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Reconsidering Development – Coping with Uncertainties: Live Reef Food Fish (LRFF) Trade in Spermonde Archipelago, Indonesia

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Photo essay 1

Coastal communities on the Spermonde Archipelago in South Sulawesi, Indonesia are dependent on the fishing of live reef food fish (LRFF) and its trade. Limited education and a low skill base constrain the possibility of benefiting from other industries. There are approximately 150 islands with fringing reefs, barrier reefs, and submerged patch reefs in the Makassar Strait along the province of South Sulawesi. LRFF trade in this area serves the biggest live reef fish market in the world: Hong Kong. Barrang Caddi Island is one of the Islands on the Spermonde Archipelago that depends on the LRFF trade.

Photo essay 2

LRFF are usually kept alive until cooking to preserve freshness and taste.

Photo essay 3

Live reef food fishing is an important livelihood that generates income for many coastal and small island communities, with estimated exports between 10,000 and 20,000 tons per year. During the live preservation period, fish are injected with antibiotics to cure wounds and keep them fresh. At a packaging site in the City of Makassar, fish are anesthetized with chlorophenicol and placed into styrofoam boxes to be sent to Jakarta and Hong Kong (Bentley, 1999).

Bentley, N. (1999). *Fishing for solutions: Can the live trade in wild groupers and wrasse from Southeast Asia be managed?* Selangor, Malaysia: TRAFFIC Southeast Asia.

Photo essay 4

Although fishermen are not always able to get a catch everyday, they always have support for their daily needs through an informal debts and credits system, known locally as *punggawa-sawi relation* (Pelras, 2000). The *punggawa* (patrons) provide fishermen with boats and money for their fishing livelihoods, as well as money for their families during difficult seasons.

Pelras, C. (2000). Patron-client ties among the Bugis and Makassarese of South Sulawesi. *Bijdragen tot de Taal- en Volkenkunde*, 156(3), 393-432.

Photo essay 5

One island-based *punggawa* is reported to have earned up to 1 billion rupiahs (US\$100,000) in 2009. Other *punggawa* are indebted between 40 to 150 million rupiahs (US\$4,000 to 15,000) for one year to their boss (an exporter/trader who lends money to the *punggawa*), who is based in Makassar (the capital of South Sulawesi Province, Indonesia). The fishermen also experience debt accumulation, as they owe their patron anywhere between 3 to 20 million rupiahs (US\$300 to 2,000) per year. This picture shows fishermen of a *punggawa* as they unload their catch at their boss's place in Makassar and are supervised by the boss's right hand man. The fish are sent via airplane to Jakarta and Hong Kong afterwards.

Photo essay 6

Different techniques and tools are used in LRFF. Cyanide is used by some fishermen to increase their catch even though it is illegal. Three bottles of cyanide shown here were found off the shore of one of the islands. Cyanide threatens the ecosystem by contributing to overfishing and reef destruction, and leads to a decline in the target species' population (Mous, Pet-Soede, Erdmann, Cesar, Sadovy, & Pet, 2000; Pet-Soede & Erdmann, 1998). Furthermore, the medium- and long-term outcomes of this process threaten people's livelihoods. Because of overfishing, cyanide use, and other harmful practices, the International Union for Conservation of Nature and Natural Resources (IUCN) has placed some of the fish species traded onto their Red List of Threatened Species (www.iucnredlist.org).

Mous, P.J., Pet-Soede, L., Erdmann, M., Cesar, H.S.J., Sadovy, Y., & Pet, J.S. (2000). Cyanide fishing on Indonesian coral reefs for the live food fish market – What is the problem? In H.S.J. Cesar (Ed.), *Collected essays on the economics of coral reefs* (pp. 69-76). Kalmar, Sweden: CORDIO.

Pet-Soede, L., & Erdmann, M. (1998). An overview and comparison of destructive fishing practices in Indonesia. *SPC Live Reef Fish Information Bulletin*, 4.

