

Nepal's Dairy Farmers Embrace Climate Resilience: A Case from Bharatpur Metropolitan City

Binita Khadka,
Climate Change and Environment Expert, CASA Nepal

May 2025



Nepal is highly vulnerable to climate change, with significant impacts on its water resources, biodiversity and economy, particularly in agriculture, including dairy farming. The National Climate Change Survey 2022 (GoN, 2024) highlighted these challenges, noting that dairy farming, a key livelihood for rural communities, is both affected by and contributes to climate change. The sector accounts for 37% of methane and 65% of nitrous oxide emissions. With 13 million low-productivity cattle and buffaloes, Nepal's dairy sector is under strain, particularly for women-led households with limited market access and exposure to climate extremes (Heifer International, 2024).

Rising temperatures under moderate to high emissions scenarios (RCP 4.5 and RCP 8.5) (MoFE, 2021) are exacerbating heat stress and prolonged drought, further threatening livestock productivity. These changes have led to reduced milk quality and quantity, infertility in cattle, and increased vulnerability to pests and diseases. These scientific projections align with the lived experiences of smallholder farmers in Chitwan District, who have been engaged in dairy farming for over 30 years. Farmers reported alarming climate-related changes, including intensified heat, erratic wind patterns, declining milk yields and increased occurrences of diseases in both livestock and animal fodder.

To help dairy farmers improve their climate resilience and adapt to and mitigate the impacts of climate change, the CASA Programme – funded by the UK's Foreign, Commonwealth and Development Office (FCDO) – has initiated climate-resilient dairy farming training for farmers in the supply chain of its implementing partners. To date, four dairy firms – [Bhawani Dairy](#), [Martin Dairy](#), [MSSK](#) and [Sujal Dairy](#), along with one livestock feed and forage producing company – [Goras Green Feed and Resources Pvt. Ltd.](#) – have incorporated climate resilience components in their Good Manufacturing Practices (GMP) training under their partnerships with CASA. These initiatives aligned with Nepal's National Adaptation Plan (GoN, 2021), which prioritises resilient agriculture, integrated soil and nutrient management, and commercial animal husbandry for climate-resilient rural livelihoods. A total of 11,272 smallholder farmers, including 6,769 women farmers, have benefitted from these climate-resilience trainings.



GMP training conducted with smallholder farmers of Bhawani Dairy

BUILDING RESILIENCE THROUGH TRAINING AND INNOVATION

CASA's partnership with Bhawani Dairy, a growing dairy processing company in Chitwan, provided GMP training to farmers within its supply chain to increase the quality and nutritional value of raw milk while strengthening climate resilience. Under this initiative, GMP and climate resilience training programmes reached 1,530 farmers from 17 dairy cooperatives.

These climate stories come from three milk cooperatives – Shree Jaya Shiva Ganesh Milk Producer Cooperative Society Ltd., Shuva Shanti Milk Producer Cooperative Society Ltd., and Avyudaya Multipurpose Cooperative Society Ltd. – where farmers gained invaluable insights into the impacts of climate change, including:

- Drought conditions affecting animal feed availability
- Pest and disease infestations in fodder and livestock with increased temperature
- Changes in livestock fertility and milk production, and
- Mitigation and adaptation strategies tailored to Chitwan's climate.



Farmer training on climate resilient dairy farming

This collaboration between CASA, Bhawani Dairy, and local cooperatives equipped smallholder farmers with the tools and knowledge needed to sustain and improve dairy farming in the face of climate change, ensuring long-term resilience and productivity. As a result, smallholder farmers adopted several key climate adaptation practices, including:

- 1. Cow Shed Improvements** – Farmers redesigned sheds using the “Gaidakote Goth” model, a traditional structure with raised roof and straw-covered insulation. This significantly improved ventilation, reduced heat stress, and enhanced cattle comfort, resulting in increased milk yields.
- 2. Nutritional Management** – Farmers optimised feed selection and introduced climate-resilient fodder crops and local grasses to ensure continuous livestock nutrition, even during drought periods.
- 3. Manure Management** – Farmers implemented sustainable waste management by separating dung for biogas production and using slurry and urine as organic fertilisers, boosting both soil health and farm productivity.
- 4. Genetic Improvements and Animal Insurance** – Farmers explored breed improvement programmes and invested in livestock insurance to safeguard their herds against climate-induced losses.
- 5. Commercial Animal Husbandry** – Climate-smart collective dairy farming practices were introduced, promoting cooperative efforts for resource sharing, improved breeding techniques, and market expansion.

