

Listening to Women Fishers on the Sekong River: Fostering Resilience in Village Fishery Co-Management

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Abstract

The accelerated economic development of landlocked Laos, combined with extreme climate variables, points to dramatic transformations in subsistence fisheries on its rivers. In the country's first Fisheries Law, adopted in 2009, co-management of village fisheries is required as a way to promote sustainable development at a local level. The co-management model, however, does not stipulate participation by women fishers, important stakeholders who make up almost one-half of all Lao fishers and whose work contributes directly to family nutrition and well-being. Based on fieldwork conducted in fishing villages on the Sekong River in southern Laos in 2013, this paper takes an ecosystems approach to discuss how the country can build resilience and social cohesion into fisheries by incorporating women and their knowledge into village fishery management. In the process, the health of river ecosystems and food security will improve, while women fishers will acquire new skills to help them avoid 'poverty traps.'

Introduction

The concept of resilience is central to effective adaptive management of ecosystems. Developed by ecologist C.S. "Buzz" Holling in the 1970s as a theory for managing complex ecosystems, resilience theory suggests that an ecosystem is resilient if it has the ability to remain cohesive during periods of extreme perturbations or what are called 'shocks' (Holling 1973). Rather than "bouncing back" to a former equilibrium, an ecosystem is resilient if it can absorb changes in internal and external variables and still persist, albeit in a somewhat different yet robust form. As a manager of natural resources, Holling wrote that long-term expectations about agricultural productivity, for instance, may even 'fragilize' an ecosystem by undermining complex factors that support the resilience of the system as a whole, potentially leading to its eventual decline or collapse. Now widely applied as a risk management tool by many sectors focused on long-term security (in finance and urban planning, for example), the resilience framework remains particularly relevant to complex agricultural systems where biodiversity is threatened by development and by global phenomena such as climate change. Holling introduced the concept of adaptive management for ecosystems as a practical application of resilience theory. A key component of the adaptive management concept is the acquisition of new knowledge through continual learning to prepare citizens living within an ecosystem to absorb the inevitability of change without losing cultural coherency.

A management approach based on resilience...would emphasize the need to keep options open, [...] and the need to emphasize heterogeneity. Flowing from this would be not the presumption of sufficient knowledge, but the

recognition of our ignorance: not the assumption that future events are expected, but that they will be unexpected. The resilience framework can accommodate this shift in perspective, for it does not require a precise capacity to predict the future, but only a qualitative capacity to devise systems that can absorb and accommodate future events in whatever unexpected form they may take. (Holling 1973: 21)

Co-management of ecosystems has evolved as an effective adaptive management methodology that promotes sustainable development premised on the concept of resilience (Berkes 2004; Charles 2004; Olsen et al. 2004; Lebel et al. 2006; Arthur et al. 2012). Highlighting the need to take all stakeholders into account in managing natural resources, co-management strengthens the implications of participatory governance by promoting shared goals and communal values in preserving an ecosystem (Jentoft et al. 1998; Gutierrez 2012). Under this model, local or regional government is the co-manager of natural resources with local users, and so some level of decentralization of government is necessary for co-management to exist (Berkes 2004; Folke et al. 2007). In co-management, the communicative and collaborative process through which regulations are formed—who participates, how debates are structured, how knowledge is employed, how conflicts of interest are addressed, and how agreements are reached—are just as important as government regulations (Jentoff et al. 1998).

By the late 1980s, as it opened up to economic expansion and improved its transport and communication sectors, Laos had coalesced its policy decision making within the central government while simultaneously decentralizing governing authority to provinces and districts. During its many years of isolation, Laos had retained relatively high-quality natural resources. Beginning in the 1990s, a number of international organizations, nongovernmental organizations (NGOs), and bilateral and multilateral donors began providing financial and technical support to document and monitor the health of wildlife species in Laos, many of which were eventually added to the International Union for Conservation of Nature (IUCN) Redlist of Endangered Species (Timmins 1993). In addition to IUCN, these conservation efforts were conducted by the Wildlife Conservation Society (WCS), the World Wide Fund for Nature (WWF), the Swedish International Development Agency (SIDA), the Netherlands government, the Ministry of Foreign Affairs of Finland, and a number of other NGOs. Attention to the country's biological diversity led to an examination of the policies and practices shaping the management of Laos' natural resources and the government's role in supporting sustainable development (Baird 1996; 1998b; 1999). The potential for developing hydropower by building large-scale dams on the Mekong River and its tributaries in Laos had been debated since the 1950s, but by the late 1990s, with Laos' rapid economic expansion under way, analysis of the impact of hydropower development increased (Shoemaker 1998; IRN 1999). More recently, Friend (2009), Baird and Shoemaker (2008) and Baird (2011) have written about how dams would affect wild capture fisheries and the migration of fish spawning in the Mekong and Sekong Rivers. Linkages between economic development and affected fish populations, and food and economic security, have been discussed in the context of trade-offs (Ziv 2012), food-led regional development (Arthur 2011) and environmental degradation and natural resource-dependent populations in Laos (Fenton 2010).

