock-based livelihood diversification, particularly for households engaged in crop cultivation. The integration of buffaloes with existing agricultural activities allows farmers to utilize crop residues and locally available resources while obtaining livestock products for household consumption and sale. Thus, buffalo rearing contributes not only to direct economic returns but also to the resilience of farm households.

The traditional knowledge associated with buffalo husbandry, including housing, grazing management, feeding practices, healthcare, and the use of ethnoveterinary remedies, represents an important component of the local livestock production system. Documentation of these practices is therefore essential for understanding the production environment, management adaptability, and conservation requirements of the buffalo population.

Performance Traits of Gomanchali buffalo

Physical characteristics of Gomanchali buffalo

The body measurements of male and female Gomanchali buffaloes were assessed to characterize their physical conformation and morphological development. Chest girth, body length, and height at withers were considered important indicators of body size and structural characteristics. The measurements demonstrated variation between males and females and provide useful phenotypic information for breed characterization and future conservation and genetic improvement programmes.

Body Weight

The body weight of Gomanchali buffaloes was evaluated at different stages of growth, namely at birth, 24 months of age, and adulthood, to assess growth pattern and variation between males and females. At birth, male buffalo calves recorded a mean body weight of 21.44 ± 3.18 kg and female calves had a mean birth weight of 20 ± 2.78 kg. The slightly higher mean birth weight observed in males indicates a modest sex-related difference in early body development.

At 24 months of age, male buffaloes recorded a mean body weight of 184 ± 22.45 kg. Female buffaloes recorded a mean body weight of 175 ± 20.23 kg. The higher mean body weight in males at this stage suggests greater growth and skeletal development, although considerable individual variation was evident in both sexes.

Adult males recorded a mean body weight of 637 ± 35.20 kg, whereas adult females recorded a mean body weight of 436 ± 33.12 kg. The considerable difference in adult body weight between males and females indicates pronounced sexual dimorphism in the mature buffalo population. The relatively broad range of body weight, particularly among females, may reflect variation in age, physiological status, parity, nutritional condition, and individual body conformation.

Table: Body weight of Gomanchali buffalo

Weight at	Male			Female		
	Mean $\pm$ SE	Range	N	Mean $\pm$ SE	Range	N
Birth (kg)	21.44 ± 3.18	18-27	29	20 ± 2.78	16-25	45
24 months (kg)	184 ± 22.45	140-214	34	175 ± 20.23	137-233	58
Adult weight (kg)	637 ± 35.20	511-762	60	436 ± 33.12	249-611	162

Chest girth

The mean chest girth of male buffaloes was 222 ± 18.20 cm, with a range of 194–250 cm, based on 60 observations. In female buffaloes, the mean chest girth was 179.5 ± 16.13 cm, with a range of 125–210 cm, based on 162 observations. The substantially higher mean chest girth in males reflects their larger thoracic development and greater overall body size. Chest girth is also an important morphological measurement for assessing body conformation and can provide an indirect indication of body weight and growth in field conditions.

Body length

The mean body length recorded in male buffaloes was 139 ± 14.91 cm and female buffaloes recorded 144.5 ± 12.39 cm. The observed variation in body length indicates differences in individual conformation within the population. Interestingly, females exhibited a higher mean body length than males, demonstrating that individual body dimensions do not necessarily follow the same pattern as body weight or chest girth.

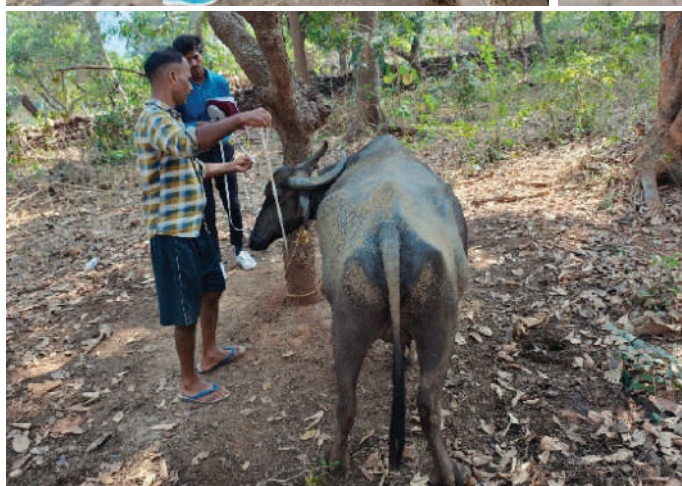
Height at withers

The mean height at withers of male buffaloes was 142 ± 15.12 cm and female buffaloes recorded 139.7 ± 11.12 cm. The slightly higher mean height at withers in males indicates their comparatively greater stature. The variation recorded among females suggests differences in individual body size and structural development within the population. Height at withers, together with body length and chest girth, provides useful information for describing the overall conformation of Gomanchali buffaloes.

Table: Body measurements of Gomanchali buffalo

Parameter	Male			Female		
	Mean $\pm$ SE	Range	N	Mean $\pm$ SE	Range	N
Chest girth	222 ± 18.20	194-250	60	179.5 ± 16.13	125-210	162
Body length	139 ± 14.91	132-147	60	144.5 ± 12.39	125-190	162
Height at withers	142 ± 15.12	139-155	60	139.7 ± 11.12	125-160	162

Recording of body measurements of Gomanchali buffalo



Production Performance of Gomanchali buffalo

The Gomanchali buffalo demonstrates satisfactory productive and reproductive performance under the traditional management systems prevalent in Goa. The breed is primarily maintained for milk production and is valued for its relatively high milk fat content. The ability of these buffaloes to produce milk under low-input conditions, while utilizing locally available grazing resources, contributes to their importance in smallholder production systems.

A notable biological characteristic of the breed is its relatively early attainment of puberty, occurring at 24–30 months, followed by sexual maturity at 30–34 months. The age at first calving is approximately 40–42 months, allowing animals to enter the productive reproductive phase at a comparatively early age. These reproductive characteristics contribute to herd replacement and maintenance and support continued productivity under field conditions. The breed also exhibits satisfactory fertility, good mothering ability, and regular calving under traditional management.

Under farmers' management, the Gomanchali buffalo produces an average daily milk yield of approximately 4.7 kg, with an average lactation length of about 230 days and an average lactation milk yield of around 1,130 kg. The milk contains a relatively high fat percentage, averaging 7.8%, which enhances its value for household consumption and preparation of traditional dairy products.

The breed is characterized by hardiness, efficient utilization of locally available feed resources, adaptation to the hot and humid coastal environment, and the ability to maintain production under relatively limited nutritional and management inputs. These characteristics, together with its distinctive morphology and reproductive performance, contribute to the importance of Gomanchali buffalo as an indigenous animal genetic resource of Goa.

Milk Composition

The milk of Gomanchali buffaloes, assessed from pooled lactation data, exhibits favourable nutritional and processing characteristics. The average fat content was $7.80 \pm 0.71\%$, indicating the richness of the milk and its suitability for the preparation of fat-rich dairy products such as ghee and traditional sweets. The average protein content was $3.97 \pm 0.14\%$, while casein accounted for $2.99 \pm 0.09\%$. The relatively substantial casein content enhances the suitability of the milk for processing into products such as cheese and curd. The lactose concentration was recorded at $4.5 \pm 0.2\%$, contributing to the energy value and palatability of the milk.

