

Impact Study of Dairying Interventions to improve well-being of Rural Women through Dairy Co-operatives in Uttarakhand



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Abstract

This research investigates how dairying initiatives and cooperative structures contribute to the economic and social advancement of women in rural India. It focuses on two core areas: improvements in financial well-being & empowerment within communities, & cooperative development & sustainability. Employing a Quasi-Experimental approach, the study gathers insights through surveys, interviews, and case analyses conducted in selected rural settings. The results indicate that right dairy farming practices enhances women's earnings, autonomy, and influence in household decisions, while cooperative involvement promotes effective delivery model and in return they get benefited through increased sales and milk procurement. The findings highlight the importance of targeted support systems in fostering long-term success and empowerment for women in the dairy sector.

Introduction

Uttarakhand's diverse topography, featuring Himalayan mountains, deep valleys, streams, and rivers, give rise to a wide range of climates, from sub-tropical in the valleys to temperate in the higher slopes. This variation leads to distinct differences in livelihood practices across the State. While prevalent traditional agriculture is yet largely subsistence due to small and fragmented landholdings & topographical challenges. Subsistence nature of agriculture has prompted farmers to diversify their livelihoods into sectors such as Animal Husbandry (poultry & goat rearing), Dairying, cultivation of Traditional Herbs, Beekeeping, Mushroom related activities.

In terms of growth rate and per capita income, the state has outperformed the national average but then, poverty is still a major challenge. One of the primary reasons for persistence of poverty is the regional disparities existing between urban and plains-hills ecosystem. In an effort to bridge this gap, animal husbandry and dairying has played a vital role so much so that practically every

household in the rural and semi-urban areas in the state owns a mix of cow and buffalo.¹

In ancient times, wealth and status were often measured by the number of cattle one owned, with those possessing more cattle held a position of superiority. In present times, this tradition continues to prevail in many rural areas, where cattle ownership continues to confer economic reliability as it is the most potent risk mitigation mechanism against crop failure hence ensuring well-being at all times.

Considering the increasing population and resource constraints in terms of land, water etc, focus on dairying and maintaining productive animal is even more desirable in coming times. Hence various cluster-based interventions, particularly in the dairy sector which include cattle induction programmes, availability of good quality (silage & TMR), high quality breed, disease management have shown promising results in enhancing income and economic stability esp for women folks in Uttarakhand.

Women in Uttarakhand plays a vital role in the state's economy. Despite their crucial contribution, women have not been able to reap economic benefit in that proportion. However, dairy enterprise has yielded tangible economic benefits for women demonstrating its potential to boost their financial well-being. Notably, this has a particularly positive impact on the status of women, enhancing their social standing and influence within their community.

Table 1: Milk Production Statistics in Uttarakhand & India

Year	Milk Production in Uttarakhand ('000 tonns)	Milk Production in India ('000 tonns)
2017-18	1742	176348
2018-19	1792	187749
2019-20	1845	198442
2020-21	1194	209959
2021-22	2254	222069.42
2022-23	1859	230578.41
2023-24	1898	239299

¹ Sharma et al.: Potential & Prospects of Dairy Business in Uttarakhand

² Economic Survey 2023-24 of Uttarakhand & Basic Animal Husbandry Statistics, MoFAHD, DAHD, GoI

The current milk production status in Uttarakhand & India and State contribution to National Milk production is provided².

From the data, it can be observed that except for two years i.e 2020-21 and 2022-23, the dairy

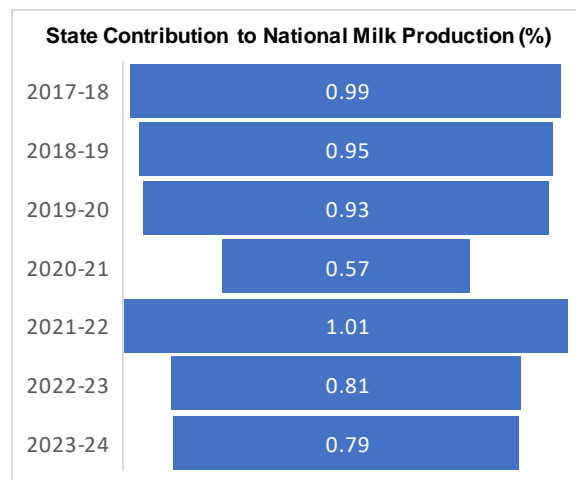


Figure 1: State Contribution to National Milk Production

production has consistently increased in the State in last few years. Although total milk production of India is increasing at faster growth rate as compared to the Uttarakhand. The per capita availability of milk in the state is 448 gms per day in 2023-24, as against 471 gms at national level³
⁴.

