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Gender Roles in Coffee Agroforestry Management: A Case Study of the Boritallasa Community Forestry Area, Gowa Regency, Indonesia

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Agroforestry has been widely recognized as a sustainable land-use system that integrates economic, ecological, and social functions. However, the effectiveness of agroforestry management is influenced not only by biophysical and economic factors but also by gender dynamics that shape labor division, participation, and decision-making within households. This study aimed to analyze gender roles in coffee agroforestry management in the Boritallasa Community Forestry Area (Hutan Kemasyarakatan/HKm Boritallasa), Gowa Regency, South Sulawesi, Indonesia. A case study approach combining descriptive quantitative and qualitative methods was employed. Data were collected from 20 respondents through structured questionnaires, semi-structured interviews, and field observations. Gender roles were analyzed using the Moser Gender Analysis Framework, which classifies activities into productive, reproductive, and community roles, while participation patterns were examined through descriptive statistics and thematic analysis. The results revealed distinct gender-based patterns in coffee agroforestry management. Men were more actively involved in land preparation, planting, and crop maintenance activities, whereas women showed higher participation in harvesting and post-harvest handling. Reproductive activities, including cooking, house cleaning, laundry, and household financial management, were predominantly carried out by women, indicating the persistence of gendered domestic responsibilities. In community-related activities, men participated more frequently in farmer group meetings and collective activities, while women demonstrated increasing involvement in extension and training programs. Decision-making patterns varied according to the type of activity, with men exerting greater influence over technical farming decisions, whereas decisions related to marketing and income utilization were more commonly made jointly by household members. These findings suggest that coffee agroforestry management in the Boritallasa Community Forestry Area is characterized by a complementary division of labor and increasing collaboration in household decision-making. Understanding these gender dynamics is important for designing more inclusive agroforestry and social forestry interventions that recognize the contributions of both women and men

and support equitable participation in sustainable resource management.

Keywords: Gender roles; coffee agroforestry; social forestry; household decision-making; community forestry

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1. Introduction

Agroforestry is increasingly recognized as a sustainable land-use strategy that integrates economic, social, and ecological functions within a single management system. By combining agricultural crops with trees, agroforestry contributes not only to household income generation but also to soil conservation, carbon sequestration, and climate change resilience. However, the success of agroforestry systems is influenced not only by biophysical and economic factors but also by social dynamics that shape access to resources, participation, and the distribution of responsibilities within households and communities (Elias & Adeyiga, 2025; Galudra et al., 2024). Previous studies have demonstrated that women and men possess different knowledge, experiences, and responsibilities in managing agroforestry resources, resulting in distinct management practices and outcomes (Awalina et al., 2016; Mulyoutami et al., 2020).

In agricultural and forestry sectors, women contribute substantially to production activities, post-harvest processing, and household management. Nevertheless, women often face barriers in accessing land, information, training opportunities, financial resources, and decision-making processes. These constraints frequently lead to the under recognition of women's contributions within agricultural and forestry production systems (Galudra et al., 2024; Kassaye et al., 2025). Evidence from global studies indicates that gender inequalities in access to productive resources remain a major challenge in achieving inclusive and sustainable agroforestry development (Galudra et al., 2024). Understanding how gender roles are constructed and practiced within agroforestry systems is therefore essential for promoting equitable and effective resource management.

In Indonesia, the Social Forestry Program has expanded opportunities for local communities to legally access and manage forest resources through several schemes, including Community Forestry. Beyond improving rural livelihoods, the program aims to support sustainable forest management through agroforestry-based enterprises. Previous studies have shown that the effectiveness of social forestry initiatives is strongly influenced by community participation, including women's involvement in productive activities and local institutions (Mulyoutami et al., 2021; Awalina et al., 2016). Despite growing interest in social forestry, gender dimensions within agroforestry practices under social forestry schemes have received considerably less attention than economic, production, and institutional aspects.

Coffee is one of the most important commodities cultivated within agroforestry systems in Indonesia's social forestry areas. Coffee agroforestry provides economic benefits to farming households while maintaining ecological functions through shade trees and vegetation diversity. Studies conducted in Indonesia have reported that coffee agroforestry management involves multiple household members with varying levels of participation across different stages, including land preparation, planting, maintenance, harvesting, and post-harvest activities (Mulyoutami et al., 2021; Indraswati, 2025). However, empirical evidence explaining how responsibilities and participation are distributed between women and men throughout these management stages remains limited, particularly within community forestry areas in South Sulawesi.