A major transborder river, the Sekong River begins in the Annamite Mountains, just over the border from Laos in Viet Nam, and flows south through the country's southernmost (and two of its poorest) provinces—Attapeu and Sekong—before crossing into Cambodia where it joins the Mekong River at Stung Treng Town near the border. The Sekong watershed includes several river tributaries, including the Xekaman, Xesou and the Xe Pian Rivers; many streams and ponds, among them the Houay Ho; and one of the country's major wetlands, the Beung Kiat Ngong Wetlands in adjacent Champassak Province. Because of its waterways and wetlands, aquatic life is abundant in southern Laos, where the people consume more aquatic resources than anywhere else in the country; more than 70 percent of animal protein in daily diets is derived from aquatic resources (Hortle 2007). Almost 80 percent of rural people living in southern Laos engage in fishing activities daily (FAO 2006).

“Participation by Women Fishers in Community-Managed Fisheries in Sekong River Basin, Lao PDR” was a two-month local water governance project conducted in 2013 by the author.¹ Its objective was to gather anecdotal information about how women fishers are integrated into village-based fisheries management with the goal of informing the creation of two new village-based fishery management committees slated by the Mekong River Commission for the Sekong basin in late 2013 (World Bank 2012-2014). With technical support from IUCN-Lao PDR, focus groups were arranged in six villages in the Samakhixay and Saysettha districts of Attapeu Province in southern Laos. Villages were selected based on their prior involvement in Fish Conservation Zones (FCZs) set up in the Sekong basin and their participation in local fishery management. Making up one of the country's poorest and least densely populated areas, with a total land area of 139,056 hectares, these districts have a total population of under 32,000 people, living in sometimes remote villages and supporting themselves almost entirely through subsistence wet rice farming and fishing. Almost 60 percent of the population is lowland Lao, with the remainder from Oy, Brao, Alak, Talieng and Nya Heun ethnic groups (ADB 2012).

Over a two-week period in early 2013, 95 fishers, including 55 women, participated in focus groups in Ban Hom, Ban Saphaonthong, Ban Vaththat, Ban Xaysy, Ban Sokkham, and Ban Sakhae. The principal village fishing grounds were the Sekong River; its tributary, the Xekaman River converging at Attapeu Town; Houay Ho Dam Reservoir to the north; and nearby ponds and streams. The area has no year-round rice field irrigation, but in the rainy season women fish in flooded rice paddies. An additional CPWF grant to IUCN-Lao PDR supported a one-day Mekong Water Dialogue in Attapeu Town at the end of the field study that included participation by selected women fishers and village heads from the study as well as officials from the Provincial Office of Natural Resources and Environment (PONRE) and the Lao Women's Union.

¹ Charlotte Moser, a consultant for IUCN, conducted this independent research project with grant support from the Consultative Group on International Agricultural Research (CGIAR) Challenge Program for Water & Food Opportunity Fund (CPWF) and The Asia Foundation-Lao PDR.

Co-Management of Village Fisheries: Who Makes Decisions at the Local Level?

Analysts strongly believe that decision making at the local level is key to sustainable development and an essential tool for adaptive management to ensure the resilience of an ecosystem (Pomeroy 1998; Jentoft 1998). A study in Chile (Gutierrez 2012) found that co-management of fisheries is most effective when community leadership is proactive and promotes social cohesion, defined as working toward the well-being of all its members, working toward decreasing exclusion and marginalization, creating a sense of belonging, promoting trust and offering its members the opportunity for upward mobility. In Laos, natural resource co-management involves a balance between governance oversight at the central and provincial level and actual implementation through village fishery management committees. The fishery sector in the country began to adopt practices of adaptive co-management in the early 1990s (Baird 1996, 1998; Claridge et al. 1997; Pomeroy 1998). By late 1993, local governments in a few villages on the Mekong River had established a process for allowing villages to voluntarily set up regulations for managing aquatic resources (Baird 2006). Regulations adopted by villages included establishing FCZs—essentially no-fishing zones—in the mainstream Mekong, banning destructive fishing methods like dynamite and electroshock, managing natural ponds and rice-field paddy wetland areas, protected flooded forest habitat, and conserving and sustainably managing frogs and juvenile fishes (Baird 1998b; 2005; 2006).

The design and implementation of co-management projects in Lao village fisheries now varies widely from district to district (Baird 2006). Some are dominated by the politics of the Lao People's Revolutionary Party, requiring endorsement from village or district officials with little real decision-making powers being devolved to resource users (Baird 2006). In such cases, the co-management label that implies local participation by the local community may be more symbolic than actual, and in reality, represent a form of top-down management that promotes homeostasis rather than resilience. Nevertheless, when Laos adopted its first Fishery Law in 2009 in consultation with international and regional fishery policy groups,² village fishery co-management became a requirement (Cacaud et al. 2008). *Guidelines for Fisheries Co-Management* (Lao PDR 2009), adopted by the Department of Livestock and Fisheries, aimed to provide district and provincial authorities with the necessary steps for the promotion and maintenance of village co-management of fisheries. The final guidelines were developed as an output of the project "Aquatic Resources Management to Improve Rural Livelihoods (ARL) of the Xe Kong Basin," a project conducted by World Wildlife Fund-Lao PDR from 2005 to 2009 that established FCZs in 26 locations in the lower Sekong River (WWF 2009). The ARL project was itself an outgrowth of efforts begun in the previous decade to promote participatory planning by managing FCZs formed throughout southern Laos (Chomchanta et al. 2000; Baird 2006).

