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Gender roles and ethnicity in agricultural water management: a case study of Tinh Bien District, An Giang Province, Vietnam

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Abstract. Women form a crucial part of Vietnam's agricultural labor force and contribute to national economic development. Still, often the nature of their contribution is inadequately recognized by broad sectors of society. Due to entrenched gender roles and norms, women's influence over agricultural activity decision-making at the household and institutional levels is limited and poorly acknowledged. This paper explores women's participation at a household and local level in agricultural water resources management. This research draws upon field studies conducted in Tinh Bien district, An Giang province, Vietnam, a predominantly wetlands environment but with some prominent low hills that present different challenges for water management. The study employed focus group discussion, in-depth interviews, and participant observations to gather data at households and higher levels of governance. The findings highlight that despite being central to socio-economic production across multiple aspects of water wetlands management, women's voices are overlooked for inclusion within management institutions. It was noted that Khmer minority women tend to be better represented at the household level than Kinh women, but both Khmer and Kinh women's decision-making power over wetlands and water management at higher institutional levels is still limited.

Keywords: Agriculture, water resources management, women participation.

1. Introduction

People living in rural areas across the Mekong region rely highly on natural resources for their livelihood and well-being. Women are a crucial part of the agricultural labor force in Vietnam and make an essential contribution to national economic development, but this is often not fully recognised by society or the government. In 2014, 48 percent of women and 45 percent of the male workforce were engaged in agriculture. However, much of this is part-time and seasonal work, with women often simultaneously involved in several economic sectors [1]. Women play significant roles in agricultural production and



managing water resources, but their contributions are often invisible, and their voices are not fully included in decision-making platforms [2, 3]. Due to entrenched gender roles and norms, women's decision-making power over wetlands and water management at both the household and institutional levels is still limited. Women often don't have an adequate or equal voice in wetlands management institutions, both formal and informal, sometimes resulting from traditional gender stereotyping about women's roles, social prejudices, and cultural practices. According to a 2013 State Report to the CEDAW Committee, "Rural Vietnamese women are still less privileged than men. The primary reason lies in the unequal access to and controls over key resources in agriculture and the lack of gender sensitivity in agricultural services" [4].

Even though being the main user of water resources, women are commonly excluded from committees and organizations managing water resources from the local level upwards. One main reason is rooted in a social belief that water resource management is a highly technical field better suited to the interests of men. Currently, women's participation in water governance is assessed only by the number of women present at meetings. When women participate in community water governance meetings, they often do not voice their opinions and participate less when senior male officials are involved, perhaps out of deference to authority figures. Poor ethnic women disproportionately experience exclusion from community water decision-making, in some cases due to language barriers. Most participants in science-technology transfer activities or irrigation management training courses are men. Heads of cooperatives and irrigation management groups are men, as are most local village and commune chiefs. Therefore, all local irrigation management institutions tend to be male-dominated [5].

This paper aims to explore the distinct roles and contributions of women and men in agricultural production and managing water resources; the participation of women in decision-making platforms in wetlands resources management and their participation in multi-scalar wetland management institutions; the underlying factors for limited female representation and participation in wetland management institutions. This research draws upon field studies conducted in two multi-ethnic communes in Tinh Bien district, An Giang province, Vietnam, located near the border with Cambodia.

2. Methods

2.1. Study areas

Tinh Bien district is a border district where locals rely highly on wetland resources for their livelihood. However, it is a heavily modified environment for intensive agriculture, and in recent years there has been a steep decline in the productivity of riverine and aquatic habitats. Residents' main livelihood occupation is agriculture, especially rice cultivation, with increasing transformation to vegetable or orchid farming due to environmental decline and climate change in recent years. Tinh Bien district is primarily a lowland, floodplain area of An Giang province, but with several isolated hilly or upland areas across the district with distinctive local geography, history, land, and water management practices, and cultural affinities. Tinh Bien district population is mostly Kinh, the dominant ethnic group of Vietnams, but with some Khmer majority villages, in the communes of An Phu and Nhon Hung that form the focal study sites in this research. The Kinh ethnic group, also known as Viets, is the majority ethnic group in Vietnam and An Giang province.

