Impact of Age, Experiences, Education, Working Hours, and Household Expenditure on *Juju Dhau* Traders' Income in Bhaktapur Municipality

Padma Kumar Adhikari (PhD)[1] Dil Nath Dangal (PhD)[2] Kul Prasad Lamichhane[3] Krishna Prasad Ghimire[4]

[1] Adhikari is an Associate Professor of Economics at Ratna Rajyalaxmi Campus, TU.
adhikaripadam26@gmail.com

[2] Dangal is a Lecturer of Economics at Ratna Rajyalaxmi Campus, TU.
dangaldilnath@gmail.com

[3] Lamichhane is an Associate Professor of Economics at Ratna Rajyalaxmi Campus, TU.
kul.lamchhane@rrlc.tu.edu.np

[4] Ghimire is a Lecturer of Economics at Ratna Rajyalaxmi Campus, TU.
ksghimire@gmail.com

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Abstract

This study investigates the socio-economic dynamics of *Juju Dhau* traders' income in Bhaktapur Municipality. The research is based on primary data collected through field surveys conducted in December 2022 and January 2023, focusing on the impact of respondents' age, working experiences, education level, working hours, and household expenditure. The conclusion is based on ANCOVA regression techniques after utilizing home ownership and marital status as dummy-coded drivers. The regression analysis highlights a strong positive relationship between household expenditure and family income. Other relationships, however, require further investigation due to unexpected signs or lack of statistical significance. Marital status, further, influenced income-generating activities through its interaction with working hours and expenditure patterns, reflecting the complexities of family income dynamics in this traditional trade. To ensure the sustainability of *Juju Dhau* production and trade, the study recommends preserving its cultural significance while addressing challenges such as market limitations and competition from industrial dairy products. Additionally, it highlights the need for future research to explore the long-term effects of these variables on income stability and to investigate how integrating modern practices with traditional methods could enhance the economic resilience of traders in the Bhaktapur region.

Keywords: Juju Dhau, economic analysis, ANCOVA regression, field survey, Nepal

Introduction

The economic background of Nepal combines extremely rooted traditional practices with the challenges of modern development, particularly in its small-scale industries. Among these, the production and trade of *Juju Dhau*—a traditional yogurt known as the "king of curd" occupy a central role in the cultural and economic life of Bhaktapur Municipality (Bhaktapur Municipality, n.d.). Initiating during the Malla period (12th to 18th century), *Juju Dhau* is not merely a culinary delight but a cultural symbol of purity and prosperity for the Newar community (Shrestha, 2018). Entrenched in religious and cultural rituals, its preparation and consumption reflect the richness of Newar traditions (Manandhar & Shrestha, 2020).

Despite its deep cultural roots, the economic sustainability of *Juju Dhau* production and trade faces increasing pressure from modern market dynamics and industrial dairy products. These traditional methods of production and trade, passed down through generations, are now being challenged by contemporary techniques and competition. Nonetheless, *Juju Dhau* continues to serve as a vital income source for many families in Bhaktapur, maintaining livelihoods and preserving cultural heritage (Gautam, 2007).

The study showed that the importance of *Juju Dhau* extends beyond individual households and offers commercialization a promising avenue for local economic growth and poverty reduction, contributing to the socio-economic upliftment of Bhaktapur's communities (Gosain, 2023). The informal nature of *Juju Dhau* trade allows traders flexibility in adapting to market demands while retaining traditional practices (Tachamo, 2024). This duality of preserving heritage and responding to modernity underscores its potential as a sustainable local industry.

However, economic sustainability is troubled by challenges. Smallholder producers often face limited access to essential inputs, hindering their capacity to enhance productivity and income (Bayiyana et al., 2018). Issues such as inconsistent product quality, declining consumer trust, and inadequate infrastructure are additional worsen the difficulties (Karki & Shrestha, 2020; Rana, 2021). These limitations highlight the need for targeted interventions to support the *Juju Dhau* industry, ensuring its resilience and growth in the modern economic environment.