² Participants in the process were the United Nations Food and Agriculture Organization (FAO-Legal Service and the Regional Office for Asia and the Pacific), WWF, the Mekong River Commission's Fisheries Programme, in particular its Fisheries Management and Governance Component, the Asian Institute of Technology and the WorldFish Center (SE Asia Regional Office).

From the outset, village fishery committees typically were appointed by village heads, rather than elected, to oversee enforcement of the FCZs. To reduce conflict over territorial rights to fishing grounds, the committees were authorized to impose fines for destructive fishing practices, and for poaching by fishers who came to village fishing grounds from other areas. However, the *Guidelines for Fisheries Co-Management* provide no clear option for village response to other issues important to managing river fishing, such as changes in water quality affecting fish populations, or to specific requirements about which stakeholders should participate in village fishery decisions. Instead, the guidelines state only that “as much as possible, the needs of women, poorer households, and minorities should be given specific consideration” (Lao PDR 2009:10). How much benefit a village receives by maintaining an FCZ, or what difference broad representation of stakeholders might make to sustaining an FCZ, has not been examined in Laos, though the Chile study (Gutierrez 2011) that measured these conditions has had interesting results. While follow-up evaluations on the success of the FCZs and the village fishery committees in Laos have apparently not been conducted,³ in 2012, as part of a US \$26 million grant to the Ministry of National Resources and Environment (MoNRE), which is part of the Mekong Integrated Water Resources Management Plan (MIWRMP), the World Bank stipulated that two additional village-based fishery management committees be established on the Sekong River that were to be designed and administered by managers at PONRE in Attapeu (World Bank 2012-14).

The Absence of Gender Mainstreaming in Small-Scale Village Fisheries

Improving the well-being of rural women has been an emerging development priority for Laos (Murray et al. 1998; Cleaver 2000; Ireson-Doolittle et al. 2004; Chamberlain 2005). Though by no means universal, the diverse ethnic groups that make up Laos have traditionally given broad authority to women, including matrilineal residence, inheritance of land by daughters, and women’s control over money and management of family finances (Chamberlain 2006:15). Agricultural women are involved in domestic pursuits, such as tending gardens and gathering foods from forests and wetlands to feed their families, while men find meat through either hunting or fishing. The introduction of laws and regulations imposed by external authorities, along with the conditions that require such regulations, may reflect social or environmental upheaval—for instance, a lack of access by both genders to productive natural resources—that promotes the replacement of a traditional complementarity between the genders with a more stratified, even oppositional state of gender relations more in line with Western practices. The argument has even been made that, as a result of Western influence in Laos, women’s rights are replacing women’s power (Chamberlain 2006).

All women in Laos over the age of 18 are automatically members of the Lao Women’s Union (LWU). The LWU, founded in 1955 as one of the country’s four official mass organizations, was originally part of the Lao Patriotic Women’s Association, which aimed at mobilizing women to participate in the struggle for national independence. By

³ Personal communication with Victor Cowling, Technical Advisor, WWF Greater Mekong Programme, Vientiane, April 3, 2013.

law, every village in Laos must appoint a female representative to the LWU to serve as a bridge between the Lao People's Revolutionary Party, the government, and Lao women (World Bank 2013). The main function of the unpaid LWU representative, who serves on the historically all-male village council, is to preserve the existing social order by supporting the traditional roles of women as wives, mothers and household managers.

LWU comes to our village one or two times per year. They teach us how to work with men and have good social development, be a good mother, how to keep things clean. They also teach us about believing in government policy. (Moser 2013:11)

Generally, village women interviewed in field studies regard taking on the LWU role as a time-consuming duty, adding the responsibility for organizing village cultural functions to their already overloaded domestic schedules (Moser 2013). Since the mid-2000s, however, Laos has made other efforts to increase the responsiveness of national policies toward women. The National Commission for the Advancement of Women (NCAW), created in 2003 to formulate women's policies, has a National Strategy for the Advancement of Women (2011–2015) and is now focused on advancing human rights for Lao women, particularly in regard to health care, education, economic opportunity and reducing violence toward women (World Bank 2013).

While it has periodically called for the election of more women as village chiefs, the LWU has not historically encouraged, or provided training for, leadership and decision making by women (Ireson-Doolittle et al. 2004; LWU 2012). In Lao villages, a clear division of labor exists between the public and private spheres for men and women. As heads of households, men generally speak for households and are elected or appointed to positions of authority within village social and political organizations. With the exception of widowed or divorced women who are considered heads of households, village women restrict their non-work activities to the private, domestic sphere and to community social matters. Economic divisions, even within the informal economy of most Lao villages, also exist in households (Ireson-Doolittle et al. 2004). Men are expected to be the primary earners in the family. Large fish caught by any family member are sent to market while small fish become food for the family. Income is turned over to wives who, as the household money managers, use it to buy additional food and to pay for other family needs. One important exception is the role of women in fish trading in Laos (Walker 1999), a more formal and complex economy where women play a significant role as traders of fish, other foods and household goods. In the study of fish trading in Attapeu published by the Living Aquatic Resources Research Center (LARReC), for example, it is noteworthy that all three large-scale fish traders in the province were women, providing cash when necessary to small-scale village fish traders and fisher traders, who were primarily men (Phonvisay 2006).