Photo essay 7

LRFF trade in the Spermonde Archipelago includes different endangered species, such as the Humphead Wrasse (*Cheilinus undulatus*/ local: *ikan Napoleon*). Despite their endangered status and a prohibition by law to fish the Humphead Wrasse in Indonesian waters, this picture depicts an *ikan Napoleon* fish caught by fishermen. (Photo taken by Keyka Syamsoe)

Photo essay 8

Established in 1997 and running through 2012, a US\$18 million project called COREMAP that aims to protect, rehabilitate, and sustain the utilization of coral reefs and associated ecosystems in Indonesia was funded by the World Bank, the Global Environment Facility and the Asian Development Bank. This sign provided by COREMAP publicizes Law No. 31 / 2004, which prohibits the use of chemical and biological compounds and bombs to catch fish. Punishment may include up to 6 years in prison or payment of 1.2 billion rupiahs (US\$120,000). Despite the efforts of COREMAP, the practice of destructive fishing continues and is moving to new fishing grounds outside of the Spermonde Archipelago.

Photo essay 9

Reef fisheries have depended on unrestricted flows of foreign capital because state institutions and joint ventures have not played significant roles in regulating or channeling resources into the fishing industry (Fougeres, 2009). However, a new initiative called the “Indonesia Blue Revolution” was established in 2010 by the Indonesian Ministry of Marine and Fisheries and aims to maximize Indonesian marine potential through boosting fish production, while also meeting the objective of increased supply for the international market. On the one hand, the “Indonesia Blue Revolution” aims to be a model of development for Indonesian marine and coastal sectors. On the other hand, there is a potential for conflict within the existing structure especially regarding sustainability, which has been the central concern with this type of fishing. The focus on increasing production without considering the local structures in promoting sustainability has added more pressure to the reef ecosystem. Fishermen have reported that

fishing is now a challenge; as a result, they have to move further out to sea in search of new fishing grounds while continuing to use cyanide to catch fish. The LRFF in the photo were caught with cyanide at Makassar. This photo shows the fish after being injected with an antibiotic, anaesthetized, and ready to be packed and transported.

Fougeres, D. (2009). Old markets, new commodities: Aquarian capitalism in Indonesia. In J. Nevins, & N.L. Peluso (Ed.), *Taking Southeast Asia to market: Commodities, nature and people in the neoliberal age* (pp. 161-175). Petaling Jaya, Malaysia: SIRD.

Photo essay 10

This picture shows one of the fishing communities destroyed by the increasing intensity of big waves in the last three years. Weather is just one of the uncertainties faced by fishermen in these villages. There is a need to reconsider the mode of development of the Indonesian marine and fisheries sector since fishermen and agents within fisheries are facing several types of uncertainties including (1) unpredictability, (2) incomplete knowledge, and (3) multiple knowledge frames. These uncertainties highlight the state of Indonesian fishing in which there are different and sometimes conflicting views about how to understand and manage the system (Brugnach, Dewulf, Pahl-Wostl, & Taillieu, 2008). The reportedly unpredictable weather, incomplete information and data on fish resources, and multiple stakeholders' perceptions of the reef ecosystem at the local level need to be considered if the "Indonesian Blue Revolution" is to meet its intended objectives.

Brugnach, M., Dewulf, A., Pahl-Wostl, C., & Taillieu, T. (2008). Toward a relational concept of uncertainty: About knowing too little, knowing too differently, and accepting not to know. *Ecology and Society*, 13(2).

Photo essay 11

This photo depicts an example of attempting to understand the local conditions being faced by the marine and fisheries communities. An interdisciplinary, social-science-led team of researchers has worked on issues relevant to the achievement of more sustainable development trajectories for Indonesian coastal social-ecological systems, linking understanding of local fishing communities to policy making processes at different levels (Glaser, Radjawali, Ferse, & Glaeser, 2010). Role playing games were conducted on several occasions with fishermen and *punggawa* on different islands. These games were used as a research platform for the further development of an agent-based model for a coastal social-ecological management system that could provide input into decision-making in fishery policies. The games were also used as a method for deliberation among fishermen and different stakeholders in promoting sustainability in reef fishery.

Glaser, M., Radjawali, I., Ferse, S., & Glaeser, B. (2010). Nested participation in hierarchical societies? Lessons for social-ecological research and management. *International Journal of Society Systems Science*, 2(4), 390-414.

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