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An exploratory review and qualitative analysis of female stakeholders' perspectives on agrobiodiversity conservation

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Abstract: Gender differences in agrobiodiversity conservation have been largely examined in the literature. Exploration of female stakeholders' perspectives on agrobiodiversity conservation in different agricultural sectors having diversified economic, social, and institutional contexts is, however, scant. Applying the framework of feminist social-ecological analysis of agrobiodiversity to conduct an exploratory review and qualitative analysis of information collected from focus group and in-depth interviews with female farmers and other female stakeholders in vegetable and aquaculture production in Viet Nam, this study discusses how agrobiodiversity conservation is perceived by female stakeholders in vegetable and aquaculture production. Findings from this study indicate that different female stakeholders' perspectives on agrobiodiversity conservation in vegetable and aquaculture production are due to diverse sources of loss in agrobiodiversity, levels of resource intensity of the production, and features of the supply chain.

Keywords: Female stakeholders, agrobiodiversity conservation, exploratory, qualitative.

1. Introduction

Overuse of environmentally harmful substances in agriculture to boost yields degrades farming systems, natural resources, and biodiversity (Jiang et al., 2023). Agrobiodiversity degradation due to intensified agricultural production is severe in emerging economies (Ulimboka et al., 2022). Encouraging farmers to adopt conservation practices is critical (Sylvester & Little, 2021). Agrobiodiversity conservation is a technical issue and shaped by societal and cultural values (Picot-Allain et al., 2023). Gender roles influence priorities in crop and livestock management, with women often juggling multiple tasks (Villamor et al., 2023).

Studies highlight gender differences in agrobiodiversity conservation. In developed countries, women have a strong inclination to conserve biodiversity (Maas et al., 2021). In developing countries, findings are mixed. In Nepal, factors like environmental interest, local markets, and women's empowerment drive conservation (Maharjan et al., 2023). Women in low-income countries often face marginalization, limited rights, and barriers like restricted access to leadership, capital, and land (Sylvester & Little, 2021).

This study examines female stakeholders' perspectives on agrobiodiversity conservation in Viet Nam's vegetable and aquaculture sectors using a feminist social-ecological framework.

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Vegetable production is labor-intensive with diverse crops, while aquaculture is capital-intensive. These differences require a gendered lens to understand how women navigate resource constraints, market pressures, and environmental changes.

The feminist social-ecological framework is structured around four pillars: livelihoods, food security, nutrition, and climate change. Livelihoods emphasize women's roles in crop diversity and farm management (Assefa et al., 2022). Food security highlights women's contributions to household and community food systems through agricultural practices and land tenure (Jacobi et al., 2020). Nutrition underscores women's roles in dietary diversity through crop and livestock management, which is influenced by education and empowerment (Santoso et al., 2021). Climate change focuses on gendered responses to enhance agrobiodiversity resilience (Labeyrie et al., 2023).

To bridge the research gap, this study applies both the exploratory review and the analysis of data from in-depth interviews. An exploratory review of 117 peer-reviewed articles from the Web of Science identified four thematic clusters: livelihoods, nutrition, food security, and climate change. The focus group and in-depth interviews with farmers and stakeholders in vegetable and aquaculture production revealed three key factors affecting women's perspectives on agrobiodiversity conservation: diverse sources of agrobiodiversity loss, resource intensity of production, and supply chain dynamics. These findings provide evidence to promote agrobiodiversity conservation in agriculture.

2. Exploratory review

2.1. Gender and agrobiodiversity conservation

Agrobiodiversity refers to the biological diversity of food-producing biota, land use, and interactions with farmers and end-users as networks (De Boef et al., 2012). Conserving agrobiodiversity is to improve the sustainability of agricultural production through greater reliance on ecological goods and services (Jackson et al., 2007). In this study, we employ an exploratory review method to inquire into thematic clusters on women and agrobiodiversity. Data are collected from the Web of Science database. The metadata of published papers relating to "*women*", "*female*", "*gender*", and "*agrobiodiversity*" was retrieved. The retrieval time was January 2024. Searching for a topic, title, or abstract with these keywords was employed. The search strings were *((TS=(("women" OR "gender" OR "female") AND "agrobiodiversity")) OR TI=(("women" OR "gender" OR "female") AND "agrobiodiversity")) OR AB=(("women" OR "gender" OR "female") AND "agrobiodiversity").* This study exploits the snowball method in using references in publications. The number of selected papers is 117.