Understanding the economic dynamics of *Juju Dhau* production and trades requires examining the factors influencing traders' income. This study emphasizes two critical variables: working hours and household expenditure. The relationship between these variables and income generation is complex. Studies have shown that daily income is significantly affected by the time spent working and the patterns of household expenditure (Adhikari & Gajurel, 2024). *Juju Dhau* is considered a source of income for many families through informal entrepreneurship and tourism. Limited access to inputs reduces the earnings of smallholder farmers (Bayiyana et al., 2018). In the same vein, family-owned and managed businesses attract income by leveraging visitor preferences (Bhatta et al., 2024), with marital status boosting profitability (Gajurel et al., 2024) and obviously by *Juju Dhau* traders.

The production and trade of *Juju Dhau* are more than an economic activity, as it includes a cultural legacy for the Newar community of Bhaktapur Municipality. Often undertaken as an ancestral and communal endeavour, the knowledge and skills required for *Juju Dhau* production are transmitted through generations, creating a strong cultural identity (Dhakal & Shrestha, 2023). The production of *Juju Dhau* has socio-cultural significance in preserving heritage, fostering shared family labour, and shaping economic behavior. Conversely, such work, because it falls outside the ambit of formal employment, tends to be less economically secure due to a lack of recognition and resultant privileges.

The production of *Juju Dhau* in Bhaktapur is extremely intertwined with cultural heritage and economic activities (Maharjan & Karki, 2017). The traders' ability to bear these burdens originates from traditional activities and relationships within the community. This study, through ANCOVA regression, shows that household expenditure, working hours, and

socio-cultural variables are key factors influencing traders' incomes. However, several gaps still exist in previous research. Future studies on socio-demographic influence and market dynamics regarding competition and consumer preference will help detail challenges and opportunities for *Juju Dhau* traders.

The study emphasizes the need for targeted policy interventions to support traditional industries like *Juju Dhau*, ensuring economic sustainability in a rapidly changing financial landscape. By preserving its unique qualities and promoting its cultural significance, stakeholders can contribute to the long-term viability of *Juju Dhau* production, fostering local economic development and cultural continuity in Nepal. Improvement of resources, infrastructure, product quality standards, and cultural promotion should be prioritized by the policymakers, while simultaneously addressing the problem of financial constraint through micro-financing and building better storage and distribution systems. The approach of gender equity and labour security, especially recognition of women's contribution, skill development, and improvement of work conditions, will help empower women and increase overall productivity.

Literature Review

The role of cottage and small-scale industries in economic development is well-documented, particularly in developing countries like Nepal. These industries often rely on labour-intensive production methods, utilizing local resources to generate employment and support domestic economies (Andrew & Patrick, 2007). Smith and Johnson (2023) described small-holding dairy farms as complex systems with interconnected components, emphasizing structural, functional, and ontological aspects of these farms, including land, cattle, and equipment. Within this framework, small-scale dairy farming and traditional dairy production like *Juju Dhau* in Nepal hold cultural and economic significance. In the context of Nepal, Dhakal and Shrestha (2023) examined *Juju Dhau*'s role in preserving cultural identity, highlighting the importance of physical elements like cows, milking facilities, and clay pots in creating its unique identity. They also addressed the transmission of traditional yogurt-making knowledge and how producers adapt these methods to modern contexts while ensuring food safety and maintaining authenticity.

Globally, small-scale dairy farming contributes significantly to rural development, poverty alleviation, and food security. In India, Taneja and Birthal (2004) observed that smallholder dairy farms positively influenced rural infrastructure by improving roads, veterinary services, and local markets. Similarly, Birthal and Taneja (2006) highlighted the employment generation potential of these farms, especially for women, thus addressing rural poverty. Similarly, Ngongoni et al. (2006) highlighted factors affecting milk production in the smallholder dairy sector of Zimbabwe. Likewise, in Africa, small-scale dairy farming provides substantial income and employment. Kristjanson et al. (2007) reported that these farms contributed 40% to 50% of household income, with factors like herd size and market proximity playing key roles in Kenya. Similarly, Staal et al. (2008) demonstrated that smallholder dairies in Uganda alleviated poverty by offering consistent income. In Latin America, Garcia et al. (2008) found that small dairy farms stimulated rural development through multiplier effects that bolstered local economies. In Bangladesh, Uddin et al. (2012) revealed that smallholder dairies provided critical employment for women and landless labourers, emphasizing their role

in livelihood sustenance. Muriuki, et al. (2014) showed the role of milk production in the reduction of poverty and food insecurity in developing countries. Similarly, Kabunga et al. (2014), further, emphasized the infrastructure improvements driven by small dairy farms in Ethiopia, while Omore et al. (2019) noted the need for better market access to enhance productivity in Tanzania.

