

A managed access approach to sustain small-scale fisheries management in southeast Sulawesi, Indonesia

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Abstract

Managed access is a form of Territorial Use Rights for Fishing (TURF) and is a well-known solution to address overfishing and transition away from open-access fisheries. 'Managed access with reserves' is a community rights-based fisheries management approach that provides coastal communities with exclusive access privileges for fishing in defined areas. Protected areas (i.e., reserves) are established inside or adjacent to these exclusive access areas. Understanding the need to recover fisheries in Kolono Bay, Indonesia, communities from five villages came together and agreed to establish 1 264 hectares (ha) of managed access area, along with 50 ha of the marine reserve (managed access with reserves). A community management body was established to manage the area and enforce agreed-upon rules such as fishing zone and fishing gears. Two years after the agreement to use managed access with reserves in Kolono Bay, fish biomass inside the reserve was maintained or slightly increased, coral cover in the area slightly improved, and community knowledge of sustainable fishing and compliance with regulations increased. Building on this success, the Government of Southeast Sulawesi Province plans to replicate managed access with reserves across the province's waters. However, to ensure it will be an effective solution to overfishing in areas outside Kolono Bay, thorough and systematic site selection must take place. Site selection criteria must include type of fisheries targeted, socio-cultural dimensions, community and government acceptance, seascape, and other spatial issues. Ideally, the criteria will help assess and identify the likelihood of managed access with reserves being successful and enable us to identify potential challenges early in the planning and implementation phase. This case study elaborates the establishment of managed access with reserves in Kolono Bay, Indonesia, as an example of community-based small-scale fisheries management, and the effort by the provincial government to scale-up the solution to a province-wide initiative.

Keywords: managed access; open access, marine reserve, scaling up, sustainable fisheries

1. INTRODUCTION

1.1 Description of the Fishery

Overfishing is common in 'open-access' fisheries, where entry to the Fishery is unrestricted. As more people rely on the sea for their income and daily food intake, fishers find ways to catch as many fish as possible. In some cases, they have turned to highly destructive fishing practices despite the long-term damage these practices do to the marine environment and fisheries. 'Managed access' is a form of TURF and is a well-known solution to address overfishing, transitioning away from open-access fisheries. 'Managed access with reserves' is a community rights-based fisheries management approach that provides coastal communities with exclusive access privileges for fishing in defined areas, and in which protected areas (i.e., reserves, or no-take zones) are established inside or adjacent to these exclusive access areas.

In 2014, under its global Fish Forever program, Rare Indonesia selected Kolono Bay – an open access bay located in the East Kolono Subdistrict, South Konawe District in Southeast Sulawesi Province – as one of its fifteen Indonesian sites for establishing a community rights-based managed access with reserve approach to small-scale fisheries management.

Over the course of three years, Rare partnered with five villages (Lambangi, Tumbu-Tumbu Jaya, Ngapawali, Batu Putih and Rumba-Rumba) as well as the local government authority (The District of South Konawe Office for Fisheries and Marine Affairs (DKP Konawe Selatan)), to create a 1 264 hectare (ha) managed access area with two reserves (in sum 50 ha) within the 5 400 ha that comprise the Bay. Together, the heads of the five villages, 362 fishers, local government authorities, fishing households and other fishing stakeholders also created a management body, Forum Peduli Laut Teluk Kolono, to manage the new “Kolono Bay Marine Sanctuaries.” For further background, see Section 2.1.

Harvesting activities for the new Kolono Bay Marine Sanctuaries occur full-time throughout the year in the narrow Bay’s coastal and coral reef ecosystems, up to two nautical miles (nm) from shore (see map below). The 362 male fishers in these five villages harvest fish and receive landings in the managed access area and surrounding area (some at a formal government-created landing site; many others informally near their homes). They primarily target snapper (*Lutjanus* sp.) and grouper (*Plectropomus microcephalus*) –both of which are depleted species – although capture fishery commodities in this area consist of a wider spectrum of marine biota that also includes rabbitfish, squid, emperor fish, giant trevally, threadfin breams, black pomfret and mackerel.

