



**WorldFish**  
C E N T E R

Photo: Anne-Maree Schwarz



Project Brief 1945

Mangrove revival  
diversifies livelihoods  
while addressing  
climate change

Photo: Zaida Hilly



## Background

Mangrove forests furnish ecosystem services made all the more valuable by climate change. They protect coastal communities from cyclone and storm damage, and this function may become even more important as climate change intensifies. Like all plants, mangroves take up carbon dioxide, and mangrove forests are net stores for carbon. Conserving and restoring mangrove forests may therefore play an important role in mitigating climate change. Mangroves further provide firewood, building materials and food for humans, as well as habitat and spawning grounds for fish.

Globally, mangroves are being cleared or degraded at the alarming rate of 1-2% annually, their area declining by a third since the 1980s. Multiple pressures threaten the world's remaining 15-18 million hectares, including pollution, fuelwood collection, land clearance for aquaculture and coastal development, and natural disasters.

The ability of terrestrial forests in the tropics to sequester carbon has spurred the quantification of this ecosystem service, and the trading of carbon offset credits through which buyers offset their own carbon emissions and owners of forested land are rewarded for the carbon their trees sequester. Offset projects either protect existing forests, regenerate lost or degraded forests by planting trees, or both.

Rapid growth in the market for voluntary carbon offset credits offers the potential for small, equitable and self-sustaining conservation projects in developing countries. Many questions remain, however, as to whether such initiatives are viable for rural communities and how they should be managed locally and nationally.

## Objectives

The project "Poverty alleviation, mangrove conservation and climate change: Carbon offsets as payments for mangrove ecosystem services in Solomon Islands" explores whether or not mangroves can be included in offset projects. It asks whether replanting mangroves and using them sustainably can qualify the rural poor along

tropical coasts to link into the global carbon market, thereby earning an income that communities may invest in education, health and conservation.

As trading and registry procedures are not yet well established for the nascent voluntary offset market, especially for mangroves, local communities, nongovernment organizations and governments need a roadmap to guide them from the first step of identifying the ecosystem services that their mangroves provide, through quantifying carbon sequestration, to credit registry and fund management. The goal of the project is to provide that roadmap.

## Duration and Donor Support

Funded by the Australian Government with a US\$321,000 grant through AusAID, the project is the first of its kind in the Indo-Pacific. The three-year project is being implemented from 1 April 2009 to 31 March 2012.

## Partners

In July 2009, the Solomon Islands Ministry of Environment, Conservation and Meteorology launched the National Biodiversity Strategy and Action Plan for Solomon Islands. The plan identifies mangroves – at the interface of land and sea – as critical to Solomon Islands biodiversity, and climate change as a priority theme, among others. The Climate Change Division of the Ministry of Environment, Conservation and Meteorology is a formal partner of WorldFish in this project. Other partnerships arise through active collaboration with nongovernment organizations working on complementary projects in terrestrial environments.

## Who Benefits

The project studies contrasting sites in three of the nine provinces of Solomon Islands. A site on the island of Ranonga in Western Province suffered a

major earthquake and tsunami in 2007 that severely damaged previously intact mangroves. The project reinforces community mangrove restoration already begun. A second site in Choiseul Province possesses one of Solomon Islands' larger intact tracts of mangroves, which is adjacent to a community-run conservation area that encompasses a terrestrial forest. A third site in Malaita Province is heavily utilized by the residents of the country's most populous island. The immediate beneficiaries are the coastal communities near these three sites who stand to strengthen their resilience to climate change through a greater awareness of the ecosystem services their mangroves provide and a better understanding of management options to maintain those services, including the future possibility of earning income by selling carbon offset credits.

The contrast among the study sites will maximize the applicability of project findings to Solomon Islands as a whole, thereby contributing to policy development in the Solomon Islands Ministry of Environment, Conservation and Meteorology. Consequently, other coastal communities may benefit as subsequent projects adopt the methods and procedures of this project and apply the lessons learned to mangrove conservation and restoration elsewhere in the Indo-Pacific.

Finally, the enhanced conservation and restoration of mangroves, and its associated sequestration of atmospheric carbon, contributes to mitigating global warming, thereby benefiting the entire planet.

## Cross-cutting Dimensions

As rural communities conserve and enhance their mangrove forests to improve their livelihoods – and potentially acquire through the sale of carbon credits a direct economic stake in restoring and sustainably using mangrove forests – they will become less vulnerable to poverty and more resilient to future external shocks, including those arising from climate change.