The Boritallasa Community Forestry Area in Gowa Regency represents an important example of a social forestry landscape where coffee serves as the primary agroforestry commodity. Coffee management activities involve household members with diverse social and economic backgrounds, potentially creating distinct patterns of gender-based roles and participation. Understanding these gender roles is important for identifying the contributions of women and men to productive, reproductive, and social activities that support the sustainability of agroforestry systems. Therefore, this study aims to analyze gender roles in coffee agroforestry management within the Boritallasa Community Forestry Area, Gowa Regency, Indonesia.

2. Materials and Method

1) Study Area

This research was conducted in the Boritallasa Community Forestry Area Boritallasa, located in Rappolemba Village, Tompobulu District, Gowa Regency, South Sulawesi Province, Indonesia. The area is managed by the Boritallasa Forest Farmer Group Boritallasa, which has developed coffee-based agroforestry as one of its primary livelihood strategies under the Social Forestry Program. Coffee cultivation is integrated with various shade tree species and multipurpose trees, creating a diversified agroforestry system that supports both household income and environmental sustainability.

The study area was purposively selected because coffee agroforestry represents the dominant land-use practice among group members and involves the participation of both men and women in different management activities. This condition provides an

appropriate setting for examining gender roles within agroforestry management at the household level.

2) Research Design

This study employed a case study approach combining descriptive quantitative and qualitative analyses. The approach was selected to capture both measurable patterns of participation and contextual explanations regarding gender roles in coffee agroforestry management.

Gender roles were analyzed using the Gender Analysis Framework developed by Moser (1993), which classifies gender-related activities into productive, reproductive, and community roles. The framework has been widely applied in studies examining labor division and participation in agricultural and agroforestry systems (March et al., 1999; Awalina et al., 2016).

The study focused on two main aspects:

- Gender roles in coffee agroforestry management activities.
- Participation of men and women in household decision-making related to coffee agroforestry management

3) Sampling and Respondents

Respondents were selected using purposive sampling. The selection criteria included:

- Registered members of KTH Boritallasa.
- Actively engaged in coffee agroforestry activities.
- Having experience in managing coffee agroforestry for at least three years.
- Willing to participate in interviews and field observations.

A total of 20 respondents were involved in the study. Considering the objective of understanding gender-based participation patterns, respondents consisted of both male and female household members who were directly involved in agroforestry management.

Table 1. Respondent Selection Criteria

Criteria	Description
Membership status	Registered member of KTH Boritallasa
Farming activity	Actively involved in coffee agroforestry
Experience	Minimum three years of farming experience
Participation	Willing to participate in interviews and observations

4) Data Collection

Primary data were collected between February and March 2026 through structured questionnaires, semi-structured interviews, and field observations. Structured questionnaires were used to identify the level of participation of men and women in different stages of coffee agroforestry management. These stages included land preparation, planting, maintenance, harvesting, and post-harvest handling. Semi-structured interviews were conducted to obtain in-depth information regarding labor division, household responsibilities, participation in decision-making, and perceptions related to gender roles. Interviews allowed respondents to explain the reasons underlying their involvement in specific activities and to describe how responsibilities were negotiated within the household.

Field observations were conducted to verify information obtained through questionnaires and interviews and to document actual farming practices in the study area.

Table 2. Variables and Indicators Used in the Study

Variable	Indicator	Data Source
Productive roles	Land preparation, planting, maintenance, harvesting, post-harvest activities	Questionnaire, interview
Reproductive roles	Household management and domestic responsibilities	Interview
Community roles	Participation in farmer group activities and community meetings	Interview
Decision-making participation	Decisions related to planting, maintenance, harvesting, marketing, and income utilization	Questionnaire, interview

5) Measurement of Participation

Participation levels were classified into three categories based on the frequency and intensity of involvement reported by respondents.

Table 3. Participation Categories

Category	Operational Definition
Active participation	Frequently involved and directly responsible for the activity
Occasional participation	Involved only when needed or under certain conditions
No participation	Not involved in the activity

This classification was adopted to provide a clearer interpretation of gender participation patterns and to reduce ambiguity associated with subjective assessments of involvement.

6) Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequencies and percentages, to summarize participation patterns of men and women across different coffee agroforestry management activities. Descriptive statistics are commonly used in social and agricultural research to describe respondent characteristics and participation patterns in a clear and interpretable manner (Creswell & Creswell, 2018).

The percentage of participation was calculated using:

$$P = \frac{n}{N} \times 100$$

where:

P = participation percentage (%)

n = number of respondents involved in a specific activity

N = total number of respondents

The resulting percentages were used to compare the relative involvement of men and women across productive, reproductive, community, and decision-making activities.