Nepal presents a unique case for small-scale dairies, where traditional practices are deeply interwoven with local cultures. Poudel et al. (2016) highlighted the positive impact of small dairies on rural development, including infrastructure enhancement and community economic growth. Gautam et al. (2017) demonstrated the importance of small dairy farms in Nepal's Far-Western Region for regional growth, with benefits like road development and improved milk processing. In Eastern Nepal, Thapa and Sapkota (2017) revealed that small dairy farms contributed 30% to 40% of household income, significantly reducing poverty and improving food security. Adhikari et al. (2018) emphasized the transformative role of better market access in the Terai region, showing how cooperatives and improved infrastructure boosted productivity and income. Focusing on economic impacts, Karki et al. (2019) found that small-scale dairies alleviated poverty in remote areas by providing steady income. Tiwari et al. (2018) explored employment opportunities created by these farms, particularly for women, demonstrating their role in reducing outmigration and supporting rural economies.

Juju Dhau, a traditional yogurt unique to Bhaktapur, holds cultural and economic importance. Shakya and Tamang (2019) explored its dual role as a cultural symbol and a source of livelihood, highlighting how it supports local families through income and employment. Dhakal and Shrestha (2023) further examined *Juju Dhau*'s role in preserving cultural identity, emphasizing the traditional elements like clay pots and the transmission of yogurt-making knowledge across generations. Bhandari et al. (2020) analyzed the economic impact of *Juju Dhau* production on household income in Bhaktapur, finding that it significantly increased income for families with limited alternatives. Their study underscored the importance of maintaining traditional dairy practices for economic sustainability. Similarly, Shrestha et al. (2020) highlighted the employment opportunities provided by small dairy farms, including *Juju Dhau* production, which reduced rural-to-urban migration and supported sustainable rural development.

These prior studies have extensively examined the economic contributions of small-scale dairy farms in national and international contexts and the cultural significance of *JUJU DHAU*, there remains a lack of focused analysis on the specific factors affecting the income dynamics of *JUJU DHAU*traders. Most studies, such as those by Adhikari et al. (2018) and Shakya and Tamang (2019), emphasized broader economic or cultural impacts but did not explore how working hours, household expenditure, and family dynamics influence income levels.

This study has addressed this gap by investigating the unique economic dynamics of *Juju Dhau* traders in Bhaktapur Municipality, which remain underexplored. By analyzing the interaction of working hours, household expenditures, and marital status, this study aims to provide a nuanced understanding of the factors shaping income stability and economic resilience among these traders. This study contributes to a deeper understanding of the challenges and opportunities in this sector, paving the way for targeted interventions and policy

development. This approach reviewed the existing literature and offered practical insights for stakeholders to support the sustainability and growth of *Juju Dhau* production in Bhaktapur, Nepal.

Data and Method

This study employed a quantitative approach to income determination among Juju Dhautraders in Bhaktapur Municipality. The research was based on primary data collected through primary sources during December 2022 and January 2023 for the trade and employment process of *Juju Dhau* dairy dealers in the Bhaktapur municipality. A structured questionnaire was used to gather data through face-to-face interviews, ensuring a comprehensive understanding of the variables relevant to the study. Multiple variables were collected to address the research question, including respondents' age, experience, education, working hours, expenditure, home ownership, and marital status, which were used as indicators of traders' income levels.

The data collection process began with an initial consultation with *Bhaktapur Juju Dhau* Byabasai Sangh (BJDBS), where 58 traders registered in the BJDBS within the Bhaktapur Municipality, including Ward numbers 1, 2, 3, 4, 5, 7, 8, and 10. Thus, 58 traders were confirmed as the targeted population (N), considering the 5% margin of error (e), the sample size (n) to be taken for the data collection has been calculated by using the *Yamane* (1967) formula of definite sample size, i.e.

$$n= \frac{N}{[1+N(e^2)]} = \frac{58}{[1+58(0.05^2)]} = 50.65 \text{ (50 approximately)}$$

Thus, 50 traders were randomly selected for the interview.

