

Gender Roles and Household Participation in Hydroponic Farming in Sorsogon

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Abstract— Agricultural work in the Philippines has long followed gendered lines. Men typically perform hard labor in the agricultural field while women manage small plots or backyard farming as supportive role and supplementing household income. As backyard farming has increasingly shows significant contribution to food security and household nutrition, innovations and new technologies were introduced transforming the soil based farming to soil-less farming characterized as hydroponics. Hydroponic farming is a shift from intensive labor to data driven farming. It allows both men and women to engage in farming with less physical strain and limited land and space. This study examines how gender roles shape household involvement in hydroponic farming in Sorsogon. It aimed to: (1) describe the tasks assigned to men and women; (2) assess their involvement in household decision-making; (3) evaluate their economic contributions; and (4) propose recommendations for gender-sensitive agricultural programs. Using a descriptive research design, the researchers collected data through surveys, interviews, focus group discussions, and direct observation from 22 hydroponic farming households across Sorsogon Province. Quantitative data were analyzed with descriptive statistics, and qualitative data underwent thematic analysis. Findings show men predominantly handle technical system setup and maintenance (77%), while women are more engaged in nutrient solution preparation (68%), plant care (75%), marketing (62%), and financial management (70%). Household decision-making remains largely male-dominated (45%), though joint participation (20%) is emerging. Economically, men contribute more to direct income generation (60%), whereas women dominate resource allocation (65%) and financial management (75%). While traditional divisions persist, women play a substantial role in ensuring household economic sustainability through management and marketing. The study highlights the need for gender-sensitive programs that empower women through technical training while recognizing their existing strengths. Promoting equitable participation is not only a matter of social justice but can also drive agricultural innovation, improve household welfare, and support rural development.

Keywords— Gender roles, household participation, hydroponic farming, Sorsogon, agricultural development.

INTRODUCTION

Agriculture is generally known as a labor intensive field. It demands physical work and gendered division of labor. There is a clear separation of tasks, where “masculine task” performs hard labor in the agricultural field and the “feminine task” manages backyard farming or gardening. Despite this, women’s contributions remain central to agricultural productivity, food security, and household welfare. The FAO (2011) notes that gendered roles are critical to sustaining farming systems, even when women’s work is undervalued or unrecorded. Persistent disparities in women’s economic participation, access to resources, and market opportunities continue worldwide, as highlighted in the UN report *The World’s Women 2020*.



In the Philippines, traditional gender roles still present in agriculture. Men assigned to work in the field recognized as primary farmers while women's contributions are marginalized (Quisumbing & Malapit, 2023). National data emphasize women's significant economic role in small-scale and household farming, yet barriers like limited access to land, credit, and decision-making power hinder full participation. Financial inclusion remains a particular challenge for rural women (Manta, 2019; Kishor & Ahmad, 2024).

Empowerment frameworks such as the Women's Empowerment in Agriculture Index show that when women gain financial autonomy, household welfare improves. Studies from Asia and Africa confirm that women's involvement in farming and micro-enterprises enhances household resilience, education, and health outcomes.

Hydroponic farming has emerged locally as a sustainable innovation. Using nutrient-rich water instead of soil, it allows controlled cultivation with higher yields and lower land requirements. In provinces like Sorsogon, where agriculture is a primary livelihood, hydroponics offers diversification, modernization, and climate resilience. It also reshapes household income dynamics, enabling women to engage in production, marketing, and reinvesting earnings into family welfare.

In Sorsogon, women's participation in hydroponics mirrors broader patterns: they manage household finances, reinvest income, and contribute to community initiatives. While men may dominate external market transactions, women often oversee budgeting and reinvestment, ensuring hydroponic earnings translate into tangible welfare gains. Thus, hydroponic farming in Sorsogon represents both a technological shift and a potential social transformation, positioning women as active agents in income generation and financial management.

This study explores gender roles and household participation in this context, examining the division of labor, decision-making, and economic contributions to inform policies for inclusive agricultural development.

Specifically, the study aims to:

- Describe the specific tasks and responsibilities assigned to men and women in hydroponic farming households.
- Assess the extent of male and female involvement in household decision-making related to hydroponic operations.
- Evaluate the economic roles of men and women in terms of income generation, resource allocation, and financial management.
- Provide recommendations for promoting gender-sensitive approaches in local agricultural development programs.

This research addresses a knowledge gap in the gender analysis of Philippine hydroponics and provides Sorsogon-specific insights to guide community-based development, inform equitable policy, and empower households by recognizing women's contributions.

