

PROJECT INFORMATION

Assessment of reproductive status and development of sustainable reproductive strategies for managing non-infectious infertility in dairy animals reared under coastal climate

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Title of the Project

Assessment of reproductive status and development of sustainable reproductive strategies for managing non-infectious infertility in dairy animals reared under coastal climate

Funding Agency

Indian Council of Agricultural Research

Total Outlay

Rs 68.95 Lakhs

Duration

4 years (Aug, 2025 to July, 2029)

Single / Multi-Institutional

Single

Principal Investigator

Dr. Gokuldas PP

Co-Investigators

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Rationale

The Indian dairy sector is vital to the agrarian economy, yet productivity of indigenous and crossbred animals lags global standards. One of the main constraints is incidence of infertility, leading to significant economic losses for farmers through reduced milk yield, extended calving intervals, and increased costs. While infectious diseases contribute, a substantial portion of infertility stems from non-infectious causes. Coastal regions present unique challenges, where high ambient temperatures, humidity, and specific fodder availability induce physiological stress, directly causing reproductive failures. This project addresses a critical gap: the lack of comprehensive, region-specific data on non-infectious infertility in dairy animals in coastal areas. Understanding the important factors affecting reproduction of dairy animals reared under coastal tropical climate is crucial for developing effective, sustainable reproductive interventions and strategies tailored for coastal regions. This research project thus aims to assess the reproductive status of dairy animals reared under the coastal climate, with a specific focus on identifying and characterizing the prevalent non-infectious causes of infertility. Furthermore, it seeks to develop sustainable and optimal reproductive strategies that can be readily adopted by farmers to improve herd fertility, enhance overall productivity, and ensure long-term viability of dairy farming in these vulnerable coastal regions.

Research Gaps

The genesis of this project stems from a recognized gap in comprehensive, region-specific data concerning non-infectious infertility in dairy animals in the coastal region. Existing research on dairy animal reproduction in the country often provides broad generalizations or focuses on specific geographic pockets, but a targeted investigation into the unique challenges of the coastal climate and their impact on non-infectious infertility is notably lacking. The need to integrate climate-resilient farming practices, including adaptation strategies for livestock, has been emphasized, but specific reproductive interventions for coastal areas are still an active area of research. Further, assessing the present status of various reproductive disorders of dairy animals and understanding the intricate interplay of various factors with the animals' physiological and reproductive responses are crucial for developing effective mitigation strategies. The present project is further spurred by different interactions with dairy farmers, dairy cooperative societies and veterinary practitioners who expressed a pressing need for efficient solutions to address this persistent and economically debilitating problem.

Objectives

1. To assess the current reproductive status through detailed phenotyping of reproductive parameters of dairy animals reared under the coastal climate 2. To identify and characterize the major non-infectious factors, including nutritional, environmental and potential epigenetic factors, contributing to infertility in dairy animals of the coastal region 3. To develop and validate sustainable, region-specific reproductive strategies and management protocols, and potentially novel reproductive tools for effective management of non-infectious infertility in dairy animals

Activities

1. Initial plan of work, preparation of final proposal, animal screening and selection, procurement of lab essentials and consumables 2. Collection and collation of reproductive data of dairy animals and comprehensive evaluation of reproductive status in relation to breed, season, body condition score and parity 3. Identification and characterization of major non-infectious factors, including nutritional, environmental factors, and potential epigenetic markers contributing to infertility 4. Determination of fertility status, metabolic profiling and detailed phenotyping of reproductive attributes of the dairy breeding herd 5. Blood sample collection, DNA extraction and methylome sequencing and subsequent bioinformatic analysis for investigation of epigenetic regulation of fertility related gene expression. 6. Evaluation of the efficacy of different reproductive tools and management protocols in relation to fertility improvement in dairy animals reared under coastal climate 7. Development and validation of sustainable, region-specific reproductive management strategies and novel reproductive tools for management of non-infectious infertility 8. Field level demonstration and dissemination of developed reproductive tools and strategies 9. Data compilation and analysis, interpretation, Report preparation and final submission

Treatment Details

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Fertilizer Doses

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Variety

-

Replications

-

Observations to be Recorded

1. Animal identification data 2. Reproductive Parameters (Age at puberty, Age at first calving, Non-Return Rate, Calving interval, First Service Conception Rate, Overall Conception Rate, Pregnancy Rate, Calving Rate, Calving Interval) 3. Infertility data (Number of services per conception, Repeat breeding incidence, Anestrus incidence, Incidence of abortion, stillbirth, retention of fetal membranes, Incidence of uterine infections) 4. Metabolic profiling data (Blood glucose, Total protein, Cholesterol, Calcium, Phosphorus, Magnesium, Zinc)

GPS Coordinates of Field (Lat , Long)

Latitude 15°49'N, Longitude 73°91'E

Expected Output

Expected Outputs: 1. Development of specific guidelines & minimum standards for optimal reproductive management of dairy animals in the coastal region 2. Development of area-specific nutritional supplements and veterinary preparations for combating infertility in dairy animals 3. Development of epigenetic markers for early prediction of infertility risk 4. Potential benefits in fertility preservation of dairy animal resources in the coastal region

Expected Outcome

1. Demonstrable increase in conception rates, decrease in incidence of non-infectious infertility cases and enhancement in overall reproductive efficiency in dairy animals 2. Potential benefits of enhanced dairy productivity and farm profitability as higher reproductive efficiency directly translate to more calves, increased lifetime milk production of the animal 3. Improved animal health and welfare through better nutritional management and heat stress mitigation, timely diagnosis and intervention that will lead to healthier animals, reducing disease incidence and improving animal welfare 4. Development of specific guidelines and minimum standards for optimal reproductive management of dairy animals in the coastal region

When the field was developed

August 2025

What are crops being cultivated season-wise

-

Soil type

-

Soil pH, EC, OC

-

Soil depth

-

Soil NPK and Micronutrient status

-

Common pests and diseases

Repeat breeding, Anestrus and endometritis