Out of the total marketable surplus, approx. 8% is procured by Co-operatives while rest of the market share is captured by middlemen, local dairies and a few private dairies along with good proportion being consumed locally. Presently, there are 2771 milk Co-operative societies and 11 District Milk Unions in the State. Dairy Co-operative landscape at State level is led by Uttarakhand Co-operative Dairy Federation (UCDF), popularly known by its brand name 'Aanchal' Dairy. Dairy Co-operatives in Uttarakhand have a three-tier structure as most of the other states in the country. Major private players into procurement in Uttarakhand are Madhusudan and Mother Dairy.

Many efforts in uplifting women through dairying have been made by Uttarakhand Co-operative

³ [Per capita availability of Milk by States/UTs | nddb.coop](https://nddb.coop/per-capita-availability-of-milk-by-states-uts/)

⁴ Economic Survey 2023-24 of Uttarakhand & Basic Animal Husbandry Statistics, MoFAHD, DAHD, GoI

Development Federation (UCDF) through its District Milk Unions (DMUs) and Dairy Co-operative Societies (DCSs). In return, these societies have also gained significantly from the services provided to the dairy farmers. ***It should be seen as a symbiotic relationship creating productive development and shared growth.*** Hence this paper assesses the impact of dairying interventions on well-being of rural women delivered through Dairy Co-operatives. It will throw light on delivery models and in return benefits accrued by Co-operative Institutions which has played a significant role in its sustainability.

Rationale of the Study

Despite women's growing involvement in multiple roles in India, they often struggle to realize economic gains. This is primarily due to the subsistence nature of their activities, which, while increasing their workload, fails to provide substantial financial returns. Similarly, in Uttarakhand, the challenging topography exacerbates the drudgery faced by women, making their situation more arduous compared to other regions. The rugged terrain, restricted access to market, fodder & other essential resources have impeded women's efficiency. One case in point is wild animal attack on women who go into the forest to collect fodder for their animals.

Dairy Co-operatives, especially those with inclusive delivery models, have emerged as critical institutions in facilitating this empowerment. However, there is a need to systematically assess how these interventions impact women's well-being—spanning income, decision-making power, social status, and access to resources.

This paper aims to:

- **Evaluate the effectiveness** of dairying interventions delivered through Co-operatives in enhancing rural women's well-being.
- **Highlight reciprocal benefits** to Co-operative Institutions, such as increased membership, productivity, and sustainability, resulting from women's active participation.

By throwing light on these dynamics, the study contributes to the discourse on gender-inclusive development and offers insights for policymakers, development practitioners, and Co-operative Institution leaders seeking to develop scalable, sustainable and equitable models.

Research Questions

- 1) What is the impact of dairying interventions on the economic well-being of rural women and how do these interventions affect milk production, herd size, and feeding practices?
- 2) What is the relationship between economic benefit to members and Dairy Co-operatives?

Literature Review

Numerous studies have explored the role of dairy farming in enhancing the economic status of rural women. The literature consistently underscores its positive effects on income generation, financial autonomy, skill acquisition, and social empowerment. Empirical evidence shows that dairy farming offers a sustainable livelihood option, enabling women to contribute to household finances and participate more actively in decision-making processes.

Research by Singh and Kaur (2022)⁵ indicates that dairy farming significantly increases women's access to income, allowing them to support household expenses and improve their standard of living. According to Sharma et al. (2023), dairy farming contributes to rural women's financial stability by providing a steady income source, which reduces their dependence on male family members. ***However, this study tries to quantify economic enhancement in hilly region due to dairying interventions by women. And further broader social change by challenging traditional gender roles and promoting more inclusive participation in local governance and development initiatives.***

Many studies and research papers have discussed that the unequal distribution of economic benefits between the affluent and the disadvantaged is largely attributed to restricted access to resources and information. Increasing penetration of internet and other form of

⁵ Singh R, Kaur M. Economic benefits of dairy farming for rural women: A case study in Haryana. Asian J Dairy Sci. 2022;12(4)

connectivity, has resulted in filling up the information gap to a large extent. However, it is often argued that livelihood interventions in rural landscape more particularly women-oriented interventions need more than just access to internet, rather it requires customized information/training and access to services/resources. Providing the customized information, and services/resources at doorstep requires institutional mechanism. An effective and efficient institution have the capacity to create wider impact and more sustainable model in long run. Effective business model around these institutions have not only brought positive results for the community but has enabled the

institutions themselves to flourish financially. **Hence, this study aims to examine sustainable delivery models that effectively provide input services directly to dairy farmers at their doorstep through co-operative institutions, resulting in tangible financial benefits for the farmers and co-operative institutions as well in return.** According to Kumari and Gupta (2023)⁶, these institutions facilitate better bargaining power, access to financial resources, and skill development opportunities.

