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Shifting the aquaculture regime toward gender equity? Case studies of women's entrepreneurial niche innovations in Bangladesh

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ABSTRACT

Efforts to promote women's participation, benefits, and empowerment in aquaculture entrepreneurship face persistent challenges rooted in patriarchal norms, policy frameworks, and local contexts. This article investigates how women's entrepreneurship, supported by targeted programs, can help address these entrenched barriers. To do so, we employ the multi-level perspective (MLP) framework, which examines women's entrepreneurial "niches" in relation to the dominant "regime" of local policies, public action, and gender norms. Our central aim is to understand how supporting women's entrepreneurship can drive systemic change within aquaculture. Using a governance framework, we analyze strategies applied in two pilot interventions in Bangladesh, seeking to identify the limitations of current governance approaches and to propose strategies for establishing a more gender-equitable aquaculture regime. Our analysis reveals that existing strategic frameworks often fail to capture the agentic actions women take prior to program implementation and do not sufficiently address the influence of social and gender norms. Based on our findings, we recommend integrating gender transformative approaches and agentic strategies into governance frameworks, with the goal of challenging the prevailing regime and fostering greater gender equality in aquaculture. This approach recognizes women's proactive roles and the importance of reshaping governance to support systemic gender equity.

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Gender; women's entrepreneurship; multi-level perspective; innovation; aquaculture

Introduction

Globally, governments, development organizations, innovation brokers, and large private sector actors in emerging economies are encouraging both women and men to become more entrepreneurial (Manning & Vavilov, 2023, Kirkwood, 2009).

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They particularly support women in seizing new business opportunities and exploring niche innovations beyond basic entrepreneurship (Levi-Strauss, 1962). Initiatives include women-only support networks, venture capitalists, business incubation (Marlow & McAdam, 2015), acceleration programs, private partnerships, business development training, and the creation of risk capital infrastructure and angel investment networks. Combined with “push factors” like limited employment options and poverty, making self-employment a necessity (Kirkwood, 2009), these initiatives seem to have boosted women’s entrepreneurship rates (International Labour Organization [ILO], 2018).

Socio-cultural norms around mobility, ownership, and control limit women’s entrepreneurial growth despite supportive efforts. Men own two-thirds of global businesses (World Economic Forum, 2022), while women-owned SMEs face a \$1.48 trillion credit gap (IFC). The pandemic worsened gender disparities as women took on caregiving roles (Global Entrepreneurship Monitor [GEM], 2022). Critics argue that women-focused initiatives may reinforce inequalities by confining them to gendered niches without addressing systemic issues (Ahl, 2004, 2006; Harrison et al., 2020). Stereotypes further restrict women to small-scale enterprises, often relying on tactics like commodity feminism for sales (Daily, 2019).

Evidence-based insights are essential for developing business models that avoid reinforcing gender disparities. However, the relevant literature on entrepreneurship remains predominantly masculine (Ahl, 2006; Harrison et al., 2020), with conventional depictions of entrepreneurs relying on masculine norms and traits (Dean & Ford, 2017) and primarily focusing on women’s performance gaps relative to men (Dean et al., 2019). This approach overlooks the gender relational, social, and institutional structures that shape entrepreneurial contexts¹ (Brush et al., 2009; de Bruin et al., 2007; Marlow & McAdam, 2012; Muntean & Ozkazanc-Pan, 2015). Consequently, there is a knowledge gap regarding whether inclusive business models and strategies for encouraging women’s participation can trigger systemic changes.

This study aims to address the gap in knowledge by examining women’s entrepreneurial niche development in aquaculture, which faces significant constraints from the prevailing socio-technical regime. It will explore how women’s niche innovations and management, including gender-transformative approaches, can potentially reconfigure the regime toward a more gender-equitable aquaculture system. The paper focuses on two case studies of interventions with transformative ambitions to strengthen women’s entrepreneurial niches in aquaculture. It views these interventions as niches within a broader system, where new ideas and structures emerge. The study examines small pilots where men and women, supported by programs, strive to build women’s entrepreneurship in a patriarchal aquaculture system. It addresses the following research questions:

In what ways do men, women, and a research-for-development initiative strategically engage with women’s entrepreneurial niches to promote a more gender-equitable system? What contributions do strategies targeting norms and legal rights play in destabilizing the incumbent system?

The paper is structured around a research context and a conceptual orientation followed by a methodology, results from Case Study 1 and Case Study 2, an analyses of the two cases, followed by a discussion and conclusion.

Research context: Women's entrepreneurship in Bangladesh and the IDEA project

In Bangladesh, women own 7.2% of the 8 million businesses, primarily in the cottage, micro, small, and medium enterprise categories (International Finance Corporation [IFC], 2016; Ahammad & Moudud UI-Huq, 2013). A 2018 UNCDF report also indicates that out of 1.3 million micro-merchants, about 94,800 are women, often operating informally without trade licenses.

Despite progress, few female entrepreneurs access loans. Bangladesh Bank noted a rise from 21,400 to 57,732 female entrepreneurs obtaining loans in 2021. However, this remains a small proportion. The Mastercard Index of Women Entrepreneurs (2022) ranks Bangladesh poorly at 32.5 points, citing socio-cultural, economic, and financial hurdles.

Women hold 1.4 million of 17.8 million jobs in aquaculture and fisheries but often occupy lower production roles (Asia & Pacific Commission on Aquacultural Statistics [APCAS], 2016). In rural areas, limited opportunities push women toward self-employment. NGO-led homestead initiatives have boosted women's participation in aquaculture, yet socio-cultural norms around mobility, ownership, and control hinder their business growth and equitable benefits (Kruyissen et al., 2021). Women's business ownership is concentrated in agriculture, forestry, hunting, gathering, and fishing.

To support women's entrepreneurship, the government established the SME Foundation and Bangladesh Bank's "Small Enterprise Refinancing Scheme." Financial institutions must allocate at least 10% of credit guarantees to women² entrepreneurs. Despite these efforts, barriers like lack of information, corruption, bureaucracy, facilitation fees, and time constraints persist (International Finance Corporation [IFC], 2014). The government and IFC have simplified and expedited the business registration process (Chowdhury & Rabbani, 2013).

The IDEA project, funded by the Bill and Melinda Gates Foundation and executed by WorldFish (2018–2022), aimed to empower women in aquaculture in Bangladesh and Nigeria. Initial scoping studies (Haque et al., 2020) revealed women's limited visibility and inequitable benefits despite their significant contributions. To address this, pilot experiments were conducted to strengthen women's entrepreneurial niches and promote gender equity in aquaculture systems. This paper investigates two such pilots to explore how women's innovations can reshape the aquaculture regime for greater inclusivity.

Conceptual orientation: governance strategies in niche management

The Multi-Level Perspective (MLP) explains system transformation through interactions at three levels: niche, regime, and landscape. Niches foster experiments and innovations that, along with landscape pressures (e.g., societal or political changes), challenge the incumbent regime to adopt new practices. However, this process is gradual and requires significant structural changes within the regime (Bui et al., 2016; Bush & Marschke, 2014; van Rijnsoever & Leendertse, 2020).

Applying an MLP lens in this study is beneficial for understanding the macro multidimensional issues and priorities that can facilitate the transition of women's gender niches at the regime level (see Figure 1). Historically, the MLP lens has been instrumental in comprehending how complex social-technical systems evolve over time (Leeuwis et al., 2021), which is crucial for systemic transformation of gender relations in food systems.