Methodology

The study employed an *ANCOVA* regression technique (Gujarati et al., 2009, p 302)—a mixture of quantitative and qualitative data, carried through primary sources for the trade and employment process of *Juju Dhau* dairy dealers in the Bhaktapur municipality, focusing on the features and measurement scale of the variables. For a more in-depth analysis, ratio scale and ordinal variables were interacted with independent variables, allowing for comparative insights based on averages. Additionally, ratio scale variables were analyzed independently to assess their interdependence, homoscedasticity, correlation, and the relationship between dependent and independent variables. These statistical approaches ensured a robust examination of the qualitative and quantitative factors influencing *Juju Dhau* traders' income level.

Qualitative Family Income Model

The traders' family income, a dependent, was analysed with the independent variables, including respondents' age, years of experience, education, working hours, and expenditure. Additionally, home ownership and marital status binary variables were categorized as dummy variables and were incorporated to assess their impact on family income. These relationships provide a comprehensive overview of the factors influencing income determination among *Juju Dhau* traders as detailed in Table (1).

Table 1

The Qualitative Model Frame

Dependent Variables	Measures	Independent Variables
Traders' Family Income	Scale with dummy-coded home ownership and marital status	Age, experience, education, working hours, and expenditure are included, with dummy categories for homeowner as yes and no, and marital status as married and unmarried.

The qualitative regression model has been outlined as:

Daily income = f (Age, experience, education, working hours, household expenditures, married, and homeowner) …… (1)

The model is placed as:

$$Y_i \begin{Bmatrix} \text{Married} = (\delta_{1=} \quad 1) \\ \text{Unmarried} = \delta_0 = \quad 0 \\ \text{Homeowner} = \delta_2 = \quad 1 \\ \text{Rented home} = \delta_0 = \quad 0 \end{Bmatrix} = \beta_o + \beta_1 \mathrm{A_i} + \beta_2 \mathrm{Ex_i} + \beta_3 \mathrm{Ed_i} + \beta_4 \mathrm{T_i} + \beta_5 \mathrm{E_i} + \beta_6\, \delta_1 + \beta_7\, \delta_2 + u_i \quad \ldots. (2),$$

Where Y_i = Daily income, T = Time for working hours in a day, and E = Daily household expenditures per day. Similarly, β_o showed the benchmark of the regression equation, β_1, β_2, β_3, β_4, and β_5 represented the coefficients of A, Ex, Ed T, and E, respectively. While β_6, and β_7, indicated the coefficients of married and home ownership, respectively, and u_i the error term.

The functioning model has been written as:

$$\widehat{Y_i} = b_o + b_1 \mathrm{A_i} + b_2 \mathrm{Ex_i} + b_3 \mathrm{Ed_i} + b_4 \mathrm{T_i} + b_5 \mathrm{E_i} + b_6\, \delta_1 + b_7\, \delta_2 \quad \ldots\ldots (3)$$

Herein, δ_1 and $\delta_2$represented the dummy codes for married and homeowners, respectively. The dummy-coded unmarried and rented homes are placed in reference categories in this model.

Interactive Model

After the interaction was made by a married couple on working hours and household expenditures (Gujarati & Gunasekar, 2009), the interactive model was formed:

$$\widehat{Y_i} = b_o + b_1 \mathrm{T_i} + b_2 \mathrm{E_i} + b_3\, (\mathrm{T_i} * \delta_1) + b_4\, (\mathrm{E_i} * \delta_1) \ldots\ldots. (4)$$

Where these interactive variables $(T_i * \delta_1), and\ and\ \ (E_i * \delta_1)$, measured the interconnection of married respondents with the daily working hours, and household expenditure patterns, respectively. In this model (4), age, experiences, and education have been assumed less influential than these two variables, and the dummy-coded variable as its own home (δ_2) was kept as a reference category.

Results

Based on the data, a qualitative regression analysis was conducted to explore the relationship between daily family income and several predictor variables, including daily income of the family, age of the respondents, experience of the employee, completed classes

of education, daily time allocation in an hour, and daily household expenditure. The other two dummy-coded variables, own homes and married respondents, were taken as qualitative indicators of this model, taking business with rented homes and unmarried respondents as reference categories.

Descriptive statistics of model (3) reveal that the mean daily income was NRs. 1786.67 with a standard deviation of 632.671. The average age of respondents was 44.14 years, with an average employee experience of 14.06 years, and an average education of 5.32 classes completed. On average, 10.44 hours were allocated to daily work, and daily household expenditure averaged NRs. 1042.67. Homeownership was prevalent in 36 (72%), and 46 (92%) respondents were married. The studied variables provide valuable information in this qualitative analysis of the daily income model impacted by various factors and others detailed in Table 2.