2.2. Thematic clusters on gender and agrobiodiversity

2.2.1. Thematic clusters

Thematic cluster 1: livelihoods and gender

The literature on agrobiodiversity and livelihoods highlights gender differences in conservation practices (Zimmerer et al., 2020). It reveals socio-economic structures and needs in agrobiodiversity conservation. As men and women undertake distinct agricultural roles, their conservation behaviors differ.

Female farmers engage more in agrobiodiversity conservation, driven by their children's livelihoods (Singh et al., 2022). In Ethiopia, women's involvement in agriculture increases crop diversity (Assefa et al., 2022). Women's farm management decisions in Brazil improve agrobiodiversity and agroecological practices (Valencia et al., 2021). Female migration impacts crop distribution and shapes agrobiodiversity (Zimmerer, 2020). In low-income areas, where women dominate agricultural production, agrobiodiversity fosters livelihood stability and dietary diversity (Assefa et al., 2022).

Thematic cluster 2: food security and gender

Global population growth and urbanization threaten biodiversity. This thematic cluster examines gender roles in agrobiodiversity conservation, focusing on poverty, food security, and inequality. Many studies highlight women's roles in household agriculture, decision-making, and sustainable practices (Jacobi et al., 2020).

Women's management of diverse crops boosts household dietary diversity (Singh et al., 2012). Men prioritize cash crops, potentially reducing crop diversity (Kerr et al., 2019). Gender disparities in resource access hinder women's contributions (Ekesa et al., 2020). Securing land tenure for women supports agrobiodiversity. Women's access to land, credit, and social protection is vital for food security (Jacobi et al., 2020). Women's cultural knowledge sustains agrobiodiversity (Singh et al., 2012). Participatory agroecological approaches involving women improve food security and dietary diversity (Kerr et al., 2019). Gender-sensitive policies addressing resource inequalities enhance agrobiodiversity.

Thematic 3: nutrition and gender

The third thematic cluster explores agrobiodiversity's role in nutrition, emphasizing female farmers' contributions to dietary diversity (Ekesa et al., 2020). Women's focus on diverse crops and livestock enhances family

nutrition, which is linked to species diversity and land security, while men prioritize cash crops for income (Reynolds et al., 2020).

Women's empowerment amplifies agrobiodiversity's nutritional benefits (Luna-González & Sørensen, 2018). Dietary diversity is influenced by seasonality and household size (Powell et al., 2017), farm diversification and nutrition education (Boedecker et al., 2019), and women's well-being (Santoso et al., 2021). Agrobiodiversity loss highlights women's role in diversification as women-led diversification is critical (Londres et al., 2023). Collaboration among stakeholders optimizes food biodiversity use through women's empowerment (Pawera et al., 2020).

Thematic 4: climate change and gender

This thematic cluster deals with gender in agrobiodiversity management under a changing climate (Eneji et al., 2021). Climate change affects both genders' choices on agricultural management (Saxena et al., 2016). When female farmers participate in crop management, they enhance agrobiodiversity. Brody et al. (2008, p.15) state that "women are more prepared for behavioral change and more likely to support drastic policies and measures on climate change adaptation processes". The ethnographic studies demonstrate gendered experiences of water access and land quality (Bacon & Kelley, 2021). In small farms, women diversify crops and choose varieties that adapt to environmental changes (Labeyrie et al., 2023). Several factors motivate women to get involved in agrobiodiversity conservation, such as having membership in agriculture organizations, indigenous values, government support, credit, technology, and land access. Many other factors are barriers to agrobiodiversity conservation (Sylverster & Little, 2021). Women's agrobiodiversity networks are proposed to provide support for agricultural organizations that have gender mainstreaming mandates (Sylverster & Little, 2021).

2.2.2. Findings from the exploratory review

An exploratory review of 117 articles published from 2003 to 2023 identifies four thematic clusters that analyze gender in agrobiodiversity conservation using the feminist social-ecological framework (Padmanabhan, 2011). This framework comprises four pillars: institutions, knowledge, production, and utilization. Knowledge highlights women's expertise in seed-saving and crop diversification (Singh et al., 2012). Production emphasizes women's labor in cultivating diverse crops (Assefa et al., 2022).

