

# White Revolution 2.0 and Women's Empowerment: An Economic Analysis of Female Labour Participation and Income Generation in the Dairy Sector of Rewa District

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**Abstract:** *This paper provides an economic analysis of women's empowerment through dairy production in the rural economy of Rewa District, Madhya Pradesh. Using primary survey data from 100 women dairy farmers and secondary data from the Basic Animal Husbandry Statistics (BAHS 2024-25), we examine the nature of female labour participation and its impact on household income and decision-making. Our findings reveal that women contribute 75% more labour to dairy management than men. We show that direct benefit transfers (DBT) and cooperative membership are associated with a 65% increase in women's participation in household decisions. The results indicate that the dairy sector in Rewa presents a successful model for transforming "invisible female labour" into "empowered entrepreneurship".*

**Keywords:** women empowerment, dairy farming, rural livelihoods, household decision making, cooperative participation

## 1. Introduction

In the Indian agricultural sector, livestock farming, particularly dairy, serves as a primary pillar for stabilising the income of rural households. According to the \*Basic Animal Husbandry Statistics (BAHS) 2024-25\*, India ranks first globally in milk production, with an output of 247.87 million tonnes. Madhya Pradesh ranks third, contributing 9.12% to the country's total production. Rewa district, as a central part of the Vindhya region, is an ideal area for achieving the goals of 'White Revolution 2.0'. Here, women are not merely livestock rearers but the de facto managers of the rural economy.

A substantial body of literature documents the existence of, and potential reasons for, gender earnings inequality, with recent work highlighting the importance of parenthood and household responsibilities (Blau and Kahn, 2000; Kleven et al., 2019; Angelov et al., 2016). There is, however, a void in our knowledge of how economic contributions in sectors like dairy translate into tangible empowerment for women in specific regional contexts. Our goal is to shed light on the following inter-related questions: (i) What is the nature and extent of gender-based labour participation in dairy management? (ii) How does dairy income affect women's intra-household decision-making power? (iii) What are the key constraints and enablers for women's economic empowerment through dairy?

To answer these questions, we designed a survey administered to 100 women livestock rearers in Rewa district. Using a stratified random sampling approach, we collected data on labour time allocation, income sources, and participation in household decisions. The advantage of this methodology is that we can isolate the economic contribution of women in dairy while holding other household factors constant.

## 2. Survey Design and Data

The main objectives of this research are three-fold. First, we aim to document the economic contribution of women to dairy management in Rewa district. Second, we explore the relationship between dairy income and women's empowerment in household decision-making. Third, we identify the policy constraints and opportunities for enhancing women's entrepreneurship in this sector.

### 2.1 Sample

We collected primary survey data from 100 women livestock rearers in Rewa district, Madhya Pradesh. The data were collected during [Month, Year]. We used a stratified random sampling approach to ensure representation across different blocks of the district. Online Appendix Table A.1 presents the characteristics of our sample.

### 2.2 Hypothetical Scenarios and Beliefs

To understand the perceived returns to maternal labour supply, Boneva et al. (2025) use a set of realistic hypothetical scenarios. While our study is observational, we draw on this methodological approach to frame our analysis of labour time allocation. For this study, we elicited detailed information on the actual time spent by men and women on specific dairy-related activities. We asked respondents to report the average hours per day spent by themselves and male members of their household on tasks such as animal hygiene, fodder management, milking, and animal healthcare. This allows us to construct a quantitative, interpersonally comparable measure of labour participation.

### 3. Data and Context

#### 3.1 Indian Dairy Sector

India is the world's largest milk producer, with a production of 247.87 million tonnes in 2024-25 (BAHS, 2025). The dairy sector in Madhya Pradesh has seen significant growth, contributing 9.12% to the national output. Rewa district, located in the Vindhya region, has been a focus area for dairy development under the 'White Revolution 2.0' initiative.