Meanwhile, the Khmer is the Mekong delta's largest ethnic minority group. They have their language, Khmer, and almost all practice Theravada Buddhism. Khmer is commonly reported as a locally disadvantaged group, and their poor socio-economic status is accounted to their shortage of capital, heavy reliance on incomes from agricultural production, and high levels of landlessness, geographical remoteness, and language barriers. They are marginalized in economic, social, and cultural facets and disadvantaged in business and officialdom [6]. The map of study sites is presented in figure 1, and the general data of study sites are shown in table 1.

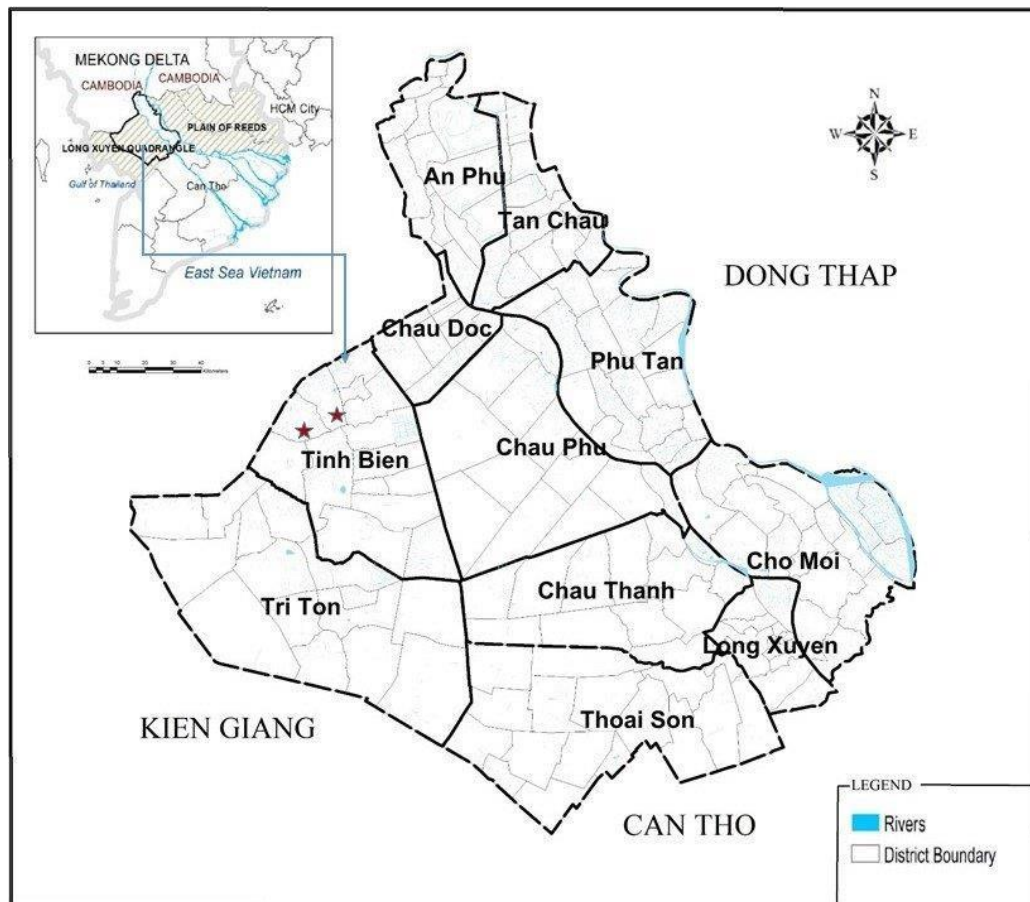


Figure 1. Map of An Giang province in Vietnam (Note: ★ study sites).