These studies have expanded the literature on gender in agrobiodiversity by acknowledging the importance of gender issues in agrobiodiversity conservation. Women are a major working force in agricultural production. They play an important role in farm diversification and agrobiodiversity conservation. Women's attitudes towards and experience of agrobiodiversity conservation differ with contexts. Women play a key role in conserving agrobiodiversity and attract great attention in the formulation of agricultural policies.

3. Methodology and data

3.1. Methodology

This study investigates agrobiodiversity conservation in Viet Nam's vegetable and aquaculture sectors, using a feminist social-ecological framework (Padmanabhan, 2011). These sectors were selected for their remarkable agricultural contributions. Vegetables and aquaculture products accounted for 3% and 29%, respectively, of total agricultural output value (GSO, 2024; VnEconomy, 2023). Vegetable farming is labor-intensive with more female owners, while aquaculture is capital-intensive and male-dominated (Lee et al., 2019a; Lee et al., 2019b). Vegetables are sold domestically, while aquaculture products are mainly exported.

Agrobiodiversity conservation in vegetable farming emphasizes reduced synthetic pesticide use and organic practices (Pham et al., 2023). In aquaculture, it focuses on minimizing antibiotics and managing waste (Suzuki et al., 2023). The feminist social-ecological framework, with pillars of institutions, local knowledge, production, and utilization, guides the analysis of women's roles.

We conducted focus group and in-depth interviews with 41 female stakeholders, who are farmers, Women's Union presidents, cooperative directors, input suppliers, traders, and processors/exporters across one Northern and three Southern Vietnamese provinces. Focus group interviews discussed production and agrobiodiversity. In-depth interviews explored government support, regulations, awareness, and marketing.

Interviews were conducted in Vietnamese, recorded, transcribed, and translated into English with reverse translation to ensure accuracy. Ethical procedures ensured respondent confidentiality. Data were analyzed using NVivo software through thematic analysis, starting with open coding to identify recurring concepts related to agrobiodiversity, gender roles, and the framework's four pillars. Codes were grouped into four thematic clusters. The analysis captured narratives on female stakeholders' perspectives, highlighting factors like agrobiodiversity loss, resource intensity, and supply chain dynamics.

3.2. Data collection

Focus group interviews were conducted with twenty-two female farmers in Hanoi, Lam Dong, Can Tho, and Ca Mau. In Hanoi, we selected two districts with the largest vegetable production. We randomly selected one commune in each district. In Lam Dong, we selected one district with the largest vegetable production and then randomly selected four communes in the district. In Can Tho and Ca Mau provinces, we selected two districts with the largest outputs in aquaculture and randomly selected two communes in each district. In each commune, we obtained a list of female farmers from the commune governments to select the respondents.

In-depth interviews with nineteen female respondents were conducted in the study areas. We recruited and trained fifteen local enumerators to conduct both the focus group and in-depth interviews in Lam Dong, Ca Mau, and Can Tho, and six other local enumerators to conduct the interviews in Hanoi.

4. Findings

Table 1 exhibits profiles of fourty-one respondents. The respondents are stakeholders along the supply chain, including women union leaders, input suppliers, farmers, traders, domestic customers, and a processor cum exporter in both vegetable and aquaculture production.

Table 1: The respondents' profiles

Code	Location	Occupation	Persons
Respondents of the focus group interviews			
VFFG_LD	Lam Dong	Vegetable farmers	6
VFFG_HN	Hanoi	Vegetable farmers	6
AFFG_CT	Can Tho	Aquaculture farmers	5
AFFG_CM	Ca Mau	Aquaculture farmers	5
Respondents of the in-depth interviews			
WUL	Lam Dong	Women's union leader	1
WUC	Ca Mau	Women's union leader	1
ACD	Hanoi	Agricultural cooperative director	1
VIS	Hanoi	Vegetable input supplier	1
VF_LD	Lam Dong	Vegetable farmers	2
VF_HN	Hanoi	Vegetable farmers	2
VT	Hanoi	Vegetable trader	1
VDC	Lam Dong	Vegetable domestic consumer	1
FP_CT	Can Mau	Aquaculture feed producer	1
FT_CM	Ca Mau	Aquaculture feed trader	1
AF_CT	Can Tho	Aquaculture farmers	2
AF_CM	Ca Mau	Aquaculture farmers	2
AT	Ca Mau	Aquaculture trader	1
ADC	Ca Mau	Aquaculture domestic consumer	1
P&E	Ca Mau	Processor cum exporter	1

4.1. Institutions

There are differences in government support programs for female stakeholders. In the vegetable production, there are various programs to support female cooperative leaders, input suppliers, and farmers with training courses, consulting services, and technical support. The government support to female stakeholders in the aquaculture sector is much less.