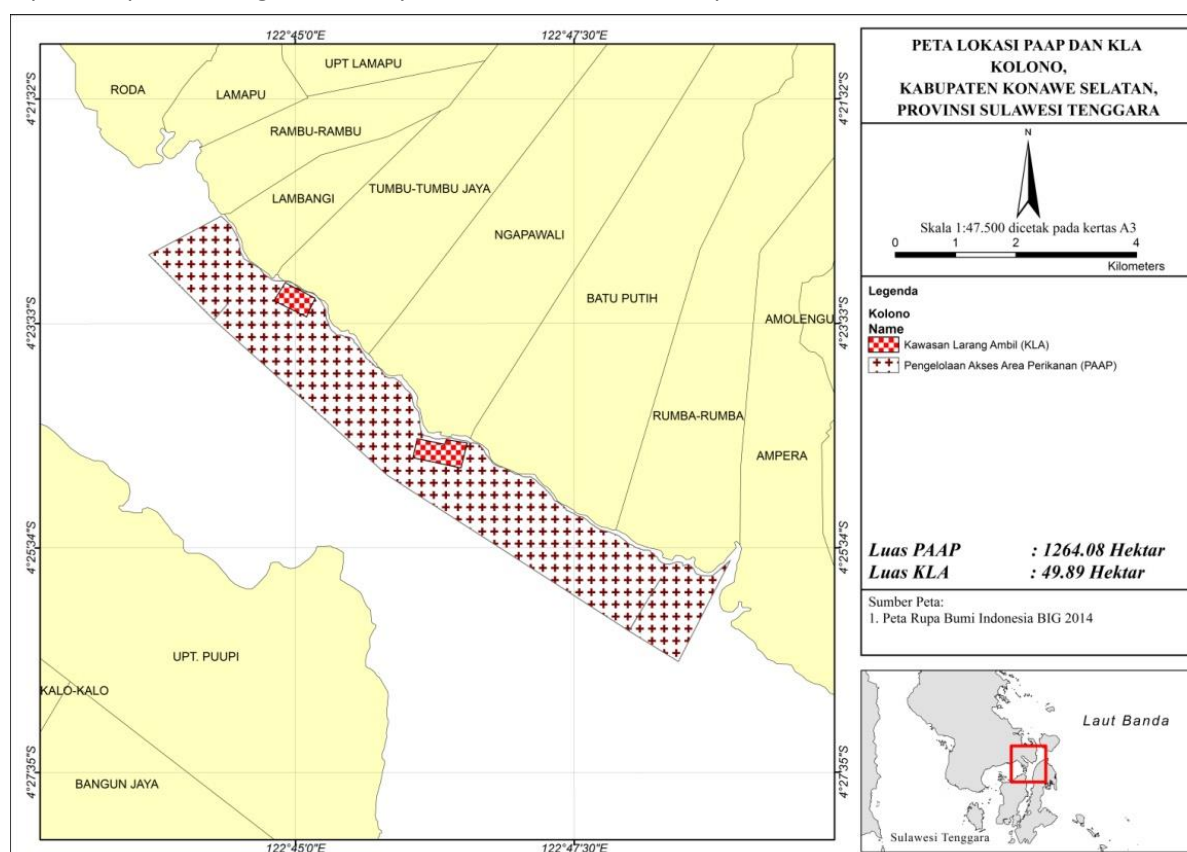


Figure 1. Map of the Managed Access Area with Reserve in Kolono Bay, Southeast Sulawesi (PAAP means Managed access Area, while KLA means Reserve).

Source: Indonesia National Meteorology, Climatology, Geophysics Agency.

Kolono Bay’s small-scale fishers use gillnets and entangling nets (e.g., set gillnets, drift gillnets), and hooks and lines (e.g., hand lines, long lines) for fishing, without any type of mechanization. Individual fishers and/or family members travel to catch fish on over 100 fishing vessels with outboard/inboard engines (generally less than 100 horsepower) that measure less than 12 meters long and weigh less than ten gross tons to catch fish. These fishing vessels and gear are either personally owned by a local

community member or a middleman who agrees to loan his vessel in exchange for fish, gas, etc. When fishing, fishers travel, on average, up to two nm from the shoreline/high-water mark, and they may travel from a few hours to a full day to fish. There is no cold storage for catch on the fishing vessels, nor do the fishers use fish aggregating devices.

Women in Kolono Bay participate in post-harvest fish operations such as processing and selling fish. While they could theoretically own vessels, gears, fish aggregating devices and so on, they have historically been employed solely in post-harvest processing.

Competition and Conflict

Competition and conflict for Kolono Bay's resources are common. For example, fishers from outside the five communities, including seasonally migrant fishers, encroach on the managed access with reserves areas, despite regulations that discourage outsiders who don't have rights to access the fishery. Additional sources of conflict are fishers with access rights to the fishery that continue to fish in the no-take reserve and fishers that continue to use seine fishing gear, a non-regulated gear that decreases the catch of regulated gillnets and hook and line. Further, shipbuilding activities often cause wood waste in the sea, which disrupts important coral reef habitat.