Study Area

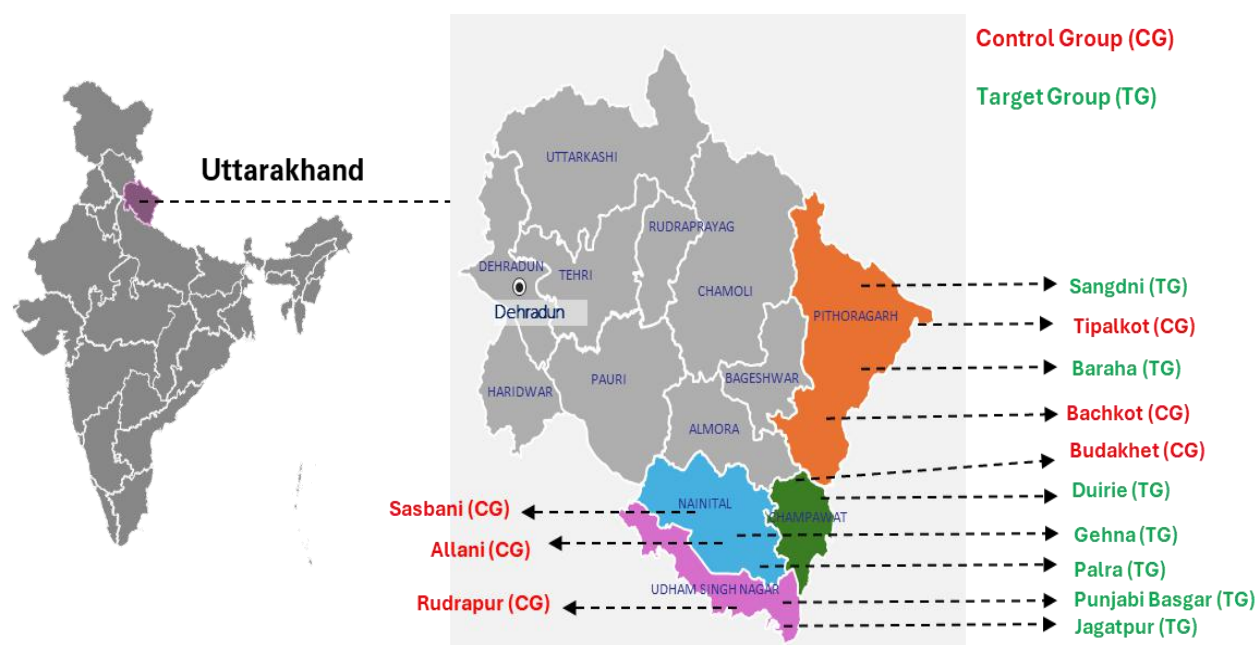


Figure 2: Map illustrating the Study Area

This Study was conducted in four districts of Kumaon region of Uttarakhand (Figure 2). In Pithoragarh district two clusters (Baraha and Sagdini) were selected as a target group and two clusters (Tipalkot and Bachkot) were selected for control group in Pithoragarh district, in Chamapwat district one cluster (Duiurie) for target group and one cluster (Budakhet) for Control group, in Nainital two clusters (Gehna & Palra) for

target groups and two clusters (Sasbani & Allani) of control group, similarly in Udham Singh Nagar two cluster (Pujabi Basgar and Jagatpur) for target group and one cluster (Rudpur) for control group were selected for this study.

⁶ Kumari S, Gupta M. The role of self-help groups and dairy cooperatives in women's empowerment. Indian J Agric Econ. 2023;78(2)

Table1: Districts, Blocks, Target group type, Villages selected for the Impact assessment of cluster level interventions on livelihood of women beneficiaries in Uttarakhand

District	Block	Study Group	Cluster
Pithoragarh	Kanalichina	TG	Sangdni
	Dharchula	TG	Baram
	Gangolihat	CG	Tipalkot
	Kanalichina	CG	Bachkot
Champawat	Champawat	TG	Diurie
	Champawat	CG	Budakhet
Nainital	Dhari	TG	Gehna
	Bhimtal	TG	Palra
	Dhari	CG	Sasbani
	Bhimtal	CG	Allani
US Nagar	Sitarganj	TG	Punjabi Basgar
	Sitarganj	TG	Jagatpur
	Sitarganj	CG	Rudpur

Pithoragarh: Pithoragarh district is in the easternmost part of Uttarakhand, lies in Kumaon division of the state. The district shares international borders with Nepal and Tibet (China), shares boundaries with Almora, Bageshwar and Champawat district within the state. It spans through an area of 7,110 square kilometer, the district is characterized by its high hilly terrain with snow-capped peaks, rivers and glaciers. As per the 2011 census the district has total population of approximate 483,439 predominantly rural, with over 87% population in villages. The major source of livelihood in the district is Animal Husbandry, Agriculture and Tourism.