However, while the MLP provides a valuable perspective on transformation, it does not explicitly address gender and socio-normative aspects (see Petesch, 2022). Figure 1 below integrates the Multi-Level Perspective with gender transformative change across multiple dimensions to illustrate the intersections. Gender transformative approaches

"represent a shift toward engaging with the underlying constraining social structures and intersectional power dynamics that perpetuate gender inequalities across scales. In doing so, they add value to the sectors by helping unmask and address the systemic fault lines of complex inequalities and institutionalized power and politics, exclusion, and inequality." (McDougall et al., 2021a, p. 388).

Niche-level strategies aim to disrupt entrenched systems through targeted innovations. This study analyzes two case studies where niche-level initiatives and program-driven strategies challenge patriarchal aquaculture structures to advance gender equality. Using Strategic Niche Management (SNM)—a governance framework for fostering innovation in protected niches (Melchior and Newig, 2021)—the research evaluates how these interventions drive systemic change. While SNM has rarely been applied to women's entrepreneurship in agrifood systems, the study links its strategies to Leeuwis et al.'s (2021) governance approaches (Table 1), emphasizing resistance mitigation and regime reconfiguration.

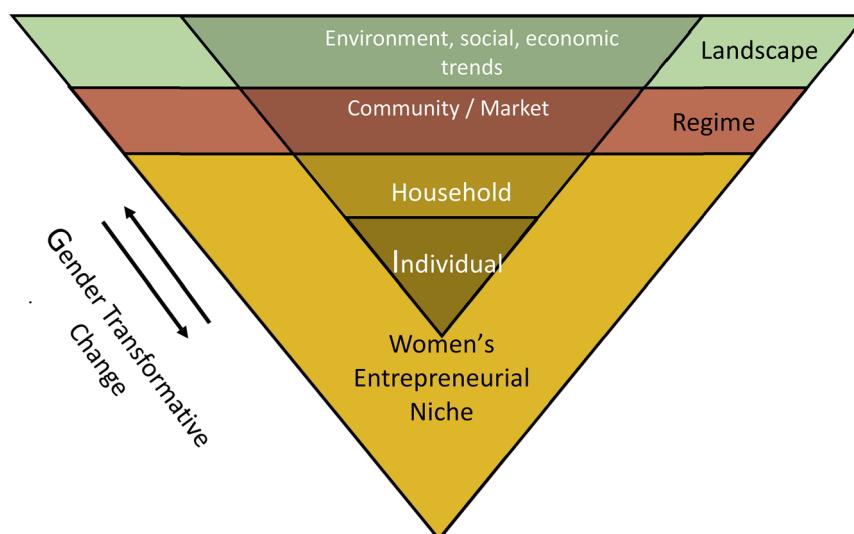


Figure 1. MLP and gender transformative change.

Table 1. Strategies to strengthen niche level initiatives are taken from Leeuwis et al. (2021).

Focus: Women's entrepreneurship in aquaculture

Transition Goal: To create an aquaculture system configuration where women can fully participate, benefit, be empowered and where social norms do not hinder their participation and benefits.

Strategies to strengthen niche level initiatives

- Analyzing landscape trends and visioning
- Identify plausible leverage points
- Capturing and supporting existing diversity
- Creating and supporting variation
- Temporary protection of niche-level initiatives
- Fostering landscape level pressures and active regime destabilization
- Process investment in coalition building, collaborative research and media presence

The transition objective is to create an aquaculture system where women actively participate, benefit, and are empowered without socio-cultural barriers. The current socio-technical regime, dominated by a neoliberal, industrial agribusiness model, prioritizes market dynamics but faces criticism for its adverse environmental, social, and economic impacts. Increasingly, environmental and social concerns related to farming are recognized as equally important as economic factors (Melchior & Newig, 2021).

Methodology

The research involves two qualitative case studies from the IDEA project, focusing on women's entrepreneurship in aquaculture in Northwest Bangladesh. One pilot adopted a couple-centered approach, while the other targeted landless women through group efforts. Data collection took place over six months starting March 2022, employing focus group discussions (FGDs), in-depth interviews (IDIs), and key informant interviews (KIs) with 100 men and 102 women (see Table 2). NVIVO 12 was used to analyze qualitative data, with codes around project and individual strategies, incumbent regime elements, and later emerging codes like social norms, technology, and resources. Participants provided informed written consent, and their identities remain anonymous. The study followed ethics guidelines from Wageningen University and WorldFish and did not require separate ethics approval as it was non-interventional and not considered risky or sensitive..

Case study 1 examines project workshops designed for couples to facilitate business development and networking for women entrepreneurs in aquaculture and their husbands. The study aims to gauge participants' perceptions of the workshops and their impact on business practices and women's ability to manage aquaculture businesses. Data collection occurred six months post-workshop, with a focus on in-depth interviews due to participant dispersion across districts and upazilas.

Case study 2 explored the project's support of a group of landless women in collectively managing aquaculture in a government-owned pond. The study delved into participants' experiences with group aquaculture, its impact on their lives, and desired changes in the intervention, following one production cycle.

Table 2. Study participants and geographic coverage.

	Rangpur division						Rajshahi division					
	FGDs		IDIs		KIs		FGDs		IDIs		KIs	
	M	F	M	F	M	F	M	F	M	F	M	F
Case Study 1: Couples Business development Workshop*	2 (16)**	2 (16)	7	10	8		2 (16)	2 (16)	17	19	7	
Case Study 2: Landless women's group aquaculture***	3 (24)	5 (40)	18	22	5	1						

*Some of the men could not be reached as they were away working. 4 FGDs were conducted with community members in Rajshahi and Rangpur Divisions (2 in each Division with Male and Female separately).

**Number of FGD participants in parentheses.

***The study reached all participants and all men and women in-depth interviewed also participated in the FGDs. Two FGDs were conducted with the mainstream community. 1 female KII and 1 male KII were with Government officials in charge of this pilot, 2 male KIs were with project staff and 1 male KII with a member of advisory committee.

Results Case Study 1: Using Couple centered approach to women's entrepreneurship development in Bangladesh

The incumbent regime system

Community FGDs revealed that aquaculture in the studied communities is male-dominated, with women assuming supportive roles alongside unpaid care work. Purdah, grounded in religious and cultural norms, promotes female seclusion and limits women's mobility, especially in mixed-gender settings. This often prevents women from attending trainings, accessing markets, or managing aquaculture activities outside the home. As a result, they remain confined to domestic roles, relying on male relatives for public engagement, which reduces their visibility and agency in the aquaculture value chain and reinforces gender inequality. Firm beliefs around gender roles and stereotypes also limit women's entrepreneurial participation. Women's involvement is mainly accepted at the homestead level due to norms around mobility.

Participants highlighted the demanding nature of aquaculture, requiring experience, technical skills, mobility, and late-hour work. While some believed women could do aquaculture from home, many felt it was not feasible for them to handle all tasks alone.

Both men and women acknowledged that, while women could manage aquaculture from home through farmgate services, the market environment was deemed inappropriate for them—particularly fish selling—which involved navigating male-dominated spaces and assertive negotiations. Yet, they recognized that with male labor assistance, women could succeed as entrepreneurs. However, those deviating from traditional roles often face social repercussions. Small-scale women entrepreneurs encounter challenges such as purchasing inputs on credit, receiving lower prices from farmgate sales, limited mobility for market access, and unequal access to information and extension services.