**Gender and Youth.** The participation and support of rural women is particularly important in Solomon Islands, where a substantial portion of subsistence users and customary owners of mangroves are women. Any additional income that communities generate from their use of mangrove forests will likely be earmarked for improving educational opportunities and facilities for women's health, among other uses, thereby improving the daily lives and future prospects of women and children.

**Environmental Protection.** Tropical mangrove forests connect sea and land, provide coastal protection, and play a critical role in the health and productivity of coral reefs and coastal fisheries. As such, their conservation and restoration extends environmental benefits to these neighboring ecosystems.

**Adaptive Capacity for Climate Change.** Healthy mangrove forests buffer coastal communities from the severe storms that are expected to proliferate

with global warming. They provide habitat and spawning grounds for fish stocks that face many current and future threats, including climate change.

**Collaboration and Capacity Building.** The project offers the Government of Solomon Islands timely advice and enhanced technical expertise to cope with the costs and challenges arising from climate change. It trains Solomon Island scientists on the implications of, and opportunities for, using tradable carbon credits as a conservation tool and livelihood opportunity. Local capacity building includes the participation of communities and nongovernment organizations in project workshops and presentations. The project provides education and hands-on field experience to new WorldFish staff, including several female graduates of regional universities.

## Key Project Deliverables

Project outputs include an action plan for registering carbon offsets and establishing trust funds, a how-to guide for villagers, peer-reviewed publications, policy briefs, a report for the Government on the feasibility of small carbon offset projects, seminars and presentations, annual and final reports, communication and engagement reports, and educational and public awareness materials.

Through the project, WorldFish and its partners specifically work to:

- determine the ecosystem services that mangrove forests provide to rural Solomon Islanders;
- build stakeholder and community awareness and capacity through workshops and the preparation of educational materials;
- estimate the carbon storage potential of the sites using remote sensing data from the WorldFish-hosted ReefBase and other existing databases, followed by ground truthing;
- review offset market case studies and assess the potential for mangrove forests' inclusion in trading schemes; and
- work with the Solomon Islands Government to determine policy about engaging communities with the international carbon offset market.



Photo: Anne-Maree Schwarz

## Communications

WorldFish project staff work directly with communities, government agencies and nongovernment organizations to widely disseminate the lessons learned. They communicate findings through community workshops, seminars, and research and educational presentations that provide opportunities for exchanging lessons learned and on-going consultation in all project phases. A notable communication output is a policy brief and seminar for the Climate Change Unit of the Solomon Islands Ministry of Environment, Conservation and Meteorology and other government policymakers. The brief and seminar will compare and contrast voluntary carbon markets and the Kyoto Protocol's Clean Development Mechanism (CDM), by which industrialized countries offset their carbon emissions by investing in large projects in developing countries that reduce emissions.

Presentations, posters and electronic media are produced in local languages. Interaction with organizations active in Solomon Islands, including national and local women's associations, are integrated into all phases of the research. The suggestions thus received have influenced the design, goals, methodology and communication strategy of the project.

## Action Research

The project researches the nexus of climate change, biodiversity conservation, payments for environmental services and poverty alleviation. As the first project to explore opportunities for obtaining carbon credits for mangrove protection and rural livelihood diversification in Solomon Islands, it promises to serve as a practical blueprint for protecting the estimated 50,572 hectares of mangroves nationwide.

Despite their potential for alleviating poverty while mitigating climate change, research is lacking on payments for ecosystem services in mangrove conservation and restoration. This is particularly true for small projects in remote Pacific island communities, which are especially at risk from climate change. The project tests the strategy of making conservation pay by addressing four questions in Solomon Islands:

1. Can carbon offset credit programs alleviate poverty and promote mangrove conservation?
2. What is the estimated annual carbon sequestration of small mangrove forests covering less than 10 square kilometers?
3. Is selling credits on the voluntary carbon offset market a feasible option for villages to earn income to meet basic educational and women's health needs?
4. What is the relationship between small projects tapping voluntary offset markets and large government programs under the CDM?

Anticipating and designing out problems encountered in previous projects is a key benefit of



the case study work. The project evaluates, for example, the influence of secure land tenure – which exists for mangrove areas in Solomon Islands under customary marine tenure and long-standing chiefly systems – on the effectiveness and efficiency of poverty alleviation through payments for ecological services. Data from case studies of carbon offset and fund systems are analyzed, as are national options under voluntary markets and the CDM, considering that revenues from the latter rarely reach the rural poor. Economic analyses of returns and transaction costs, both start-up and recurrent, are carried out to determine the financial feasibility of tapping voluntary carbon offset markets.

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