In 1995, Laos was a signatory to the Beijing plan adopted by the UN Conference on Women attended by an LWU delegation as the country's official representation. Three environmental actions were adopted at the conference: 1) to involve women actively in environmental decision making at all levels; 2) to integrate gender concerns and perspectives in policies and programs for sustainable development; and 3) to strengthen or establish mechanisms to assess the impact of development and

environmental policies on women (Earle 2013). Subsequent to the Beijing meeting, analysis of gender mainstreaming in fisheries has been conducted worldwide and led since the late 1980s by the UN's Fishery Industries Division of the Food & Agriculture Organization (FAO) (Haque 1988; Abbasi 1994; Tietze 1995). The first Global Symposium on Gender and Fisheries, held in Malaysia in 2004 and sponsored by the Asian Fisheries Society (Global Symposium 2004), has made particular contributions to the advancement of gender studies in Asia Pacific fisheries (Vunisea 2008; Williams 2012; Lentisco 2012) and elsewhere (Matthews 2012).

A flurry of gender mainstreaming activities took place in fishery management agencies at the Lao central-government level in the decades following the Beijing conference (Kusakabe 2002, 2006, 2010; Hartman et al. 2004; Lentisco et al. 2012). In 1999, the Department of Livestock and Fisheries began training women for aquaculture and community fish pond management, a high government priority for commercial development and a sector widely promoted throughout Southeast Asia as a fishery activity that women could integrate into their daily domestic activities (Kusakabe 2002; Williams 2012). Similarly, in the 1990s, the Mekong River Commission (MRC) began tracking involvement by women in fishery management in the four Lower Mekong countries (Sriputinibondh 2004; Kusakabe 2006, 2010). In 2004, the MRC gender program published research about Lao women fishers' access and rights to natural resources (Hartmann 2004), leading to additional research on the topic (Chamberlain 2005). In 2010, an important step was taken when the Ministry of Agriculture and Forestry, working with the FAO, published the *National Gender Profile of Agricultural Households*, the country's first effort to disaggregate gender data from Laos's agriculture sector, including fisheries (Lao PDR 2010). This baseline data is important because it allows analysis to focus specifically on gender as a key factor in improving fishery management and policy.

Gender mainstreaming in Lao fisheries, nevertheless, appears to have stayed at the national administrative level with very little analysis conducted on the village impact of national gender mainstreaming in natural resource management. Fishing is a livelihood in Laos that is passed down through generations of women. This is true in Attapeu Province where significantly more women than in any other province in Laos engage in subsistence fishing, almost equalling male involvement in fishing (Lao PDR 2010). While generalizations about strict gender divisions of labor can be misleading, river fishing with larger gear is widely considered a male activity (World Bank 2013). Men fish on rivers, casting nets from boats, and women fish in wetlands but also in rivers with scoop nets and other small-scale gear, using simpler, more traditional gear (Claridge et al. 1997). Women also provide important support services to their husbands' river fishing, such as paddling boats, mending nets, collecting bait and keeping accounts, activities that are unacknowledged or undercounted as part of the financial cost of fishing. While men will sometimes also fish in wetlands, particularly during the dry season and if families are especially poor and cannot afford boats, typically only women and children (both male and female), gather aquatic resources from flooded rice paddies, streams, marshes and other lowland floodplains (Meusch et al. 2003).

These distinctions align with other gender divisions in rural Lao families. Accustomed to acting in the public sphere, men will often travel long distances to find

productive fishing grounds such as the reservoir created by the Houay Ho dam where the government has introduced the rapidly reproducing Nile tilapia. Wetlands, usually located closer to villages, are more accessible to women, and fishing in them can more easily be incorporated into their daily domestic routines. Along with less marketable fish from the rivers, the small fish, frogs, turtles, crabs, and shrimp that women harvest from wetlands are lower-quality aquatic products that bring in a lower unit price in markets but that still retain high nutritional value (Fenton 2010; Kawaraziuka 2010; Arthur 2011). They are more often consumed than sold. With declining fish stocks in the rivers, many women report fishing in wetlands two or three times per day, often with other women and children, to prepare adequate meals for their families (Moser 2013). If fish or other protein sources are not found, however, people sometimes depend on garden vegetables, non-timber forest products, or aquatic plants for food, limiting the nutritional variety in their diets. As one woman in Attapeu put it:

If we catch enough to eat, we go fishing once a day. If not, we go more. In the dry season, if our husbands catch big fish, we try to sell it in the market. We eat what we can't sell or what the women catch in the paddies or ponds. We get vegetables from the ponds and we eat bamboo. (Moser 2013:7)

Aquatic resources from rice paddies, marshes and other wetlands are important but often-overlooked sources of nutrition for families in Laos (Meusch et al. 2003; Halwart 2003). The economic value of wetland food contributed by women to maintaining family health and nutrition deserves greater attention. Some data are available that measure the economic value of wetlands to community livelihoods. In 2010, when the government submitted an application to declare the Beung Kiat Ngong Wetlands in southern Laos a Ramsar Wetlands Site of International Importance, it was estimated that resources from the wetlands, particularly fish, frogs and aquatic vegetables, contributed US \$850,000 annually to the local economy (IUCN 2011). In neighboring Cambodia, a household study in the wetlands of Ream National Park estimated that wetland fishing contributed 65 percent of household income for families living around the wetlands (Horwitz 2012).