Despite these obstacles, men acknowledge that women have increasing knowledge and experience in aquaculture, seeing it as beneficial for cost-saving and addressing labor shortages.

Figure 2 summarizes the main elements of the incumbent regime system.

The targeted women entrepreneurs: how they established their niche in aquaculture pre intervention

The women in this intervention play crucial roles in family aquaculture businesses but lack recognition from their families and society. The study identifies circumstances and characteristics enabling these women to participate in the male-dominated aquaculture sector, essential for understanding how they established their own niches before the project.

Findings reveal two common characteristics among all women: proximity of aquaculture resources to their homes and coming from households engaged in multiple livelihoods. Data suggest categorizing women into two groups (see Figure 3).

The first group comprises women from aquaculture families in thriving business communities. Often well-educated, they see aquaculture as a viable income source requiring less time. These women belong to relatively wealthy households with substantial aquaculture resources, where spouses divide business operations: wives manage operations

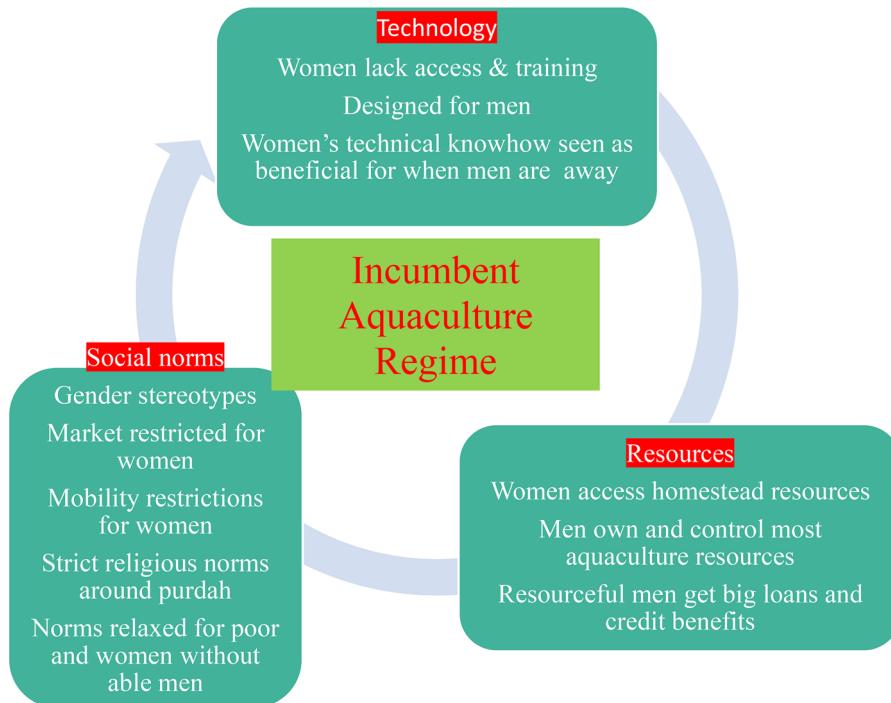


Figure 2. The incumbent aquaculture regime system.

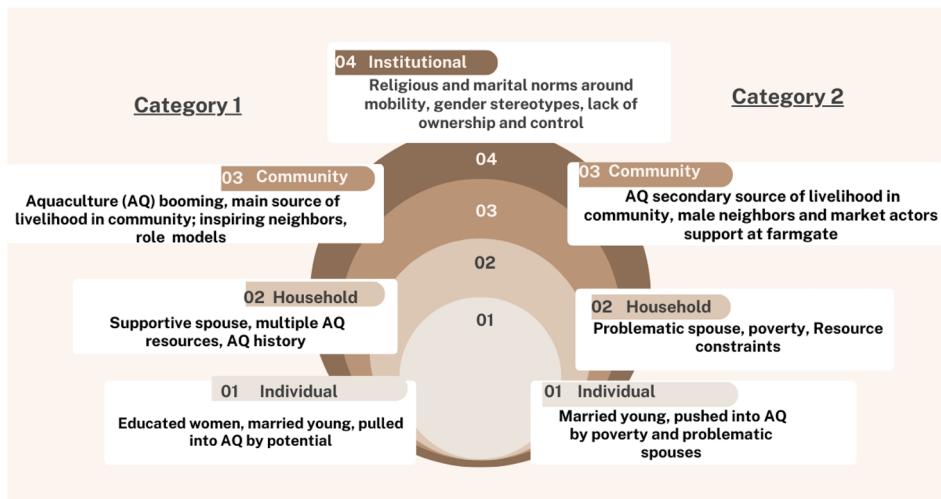


Figure 3. Categories and multilevel characteristics of women entrepreneurs in aquaculture from case study 1.

closer to home, while husbands handle those further away. These families have a history of engaging in aquaculture as a business.

For the second category of women, in-depth interviews reveal they were primarily pushed into aquaculture by their circumstances. This group includes educated and uneducated women, many of whom married young and completed their education

afterward. These women assumed significant roles in aquaculture due to their husbands' inability to provide for the family. Narratives from the women highlighted various reasons for this, such as husbands' absence due to death, abandonment, or migration; poverty or illness; lack of initiative; or distractions like gambling or politics. Faced with these challenges, the women took matters into their own hands, working hard to establish and manage aquaculture businesses, often without their husbands' assistance.

The FGDs revealed that communities were generally accepting of women facing difficulties in maintaining their households, especially in the absence of capable spouses and were supportive of their involvement in aquaculture. One male participant in Natore expressed, "Of course she can engage in aquaculture if her husband isn't available. She has to feed her family."

Similarly, a woman from Rangpur stated,

I can't care what people say, my husband is too poor and simple-minded to feed us, so I had to help him from the day we got married. We struggled, and now we have a successful business, all because of my ideas.

The pilot intervention: Strengthening women's entrepreneurship through couples business development workshops

The IDEA project identified positively deviating women entrepreneurs through scoping studies. These women took up entrepreneurship despite receiving little recognition and support. To address this, the project collaborated with Nexus Research Limited (NRL) to design interventions providing aquaculture business development services through workshops for couples.

Recognizing gender relational barriers, the project included male counterparts in the workshops, focusing on assisting women in effectively managing their businesses while garnering recognition and support. Sessions alleviated women's work burdens, co-designing business plans, teaching basic accounting, and connecting them with mentors for guidance on loans and sales.

Emphasizing the importance of obtaining trade licenses in women's names and government benefits, the workshops encouraged men's support and facilitated women opening bank accounts. Forum theater³ and video shows in communities promoted acceptance of women's entrepreneurship, creating a supportive environment.

Ten couples participated in each two-day workshop, receiving 10 hours of training. A total of 41 couples attended, with one-day follow-up workshops conducted before the study. Follow-up visits ensured workshop learnings were implemented effectively. Project promotion through media aimed to establish women as role models. Many women joined the project's local service provider network, which consists of men and women serving as aquaculture extension agents, further supporting and empowering them in their entrepreneurial endeavors in aquaculture.

Strategies by men, women, and the IDEA project to maneuver the incumbent aquaculture system

In navigating the male-dominated aquaculture socio-technical regime, women and men in the study and the project have employed various strategies.