The solids-not-fat (SNF) content averaged $8.81 \pm 0.40\%$, whereas the total solids (TS) content reached $17.86 \pm 1.10\%$. These values indicate the relatively rich composition of Gomanchali buffalo milk and its high concentration of milk solids. The density was measured at 1004.72 ± 2.40 g/L, while the freezing point was recorded as $-0.47 \pm 0.04^{\circ}\text{C}$. These physicochemical characteristics are consistent with the properties expected in high-quality, unadulterated buffalo milk. The salt content was minimal at $0.01 \pm 0.04\%$, remaining within the expected physiological range.

Lactation Length

The Gomanchali buffalo exhibits a moderate lactation length, reflecting its adaptation to the hot and humid agro-climatic conditions of Goa and the low-input production systems followed by farmers. Based on the analysed field data, the average lactation length was 240 days, indicating that most animals remain in lactation for nearly eight months. The observed range extended from 150 to 300 days, demonstrating variation among individual animals, including differences between first-lactation and mature animals.

Under conditions of minimal supplementary feeding, Gomanchali buffaloes are able to maintain a productive lactation period of approximately 7–8 months. Such a lactation duration provides a sustained source of milk for household consumption and sale and contributes to the livelihood security of smallholder farmers. The ability to maintain production under locally available feed resources further emphasizes the adaptation of the breed to the prevailing production environment of Goa.

Collectively, these milk characteristics demonstrate the high nutritional and processing value of Gomanchali buffalo milk. Its relatively high fat and total solids content, together with favourable protein, casein, and lactose concentrations, makes the milk suitable for direct consumption as well as for the preparation of traditional and value-added dairy products.

Table: Production performance of Gomanchali buffalo

Parameter	First Lactation			Overall		
	Mean $\pm$ SE	Range	N	Mean $\pm$ SE	Range	N
Daily milk yield (kg)	3.0 $\pm$ 0.23	2-6	24	4.7 $\pm$ 0.43	2-8	162
Peak milk yield (kg)	5.7 $\pm$ 0.42	3-8.2	19	7.37 $\pm$ 0.15	4-10.5	112
Days to reach peak yield	61 $\pm$ 7	50-70	24	54.16 $\pm$ 8	45-74	162
Lactation length (days)	240 $\pm$ 21	230-280	24	230 $\pm$ 24	150-300	162
Lactation milk yield (kg)	720 $\pm$ 32	550-750	24	1130 $\pm$ 41	480-1800	162
Fat %	7.1 $\pm$ 1.1	6-10	26	7.8 $\pm$ 0.06	6.0-11.4	104
SNF %	-	-	-	8.84 $\pm$ 0.25	7.4-10.8	104
Dry period (days)	70 $\pm$ 12	55-79	24	64 $\pm$ 14	57-88	162

Reproductive performance of the buffalo population

The breed exhibits relatively early reproductive maturity, with the age at first calving reported between 38 and 40 months. Regular breeding cycles are supported by a moderate calving interval, while the animals exhibit satisfactory fertility under field conditions. Farmers generally rely on spontaneous mating, and relatively few reproductive problems have been reported. These characteristics, combined with their adaptation to the prevailing environmental conditions, support the suitability of Gomanchali buffaloes for smallholder production systems in the coastal agro-ecological zones of Goa.

Table: Reproductive performance of Gomanchali buffalo

Male	Average	Range	N
Age at first ejaculation (months)	28 $\pm$ 1.45	23–33	104
Age at first mating (months)	34 $\pm$ 0.95	27–38	104
Female			
Age at first oestrous (months)	28 $\pm$ 0.50	22–30	104
Oestrous cycle duration (days)	21 $\pm$ 0.35	19–23	104
Oestrous duration (hours)	21 $\pm$ 0.90	18–24	104
Age at first mating (months)	30 $\pm$ 0.60	25–34	104
Age at first calving (months)	40 $\pm$ 0.70	39–45	104
Service period (days)	80 $\pm$ 3.50	70–95	104
Calving interval (days)	430 $\pm$ 6.50	410–460	104
Gestation length (days)	300 $\pm$ 2.10	295–305	104
Number of services per conception	1.20 $\pm$ 0.10	1–2	104

Farmers' Experiences and Perceptions about Gomanchali buffalo

Mr. Prakash Krishnath Naik has been engaged in buffalo rearing for more than 48 years, continuing the livestock-rearing tradition of his family. He maintains a herd of 19 animals, comprising 2 males, 13 females, and 4 calves (1 male and 3 females). He also cultivates paddy on his small landholding, integrating buffalo rearing with crop production. The herd is managed under a semi-intensive system, with animals allowed to graze during the day and supplemented with paddy straw, seasonal green fodder, and concentrate feed for lactating animals. Regular housing, watering, bathing, and timely veterinary care are provided to maintain herd health. The buffaloes produce an average of 4–5 litres of milk per day, with the best animals yielding up to 6 litres. Milk sales generate a monthly income of approximately ₹50,000–60,000, providing an important source of livelihood for the family. A major challenge for the farmer is finding reliable labour for daily herd management and maintenance. Government support through labour assistance, fodder support, and conservation incentives could help reduce management constraints and encourage the continued conservation of Gomanchali buffaloes. His integrated, low-input management system demonstrates the adaptability and sustainable production potential of Gomanchali buffaloes under traditional farming conditions.

Name: **Prakash Krishnath Naik**

Age: 60 years

Gender: Male

Address: Nevra Pikne, Tiswadi, Goa

Experience: Above 48 years

No. of Animals (Herd Size) = 19



Mr. Narendra Dhasratha Polle from Khorjuve, Aldona, has over 40 years of experience in traditional buffalo rearing and has bred Gomanchali buffaloes for 42 years.

Name: **Narendra Dashrath Polle**

Age: 55 years

Gender: Male

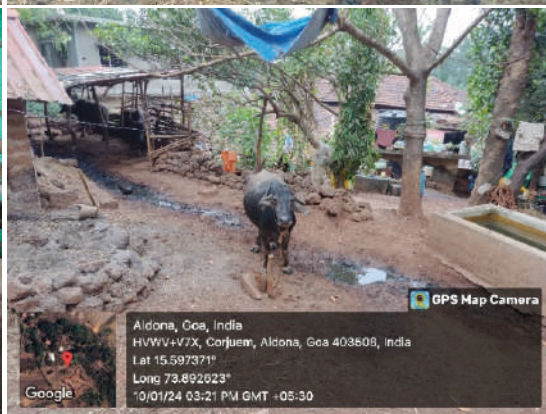
Address: Khorjuve, Aldona, Bardez, Goa

Experience: Above 40 years

No. of Animals (Herd Size) = 16

He maintains a herd of 16 buffaloes, comprising 5 males, 6 females and 6 calves (1 male and 5 females), under an extensive grazing system. Animals graze freely on available pastures, while milking buffaloes receive supplementary concentrate feed. Simple sheds provide

shelter, and routine vaccination and deworming are practiced for herd health. The buffaloes produce approximately 4–5 litres of milk/day, averaging about 5 litres per animal. He earns approximately ₹30,000–40,000 per month from buffalo rearing and also generates additional income by selling buffalo dung at about ₹4,000 per tonne as a by-product. He considers Gomanchali buffalo an important part of Goa's livestock heritage and rural livelihoods, with recognition necessary to prevent replacement by crossbred buffaloes, increase awareness and facilitate financial support for conservation. Traditional feeding and breeding practices have helped maintain the herd sustainably. He wishes government-supported breeding centres and farmer training programmes to improve productivity. The breed is distinguished by its hardiness, disease resistance and low maintenance requirements compared with exotic buffaloes.