Champawat: Champawat is a scenic district located in the Kumaon division of Uttarakhand. It shared international border with Nepal and surrounded by Pithoragarh, Almora, Nainital and US Nagar district within the state. It spans across an area of 1,766 square kilometer. As per the census 2011, the total population of districts is 259,648, this includes 131,125 males and 128,523 females. The district is predominantly rural, with 85.23% of its population residing in rural areas. Champawat is divided into four Tehsil and 4 development blocks. In this study, Budhakhet and Diurie cluster of Champawat block have been covered.

Nainital: Nainital district lies in Kumaon division of Uttarakhand, it shares border with Champawat, Almora, Pauri Gharwal (in Gharwal region) and U.S Nagar. It spans across an area of approx. 2,860 square kilometers with a mix of hilly and plain terrain. The total population of the district is approximate 954,605, which includes 70% of rural and 30% of urban population. Nainital districts is divided into 9 tehsils and 8

development blocks. The major livelihood source in the district is tourism, animal husbandry and horticulture. In this study, 4 clusters of Dhari and Bhimtal blocks have been covered.

Udham Singh Nagar: U. S Nagar is a district located in the Kumaon division of Uttarakhand. Established on September 29, 1995, the district headquarter in is Rudrapur. US Nagar is situated in Tarai region and shares district boundaries with Nainital and Champawat district within state and shares state borders with Uttar Pradesh, it also adjoins Nepal from east side. The district spans an area of approx. 3,055 square kilometers. The terrain comprises fertile plains at the foot of the Himalayas characterized by rivers, lakes and dams. This study was conducted in above villages (mentioned in table 1) of Sitarganj block, the total population of the block is approximate 176,446. This includes approximate 91,072 male and 85,374 females.

Materials & Methods

Research Design

- **Quantitative Approach:** To capture economic benefits to women dairy farmers & co-operative institutions.
- This study also employs a **Quasi Experimental** design to evaluate the causal impact of dairying interventions on rural women's economic well-being. It compares changes over same period of time between a **Treatment Group (TG)** and a **Control Group (CG)**.

Groups and Time Periods

- **Treatment Group (TG):** Cluster where dairy cooperatives have actively engaged in providing accessibility to input services (e.g., training, credit, input access).
- **Control Group (CG):** Cluster where dairy cooperatives have not actively engaged in providing accessibility to input services.
- **Time Periods:**
 - ✓ **T1 (Pre-Treatment):** Before the year 2021 i.e before the interventions.
 - ✓ **T2 (Post-Treatment):** After the year 2021 i.e after the intervention.

Sampling Technique

- **Purposive Sampling** to identify intervention areas and matched control areas.
- **Quantitative Surveys:** Administered at both T2 to collect data. T1 data is collected based on records with women dairy farmers and co-operative societies.
- **Qualitative Interviews and FGDs:** Conducted post-treatment to explore perceived changes and contextual factors.
- **Sample Size:** 100 Dairy Women Farmers in Treatment & Control Group each and 4 Co-operative District Milk Unions.

Data Sources

- **Household surveys** (pre- and post-intervention)
- **Cooperative records**
- **Focus group discussions (FGDs)**
 - In-depth interviews with women and cooperative leaders & administrators.

Treatment Group Vs Control Group

Parameters	Treatment Group	Control Group
Convergence Support	✓	×
Awareness Programme	Approx 14 programmes annually	Approx 6 programmes annually
Availability of Input Material	✓	Limited

Veterinary Services	✓	Limited
Trainings	✓	×

The **treatment group** comprises members from villages that falls within the active **cooperative unions**, which have provided consistent support across four key parameters listed above. In contrast, the **control group** has had **limited or no access** to these interventions. Notably, the treatment group has benefited from **ongoing government schemes**, made possible through the proactive involvement and facilitation by co-operative institutions.