In many vegetable cooperatives, female farmers dominate. We have been organizing various extension programs to help female farmers grow vegetables with less use of synthetic pesticides (WUL, ACD). In aquaculture production, there are limited government support programs for female farmers. Few farmers in this sector are female (WUC).

We have not received any government support program designed only for female agricultural cooperative leaders (ACD).

Aquaculture production is more capital intensive, requiring larger investment (Lee et al., 2019a; Lee et al., 2019b). Vegetable production does not require much investment (Pham et al., 2023). Hence, the number of females involved in vegetable production is higher. The high labor intensity in the vegetable sector can be used to explain the need for more support from the government to female stakeholders. Specific support policies for female stakeholders in the vegetable sector have not been identified.

There is no specific policy to support female stakeholders conducting biodiversity conservation practices (WUL, WUC, ACD).

To address these gaps, government support programs should be developed to encourage female stakeholders in both vegetable and aquaculture production to adopt agrobiodiversity conservation practices. Such initiatives would enhance the involvement of women in both sectors and promote sustainable agricultural practices.

4.2. Knowledge

Regarding the knowledge of agrobiodiversity conservation, there is a difference between female stakeholders in the vegetable production and in the aquaculture production. Female vegetable farmers show their awareness and practices of agrobiodiversity conservation. One vegetable domestic consumer reported that she was interested in having more information about agrobiodiversity conservation in vegetable production as it signals safe vegetable products.

We are aware of agrobiodiversity conservation. We practice agrobiodiversity conservation by limiting the use of synthetic inputs. Spraying pesticides will stick to surrounding objects and soil, and pollute the air. Hence, we try to reduce synthetic pesticides (VF_LD, VF_HN).

Farmers, domestic consumers, and processors cum exporters in the aquaculture sector are not well aware of and do not practice agrobiodiversity conservation, even though they care about residuals of synthetic substances in aquaculture products.

Information about what the shrimp and fish are fed is important to us (ADC).

We need to make sure that the quality of shrimp meets export standards with an appropriate level of residuals of antibiotics and other prohibited substances (P&E).

There are multiple reasons for the difference between the two sectors. Vegetable production is technically simpler than aquaculture production. Therefore, female stakeholders in vegetable production are better aware of the sources of loss of agrobiodiversity. Using synthetic inputs is identified as the main source (Zheng et al., 2020). It is more complicated in aquaculture production. The risks of environmental pollution and the spread of diseases are higher as the aquaculture production intensifies.

There is another difference in the level of education of the farmers in the two sectors. The aquaculture sector is concentrated in the lower Mekong River Delta region, where many female stakeholders have limited access to education. Many females in this region have no jobs. They do not directly manage aquaculture work and just support their husbands. They rarely participate in training courses.

I support my husband in shrimp production, such as contacting agents to buy feeds and sell harvested shrimp (AF_CM).

We are willing to engage in side businesses of aquaculture production during our free time (AF_CT).

4.3. Production

The risk of income loss for one crop may not be too problematic for many vegetable farmers. In the aquaculture production, farmers invest a lot in pond preparation, seed, and feed (Lee et al., 2019a; Lee et al., 2019b). Therefore, they cannot risk their income by switching to more agrobiodiversity conservation practices.

Seven to ten years ago, we raised shrimp and fish with high productivity and income. In recent years, as super-intensive shrimp production has been widespread, aquaculture farming has become more difficult with frequent diseases. We have to use more medicines (AF_CM).

Our interviews reveal that the female farmers in the two sectors are willing to conduct agrobiodiversity conservation practices with different motives. In the vegetable production, they worry about the health of themselves, their family members, neighbors, community, and customers.

We know synthetic pesticides adversely affect the health of ourselves, our family members, and people in our community. We want to reduce it. Buyers of vegetable products could be our relatives or family members. We do not want to use too much of synthetic inputs (VF_HN, VF_LD).

Vegetable customers also show their willingness to pay a higher price for cleaner vegetable products.

