

Gleaning fisheries in the Asia-Pacific

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Introduction

Gleaning practices, collecting marine organisms from the coastal zone, are critical but poorly understood small-scale fisheries. Gleaning fisheries support food and nutrition security, contribute to coastal livelihoods, and hold important social values (Chapman 1987; Whittingham et al. 2003; Grantham et al. 2020) (Fig. 1). However, they continue to be excluded from economically oriented fisheries assessments (Kleiber et al. 2014). There is an urgent need for a global perspective on the management of gleaning fisheries combined with local assessments and monitoring that integrate fisher's perceptions, views and knowledge (Burgos 2016).

Eight early career-researchers and practitioners from the Asia-Pacific and beyond, gathered at James Cook University, Townsville, Australia, 5–8 June 2023 for a professional development Workshop on Gleaning Fisheries in the Asia-Pacific (Fig. 2). The workshop was designed to provide a space for dialogue, share skills, build connections, develop professionally, and identify key challenges and research priorities about gleaning fisheries in the Asia-Pacific. The workshop included participants from Timor-Leste, Fiji, Solomon Islands, Australia and Colombia.

In this report we summarise broad information about gleaning fisheries in the Asia-Pacific, outline challenges, frameworks and methodologies for studying gleaning fisheries, and highlight priorities for future research. Note that the frameworks and approaches described here reflect the expertise of workshop participants and are not exhaustive.

Gleaning in the Asia-Pacific region

Gleaning is widespread in the Asia-Pacific region, typically occurring in the intertidal zone, including nearshore coral reef flat habitats, mud and sand flats, as well as mangroves. During the workshop we discussed different terms for gleaning. For example, in Fiji, there is no generalised term for gleaning; however, within the Indigenous Fijian culture, the name of the gleaning technique refers to the method and the target resource. We concluded that the term “gleaning fisheries” best covers a range of techniques, but note that what counts as gleaning may differ for different people and disciplines. For instance, from the point of view of some participants, certain gathering practices – such as harvesting crabs in mangrove areas – would not be classified as gleaning.

Gleaning is a seasonal activity and depends on the weather and the moon cycles that drive tidal flows. It can happen in the night-time and daytime. Gleaning fisheries are accessible and low-cost; they occur in a diversity of habitats including rocky reefs, coral reefs, intertidal flats and mangroves, and are often pursued by fisherwomen and children (Harper et al. 2013). Gleaning fisheries use traditional fishing methods to collect a diverse range of small fish, molluscs, shellfish, crustaceans and seaweed. Many small-scale fishers rely on the resources gathered from gleaning for their livelihoods. These resources make an important contribution to local economies through the sale of high-value catches such as octopus (Willer et al. 2023), and shells for ornamental products that contribute to income from tourism (Barclay et al. 2018).

The resources gathered through gleaning also provide key food and nutritional benefits. These benefits include providing a source of protein and essential nutrients and are particularly crucial for mothers and young children, who have higher nutritional requirements and are more vulnerable to nutritional insecurity. Fish and seafood are a rich source of high-quality protein and bioavailable haem iron and, alongside other aquatic foods such as seaweeds,



Figure 1. Technique for harvesting the shell *Codakia tigerina* in Papua New Guinea. (© A. Burgos, J.F. Dejouannet and P. Dillais).

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provide a wide range of micronutrients. In many food-insecure countries, such as Timor-Leste, most households in coastal communities practice gleaning (Tilley et al. 2021). Gleaners bring some catch home after all trips, providing an important source of nutritious foods to household meals and covering seasonal gaps in other foods.

Challenges to sustainable and equitable futures of gleaning fisheries

During the workshop, we identified practical and research challenges for gleaning fisheries. Some challenges identified include lack of information and research, ensuring recognition and sustainable management, resource degradation and habitat destruction, and tensions between local gleaners and gleaners from other villages. First, gleaning practices are often not recognised as a fishery (Tilley et al. 2021). As a result, gleaners have little input into the management of natural resources on which their nutrition security depends, either at community or policy levels. Such marginalisation suggests gender-blindness; gleaning is a women-associated fishery that does not use boats or typical fishing gear. Hence there is a need to better recognise gleaning fisheries in ways that improve the representation of women's fisheries in decision-making, and better account for them in coastal management and development. In part, improving the inclusion of gleaning fisheries in policy and management will require better and more accessible research about their many benefits and baseline data.

Research on gleaning fisheries remains fragmented. Different disciplines approach and categorise gleaning fisheries differently, resulting in siloed research. For instance, we discussed a literature review, which explores how different disciplines characterise gleaning fisheries (O'Leary et al. in prep). The review found that gleaning research describes gleaning practices differently, using multiple terms and phrases. The review highlighted that gleaning fisheries research has distinct temporal and geographic patterns. While still in progress, the preliminary results from a discourse analysis of the literature showed that certain disciplines (e.g., fisheries science and anthropology) categorise gleaning in different ways (e.g., as destructive to the environment or as a cultural practice), and that these differences may hinder cross-disciplinary insights. In addition to disciplinary differences in terminology, the seasonal and temporal dynamics of gleaning fisheries mean they are difficult to collect data on (Grantham et al. 2021). These research challenges hinder the development of a holistic research programme on gleaning fisheries.

Better baseline understanding of gleaning fisheries is critical. Indeed, aquatic foods more broadly have often been excluded in food security discourse and interventions (Thilsted et al. 2016). Despite recent efforts to assess the nutritional contribution of small-scale fisheries (Hicks et al. 2019), the nutrient profile of many gleaned species remains understudied. Participants highlighted that



Figure 2. Participants at the Gleaning Fisheries in the Asia-Pacific Workshop. © Kylie Davis

further research on the contribution of aquatic foods in general, and gleaned species in particular, will enable us to assess the current role of aquatic foods sourced from gleaning among women and children. This data-driven strategy will likewise increase the visibility of women's contribution to household food and nutrition security.

