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Payments for coastal and marine ecosystem services: prospects and principles

Coastal and marine resources provide millions of impoverished people across the global South with livelihoods, and provide the world with a range of critical 'ecosystem services', from biodiversity and culture to carbon storage and flood protection. Yet across the world, these resources are fast-diminishing under the weight of pollution, land clearance, coastal development, overfishing, natural disasters and climate change. Traditional approaches to halt the decline focus on regulating against destructive practices, but to little effect. A more successful strategy could be to establish payments for ecosystem services (PES) schemes, or incorporate an element of PES in existing regulatory mechanisms. Examples from across the world suggest that PES can work to protect both livelihoods and environments. But to succeed, these schemes must be underpinned by robust research, clear property rights, equitable benefit sharing and sustainable finance.

Policy pointers

- **Evidence suggests that** payments for coastal and marine ecosystem services schemes can effectively complement or replace regulatory approaches.
- **Effective PES schemes in** coastal and marine ecosystems rely on robust research on what services these ecosystems provide and how.
- **To promote sustainable** fishing practices, payments for coastal and marine ecosystem services will have to be high because the incentives to 'misbehave' are so strong.
- **Formally recognising** communities' customary rights is crucial to empowering local fishers to sustainably manage their resources.

Regulation by incentive

Coastal and marine ecosystems matter for people and planet. Fisheries alone support millions of impoverished coastal communities, who rely on them for both food and work. Some 43.5 million people — mostly in the global South — are directly employed in fisheries; a figure that rises to nearly 200 million if you also consider those who work in associated processing, marketing, distribution and supply industries.[1]

Beyond commodities such as fish and aquatic plants, coastal and marine ecosystems also provide a range of vital 'ecosystem services' that support the lives and livelihoods of coastal communities and others. For example, they recycle nutrients, regulate natural hazards and protect against floods, and they underpin spiritual and cultural values, including recreation and tourism.[2]

And yet, despite their social, economic and environmental benefits, coastal and marine ecosystems are being degraded and overexploited at an alarming rate. Pollution, land clearance, coastal development, overfishing, natural disasters and climate change are all damaging coastal and marine habitats and undermining the services they provide.[3] The mangrove forests that fringe the coasts of many developing countries have decreased in size by up to 50 per cent in the past half century.[4] And across the world, fish stocks are falling, with around a third considered to be overexploited or depleted.[5]

Many countries have tried to address the problem through regulation — imposing rules and restrictions on when, where and how fishing and coastal development can take place, for example by restricting the mesh size of fishing nets or by issuing controlled fishing permits. But in many cases these approaches have failed to change unsustainable practices among fisher and coastal communities.

To a large extent, this is because regulation does not adequately compensate these communities for loss of earnings, or because it provides no alternative livelihood option. An underlying problem is that markets do not easily capture the non-monetary values of coastal and marine ecosystem services and so they are rarely considered in resource management decisions, which instead favour land clearance or other unsustainable options that can, in the short-term, produce goods to sell in the market place.

Pay to protect

Payments for ecosystem services (PES) schemes — in which natural resource users are paid to conserve natural resources or manage them more sustainably — are increasingly acknowledged as an alternative to failed regulatory mechanisms. This market-based approach is already relatively widely used on land, for example within forest and watershed ecosystems. But its application in coastal and marine environments — where resources (fish) are more mobile and harder to monitor,[6] and where property rights are often ill-defined or insecure — remains embryonic.

Adding PES to existing regulatory schemes can make them more effective

If well designed, PES schemes could play a significant role in incentivising fisher or coastal communities to conserve, restore and sustainably manage their resources. A growing number of examples from across the world point to ways in which adding PES to existing 'regulatory' schemes can make them more effective in protecting both environments and livelihoods (see Figure).