Even if the price is higher, I am willing to buy the organic vegetables because of my family's health. I prefer to buy organic vegetables directly from farmers (VDC).

The female farmers in the aquaculture production reflect differently. They are willing to conduct agrobiodiversity conservation practices if these practices induce a higher income. The supply chain of vegetable production is shorter than that of aquaculture production. Vegetables are mainly sold to domestic customers. The supply chain for shrimp and fish is longer with more intermediaries. The distance between farmers and customers in the aquaculture supply chain is longer, leading to less concern about customers' health. When being asked about the possibility of joining a new project to treat waste from aquaculture production, the interviewed female farmers reported that:

If we can treat waste to make it become productive and generate new income, I am happy to try it (AF_CM, AF_CT).

4.4. Utilization

Female farmers in the vegetable and aquaculture production have different motives to communicate their agrobiodiversity conservation practices. Due to the shorter distance between vegetable farmers and end consumers, female farmers in this sector are more active in communicating their agrobiodiversity conservation practices.

We can sign a contract with a grocery shop, a supermarket, or sell our products in the local open market. If our production is more environmentally friendly, we can sell our products more easily (VF_LD, VF_HN).

Meanwhile, female farmers in aquaculture are less interested in communicating agrobiodiversity conservation practices because they do not sell their products directly to end consumers. Collectors purchase shrimp and fish from farmers and sell them to processors cum exporters. The distance between farmers and end-users is far. Hence, it is less motivating for farmers to adopt and communicate their agrobiodiversity conservation practices.

5. Contributions and conclusions

5.1. Contributions

This study contributes to the literature in four new aspects. Firstly, this study finds the difference between the female involvement in agrobiodiversity in the labor-intensive sector (vegetable production) and the capital-intensive sector (aquaculture). Female vegetable farmers have more knowledge and conserve agrobiodiversity more than female aquaculture farmers. Our findings are different from Pfeiffer and Butz (2005), who find that the variation in male and female knowledge of biological taxa occurs for many reasons. Therefore, studying women's contribution to agrobiodiversity needs to be sector-specific.

Secondly, this research indicates that different agricultural sectors require different biodiversity conservation measures. Vegetable production causes the loss of agrobiodiversity through the overuse of chemical fertilizers, while in aquaculture, it is mainly due to the use of antibiotics and wastewater. The awareness of women in agrobiodiversity conservation is contingent on sectors. Specific training for female farmers in different sectors is, thus, important.

Thirdly, female farmers with small-scale production tend to be more willing to conserve agrobiodiversity. This finding is in line with Noack et al. (2022), who argue that smaller farms have greater biodiversity than larger farms. When the farm size is large enough, an increase in farm size will lead to more biodiversity conservation. Perhaps, small farms need to earn a profit and do not have enough resources to pay attention to biodiversity conservation. From this study, several challenges are found to constrain women's engagement in agrobiodiversity conservation. The main barrier to agrobiodiversity conservation is the short-run income viability for the farmer's family. Biodiversity conservation should be effective if farmers are supported by joint actions from governments and businesses.

Finally, this study analyzes in-depth women's role in agrobiodiversity, revealing the importance of value chain coordination for encouraging women in agrobiodiversity conservation. There is limited evidence on improving biodiversity conservation from the aspects of value chains. Our investigation demonstrates the importance of coordination among stakeholders, focusing on the role of women in value chains to preserve agrobiodiversity. Therefore, governments and other stakeholders have a role in supporting women to participate in biodiversity conservation.

5.2. Conclusions

This study provides several policy implications. It is crucial to understand the importance of value chain coordination in agrobiodiversity among stakeholders. Hellin et al. (2010, p.225) state that "the ability of value chains to deliver greater agrobiodiversity and livelihood benefits depends on how value chains are structured, the relationships between chain actors, and the role of the private and public sectors in providing financial and non-financial services to value chain actors". Although the government is the main actor, who can initiate top-down policies for raising awareness of biodiversity conservation in agricultural production, it is important to have support from universities, agencies, and private enterprises. Private companies create technology, promote new models of farming, sell the concepts to farmers, provide technical assistance, and pay premiums to farmers for biodiversity conservation. Moreover, education programs for each agricultural sector about agrobiodiversity conservation should be set up for female farmers to understand the techniques in preserving agrobiodiversity. To enhance agrobiodiversity, governments should have different policies in different agricultural sectors regarding the control of pesticides, land use, natural resources, waste nutrition recovery, etc. The main motivation behind agrobiodiversity conservation is to sustain food security and poverty reduction. In harsh environments where crop landraces and

aquaculture are the main activities, agrobiodiversity conservation remains the basis of farmers' livelihoods and the community members' well-being.