Table 1. General data for research sites.

Items	Nhon Hung commune	A Phu commune	Tinh Bien district
Total area (ha)	1,892.3	2,163.5	35,468.9
Agricultural area (ha)	1,665.3	1,946.5	31,308.9
Rice area (ha)	1,406.6	821.9	21,775.6
Forestry area (ha)	165.4	470.4	5,287.9
Population (people)	6,015	8,076	122,160
Male: female ratio	0.95	1.00	0.95
Kinh	5,827	7,276	85,693
Ethnicity Khmer	178	785	35,922
Others	2	6	404

(Adapted from District statistic book, 2018 [7])

2.2. Data collection and sampling strategies

The study involved a desktop study, a focus group discussion with local farmers, and in-depth interviews with district and communal officers, water line owners, and local farmers. This study is qualitative research, and to get insights into gender and ethnic diversity, I involved interlocutors from a variation in gender and ethnicity. The interviews were done in person, mostly in Vietnamese, and a Khmer student translated interviews with Khmer people. Pseudonyms were applied to protect the interviewees' privacy. Interviewees were asked about three research themes women's and men's roles in agricultural activities and water resources management, women's decision-making institutions at the various tiers regarding water management (i.e., from household to village or commune to district level), and the present barriers or obstacles to achieving more inclusive representation and participation by women. In addition, observation was applied to understand the villages' context and cross-check information collected from interviews and focus group discussions. The research results and observations are preliminary and provisional as the research is still in the ongoing process of fieldwork study. Thematic analysis was employed to analyze the data in this study. The interviews were transcribed, and the data were categorized into a visual layout of the categories to develop main themes. More data were added to each category and theme to uncover the roles of women and men in agricultural activities and water resources management, decision-making regarding water management, and the current barriers to achieving more inclusive representation and participation by women.

3. Results and discussion

3.1. Eco-cultural contexts-low lands and uplands

The study area incorporates two different eco-cultural settings, divided by the large Vinh Te canal, a major transport and drainage waterway close to the border with Cambodia. The Lowland floodplain of the Mekong River dominates, interspersed with a series of small hills that rise out of the floodplain and form prominent features in the landscape. The hills are closely associated with the ancient Oc-Eo and later Khmer cultures, based on archaeological evidence, and today are still occupied by villagers predominantly of Khmer ethnicity. People living in the low land area have easier access to water sources, which is advantageous for their agricultural production. In contrast, people living in the upland face water shortage, so their agricultural production is unstable. Kinh ethnic people reside in the lowland area, while Khmer ethnic minorities gather around their pagodas in the upland area. Under two different ecological and cultural conditions, livelihood activities in the two settings are also different.



Figure 2. Two contrasting eco-cultural contexts (Uplands growing peanuts on the left side, low land cultivating corn on the right side) (Source: Field study, in the dry season on March 20th, 2021).

The lowland fields are areas on the Mekong floodplain subject to periodic periods of flooding in the wet season and occasional droughts. The area is crisscrossed with numerous canals, which provide both transportation routes and sources of water for irrigation, with smaller supply canals leading water into the field, providing reliable supplies for agricultural production. Water supply is enough for cultivating at least two rice crops annually, sometimes three. An Giang province has prioritized intensive rice