Table 2

Descriptive Statistics, N=50

	Mean	Std. Deviation
Daily Income of Family	1786.67	632.671
Age of Respondents	44.14	8.746
Experience of Employee	14.06	5.085
Completed Class of Education	5.32	4.736
Daily Time Allocated in an hour	10.44	1.763
Daily Household Expenditure	1042.6667	348.27336
Own Home	0.7200	0.45356
Married	0.9200	0.27405

Note. Data are compiled from the survey conducted in December 2022 and January 2023 (Adhikari & Gajurel, 2024)

Table (2) reveals that the average daily income of the traders' families, with a standard deviation of 632.671, indicates a moderate level of income variability among families, suggesting that while some families earned significantly more, others earned less. Similarly, the average daily household expenditure with a standard deviation of 348.27 indicated that different expenditure habits among families were influenced by their income levels. Respondents reported an average of 10.44 working hours per day, with a standard deviation of 1.763, suggesting a relatively consistent work schedule among the respondents.

Descriptive statistics of the interactive model (4) reveal that the average working hours interacting with a married couple was 9.64 per day, with a standard deviation of 3.31822, indicating that while most married respondents spend a significant amount of time on the trade process, there was some variability in how this time was allocated. Similarly, the average expenditure on married connections was Rs. 977.33, with a standard deviation of 447.67. This suggested that while some trader couples had to spend significantly more on their relationships, cultural events, and ceremonies, other unmarried ones spent less, reflecting differing financial priorities.

Correlation results examine the relationships between various variables and daily family income. A strong positive correlation ($r = 0.851$) exists between daily family income and household expenditure, indicating that as household spending increases, so does family

income. This suggests a strong association, although correlation does not imply causation. It's possible that higher income allows for greater expenditure, or that increased spending leads to higher income through increased economic activity. Similarly, the other correlations were weaker, with some negative correlations observed. For example, the correlation between daily income and time allocated is weakly negative (r = -0.115), suggesting a minimal inverse relationship.

The model shows a strong fit to the data, explaining 85% of the variance in daily family income ($R^2 = 0.854$) and maintaining robustness after accounting for predictors (adjusted $R^2 = 0.830$). A highly significant F-statistic (35.058, $p < 0.000$) and supportive change statistics confirm the model's overall significance and predictive power. The standard error value of 261.23 reflects moderate average deviations between observed and predicted incomes, while the Durbin-Watson statistic (2.260) indicates no major autocorrelation issues. The ANOVA results, including degrees of freedom (regression = 7, residual = 42), further validate that at least one predictor significantly influences daily family income, affirming the model's reliability.

These findings demonstrate that the model effectively captures the impacts of age, experience, education, working hours, household expenditure, marital status, including the dummy-coded levels—married, and own home relative to the reference category, unmarried, and rented home as the reference category as specified in Model (3).

The estimated equation (3) has been expressed as:

$$Y_i = 1327.049 + 3.02A_{\mathrm{i}} - 17.512\mathrm{Ex}_{\mathrm{i}} - 0.61\mathrm{Ed}_{\mathrm{i}} - 96.56\mathrm{T}_{\mathrm{i}} + 1.72\mathrm{E}_{\mathrm{i}} + 340.65\,\delta_1 + 139.23\,\delta_2$$

Std. error	315.03	4.77	9.448	10.667	22.865	0.120	165.982	90.107
T	4.212	-0.632	-1.853	-0.057	-4.223	14.350	-2.052	1.545
P	0.000	0.531	0.071	0.995	0.000	0.000	0.046	0.130

This details the impacts of respondents' age, education, experiences, working time, and expenditure factors on daily income. The constant term is 1327.049, representing the baseline daily income when all predictors were zero. The coefficient for daily household expenditure is 1.723 ($p < 0.000$). This positive and statistically significant coefficient indicates that for every one-unit increase in daily household expenditure, daily family income is predicted to increase by 1.723 units. Economically, this suggests a strong positive relationship between spending and income. This could be interpreted in several ways. Higher income may lead to higher spending, reflecting increased purchasing power. Alternatively, increased spending might stimulate economic activity, leading to higher income generation. The strong significance suggests this relationship is robust and not due to chance.