Fostering networks and social capital: One such strategy reported by women from both categories during in-depth interviews is that they sought the help of other men in their community. For example, an educated woman with a Master's degree, a school teacher, whose husband works in a factory in the city, was inspired to venture into aquaculture after observing successful male farmers in her community. Her strategy involved seeking assistance from one of the most accomplished and respected male farmers in her village. She stated,

I knew he has the power and knowledge to help me, and if he takes me under his wing, no one can say anything to me as everyone respects him. I go to him for all kinds of help and knowledge, and he happily guides me. I'm like his sister.

The project effectively supported the strategy of building social capital during and after the couples training workshop by facilitating connections at both individual and institutional levels. The support included guidance from government actors, input suppliers, female role models, processors, and financial institutions like Bank Asia, which provides loans to women. Participants were linked to processors like Bengal Fish and programs like Light Castle's private sector accelerator. Some women joined the project's local service provider network, training other women and expanding their customer base. The network of women entrepreneurs met during the workshop was particularly inspiring, and they maintained contact, sharing experiences and support. One participant from Natore, Rajshahi, commented on another woman with a business Facebook page, saying, "She is so advanced. Hearing her story inspired me as she is just like me."

Spousal and family support emerged as crucial for women's success, especially for the second category of women. Women noted that household and unpaid work often hindered their entrepreneurial efforts in aquaculture. The project addressed this by organizing two-day couples workshops, where women valued their husbands witnessing their contributions. Participants reported that their husbands' presence at the workshops led to increased support and understanding.

One woman from Rajshahi emphasized the importance of her husband's attendance, stating, "Because he went, he now asks me about aquaculture, whether I need some help. Before that, he didn't care."

To alleviate women's burdens, the project included sessions on sharing business and household responsibilities as a couple. Women appreciated these sessions, noting they facilitated more assistance from their husbands. They shared instances where reminding their husbands about workshop discussions encouraged them to help more with household chores. The men's responses were varied, with some considering the session unnecessary, while others acknowledged the importance of mutual support. A man from Rangpur stated, "She helps me in my work, why shouldn't I help her in her work?"

Utilizing technologies at hand to increase efficiency and bypass mobility constraints: This was another strategy employed by women from both categories. Many women used their phones to call market actors and obtain services at the farmgate, albeit at an extra cost. For instance, a Master's educated woman entrepreneur from Natore, Rajshahi, created a Facebook page to receive orders and publicize her fish through videos. Participants also reported using their phones to contact various stakeholders connected by the project when needed.

The project leveraged technology to promote women entrepreneurs as role models on television and social media platforms. They showcased successful women entrepreneurs, such as the woman from Natore with her own Facebook page, through interviews on television and social media. Their stories were also featured in local newspapers. Additionally, the project ensured that these women gained recognition from the local Department of Fisheries. During National Fish Week, some women fish farmers were awarded by the department for their outstanding performance.

Operating secretly: This emerged as another strategy employed by women, particularly among the second category whose husbands were present but not actively involved. These women often hid their involvement in aquaculture for social decorum, claiming their husbands managed everything. One woman even concealed fish under her saree when going to the market, pretending to shop for household items. The workshop played a crucial role in legitimizing women's efforts by bringing existing women entrepreneurs to the forefront and recognizing them as entrepreneurs. Participants expressed surprise and gratitude upon realizing their entrepreneurial status, with one woman from Natore stating, "I had no idea I'm an entrepreneur. That was the best thing about the workshop."

This sentiment was shared by many women in the study. Furthermore, the workshop helped their husbands acknowledge their wives' entrepreneurial roles. As one woman noted, her husband learned about her entrepreneurship during the workshop. Consequently, the data reveals that communities also began recognizing them as entrepreneurs, having heard about the workshop and the business registration in their names.

Women gaining institutional recognition: The project implemented an important institutional-level strategy to ensure women gained institutional recognition by convincing men to register businesses and create trade licenses in women's names. This move not only legitimized women's efforts but also empowered them and instilled a sense of pride in their businesses. Men, particularly from the first category, readily agreed to register businesses and create trade licenses in women's names after learning about the benefits during the training workshop. A man from Rangpur expressed, "I didn't know I can get benefits from the Government if I register my pond. It all makes sense now."

Additionally, providing bank accounts for women allowed them to take charge of the money they earned, further reinforcing their empowerment. However, men from the second category were initially more reluctant due to limited resources and unwillingness to transfer assets to their wives' names. Nevertheless, through follow-ups and reminders of the benefits, they eventually agreed to register businesses and create trade licenses in women's names. This ensured that women received the recognition and empowerment they deserved in their entrepreneurial endeavors.

Engaging in normatively acceptable activities and technologies: Another strategy employed by women is to engage in gender-stereotyped or women-targeted technologies. For instance, participating in homestead pond aquaculture is deemed suitable for women due to its proximity, accommodating their mobility and household roles. Consequently, many men in the study have delegated businesses close to the homes they share with their wives, particularly those men who oversee various successful businesses. This approach enables women to operate within societal norms and roles while still engaging in entrepreneurial activities.

Ignoring normative constraints despite consequences: Some women chose to defy normative constraints despite the challenges. For instance, a woman entrepreneur with a Master's degree in Natore attempted to establish a supply chain for Bengal Fish by engaging with local farmers. However, she believed they were reluctant to partner with her because she is a woman. Similarly, she encountered difficulties seeking additional training from government officials regarding fish processing, as she felt they did not take her seriously. Despite these obstacles, she remains determined and has set a bold goal of procuring a motorcycle to enhance her mobility and access aquaculture-related services and products, even though it goes against traditional gender norms in Bangladesh.

The project aimed to combat normative constraints and promote gender equality by showcasing Forum Theater and gender videos to the communities. Forum Theater enacted scenarios where women faced harassment and barriers while attempting to become fish entrepreneurs, prompting community debate and discussion. Gender videos depicted real-life struggles faced by women in aquaculture, such as lack of support from husbands and financial exploitation. Remarkably, during interviews and focus group discussions, both women and men voluntarily referred to the women depicted in the videos and theater as examples of women in aquaculture, highlighting the impact of these initiatives in raising awareness and promoting gender equality.

Results Case Study 2: Landless women's group aquaculture on government pond

The incumbent regime system

Key Informant Interviews revealed that before women began aquaculture in the Government Pond, men in the landless community sporadically used it, but it lacked systematic management and proper restoration. Fish stocking was random, with attempts at communal stocking unsuccessful due to the members' unwillingness to contribute.

Focus Group Discussions showed that social norms and gender stereotypes are less rigid for women in the landless community due to their impoverished circumstances. With challenging relationships and lacking male support, unconventional roles taken on by women are more accepted.

Despite this, aquaculture remains male-dominated, and women's involvement, especially in group aquaculture, is unprecedented. Men's support in input procurement and advice is crucial for women to enter and succeed in this traditionally male-dominated environment, serving as a gateway for effective participation. See Figure 4 below for a summary of the system.

