

# Capturing Coral Reef & Related Ecosystem Services



The Capturing Coral Reef & Related Ecosystem Services (CCRES) project is a new initiative which seeks to unlock the natural wealth of coastlines in the East Asia-Pacific region, in order to enhance livelihoods and food security, improve community health and wellbeing, and sustain coastal ecosystems in the region.







# Ecosystems under pressure

Human civilisations have developed and thrived during millennia of environmental stability. Until relatively recently, population densities have been low and ecosystems — particularly in the tropics — have been rich in natural resources. As a result, the availability of 'natural capital' assets such as fish stocks, agricultural land and potable water has not limited prosperity. This has meant that although communities have directly depended on these assets for livelihoods, food security and wellbeing, ecosystems have been considered inexhaustible.

In recent decades, rapid population growth and other factors, such as the impacts of climate change, have led to dwindling ecosystem health, undermining the economic, social and ecological systems of many tropical regions. Resources once considered infinite have started to become limited. If nothing is done to change the current path of resource exploitation, the opportunity for the prosperity and wellbeing of many communities will be severely curtailed.

The Capturing Coral Reef & Related Ecosystem Services (CCRES) project will demonstrate how the conflict between economies, ecosystems and community wellbeing may be



resolved by using the ecosystem services concept to create a mutually-beneficial relationship between local economies and the natural resources on which they rely. By explicitly valuing many of the ecosystem services currently taken for granted, CCRES will also provide the political rationale for protecting natural capital such as coral reefs, mangrove forests and seagrass beds, and show how competition among businesses, conservation activities and other planning objectives may be reconciled to maximise public benefits in an equitable and transparent manner.

## Project Development Objective

The CCRES Project Development Objective is to design and support the uptake of innovative models for valuing mangrove, seagrass and coral reef ecosystem services with the potential to enhance the sustainability of marine-based enterprise and marine spatial planning in select coastal communities in Indonesia and the Philippines.

## The East Asia-Pacific Region at a glance

**4 billion or 60%**

of the world's population resides in the region

**1 billion people**

live in low-lying coastal areas

**1.8 billion people**

live on less than US\$2 a day

**30% contribution**

to global GDP growth

**15 megacities**

with more than 10 million people

**12 megacities**

are located on the coast

**World's biodiversity epicentre**

lies within the Coral Triangle

1 Once reliant on fishing, El Nido in the Philippines now earns significant income from tourism (M King)

2 Reef fisheries are a critical source of protein for coastal communities (A Hooten)





# Valuing ecosystem services

Ecosystem services are the benefits that nature provides to people. Initiated in 2001, the Millennium Ecosystem Assessment brought the concept to global attention, dividing ecosystem services into four categories:

- Provisioning services: the production of food, water, timber and other crops
- Regulating services: climate, flood, disease regulation
- Cultural services: recreational opportunities, aesthetic and spiritual benefits
- Supporting services: these maintain the processes that underpin the other services, such as soil formation, pollination and nutrient cycling

Despite their importance to human wellbeing and economic activity, ecosystem services are routinely taken for granted by communities, industry and policy makers. This is in part because valuing the benefits people derive from ecosystems is often more complex than valuing other resource uses and, as a result, are not considered in the same light. For example, determining the market value of a mangrove forest if it is cleared to provide land for housing is relatively straightforward. However, valuing the benefits that same mangrove forest will provide, if preserved, to local fisheries, the defence of the coastal area from storm surges, and the provision of building materials is more complicated, requiring multi-disciplinary expertise in natural sciences, social sciences, and physical sciences, as well as economics.

Failure to consider the true value of ecosystem services can lead to inappropriate management decisions. All too often land-use options that provide financial gain to private

owners are prioritised over alternatives with greater public benefit. This leads to an overall loss of services, especially those that are difficult to value or where ownership is difficult to determine.

Capturing the economic and cultural values of marine natural capital through valuation of ecosystem services, and quantifying the cost of lost services due to environmental degradation, has the potential to transform the development and stewardship of coastal areas by translating ecological value into intuitive and financial terms for local stakeholders as well as policy makers. This knowledge can be harnessed by decision support tools, which can help to build the political rationale for change.

Knowing the actual economic value of the services provided by marine and coastal ecosystems will:

- Present an economic argument for protecting natural resources
- Create new ways (tools, models) to enhance livelihoods
- Highlight the opportunity cost of coastal environment degradation
- Provide data for use in a nation's accounts
- Show which environmental assets need to be protected, and how

Translating ecological value into financial terms will create a compelling incentive for local communities, businesses and policy-makers to preserve coastal ecosystems for the protection of livelihoods and wellbeing for current and future generations.