Mr. Arjun Babbani Parwar, a 28-year-old farmer from Sal, Bicholim, Goa, has been engaged in buffalo rearing since his teenage years and has accumulated approximately 16 years of experience. He currently maintains a herd of 24 buffaloes, comprising 1 male, 18 females, and 5 calves (2 males and 3 females).

The herd is maintained under an extensive, low-input system, with animals primarily depending on open grazing. During periods of limited pasture availability, paddy straw and seasonal green fodder are provided as supplementary feed. Traditional housing and routine veterinary care given. The buffaloes produce an average of approximately 4 litres of milk per day from each, with a fat content of around 7.5%, indicating satisfactory milk quality under the prevailing management conditions. He earns net annual income of 5-5.5 lakhs from his buffalo farm. Despite his relatively young age, Mr. Parwar's considerable experience and continued involvement in buffalo husbandry demonstrate the potential for sustaining traditional livestock-rearing practices among the younger generation. He requires scientific training in buffalo nutrition, breeding, calf management, herd health, and general farm management, which could help improve herd productivity and strengthen his overall livestock enterprise. His enthusiasm for maintaining and improving these practices also contributes to the continued conservation and utilization of the local Gomanchali buffalo resource in Goa.

Name: **Arjun Babbani Parwar**
Age: 28 years
Gender: Male
Address: Sal, Bicholim, Goa
Experience: 16 years
No. of Animals (Herd Size) = 24



Mr. Francis Dias, a 58-year-old farmer from Navelim, Salcete, Goa, has been engaged in buffalo rearing for more than 26 years. He maintains a herd of 18 buffaloes, comprising 1 male, 11 females, and 6 calves (4 males and 2 females). The herd is managed

Name: **Francis Dias**

Age: 58 years

Gender: Male

Address: Navelim, Salcete, Goa,

Experience: 26 years

No. of Animals (Herd Size) = 18

under an extensive, low-input system, relying mainly on open grazing and locally available crop residues. The animals are maintained in simple traditional housing, while calves are reared using customary practices. Veterinary care is provided as required to maintain herd health and ensure continuity of production.

Each buffalo produces an average of approximately 5 litres of milk per day, with a fat content of around 7%, indicating satisfactory milk quality under traditional management conditions. He earns 5 lakhs rupees per annum as net income from buffalo farming. A major challenge is the rapid reduction of open grazing land due to increasing construction and urban development, which has limited access to traditional grazing areas. Government support through designated community grazing lands, protection of existing pasture areas and promotion of community fodder plots could help ensure continued access to feed resources and support the long-term conservation of Gomanchali buffaloes. Mr. Dias's long-term commitment to buffalo husbandry represents the continued importance of traditional livestock production systems and local milk supply in Goa.



Mr. Rue Menzes has been breeding Gomanchali buffaloes for the past 28 years. He owns about 5 ha of land, cultivating paddy and fodder to support his herd of 11 buffaloes, comprising 2 males, 7 females and 4 calves (2 males and 2 females). The herd is maintained under a semi-intensive system, combining daytime grazing with cultivated green fodder and concentrate supplementation for lactating animals. The buffaloes yield approximately 6 litres of milk/day with about 7.5% fat. He considers Gomanchali buffalo distinct due to its characteristic grey coat, unique horn shape, docile temperament, early maturity and regular calving under low-input conditions. He earns approximately ₹60,000–70,000 per month from milk sales by supplying directly to urban consumers, who pay a premium of about ₹70–80 per litre for his milk. However, distribution and transportation from the farm to consumers remain major challenges, limiting his ability to expand direct marketing. Government support for direct milk marketing, quality certification, branding of Gomanchali milk and small-scale dairy processing could help the farmer improve value realization and expand his customer base. He believes official breed recognition would enhance market value and farmer pride in conserving this local genetic resource. He recommends village-level awareness on balanced nutrition, fodder cultivation and veterinary services for long-term breed improvement and conservation.

Name: **Rue Menzes**

Age: 57 years

Gender: Male

Address: Chicalim, Vasco da Gama, Goa

Experience: more than 45 years

No. of Animals (Herd Size) = 11



Mr. Ratanakar Faldesai, a 60-year-old farmer has been engaged in buffalo rearing for nearly five decades. He maintains a herd of 15 buffaloes, comprising 1 male, 10 females, and 4 female calves, supported by a large landholding used for farming and grazing. The herd is managed under an extensive, low-input system, with buffaloes relying mainly on open grazing over available pasture and agricultural land. Limited supplementary feed is provided to milking buffaloes to support milk production.

Name: Ratanakar Faldesai

Age: 60 years

Gender: Male

Address: Pirla, Sanguem, Goa

Experience: Above 48 years

No. of Animals (Herd Size) = 15

The animals have access to seasonal housing and adequate drinking water. The buffaloes produce an average of approximately 4 litres of milk per day, with an average fat content of around 7%. As the farm is located in a rural area, milk is mainly sold through the local dairy collection centre, where the farmer receives a comparatively lower price. His monthly income from buffalo rearing is approximately ₹50,000–60,000. A major constraint is shortage of green fodder and feed during the summer season, which increases feeding costs and affects herd management. Government support through community fodder banks, subsidized fodder during the lean season, and incentives for on-farm fodder cultivation could help ensure year-round feed availability and reduce production costs. The farmer's long experience, extensive grazing resources, and efficient utilization of locally available feed allow him to maintain the herd with low input costs.



Mr. Anil Bhandari, a 57-year-old farmer from Corlim, Old Goa, Tiswadi, Goa, has been engaged in buffalo rearing for more than 42 years. He currently maintains a relatively large herd of 28 buffaloes, comprising 8 males, 14 females, and 6 female calves. The herd is managed

under an extensive, low-input system, with animals relying primarily on natural grazing for their feed requirements. During lean periods, particularly when pasture availability is limited, paddy straw and other crop residues are provided as supplementary feed. The buffaloes are maintained in simple, traditional housing, with emphasis on natural feeding and open grazing. The herd produces an average of approximately 3 litres of milk per day, with a milk fat content of around 6%. Although milk production is comparatively modest, the system demonstrates the ability of the buffaloes to survive and maintain production under minimal-input management conditions.

Name: **Anil Bhandari**

Age: 57 years

Gender: Male

Address: Corlim, Old Goa, Tiswadi, Goa

Experience: Above 42 year

No. of Animals (Herd Size) = 28



Mr. Kashinath Goude, a 60-year-old farmer from Corlim, Old Goa, Tiswadi, Goa, has been engaged in buffalo rearing for more than 37 years. He maintains a herd of 10 buffaloes, comprising 1 male, 6 females, and 3 female calves. The herd is managed under

Name: **Kashinath Goude**

Age: 60 years

Gender: Male

Contact no: 9049789970

Address: Corlim, Old Goa, Tiswadi, Goa

Experience: Above 37 years

No. of Animals (Herd Size) = 10

an extensive, low-input system, with animals relying mainly on open grazing and paddy straw, with minimal external supplementation. Seasonal housing, regular access to drinking water, and basic veterinary care are provided to maintain herd health and welfare. The animals efficiently utilize locally available

feed resources, helping to keep production costs low. Buffalo produces an average of approximately 5 litres of milk per day with a fat content of around 7.8%. The relatively high milk fat percentage indicates good milk quality and adds value to the produce.