Women and Village Fishery Decision Making: Excluded—or Hidden in Plain Sight?

Fishing in rice paddies, marshes and other wetlands is a category of wild capture fishing included in the Fishery Law and in the *Guidelines for Fisheries Co-Management*. Yet about 90 percent of village fishery committees in the 2013 study were made up of men who fish on the river and are typically appointed by male village heads, not elected by villagers (Moser 2013). Considering the importance of wetland catches and women's small-scale catches from rivers and streams to daily family nutrition, the absence of women on fishery management committees reflects an imbalance in village representation. The method for assembling the fishery committees may be responsible for this. In its 2003 report, "Governance and participation in Laos," Sida, the Swedish aid agency, noted that women were more likely to be in leadership roles if they were elected rather than appointed (Chagnon

2003). This suggests that appointments by elite males maintain traditional social order while elections in which women participate are more likely to challenge the social order. In fieldwork conducted in fishing villages in 1998, the FAO identified the following reasons for lack of leadership by women: the traditional role of women in Lao culture that confines them to the domestic sphere; the lack of experience by women in speaking in public; and women's lack of confidence in having knowledge about the issues (Murray et al. 1998). Nearly fifteen years later, in 2013, almost identical sentiments were expressed during fieldwork with Sekong women fishers (Moser 2013). Even though they might possess expert knowledge from assisting their husbands in river fishing or fishing independently in wetlands and rivers, women acknowledged that they lacked confidence to speak up in front of men. When village chiefs were asked why more women fishers did not serve on fishery committees, they replied that women were believed to be unsuitable to serve because they did not understand the rules and regulations of fishery management imposed by the Fishery Law (Moser 2013). Though they may agree with men's decisions, the possibility of overlooking women's priorities is evident.

Another explanation for the lack of involvement of women in fishery management committees emerged in field interviews in 2013. Though the recommendation to explicitly include women in decision making had been made before (Murray et al. 1998; Kusakabe 2002; Nelson 2009), the *Guidelines for Fishery Co-Management* adopted by the Lao government in 2009 do not stipulate the participation of women fishers as key stakeholders in the community decision-making process. Without women being specifically included in the language of fishery regulations, it comes as no surprise that village fishery committees, appointed by village chiefs, are not compelled or likely to include many or any women fishers. As one woman in Attapeu stated,

In the past, women wanted to participate on the fishery committee, but the men did not allow this. Women weren't asked to be on the fishery committee. This is men's work. Men make the decisions. (Moser 2013:12)

Interventions by superordinate authority, such as laws and regulations, have been identified as one way that women can escape social traps (Cinner 2008). In fact, when asked during the field study what would happen if women called a meeting to promote gender mainstreaming in village fisheries, women responded that men fishers would only attend if required to by district officials.

During the 2000s, recognizing the importance of gender equity in reducing poverty in Laos and other Southeast Asian countries, multiple UN agencies, notably UNESCO, ILO, IFAD and UNDP⁴, produced guidelines and conducted a gender sensitivity training program in Laos (Aksornkool 2002). Evaluations of the effectiveness of this effort cannot be found. However, during the Mekong Water Dialogue coordinated by

⁴ United Nations Educational, Scientific, and Cultural Organization (UNESCO), International Labour Organization (ILO), International Fund for Agricultural Development (IFAD), and United Nations Development Program (UNDP).

IUCN in Attapeu at the end of the 2013 study, the lack of gender sensitivity emerged as a prominent issue. Women fishers in the study, as well as male village chiefs and natural resource managers from the districts and Attapeu Province, attended the daylong workshop. In breakout sessions, men acknowledged that there were gaps in how women were integrated into village fisheries. These included men's weak response to understanding the importance of women in fishery management work, gaps in adequately conveying regulatory information to women, and a lack of understanding about how dismissing them made women feel. Women also felt that village and district authorities should give more importance to fishery work performed by women and that an ongoing women's discussion group to build leadership skills was needed (Moser 2013).

Other developing countries have also experienced gender divisions in activities in small-scale fisheries. Though there are cultural and political differences between the countries—notably in the different stages of their civil society development—analysis of activities of women fishers in the floodplain wetlands of Bangladesh, for instance, can provide some comparisons to women fishing in Lao wetlands (Sultana and Thomas 2008). Starting in the 1980s, improving the position of women became a focus of the NGO movement in Bangladesh, which made strides in the empowerment and economic emancipation of women. Building on the country's program to extend micro-credit to women, a network of community-based organizations (CBOs) helped coordinate fishery management projects that were gendered. In an analysis comparing women-only, men-only and mixed management fishery committees, it was found that women-only projects placed greater value on participatory processes, the mixed projects on community-wide action and norms, and the men-only CBO on setting rules. More criteria for successful floodplain resource management were identified by committees that included women than committees that had no women. Pressure for community compliance with sanctuary and fishing rules came from women who control what is cooked, what is decided based on group discussions, and decisions about what to catch or not to catch by their own hands.