production for many years as a core policy objective. After harvesting the summer-autumn crop, people pump water into the fields to wash out alum and increase the silt and fertility of the field. In recent years, erratic weather conditions and other natural disasters, including rat infestations, have made rice farming difficult, decreasing yields and incomes in the sector. The Covid 19 pandemic has exacerbated the situation, although it may have reduced the rate of out-migration from rural areas, thus increasing labor availability, at least temporarily. In recent years, more farmers have transitioned from rice to vegetable farming, such as corn or chili, due to decreasing incomes from rice farming. While fishing was formerly an important source of livelihood for villagers living around canals, especially in the wet season, the quantity of fish caught has been decreasing steadily in recent years, according to numerous reports, as the upstream hydrology of the Mekong River has changed [8], [9]. Villager reports note that in 2011, there was major flooding and plenty of fish. Still, following the construction of many upstream hydroelectric dams and numerous other environmental changes, the quantity of natural fish has decreased by nearly 90%. In 2020, the flood water came late and withdrew soon, and the quantity of fish was much less than in previous years (KIP interview and group discussion, 2020). A farmer in a lowland field in Nhon Hung commune shared that *"in the past few years, after two rice crops, I could earn supplementary income from fishing during the flood season. However, in recent years, the flood has declined in height, and fewer fish are in the canal, so I have not been able to live on fishing in flood season. Instead, I have had to work as hired labor"* (Mr. Hoang, 2021).

In upland areas, farmers are more vulnerable in terms of steady agricultural production as they face occasional water shortages, especially in the dry season. Pumped irrigation water from the canals does not extend to the higher ground on the hills. There are few water storage facilities, so villagers only tend to cultivate crops in the rainy season. They rely mostly on rainwater or diverting water from small ditches and streams flowing from the hills to their fields. Rice cultivation is restricted to a single crop per year in the rainy season—from August to December. After the rice is harvested, the land will be left empty to grow grass for cows. Some households grow chili and sweet potatoes after the rice crop is completed. Many farmers have shifted from rice farming to vegetable farming. In addition, making palm sugar is a main source of income for Khmer ethnic people. Collecting herbs also brings certain income for landless or elderly locals in the upland area (Key informant interview and focus group discussion, 2020).

3.2. The roles of women and men conducting agricultural activities in the two ethnic groups

Villagers in upland and lowland sites rely heavily on natural resources and agricultural activities for their livelihood. The field observations note that women and men work together on most agricultural tasks, but men are the main decision-makers. In contrast, women's positions and roles are considered subservient within households. As in most other societies, men and women have different roles and responsibilities in agricultural production [10]. Consistent with FAO [11] and Lebel et al. [12], this study also finds that in agriculture, the traditional division of labor between men and women normally depends on the physical nature of work and if it is skilled or unskilled work. Women are typically assigned meticulous, time-consuming, and care-related work, while men are responsible for the heavier and more technical-related work. For example, in crop production, women are often responsible for sowing, transplanting, seedlings, weeding, and selling products, while men do works that require physical strength, such as preparing land for cultivation, watering crops, and spraying pesticides. In small-scale animal husbandry, women are more involved in activities close to the house so that they can manage in parallel with doing housework such as feeding, washing, and selling products while doing heavy work such as collecting weeds, and cleaning the barn are men's jobs.

Besides these agricultural activities, Khmer villagers also derive income from collecting herbal medicine plants and making palm sugar. Collecting herbs brings reliable income for unemployed and landless elderly Khmer women and men. Normally, Khmer women go in groups to hilly areas to collect herbs, which are then processed by chopping and drying, while men also can share these tasks with women, but they are more responsible for transporting dried herbs to sell in shops and the market. Women in almost all households are the keepers of money earned from herb collecting as they are

considered more careful than men. Similarly, men do much of the heavier work in making palm sugar, such as climbing into the tree to collect palm fruits and transportation. At the same time, women are responsible for cooking and processing palm sugar.

Since 2000, under the influence of climate change and other environmental changes, agriculture has become more precarious as a livelihood source, so more young locals have left their hometowns for cities to work in factories and other jobs. The district reports that until February 2021, there were 470 migrants (272 men and 198 women) in An Phu commune, 76 of whom were Khmers. They occupy 5,8 percent of the commune population. In Nhon Hung commune, there are 393 migrants (213 men and 180 women) and 26 of them are Khmer, occupying 6,5 percent of the commune population [13]. The actual number of migrants must outnumber this recorded number as we hardly see the young in study areas during our fieldwork. An old Khmer local said, *"We cannot live on agricultural activities, so our children move to work in cities to have better income, and their remittance helps us build our new house. Many young locals, including both male and female, have migrated, and the left behind is only the elderly and the children"* (Ms. Neang Thi, 2021).