- 1 Processing seaweed gleaned from reef flats, Philippines (G Sheehan)
- 2 Coral reef, Biak, Indonesia (A Hooten)
- 3 Mangroves protect the coast against storm surges and provide nurseries for reef fish (G Sheehan)
- 4 Seaweed farming, Wakatobi, Indonesia (M King)









# About CCRES

The Capturing Coral Reef & Related Ecosystem Services (CCRES) project demonstrates how coastal communities in the developing world can sustainably capture the benefits of ecosystem services. The project seeks to make explicit the value of “blue” natural capital and ecosystem services to coastal communities and other stakeholders in the management of a country’s natural assets for sustainable development.

The project will demonstrate the fundamental relationship between the ecological value of healthy coral reef, seagrass and mangrove ecosystems and the economic value and market potential of their ecosystem services. It will explore how these are tied to healthy, resilient systems; and how routine distribution of economic benefits can bring transformational change in sustaining the wellbeing of coastal communities. By making the connections to values and benefits explicit, CCRES will demonstrate the fundamental links between — and the need to maintain and conserve — healthy ecosystems and the economic benefits derived from ecosystem services.

The project will forge community-led innovations in capturing and sustaining these benefits by generating model frameworks for business development (or by strengthening the value chains of existing businesses) linked to ecosystem services to better highlight and harvest the values accruing from the ecosystems on which their business success depends. CCRES will also promote the application and uptake of these model approaches in local planning frameworks.

CCRES will finance ecological and economic valuation studies; develop innovative tools and models to support decision-making and new opportunities for business development; and communicate results to promote uptake. This will be achieved through CCRES’s three integrated components:

1. Quantifying the value and market potential of coral reef and mangrove ecosystem services
2. Forging community-led innovation in capturing and sustaining benefits from marine ecosystem services and enhancing resilience in the face of climate change
3. Promoting behavioural change through outreach, decision support and regional learning from results in selected field sites

CCRES focuses on ecosystem services surrounding coral reef, seagrass and mangrove habitats in Indonesia, the Philippines and in Small Island Developing States of the Pacific Islands, where coral reef and related ecosystem services are critical to livelihoods, food security and climate resilience.



- 1 Selling seaweed at the local markets, Bantayan Island, Cebu (A Edwards)
- 2 Shellfish gleaned from the reef, Solomon Islands (G Dews)
- 3 Dried fish market, Bantayan Island, Cebu (M King)



# Project components

## 1 Quantifying the value and market potential of coral reef and mangrove ecosystem services

CCRES will fill key knowledge gaps on how developing world coastal communities can sustainably capture the benefits provided by ecosystem services while improving the governance of natural resources by facilitating their inclusion in systems of national accounts.

Studies will ascertain the degree to which wise management of coral reefs can mitigate challenges confronting food security and provide opportunities for diversified livelihoods. CCRES aims to push the ecosystem service frontier forward, applying existing knowledge and filling critical gaps in order to demonstrate how ecosystem services can be meaningfully valued and sustainably managed to deliver ongoing benefits to local communities.



### Key activities:

- **Valuing ecosystem services** — Calculating the value of services (including reef fisheries, ecotourism, coastal defence, blue carbon sequestration and storage, and water filtration for human and ecosystem health). The project will focus on those services that address policy needs in the East-Asia Pacific region.
- **Mapping the distribution of ecosystem service benefits** — To support appropriate ecosystem service management decisions, especially those that are targeted to alleviate poverty, it is necessary to understand where service providers and beneficiaries are located; who these groups are and their socio-economic and demographic characteristics; how access to ecosystem service benefits is mitigated by institutions and governance; and how institutional and governance changes impact on human wellbeing.
- **Marine spatial planning** — Marine spatial planning provides decision support for community-based resource management, explicitly considering the trade-offs that exist in environments where resources are used in multiple ways. Engaging with the



local community, CCRES will determine how local businesses (both pre-existing and new) can operate within the same coastal landscape, and ensure that the ecosystems are sustainably managed to deliver ongoing benefits to local communities. CCRES will demonstrate how to integrate maps of ecosystem service flow, priority sites for marine reserves designation, and the requirements of sustainable businesses which rely on coastal ecosystems and the services they provide.





- 1 Bajo community, Wakatobi, Indonesia (M King)
- 2 Reef fish for the ornamental aquarium trade, Bali, Indonesia (A Edwards)
- 3 Mangroves, Palawan, Philippines (G Sheehan)
- 4 Fish farming can have a significant environmental impact, Bali, Indonesia (A Edwards)







## 2 Forging community-led innovation in capturing and sustaining benefits from marine ecosystem services and enhancing resilience in the face of climate change

CCRES will bring a 'whole of system' business thinking to the way in which coastal communities manage their natural capital assets to support sustainable livelihoods. The work will demonstrate how communities can combine local knowledge with business knowledge and decision-making tools to create complementary suites of businesses that promote social, environmental and financial outcomes. Using business techniques, such as value chain analysis and complex system analysis, our work will help policy makers, community leaders, and business owners link economic value to ecosystem service value so that ecosystems and economies can mutually reinforce one another. Only when the value of ecosystem services becomes an explicit component of the local economy can a transition to sustainable, equitable 'blue economies' take place.