Additionally, smallholder farmers are contributing to climate mitigation through afforestation, planting trees to provide natural cooling and reduce environmental heat stress. The results have been transformative, with farmers reporting significant improvements in both sustainability and commercial viability. Looking ahead, they are eager to tackle challenges like anestrus (period of sexual inactivity) caused by heat stress to further boost herd productivity.



Milk cooperative with equipment essential for measuring milk quality

FARMER TESTIMONIALS: BUILDING CLIMATE- RESILIENT DAIRY FARMS

“Before the training, I struggled with declining milk production, heat-stressed cows, and worsening farm conditions. Feeding my cows with fodder cut a day earlier led to severe health issues due to heat exposure. Attending the training helped me understand the direct impact of climate change on my dairy farming. I now implement better feed management, ventilation, and health monitoring practices, making my farm more productive and my livelihood more secure.”

Manju Kumari Sharma, Shuva Shanti Dugdha Utpadak Sanstha, Torikhet, Chitwan



Gaidakote Goth Model in practice

"With the knowledge I gained from the climate-resilient dairy farm training, I made crucial improvements to my farm. I adopted the 'Gaidakote Goth' model for my cow shed, which has significantly reduced heat stress among my cows. Their health has improved, and milk production has increased by 1 litre per cow, totalling 24 litres daily from my six cows. I also expanded my farm's manure management system with controlled composting in three separate huts rather than open decomposition. [Controlled composting has benefits of better temperature control, reduced nutrient loss, faster decomposition, and improved hygiene and safety.] I am using biogas for energy and organic fertilizer for my vegetable farming. These changes have not only improved productivity but have also made my farm a model of sustainability and resilience."

Shiva Raj Neupaney, President, Shree Jaya Shiva Ganesh Dugdha Utpadak Sahakari Sanstha, Bharatpur Municipality

IMPROVING MILK QUALITY AND FARMER RESILIENCE

Farmers have gained hands-on experience in climate adaptation and mitigation, from cow shed improvisation to nutrition management. These practices have led to healthier livestock, increased milk quality and higher yields. By supporting Bhawani Dairy in delivering farmer-level training, CASA has fostered a strong sense of pride and ownership among their supplier farmers. Seeing their milk transformed into high-quality products has deepened their connection to the dairy, motivating them to adopt Good Manufacturing Practices for improved milk quality, productivity, and climate resilience. Inspired by this success, Bhawani Dairy plans to expand training, veterinary support, and outreach programmes.



Milk collection centre, Torikhet, Chitwan

EXPANDING CLIMATE RESILIENCE TO DAIRY PROCESSING: ENERGY EFFICIENCY AND GHG REDUCTION

Recognising that climate resilience extends beyond the farm level, CASA has also supported the dairy processing industry in Nepal to enhance energy efficiency and reduce greenhouse gas (GHG) emissions. The dairy industry faces multiple challenges related to energy inefficiency including grid instability, limited adoption of renewable energy sources, and high dependency on fossil fuel.

To address these challenges, CASA supported 13 dairies to introduce climate adaptation measures at the processing level. Energy audits at Bhawani, Martin, and [SK Dairy](#) identified key areas of energy loss and GHG emissions, leading to recommendations for optimising electricity, fuel and water usage. These recommendations included reducing dependency on diesel generators and fuelwood, adopting renewable energy sources and improving the efficiency of boilers, refrigeration units and lighting systems.



Bhawani Dairy with right placement of apparatus preventing energy leakage

As a result, the three dairy companies (Bhawani, Martin and SK) are successfully contributing to reducing GHG emissions to 130 tCO₂/MW per year from switching fuel from diesel generator and wood to electricity. Findings and recommendations have also been shared with other dairies through their national association. Other quantifiable data and actionable insights will not only help the dairy industry to improve efficiency and enhance sustainability efforts but also bolster climate resilience by ensuring stable dairy operations during power cuts, reducing costs, and supporting long-term productivity.

CONCLUSION: A SUSTAINABLE FUTURE FOR NEPAL'S DAIRY SECTOR

The CASA-supported climate-resilient dairy farming training provided crucial insights into the science of climate change and its impact on dairy farming. More importantly, it offered practical solutions tailored to Nepal's unique geography. By equipping farmers with climate adaptation and mitigation strategies, the programme has not only improved milk production and livestock health but has also fostered long-term sustainability in the sector. By extending climate resilience strategies to dairy processing through energy efficiency improvements, Nepal's dairy industry is taking a holistic approach to climate-smart agriculture, ensuring a more sustainable and prosperous future for farmers and businesses alike.

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