Convergence Support: The Government of Uttarakhand has introduced several subsidy schemes to make fodder and cattle feed more affordable for livestock owners, especially during times of scarcity or distress. These subsidies aim to reduce the economic burden on farmers while ensuring livestock health and productivity. Below are the schemes to support the dairying interventions in Uttarakhand:

- **Front-end Subsidy of Rs. 6 per Kg on Cattle Feed:** This direct subsidy helps reduce the market cost of cattle feed for farmers. It encourages regular feeding of balanced feed, which is vital for improving milk yield and overall livestock health.
- **50% Subsidy on Bhusha Bhelly / Compact Feed Blocks:** These are highly compressed and nutritionally dense feed blocks, often made from crop residues like wheat straw (bhusha) enriched with nutrients. The 50% subsidy makes them more accessible, especially in remote or drought-affected areas.
- **Ghasyari Kalyan Yojana:** Silage is fermented green fodder, rich in nutrients and essential for dairy cattle. With 75% of the cost covered, this subsidy promotes the use of preserved green fodder, particularly during dry seasons when fresh fodder is scarce.
- **Subsidy on Mineral Mixtures:** Mineral mixtures are essential for maintaining the reproductive and immune health of animals. Government-subsidized rates ensure that even small-scale farmers can provide complete nutrition to their livestock.

Awareness Programme: These include animal health and disease management camps that educate farmers on vaccination, deworming, and

hygiene, along with fodder and nutrition drives that promote balanced feeding and silage preparation. Campaigns focused on milk quality and hygiene to demonstrate clean milking practices and the use of milk testing kits.

Veterinary Services: which include health check-up camps and vaccination drives were organized.

Trainings: Education on cattle rearing and clean milk production practices were the key areas that were targeted. Other training sessions included financial literacy sessions, special sessions for women to empower them in dairy operations and leadership roles, and climate-resilient dairy training like water conservation etc. These programmes collectively were aimed at building capacity, improving productivity, and ensuring long-term sustainability in rural dairy farming

Findings

1. Impact of dairying interventions on the economic well-being of rural women

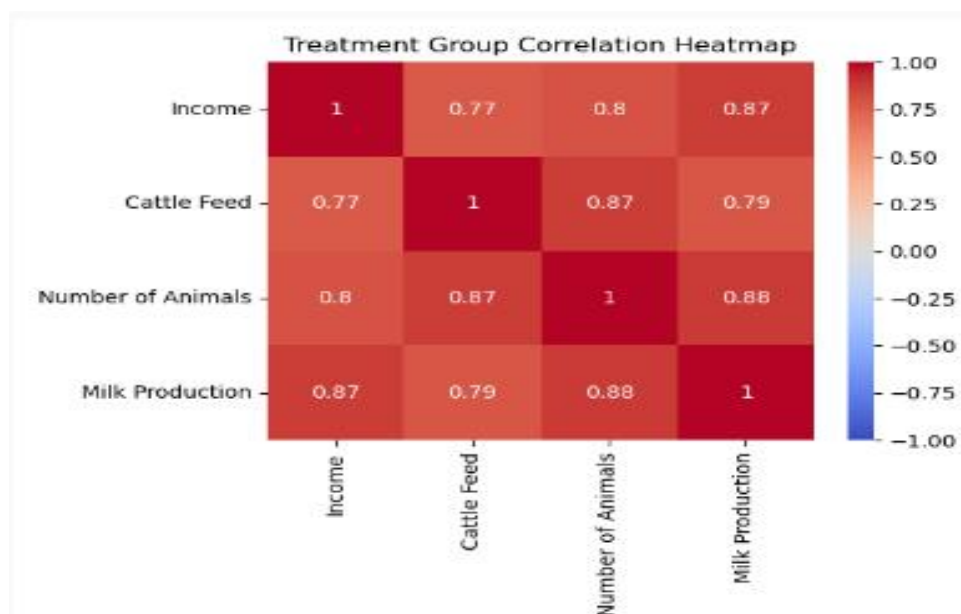
i. Correlation between various Dairying Intervention on Income of rural women