References

Assefa, W., Kewessa, G., & Datiko, D. (2022). Agrobiodiversity and gender: the role of women in farm diversification among smallholder farmers in Sinana district, Southeastern Ethiopia. *Biodiversity and Conservation*, *31*(10), 2329-2348. https://doi.org/10.1007/s10531-021-02343-z

Bacon, C. M., Kelley, L. C., & Stewart-Frey, I. (2021). Toward a feminist political ecology of household food and water security during drought in northern Nicaragua. https://doi.org/10.5751/ES-12716-270116

Boedecker, J., Odhiambo Odour, F., Lachat, C., Van Damme, P., Kennedy, G., & Termote, C. (2019). Participatory farm diversification and nutrition education increase dietary diversity in Western Kenya. *Maternal & Child Nutrition*, *15*(3), e12803. https://doi.org/10.1111/mcn.12803

Brody, S. D., Zahran, S., Vedlitz, A., & Grover, H. (2008). Examining the relationship between physical vulnerability and public perceptions of global climate change in the United States. *Environment and behavior*, *40*(1), 72-95. https://doi.org/10.1177/001391650629880

De Boef, W. S., Thijssen, M. H., Shrestha, P., Subedi, A., Feyissa, R., Gezu, G., ... & Sthapit, B. R. (2012). Moving beyond the dilemma: practices that contribute to the on-farm management of agrobiodiversity. *Journal of Sustainable Agriculture*, *36*(7), 788-809. https://doi.org/10.1080/10440046.2012.695329

Ekesa, B., Ariong, R. M., Kennedy, G., Baganizi, M., & Dolan, I. (2020). Relationships between land tenure insecurity, agrobiodiversity, and dietary diversity of women of reproductive age: Evidence from Acholi and Teso subregions of Uganda. *Maternal & Child Nutrition*, *16*, e12965. https://doi.org/10.1111/mcn.12965

Eneji, C. V. O., Onnoghen, N. U., Acha, J. O., & Diwa, J. B. (2021). Climate change awareness, environmental education and gender role burdens among rural farmers of Northern Cross River State, Nigeria. *International Journal of Climate Change Strategies and Management*, *13*(4/5), 397-415. https://doi.org/10.1108/IJCCSM-06-2020-0070

GSO. (2024). Agriculture, forestry, and fishery production in 2023 – Achievements and challenges. General Statistics Office of Vietnam. https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2024/01/san-xuat-nong-lam-nghiep-va-thuy-san-nam-2023-ket-qua-dat-duoc-va-kho-khan-thach-thuc-dan-xen/

Hellin, J., Keleman, A., & Atlin, G. (2010). Smallholder farmers and maize in Mexico: a value-chain approach to improved targeting of crop-breeding programs. *Journal of New Seeds*, *11*(3), 262-280. https://doi.org/10.1080/1522886X.2010.501623

Jacobi, J., Mukhovi, S., Llanque, A., Giger, M., Bessa, A., Golay, C., ... & Rist, S. (2020). A new understanding and evaluation of food sustainability in six different food systems in Kenya and Bolivia. *Scientific Reports*, *10*(1), 19145. https://doi.org/10.1038/s41598-020-76284-y

Jackson, L. E., Pascual, U., & Hodgkin, T. (2007). Utilizing and conserving agrobiodiversity in agricultural landscapes. *Agriculture, Ecosystems & Environment*, *121*(3), 196-210. https://doi.org/10.1016/j.agee.2006.12.017

Jiang, S., Zhang, J., Tang, Y., Li, Z., Liu, H., Wang, L., ... & Liang, C. (2023). Plant functional traits and biodiversity can reveal the response of ecosystem functions to grazing. *Science of The Total Environment*, *899*, 165636. https://doi.org/10.1016/j.scitotenv.2023.165636

