

6 Fisheries

*It is He who has **subdued** the oceans, so that you may eat of the fresh fish and bring up from its depths ornaments to wear. Behold the ships ploughing their course through it. All this that you may **seek** His **bounty** and **render** thanks. (Qur'an 16:14)*

What are fisheries?

The term 'fishery' is used both to mean the operation or industry of harvesting a fish stock, and the sub-population or 'stock' of fish being exploited. Fisheries involve either catching wild fish and shellfish from seas, lakes or rivers, or raising captive fish in farms (aquaculture). They can be in freshwater, but Zanzibar fisheries are mostly marine. They are classified by the type of fish harvested, the fishing method and gear type used, and the location where the fishery operates. Some fisheries are exploited for **subsistence**, some for commercial gain, and some for **recreation**.



Traditional dema fish trap © Nell Hamilton

What kinds of fishing occur in Zanzibar?

There are many different fisheries in Zanzibar. Fishers target different kinds of fish in different locations and with different gear. Most Zanzibar fisheries are small-scale, taking place along coastal reefs where small traditional craft such as outrigger canoes (ngalawas) dhows (dau) dugout canoes (mtumbwi) and boats (mashua, boti) can reach. Several fishing methods are used, including traditional basket traps (madema), fence traps (uzio), gill nets (jarife), seine nets, handlines and longlines. Hand collection of shellfish and other invertebrates from intertidal waters and coastal **lagoons** is also very common, traditionally carried out by women and children for both **subsistence** and commercial purposes.

While most fish caught are used for **subsistence** or sold for local consumption, demand for fish is increasing as tourist hotels and restaurants **seek** high value **species** such as squid, octopus, crab, marlin and kingfish. Recent external investment is increasing fisheries' capacity. **Outboard motors** enable fishers to exploit more distant waters, and larger nets with smaller mesh sizes catch more fish than traditional techniques. These technologies also make Zanzibar more accessible to fishers from the mainland. Use of destructive, illegal methods such as **harpoon**, spear fishing, poison, **dynamite**, drag monofilament nets and beach seines has also increased.

Recreational fishing is not widespread in Zanzibar, but is gaining popularity among tourists. Game fishing is usually carried out from a purpose-built boat with a rod and line, aiming to catch large open-water **species** such as sailfish, marlin or sharks. These **species** and important reef fish are also illegally targeted by tourists spear fishing, who swim with a spear gun.

Why are fisheries important in Zanzibar?

People in coastal communities around Zanzibar depend heavily on marine resources for their livelihoods. Many people live very traditional lifestyles, collecting food as they need it: fish provide 98% of the protein in low-income diets in Zanzibar. For many families, fish provide the main income too; at least 34,000 fishers are employed in the industry. Fish caught are usually sold to local markets. Around 24,000 tonnes are caught per year, worth TSh 36 million to the Zanzibari economy.

Fishing is a culturally important activity for many, with fishing families going back many generations. Artisanal fisheries are therefore very important to coastal communities.

Much of Zanzibar's tourism is driven by the international reputation of its marine life, with tourists attracted by fresh seafood, and **snorkelling** or diving to see colourful fish, coral gardens and marine mammals. This brings more jobs to Zanzibar which also rely on healthy coastal resources.

What are the threats to fisheries?

Overfishing – Any fisher will tell you there are not as many fish now as there used to be, and they have to travel further now than they did in the past to catch the same amount of fish. There are several reasons for this: there are more fishers now, more fishing boats which are bigger, and fishers are using bigger nets (such as seine and gill nets) with smaller mesh size than before. Zanzibar waters also now attract fishers from other areas (migrating fishers, locally known as ‘dago’) because many local stocks in their areas have been overexploited. Worse still, huge drift nets up to 900 m long target open-water fishes like kingfish, swordfish, sailfish, tuna and marlin, and bottom-set nets up to 450 m long are set very close to the **shore** to catch sharks and rays.

When these techniques were first introduced, a lot more fish were caught and populations declined. A few fish **species** breed quickly, and their stocks may recover quickly after high fishing pressure stops, but many others (including sharks and groupers) breed very slowly and may not be able to recover. It is therefore vital to understand the life cycle of the fish we depend on and monitor fishing impacts closely. Scientists monitoring fish stocks have confirmed what fishers know: the fish from Zanzibar’s inshore waters that we eat are getting smaller and fewer every year. If this does not stop, then there will literally be no fish left!

