

CORAL REEF RESILIENCE FACT SHEET



Coral reef resilience can be defined as the ability of a reef to recover from damage and continue to provide ecosystem goods and services. Reefs exhibit resilience by either **resisting** changes, or **adapting** to changes.

These characteristics are measured as a reef's sensitivity and its recovery potential. **Sensitivity** refers to the ability of individual corals to experience exposure to a stress such as bleaching without responding, or to survive if bleaching does happen – in other words, resisting change.

Recovery potential on the other hand is the capability of the entire coral community to maintain or regain its structure and function despite some corals dying. This could mean that the community has adapted to change, such as some corals becoming “heat resistant”.

It is important to understand that coral reefs are naturally resilient. However, their resilience can be reduced by the threats they face.

What's Going Wrong?

Coral reefs around the world face many stressors, some global and some local. We explored these threats in a previous factsheet, which you can view [here](#).

Local threats such as pollution and physical damage weaken the reef's ability to withstand global threats such as ocean warming and stronger storms.

To effectively address this issue, management of coral reefs should adopt a resilience-based approach.





What is Resilience-Based Management (RBM)?

Resilience-based management (RBM) is an **approach** to **natural resource management** that focuses on enhancing the resilience of ecosystems, communities, and social-ecological systems.

To apply RBM and achieve its management objectives, we need to understand how a local coral reef ecosystem would be likely to respond to a diversity of impacts at different scales.

Benefits of applying RBM include:

- Prioritises management actions that best address future threats, encouraging adaptation and transformation
- Provides a way to manage reefs under future climate change scenarios
- Empowers local conservation practitioners
- Validates role and importance of local management actions
- Links well-being of coral reefs and local communities more closely.

Examples of RBM

Ecological

- Reducing local threats to reefs (overfishing, coastal development)
- Supporting reef ecosystem recovery processes (recruitment of new coral larvae)

Social

- Developing alternative livelihoods
- Supporting adaptive capacity (help locals to learn and adapt to changes in reef resources)

Governance

- Developing networks and relationships across multiple stakeholder groups
- Implementing collaborative and participatory approaches to planning and management

Factors Of Reef Resilience

Here are some factors that support reef resilience:

RESISTANCE



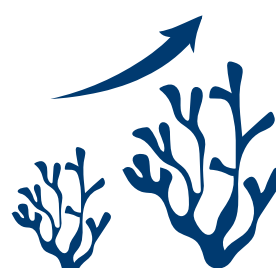
Not all corals are affected during a disturbance. The more resistant species and colonies can provide the seeds for recovery in other areas.

RECRUITMENT



Surviving corals produce larvae to "reseed" damaged reefs, which has to have suitable surfaces for them to attach and survive.

GROWTH



Young corals need ideal conditions to grow, without interference from pollution, competition and diseases.

SURVIVAL



Stress from human activities can both slow and prevent full recovery of reefs as well as kill them prematurely.

What Are The Solutions?

There are a number of steps we can take to practice resilience-based management in Malaysia:

PROTECT A DIVERSITY OF SPECIES AND HABITATS

01 *Different species and habitats support different ecological processes. Ensuring diversity of both reduces the risk for catastrophic changes in reef health.*

PRIORITISE AREAS

06 *Prioritise areas with low environmental risk and high social adaptive capacity. Consider social, ecological, and/or economic objectives, the risks and benefits, and feasibility of management success.*

MAINTAIN PATHWAYS OF CONNECTIVITY

02 *Connectivity promotes reef recovery by providing coral larvae from less impacted reefs. Connections between reefs and adjacent seagrass/mangroves habitats is also important for reef health and recovery*

INCORPORATE SOCIAL AND ECOLOGICAL INDICATORS

07 *Ecological: monitoring programs to focus on recruitment and recovery patterns.
Social: changes in demographic as well as in governance structures or policy.*

REDUCE LOCAL STRESSORS

03 *Reducing local threats can support reef recovery following disturbance. Nutrient pollution, sedimentation, and physical impacts can reduce coral growth rates, increase algal growth, and increase possibility of coral disease and bleaching.*

EXPLORE EXPERIMENTAL APPROACHES

08 *New interventions supporting all levels of reef resilience (e.g., genetic, habitat, ecosystem) will need to be incorporated into RBM.*

IMPLEMENT MPA

04 *MPAs can help to reduce local stressors, restore coral reef food webs, support herbivory, and promote recovery. MPAs should include all habitat types, ensure connectivity and include coral refuges.*

BUILD SOCIAL ADAPTIVE CAPACITY

09 *Communities with increased capacity may be better able to cope with restrictions on resource use.*

MANAGE ADAPTIVELY

05 *Key components of adaptive management include 1) monitoring and evaluation; 2) a continuing cycle of experimentation and reevaluation; 3) participatory approaches; and 4) diverse stakeholder participation.*

FACILITATE ADAPTATION AND TRANSFORMATION

10 *For ecological systems, buffer zones around protected areas allow for species to adapt and move under future climate change conditions. Supporting mixed governance may help social systems adapt and transform.*



Call to Action

Management of marine protected areas in Malaysia could benefit from incorporating the resilience principles outlined above. This would help to improve the health of marine ecosystems - not only coral reefs but also ecologically associated seagrass meadows and mangroves. It also provides climate change adaptation opportunities.

Incorporating resilience would also benefit the local communities whose livelihoods depend on marine ecosystems, either in tourism or the fishing industry.

This will require a new approach to marine resource management, both to ensure resilience principles are included and to provide the necessary capacity building for a range of stakeholders.



WHAT IS REEF CHECK MALAYSIA (RCM) DOING?

Community

RCM is working with communities in several locations to build capacity in coral reef management. We are training local teams to carry out conservation activities, and helping to raise awareness about the importance of marine resource management.

Management plans

Together with Department of Fisheries, RCM has drafted resilience-based management plans for several Marine Parks. Working with local stakeholders to conduct resilience surveys, the plans focus on managing local threats to ensure reefs are as healthy as possible to survive external impacts.

What will success look like?

If we are to succeed in strengthening marine resource management in Malaysia, the following steps could be considered:

Resilience principles embedded in Marine Park Management Plans.

This would encourage managers to focus on resilience principles, and incorporate them into improved management strategies

Develop programmes to reduce local impacts to marine ecosystems

This will ensure marine ecosystems are as healthy as possible to withstand or recover from the growing impacts of climate change

Build capacity of local stakeholders

Empower local communities to participate in management and ensure buy-in to efforts to build resilience of marine resources

REFERENCES: Reef Resilience Network (<https://reefresilience.org/>).