Mr. Kistod Cardozo, a 51-year-old farmer from Mulem, Quepem, Goa, has been engaged in buffalo rearing for more than 32 years. He maintains a herd of 20 buffaloes, comprising 4 males, 12 females, and 4 calves (1 male and 3 females). The herd is maintained under an extensive management system, with animals relying primarily on natural grazing. Depending on seasonal availability, paddy straw and green fodder are provided as supplementary feed. The buffaloes produce an average of approximately 5 litres of milk per day, with a notably high milk fat content of around 9%, which enables him to receive a premium price for his milk. He earns approximately ₹70,000–80,000 per month from buffalo rearing. This high fat percentage indicates excellent milk quality. The farmer's long experience and traditional management practices demonstrate the adaptability and productive potential of the local Gomanchali buffalo, particularly its ability to maintain good milk quality under extensive, low-input conditions. A major challenge faced by the farmer is inadequate housing facilities for the herd. Government incentives or financial assistance for scientific shed construction and improvement of existing housing facilities could help improve animal welfare, hygiene and overall herd management.

Name: **Kistod Cardozo**

Age: 51 years

Gender: Male

Address: Mulem, Quepem, Goa

Experience: Above 32 years

No. of Animals (Herd Size) = 20



Mr. Cleton Fernandez, a 44-year-old farmer from Nagve, Verna, Mormugoa, Goa, has been engaged in buffalo rearing for more than 28 years. He maintains a herd of

Name: Cleton Fernandez

Age: 44 years

Gender: Male

Contact no: 8806292919

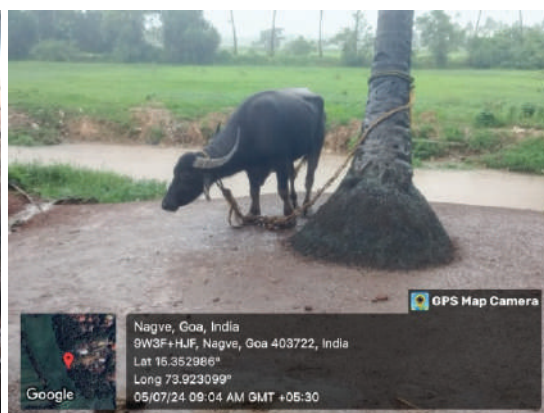
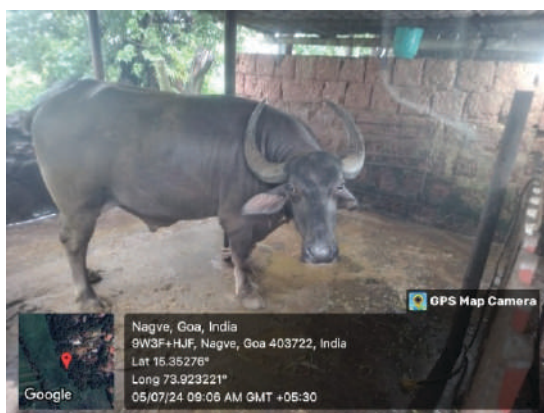
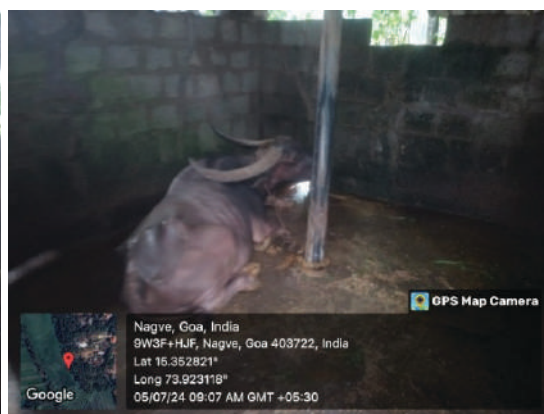
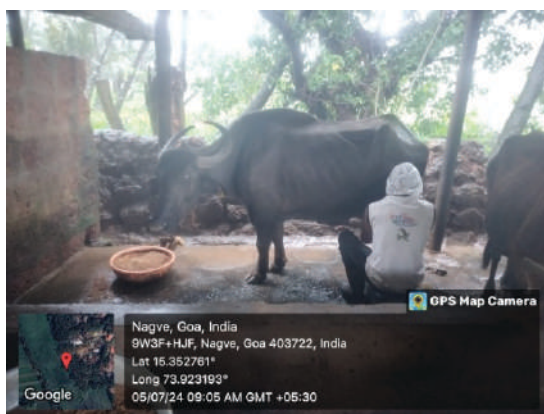
Address: Nagve, Verna, Mormugoa, Goa,

Experience: Above 28 years

No. of Animals (Herd Size) = 18

18 buffaloes, comprising 2 males, 15 females, and 1 female calf. The herd is managed under an extensive grazing system, with animals utilizing natural pastures as the primary source of feed. Fodder and concentrate feed are provided to lactating buffaloes to support milk production and maintain nutritional

requirements. Traditional housing is supplemented by regular bathing, watering, and deworming, contributing to good herd health and hygiene. Despite the predominantly extensive management system, the buffaloes demonstrate strong productive performance, producing an average of approximately 8 litres of milk per day with a fat content of around 7.5%. His long experience in buffalo husbandry further reflects the continued importance of indigenous buffaloes in the farming systems of Goa.



Mr. Nitesh Naik, a livestock farmer from Corlim, Tiswadi, has been traditionally engaged in buffalo rearing for more than three decades. He currently maintains a herd of approximately 20 buffaloes, which are managed under an extensive, free-ranging production system along the backwaters and wetland areas of Corlim. The animals are allowed to move freely over the surrounding wetlands, where they have regular access to natural wallowing sites, grazing areas, and abundant green fodder. The availability of aquatic vegetation, grasses, and other naturally occurring forage throughout much of the year provides an important nutritional base for the herd. The animals also benefit from the wetland ecosystem, particularly during the hot and humid months, when access to water and wallowing sites helps them regulate body temperature and maintain comfort. The herd is maintained under a low-input system, with minimal dependence on purchased feed and other external inputs. The buffaloes are well adapted to the local environmental conditions and are described by the farmer as docile, hardy, and easy to manage. The herd produces an average of approximately 4.5 litres of milk per animal per day, with an average milk fat content of around 7.5%. The relatively high milk fat percentage enhances the value of the milk for household consumption and local dairy marketing.

Name: **Nitesh Naik**

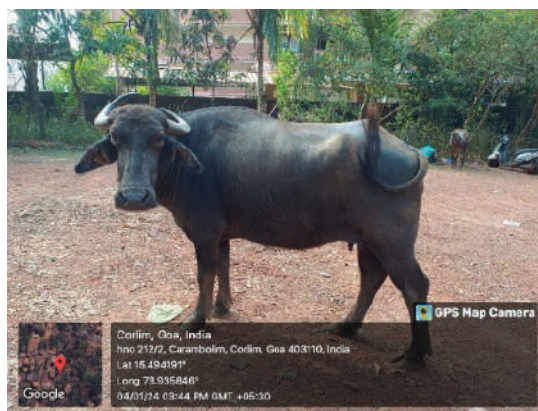
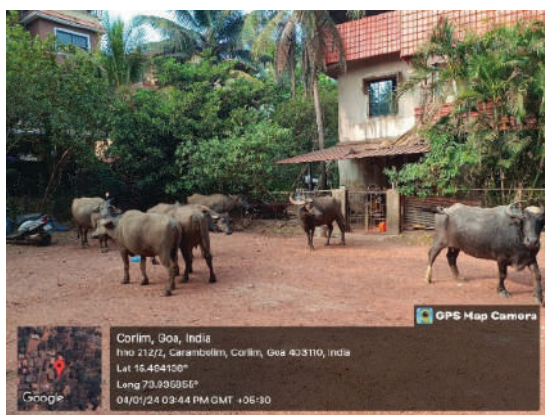
Age: 48 years