Destructive fishing techniques – As well as catching more fish than traditional methods, new fishing methods are much more likely to destroy the fish **habitat**. Drag-nets break off and destroy coral, and **dynamite** fishers literally blow the reef to pieces killing everything, **edible** or not. **Coral reefs** and **seagrass beds** damaged in these ways take generations to recover. These activities are therefore not allowed in Zanzibari waters, nor is seine netting permitted on **coral reefs** – however it is hard to patrol the open seas and these illegal and destructive practices continue.

Bycatch – Bycatch is fish caught by accident in fishing gear set to target other **species**. In other countries, unwanted non-target **species** usually get thrown back dead, so nobody benefits, but in Zanzibar everything is eaten. Some fishing methods such as madema have low bycatch, however other techniques, especially trawl, drift and bottom-set nets, catch many more fish they don’t want than fish they do. Most at risk from large nets are marine mammals such as whales, dolphins and dugongs, and also turtles, which get **tangled** in the nets and drown. Most marine mammal bycatch in Zanzibar occurs in nets off northern Unguja, and populations of many dolphin and sea turtle **species** are being reduced.

Abandoned nets – If a fisher loses a madema because the marker buoy breaks off, then the trap, made from natural materials, will eventually disintegrate. However, modern nets are made from materials which do not break down, so if they are lost, the net continues to catch and kill marine life for centuries.

Ulikua unajua...?

- Fishers in southern Unguja used to use dolphin meat as shark bait: it contains a lot of blood, which attracts them. But now they benefit so much from dolphin tourism they don’t catch dolphins any more!
- Parrotfish produce sand! They graze on coral and **excrete** it in their poo as sand: one fish can make 90 kg sand in a year!
- Reef Balls are artificial reef modules placed in the ocean to form reef habitat, and are being used to preserve the reefs around Pemba!
- Biodiversity is much higher in Chumbe Island Coral Park (CHICOP) than outside: the 0.4 km² reserve is home to 200 coral and 400 fish species!
- Also, fish inside CHICOP are bigger and more numerous than in fished areas outside and the total weight of fish per km² was calculated to be more than three times higher!



Critically endangered hawksbill turtle caught and killed by an **abandoned** net in Zanzibar © Nell Hamilton

Pollution – Impacts of pollution on fisheries can be severe. Fish mistake plastic litter for food and eat it, where it blocks their guts and they starve. Untreated sewage contaminates seafood harvested from beaches and can spread deadly diseases such as cholera and typhoid. Toxic chemicals leach from rubbish dumps, farms using chemical fertilizers and pesticides, and burn sites into the sea, where they build up in the tissues of marine organisms through what they eat. They cause infertility, cancers and other diseases in both fish and humans, and can be fatal. Toxin levels build up the higher you go up the food chain, and so do their effects, including on people who eat contaminated fish. Children are particularly at risk.



Children collecting shellfish on a Zanzibar beach © Nell Hamilton

How can we protect Zanzibar’s fisheries?

Zanzibar is not the first place to experience these challenges, and there are many solutions available that have been used successfully elsewhere. Whether children or adults, individuals or groups, we can help protect our fisheries and preserve livelihoods for future generations.

Marine Protected Areas (MPAs) – As with coral reefs, one of the best ways to protect fish stocks is to create Marine Protected Areas (MPAs). MPAs are zones where fishing is restricted. They protect coral, mangrove and seagrass habitat from destructive practices: this safeguards the areas where fish breed and nursery areas for young fish to grow. They provide food for many other species, and refuges for endangered species. In some MPAs, fishing is banned (no-take zones), others permit sustainable fishing but not destructive methods. They can combine both, with a central no-take zone surrounded by a buffer zone where sustainable fishing is permitted. Fishing restrictions may be seasonal, protecting valuable species in their breeding season but allowing fishing at other times. Currently in Tanzania, Community-Based Organisations (CBOs) have been established by groups of fishers themselves to enhance fishing now, and protect fish stocks for the future.