1.2 Economic contribution and social implications of the fishing activity

Grouper and snapper, the targeted species in Kolono Bay's managed access area, may be consumed directly but are generally chilled for local and factory processing before being sold to domestic and international markets. Only ten percent of the overall catch, normally the lowest quality catch or bycatch, will remain in the local markets; 90 percent will travel to the capital city, Kendari, and if the quality meets high standards, it will be exported outside Indonesia. Given that grouper and snapper are valuable fish commodities, none of the catch is used for non-human consumption.

On average, 51-75 percent of fisher income comes from year-round, full-time fishing activity. It is likely that they spend only half of that time fishing in the managed access area. Seasonally, based on weather, fishers also support livelihoods through agriculture and farming. During the rough season, most fishers use their time to fix their fishing gear, maintain their boat and do gardening and livestock.

2. MANAGEMENT OF THE FISHERY AND RIGHTS-BASED APPROACH

2.1 Management of the Fishery

Through Fish Forever, Rare Indonesia has facilitated the development of a managed access with reserves approach in Kolono Bay, and based on the program's impact, the Bay's small-scale fisheries are now co-managed by the local government and new community-based fisheries management body. No community rights-based fisheries management system existed in the Bay prior to the Fish Forever intervention. In 2014, Indonesian law transferred authority for small-scale fisheries management from the national to the provincial government, and this law (Law No.23 of 2014) disannulled the authority of district or city governments on managing coastal waters (Susanto et al., 2015). Furthermore, in 2016, the Ministry of Marine Affairs and Fisheries (MMAF) enacted a new legal guideline that gives communities living in and around Marine Protected Areas the opportunity to co-manage their fisheries alongside government partners. Based on these two important policy shifts, Kolono Bay's five villages could pursue rights-based co-management.

In September 2015, Rare worked with the five villages to establish a representative working group named "*POKJA PAAP Teluk Kolono*." Comprised of 20 members (local fishermen, the five village heads, public figures, religious leaders, and local government), the group's purpose was to design the managed access areas and related management plans. Because this design process was inclusive, transparent and participatory, this working group was able to transition into a more formal management body called "Forum Peduli Laut Teluk Kolono" (hereafter, "The Forum").

The Forum, still active today, was formed to agree on management measures, which include acceptable fishing areas and their restrictions (including no-take zones and marine reserves), fishing rules (including the type(s) of fish targeted and gear used), fishing vessels characteristics, and the group's work plans. Everyone on the body can participate in providing advice, opinions, and formulating governance rules for fishery management. While fishing operations are formally registered by the DKP (local district fisheries and marine affairs office), fishers are not taxed or charged a fee for their fishing activities.

The working group has defined the managed access with reserves area boundaries alongside the local government, based on an agreement among the five village heads and with support from the District government. While the two marine sanctuaries have been legally established through Decree of Head Village, the Kolono Bay managed access area has not yet received formal legal recognition from the provincial government (see Section 4 for further discussion on this challenge). Further, fishers and local government are now responsible for monitoring fishing activities and enforcing the regulations. This is accomplished primarily by catch monitoring during fish landings (no other monitoring, control and surveillance systems are used to monitor fishing activities in this area). Given the lack of formal, legal recognition, the community is limited in enforcement measures, using peer pressure as the rule enforcement mechanism. When conflicts occur, either the management body or the governmental fisheries management authority help stakeholders to resolve conflicts—informal methods that may likely need to be formalized in the future.

2.2 Rights-based approach: allocation and characteristics

Fish Forever facilitated Kolono Bay's small-scale fishing community to locally recognize managed access as a form of Territorial Use Rights for Fishing (TURF) in 2017. These rights were uniformly allocated across fishers that historically participated in the Fishery; they did not recognize informal customary or traditional fishing rights, given that they didn't previously exist. There are no restrictions on who can hold, receive or purchase the fishing rights, and the fishing rights cannot be leased, sold or inherited. Further, the rights allocation for harvest is restricted to fishers using hook and line and gillnet.

The initial allocation criteria for distributing the rights took the economic viability of the fishing activity into consideration, as well as the rights to fish for the next generation of fishers. Allocation is based on an agreement among five villages around the Bay, focusing on fishing and gear limitations in the reserves (i.e., no-take zone) within the managed access area.

3. CONTRIBUTION OF THE RIGHTS-BASED APPROACH TO ACHIEVING SUSTAINABILITY

3.1 Sustainable use of the resources

Based on Fish Forever Program Results, 2014-2017, the rights-based approach and the allocation of rights are helping to achieve sustainable use of Kolono Bay's Fishery. Two years after establishing managed access with reserves in Kolono Bay, fish biomass inside the 50 ha reserves has increased, coral cover in the area slightly improved, and community knowledge of sustainable fishing and compliance with regulations increased.