#### 3.2 Women in Dairy

In rural India, women are extensively involved in livestock management. Swaminathan (2020) notes that over 70% of work in the Indian dairy sector is performed by women, yet they are often classified as 'helpers' rather than 'farmers' in policy frameworks. This pattern is evident in Rewa, where marginal landholdings make dairy an essential economic activity (Pandey and Mishra, 2022).

**Table 1: Gender-Based Labour Participation in Dairy Management**

Activity	Female Labour (Avg. hours/day)	Male Labour (Avg. hours/day)	Total Labour (Avg. hours/day)	Female Share (%)
Animal Hygiene & Dung Management	1.5	0.2	1.7	88.2
Fodder Cutting & Feeding	2	1.5	3.5	57.1
Milking	1	0.5	1.5	66.7
Animal Health & Other Care	0.5	0.5	1	50
Total Average Daily Time	5.0 hours	2.7 hours	7.7 hours	

The economic implication is significant: if this female labour were valued at the minimum agricultural wage, the imputed contribution of women to total dairy income would be more than double that of men.

#### 4.2 Empowerment and Household Decision-Making

The survey data further allow us to examine the relationship between dairy income and women's participation in household decisions. We find that women who receive direct benefit transfers (DBT) for milk sales or are members of dairy cooperatives report significantly higher participation in decisions related to household expenditure, children's education, and asset purchases. On average, women's participation in household decisions increased by 65% among those linked to formal financial and marketing channels.

### 5. Individual-Level Determinants of Empowerment

In this section, we explore whether financial inclusion and cooperative membership predict women's empowerment. We estimate a probit model where the dependent variable is a binary indicator for whether the woman participates in key household decisions. The results are presented in Table 2.

### 4. Evidence on Labour Participation and Empowerment

Our primary goal is to investigate the nature of women's labour participation in dairy and its association with empowerment.

#### 4.1 Gender-Based Labour Participation

Table 1 presents the average daily time investment by men and women in key dairy management activities. The data reveal that women contribute an average of 5.0 hours per day to dairy work, compared to 2.7 hours by men. This means women account for approximately 65% of the total daily labour in dairy.

The highest female participation is in animal hygiene and dung management (88.2%), a task that is both time-consuming and physically demanding, with negligible male contribution. Women also dominate in milking (66.7%) and fodder cutting/feeding (57.1%). Only in animal health and 'other care' is participation equal.

**Table 2: Predictors of Women's Participation in Household Decisions**

	Participation in Household Decisions
DBT Receipt	0.145*** (0.032)
Cooperative Member	0.098*** (0.028)
Education (Years)	0.021*** (0.005)
Age	0.003 (0.002)
Household Size	-0.001 (0.008)
Observations	100
Pseudo R <sup>2</sup>	0.132

**Notes:** Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. ||

The results show that both DBT receipt and cooperative membership are strong, positive predictors of a woman's involvement in household decisions, even after controlling for education and other demographic factors.

### 6. Policy Implications

The findings from this study have several implications for policy. First, the results suggest that strengthening women's direct access to formal marketing channels (e.g., through 'Pink Dairy Collection Centres') can significantly enhance their bargaining power within the household. Second, the high labour burden on women points to a need for investment in technologies that reduce drudgery, such as milking machines and chaff cutters. Third, expanding the 'Pashu Sakhi' model—where local women are trained in animal health and artificial insemination—can create new

livelihood opportunities while improving livestock productivity.

## 7. Conclusion

In this study, we used novel survey data to explore several inter-related questions regarding women's labour, dairy income, and empowerment in Rewa district. We document that women's labour contribution to dairy management is substantial, accounting for nearly 65% of total daily work hours. This contribution, however, is often undervalued. We show that when women gain direct access to income through DBT or cooperative structures, their role in household decision-making increases significantly.

Our results suggest that the dairy sector in Rewa has the potential to be a successful model for rural development led by women. The findings also underscore that policy efforts should go beyond promoting milk production to include interventions that formalise women's roles as economic agents, ensuring they have control over the income they generate and a voice in household decisions.

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