3.3. Water resources accessible in two different contexts

In the past, lowland people used canal water directly for daily domestic purposes, while upland people, without access to reliable surface water sources, mainly used well water. To ensure all local people have safe water for domestic consumption, government agencies have invested in building public piped water for household usage. Up to 2016, piped water connections have been installed in every household in both study communities. Since then, daily clean consuming water is no longer a problem for locals in both two study sites. In lowland areas, farmers have land close to canals that can irrigate their farms with the available surface water source. Those farmers having fields far away from the canals register their pumping needs to the private water line owner. The private water line owner is responsible for pumping and controlling water levels to meet the needs of a farmer during their crop, and farmers pay him a fee at an agreeable rate. Mr. An, an owner of a waterline, said, *"At first, I bought a water pump for my farming usage, and many neighboring farmers asked for pumping to their rice fields, so I started my business. With the permission of the local authority, I invested in building the waterline to irrigate and control the water level for farming. The fee rate is decided by the involvement of three partners, including farmers, waterline owners, and local authorities. The Commune People's Committee organizes a meeting for farmers and waterline owners to negotiate a reasonable fee rate for both."*

Water for farming is a more serious concern for locals in an upland area, as water supplies are far more limited in quantity and season. For cultivation, upland farmers mainly rely on direct rainfall or water from the "ô" [Khmer terms meaning a ditch] running from the hills to irrigate their farms. However, there has been less rainfall in the last ten years, and the water flow in the ditches has decreased. Due to limited water supplies, upland farmers can only grow rice one crop per year in the rainy season, and many leave their land fallow or grow grass to feed cattle, providing an alternative income stream. To maintain sources of livelihood through the dry season, many local people work as seasonal hired labor, which is generally low-paid and precarious.



Figure 3. A ditch running from the hill (left photo) and upland farmers using plastic pipes to take water for irrigation (right photo) in Tay Hung village, Nhon Hung commune (Source: A field study on December 5th, 2020).

To facilitate agricultural activities for farmers in the upland area, the District People's Committee has established the Bông Đình Nghĩa pump station, designed and built in 2018 and operated since 2019 in An Phu commune. With the operation of the pump station, upland farmers in this area can grow two crops per year. However, due to the design limitation, the pump station cannot irrigate for some higher upland farms (Key informant interview, 2021). However, there is no pump station in the upland area in Nhon Hung commune. To Mr. Phong, *"because the terrain areas are steep, with a small farming area of 90 hectares in this higher place, it is not possible to invest in a water pumping system because it is inefficient. In recent years, many farmers spontaneously convert their rice crop to coconut and mango because rice cultivation is ineffective."*

3.4. Women's engagement in water governance institutions

This research explores women's decision-making at several scales, including within households, community public spaces, and water management institutions. Most people in the district are engaged in agricultural production and depend heavily on water resources. Men and women are a crucial part of the agricultural labor force in these two ecological contexts and make an essential contribution to family income, but this is often invisible to their own families and the larger society. As mentioned in the previous section, there is a traditional labor division between men and women in agricultural activities, and irrigating or watering crops are socially assigned male job as it is heavy and technical work.

At the household level, in agricultural cultivation, the men are in charge of pumping water or petitioning the irrigation staff for assistance. Because this is male work, women are often less concerned about this activity. However, in female-headed households, women also take part in this activity. (Mr. Toan, a Kinh rice farmer in Nhon Hung commune, March 21st, 2021)

This finding reinforces Lebel et al.'s [12] view that irrigation is considered masculine. Through observation, the study found that men are more responsible and decisive on time and the quantity of water to irrigate the rice field. At the same time, women mainly help with supplementary work such as buying gasoline or looking after the uring irrigation process. Ms. Phuong, a female Kinh farmer explained:

"When irrigating our rice fields, after my husband started their pump, I would help to look after it to ensure the machine was running and pumping enough water to the rice field. If there was a problem, I would ask my husband to fix it as I am not good at this technical and heavy work" "(In-depth interview, March 21st, 2021).