The coefficient for daily time allocated is -96.560 ($p < 0.000$). This negative and statistically significant coefficient suggests that for every additional hour allocated daily, daily family income is predicted to decrease by 96.560 units. This seemingly counterintuitive result requires careful interpretation. It might indicate that individuals allocating more time to other activities (potentially non-income-generating ones) have lower daily income. This could be due to factors like self-employment, where time allocation is flexible, or individuals with part-time jobs supplementing their income. Further investigation is needed to understand the traditional practices driving this negative relationship.

The coefficient for marital status is -340.655 (p = 0.046). This negative coefficient, while statistically significant, suggests that married individuals have a predicted decrease in daily income of 340.655 units compared to unmarried individuals. This result is unexpected and warrants further investigation. This relationship may be spurious or influenced by other factors not included in the model. For example, married individuals might have different spending patterns or career choices that affect their income. The relatively high p-value (0.046) compared to other variables suggests that this relationship might be less robust.

The coefficient for the age of respondents is 3.020 (p = 0.531). This positive coefficient suggests that for every one-year increase in age, daily income increases by 3.020 units. However, this coefficient is not statistically significant (p = 0.531), indicating that age does not have a reliable predictive effect on daily income within this model.

The coefficient for employee experience is -17.512 (p = 0.071). This negative coefficient suggests that with each additional year of experience, daily income decreases by 17.512 units. While the p-value is close to significance, it's not statistically significant at the conventional 0.05 level. This result might be due to the model's limitations or the presence of confounding factors.

The coefficient for completed classes of education is -0.608 (p = 0.955). This negative coefficient suggests that for each additional class completed, daily income decreases by 0.608 units. However, this coefficient is not statistically significant (p = 0.955), indicating no reliable relationship between education level and daily income in this traditional occupation.

The coefficient for homeownership is 139.234 (p = 0.130). This positive coefficient suggests that homeowners have a predicted increase in daily income of 139.234 units compared to non-homeowners. However, this coefficient is not statistically significant (p = 0.130), indicating that homeownership does not have a reliable predictive effect on daily income within this model.

The residual statistics further provide insights into the model's fit and the distribution of errors. The minimum predicted daily income is 953.09, while the maximum is 3114.95, with a mean of 1786.67, reflecting the average predicted income. The standard deviation of predicted values (584.618) indicates the dispersion of predicted incomes around the mean. The residuals, representing the differences between observed and predicted incomes, range from a minimum of -488.940 to a maximum of 506.449, with a mean of 0. The standard deviation of residuals (241.855) measures the average deviation of observed incomes from their predicted values. The standardized residuals, ranging from -1.872 to 1.939, help identify potential outliers. These statistics collectively provide the model's predictive accuracy and the distribution of errors, aiding in assessing the model's overall goodness of fit and identifying potential issues such as outliers or heteroscedasticity. The relatively small standard deviation of residuals suggests a reasonably good fit.

The Interpretation of ANCOVA Regression (4): Interacting with Marital Status (δ_1)

The dummy-coded *ANOCOVA* regression equation (4) interacted with a married dummy-codded (δ_1) remaining home ownership dummy variable in the reference, the results were interpreted in equation (4) as below:

$$\hat{Y}_i = 1270.976 + 72.0443\mathrm{T_i} - 0.197E_\mathrm{i} - 203.347\ (T_i * \delta_1) + 1.970\ (\mathrm{E_i} * \delta_1)$$

Std. error.	198.041	31.803	-0.194	32.926	0.406
T	6.418	0.028	0.635	-6.176	4.849
P	0.000	0.635	0.028	0.000	0.000

The interaction equation (4) results show that the conditional mean was estimated at 1270.976, indicating the estimated mean of other effects was constant. It was similar to equation (3), statistically significant ($p < 0.001$), as it differs from previous findings. The coefficient for E was -0.194 in married couples, indicating a negative relationship with daily income. This variable was not statistically significant ($p = 0.635$), suggesting it did not impact married couples' daily income and probably impacted unmarried traders. The coefficient for T was 72.043, indicating a positive relationship with the daily income. This variable was statistically significant ($p = 0.028$), suggesting that as working hours increased, the daily income tended to increase in married couples.