Parallels capitalizing on women's environmental knowledge can also be drawn from agricultural projects developed in response to climate change. A project in Bolivia, coordinated by local and international NGOs, engaged women farmers in the Aymara communities known as *yapachuris*, or 'sowers,' to use their knowledge to avert risk caused by extreme climate variations in the high-altitude plains of the Andes (Nelson 2009). Women *yapachuris*, whose traditional responsibilities include storing grains and seeds for future planting, are being trained to monitor bio-indicators of climate and weather-related hazards. This climate-prediction project has led to reductions in crop losses from drought, hail and floods, as well as more stable and predictable markets for local crops. By combining their traditional knowledge with new technical skills, Aymara women have helped adapt more effectively to climate change for the benefit of the entire agricultural community.

Building Ecological Resilience by Listening to Women

Looking at the Sekong village fishery committees established in 2009, it is instructive to compare the resilience of committees that included women with ones that did not. In 2013, of the six villages that were targeted for FCZs in 2009, five had either abandoned management of their FCZ or had chosen to never create one. The only village fishery committee that was still functioning was the one for which a woman had the responsibility of keeping records. Though it is undocumented, the greater compliance associated with the FCZs may account for a reduced concern with illegal fishing practices, previously identified as the fishers' primary concern, in 2013. Increased population along the Sekong, and more importantly deteriorating water quality, were cited instead as the primary reasons for abandoning FCZs in 2013. Because of the growth in population along the river, villages have been unable to control fishing in their FCZs if a nearby village stopped managing its FCZ, allowing newcomers to become accustomed to unrestricted fishing (Moser 2013).

For most women and men fishers alike, however, the greatest concern was the deteriorating quality of the Sekong water, primarily due to river dredging for gold primarily by foreign companies granted mining concessions by the Lao government. In focus groups, villagers often recalled the clear waters of the Sekong in the 1970s before pointing to buckets of muddy water drawn that day from the river. Riverbank erosion during the rainy season that was triggered by agricultural development along the river and increasingly heavy rainfall, and river-bottom dredging by mining companies, were identified as the main causes of the degraded water.

Since three years, fishing on the river has been difficult because water quality is so bad. It makes no difference if we have a FCZ because, if the water is bad, the fish go somewhere else. (Moser, 2013:9)

The degradation of the Sekong River water was first recorded in the 1990s, when the central government's Department of Water Resources began to require environmental impact assessments (EIAs) from commercial developers clearing forests for rubber plantations or dredging river bottoms for alluvial gold or gravel (Wayakone 2013). By the mid-2000s, the Sekong water was muddy, sometimes laced with fertilizer runoff from rubber plantations or traces of mercury used in mining. As early as 2003, a study by the MRC's Laos country office found that the microbiological composition of Sekong water had degraded to levels significantly lower than the Mekong, indicating that the Sekong was no longer providing the once-abundant food supply to support migrating fish during the rainy season (MRC 2011). In 2008, as part of the EIA conducted for the construction of a hydropower plant on the Xekamen River, a Sekong tributary, it was found that water quality was acceptable for aquatic life and agriculture, but for human consumption, it fell between "impacted" and "seriously impacted" (MRC 2011). That warning was reiterated by the MRC in 2010, when it released its 2008 biomonitoring survey of Mekong tributaries (MRC 2010). The only sampling station on the Sekong River in Attapeu Province, at Ban Xou Touat in Sanamxay District, was given a C rating for its water quality, the next-to-the-lowest rating. According to the report, the low rating was due to "many changes" in the basin, including increased bank erosion, accumulated sand and clay and changing water flow, all contributing to a deteriorating

ecosystem on the lower Sekong (MRC 2010).

While there has been some discussion about deteriorating river water quality in Laos (Baird and Shoemaker 2008), the topic is a sensitive one for government authorities in the country because it is related to the larger issues of the public water supply and government control of commercial development, which are degrading river quality. In a data-poor country like Laos, the monitoring of river water quality can be sporadic, influenced by a lack of both resources and technical know-how (Visvanathan 2010). In January 2014, unusually turbid water—the muddy condition that blocks daylight needed for the growth of algae and other aquatic plants that feed wild fish—was found to have grown to unprecedented dry-season levels in measurements taken by MRC at the mouth of the Sekong River. Although this was attributed by MRC to unusually heavy rainfall in December 2013 rather than to riverbed erosion, the turbidity was cited as the reason for skin rashes in Laos and water that was unusable for cooking and drinking in Cambodia (MRC News 2014). Apart from turbidity caused by erosion, river water can also be contaminated by cadmium and mercury used in the mining process.

Thorny topics like deteriorating water quality or the absence of the voices of marginalized people are avoided in the Lao fishery co-management guidelines, giving clues to why FCZs may be unsustainable as ways to protect the fish population. Records of the ethnicity of villagers who participated in the creation of the village fishery committees are not available. Though six ethnic groups are known to live in the two districts of Attapeu Province where the 2013 study was conducted, only one village, Ban Sokkham, the village closest to the Houay Ho reservoir, identified members from an ethnic group—the Nya Heun—as participants in the village management committee. Because the participatory process that established the FCZs was controlled by officials from provincial, district and village governments, there remained a broad range of issues of concern to village fishers that were not addressed or incorporated into decisions about village fishery management.