On the other hand, women are more involved and decisive in irrigation work in female-headed households. They are more aware of where to take water and when and how much to irrigate their crop. Ms. Neang Nhol, a Khmer female-headed household farmer, shared that *"under the water shortage, she transformed her rice field to chili crop. She is the main worker and decision-maker in farming, including irrigation work, she decides when and how much water to rinse, and she irrigates her chili farm by pumping water from the ô. She prepares plastic water pipe and borrows a pumping machine from her neighbor and with the help of her neighbor in transporting and installing the pumping machine."*

As this is a socially assigned male job, mostly men, except in female-headed households, are the representatives of the family to contact the private waterline owner or irrigation officer in cases related to farming irrigation. And officially, men are more likely to be members of agricultural cooperatives and water user groups. Mr. An, a private water pipe owner of 17 hectares area in the Northern Vinh Te canal for 30 years, shared almost male farmers are responsible for taking water to their fields, and only a few female farmers take water for their farms. However, most men contact him when there is a problem with irrigation in their rice fields as they are the head of the households. However, women are more anxious when they see insufficient water for their rice fields, and they tend to hasten to pump for their rice fields more intensively. His sharing has shown the social norm that men are the head of households in the Kinh family and men should be the representatives of the family in the public domain and his belief that women are better at detail works.

The study also found that even though women play an important role in agricultural production, their engagement in meetings on water management and irrigation operation is normally under numbered as compared to men. Field observation uncovers that domestic work is socially assigned to women's jobs in both Kinh and Khmer communities and Kinh and Khmer women are overwhelmed with domestic work besides farming, so they hardly have time to attend meetings. Women's limited participation in public spheres leads to limited opportunities for women's voices heard in higher levels of decision-making outside their household [2, 10, 14]. However, an interesting finding is the difference between Kinh and Khmer women participating in the meetings. To Ms. Hoa, a commune officer, *"Mostly Kinh men are the representatives of the households to public activities, Kinh women rarely attend the meeting, they only attend when their husbands are busy or there is no man in the house, normally in Kinh community, only about one-third of attendant in the meeting are Kinh women. On the other hand, Khmer women attend the meeting as much as Khmer men, normally, in the Khmer community, more than half of the attendants are Khmer women."*

Such differences are rooted in differences in gender norms across ethnic groups. To Kinh people, men are socially considered the main workers in farming, they are knowledgeable, and they are the head of households, so they should be the representatives of the family to attend meetings or training. This case study has strengthened the UN Viet Nam [1] analysis of gender norms that even though women are expected to contribute economically, they are still seen as subordinate to their husbands. And it is strongly believed that a women's domain is within the home while a man's domain is outside the home. On the other hand, a common social discourse in the study area is that gender relation in the Khmer family is far less patriarchal than in Vietnamese family, and Khmer women are commonly the main decision-makers in the Khmer family (Focus group discussion, 2021). To Mr. Khane, a Khmer commune officer, *"In the Khmer community, women are considered the roof of the house, so they should be attendants in the meetings or training"* (Key informant interview, 2021).

However, women's attendance does not ensure their full inclusion in achieving information or making decisions. In the meetings, female attendants often unfocus, they rarely raise their voices except when they are asked. Mr. Tam, a Kinh rice farmer, said, *"He is the representative in his household to attend the meeting on irrigation operation, and there are only a few women in the meeting, and he rarely*

