Managing fishing gears I2

Fishing gears have different impacts on marine resources and habitats, depending on a variety of factors. It is important for MPA personnel to understand this in order to ensure appropriate enforcement of regulations covering types of gear, and the areas and seasons when they can be used. This sheet provides some guidance on the complex issue of gear management.

Many MPAs in the WIO have the dual objectives of improving coastal livelihoods and protecting biodiversity. Unsustainable fishing practices, such as the use of destructive fishing gears, dynamite and poison, prevents the achievement of both these aims. Some fishing gears are relatively benign when used in one way, but highly damaging when used in another, so attention must be paid to determining the most appropriate regulations. Some gears are used by groups of fishers, and control of their use may have an important social impact which will also need consideration.

GEAR TYPES

Hook and line

This gear is generally benign as well as selective. However, it may be unsustainable if top-level predators are caught in large numbers. Although the MPA could encourage fishers to release such species alive, particularly if, like triggerfish, they are not high value species, putting a limit on the number of fishers may be more effective. If such fishing is done from boats anchored on coral reefs or seagrass beds, this should be discouraged, although permanent moorings (which reduce anchor damage – see sheet F9) may cause localised over-fishing at the site and could result in conflict for use of a buoy.

Traps

When made with small mesh, traps tend to take large numbers of juvenile fish. Basket and fence traps (which catch fish as the tide goes out) that are designed to target larger, mature fish, and are made from bio-degradable materials, are preferable. Basket traps cause damage if they are dropped on reefs and break corals, or where fishers use broken coral to weight them down. Damage can be reduced by agreeing locations for their use, for example, in intertidal areas, bearing in mind that fishers may lose earnings if they move to a less suitable area.

J. Rubens

Small-meshed seine nets when used in shallow seagrass areas often result in high by-catch of juvenile fish.

Nets

Gill and seine nets are the main types of net used in the WIO and are often unselective. Gill nets can be selective, allowing some fish smaller than the mesh size to escape, and are generally not damaging to benthic habitats. However, they tend to catch overexploited fishes such as sharks and rays, and result in incidental catch, which is one cause of the drastically reduced populations of dugong and sea turtle. Lost nets sometimes continue fishing, termed ghost fishing, and get tangled around corals. Beach-seine nets are dragged across the seabed, often damaging seagrass beds and sometimes coral communities. Large beach-seine and small pelagic seine nets are generally too costly for individual fishers to own, and are leased out by businessmen which makes enforcement difficult as they are not directly involved in the fishing itself. Ring-nets are used to catch pelagic fish in deeper water, which may be less damaging, but generally require a motorised boat.

Spear guns

Spear guns if used selectively to target larger, mature fish (i.e. not juveniles) cause little damage. They are also easy and cheap to make and use (e.g. a boat is not essential). However, if used in large numbers over a small area, and if used with SCUBA gear, they can exert considerable pressure on some high value and/or vulnerable reef species and thus often tend to be prohibited in MPAs and under national fishery regulations (e.g. Tanzania).

Collection on foot

This is typically done by women and children, who target small fish and invertebrates. The reef flat and intertidal area can be damaged by trampling if large numbers of people are involved. Certain high value species have been over-collected, such as sea cucumbers, shells and some species used in the aquarium trade (see sheets I6, I8 and I9).

REDUCING DAMAGE

The damaging impacts of fishing gear can be minimised through:

- good enforcement of gear regulations (see sheet G2);
- zoning, i.e. restricting certain gears to certain areas (see sheet C2);
- encouraging fishers to use gears that are more benign, and/or to use their existing gear in a less damaging manner; a gear exchange programme where non-destructive fishing gears are offered (usually free in the

first instance) in exchange for destructive gears may be appropriate;
- improving post-harvest treatment and marketing of the catch so that more revenue is generated, provided this can be done without encouraging more intensive fishing.

Gear exchange programmes

These can be difficult to implement successfully, especially where fishers resist changing from methods used for generations to new, unfamiliar or unproven gears. Education, training and patience may be necessary. The least destructive gears often require more time and energy (e.g. hook and line), or higher capital (long-lines and deep-water nets) and fishers may be unwilling to invest in either of these. Some gears may not be used as intended (see Mafia case study). Exchange programmes should not be seen to 'reward' destructive fishers by providing them with new and better gear, or resentment may arise among those using non-destructive methods but not benefiting from the exchange. Examples of gear exchange programmes include the Tanga Coastal Zone Conservation and Development Programme, Tanzania (exchanged beach seine nets for gill nets), Kigomani in Unguja, Zanzibar (where the Dutch Embasssy provided fishers' cooperatives with larger boats and gill nets to fish for large pelagic species in open waters), Nampula Province in Mozambique (beach seines exchanged for light attraction fishing gear for small pelagic species), and Mafia Island, Tanzania (see case study).

KEY POINTS FOR THE MPA

- ❑ **In order to understand the fishing methods used in an MPA, develop a profile and monitoring programme (see sheet G7) covering method and frequency of gear use, areas fished, financial returns, gear ownership, species caught, catches, marketing and environmental impacts.**
- ❑ **Ensure any regulations relating to use of destructive practices are well enforced.**
- ❑ **If a gear exchange programme might be appropriate, obtain technical advice and carry out a feasibility study; discuss potential options with fishers, identify which fishers to involve and mechanisms for carrying out the exchange (e.g. feeding new gears into the system slowly) and evaluate sustainability.**

Sources of further information

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CASE STUDY

Gear exchange programme in Mafia Island Marine Park

In 2002, Mafia Island Marine Park (MIMP) initiated a programme to encourage 17 groups of fishers using illegal small-mesh beach seine nets to switch to less damaging methods. 'Traditional' gears such as handlines, basket traps or fence traps were not acceptable to the fishers as they do not require them to work in their groups, which provide food and income security in the case of, for example, ill health.

Other forms of legal net fishing, that allowed them to maintain the groups, were considered. One group exchanged their gear for a purse seine net (and outboard engine) for use outside the park, taking out an interest-free loan, successfully adopting the new gear, and maintaining loan repayments.

Eight groups requested large mesh (13-15 cm) gill nets which, despite the risk of by-catch and damage to benthic habitat if set for bottom-fishing (see main text), can also be used as drift-nets offshore, targeting large commercial pelagic species such as tuna with minimal by-catch. A large boat with an engine (and ideally an icebox) is needed and fishing has to take place at night, which Mafia fishers do not like. As a trial, two groups were provided with these gill nets and the process was monitored. During the first year, the groups, as feared, modified the nets for bottom fishing which resulted in significant shark and ray by-catches. In order to persuade them to use the nets offshore, some group representatives were sent on a study tour to Zanzibar to learn about the offshore fishing method used there. This encouraged them to try the technique in Mafia, but further problems arose. Offshore eddies mean that boats have to travel further to find suitable conditions, adding cost in time and fuel, and one group now feels they need a larger boat for safety, requiring a further loan. Secondly, there is a limited market for tuna on Mafia although changes in fish trading laws are expected which should improve demand.

The Mafia experience shows that a large investment in time and personnel is needed to liaise with fishers to identify and resolve obstacles. Close technical supervision is essential, especially in the initial stages, and marketing issues should be carefully examined before gear exchanges start.

M. Richmond

In MIMP, beach seines were swapped for large meshed gill nets for use offshore (as seen here), resulting in less by-catch.