Gender: Male

Address: Corlim, Old Goa, Tiswadi, Goa

Experience: 32 years

Herd Size: 20



Mr. Shamsundar Naik, a traditional buffalo keeper from Cansaulim, Mormugao, has been engaged in buffalo rearing for more than 36 years. He currently maintains a herd of nine buffaloes, which are primarily managed under an extensive grazing system. The

Name: **Shamsundar Naik**

Age: 53 years

Gender: Male

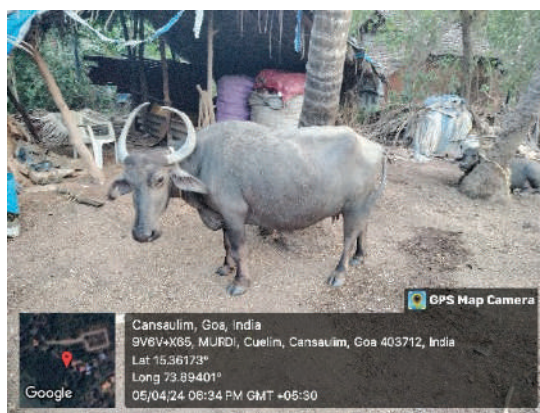
Address: Cansaulim, Mormugao, Goa

Experience: 36 years

Herd Size: 9

animals are allowed to graze freely across the coastal plains, open fallow lands, and areas adjoining the beaches, where naturally occurring, saline-tolerant grasses and other vegetation provide a substantial portion of their feed requirements. The humid and saline coastal environment presents

challenges for livestock management; however, the animals demonstrate good adaptability and resilience under these conditions. Lactating buffaloes receive supplementary locally available concentrates and paddy straw to support milk production and meet additional nutritional requirements. The overall management remains traditional, as regular grazing and utilization of locally available feed resources form the foundation of the production system. The herd maintains satisfactory productive performance, with milking buffaloes producing approximately 4 litres of milk per day, containing around 6% milk fat. The ability of these animals to sustain milk production under an extensive, low-input system highlights the hardiness, adaptability, and production potential of the local Gomanchali buffalo.



Mr. Shuhas P. Sawant, a buffalo farmer from Karmaliwada, Kudchade, has been engaged in buffalo rearing for more than 34 years. He currently maintains a herd of 22 buffaloes in the vicinity of the Nanda Lake Ramsar wetland, where the availability of perennial water sources, natural grasslands,

and abundant aquatic vegetation provides a favourable environment for buffalo husbandry. The herd is maintained under an extensive, low-input production system, with animals allowed to graze freely and access natural wallowing areas throughout the day. The surrounding wetland ecosystem provides a diverse and continuous source of naturally available grasses and aquatic vegetation, while locally available crop residues supplement the animals' feed requirements. The buffaloes are well adapted to the moist and wetland environment, utilizing the available natural resources efficiently. Regular access to water and wallowing sites is particularly beneficial during the warm and humid conditions prevalent in Goa. Each buffalo produces an average of approximately 5 litres of milk per day, with peak yields reaching around 7 litres per day. The milk contains approximately 7% fat. His net annual income is approximately ₹ 4 lacs from buffalo rearing. The combination of adaptability, efficient utilization of natural resources, satisfactory milk production, and low maintenance requirements highlights the productivity and resilience of the local Gomanchali buffalo. However, increasing restrictions on access to grazing and wetland areas could affect the sustainability of this traditional system. Government support through designated community grazing areas, regulated access to suitable wetland resources, and community fodder development could help maintain this low-input production system while ensuring long-term conservation of Gomanchali buffaloes.

Name: **Shuhas P. Sawant**

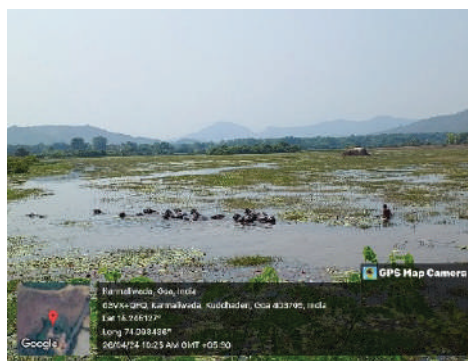
Age: 53 years

Gender: Male

Address: Karmaliwada, Kudchade, Goa

Experience: Above 34 years

Herd Size: 22



Mrs. Shashikala Desai, one of the few women actively engaged in buffalo husbandry in South Goa, has more than 38 years of experience in traditional buffalo rearing. She

Name: **Shashikala Desai**

Age: 56 years

Gender: Female

Address: Karmaliwada, Kudchade, Goa

Experience: Above 38 years

Herd Size: 22

currently manages a herd of 22 buffaloes near Nanda Lake, Kudchade, where abundant natural vegetation and perennial water availability provide a favourable environment for buffalo production. The herd is maintained under a semi-nomadic and extensive management system, with the

animals allowed to graze freely around the wetland and surrounding grasslands during the day. The buffaloes return to the homestead for milking and overnight shelter, combining traditional grazing practices with basic housing management. Her long experience in traditional buffalo husbandry has enabled her to manage the herd efficiently while making effective use of locally available natural resources. The buffaloes produce an average of approximately 4 litres of milk per day, with a milk fat content of around 7%. The milk is processed and marketed locally, providing a regular source of income for the household and contributing to the local dairy supply. The combination of traditional knowledge, extensive grazing, careful animal management, and local milk marketing demonstrates the adaptability, productivity, and livelihood value of the Gomanchali buffalo under the traditional farming conditions of South Goa.



Mr. Domnic Perera, a 43-year-old farmer from Gansua, Majorda, Salcete, Goa, has been engaged in buffalo rearing for more than 28 years, reflecting his long-standing experience in traditional livestock husbandry. He currently maintains a herd of 34 buffaloes, comprising 3 males, 23 females, and 8 calves (3 males and 5 females), making it one of the larger buffalo herds in the locality. The animals are managed predominantly under an extensive grazing system, with buffaloes allowed to move freely along the coastal areas near the beach and surrounding fallow paddy fields. These areas provide access to naturally available grasses and other vegetation, particularly during periods when agricultural fields remain uncultivated. The use of coastal grazing areas and post-harvest paddy fields enables efficient utilization of local feed resources and reduces dependence on external inputs. Despite the extensive management system, the herd demonstrates excellent productive performance. The buffaloes produce an average of approximately 10 litres of milk per day, with an average fat content of around 8.5%, indicating both high milk yield and good milk quality. Mr. Perera's long experience and continued maintenance of a sizeable herd also contribute to the sustenance of traditional buffalo husbandry and local genetic resources in the region.

Name: **Domnic Perera**

Age: 43 years

Gender: Male

Address: Gansua, Majorda, Salcete, Goa

Experience: Above 28 years

Herd Size: 34



Mr. Nandesh Talmi, a 27-year-old farmer from Khandepar, Ponda, has been engaged in buffalo rearing for more than seven years. His herd is managed predominantly under an extensive grazing system, with the animals utilizing nearby forest areas, natural

Name: **Nandesh Talmi**

Age: 27 years

Gender: Male

Address: Khandepar, Ponda, Goa

Experience: Above 7 years

Herd Size: 14

grasslands, and harvested rice fallows as important sources of feed. The buffaloes are closely integrated with the surrounding agricultural landscape, moving between grazing areas and rice fields according to seasonal availability of forage. The use of forest vegetation and post-harvest rice fallows

provides a diverse and naturally available feed base, while the animals contribute to the farming system through manure production and utilization of otherwise underused resources. Despite the relatively short period of experience compared with traditional buffalo keepers, Mr. Talmi's herd demonstrates excellent productive performance under the extensive management system. The buffaloes produce an average of approximately 7.8 litres of milk per day, with individual animals reaching peak yields of around 10 litres per day. The milk has an average fat content of approximately 7.8%, indicating good milk quality. The combination of high milk productivity, good milk fat content, efficient use of local resources, and low-input management highlight the productive potential and adaptability of the local Gomanchali buffalo.