The targeted landless women: how they live in their community

Data from Focus Group Discussions (FGDs), In-depth Interviews (IDIs), and Key Informant Interviews (KIs) reveal that participants in this study come from severely impoverished populations, struggling to meet basic needs. They have lived in government-provided shelters for approximately 11 years, expressing aspirations of purchasing land and

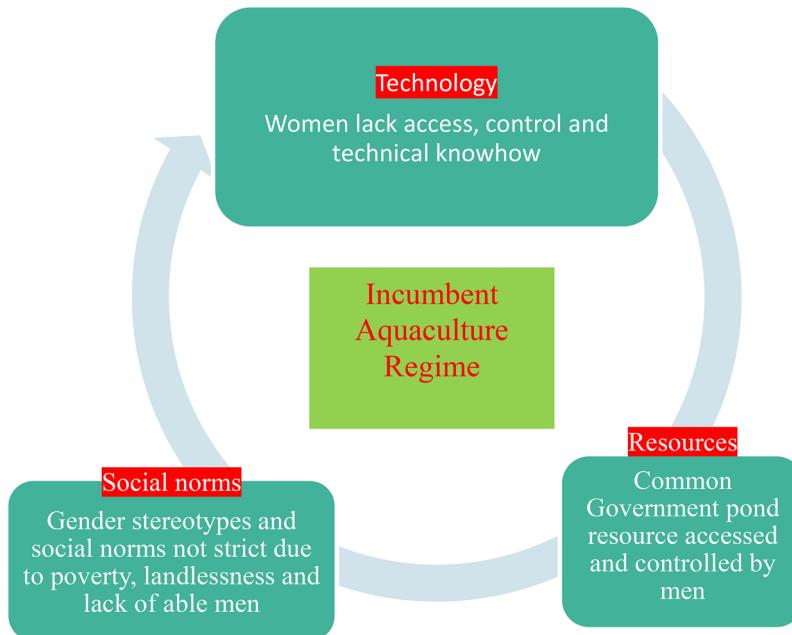


Figure 4. The incumbent aquaculture regime in the landless community.

moving out one day. This government land and shelters are located beside a mainstream community.

Most community members engage in multiple jobs daily, with the majority of women and some men working in a nearby brick manufacturing field as their primary income source. IDIs highlighted women's estrangement from husbands engaged in drinking, gambling, or neglecting household responsibilities. Young women bear significant workloads but find support in their tight-knit community, where multiple generations reside in small brick houses.

Education is valued, with many children educated up to at least the 10th grade, relied upon for assistance with calculations and decision-making. Despite aspirations for independence, few are willing to relinquish free government-provided shelter. Jealousy exists within the mainstream community toward landless households, perceived to receive various benefits from charities and programs. Skepticism surrounds the fairness of the government shelter selection process.

A graphic summary of the key characteristics of the landless community is provided in [Figure 5](#).

The pilot intervention: Group aquaculture in government ponds

In Bangladesh, over 150,000 landless families are residing in government-run shelters, many of whom are granted access to government-owned seasonal and derelict ponds. Typically managed by men and/or leased out for commercial purposes, these ponds are now being entrusted to women for the first time through collaboration between the Government of Bangladesh and WorldFish's IDEA project.

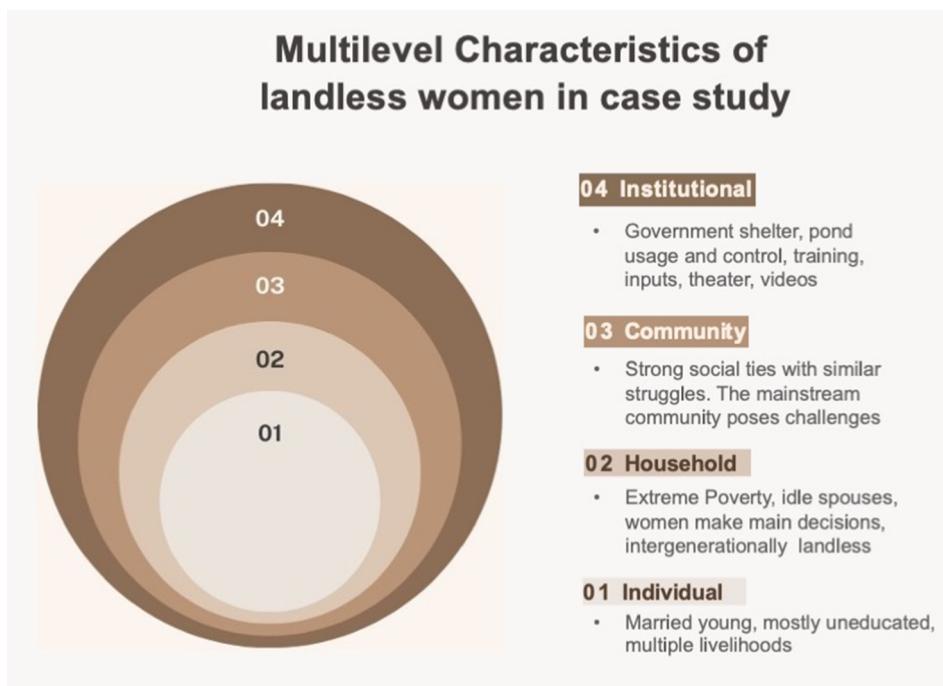


Figure 5. Characteristics of landless women in case study 2.

Initiating activities in an 18-decimal pond in Taraganj upazila, Rangpur division, where 22 landless families have been relocated, the project supports women in forming a management group to collectively restore the pond and produce native fish for consumption and sale. Pre-assessments showed significant enthusiasm among women to become aquaculture farmers, with support from the Department of Fisheries.

The project facilitated the formation of a management group comprising women from the 22 households, with a woman appointed president and supported by a woman secretary and cashier. Training on aquaculture technicalities was provided, and a deep tube well was installed to supply water to the pond. An all-male advisory committee and a male youth from the community were also involved to minimize gender-related constraints.

After releasing 36 kgs of fingerlings in 2021, the women achieved a harvest of 100 kg of fish valued at BDT 300,000. Although the harvest could have been larger if they had waited longer, the pandemic led to an earlier than planned harvest. Collaboration with men from the community and the use of Forum Theater and gender equality-related videos aimed to address gender norms and facilitate women's access to the pond.

Establishing women's niche in group aquaculture

In the landless community, women engage in various livelihoods, including small businesses (via grants provided by the Government), agricultural activities, and wage labor. The introduction of aquaculture offers a promising opportunity for economic empowerment, requiring relatively minimal time once set up. Collaborative group-based aquaculture allows for task distribution, easing individual burdens.

Support from the project and government is crucial for women's participation in aquaculture, offering input support, technical expertise, and inclusion in decision-making. Men in the community recognize the benefits, contributing to the initiative's success.

Women involve family members in aquaculture but retain decision-making power. Older women handle feeding and daily management, while younger women are occupied elsewhere. Women appreciate their leadership roles and decision-making authority concerning the pond. One woman mentioned,

"When the project comes, they only provide the inputs or advice to us women and take our opinion. This has led to everyone in the community seeing us in an important light. We are not a women's group in name only."

Strategies by men, women and the IDEA project to maneuver the incumbent aquaculture system

In the landless community, prevailing gender norms are less entrenched for women due to poverty, making them less adherent to societal stereotypes. Meeting basic needs like acquiring food takes precedence, leading women to disregard many norms. Breaking stereotypes is more acceptable when men are absent or when poverty necessitates all hands on deck. However, at the community level, strategies were necessary to facilitate women's control of the pond, especially since men had historically utilized it.

The project's strategy to involve all 22 households in the group aquaculture pilot aimed to ensure inclusivity and prevent any feelings of resentment among community members. However, the resulting size of the group led to challenges, with the woman president acknowledging issues of free riding and expressing a preference for a smaller group size. Despite this, maintaining peace within the community was prioritized, and dividing the fish equally among households was seen as a way to achieve this.