Qualitative data obtained from semi-structured interviews were analyzed using thematic analysis. This approach involved data familiarization, coding, theme development, theme review, and interpretation of recurring patterns related to gender roles in coffee agroforestry management. Thematic analysis is widely recognized as a flexible and rigorous qualitative method for identifying and interpreting patterns of meaning within qualitative datasets (Braun & Clarke, 2006; Braun & Clarke, 2021).

To strengthen the interpretation of gender relations, the findings were analyzed using the Moser Gender Analysis Framework, which classifies gender roles into productive, reproductive, and community roles while also examining access to and control over resources and decision-making processes (Moser, 1993; March et al., 1999). This framework has been widely applied in studies of rural livelihoods, agriculture, and agroforestry to understand the division of labor and participation patterns between men and women (Awalina et al., 2016).

3. Result and Discussion

1) Productive Roles in Coffee Agroforestry Management

Productive roles describe the involvement of men and women in coffee agroforestry management activities that directly contribute to household income generation. The results revealed differences in participation patterns between men and women across various stages of coffee agroforestry management (Table 4).

Table 4. Participation of Men and Women in Coffee Agroforestry Management Activities

Activity	Men (n)	Men (%)	Women (n)	Women (%)
Land preparation	13	65	7	35
Planting hole preparation	13	65	7	35
Planting	13	65	7	35
Crop maintenance	13	65	7	35
Coffee harvesting	7	35	13	65
Post-harvest handling	3	15	17	85

Table 4 shows that men were more involved in land preparation, planting hole construction, planting, and crop maintenance activities, each accounting for 65% of total participation. These activities generally require substantial physical effort and are culturally associated with male responsibilities in agricultural production systems.

In contrast, women demonstrated higher participation in harvesting (65%) and post-harvest activities (85%). The high involvement of women in post-harvest processing indicates their important contribution to maintaining coffee quality and preparing products for marketing. Similar patterns have been reported in coffee agroforestry systems where women play a crucial role in labor-intensive activities requiring precision and continuity, particularly during harvesting and post-harvest stages (Mulyoutami et al., 2021; Kassaye et al., 2025).

These findings suggest that productive roles in the Boritallasa Community Forestry Area are characterized by a complementary division of labor. Men primarily undertake physically demanding field activities, while women contribute substantially to activities associated with harvesting and product handling. From the perspective of Moser's Gender Analysis Framework, productive responsibilities are distributed according to perceived capacities and household labor arrangements rather than being exclusively performed by one gender (Moser, 1993).

2) Reproductive Roles in Farming Households

Reproductive roles refer to unpaid domestic activities that support household welfare and the daily reproduction of labor. These activities include food preparation, childcare, house cleaning, laundry, household shopping, and financial management.

Table 5. Participation in Reproductive Activities

Reproductive Activity	Men (%)	Women (%)
Cooking	10	90
Childcare	35	65
House cleaning	15	85
Laundry	5	95
Household shopping	45	55
Daily household financial management	5	95

The results indicate that reproductive activities remain largely dominated by women. Women accounted for 90% of cooking activities, 85% of house cleaning, 95% of laundry responsibilities, and 95% of daily household financial management. These findings demonstrate that women continue to bear the primary responsibility for domestic work despite their active involvement in coffee agroforestry production.

The dual burden experienced by women is evident from their simultaneous participation in productive and reproductive activities. While women were actively engaged in harvesting and post-harvest management, they also remained responsible for most domestic tasks. Similar findings have been documented in rural agricultural communities across Indonesia, where women contribute significantly to household livelihoods while maintaining primary responsibility for reproductive work (Awalina et al., 2016).

Although some male participation was observed in childcare (35%) and household shopping (45%), domestic responsibilities remained predominantly associated with women. This condition suggests that

traditional gender norms continue to influence labor allocation within farming households.

3) Community Roles and Participation in Farmer Groups

Community roles refer to participation in collective activities related to farmer organizations, extension services, training programs, and community development initiatives.

Table 6. Participation in Community and Farmer Group Activities

Activity	Men (%)	Women (%)
Farmer group meetings	90	10
Coffee cultivation training	65	35
Forestry extension programs	50	50
Collective labor activities	65	35
Village social activities	65	35

The findings indicate that men were generally more active in formal community and organizational activities. Participation in farmer group meetings reached 90% among men, compared to only 10% among women. This pattern suggests that men continue to act as the primary representatives of households in organizational decision-making processes.

