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# Assessing the future of small-scale fishery systems in coastal Vietnam and the implications for policy

Derek Armitage<sup>a,\*</sup>, Melissa Marschke<sup>b,1</sup>

<sup>a</sup> Environment and Resource Studies, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1

<sup>b</sup> School of International Development and Global Studies, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5

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## ABSTRACT

Our aim in this paper is to examine the future for small-scale fishers and fish producers in the rapidly changing Tam Giang Lagoon in central Vietnam. The analysis shows: (1) the multi-dimensional and linked social, ecological and economic challenges confronting lagoon resource users and government officials, including the possibility that important features of the ecological system have been significantly altered; and (2) the spatial and temporal variation in the lived experience and conditions facing lagoon resource users even in the context of one relatively-bounded physical system. In this context, policy and management interventions need to better reflect social and ecological variability, incorporate local perspectives about the future of small-scale fishing and small producer aquaculture, and acknowledge how individuals simultaneously produce, resist and adapt to change. Key policy responses include the adoption of an integrated fishery (fishing and aquaculture) and coastal systems perspective, clarifying security of access rights to aquatic resources, and building institutional conditions for greater collaboration and learning among resource users and decision makers.

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## 1. Introduction

Small-scale fishery systems are influenced by multiple factors, including fisheries (mis)management and poor enforcement (Pitcher and Lam, 2010; Axelrod, 2011), economic development policies (Mansfield, 2011), and climate variability and change (Badjeck et al., 2010). Market uncertainty and stock depletion further create difficult social and ecological conditions for small-scale fishers (Berkes et al., 2006; Worm et al., 2006). Understanding the implications of such drivers of change for small-scale fishers and the environments upon which they depend is a crucial environmental, economic and social policy challenge (Chuenpagdee, 2011).

Small-scale fish capture and production is a vital source of livelihoods and food security for millions of people in the Southeast Asia, as well as a way of life (Chuenpagdee, 2011). In many small-scale capture fisheries pressure on fish stocks and coastal aquatic resources has increased while overall incomes and employment has declined, further marginalizing often impoverished households (Allison et al., 2011). Fish farming has simultaneously emerged as the world's fastest growing sector of food production (Bostock et al., 2010), particularly in countries such as China, Thailand and Vietnam, and much of this growth is taking place at the small producer level (Belton and Little, 2011). Here too the experience of small producer fish farmers is proving increasingly untenable given the

\* Corresponding author. Tel.: +1 519 888 4567x35795.

E-mail addresses: [derek.armitage@uwaterloo.ca](mailto:derek.armitage@uwaterloo.ca) (D. Armitage), [melissa.marschke@uottawa.ca](mailto:melissa.marschke@uottawa.ca) (M. Marschke).

<sup>1</sup> Tel.: +1 613 562 5800x4866.

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boom-bust cycle of production, emergence of aquatic disease, and dynamic consumer preferences (Bush et al., 2009).

By small-scale fishers, we are referring to both small-scale capture fishers and small producer fish farmers (aquaculture) since households may practice both capture fishing and fish farming. In the Tam Giang Lagoon, and throughout Asia, people often move between these production systems depending on fish stocks, availability of fishing gear, opportunities for fish farming and market conditions (Tuyen et al., 2010; Nayak and Berkes, 2011). Fishing and aquaculture systems are linked in terms of fish products being used within aquaculture feeds, the role of aquaculture stocks in supporting and enhancing capture fisheries, and through ecosystem management approaches connecting aquaculture and fisheries in single spatial units (such as lakes, lagoons, flood plains or mangrove estuaries) (Bostock et al., 2010). Small-scale fish producers are also most directly connected to the resources and ecosystems upon which they depend and their knowledge and understanding of those systems is an important dimension of sustainability (Berkes, 2012). This complex interplay is seldom captured in conventional interpretations of small-scale fishery systems (cf., Berkes et al., 2001), or in the small producer aquaculture literature which tends to draw on an economic analysis to understand risk or to focus on contamination issues (cf., Bui et al., 2012). This lack of integrated support to small-scale fish producers may have long-term negative consequences for achieving sub-regional and national social and economic development priorities (Charles, 2011a,b; Chuenpagdee, 2011).