However, the decision to divide the fish equally among all households, coupled with the need to provide gifts to influential members of the mainstream community, limited the women's ability to generate income from the venture. Consequently, they found themselves unable to sell the fish as initially hoped and instead had to keep most of it for consumption. While the increased fish harvest provided some improvement in their food security compared to before, it fell short of enabling the women to earn money or for example start a dried fermented fish business as some women had planned.

The involvement of the government was crucial in ensuring women's undisputed access and control over the pond. By emphasizing the government's provision of the pond to the women, it reinforced women's power and legitimacy within the community. The project's insistence on directing inputs and knowledge toward the women further solidified their control. This also contributed to their enhanced status within the community, as it demonstrated tangible financial gains from their involvement in aquaculture. This elevated their perceived competence and authority in managing the pond. During focus group discussions, both women and men referenced examples from the Forum Theater and gender equality videos to highlight the potential for women's success in aquaculture.

The women felt significant pressure to succeed in managing the pond, aware of the high expectations placed on them as custodians of a common resource. This marked the first time women were given control over such a resource, and the president of the group particularly felt the burden of meeting these expectations. Although the pilot project met community expectations, it fell short of the president's personal aspirations to turn it into a profitable business, as maintaining communal harmony took precedence. Despite this, the women remained hopeful and determined to make the next cycle even more successful.

The pilot project connected the women with market actors to assist with inputs and facilitate fish sales. The goal was for the women to sell their fish collectively to local fish wholesalers, known as "arots." Although larger ponds were initially considered in collaboration with the government, they were deemed unsuitable for management by women at the time. Despite this, the women are hopeful that their current success will lead to the consideration of larger ponds for systematic management in the future. They believe that with access to more ponds and a greater supply of fish, they can establish a successful business run collectively by women.

The involvement of men in the advisory committee proved beneficial for the women in several ways. According to the group's secretary, including men was crucial because they not only possess knowledge about aquaculture and can offer assistance but also help in managing community dynamics. Furthermore, involving both youth and older members of the community to oversee the pond and attend to the fish when the women are occupied with other tasks was another important strategy. This ensured that family support was readily available, enabling women to engage in aquaculture without the fear of jeopardizing their employment or other responsibilities.

Analyses

This section revisits the research questions to analyze the implemented strategies, focusing on challenging and disrupting the existing regime to promote gender equality. Using the framework developed earlier (see [Table 3](#)), particularly targeting norms and legal rights, the analysis assesses their effectiveness in reshaping existing norms within the socio-technical regime. By aligning strategies with this framework, insights into their potential to destabilize the incumbent system and foster gender equality are provided. Through addressing norms and legal rights, the project aims to dismantle barriers and promote systemic transformation toward gender equality.

The aquaculture socio-technical regime is entrenched with male dominance, reinforced by strong institutional structures like religion, perpetuating traditional gender roles and restricting women's participation and benefits within the system. This dominance is evident in market dynamics, technology access, and support services, relegating women to supportive roles. The project acknowledges these barriers and employs a multifaceted approach to disrupt the regime and promote gender equality. By targeting norms and legal rights, it aims to dismantle barriers, empower women, and foster systemic transformation within the aquaculture sector.

Within the project, literature reviews and scoping studies were conducted to gain a comprehensive understanding of the prevailing trends and dynamics within the aquaculture sector (**Governance Strategy 1**). Its research aimed to identify niche-level

Table 3. Agentic and niche level strategies. Strategies from the niche system are taken from Leeuwis et al. (2021) except for GTAs which was added in this paper.

Focus: Women's entrepreneurship in aquaculture

Key elements: Niche level pilots:

1. Couples approach to women's entrepreneurship in homestead systems
2. Group approach to women's entrepreneurship on government pond

Transition goal: To create an aquaculture system configuration where women can fully participate, benefit, be empowered and where social norms do not hinder their participation and benefits

Agentic strategies	Niche Initiative strategies
<p>Individual strategies from women</p> <p>Utilize leverage points by</p> <ul style="list-style-type: none"> -Employing free resources at hand to start business: leverage on underutilized homestead resources and paternal resources to experiment with aquaculture as a business -Dividing business responsibilities based on location: Homestead businesses were allocated to women as they were better able to look after the business whilst performing household responsibilities -Fostering networks and social capital: Sought help from local powerful men for advice and support, including family members, neighbors and experts in the field -Utilizing technologies at hand to increase efficiency and bypass mobility constraints: Used mobile phones and social media to avail farmgate services and attract customers. -Engaging in normatively acceptable activities and technologies: Engage in gender stereotyped activities and with gender stereotyped technologies like working with fish culture in the homestead and utilizing male labor for non stereotyped work -Avail opportunities by breaking norms -Take up aquaculture full-fledged, breaking norms and stereotypes and face the consequences or -Operate secretly by working in non stereotyped roles behind the scenes to maintain social decorum: Pretend to only engage in stereotyped roles and give all credit to spouse to maintain social decorum 	<p>Strategies from the niche system</p> <ol style="list-style-type: none"> 1. Analyzing landscape trends and visioning: <ul style="list-style-type: none"> - Used scoping studies, literature reviews to understand government policies and pressures including policies around gender equality and inclusion and strategize accordingly 2. Identify plausible leverage points: <ul style="list-style-type: none"> - Leveraged government emphasis on trade licenses and women's entrepreneurship focus - Leveraged homestead entry point and refined the extension package - Leveraged on existing women positive deviators - Leveraged on social networks and available benefits for women - Leveraged on normative barriers being relaxed for poor landless women 3. Capturing and supporting existing diversity <ul style="list-style-type: none"> - Leveraged on existing women positive deviators. 4. Creating and supporting variation <ul style="list-style-type: none"> - Piloted two approaches: couples and group approach whose lessons can be applied to future projects 5. Smart protection of niche-level initiatives <ul style="list-style-type: none"> -Temporary protection of initiatives in forms of financial incentives, investment support, regular visits, reinforcement of commitment and learnings, government support - Sustainable protection through trade licenses, equitable representation in group and distribution of output, bringing men in as partners, government support 6. Fostering landscape level pressures and active regime destabilization - Government commitment to CEDAW, SDG 5 and women's entrepreneurship fostered and used to gain benefits for women 7. Process investment in coalition building, collaborative research and media presence <ul style="list-style-type: none"> -Collaboration with men and women and local organizations to set and align strategies and build upon existing ones -Recognize and collaboratively build on women's agency and positive deviance -Understand and build strategies that cater to different types of men and women with different identity markers -Legitimize women's efforts and create dialogue and discussion around gender equality through recognition, awards, and media exposure -Tap into existing coalitions around gender equality 8. Gender transformative Approaches (GTAs) <ul style="list-style-type: none"> -Forum theater and gender videos at community level to change attitudes around women in aquaculture -Women's formal business ownership and institutional recognition -Work with men as partners

initiatives that could effectively support women's entrepreneurship in aquaculture. One key finding was the alignment between women's entrepreneurial priorities and government policies and action plans, which presented an opportunity for the project to leverage and bring benefits to women.

Based on insights from the scoping studies, strategic leverage points (**Governance Strategy 2**) were identified to support and catalyze effective change in women's entrepreneurship in aquaculture. Key leverage points included targeting family businesses, utilizing homestead aquaculture resources, and focusing on landless women who face fewer normative constraints. While using homestead resources as an entry point for women's involvement in aquaculture or agriculture is common, the project modified this approach for maximum impact.