hears women raise their opinions" In consistent with Resurreccion et al.[15] and Default, K and Yeophantong P [5], the findings also found that one of the biggest barriers to a woman's ability to raise her voice comes from her uneasiness with speaking publicly. They may not always feel safe or comfortable speaking openly and sharing their perspectives for several reasons. They may lack self-confidence with technical language, or under the outnumber of more knowledgeable men, women feel unconfident to express their opinion, or they are reluctant to speak because they do not think they have a role in water governance [10, 16]. On the other hand, more Khmer female participants are in the meetings, but they face language barriers. Khmers communicate in the Khmer language among their community, and most old Khmers cannot communicate in Vietnamese. Still, all meetings and training are delivered in Vietnamese, so their engagement is also insufficient. At the family level, regardless of whoever attend the meetings, any important decisions related to agricultural production and water usage or operation are made with a consultancy with their spouse. Most Khmer women are the main decision-makers. Kinh women participate at the consultative level; they discuss with their husbands, and normally men make final decisions. (Key informant interview and focus group discussion, 2020). Mr. Binh, the head of the district pumping station, said, *"In the construction pumping system, the commune management board and investors directly meet households in the construction site to negotiate about constructing along their farms. The woman is the decision maker in meeting with Khmer households, while for Kinh households, they negotiate with the men or the person working directly on the farm."*

In line with Resurreccion et al. [17], women in the study areas are under-represented within water management organizations. In the Tinh Bien district, there are 14 communes, and 14 officials are in charge of irrigation, but only one of these 14 officials is female (Key informant interview, 2021). In addition, to Mr. Binh, the head of the pump station, there are four pump stations, and three staff in each station, all staff in four pump stations in Tinh Bien district are all male, except one accountant. He explains that *"Irrigation work is heavy work, so the staff must have the physical strength to repair machinery"* This can be accounted to the social norms in which men are responsible for heavy and technical work. Women are good at caring and detail works. Irrigation requires a lot of physical strength, so it is suitable for men. Therefore, all local irrigation management institutions tend to be male-dominated, socially considered a technical field and traditionally perceived as a masculine domain [18, 19]. This research finding has strengthened Nguyen et al.[3] that women's voices are often marginalized or excluded from decision-making platforms and Lebel, L. et al.'s findings [12] in gender relations in water management in Northern Thailand that men dominate decision-making positions in both community-based and state-led water organizations. Consistent with the study on the women's role in agriculture and irrigation management in a communal area of the Red River Delta basin in Vietnam [20], this research also uncovers that men are dominated the wetland management board. In the Tinh Bien district, the number of women in a leadership position is also very low. There are 62 cooperative groups in agricultural activities, and only two among 62 cooperative group leaders are women (Key informant interview, 2021). These findings have uncovered that gender-equal participation and women's leadership are mostly found at micro-levels, and their participation often decreases as engagement scale-up [2]. With the limited representatives of women in decision-making boards in water and wetland management, women's voices and their needs are often excluded, which further positions women at subordinated status in wetland management.

4. Conclusion

This study has highlighted several critical findings that female participation in water governance institutions is rather low and mostly restricted to the micro-level, such as within the household, to a certain degree at the village and commune levels. At the district level, the results have shown that women are seriously under-represented in water and irrigation management institutions, which is reflected in both the quantity and quality of participation. At this stage of the research process, the results are still quite superficial, and further fieldwork is needed to tease out more profound observations regarding the quality of participation and conclusions by more in-depth analysis. This imbalance seriously constrains female voices in decision-making processes, thus implying their collective interests are not being heard

or are under-represented. According to Agarwal's typology [21] of participation categories, women's involvement would primarily qualify as nominal or passive participation at best. The study also reveals interesting findings that due to different cultural and social norms in the two ethnic groups, the participation of women in public spaces was also different between Khmer and Kinh women. More Khmer women tend to attend meetings regarding water management than Kinh women. However, for various reasons, including language barriers, Khmer women are only better represented in the village and commune-level groups than their Kinh female counterparts. Above this level, Khmer women are poorly represented in water and wetlands management institutions. The project findings highlight that at the communal and district levels, the number of women managing the water resources board is very modest. The social norms and the gender division of labor are the primary factors hindering their engagement in water governance.

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