After interacting with these variables in married couples, the coefficient of the interacted variable($\mathrm{T} * \delta_1$) was -203.347, indicating a negative relationship with married couples' daily income. This variable was statistically significant ($p < 0.001$), suggesting that increased working hours related to marital connections negatively impacted the married couples' daily income. Similarly, the coefficient of the ($\mathrm{E}^* \delta_1$) was 1.970, indicating a positive relationship with married daily income. This variable was statistically significant ($p < 0.001$), suggesting that higher expenditures related to marital connections were associated with increased married couples' daily income.

Residual statistics of the interactive model further revealed that the predicted daily income ranged from 918.38 to 3156.08, with a mean of 1786.67. This indicated that the model provided a reasonable estimate of daily income in married couples. Further, the residuals ranged from -397.656 to 527.928, with a mean of 0.000, indicating that the model's predictions were unbiased on average. The standardized residuals ranged from -1.907 to 2.532 with a mean of 0, and a standard deviation of the standard predicted value of 1, suggesting that most residuals fell within the acceptable range, indicating a good fit for the model.

Thus, the interactive regression of daily income reveals that the coefficients of interactive variables ($\mathrm{T} * \delta_1$) and ($\mathrm{E}^* \delta_1$) were negative and positive at a significant level, respectively. The interaction with married couples as a sociocultural indicator, daily working hours, and household expenditure impacted the income activities of traders more accurately. The interactive estimation process provided a real economic analysis of the *Juju Dhau* dealers' communities in the Bhaktapur Municipality.

Finally, these two regression models provided a comprehensive overview of the regression analysis of *Juju Dhau* traders' daily income on an approximation basis, highlighting the coefficients of the predictors, their significance, and their prediction accuracy of the model through residual statistics. However, variable biases would be removed by introducing new variables in this model in another research work, when one may be interested in these areas of community occupations. Variables like age, education, and work experience were unpronounced effects in this trader's income model, depending on ancestral art and cultural

beliefs. These findings inferred that the income of particular communities influenced by spending on livelihood and maintaining relations prevailed in the Bhaktapur area.

Discussion

The qualitative study on *Juju Dhau* traders in Bhaktapur Municipality offers valuable insights into the socio-economic dimensions of this traditional dairy trade. It reveals the average daily income of traders, highlighting the trade's economic importance in Nepal. This aligns with existing research on the role of small-scale dairy production in supporting livelihoods (Bhandari et al., 2020). A strong positive correlation between daily income and household expenditure further underscores the role of higher income in enabling greater household spending. This finding complements Adhikari et al. (2018), who noted market access challenges as a critical factor influencing smallholder dairy farmers.

Interestingly, the study challenges conventional notions by showing that increased working hours negatively impact income, with each additional hour reducing earnings. This finding contrasts with Gautam et al. (2017), who linked longer working hours with increased income in rural agriculture, suggesting a need to examine specific dynamics in traditional dairy production. Additionally, marital status significantly influenced expenditure patterns, with married couples demonstrating different financial behavior from unmarried individuals, echoing Gajurel et al. (2024).

The research also emphasizes the cultural significance of *Juju Dhau* production, aligning with studies like Shakya and Tamang (2019), underlining the importance of traditional practices in fostering economic sustainability. These findings highlight the complex interplay between old-style practices, working hours, and household expenditures in shaping the traders' livelihoods.

Conclusions

This study explored the socio-economic influences affecting the income of *Juju Dhau* traders in Bhaktapur Municipality, focusing on age, experience, education, working hours, and household expenditure. A positive correlation between income and household expenditure indicates that higher earnings enhance family welfare. Interestingly, longer working hours were connected to lower income, suggesting diminishing returns and signifying that many traders rely on secondary jobs. Marital status also influenced income and spending patterns, with married traders showing different economic behaviours, reflecting the impact of family responsibilities on economic decisions.

Despite its cultural value, Juju Dhau production faces several challenges, such as inconsistent quality, limited market reach, and industrial competition, all of which restrict income potential. The trade for addressing these issues requires strategic support to modernize production, expand market access, and preserve tradition. Further research is desirable to examine the long-term impact of these factors on income stability and how blending traditional techniques with modern practices might improve productivity. Education and training could enhance production methods and ensure the sustainability of this culturally significant trade in Bhaktapur.

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