Mr. Alex Fernandes, a livestock farmer from Nuvem, Salcete, has been engaged in buffalo rearing for more than three decades. He currently maintains a herd of 21 buffaloes, managed through a predominantly extensive grazing system. The animals graze freely along the grasslands adjoining the highway. During the summer and periods of reduced pasture availability, the animals are supplemented with paddy straw and other locally available dry feed resources to maintain body condition and sustain milk production. The buffaloes produce an average of approximately 6 litres of milk per day, with individual animals reaching peak yields of around 8 litres per day. The milk has an average fat content of approximately 8.7%, indicating excellent milk quality. Efficient utilization of natural forage, seasonal supplementation with agricultural residues, and organized marketing of milk allow the farmer to maintain productivity while controlling production costs. His herd illustrates the adaptability, productive potential, and economic importance of the local Gomanchali buffalo within the traditional and evolving dairy production systems of Goa.

Name: **Alex Fernandes**

Age: 55 years

Gender: Male

Address: Nuvem, Salcete, Goa

Experience: Above 33 years

Herd Size: 21



Mr. Remi Fernandes, a 38-year-old farmer from Nuvem, Salcete, Goa, has been engaged in buffalo rearing for more than 21 years. He maintains a herd of 25 buffaloes, comprising 2 males, 15 females, and 6 calves (2 males and 4 females), reflecting his

Name: **Remi Fernandes**

Age: 38 years

Gender: Male

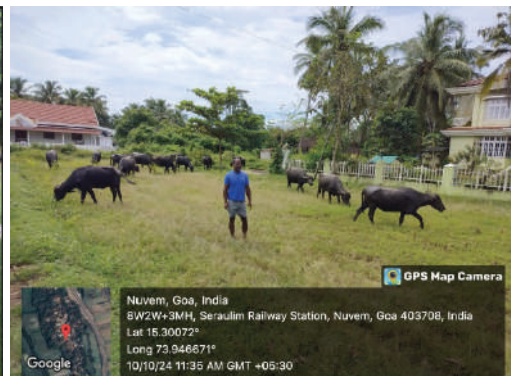
Address: Nuvem, Salcete, Goa

Experience: Above 21 years

Herd Size: 25

long-standing involvement in traditional buffalo husbandry. The herd is managed predominantly under an extensive grazing system, with the animals allowed to graze freely in areas near the beach and along highway-side grasslands. These open areas provide naturally available grasses and vegetation, enabling efficient utilization of local feed resources

and reducing dependence on external inputs. The coastal grazing environment also demonstrates the ability of the buffaloes to adapt to the humid conditions of the region. Despite the extensive management system, the herd maintains satisfactory productive performance. The buffaloes produce an average of approximately 5 litres of milk per day, with a notably high fat content of around 8.5%, indicating good milk quality. The combination of traditional grazing practices, efficient utilization of locally available forage, and relatively high milk fat highlights the adaptability and productive potential of the local Gomanchali buffalo under coastal farming conditions.



Mr. Suresh Kolapte, a 42-year-old farmer from Dhangar Wadi, Vodlemol, Cacora, Quepem, Goa, has been engaged in buffalo rearing for more than 31 years. He maintains a large herd of 58 buffaloes, comprising 15 males, 30 females, and 13 calves (3 males and 10 females), reflecting his extensive experience and continued commitment to traditional buffalo husbandry. The herd is managed under a predominantly extensive grazing system, with the animals allowed to graze freely in the surrounding mountainous areas, where abundant natural vegetation provides a continuous source of forage. Notably, the farmer does not provide concentrate feed, and the buffaloes depend mainly on naturally available vegetation. Despite this low-input feeding system, the animals maintain good body condition and produce good-quality milk, demonstrating efficient utilization of natural feed resources. The buffaloes are milked twice daily, once in the morning and again in the evening. The herd produces an average of approximately 5.5 litres of milk per day, with an average fat content of around 6.9%. The farmer also reports that his buffaloes exhibit early breeding, indicating favourable reproductive performance under the extensive management system. His net annual income is approximately ₹12 lakh from buffalo rearing.

Name: **Suresh Kolapte**

Age: 42 years

Gender: Male

Address: Dhangar wadi, Vodlemol, Cacora Quepem

Experience: above 31 years

Herd Size: 58



Mr. Hiroji Nistani, a 48-year-old farmer from Guirdolim, Quepem, Goa, has been engaged in buffalo rearing for more than 28 years. He maintains a herd of 36 buffaloes, comprising 2 males, 27 females, and 7 calves (3 males and 4 females). The herd is managed under a predominantly extensive grazing system, with the buffaloes allowed to graze freely during the day in the areas surrounding his farm, particularly along the railway-track grasslands.

Name: **Hiroji Nistani**

Age: 48 years

Gender: Male

Address: Guirdolim, Quepem, Goa

Experience: above 28 yeras

Herd Size: 36

The lactating buffaloes are supplemented with concentrate feed, providing additional nutritional support while retaining the advantages of an extensive grazing system. The herd demonstrates good productive performance, with an average milk yield of approximately 7 litres per animal per day and an average fat content of around 7.5%. His management system reflects the adaptability and productive potential of the local Gomanchali buffalo under extensive, resource-efficient farming conditions



Mr. Ranjan S. Salgaonkar, a 34-year-old farmer from Dargal, Pernem, Goa, has been engaged in buffalo rearing for approximately 16 years. He maintains a herd of 16 buffaloes, comprising 12 females and 4 calves (1 male and 3 females). The buffaloes are managed under a traditional extensive grazing system, with animals allowed to graze freely in paddy fields and along nearby riverbanks, where naturally available grasses and vegetation provide an important source of feed. Despite the simple management system, the herd demonstrates satisfactory productive performance, with an average milk yield of approximately 5 litres per day and a relatively high milk fat content of around 8%. The farmer's traditional approach to buffalo management provides him with a regular source of income, contributing to household livelihood and supporting the continuation of smallholder dairy farming. The combination of natural grazing, good milk yield, high milk fat, and low-input traditional management highlights the adaptability and productive potential of the local Gomanchali buffalo under the agro-ecological conditions of northern Goa.