Kerr, R. B., Kangmennaang, J., Dakishoni, L., Nyantakyi-Frimpong, H., Lupafya, E., Shumba, L., ... & Luginaah, I. (2019). Participatory agroecological research on climate change adaptation improves smallholder farmer household food security and dietary diversity in Malawi. *Agriculture, Ecosystems & Environment*, *279*, 109-121. https://doi.org/10.1016/j.agee.2019.04.004

Labeyrie, V., Friedman, R. S., Donnet, S., Faye, N. F., Cobelli, O., Baggio, J., ... & Raimond, C. (2023). Linking seed networks and crop diversity contributions to people: A case study in small-scale farming systems in Sahelian Senegal. *Agricultural Systems*, *211*, 103726. https://doi.org/10.1016/j.agsy.2023.103726

Lee, G., Suzuki, A., & Vu, H. N. (2019a). The determinants of detecting veterinary drug residues: Evidence from shrimp farmers in southern Viet Nam. *Aquaculture Economics and Management*, *23*(2), 135-157. https://doi.org/10.1080/13657305.2019.1568612

Lee, G., Suzuki, A., & Vu, H. N. (2019b). Effect of network-based targeting on the diffusion of good aquaculture practices among shrimp producers in Vietnam. *World Development*, *124*, 104641. https://doi.org/10.1016/j.worlddev.2019.104641

Londres, M., Salk, C., Andersson, K. P., Tengö, M., Brondizio, E. S., Lopes, G. R., ... & Tourne, D. C. (2023). Place-based solutions for global social-ecological dilemmas: An analysis of locally grounded, diversified, and cross-scalar initiatives in the Amazon. *Global Environmental Change*, *82*, 102718. https://doi.org/10.1016/j.gloenvcha.2023.102718

Luna-González, D. V., & Sørensen, M. (2018). Higher agrobiodiversity is associated with improved dietary diversity, but not child anthropometric status, of Mayan Achí people of Guatemala. *Public Health Nutrition*, *21*(11), 2128-2141. https://doi.org/10.1017/S1368980018000617

Maharjan, K. L., Singh, M., & Gonzalvo, C. M. (2023). Drivers of environmental conservation agriculture and women farmer empowerment in Namobuddha municipality, Nepal. *Journal of Agriculture and Food Research*, *13*, 100631. https://doi.org/10.1016/j.jafr.2023.100631

Maas, B., Pakeman, R. J., Godet, L., Smith, L., Devictor, V., & Primack, R. (2021). Women and Global South strikingly underrepresented among top-publishing ecologists. *Conservation letters*, *14*(4), e12797. https://doi.org/10.1111/conl.12797

Noack, F., Larsen, A., Kamp, J., & Levers, C. (2022). A bird's eye view of farm size and biodiversity: The ecological legacy of the iron curtain. *American Journal of Agricultural Economics*, *104*(4), 1460-1484. https://doi.org/10.1111/ajae.12274

Padmanabhan, M. (2011). Women and men as conservers, users and managers of agrobiodiversity: A feminist social–ecological approach. *The Journal of Socio-Economics*, *40*(6), 968-976. https://doi.org/10.1016/j.socec.2011.08.021

Pawera, L., Khomsan, A., Zuhud, E. A., Hunter, D., Ickowitz, A., & Polesny, Z. (2020). Wild food plants and trends in their use: From knowledge and perceptions to drivers of change in West Sumatra, Indonesia. *Foods*, *9*(9), 1240. https://doi.org/10.3390/foods9091240

Pham, T. P., Chi, N. T. K., Truong, T. A., & Vu, N. H. (2023). Inquiries into farmers' perception of biodiversity in Vietnam: A systematic analysis. *Forum for Social Economics*, 1–22. https://doi.org/10.1080/07360932.2023.2288793

Picot-Allain, M. C. N., & Emmambux, M. N. (2023). Isolation, characterization, and application of nanocellulose from agro-industrial by-products: A review. *Food Reviews International*, *39*(2), 941-969. https://doi.org/10.1080/87559129.2021.1928689

Pfeiffer, J. M., & Butz, R. J. (2005). Assessing cultural and ecological variation in ethnobiological research: the importance of gender. *Journal of ethnobiology*, *25*(2), 240-278. https://doi.org/10.2993/0278-0771_2005_25_240_acaevi_2.0.co_2