The ARL Final Technical Report illustrates some of the top-down dynamics between the authorities and villagers during the project (WWF 2009). Project evaluators identified a resistance to change on the part of the villagers as a challenge. According to the report, villagers were reluctant to believe that the historical abundance of aquatic life and easy access to resources in the Sekong might cease to exist or that new ways of ensuring the productivity of the river were needed. In focus groups conducted in 2013, older women fishers repeated this belief, acknowledging that, although fish catches were now much lower, they maintained tradition by fishing in the same spots that they had fished in for almost 50 years. When a villager asked the ARL team how long they would need to police the new FCZs to prevent outsider use, the district governor replied, “When the people in your village want to stop eating fish, you can stop managing your fishery” (WWF 2009:5). When it was estimated that an annual yield of 14,120 tons of aquatic resources would result from community fishery management, a Department of Livestock and Fisheries official stated, “You could never dig enough fish ponds to grow that much fish and, if you could, it would require a huge financial investment. By managing the river you can benefit from all that fish basically for free” (WWF 2009:5).

As a key to effective community participation in co-managed fisheries, traditional ecological knowledge (TEK) in fishery management has been well documented (Berkes et al. 2000; Johannes et al. 2000; Haggan 2007; Baird 2007). In Laos, a country rich in ethnic diversity, traditional culture often lies at the heart of communal values and if these values are not acknowledged, adaptive management will likely be less sustainable. Rivers and fish have played historically significant roles in the traditional cultures of landlocked Laos. For instance, in the 'spirit system' of ecosystem management used by the Khmu ethnic group in northern Laos to protect the Mekong giant catfish on the Mekong River, particular importance was given to the destructive force of 'disturbed water' and to the belief that boats and fishing gear are living things possessed of individual powers and having a life of their own (Hartmann 2007). Given the historic role of TEK in managing fisheries, it is not surprising that among the six villages in the 2013 study, the only FCZ that was still operating was located in an area on the Sekong River where water spirits were believed to live, frightening people away from fishing there (Moser 2013). Integrating such knowledge into government policies modeled on Western templates can be challenging. For instance, Baird (2010) has written that government intervention in fishery management might be justified if fisheries are characterized as 'open access.' However, he argues, fisheries in southern Laos are functionally not 'open access,' but are based on a more complicated common property management system derived from first claims to fishing sites and labor inputs.

The linkages between women and traditional culture in Sekong River fishery management deserve full ethnographic attention, particularly in southern Laos where *People, Livelihoods, and Development in the Xekong River Basin, Laos* (Baird and Shoemaker 2008) provides one of the few extensive socioeconomic overviews of the region. Fifteen major ethnic groups live in Attapeu Province, six of which live within the two districts where the 2013 study of women fishers took place. As Chamberlain (2006) points out, some aspects of gender equity can be more prevalent in animism than in Western culture. For instance, shamans can be either male or female, but spirit mediums are largely women. Women can also retain significant cultural and economic power within traditional culture. This revolves primarily around the domestic sphere as reflected in the duties assigned to LWU representatives to preserve social cohesion by organizing village cultural activities. Since ethnic Lao culture is matrilineal, with property passed down through mothers, Lao women theoretically own all property, including fish traps, though their husbands and male relatives operate and govern the traps (Baird 2008). But Lao ethnic women also possess knowledge about natural forces that have sustained traditional culture over time. Some biocultural research suggests that traditional women possess greater knowledge about plants and thus are the chief practitioners of traditional medicine (Maffi 2001). In Lao fishing villages, women are equally attuned to the natural patterns of weather and water, assisting their husbands in river fishing and using more traditional hand gear to gather wetland foods. To this extent, women serve as important possessors of the socio-ecological memory upon which a renewed, more resilient ecosystem could be built (Folke 2007).

As Laos undergoes economic expansion, with accompanying regulatory efforts, and as men adapt to new pressures, the traditional knowledge possessed by women may be even more important. Chamberlain quotes the groundbreaking work in

northern Thailand by anthropologist Otome Klein-Hutheesing to explain how new economic conditions may be both diminishing the importance of traditional knowledge and disempowering women in traditional cultures.

The breaking point of sexual equality is when female and male prestige systems undergo a mutation of meaning. It is when males have access to consumer goods, markets, and class associated symbols, that male honor becomes a more pervasive symbol of power than female honor. The power of possession may make men more powerful than females who become seemingly more illiterate as they fail to acquire the language and symbols of industrialized modernity. (Klein-Hutheesing 1997: 92)