### Key activities:

- **Analysing and modelling the system** — CCRES aims to understand how communities currently use and interact with ecosystem services, and how these interactions, along with external factors, have led to current problems such as resource degradation, resource use conflicts, failed or dwindling livelihoods or persistent poverty.
- **Identifying new markets and business opportunities** — Considering linkages to ecosystem services, CCRES will generate and test business scenarios; identify improvements to existing businesses and new business opportunities; and launch market creation processes.
- **Creating business models and tools** — CCRES will build ecologically-informed business models that support the sustained supply of marine and coastal ecosystem services, generate economically viable alternative livelihoods, and increase local stewardship of coastal natural capital. Spatial planning models and toolkits will demonstrate the value of the coastal natural capital and assist communities to develop new, sustainable revenue streams which both protect and enhance that capital.



### 3 Promoting behavioural change through outreach, decision support and regional learning from results in selected pilot sites

A key component of the project is developing a knowledge management platform in which to share what we learn from the project's activities. Working with in-country partners, regional and global stakeholders, CCRES aims to develop a knowledge sharing platform for the dissemination and uptake of the project's findings, in order to promote practices that enable communities to live along tropical coastlines for the long term.

Focusing on the effective uptake of knowledge generated from the project CCRES will develop a series of strategies and activities designed to:

- Facilitate the uptake of the valuation and eco-enterprise models into policy, management and future project design
- Increase the awareness and understanding of communities at the pilot sites of the linkages between the services the coastal and marine ecosystems provide and their livelihoods and health

This will be undertaken through reciprocal engagement with stakeholders, placing strong emphasis on local partnerships, local leadership, and culturally responsive approaches to gathering information about the desires, attitudes, and current behaviours of individuals in pilot sites. In this context, CCRES will develop communication tools and social marketing messages to sensitise communities to the issues, inform local government about trade-offs involved in different decisions regarding the use of marine space and natural capital, and help communities visualise the future under different climate scenarios and management regimes in which ecosystems services are sustained or lost.



- 1 Seagrass meadows provide habitat for juvenile fish (G Sheehan)
- 2 Eco-tourism resort, Wakatobi, Indonesia (A Edwards)
- 3 Tourism development, El Nido, Philippines (M King)