MATERIALS AND METHODS

The study focused on households engaged in hydroponic farming in Sorsogon Province, Philippines. Participants included male and female household members directly involved in farming activities such as planting,

maintenance, harvesting, marketing, and resource management. Households used various hydroponic systems, including Kratky, Nutrient Film Technique (NFT), Deep Flow Technique (DFT), and combined systems.

The research employed several instruments:

- A Survey Questionnaire with structured and semi-structured items to capture the division of labor, decision-making roles, economic contributions, and perceptions of gender roles. The questionnaire was pre-tested for clarity and reliability.
- Key Informant Interviews (KII) with household heads, women farmers, and community leaders, using open-ended questions to explore cultural and social perceptions of gender dynamics.
- An Observation Checklist to document actual participation during field visits.
- Audio recorders, field notes, and digital cameras (with consent) to document interviews and hydroponic setups.
- Participants were identified using the snowball (chain-referral) technique to identify households actively practicing hydroponics. Surveys and interviews were conducted face-to-face on-site. All participants provided informed consent, and confidentiality was maintained throughout.
- Quantitative data were analyzed using descriptive statistics (frequency, percentage, mean). Qualitative data from interviews were analyzed thematically to identify patterns in gender roles and participation.

RESULTS AND DISCUSSION

Data were gathered from 22 households in Sorsogon, involving 40 family members and 5 additional workers—45 individuals total (23 males, 22 females).

1. Gendered Division of Labor in Hydroponic Farming

Table 1. Division of Labor in Hydroponic Farming Activities by Gender

Activity / Role	Men		Women		Joint	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Set up and maintenance of farm equipment	35	77	10	23	0	0
Nutrient solution preparation	12	27	27	60	6	13
Plant monitoring and caring for plants	9	20	31	69	5	11
Harvesting	20	45	18	40	7	15
Marketing and selling	12	27	28	62	5	11
Resource management	9	20	31	69	5	11

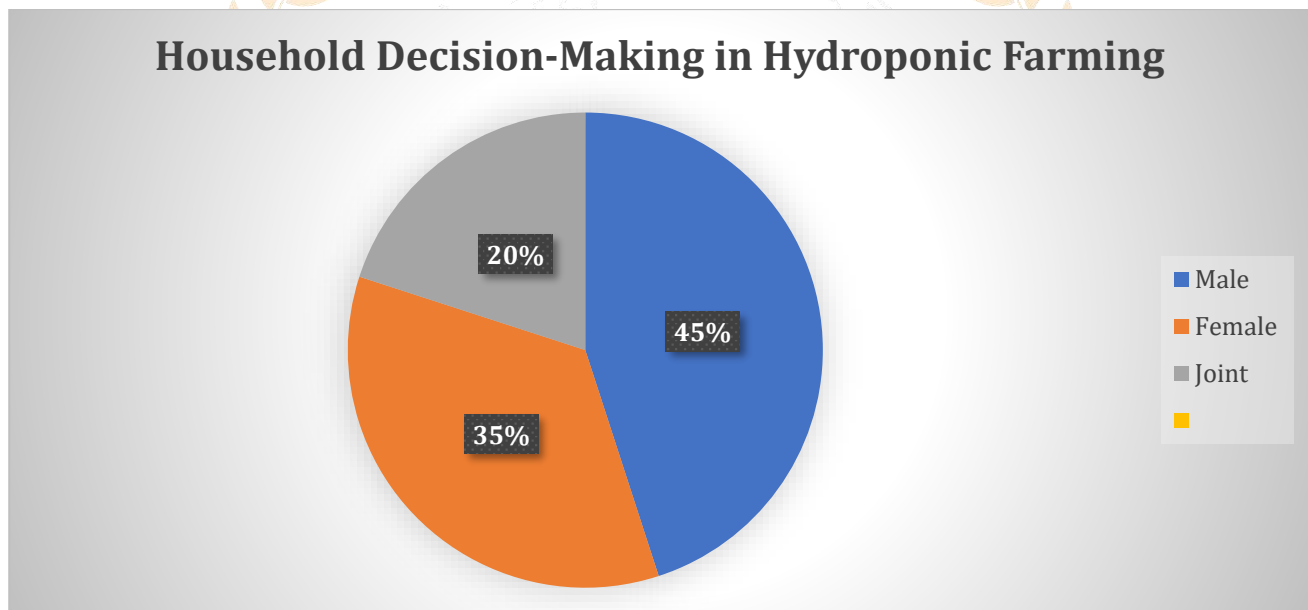
Table 1 shows a clear division of labor. Men primarily handle technical setup and maintenance (77%), aligning with traditional associations of male labor with physical and mechanical work. Women dominate nutrient solution preparation (60%), plant care (69%), marketing (62%), and resource management (69%). This mirrors broader

Philippine patterns where women's roles concentrate in post-harvest, marketing, and household financial management (Quisumbing & Malapit, 2023).