Fish Forever used human-centered behavioral design — focusing on users' and other stakeholders' needs and preferences — to create a suite of tools to support staff and local fishing communities and institutions in addressing coastal fishing challenges and adopting more responsible fishing behaviors. The resulting Fish Forever Toolkit enabled fisheries data collection, fisheries management body development, fisher and community goal-setting and management plan development, and a process for implementing the Fish Forever approach.

A 'Pride campaign' for Kolono Bay, Rare's primary tool and existing community engagement methodology to support new behaviour adoption, focused on accelerating local adoption of managed access with reserves for coastal waters. The campaign in Kolono Bay targeted individual fishers, the wider fishing community and local government leaders and was designed to help fishers and fishing communities adopt sustainable fishing behaviors – in particular, fisher/boat/gear registration, participation in management (reporting violations, reporting catch and attendance at community meetings), fishing in the right place using the right gear, compliance with the local fisheries code, and rule enforcement.

The campaign also built the community support necessary for enabling effective and sustainable management bodies. This improved the communities' knowledge about coastal fisheries management, the benefits of reserves, and the responsibilities that come with access rights. Including local government representatives ensured that the bodies had the legal authority to design and execute rules for coastal waters and fisheries. Rare strengthened existing and new management bodies' capacities to design the management process, collect data, clearly communicate fisheries regulations, organize a local enforcement system, set priorities and plan zonation, and gather the information that would guide collective fisheries planning and decision-making.

Lastly, the campaign focused on government agencies from district to national level, working on the attitudes, opinions and behaviours that make embedding a managed access with reserves approach into existing local and sub-regional governance frameworks possible. These included approving legal instruments (ordinances, management plans, etc.), allocating resources (financial, human and in-kind) and politically sponsoring the idea of managed access with reserves areas.

Rare in Indonesia administered Knowledge Attitude and Practice (KAP) and household surveys to Kolono Bay fishers at the beginning and end of the Fish Forever campaign to attain a baseline understanding of a fishing community's knowledge, attitudes, interpersonal communication and practices surrounding fishing. The surveys provide the basis for targeting the multiple behaviour changes needed to support a successful management approach, and they were used to measure relatively immediate campaign impacts: increasing awareness (Knowledge), shifting viewpoints (Attitudes), more frequent discussions (Interpersonal Communications) and adopted behaviours. Rare also conducted conservation data surveys to assess the ecological responses to the managed access with reserves approach.

Social responses to the managed access with reserves approach

Three examples of social responses to the managed access with reserves approach are the following:

Knowledge of sustainable fishing

Throughout the campaign, Rare consistently observed that when fishers gain knowledge about sustainable management, they realize how they need to modify their behaviour and discuss these changes with others. This primes them to adopt new practices that foster fisheries recovery. Community knowledge of sustainable fishing improved in Kolono Bay. Survey responses reflected an increased understanding of managed access and reserves, as well as of regulations surrounding the Bay.

Compliance with regulations

Rare measures compliance using two metrics: compliance with managed access regulations (which include applying minimum size limits and gear restrictions, respecting managed access boundaries and obeying seasonal and species-specific closures) and reserve compliance (no fishing in reserve areas). Rare observed increased compliance for both metrics in Indonesia. Although these results are self-reported, the positive trend indicates a willingness to respect the rules and regulations associated with

managed access areas and, consequently, that social norms and responsible fishing behaviour are changing.

Change in Social Trust

Social trust – in government and other community members – drives cooperative behaviour. Survey responses related to trust in the community at large showed improvement. The campaign increased trust by providing individuals opportunities to interact, discuss issues, air grievances and constructively work toward a long-term solution. Further, Rare's local impressions confirm that active involvement and validation of the individual fisher as a valued member of the management process built greater trust across the board.

Ecological Responses to the managed access with reserves approach

Rare in Indonesia conducted fish and coral transects and counted individual fish to measure the ecological responses to Fish Forever. Examples of these responses are the following:

Fish in Water

During fish recovery, populations will first stabilize (maintaining biomass) – and then sustained population protection will provide time for fish to reproduce and recruit. As the populations protected by reserves increase, they should start to spill over into surrounding areas, leading to measurable biomass increases outside reserves. On coral reefs, small fish with short life cycles and rapid growth should recover most quickly when protected. This would include small herbivorous fish like surgeonfish and parrotfish (significant change likely detectable in two to five years). Larger predatory fish such as snapper and grouper, that grow more slowly, reach maturity later and reproduce less frequently, would be expected to take longer to show signs of recovery when protected from fishing pressure (five to seven years).