Name: **Ranjan Salgaonkar**

Age: 34 years

Gender: Male

Address: Dargal, Pernem, Goa

Experience: 16 years

Herd Size: 16



Mr. Anurag Jure, a 29-year-old farmer from Pernem, Goa, has been engaged in buffalo rearing for approximately 12 years. He currently maintains a herd of 28 buffaloes,

Name: **Anurag Jure**

Age: 29

Gender: Male

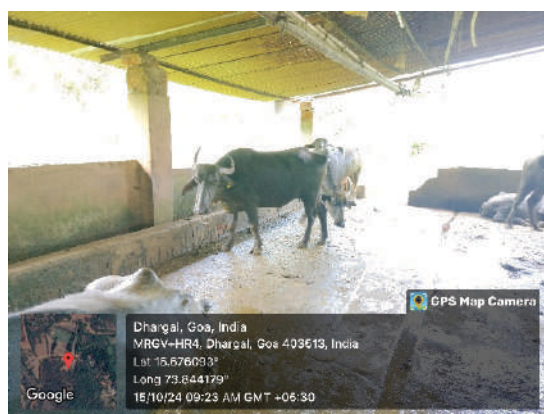
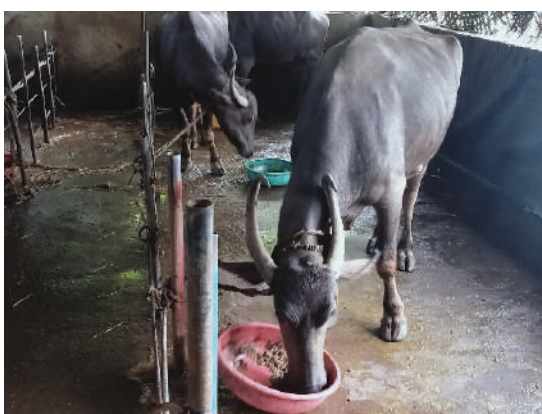
Address: Pernem, Goa

Experience: 12 years

Herd Size: 28

comprising 5 males, 17 females, and 6 calves (4 males and 2 females). Despite being a relatively young farmer, his continued involvement reflects the growing participation of younger farmers in buffalo husbandry. Concentrate feed is provided to support the nutritional requirements of milking buffaloes, thereby

helping to sustain productive performance. The farmer also ensures timely veterinary care and routine health management, contributing to the overall health and well-being of the herd. The buffaloes produce an average of approximately 6 litres of milk per day, with an average fat content of around 7.5%, indicating good milk quality. The combination of balanced feeding, timely veterinary intervention, and systematic herd management enables the animals to maintain good productivity.



Mr. Salvador Pereira, a 32-year-old farmer from Navelim, Salcete, Goa, has been engaged in buffalo rearing for approximately 16 years. He maintains a herd of 25 buffaloes, comprising 1 male, 16 females, and 8 calves (3 males and 5 females). The herd is managed under an extensive grazing system, with the animals allowed to graze freely throughout the day on fallow lands near the National Highway, where naturally available grasses and vegetation provide a substantial part of their feed requirements. In addition to grazing, lactating buffaloes are supplemented with concentrate feed, including maize powder, cottonseed cake and other locally available feed ingredients, to meet their higher nutritional requirements and support enhanced milk production. The herd demonstrates good productive performance, with an average milk yield of approximately 10 litres per day and a fat content of around 7%. The relatively high milk yield can be attributed to the combination of natural grazing, adequate concentrate supplementation, and attentive herd management. The farmer also places considerable emphasis on regular care, cleanliness, feeding, and overall animal well-being. The integration of extensive grazing with targeted concentrate supplementation represents a practical approach to improving productivity while utilizing locally available resources. The herd demonstrates the productive potential and adaptability of Gomanchali buffaloes under a semi-intensive nutritional management strategy in the traditional farming conditions of Goa.

Name: **Salvador Pereira**

Age: 32

Gender: Male

Address: Navelim, Salcete, Goa

Experience: 16

Herd Size: 25



Mr. Robert Pereira, a 44-year-old farmer from Navelim, Salcete, Goa, has been engaged in buffalo rearing for approximately 20 years. He maintains a herd of 16

Name: **Robert Pereira**

Age: 44

Gender: Male

Address: Navelim, Salcete, Goa

Experience: 20

Herd Size: 16

buffaloes, comprising 1 male, 12 females, and 3 calves (1 male and 2 females), reflecting his sustained involvement in buffalo husbandry. The herd is managed predominantly under an extensive grazing system, with the animals allowed to graze freely throughout the day on fallow lands. These areas provide naturally

available grasses and vegetation, enabling efficient utilization of local feed resources while reducing dependence on external inputs. The farmer also ensures regular care and management of the animals under the prevailing traditional production system. Particular emphasis is placed on preventive healthcare, with the farmer receiving support from the local veterinary dispensary for timely vaccination of the herd. The buffaloes produce an average of approximately 8 litres of milk per day, with an average fat content of around 7.8%, indicating good milk yield and quality. The combination of extensive grazing, locally available forage, and timely veterinary care demonstrates the adaptability, productive potential, and resilience of the local Gomanchali buffalo under traditional farming conditions.



Mr. Kamalkand P. Chodenkar, a 42-year-old farmer from Pirna, Bicholim, Goa, has been engaged in buffalo rearing for approximately 24 years, reflecting his long-standing experience in traditional livestock husbandry. He currently maintains a herd of 22 buffaloes, including six female calves. The herd is managed predominantly under an extensive grazing system, with the buffaloes allowed to graze freely in fallow lands and adjoining areas with natural vegetation and light forest cover.

This practice also helps minimize dependence on external feed inputs and keeps the overall cost of buffalo rearing low. Despite the simple, traditional management system, the buffaloes demonstrate satisfactory productive performance, producing an average of approximately 5 litres of milk per day, with an average fat content of around 7.5%. The relatively good milk fat percentage indicates satisfactory milk quality under extensive conditions.

Name: **Kamalkand P. Chodenkar**

Age: 42

Gender: Male

Address: Pirna, Bicholim, Goa

Experience: 24

Herd Size: 22



Mr. Krishna Y. Naik, a 48-year-old farmer from Pirna, Bicholim, Goa, has been engaged in buffalo rearing for approximately 27 years, reflecting his extensive experience and traditional knowledge of buffalo husbandry. He maintains a herd of 21 buffaloes,

Name: **Krishna Y Naik**

Age: 48

Gender: Male

Address: Pirna, Bicholim, Goa

Experience: 27

Herd Size: 21

comprising 2 males, 15 females, and 4 female calves. The herd is managed under a predominantly extensive, low-input system, making effective use of the natural resources available in the village. The buffaloes are allowed to graze freely on fallow lands and surrounding areas, where naturally occurring

grasses and vegetation provide an important source of feed. In addition, locally available crop residues provide supplementary feed, particularly after the harvesting of agricultural crops. Despite the relatively simple management system, the buffaloes produce an average of approximately 4 litres of milk per day, with a notably high fat content of around 9%, indicating excellent milk quality. The farmer's long experience and efficient utilization of locally available grazing and crop residues demonstrate the hardiness, adaptability, and resource-use efficiency of the local Gomanchali buffalo in the traditional farming.



Mr. Rajesh Shelke from Veroda has been engaged in buffalo rearing for approximately 9 years. Despite his relatively young age, he manages a large herd of 40 buffaloes, comprising 5 males, 20 females, and 15 calves (5 males and 10 females). The herd is maintained under a predominantly extensive grazing system, with

the animals taken to the surrounding mountainous areas for grazing. The availability of abundant natural vegetation provides the primary source of feed, and the farmer does not provide supplementary feed or concentrates. This low-input system significantly reduces feeding costs while allowing the buffaloes to utilize locally available natural resources efficiently. Despite the absence of supplementary feeding, the herd maintains an average milk yield of approximately 3.5 litres per day, with an average fat content of around 5.2%. The milk produced provides a regular source of income and contributes substantially to the farmer's livelihood. Mr. Shelke's ability to manage a large herd under extensive, low-input conditions demonstrates the hardiness and adaptability of the local buffalo population. The system highlights the importance of natural grazing resources in sustaining buffalo production and supporting the livelihoods of young farmers in the rural areas of Goa.