Although fishing is restricted in MPAs, overall, they benefit fishers. They give fish a refuge with plenty of food where they can grow to great size without being caught. They breed well, mature quickly, and produce too many offspring for the MPA. The young fish then migrate to the surrounding zone where fishing is permitted: fish close to MPAs are therefore bigger and more

Tembea ujione!

- Visit a fish landing site such as Malindi or Mkokotoni – or just your local beach.
- Visit fish markets at Chwaka, Matemwe, Uroa, Darajani, Nungwi or Pwani Mchangani.
- Talk to fishers in your family and community about how fishing catches and methods have changed.

numerous than those further away! These effects extend up to 500 m from reserve boundaries, and are well known to fishers: for example many people fish in the waters just outside the no-take zone of Chumbe Island Coral Park. They know they can catch more fish there and make more money than if they fished elsewhere. Of course, MPAs must be managed well to be sure the rules are followed and communities benefit from these conservation areas, so they work best when established with community involvement. Coastal zone management planning should ensure coral reefs, seagrass beds and mangroves are all protected together. Regulations designed to protect fish stocks must be well enforced to be effective.

Supporting sustainable fishery management – Fishers can help keep fisheries profitable by using sustainable techniques and helping educate their peers to do the same. For example:

- Avoid catching rare species that breed slowly (e.g. sharks, rays, groupers), and ecologically important species (e.g. parrotfish, triggerfish, wrasses and tritons).
- Use large-mesh nets to avoid catching young fish.
- Avoid damaging coral with anchors, boats, nets, traps, or by walking on it.
- Never catch fish that have aggregated to spawn.
- Use selective fishing techniques to avoid bycatch, especially of marine mammals and turtles.
- Be sure fishing gear does not get lost in the ocean, where it can continue to catch and kill fish.

- Respect existing MPAs, and join efforts with other fishers and community members to create more MPAs and CBOs to protect our fish stocks for the future.

Alternative livelihoods – As the population of Zanzibar rises, people are **seeking** sustainable ways to earn a living without overexploiting declining fish stocks. Increasing options are becoming available.

Seaweed farming: Widespread throughout Zanzibar, seaweed farmers – usually women – grow seaweed on ropes (off-bottom culture techniques) in intertidal areas for export. It is an important livelihood activity, producing over 7000 tonnes a year.

Crab fattening: Some communities collect **juvenile** crabs and place them in net enclosures in mangroves where they are protected from **predators**. The crabs are fed a diet rich in carbohydrates so they reach marketable size quickly.



Zanzibar seaweed farmer
© Nila Uthayakumar



Pearls farmed in Fumba © Narriman Jiddawi

Pearl farming: Local communities in the Fumba peninsula farm oysters for pearls. The market for sustainably produced pearls in Zanzibar has great potential, through the thousands of tourist visitors annually, but it is essential that wild oyster populations are not depleted (this is currently done by ensuring all those with pearl farms have no-take zones in their areas).

Sustainable tourism: The most important way MPAs improve household income is by creating new jobs: for wildlife guides, boat captains, park rangers, snorkel guides, hotel staff and fishing guides. Indirectly, tourists provide a market for local crafts made from local materials.

Sport fishing: This is sustainable game fishing: after being photographed, fish caught are released – still alive – back into the sea.

Consumer action – To protect fisheries we must all work together to ensure fisheries are used and managed sustainably, so that people can continue to make a living from natural resources and support their families now and in future generations. If everyone raises awareness in their community and supports local fishers who catch fish sustainably, then rare **species** can survive, and enough fish will live long enough to breed. Always ask how fish were caught, and don't buy rare fish, **juvenile** fish, or fish caught in destructive ways – it puts local people out of business and denies children the chance to eat local fish in the future. Especially in local restaurants, raise awareness with staff and suggest sustainable alternatives to keep at-risk fish off the menu and in the ocean!

Kitunze kidumu!

- Help raise awareness: tell friends, family and co-workers how important sustainable fishing is!
- Don't drop litter (taka taka) – recycle!
- Don't 'help yourself' on the beach! Use a proper toilet away from food resources.
- Avoid dangerous diseases like cholera or typhoid: only collect shellfish from clean beaches away from sewage outfalls.
- Join community groups to lobby government to improve sewage treatment and provide proper toilets for your community so sewage doesn't get into the sea.
- Write to your Sheha or MP to let them know that sustainable fishing matters.