The total fish biomass of ten fish families inside Kolono Bay's reserves was maintained within the reserves, which Rare interprets as a positive ecological response. Given that stock assessments for target species were not conducted during the Fish Forever campaign, it is unclear whether there have been any size changes in Grouper or Snapper caught since the rights-based approach was implemented in 2017.

Ecosystem Health – Coral Cover

A three-year, global coral bleaching event began in 2014 and was the longest and most damaging coral bleaching event on record. This event followed another severe bleaching in 2010, leaving little time for recovery. Maintaining or increasing coral cover in the face of these global impacts is difficult and it must be noted that marine protected areas do not provide direct protection against climatic threats – i.e., they do not stop causation from storms or sea surface temperature. But, evidence from global data shows that protecting coral from local impacts, especially fishing and pollution, increases the resilience of reefs to recover from exogenous impacts. Although these bleaching events devastated reefs globally, there were encouraging signs of reef resilience across other Fish Forever sites in Indonesia with maintained or increased coral cover (inside of the managed access with reserve areas).

The coral cover in Kolono Bay's managed access area improved only slightly; Rare interpreted that cover was maintained, rather than increased. These results may suggest that effective protection of fish life in water slows local-level decline in coral cover, even in the face of global change.

3.2 Economic viability of the Fishery

Since the rights-based approach was enacted in 2017, there have been no changes in the type of fishing gear or fishing vessel used (those with an outboard engine), the average characteristics of the fleet, vessel and gear ownership (those owned by individuals and leased out to fishers), or in the use

of fish aggregating devices. It is unclear whether the total number of fishers participating in this Fishery has changed since then either.

However, based on qualitative discussions with local fishers, fishers cite that the reserves have provided enhanced economic benefits to the communities, in the form of bigger catch, fishing areas closer than before, and decreases in the average distance travelled and duration fishing. Some believe that the managed access area has contributed to these benefits.

3.3 Social equality

The initial allocation criteria for distributing legally recognized fishing rights took into consideration the economic viability of the fishing activity (aiming to increase it) and the rights to fish for the next generation of fishers (aiming to create a locally-led and sustainable management approach). As mentioned in 3.2, fishers struggled with decreasing catch, increasing travel time, competition with bigger fishing vessels, and conflicts with migrant fishers. However, based on qualitative discussions with local fishers, since managed access with reserves was established, interpersonal communication among fishers has significantly improved, and knowledge of the importance of collective action for managed access has increased. Fishers also cite enhanced confidence in monitoring, surveilling, and reporting illegal activity in the Bay.

4. MAIN CHALLENGES AND WAY FORWARD

4.1 Challenges for the Fishery

Indonesia's provincial government manages territorial/coastal seas up to 12 nm. The communities must ultimately get formal recognition from the provincial government to set up managed access areas with reserves. Communities, with support from district government, have proposed to the provincial government that fishing rights be valid for 10-15 years (to account for the life cycles of different species).

Given that the provincial government doesn't yet legally recognize the managed access area, there is technically no time limit that can be regulated for the health of the fish or ecosystem. While the community of five villages now agreed to have a managed access area with reserves, the lack of legal recognition of managed access with reserve areas causes challenges, e.g., weak enforcement of the rules (the management body cannot enforce the rules to outsiders). To date, the five villages have together agreed to set up and follow the rules for managing this area, but they are limited in being able to enforce them.

Another challenge that Rare is working to solve is in helping Kolono's fishing communities adopt more sustainable fishing behaviours long after Rare's support to the communities ends; e.g., participating in management, maintaining compliance, trusting other fishers, etc.

4.2 Improving fishery sustainability in the future

One of the most significant management improvements for Kolono Bay's Reserve would be the formal legal recognition from the provincial government for the Bay's managed access with reserves. In the meantime, Rare will continue the process of supporting Kolono Bay's fishing communities to get formal legal recognition from the provincial government and continue supporting the Fishery's management body to become both legal and functional.

Further, Rare is continuing to partner with the SE Sulawesi provincial government to ensure allocation of 0-2 NM for small-scale fishing within provincial marine spatial planning. Rare is also supporting the government's interest in replicating community rights-based fisheries management in that spatial area across 11 districts in Southeast Sulawesi (out of the 16 coastal districts across the province) over

the next several years, using the success of the five communities in Kolono Bay as a model for other potential managed access with reserves areas.

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