Powell, B., Bezner Kerr, R., Young, S. L., & Johns, T. (2017). The determinants of dietary diversity and nutrition: Ethnonutrition knowledge of local people in the East Usambara Mountains, Tanzania. *Journal of Ethnobiology and Ethnomedicine*, *13*, 1-12. https://doi.org/10.1186/s13002-017-0150-2

Reynolds, T., Tobin, D., Otieno, G., McCracken, A., & Guo, J. (2020). Differences in crop selection, resource constraints, and crop use values among female-and male-headed smallholder households in Kenya, Tanzania, and Uganda. *Journal of Agriculture, Food Systems, and Community Development*, *9*(4), 65-92. https://doi.org/10.5304/jafscd.2020.094.011

Santoso, M. V., Kerr, R. N. B., Kassim, N., Martin, H., Mtinda, E., Njau, P., ... & Young, S. L. (2021). A nutrition-sensitive agroecology intervention in rural Tanzania increases children's dietary diversity and household food security but does not change child anthropometry: results from a cluster-randomized trial. *The Journal of Nutrition*, *151*(7), 2010-2021. https://doi.org/10.1093/jn/nxab052

Saxena, A. K., Fuentes, X. C., Herbas, R. H, & Humphries, D. L. (2016). Indigenous food systems and climate change: impacts of climatic shifts on the production and processing of native and traditional crops in the Bolivian Andes. *Frontiers in Public Health*, *4*, 175055. https://doi.org/10.3389/fpubh.2016.00020

Singh, R. K., Bhardwaj, R., Sureja, A. K., Kumar, A., Singh, A., Hazarika, B. N., ... & Rallen, O. (2022). Livelihood resilience in the face of multiple stressors: biocultural resource-based adaptive strategies among the vulnerable communities. *Sustainability Science*, 1-19. https://doi.org/10.1007/s11625-021-01057-z

Singh, R. K., Turner, N. J., & Pandey, C. B. (2012). "Tinni" Rice (Oryza rufipogon Griff.) production: an integrated sociocultural agroecosystem in Eastern Uttar Pradesh of India. *Environmental Management*, *49*, 26-43. https://doi.org/10.1007/s00267-011-9755-8

Suzuki, A., Nam, H. V., & Lee, G. (2023). Reducing antibiotics use among smallholders: Experimental evidence from the shrimp aquaculture sector in Vietnam. *Aquaculture*, *572*, 739478. https://doi.org/10.1016/j.aquaculture.2023.739478

Sylvester, O., & Little, M. (2021). "I came all this way to receive training, am I really going to be taught by a woman?" Factors that support and hinder women's participation in agroecology in Costa Rica. *Agroecology and Sustainable Food Systems*, *45*(7), 957-980. https://doi.org/10.1080/21683565.2020.1811830

Ulimboka, R., Mbise, F. P., Nyahongo, J., & Røskaft, E. (2022). Awareness of urban communities on biodiversity conservation in Tanzania's protected areas. *Global Ecology and Conservation*, *38*, e02251. https://doi.org/10.1016/j.gecco.2022.e02251

Valencia, V., Wittman, H., Jones, A. D., & Blesh, J. (2021). Public policies for agricultural diversification: Implications for gender equity. *Frontiers in Sustainable Food Systems*, *5*, 718449. http://doi.org/10.3389/fsufs.2021.718449

Villamor, I., Hill, N. S., Kossek, E. E., & Foley, K. O. (2023). Virtuality at work: A doubled-edged sword for women's career equality? *Academy of Management Annals*, *17*(1), 113-140. https://doi.org/10.5465/annals.2020.0384

VnEconomy. (2023). Science and technology has "contributed" to the growth of the fisheries sector. https://vneconomy.vn/khoa-hoc-cong-nghe-da-gop-suc-cho-tang-truong-cua-nganh-thuy-san.htm

Zheng, W., Luo, B., & Hu, X. (2020). The determinants of farmers' fertilizers and pesticides use behavior in China: An explanation based on label effect. *Journal of Cleaner Production*, *272*, 123054. https://doi.org/10.1016/j.jclepro.2020.123054

Zimmerer, K. S., Jiménez-Olivencia, Y., Ruiz-Ruiz, A., & Porcel-Rodríguez, L. (2020). Agri-food land transformations and immigrant farm workers in peri-urban areas of Spain and the Mediterranean. *Land*, *9*(12), 472. https://doi.org/10.3390/land9120472

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