Women's strong participation in marketing and resource management is a significant driver of empowerment and economic sustainability (Behera et al., 2024). However, their concentration in non-technical tasks highlights a gendered skill imbalance. Training women in technical areas like system maintenance could balance participation and enhance efficiency (Ahmed, 2022), as seen in studies from Nigeria and Sri Lanka where women's agricultural contributions directly improved household food security (Adepoju et al., 2015; Kalansooriya & Chandrakumara, 2014).

Women's dominance in resource management and marketing also reflects their dual economic role, engaging in both unpaid household labor and income-generating activities. Their decision-making power in financial allocation significantly impacts child nutrition, education, and household resilience (Shoo, 2011; Sidh & Basu, 2011). The World Bank (2019) further notes that women's market access is key to farming enterprise sustainability, making their marketing role in hydroponics especially vital.

2. Household Decision-Making Participation



Household decision-making in hydroponic farming remains largely male-dominated (45%), reflecting traditional norms where men are seen as primary decision-makers. However, joint participation (20%) signals a gradual cultural shift toward shared authority. This transition is consistent with trends in Southeast Asia, where modern farming practices can encourage more inclusive decision-making.

Deb et al. (2023) argue that cultural norms perpetuate household gender inequalities, but agricultural modernization can challenge these patterns by creating space for women's agency. Similarly, Mader and Schneebaum (2013) note that while intra-household decision-making is often gendered, joint decision-making improves welfare outcomes by ensuring resources meet all members' needs. Hydroponics, as a modern practice, may thus catalyze more equitable household governance.

The dominance of male in decision-making emphasizes the need for interventions that promote gender equity. Training programs and cooperative structures that encourage women's participation could accelerate this shift. Joint decision-making not only enhances welfare but also strengthens resilience by integrating diverse perspectives.

3. Economic Roles of Men and Women

Table 2. Economic Contributions by Gender in Hydroponic Farming

Contribution Area	Men		Women	
	Number	Percentage (%)	Number	Percentage (%)
Income generation	27	60	18	40
Resource allocation	16	35	29	65
Financial management	11	25	34	75

Table 2 highlights the economic contributions. Men contribute more to direct income generation (60%), aligning with traditional expectations. In contrast, women dominate resource allocation (65%) and financial management (75%), playing a central role in sustaining household welfare by reinvesting income into education, nutrition, and healthcare. This supports Quisumbing and Malapit's (2023) emphasis on the link between women's empowerment and improved household outcomes.

Despite barriers to financial inclusion (Chetiya, 2024; Manta, 2019), women's management of household finances enhances economic resilience by stabilizing operations and ensuring equitable resource distribution. Farroñán et al. (2024) argue that empowering women through entrepreneurial innovation strengthens rural sustainability, suggesting women's roles in hydroponic marketing and finance can be leveraged for broader community development.

4. Recommendations for Gender-Sensitive Agricultural Development

Based on the findings, the study recommended that gender-sensitive programs in Sorsogon prioritize three areas:

- **Technical Capacity Building for Women:** Provide training in hydroponic system setup, nutrient preparation, and equipment maintenance to balance participation and reduce reliance on male technical expertise (Ahmed, 2022).
- **Recognition and Support for Women's Strengths:** Extension services should explicitly recognize and bolster women's existing roles in marketing and financial management, strengthening their leadership in cooperatives and community enterprises (Farroñán et al., 2024).
- **Promotion of Joint Decision-Making:** Implement household-based training and cooperative models that encourage shared authority, which improves welfare outcomes (Mader & Schneebaum, 2013).

These interventions must respect local cultural contexts, as gender roles are socially constructed and context-specific (Momsen, 2004; Oyěwùmí, 1997). By integrating women more fully into technical and managerial aspects,

policies can challenge traditional labor divisions, enhance household resilience, and support sustainable agricultural development.

CONCLUSION

This study reveals that gender roles in Sorsogon's hydroponic farming households still follow traditional divisions: men handle technical tasks, while women manage nutrient preparation, plant care, marketing, and finances. Despite this, women's contributions are substantial, particularly in resource allocation and economic sustainability. Decision-making remains male-dominated, but emerging joint participation indicates a cultural shift toward more inclusive authority, which is linked to better household welfare.

The findings are relevant for multiple stakeholders. Policymakers should design gender-sensitive programs that provide women with technical training, credit access, and resource support. Educators can use this localized evidence to inform practical, context-driven curricula. For communities, the study underscores the value of women's contributions and the importance of fostering joint participation. Achieving gender equity is not only a social justice imperative but also a driver of agricultural innovation, household welfare, and rural development in Sorsogon.

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