Compensating for lost earnings

Marine protected areas (MPAs) — areas of coastal land and water where fish harvests are restricted[7] — typically aim to protect the resources underpinning livelihoods while conserving biodiversity and recreation sites.[8] But the combination of degraded fish stocks and harvest restrictions create difficulties for nearby communities with no other way to make a living and can be particularly costly, especially in the short term, for artisanal fishers.[8]

Adding a PES scheme to the mix can compensate these fishers for lost revenues and provide a strong incentive for them to actively participate in protecting coastal and marine parks (see Protecting fish and people in Tanzania). In 2005, the Kuruwitu Conservation and Welfare Association in Kenya established a 'no-take zone' of two square kilometres in response to significant declines in fish catches. During the following six months, local fishermen were paid by an international nongovernmental organisation (NGO) to not fish in the area, leading to significant environmental gains. It's reported that coral cover grew by 30 per cent; seagrass species saw a 12 per cent increase; and fish stock doubled.[9] But the scheme is struggling to secure financial sustainability because ecotourism has not managed to fulfil expectations of raising adequate funds.

If MPAs cause lost revenues for local fishers, so too do 'closed seasons', which prevent fishing at certain times of the year. This approach is used by many countries to protect species at vulnerable times in their life cycle, such as during spawning seasons.

Just as PES can compensate those affected by MPAs, it can also reimburse fishers affected by closed seasons. The defeso scheme in Brazil, for example, does just this,[10] although some researchers claim that the scheme is subject to free riding; not all beneficiaries depend on fisheries for their livelihoods.[6] Identifying the 'real' ecosystem providers and accurately assessing the cost of complying with closed seasons is essential to make PES work in this case.

Restoring coastal habitats

Beyond compensating for lost earnings, PES can be used to spur coastal dwellers to conserve and restore local habitats, including mangrove trees. The Manzanar project in Eritrea offers coastal communities small financial and in-kind benefits to plant mangrove trees. In return for their labour, project participants — mostly poor women — receive a free meal and 20 Nakfa (US$1.33) every working day; the poorest households are also given sheep and goats.

The project claims that up to 100 hectares of coastal land have been afforested through the scheme. Communities report that in addition to increasing the food available for their livestock, the newly planted mangroves have boosted numbers of fish and shellfish.

Restoring coastal habitats can bring wider benefits too. Beyond providing a home to a diverse spread of plant and animal species, coastal ecosystems such as salt marshes and mangrove forests store significant amounts of carbon that, if protected, could help reduce the emissions that fuel climate change.