Our aim in this paper is to examine the complexity found within one social-ecological system and to use this case to consider the future of small-scale fish producers. We focus on the changes taking place in the 22,000 ha Tam Giang-Cau Hai lagoon (herein Tam Giang lagoon) in central Vietnam, but the insights are relevant to Vietnam and Southeast Asia more generally. Specifically, we examine: (a) the multi-dimensional challenges confronting lagoon resource users and government officials in supporting small-scale fish producers; and (b) the spatial and temporal variation in the lived experience and in the ecological conditions facing lagoon resource users even in the context of one relatively-bounded biophysical system.

Understanding change and feedbacks between social and ecological processes is important for policy, as is the recognition that these processes may operate at different scales and simultaneously produce alternative pathways toward (or away) from sustainability (Folke et al., 2010). In small-scale fishery systems, change may be radical or abrupt with uncertain (and often undesirable) consequences for ecosystem services and human well-being. Current evidence points to the possibility that key attributes of the lagoon system (ecological and social) are under significant pressure. In this context, it is crucial to understand how individuals in the Tam Giang lagoon are simultaneously producing, adapting to, and in some cases, resisting further social-ecological change.

## 2. Fishing and aquaculture in Vietnam

The pace of change along Vietnam's coasts, deltas and lagoons is intense, and has led to an enclosure of common spaces for

fishing. The expansion of aquaculture ponds in particular has brought a series of new pressures into coastal areas including higher competition for land and the threat of marginalizing rural communities from access to productive land and water resources (Bush et al., 2009). Fish farmers and capture fishers are sometimes drawing on the same resources, particularly since fish farmers have historically been dependent on wild caught fish to use as feed for their aquaculture farms, with some small producers continuing to depend on wild feed (Loc et al., 2010). The natural resource base, particularly the inshore fishery, has been severely over-fished (for many reasons, not just the use of wild feed in aquaculture), and many high value fish resources having significantly declined (Pomeroy et al., 2009; FAO, 2010).

Vietnam's fisheries sector contributes around four percent of GDP and is viewed as a source of economic growth, poverty alleviation and food security (FAO, 2010). The Vietnamese diet, for example, relies on fish as a major source of protein, accounting for 40 percent of average intake (FAO, 2010). In 2010 total fisheries production (5,127,000 Mt) was valued at over seven billion dollars (US), making it the third most important Vietnamese export after crude oil and textile-garments (GSO, 2011). Fishing is estimated to employ nearly 700,000 people directly (GSO, 2011), although some estimates suggest that as many as four million people in Vietnam are employed in this sector. Moreover, aquaculture now covers nearly half of the total water surface area that could be used for fishing activities, and accounts for 53% of all Vietnamese fisheries production (GSO, 2011). Even with the export of high value fish such as the *Pangasius* catfish or shrimp (*P. monodon*), there are many low value species that are caught or cultivated for domestic and regional consumption (Belton and Little, 2011). For example, the percentage of boats in Vietnam under 50 horsepower is significant at 77%, and small-scale fish producers – both fishers and fish farmers – form an important part of the overall fisheries sector (FAO, 2010). Those relying on small boats generally catch low value fish species, and it appears that differentiation and marginalization may occur in some parts of the coast (cf., Bush et al., 2009; Edwards, 2010).

Vietnamese aquaculture has mainly been small-scale in nature (ponds less than 1 ha, using limited infrastructure, drawing on wild feed etc.), and this type of aquaculture continues to be practiced throughout Vietnam (Edwards, 2010), in some cases with farmers expanding the number of ponds they own. However, there also appears to be a trend toward consolidation, particularly in high-value shrimp or catfish fisheries in the Mekong Delta area (southern Vietnam). For example, Bush et al. (2009) show that farm size of aquaculture ponds in An Giang province increased in size between 2004 and 2008: in 2004 69% of farms were less than 0.1 ha whereas in 2008, 34% of farms were less than 0.1 ha. Edwards (2010) discovered similar trends in another part of the Mekong Delta. Meanwhile, in 2011 the ministry of agriculture and rural development launched Vietnam's fisheries development strategy through 2020 along with the scheme on development of aquaculture through 2020. The Vietnamese fisheries development strategy (VFDS) projects that between 65 and 70 percent of total fisheries production will be from aquaculture (VFDS, 2010) at the end of this timeframe. Moreover, the direction promoted by these policy documents

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