However, women's participation was more evident in activities that involved knowledge sharing and community engagement. Notably, participation in forestry extension programs was equally distributed between men and women (50% each), indicating increasing opportunities for women to access information and technical knowledge related to agroforestry management (Asha et al., 2025).

The relatively balanced participation in extension activities may reflect ongoing efforts to promote inclusive participation within social forestry programs. Previous studies have highlighted that women's involvement in training and extension programs can strengthen their capacity to contribute to agroforestry management and household decision-making (Mulyoutami et al., 2020). Overall, the results suggest that while formal organizational participation remains male-dominated, women have begun to gain greater access to community-based learning opportunities that support their involvement in agroforestry management (Triwanto et al., 2023).

4) Gender Participation in Household Decision-Making

Participation in decision-making represents an important indicator of access to authority and control over productive resources. The study found varying patterns of gender participation depending on the type of decision being made (Table 7).

The results show that men played a dominant role in technical farming decisions, particularly regarding planting activities (65%). Their greater involvement in field operations likely contributed to their stronger influence over production-related decisions.

However, decision-making patterns became more balanced for issues directly affecting household welfare and income management. Joint decision-making was highest for the use of coffee income (60%) and coffee marketing (55%). These findings indicate that women actively participate in decisions concerning household economic management, despite their lower representation in technical agricultural decisions

Table 7. Gender Participation in Household Decision-Making

Type of Decision	Men (%)	Joint (%)	Women (%)
Planting	65	20	15
Fertilization	45	45	10
Harvest timing	40	50	10
Coffee marketing	30	55	15
Use of coffee income	15	60	25

The increasing prevalence of joint decision-making suggests that coffee agroforestry management in the Boritallasa Community Forestry Area is characterized by shared household responsibilities rather than exclusive control by either gender. Such collaborative decision-making may strengthen household resilience by integrating the knowledge, experiences, and priorities of both men and women (Enete & Amusa, 2010).

From a gender perspective, these findings demonstrate that women's contributions extend beyond domestic responsibilities and agricultural labor. Their involvement in financial and marketing decisions reflects a meaningful role in shaping household livelihood strategies and supporting the sustainability of coffee agroforestry systems (Kalanzi et al., 2020).

4. Conclusion

This study demonstrates that gender roles in coffee agroforestry management within the Boritallasa Community Forestry Area are characterized by a complementary division of labor between men and women. Men were more actively involved in physically demanding productive activities, including land preparation, planting, and crop maintenance, whereas women played a dominant role in harvesting and post-harvest handling. In addition to their substantial contribution to productive activities, women remained primarily responsible for reproductive roles such as cooking, house cleaning, laundry, and household financial management, indicating the persistence of a dual workload within farming households.

The findings further reveal differences in community participation and household decision-making. Men were more active in formal farmer group activities and organizational meetings, while women showed increasing participation in training and extension programs. Although technical farming decisions were largely influenced by men, decisions related to coffee marketing and the utilization of coffee income were more frequently made jointly, suggesting the emergence of collaborative decision-making patterns within households. These results indicate that the sustainability of coffee agroforestry systems is supported by the contributions of both men and

women through interconnected productive, reproductive, community, and decision-making roles. From a practical perspective, the findings highlight the importance of integrating gender-sensitive approaches into social forestry and agroforestry development programs. Increasing women's access to farmer organizations, training opportunities, and leadership roles may strengthen their contribution to agroforestry management and enhance household welfare outcomes.

Nevertheless, this study has several limitations that should be considered when interpreting the findings. The research was conducted as a single case study involving a relatively small number of respondents and relied primarily on descriptive analysis of participation patterns. Consequently, the findings may not fully capture broader variations in gender relations, access to resources, control over benefits, or power dynamics across different social forestry contexts. Future research is therefore recommended to employ larger sample sizes, comparative studies across multiple community forestry areas, and more comprehensive gender-analysis frameworks that examine access, control, benefits, and decision-making authority. In addition, further studies should explore how gender roles influence agroforestry productivity, household income, livelihood resilience, and the long-term sustainability of social forestry programs.

5. Author Contributions

N.A.R. conceptualized the study, collected field data, conducted data analysis, and drafted the manuscript. [R.A] supervised the research, contributed to methodological development, and reviewed the manuscript. [H, H, S, & A.A.A] contributed to data interpretation, manuscript revision, and scientific validation. All authors approved the final manuscript.

6. Competing Interests

The authors declare that they are free of any commercial, financial, or personal relationships that could be construed as a potential conflict of interest.

7. Acknowledgements

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