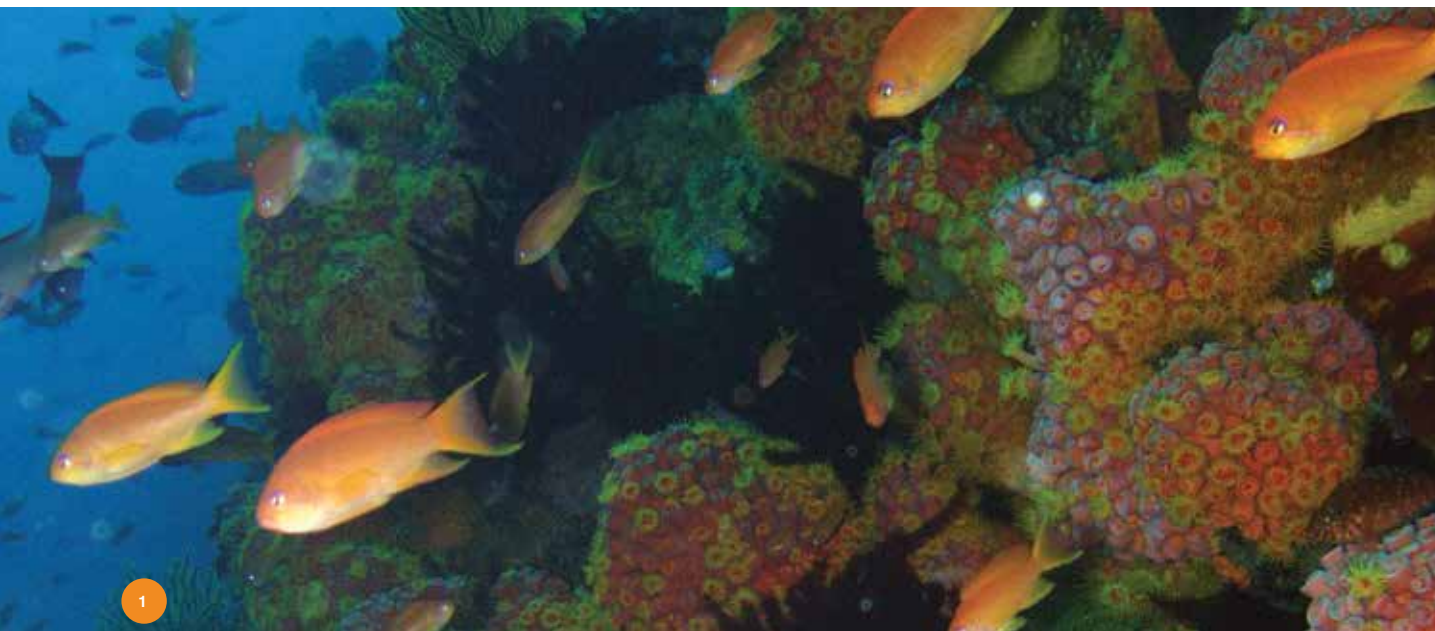
# Working in partnership

CCRES is developing a team to work together to undertake the activities in each of the pilot sites. The team is composed of both developing and developed country researchers, technical experts and practitioners who will undertake the activities within Indonesia and the Philippines.

Local and national partnerships will also underpin the implementation of CCRES. The involvement of local communities, government and businesses as partners is critical to ensuring the findings are relevant, practical and accurate.

While the CCRES project will work primarily at the local level with governments and local communities, it will make all information and resources available through the project's knowledge management platform for replication and uptake at the national, regional and global levels.

CCRES will focus on countries and sites in the East Asia-Pacific region, where coral reef and related ecosystem services are critical to livelihoods, food security and climate resilience. The Project will support selected sites on the ground in Indonesia and the Philippines to demonstrate key elements of the project objective.



1 Hundred Islands National Park, Philippines (M V Baria)

2 Fish market, Biak, Indonesia (A Hooten)









## Who will benefit?

The primary beneficiaries of CCRES will be:

- Provincial, district and local level government agencies and decision-makers (e.g. land use planners, MPA managers, fisheries and tourism officials)
- Local businesses and communities with whom CCRES will work with to apply the project's findings, and who will directly benefit from application of the results

CCRES will work closely with these people to ensure uptake of the results into government plans, business practices, and improved community awareness of the links between ecosystem health and sustainable resource use.





Information and resources will be made available for dissemination and uptake into other regional, national and local networks. These will include:

- Marine Protected Area (MPA) managers, coastal resource managers and policy officers from government agencies not directly linked to the field sites, as well as key non-government organisations and community-based organisations involved in coastal resource management and related fields
- Projects operating in the East Asia-Pacific region and other regions who focus on the improved management of coastal and marine resources
- International community of coral reef, mangrove and seagrass researchers and practitioners, climate scientists and environmental engineers, natural resource economists, behavioural economists, governance experts and modellers

1 Village children, Solomon Islands (G Dews)

2 Fisherman in Wakatobi, Indonesia (A Edwards)

3 Members of the CCRES in the Philippines (G Sheehan)

4 Village children, Solomon Islands (G Dews)

# A multidisciplinary approach

The CCRES team is multi-disciplinary, made up of international and in-country specialists who bring a unique range of skills to the project.

These include:

- agricultural science
- business management
- computational modelling
- coral reef taxonomy
- ecology
- environmental science
- food security
- marine biology
- conservation planning
- engineering
- natural resource management
- stakeholder communications and engagement
- systems modelling
- governance and policy
- project management



## Find out more

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## CCRES partners

The project is funded by the Global Environment Facility (GEF), the World Bank and The University of Queensland (UQ). Our project partners provide world-class expertise in research management, international development, engagement and practical on-ground capacity. Partners include Cornell University; Currie Communications; WWF US; University of the Philippines' Marine Science Institute; University of California, Davis; and a number of Schools and Institutes from The University of Queensland — Global Change Institute, School of Biological Sciences, School of Agriculture and Food Sciences, School of Civil Engineering, Institute of Social Science Research and the UQ Business School. Project partners are supported by local and national partners and collaborators in the countries where we work.

CCRES builds on the Coral Reef Targeted Research & Capacity Building for Management (CRTR) Program ([www.gefcoral.org](http://www.gefcoral.org), 2005–2010) which was joint-funded by the World Bank, the GEF and UQ.



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### FRONT COVER

Top Eton Beach, Efate, Vanuatu (M King)

Left to right Bolinao, Philippines (G Sheehan); Wakatobi, Indonesia (A Edwards); Batangas, Philippines (G Sheehan); Biak, Indonesia (A Hooten); Lingayen Gulf, Philippines (H Trebilco)

### BACK COVER

El Nido, Philippines (G Sheehan)