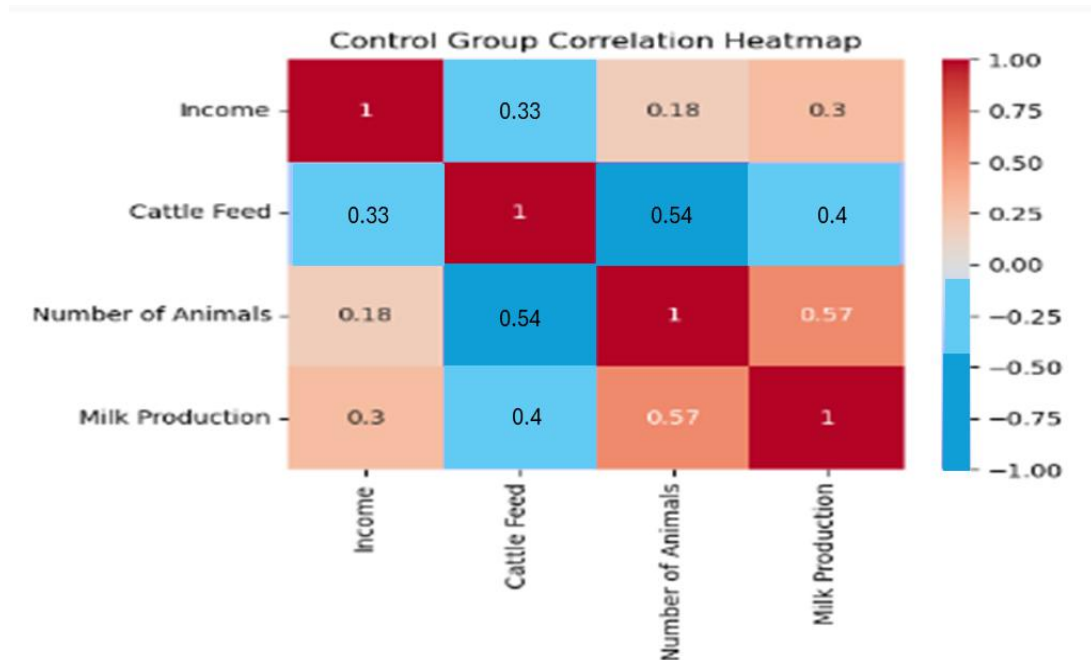
The treatment group exhibited strong positive correlations among most variables unlike as displayed by control group:

- Income was highly correlated with both milk production and number of animals in treatment group. In contrast, income of the control group displayed moderate correlation with milk production and weak & less consistent correlations between income and no. of animals. It is

because of the weak procurement network in the control group and use of superior breeds amongst the treatment group while control group was majorly dependent on non-descript breeds.

- In the treatment group, milk production showed a strong correlation with number of animals. Cattle Feed also has a positive correlation with milk production. While in control group, milk production shows a moderate correlation with no. of animals and extremely weak correlation with cattle feed. Cattle Feed showed minimal correlation with other variables, suggesting inefficiencies in quality of feed or lack of knowledge in optimal feeding practices.





Hence, it can be said that treatment group with excess to better input service and strong supply chain network provided by the co-operative institutions reflect better performance and strong correlation

between multiple variables contributing to the economic well-being. These patterns reflect a systematic and efficient production environment, which are further positively influenced by access to awareness, veterinary services, training, and government schemes.

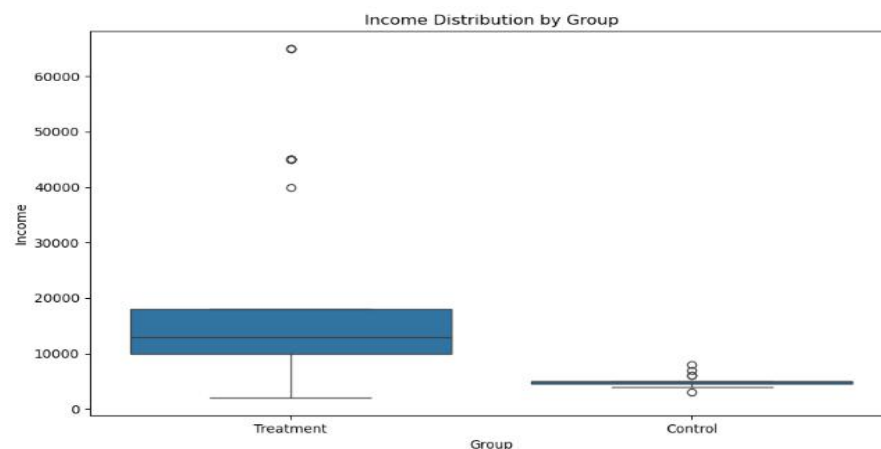
ii. Income Distribution in Treatment Vs Control Group