Name: **Rajesh Shelke**

Age: 28

Gender: Male

Address: Veroda, Cuncolim, Goa

Experience: 9

Herd Size: 40



Mr. Jimmu Kolekar, a 31-year-old farmer from Veroda, Cuncolim, Goa, has been engaged in buffalo rearing for approximately 12 years. He currently maintains a sizeable herd of 53 buffaloes, comprising 4 males, 37 females, and 12 calves (5 males and 7 females). The herd is managed under a traditional extensive and low-input production system. The

Name: **Jimmu Kolekar**

Age: 31

Gender: Male

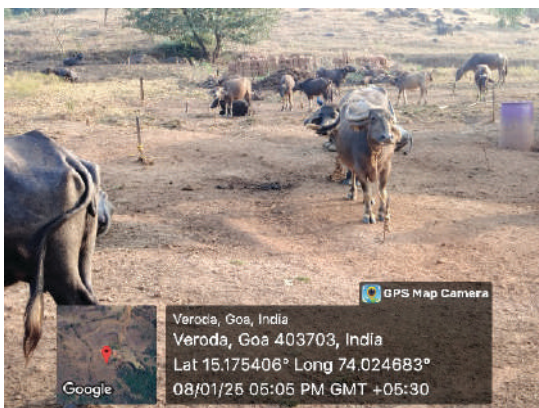
Address: Veroda, Cuncolim, Goa

Experience: 12

Herd Size: 53

buffaloes are allowed to graze freely in fallow agricultural lands and surrounding mountainous areas, where abundant natural grasses and vegetation provide the major source of feed. The system involves minimal dependence on purchased feed or supplementary inputs, thereby keeping the cost of production relatively low.

Despite the limited-input management, the buffaloes maintain satisfactory productive performance, with an average milk yield of approximately 4 litres per day and an average fat content of 6.3%. The animals are able to maintain their body condition and productivity through efficient utilization of locally available natural vegetation.



Mrs. Nirmala D., a 36-year-old buffalo farmer from Canacona, Goa, has been engaged in buffalo rearing for approximately 17 years. She manages a large herd of 115 buffaloes, comprising 21 males, 64 females, and 30 calves (10 males and 20 females), making her herd one of the larger buffalo holdings documented in the

region. The herd is managed through a predominantly extensive, low-input production system. The buffaloes are allowed to utilize natural grazing resources, with minimal dependence on external inputs. Due to the large herd size, five to six workers are employed to assist with daily activities, including grazing management, feeding, milking, watering, and general animal care. Despite the extensive and low-input system, the buffaloes demonstrate good productive performance, producing an average of approximately 8 litres of milk per day, with an average fat content of around 7.9%. The system also highlights the scope for sustainable buffalo-based livelihoods through efficient resource utilization and targeted management of productive animals.

Name: **Nirmala D**

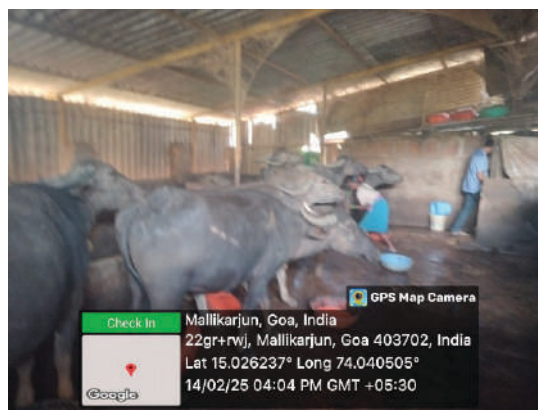
Age: 36

Gender: Male

Address: Canacona, Goa

Experience: 17

Herd Size: 115



Mr. Babu Kormapakar, a 45-year-old farmer from Canacona, Goa, has been engaged in buffalo rearing since his young age and has accumulated approximately 21 years of experience. He currently maintains a herd of 34 buffaloes, comprising 25 females and 9

Name: **Babu kormapakar**

Age: 45

Gender: Male

Address: Canacona, Goa

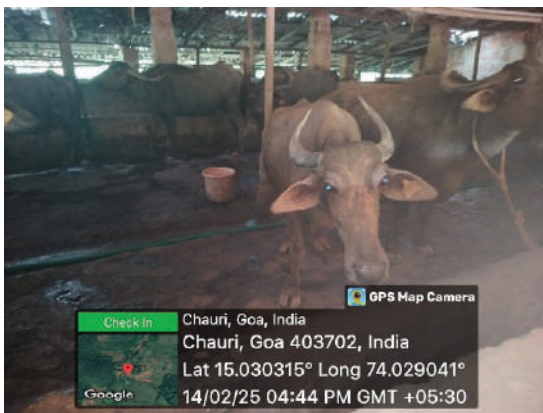
Experience: 21

Herd Size: 34

calves (2 males and 7 females), reflecting his long-standing commitment to buffalo husbandry.

The herd is maintained under a well-managed production system, with particular emphasis on animal health, nutrition, hygiene, and housing. The farmer provides supplementary feed to support the nutritional requirements of

the buffaloes and maintains good-quality housing facilities. Adequate water availability is ensured for drinking as well as regular cleaning and bathing, contributing to animal hygiene and comfort. The farmer places considerable importance on timely veterinary care and routine health management, helping maintain herd health and productivity. His long experience has enabled him to develop practical management skills in feeding, housing, sanitation, and general animal care. The buffaloes produce an average of approximately 6 litres of milk per day, with an average fat content of around 7.5%, indicating satisfactory milk yield and good milk quality.



Future Prospects

The recognition of Gomanchali buffalo as an indigenous breed of Goa provides a strong foundation for strengthening the state's dairy sector through systematic buffalo breeding and genetic improvement. Its adaptation to the hot and humid coastal environment, docile temperament, and favourable milk production characteristics offer opportunities to develop a locally adapted, low-input dairy production system. Future breeding programmes should focus on systematic recording of milk yield, milk composition, reproductive performance, health and longevity to identify superior animals for breeding. A selective breeding and genetic improvement programme can be established using elite Gomanchali bulls and females, supported by pedigree recording, performance testing, artificial insemination and genomic tools. Conservation of genetically diverse breeding populations should remain a priority while selecting animals for improved milk yield, fat and protein content, fertility, disease tolerance and climatic adaptability. Establishment of Gomanchali breeding nuclei and farmer-based nucleus herds can facilitate continuous supply of genetically superior breeding animals to dairy farmers.

Advanced reproductive technologies, including quality semen production, in-vitro embryo production & transfer, semen cryopreservation & in-vitro conservation, can further support both genetic improvement and long-term conservation. A dedicated Gomanchali germplasm bank containing semen, somatic cells and DNA samples would provide an important genetic resource for future breeding and research. Importantly, buffalo breeding should remain farmer-centred and economically oriented. Farmer cooperatives, breeding services, training programmes and incentive mechanisms can encourage the adoption of superior Gomanchali animals. Development of value-added products, particularly high-fat buffalo milk, traditional dairy products, and other speciality products, can create additional market opportunities and improve returns to smallholder farmers.

Thus, strategic breeding of Gomanchali buffalo can evolve into a conservation-linked dairy development model for Goa, integrating genetic conservation, productivity enhancement, climate resilience and farmer livelihoods. The long-term objective should be to establish Gomanchali buffalo breed as a productive and sustainable dairy resource while retaining its unique genetic identity as an important component of Goa's native livestock heritage.

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