Recognizing the significance of engaging men in reshaping gender norms, the project focused on securing women's legal rights to businesses or ponds with institutional backing. This involved facilitating access to trade licenses and leveraging supportive policies to ensure women's recognition as entrepreneurs or farmers. Additionally, participants strategically utilized their own leverage points. In Case Study 1, women with limited mobility capitalized on homestead resources to establish family businesses, often with support from their husbands. They also utilized networks and technology for business support. In Case Study 2, women involved family members in managing responsibilities, ensuring equitable distribution of pond harvests for community harmony.

The project recognized and supported existing diversity among women entrepreneurs (**Governance Strategy 3**). Through collaborations and assessments, it identified women already positively deviating in entrepreneurship, as in Case Study 1. Despite their contributions, these women lacked recognition and assistance. Using results from a needs assessment, the project designed a customized business development workshop for these women and their partners. This aimed to refine skills and address normative obstacles. By targeting these entrepreneurs, the project aimed to establish a supportive network of successful women, serving as mentors for others.

Various pilot initiatives were implemented in the project to promote women's entrepreneurship in aquaculture, demonstrating different approaches such as a couple-centered approach and a group approach. These pilots are valuable as they create and support variation (**Governance Strategy 4**). Multiple innovations and options exert pressure on the existing regime from different directions, encouraging transformation. Even if some initiatives fail, they provide valuable lessons for future programs and projects. As Leeuwis et al. (2021) noted, "redundancy and learnings are critical to making progress." For instance, in Case Study 2, while women's entrepreneurship may not have flourished, the project opened doors to the concept of collective pond management among women. Suggestions from participants to form smaller groups with access to more ponds offer valuable insights for future initiatives by both public and private organizations. Similarly, Case Study 1 illustrates the effectiveness of supporting women in utilizing homestead resources for aquaculture, aligning with established strategies in Bangladesh (see Farnworth et al., 2016; Morgan et al., 2015). Despite these advancements, it is essential to integrate lessons learned from various projects to ensure sustainable benefits for women. In Case Study 1, adjustments were made to training approaches, incorporating business development workshops for both women and men. Moreover, addressing normative constraints through community engagement, theater, and videos helped reshape attitudes toward women's involvement in aquaculture. Granting women legal rights through registration further legitimized their efforts, contributing to long-term sustainability.

Safeguarding niche-level initiatives (**Governance Strategy 5**) was vital for the project's viability and long-term success. Temporary protection measures were enacted to nurture these initiatives, allowing room for experimentation, learning, and growth to compete with the established regime effectively. Regular visits from project representatives provided crucial support and reinforcement, ensuring that learning and commitments progressed. In Case Study 2, financial and resource assistance was extended to the women, who required government backing to sustain the pond operation without constraints. The project's involvement of all 22 households represented by the women and equitable distribution of the final harvest served as protective measures against opposition. In Case Study 1, where women relied on resourcefulness and support from neighbors, measures such as opening bank accounts and registering trade licenses in women's names were adopted to safeguard and legitimize their efforts. However, ongoing reminders and visits were necessary to maintain commitment to these actions. While temporary protection of niche-level initiatives is emphasized, such safeguarding can lead to unsustainable solutions. What's crucial is "smart" protection, creating conditions that outlast the project, ensuring long-term viability and success. In both cases, the aim is to transition toward self-sustainability, where initiatives generate enough income to reinvest, and communities adapt to women's leadership in aquaculture.

To foster pressures at the landscape level (**Governance Strategy 6**), the project strategically leveraged international treaties and commitments ratified by the government of Bangladesh. With the government's endorsement of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and its commitment to achieving Sustainable Development Goal 5 on gender equality, policies promoting gender equality have been integrated into various agendas, including poverty reduction and agriculture policies e.g. the 8th five year plan, the National Women Development Policy 2011, etc. These policies and others have placed gender equality as a priority, but implementation remains weak. However, these policies helped create an environment conducive to supporting women's entrepreneurship initiatives. By aligning with the government's existing benefits and support systems for women entrepreneurs, the project aimed to incentivize men to formalize businesses under women's names and involve their wives in the aquaculture sector. Encouraging men to take these steps not only promoted gender equality but also created opportunities for women to actively participate in the aquaculture sector.

While not strictly adhering to **Governance Strategy 7** on coalition building, the project embraced collaborative efforts with the local community, leveraging indigenous knowledge and diverse stakeholders for inclusivity and transformation. In Case Study 1, tapping into the strategies employed by local organizations and community members for gender equality and aquaculture businesses was pivotal. Recognizing women's agency in defying norms was crucial. The program sought to bolster these existing strategies while introducing novel approaches. Collaboration entailed harnessing community social capital, garnering backing from male members, and confronting detrimental norms. The program prioritized changing community mindsets and formal institutional recognition for women, emphasizing intersectional considerations such as poverty, education, and age. In Case Study 2, poverty levels and male household

members influenced norms toward women's livelihood choices. Similarly, in Case Study 1, poverty and education levels affected women's engagement with aquaculture and access to resources. By adapting strategies to these dimensions, the program aimed for tailored interventions to promote gender equality. While not forming new coalitions, it utilized existing ones like the Bangladesh National Gender Working Group. The program also influenced broader discourse on women's empowerment through media and stakeholder engagement, aligning with existing efforts for gender equality.

Gender norms and stereotypes pose significant barriers to women's empowerment in the aquaculture sector, as evidenced in Case Study 1. Women often hide their involvement or credit their husbands to conform to social norms, limiting their access to opportunities and recognition. To counter these challenges and recognizing the need for a **Governance Strategy 8** for women's niche development and regime change toward gender equality, the program adopted gender transformative strategies, targeting norms and legal rights. Engaging men from the beginning acknowledged their influence and ownership, facilitating women's integration into the sector. Forum Theater and gender videos challenged community mindsets, promoting acceptance of women's roles in aquaculture. Formal institutional support, exemplified in Case Study 1 & 2, enabled women to be formally recognized or utilize government ponds collectively. These initiatives disrupted the incumbent regime, paving the way for gender equality in aquaculture.

Based on this analysis, the strategies implemented within the project align well with fostering regime change and have been effective in strengthening niches and potentially destabilizing the incumbent regime. However, these strategies require further refinement, customization, repetition, and scaling to effectively nudge the regime toward gender equality. There is hope for progress due to persistent global and national pressures for achieving gender equality.

Network anchoring, as described by Elzen et al. (2012), plays a significant role in fostering collaboration among research and development actors, as well as grassroots individuals working toward women's niche innovations and a gender-responsive aquaculture system. Targeting norms and legal rights may create new rules or adaptations of existing ones (normative institutional anchoring), temporarily impacting the actions of both niche and regime actors. However, these changes need reinforcement through additional projects to contribute to overall progress toward gender equality.

The effectiveness of these strategies and their impact on the incumbent regime depend on various factors, including the specific context and socio-political environment. According to Agneta Allos et al. (2013), understanding women's innovation requires considering incremental and process innovation, along with normative and structural factors. Further research and continued efforts are necessary to refine and amplify these strategies for long-term and sustainable progress in achieving gender equality.

Figure 6 below illustrates the interactions of governance strategies at the niche level with the regime and landscape.