Rural women make up the largest percentage of the world's poor because, as a group, they are the ones who are most frequently denied access to reproductive health, education and property rights (Chen et al. 2005). It has also been shown that when environmental change brings economic crisis, women whose livelihoods depend on natural resources bear a disproportionate part of the burden (Neumaye and Plumper 2007). Without 'safety nets' such as mobility, education or skills to help them adapt to change, rural women bear a greater burden of economic hardship caused by environmental change because they have access to fewer resources to regain a solid economic footing (Nelson 2009). To escape social traps, Cinner (2008) has identified several broad avenues applicable to women fishers, including education, the intervention of superordinate authority (legal systems, government, religions) and incentives that might convert traps to opportunities for growth. Social assumptions that exclude women from village fishery co-management committees, for instance, not only disregard their input, but also deny them ways to develop decision-making skills that might help keep them and their children out of poverty. Access to formal education for rural Lao women and children has generally improved in the last decade, although women are much less likely than men to finish secondary school (Ireson-Doolittle 2004). Sons and daughters who formerly helped with fishing and other domestic duties are now more often in school, although the poorer the family, the more likely children—and especially girls—are to leave school to help make ends meet. In focus groups, women from better-off families expressed hope that their daughters would leave the fishing village and find a good government job in the city. Others appeared unable to envision lives for their children outside the villages. As one woman stated,

We need to learn about more technical things, how to raise chickens, how to train for another job, how to learn handicrafts so that we can sell them. Only women sell fish but only those who can ride motorbikes can get to the village market. Some women can't even drive a motorbike. (Moser 2013:9)

In looking for solutions to poverty for rural women, Kusakabe (2002) has pointed out that economic planners should provide more livelihood options for women, accounting for differences in age, ethnicity and social class, and based on their knowledge, experience and interest. In the Lao fishery sector, training in rice-fishing and aquaculture management has been offered to women, a transfer of fishery knowledge

that could be considered an economic ‘trade-off’ from daily, sometimes unproductive fishing in wetlands. However, Kusakabe (2002) has argued that preconceptions about the simplicity of aquaculture and women’s suitability to conduct it around their other domestic duties limit women’s access to more demanding technologies. Similarly, with what she calls the growing ‘feminization’ of fisheries in what was previously an all-male activity, she challenges the emphasis on women for post-harvest fish processing, another occupation often earmarked for women based on their traditional domestic roles.

Using women fishers to monitor river water quality may be one way to add new technical skills to women’s traditional knowledge and to give them a way to make an important contribution to river water management. Based on its successful water-monitoring program in Mongolia, the Asia Foundation-Laos has supported a community-based biologic water-monitoring program on the Nam Song River in the tourist area of Vien Vang in Vientiane Province since 2009 (The Asia Foundation 2012). Local citizens work with students from the National University of Laos Faculty of Science to collect samples of benthic macroinvertebrates, an effective bio-indicator technique that has been used to monitor river health in such areas as the White River Watershed in Vermont. Like the Aymara women in Bolivia, women fishers on the Sekong could be similarly trained in bio-indicator monitoring, bringing new forms of know-how to fishery management that could support traditional livelihoods in fishing villages.

Conclusions

Laos is a rapidly changing country. Its accelerated economic development, combined with the onset of extreme climate variables in Southeast Asia (ADB 2013), has put its majority population of rural poor on course to experience massive transformations in traditional daily life. Nowhere will these transformations be more dramatically felt than in the subsistence fisheries on the country’s rivers, the heart of livelihoods, food and cultural tradition in landlocked Laos. This paper has discussed how practices can be developed in Laos to promote social and economic coherency in the face of rapid external change that will enhance the resiliency of the country’s fisheries and serve the people whose lives depend on them. Among these practices are increasing the diversity of stakeholders needed to strengthen the country’s socio-ecological system based on fisheries, enhancing the quality of adaptive learning to help citizens absorb and learn from changing conditions impacting changes in fisheries and improving the flow of communication between local and regional governance to strengthen fishery management.

Though they make up more than one-half of Laos’s total population and almost one-half of the country’s daily fishers (Lao PDR 2010), women have been largely excluded as stakeholders who could plan and implement sustainable practices in village fishery management. Based on a 2013 field study in Attapeu Province in southern Laos, this paper has argued that excluding women from village fishery management committees has not only rendered Fish Conservation Zones established on the Sekong River 2009 ineffective, but has also led to flaws in the co-management model promoted by the government’s Department of Livestock and Fisheries in its Fishery Law, adopted

in 2009. Cultural attitudes toward women are complex, nuanced and entrenched on many levels in Laos. Allowed to evolve at their own pace, some of these attitudes might shift over time toward greater empowerment of women. However, actively strengthening the capacity of women fishers now and enabling them to prepare for changes in the fishery sector will build resiliency and protect against growing food insecurity, poverty and decreased life chances throughout Laos.

National, regional and international organizations, such as the MRC, FAO and the Asian Fisheries Society have long recognized the importance of addressing the needs of women in fisheries in developing countries, although the actual practices of various projects promoted by these organizations are much more problematic than the stated policies might lead one to expect. Yet research conducted by these and other organizations has shown what steps can be taken to expand stakeholder dialogue by including Lao women in village fishery governance. Among these steps are including language in the national Fisheries Law that requires participation by women in village fishery management committees, creating incentives to allow women to develop new skills, ensuring more places in governance structures for women and providing opportunities for adaptive learning tailored to the experiences and interests of women in fishing villages.

None of these steps are quick fixes. But if women fishers receive the assistance they need to keep themselves, their families and their communities intact, the positive changes that would ensue might outpace the external changes that are certain to impact Laos.

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