Treatment Group

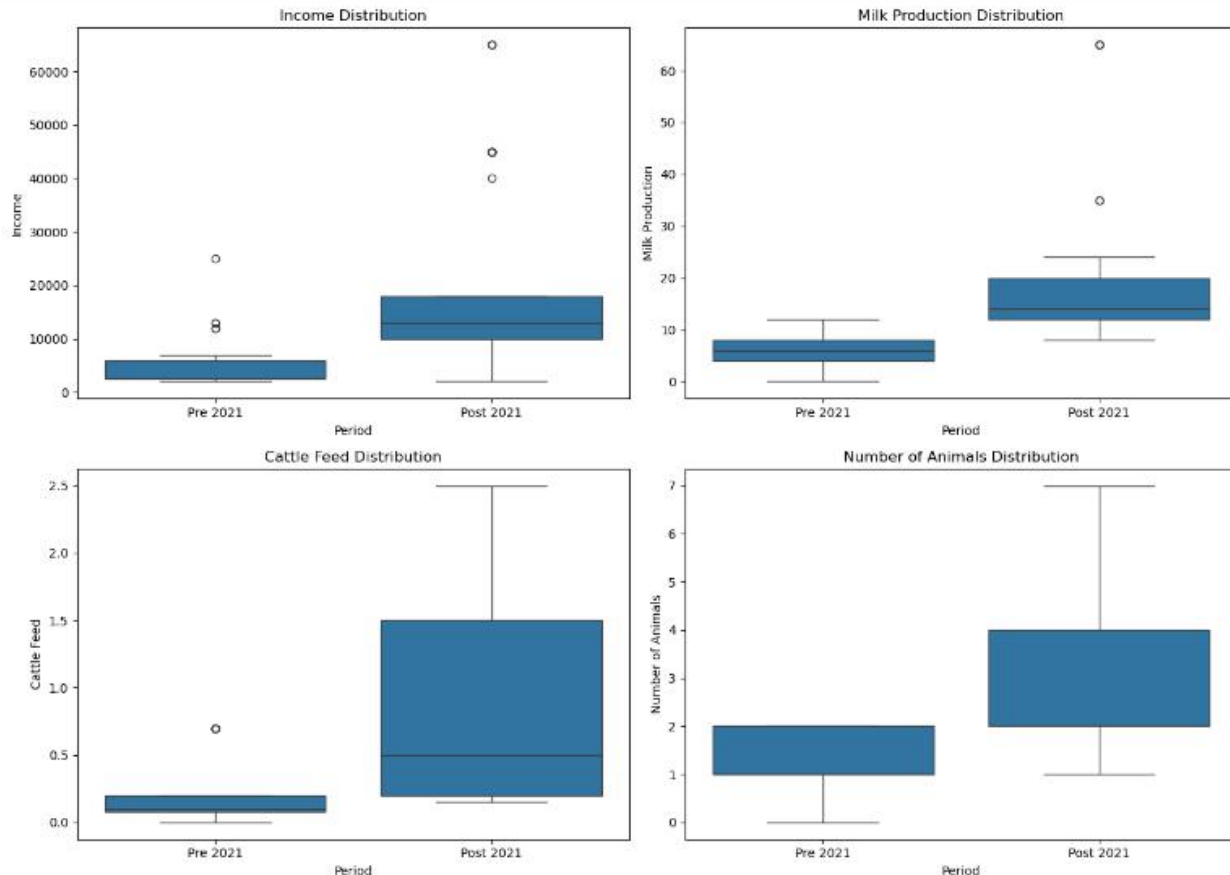
- **Higher Median Income:** The central line in the box is noticeably higher than in the control group, indicating better average earnings.
- **Wider Spread:** The extended box and whiskers show greater variability in income — some farmers earn significantly more.

Control Group

- **Lower Median Income:** The central line is much lower, indicating modest earnings.
- **Narrower Spread:** Most incomes are clustered within a smaller range.
- **Fewer Outliers:** Indicates more uniform but lower income levels.



iii. Variation between Pre 2021 (Pre-treatment) and Post 2021(Post-treatment)



- Post-2021 data shows a **notable increase in median income** among dairy farmers. The distribution also reveals a wider range and more high-income outliers, suggesting that some farmers significantly improved their earnings. This trend reflects the cumulative impact of better access to schemes, veterinary services, and improved breed adoption.
- There is a **clear upward shift in milk production** post-2021. The data indicates not only higher average yields but also more consistency across farmers. This improvement stems from enhanced feeding

