



# Governance potential for cetacean bycatch mitigation in small-scale fisheries: A comparative assessment of four sites in Southeast Asia



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## ARTICLE INFO

### Article history:

Available online 6 March 2015

### Keywords:

Small-scale fisheries  
Governance  
Community engagement  
Marine mammal bycatch  
Irrawaddy dolphin  
Bridging organization

## ABSTRACT

Bycatch of cetaceans (whales, dolphins, porpoises) in small-scale fisheries is a major global conservation threat. Mitigating bycatch is a fisheries management issue. However, investigation of the governance context of bycatch has been limited. Much-needed progress in bycatch mitigation requires integration of governance assessment in bycatch-related studies. This project assesses “conservation-relevant elements” of local governance institutions and activities that are involved in coastal and aquatic resource management (CARM) and considered important to bycatch mitigation. Research focused on four sites in Southeast Asia with small-scale fisheries bycatch of Irrawaddy dolphins (*Orcaella brevirostris*): Trat, Thailand; Mahakam River, Indonesia; and Malampaya Sound and Guimaras and Iloilo Straits, Philippines. Using key informant and household surveys, this project examines the extent to which conservation-relevant governance elements are active and effective in CARM, contribute to enforcement, coordinate across institutions, and engage communities. These attributes varied across sites, holding potentially significant implications for the feasibility and process of bycatch mitigation. The role of bridging organizations appears to be vital in CARM activities and current bycatch mitigation efforts, but involvement of local communities and support from external institutions are also necessary for sustained and impactful management. Insights derived from approaches such as that used here can hold lessons beyond Southeast Asia in terms of research methods (i.e., how to incorporate interdisciplinary approaches into bycatch studies), findings (i.e., what governance elements might be most conducive to bycatch mitigation), and setting priorities for conservation (i.e., at what sites is mitigation most feasible, and how can governance capacity for mitigation be enhanced).

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## Introduction

Small-scale fisheries (SSFs) represent a vital interface between humans and marine ecosystems, with strong dependence and potentially significant impacts on marine species and habitats. Bycatch of cetaceans (whales, dolphins, and porpoises) in these fisheries represents a major threat to cetacean subpopulations and species in developing countries around the world (A. J. Read, 2008; A. Read & Rosenberg, 2002). Mitigating cetacean bycatch is a fisheries management issue. It requires changes in fishing practices, such as a reduction in overlap between fishing gear and cetaceans through gear restrictions, or technical gear alterations to reduce the likelihood of cetacean entanglement.

As such, assessing avenues for bycatch mitigation necessitates understanding the governance context of small-scale fisheries, in

addition to understanding social, economic, and cultural contexts. It is assumed that sites with more active and effective fisheries governance are those for which mitigation of bycatch is the most feasible, as they possess the attributes conducive to managing bycatch-related fishing practices. These attributes and arrangements of governance will be described here as “conservation-relevant elements” of small-scale fisheries governance, and can be viewed as essential building blocks for bycatch mitigation.

Simply assessing existing bycatch mitigation efforts in small-scale fisheries offers only limited insight, as such efforts are relatively rare and, in several cases, recently established. This is due to deficiency of data on bycatch in developing countries and limited resources for related conservation actions (e.g., Whitty, 2014; Moore et al., 2010; A. J. Read, 2008). As such, a more thorough understanding of the opportunities and obstacles to bycatch mitigation in small-scale fisheries requires investigation of the broader context of small-scale fisheries governance. The extent to which conservation-relevant elements of fisheries governance are

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active and effective can serve as a proxy for how feasible bycatch mitigation might be, and offer an instructive understanding of how future bycatch mitigation might be implemented.