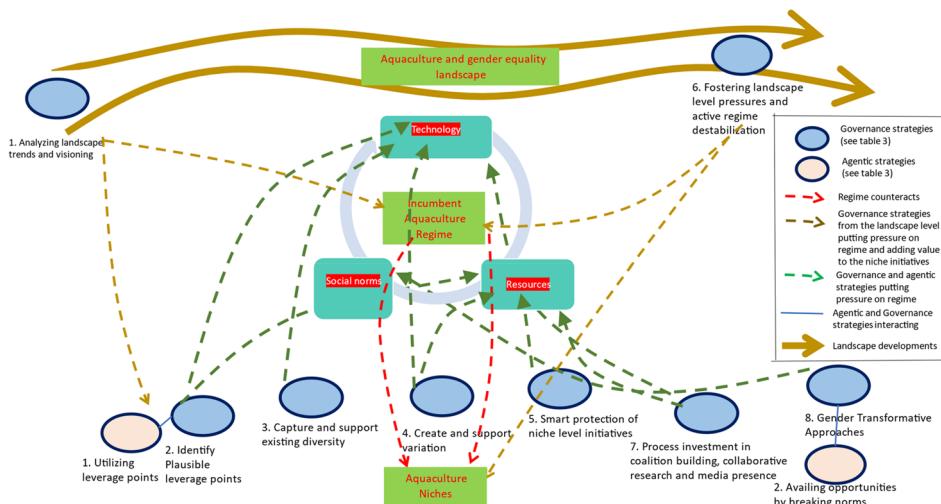


Figure 6. Diagram showing the interactions of the governance and agentic strategies with the niche, regime and landscape.

Discussion

Incorporating gender-transformative approaches (GTAs) as a distinct governance strategy is essential to disrupt the incumbent aquaculture regime and promote gender equality. While the Multi-Level Perspective (MLP) has been instrumental in understanding socio-technical system evolution (Leeuwis et al., 2021), it lacks explicit focus on gender and socio-normative aspects, which are crucial for addressing institutional dynamics and systemic barriers (Petesch, 2022). The cases highlight the normative constraints deeply embedded in the socio-technical regime that limit women's opportunities and livelihood choices, underscoring the need for strategies that explicitly target these norms to achieve gender-related goals and outcomes. GTAs address structural barriers by challenging power imbalances and fostering inclusive participation, enabling systemic transformation in aquaculture.

Gender transformative approaches (GTAs) aim to achieve systemic change by addressing power dynamics and structural inequalities that reinforce gender inequity, rather than focusing solely on individual empowerment. GTAs actively challenge societal norms and structures to create lasting change (Wong et al., 2019). They reject the notion of women as mere "special agents of development" by targeting the underlying social structures and intersectional power dynamics that perpetuate inequality (McDougall et al., 2021a). Operating across multiple levels—from households to global systems—they aim to overcome barriers and foster inclusive environments in sectors like aquaculture, farming, and value chains (Aregu et al., 2019; McDougall et al., 2021b). GTAs also highlight the role of institutions in sustaining inequality and hindering development outcomes (Kantor et al., 2015). Implementing GTAs requires time, resources, community commitment, and expertise to facilitate critical dialogues around norms and stereotypes (Choudhury & Castellanos, 2020). Success relies on building strong relationships and active community engagement, with outcomes shaped by the

intensity of social interactions (Casey, 2018). Ultimately, GTAs enable niches to “stretch and transform” broader regimes for systemic change (Smith & Raven, 2012).

The governance strategy framework was instrumental in analyzing the project’s strategies but insufficient in examining the initiatives taken by men and women themselves to disrupt the prevailing regime. Innovation studies have been critiqued for focusing on processes, organizations, and technologies while neglecting the individuals driving innovation, along with their gender and power relations. This critique highlights the gap between gender and entrepreneurship studies (see research by Ahl, Marlow, Brush, Muntean, and others) and innovation studies (Agnete Allos et al., 2013). The case studies, particularly Case Study 1, underscored the significant actions men and women were taking to foster women’s entrepreneurship, predating the project. Future strategic frameworks should capture the agency of men and women in challenging the regime’s power dynamics and integrate these individual strategies with project-level governance strategies to foster interaction and learning (see Table 3).

In addition, the institutional strategies employed within the project in promoting entrepreneurship development may be influenced by colonial and neoliberal ideologies originating from the global North. Historically, colonialism involved the domination and exploitation of countries and regions by imperial powers. It often resulted in the imposition of foreign economic and political systems, which continue to shape development approaches today. The critique here is that the institutional strategies implemented by the project may carry remnants of colonial thinking, perpetuating power dynamics and reinforcing global inequalities.

Neoliberalism is an economic and political ideology associated with free markets, deregulation, and privatization. It emphasizes individualism, profit maximization, and the prioritization of economic growth. The argument is that the project’s focus on entrepreneurship development may be oriented toward integrating women into existing capitalist systems, without necessarily challenging the underlying structures and power dynamics that contribute to and perpetuate gender inequality (see Calkin, 2015).

Conclusion

In conclusion, governance strategies—such as targeted interventions, alignment with government policies, and engagement with local communities—have demonstrated potential in challenging the dominant aquaculture regime and advancing women’s entrepreneurship. By emphasizing niche-level initiatives, individual agency, and strategic entry points, these approaches contribute to fostering gender equity within the sector.

However, it is crucial to recognize that harmful gender norms and stereotypes continue to hinder women’s participation and benefits in aquaculture. Therefore, integrating gender transformative approaches as a separate governance strategy is essential. These approaches involve engaging both men and women as agents of change and challenging the underlying structural barriers and gender norms that restrict women’s opportunities.

Implementing gender transformative approaches requires time, expertise, and community-level commitment to navigate discussions around norms and stereotypes. It is important to acknowledge that formal and informal institutions are resistant to change and require sustained efforts and resources.

Additionally, it is important to critically examine the underlying neoliberal agenda in development and the potential perpetuation of colonial characteristics in institutional strategies. While progress has been made, there is a need to address the influence of international capitalism and ensure that women's empowerment in aquaculture is not merely aligned with exploitative industries but serves the interests of gender equality and sustainable development. This involves engaging in critical dialogue, considering local contexts and perspectives, and advocating for inclusive and transformative strategies. These strategies should address the root causes of gender inequality and empower marginalized groups, ensuring development practices are equitable and sustainable.

In conclusion, a comprehensive approach that combines targeted interventions, strategic collaborations, and gender transformative approaches is necessary to disrupt the incumbent regime, challenge harmful norms, and achieve lasting gender equality in the aquaculture sector. Continued research, program or project refinement, and scaling of these strategies are essential to create a more inclusive and empowering environment for women in aquaculture.

Notes

1. For a holistic understanding of women's entrepreneurship, Brush's 5M model is relevant here but is not within the scope of this paper. However the essence is captured in bringing out the multidimensional macro/meso factors such as norms as is reflected in the regime. Brush's 5M model can be found here: Brush, C. G., De Bruin, A., & Welter, F. (2009). A gender-aware framework for women's entrepreneurship. *International Journal of Gender and Entrepreneurship*, 1(1), 8–24. <https://doi.org/10.1108/17566260910942318>.
2. For more information on Bangladesh Banks Women's entrepreneurship initiatives, please visit: https://www.bb.org.bd/smeportal/wepolicy_updated.php.
3. For more information on Forum Theater, please visit: <https://worldfishcenter.org/blog/addressing-gender-inequalities-through-forum-theater>.

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