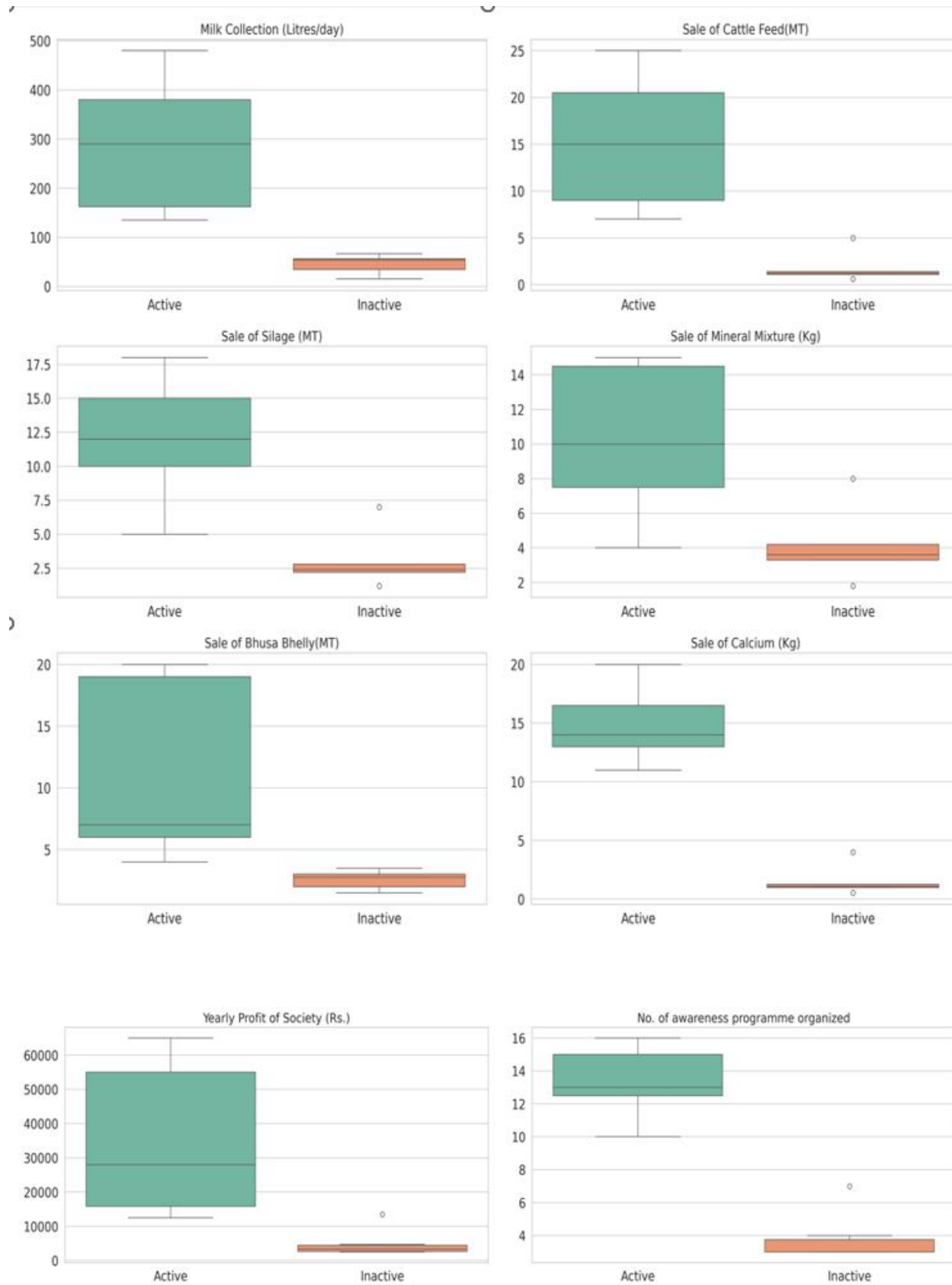
practices, better breeds, and training initiatives introduced in recent years.

- While the average quantity of cattle feed used increased slightly, the **distribution became more uniform**, indicating a move toward standardized feeding practices. This is due to better awareness and implementation of nutritional know-how among farmers.
- Farmers in the post-2021 period tend to own **more dairy animals**, which is mainly attributed to increased investment capacity, confidence in dairy profitability, and convergence support in Government schemes.

2. Reciprocal benefit to Co-operative Institutions

The Co-operative Societies covering the treatment group have outperformed the societies

covering the control group in this study. Data shows that Active Societies are 6 times more productive in terms of milk collection. It is mainly due to their outreach programs and services provided to member farmers.



Conclusion

This study clearly demonstrates that dairying interventions, when delivered through well-structured and inclusive cooperative models, significantly enhance the economic and social well-being of rural women in Uttarakhand. Women in the treatment group—who had access to veterinary services, training, quality feed, and government schemes—experienced higher incomes, increased milk production, and greater ownership of dairy animals compared to those in the control group. The interventions not only empowered women economically but also

elevated their social status and decision-making power within households and communities.

Furthermore, the study highlights a reciprocal benefit to co-operatives who actively engage with their members and invest in member support services and milk procurement, reinforcing the sustainability of the cooperative model.

Scaling such models across similar geographies could lead to broader socio-economic transformation.