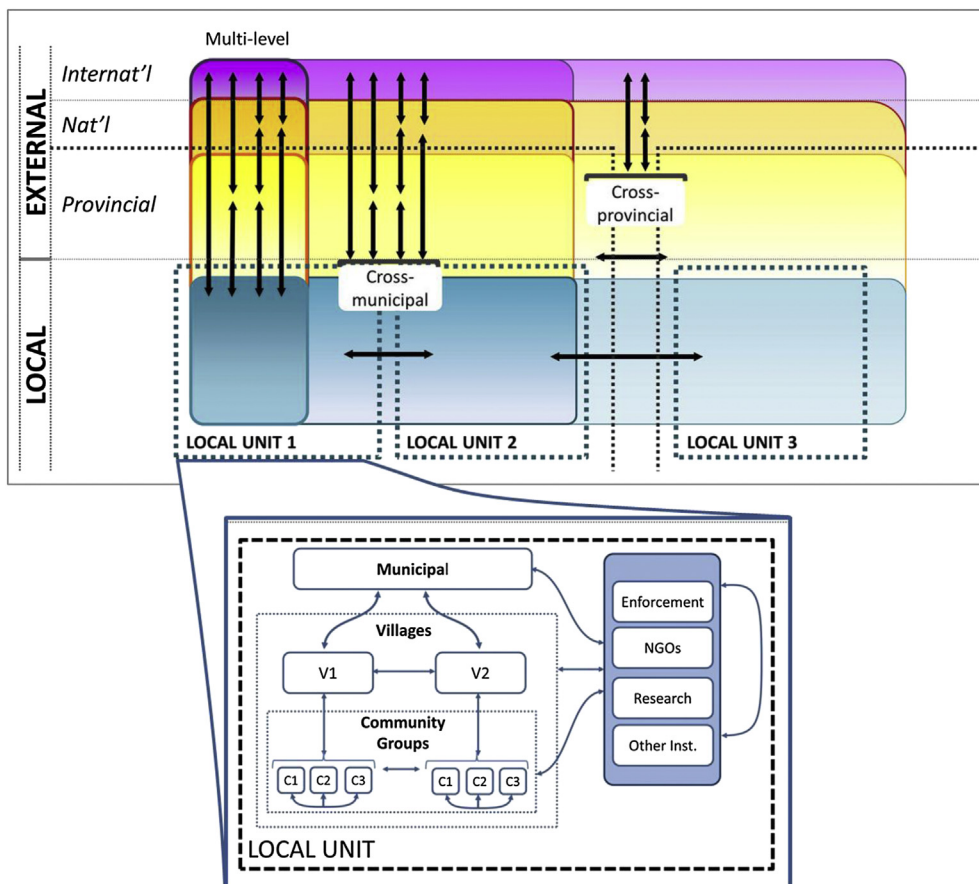
Here, the focus will be on local-level governance, as small-scale fisheries management has largely decentralized to local governments (Berkes, 2010; Engel & Palmer, 2011; Ribot, 2002). Local governance is defined as those institutions that influence resource management at the level of municipalities, and the villages and community groups within (Fig. 1). These local institutions and processes can influence and be influenced by institutions and processes external to the local unit; for example, national fisheries regulations are applied to local waters, province-level enforcement agencies might patrol across multiple local units, and international NGOs might work with local communities (Fig. 1; Andrew et al., 2007; Gibson, Ostrom, & Ahn, 2000).

*Focus: Irrawaddy dolphin bycatch in Southeast Asia*

This paper explores the institutions, activities, and arrangements involved in local-level governance of coastal and aquatic resource management (CARM) relevant to the mitigation of Irrawaddy dolphin (*Orcaella brevirostris*) bycatch in Southeast Asia; such bycatch is the major threat for this species (Reeves et al., 2008). Southeast Asia was selected as the study region based on the distribution of Irrawaddy dolphin subpopulations in a diversity

of natural and social contexts. It is a priority region for marine mammal conservation research due to a paucity of data on the conservation status of and threats to these species (A. J. Read, 2008; Reeves, Smith, Crespo, & Nortarbartolo di Sciara, 2003). Existing data suggest that bycatch is a pervasive, serious threat to marine mammals in the region (Reeves et al., 2003). Additionally, dependence on small-scale fisheries for subsistence and income is exceptionally high in Southeast Asia, in a context of rapid population growth, economic development, and technological change (R. Pomeroy et al., 2007). This high dependence on nearshore resources and extensive issues in fisheries management (Seilert, 2002; Flaherty & Karnjanakesorn, 1993; Panayotou, 1980; R. Pomeroy et al., 2007; Stobutzki, Silvestre, & Garces, 2006) render this an important region for lessons on the interface between fisheries and conservation.

Incorporation of interdisciplinary methods to understand social and governance aspects of marine mammal bycatch have been limited thus far (Lewison et al., 2011). As such, insights into bycatch-related issues of fisheries governance will contribute greatly to this data-deficient field of study Marine mammal bycatch in small-scale fisheries is a global problem; insights derived from projects such as this hold lessons beyond Southeast Asia, both in terms of research methods (i.e., how to incorporate interdisciplinary approaches into bycatch studies) and findings (i.e., what governance elements might be most conducive to bycatch mitigation).



**Fig. 1.** Conceptual figure for “local-level governance of CARM”, as defined for this paper. The “Local Unit” (bottom) is composed of the municipal (or equivalent) government, village governments, and community groups within those villages, in addition to other institutions (including enforcement bodies, NGOs, and research entities) that influence CARM, and all of the linkages between and within each type of local institution. Zooming out to beyond the local level, external institutions (at the provincial, national, and international) can influence and interact with local-level governance of CARM, either directly or through multiple steps with intermediate institutions. Cross-municipal and cross-provincial interactions can also shape CARM in local units. (2 COLUMN).

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