Conserving endangered species

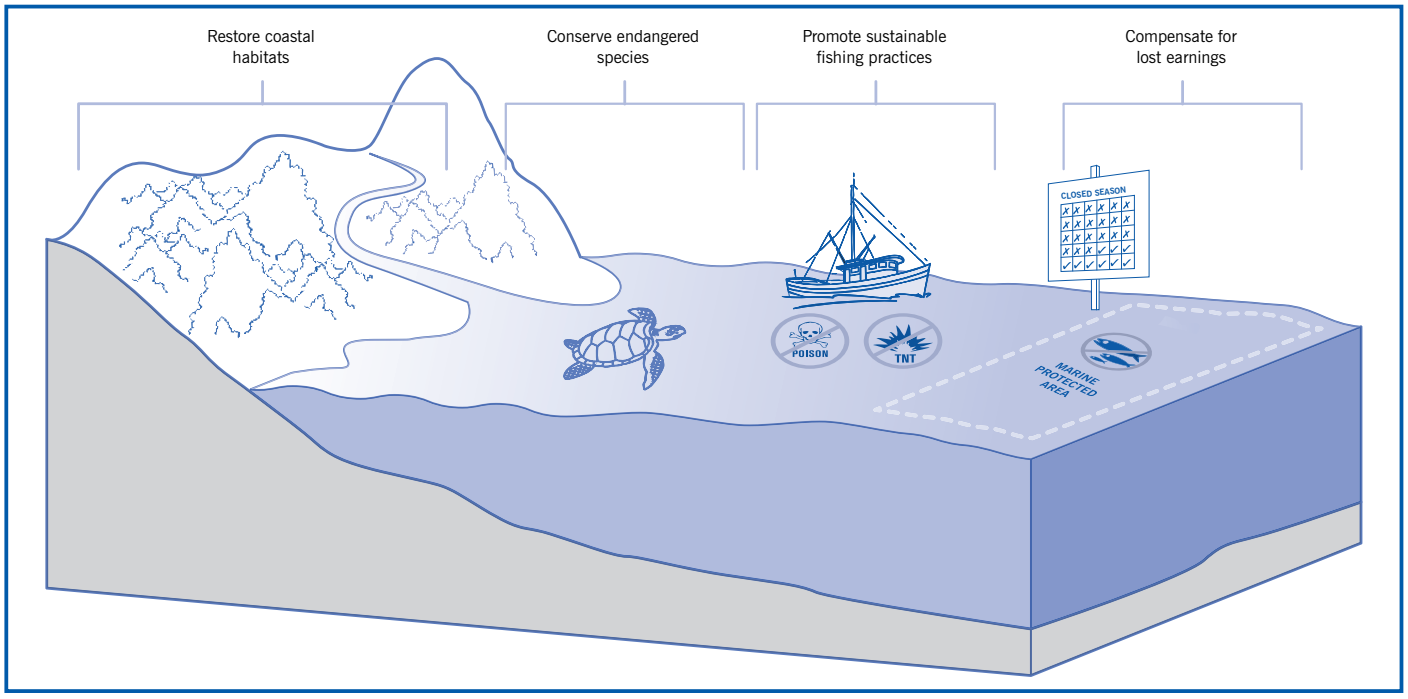
Several countries are experimenting with PES to protect threatened species and their coastal habitats. One scheme in Tanzania pays communities for finding the nests of endangered sea turtles, and then reporting them to project monitors. In some cases, payments vary depending on the nest's hatching success. Studies suggest that the scheme significantly reduced poaching in the area — from 48.5 per cent in 2001 to 0.6 per cent in 2004 — while simultaneously increasing hatching rates.[11] In the absence of reliable baseline

Protecting fish and people in Tanzania

In southern Tanzania, the Mnazi Bay Ruvuma Estuary Marine Park was established in 2000 to improve fishery health by altering local people's behaviour.[8] The park, which covers both coastal and intertidal zones, restricts the type of fishing gear allowed and bans all commercial mangrove cutting. Affected communities can swap, at no cost, their 'illegal' small mesh fishing nets for large mesh ones, and are given support for alternative income-generating projects, such as beekeeping.

The Marine Parks and Reserves Authority in Tanzania claims that the park is helping significantly to reduce poverty in the region and promote eco-tourism investment. But some researchers suggest that the scheme does not share costs and benefits equally among local communities, with those located on the bay and furthest away from agricultural land losing out.[8]

Figure. Ways that PES can be added to existing regulatory schemes.



data, these figures are not necessarily fully reliable, but they leave little doubt that PES can provide a strong and effective incentive mechanism.

Elsewhere, the Luis Echeverria community in Mexico is similarly protecting about 48,500 hectares of grey whale habitat, in exchange for annual payments of US$25,000. The payments are used to support small-scale development projects, including business training and alternative income-generating activities.[12] This scheme is praised for its attention to local needs and priorities, responding to local preferences for new livelihood options and securing a dedicated trust fund to cover expenses associated with designing and implementing the project.

Promoting sustainable fishing practices

The equipment and practices used by fishers affect marine ecosystems. In many cases the gear and practices used are destructive and unsustainable: many industrial fisheries use bottom trawls that uproot or crush seafloor species and catch millions of pounds of unintended species, while small-scale fishers across the tropics sometimes use dynamite or poison to catch fish, with devastating impacts on coral reef and other marine ecosystems.