Basic research and baseline data on gleaning fisheries is ever more critical because intertidal habitats – where most gleaning occurs – are highly threatened by climate change. In particular, sea-level rise is projected to threaten intertidal zones globally, including across the Pacific (Cooley et al. 2022). The level of inundation depends on local tidal regimes. Nonetheless, even in places with small tidal ranges, small increases in sea level will result in intertidal habitats becoming subtidal by 2100. In Timor-Leste, high weather vulnerability and rising sea levels associated with climate change pose further challenges to already widespread food insecurity and malnutrition (Bonis-Profumo et al. 2019).

Frameworks and methodological approaches for studying gleaning fisheries

Linking local and scientific knowledge through ethnoecological and inclusive approaches can offer unique opportunities for the long-term assessment, management and sustainability of gleaning fisheries (Burgos et al. 2019). One approach is ethnoecological study and a focus on documenting local Indigenous knowledge. For example, in Fiji gleaning is an important part of subsistence fisheries. With gleaning comes specialised knowledge developed by fishers who carry out gleaning on the intertidal areas and in the mangrove areas. Fishers (fisherwomen and fishermen) who glean, hand collect target resources from the mangrove areas and intertidal flats (Kitolelei and Kitolelei 2023). These gleaning fishers possess detailed local knowledge about tidal changes, moon phases and the seasonality of resources. In Fiji, it is important for people to understand that gleaning makes an important contribution to the fisheries sector. There is a need to recognise and document this traditional ecological knowledge of gleaning to inform sustainable harvest of the intertidal and mangrove resources.

Participatory research provides another approach for studying the values of gleaning. During the workshop, we learned about photovoice; a participatory approach which allows coastal communities to reflect and share their experiences (Wang 1999). This method has been used in other fields, but very little has been done in the field of fisheries, and none so far on gleaning fisheries. Photovoice requires participants to photograph key aspects of their daily lives through a series of prompts (e.g., how do gleaning fisheries benefit you?). Participants then explain the meaning behind each photograph, and their explanations are qualitatively coded. Gomese et al.'s (2020) work around the values of fisheries in a community in Solomon Islands helped communities to highlight, share and reflect on their fishing activities, benefits, challenges, and the decisions that they engage with. The results showed that both men and women fish close to the shore using mainly hook and line. The benefits are mainly from the income generated

from fishing and the main challenge is from sharks that frequent Fish Aggregating Devices (FADs). Most fishing contributions are for communal purposes. The use of participatory action research such as Photovoice provides an opportunity that can be useful to highlight the hidden values of gleaning which can be used for reflections around these activities in the Pacific.

During the workshop, we also considered the intersection of gender equality and gleaning fisheries and learned about WorldFish's work in Timor-Leste. Although their contributions are often overlooked, women play a key role in the day-to-day monitoring of coastal environments and gleaning dynamics, such as in the design of management strategies and decision- and policy-making processes (Tilley et al. 2021). In Timor-Leste there has been a lot of progress towards gender equality and women's empowerment. For instance, Timor-Leste has the highest rate (38 per cent) of women parliamentarians in the Asia-Pacific region (UNWOMEN 2023). However, women have typically been excluded from input into fisheries policies, and gleaning is unacknowledged.

WorldFish Timor-Leste has been supporting Timorese communities engaged in small-scale fisheries and aquaculture through research, systems development, and policy advocacy since 2010. For example, WorldFish supported the Directorate General of Fisheries, Ministry of Agriculture and Fisheries, to undertake gender-inclusive national consultations to inform the National Fisheries Strategy (Mills 2019). Further, more data on gleaning and women's involvement is necessary as, for example, there is a lack of understanding on how the benefits from this fishery are shared within households. Current research efforts are quantifying and characterising gleaning fisheries, assessing the nutrient composition of gleaned aquatic foods and their contribution to rural livelihoods and diets. WorldFish's work is therefore critical in highlighting gleaning fisheries as a very important sector for nutrition and income earning for women living in coastal areas. An increased focus on gleaning fisheries will enhance the recognition that women are engaged in the fisheries sector and that women's voices are crucial for policy making and management.

Conclusion and reflections

The workshop provided broad and specific insights into gleaning fisheries and connected a diverse group of early career researchers and practitioners at different stages of their careers. Participants reflected on the benefit of sharing knowledge from participants in different places: "For me, this workshop was very useful because I learnt a lot from [participants from] Fiji and the Solomon Islands. You talk about gleaning but have a different experience [to me]" (participant from Timor-Leste). Another participant highlighted that it was "valuable having participants from all different career stages" (participant from Australia).

The workshop highlighted that understanding the value of gleaning fisheries to multiple dimensions of well-being is important for equitable decision-making, gender equality, and food security and nutrition. One participant commented

on the need to maintain the visibility of gleaning fisheries, as part of the legacy of an ancient practice:

“This workshop motivated me ... you need to do research for the work you are doing, especially in areas that are understudied, and recognise these areas ... it's very important that we continue to keep [gleaning practices] here. They already existed thousands of years ago, but people don't put importance on them or see them in a way that can benefit their communities and the world, and contribute to science” (participant from Timor-Leste).

Placing gleaning fisheries front and centre in discussions about sustainability, well-being, and fisheries and coastal resource management, will be ever more crucial as the Asia-Pacific region grapples with the impacts of climate change and seeks to build resilience. Workshop participants will co-author a perspective piece to highlight the challenges and research needs facing gleaning fisheries in the Asia-Pacific; watch this space.

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