Traditional approaches to tackling the problems associated with destructive fishing gear and practices focus on restricting fishing inputs such as the number of hours at sea or the length of nets used, or putting an upper limit on catches. But they are widely criticised for stimulating 'effort creep' — where fishers in an input controlled fishery simply switch to unregulated inputs — and 'race-to-fish', where fishers race to get a maximum possible share of the total catch.[13] Both effort creep and race-to-fish endanger the sustainability and economic performance of marine ecosystems and can lead to overfishing.

PES schemes that provide economic incentives to change behaviour could prove more successful than regulation in discouraging destructive fishing gear and practices. But to succeed, the payments will have to be high because the incentives to 'misbehave' are so strong.

Design essentials

The examples above point to ways in which PES can be used to conserve and sustainably manage coastal and marine ecosystems, without sacrificing local livelihoods. But their success is by no means guaranteed.

PES in coastal and marine ecosystems schemes must be carefully designed to ensure that they can provide the necessary incentives for conservation over the long term. In particular, they must be underpinned by four key factors: robust research, clear property rights, equitable benefit sharing and sustainable finance.

Robust research. If decisions on the management and conservation of coastal and marine ecosystems are to be effective, they must be based on a strong understanding of what services these ecosystems provide and how. PES schemes must be confident that a given conservation or management strategy will really deliver the hoped for social, economic and environmental benefits. That requires higher priority to be given to research — mapping ecosystem services, understanding how these operate and interact across time and space, and identifying appropriate indicators

and thresholds to measure management activities.[14] Economic valuation of coastal and marine ecosystem services is especially important in deciding how to use marine environmental assets.[2]

Clear property rights. The lack of clear ownership or property rights over aquatic environments makes implementing, monitoring and enforcing PES schemes very challenging. Providing formal recognition of communities' customary rights is crucial to empowering local fishers to sustainably manage their resources and reduce overfishing. It's not simple — fishing rights tend to be nested under coastal and marine resource use rights, which are sought by a large, and growing, number of users for a wide range of activities. Some have harvest rights to fish, while others look for use rights such as tourist permits and passive recreation. Some groups may require conservation rights — the right to conserve threatened species — and many will be given management rights with different degrees of exclusivity. All this makes fishing and property rights a very complex issue; one that is further complicated by many governments' limited capacity to enforce property rights among artisanal fisheries.[15] Some researchers suggest that community rights, rather than individual rights, would be most appropriate for small-scale fisheries. But to work, the community approach requires more than a simple list of dos and don'ts on resource management — it demands active participation in monitoring and enforcement.

Equitable benefit sharing. The issue of benefit sharing is key in ensuring that the poorest and most vulnerable groups of society benefit from PES schemes.[16] For a start, the compensation provided by PES schemes must be equal to or greater than the cost of conservation shouldered by participating communities. But there is also the question of who gets what. 'Blanket' compensation — where every community member is paid an equal amount — may sound fair, but some researchers argue that there is a wider equity issue of impacts on non-participants who may also bear opportunity costs, or who may gain benefits without effort or cost.[17] There have been cases where villagers for whom fishing is of little livelihood value have benefited from PES projects, while villagers for whom fishing is critical often find that projects do not come close to compensating them for lost access to fisheries. This makes careful assessment of the costs and benefits for each section of society a must.

Sustainable financing. This is essential to provide continuity in incentives and ensure that resource managers do not return to destructive or unsustainable practices. Securing sustainable financing requires schemes to map the supply chain of ecosystem services and identify sellers and buyers. Ecosystem service buyers (beneficiaries) may include the tourism sector, industrial fisheries, offshore oil and gas companies, coastal city populations, government agencies, or international carbon markets. Innovative approaches such as the coastal and marine biodiversity trust fund in Mauritania could also be explored as a way to generate long-term finance.

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Notes

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