

## **Theme 1 - “Help raise awareness of how coral reefs and related ecosystems help to fight climate change”**

*The ICRI member’s report outlines the activities of ICRI members; their progress and contributions towards the ICRI Plan of Action 2016-18. The contributions detailed below are taken from written responses by Brazil; Japan; Indonesia; Malaysia; Maldives; Monaco; UK; and the USA. The member report also includes responses from the Central Caribbean Marine Institute; Coastal Oceans Research and Development in the Indian Ocean; Fondation pour la Protection de la Biodiversité Marine; Great Barrier Reef Foundation; International Society for Coral Reef Studies; Reef-world Foundation; Science and Conservation of Fish Aggregations; The Nature Conservancy; UNEP Caribbean Environment Program; and the UN Environment World Conservation Monitoring Centre (as of December 1<sup>st</sup>, 2017). For more information, you can check directly the member report.*

*To address theme one, ICRI members were asked to provide examples of how coral reefs and related ecosystems help to mitigate the effects of climate change; and how they are encouraging financing for coral reef restoration and protection. Contributions to theme one included the use of MPAs, monitoring and research, education schemes, written articles, and conservation projects. The importance of determining a socio-economic value of a reef when regarded as protection from climate change-related events was highlighted.*

- **Goal 1-1: highlight the contribution of coral reefs, mangroves and seagrasses to mitigate and adapt to climate change and its impacts**

### **Brazil**

#### Mangroves

A Brazilian Mangrove Atlas is being prepared to be launched soon and it will probably have example on this topic. ICRI will be informed about it. But until now research group still try to identify impacts of climate change on mangroves in Brazil, as reported by Schaeffer-Novelli et al., 2016 and Bernardino et al. 2016.

#### NDC

The NDC, recently implemented in Brazil, does not mention coral reefs/mangroves specifically. However, NDC uses the National Adaptation Plan for Climate Change (PNA) as an implementation tool, which recognizes the ecological, economic and social importance of these environments for Brazil. The NDC in Brazil is to be revised every 5 years from 2020 on, and it's fair to predict that the next Contribution will address coral reefs and mangroves specifically.

## Indonesia

A number of policies have been put in place to ensure good mangrove management by the Government of Indonesia and Ministry of Environment and Forestry, as follows:

### One map policy

Indonesia has officially implemented the one-map policy. The Geospatial Information Agency (BIG) has officially unveiled its basic geospatial information map (IGD) for use by government agencies, several thematic maps (IGT) that comprise of a national land-cover map, a national sea grass/shallow waterbed map, and a provincial mangrove map of Sumatra, Java and Bali-Nusra, as well as Indonesia's Coral Reef Status 2017 and Indonesia's Seagrass Status 2017.

This one map policy is important in order to make the government agencies work together instead of creating their own maps using their own distinct standards. Accurate and up-to-date geospatial information is essential in helping the government draft policies, resolve land disputes and manage its assets in the regions.

### Restoration of degraded mangrove forests and ecosystems

Mangrove maps showing the status of degradation are being generated to assist in national level planning for rehabilitation of degraded mangroves. Mangrove working groups have been established at the national, provincial and district levels to assist in the implementation of the rehabilitation strategy and a number of program have been developed by the MoEF.

### Designated the Marine Protected Areas

Designated 7 marine protected areas (MPA) under the authority of MOEF, namely Bunaken in North Sulawesi (89.065 ha), Taka Bone Rate in South Sulawesi (530.765 ha), Teluk Cenderawasih in Papua (1.453.500 ha), Kepulauan Seribu (Thousand Island) in Jakarta (107.489 ha), Wakatobi in Southeast Sulawesi (1.390.000 ha), Karimun Jawa in Central Java (111.625 ha) and Togean Island in Central Sulawesi (362.605 ha). Designated all these MPAs is based on Law No. 5 year 1990 Concerning Law of The Republic of Indonesia On Conservation Of The Living Natural Resources And Its Ecosystem.

The ASEAN Mangroves Network, which was established in 2012 with the support from the Japan International Agency. It encourages cooperation among ASEAN countries on the sustainable management of mangroves.

## Japan

Effectiveness of seaweed beds and mangroves are being assessed on climate-change

mitigation and adaptation, such as blue carbons and breakwater against waves, by Environment Research and Technology Development Fund of the Ministry of the Environment (S-14), Japan.

## **Malaysia**

The Ministry, through Department of Marine Park Malaysia has carried out resilience study of coral reefs within marine parks towards changes in their environment. Malaysia's preliminary finding is that there are reefs within marine park areas which demonstrates higher resilience to changes and was not affected during the recent bleaching events. These reefs are identified and zoned as preservation zones where human activities are limited. Importance of coral reefs was not specifically mentioned in Malaysia's INDCs submission to UNFCCC. However, protecting the country's coastline especially mangrove forest has been identified as one of the Adaptation Measures towards climate change. The country has embarked upon replanting degraded mangrove forest since 2007. This is an annual program ever since. Ministry of Natural Resources and Environment through Forestry Department Peninsular Malaysia is the focal point for the program. In 2016, a total coastal area of 106ha was restored with suitable mangrove species. As for conserving protecting Malaysia's coral reefs, emphasis has been given to better manage current MPAs as well as getting new MPAs. Efforts to restore Malaysia's reef areas has also started since 2011. The Ministry, through Department of Marine Park Malaysia has taken actions on monitoring of coral reef health and water quality surrounding coral reefs within marine parks. The department has also developed Coral Bleaching Response Plan for implementation in the event of mass coral bleaching due to impact of climate change e.g. increase in sea surface temperature. The response plan includes recommended actions such as limiting human activities on reefs affected during bleaching event. Conserving Malaysia's natural resources and pursuing green growth are also mentioned as a priority focus under 11th Malaysia Plan – 2016- 2020 (a five-year development plan) to further reduce Malaysia's carbon footprint.

## **The Republic of Maldives**

Over 120 islands in the Maldives have been developed as tourist resorts. Every island is self- contained with complete back-of-the-house services established on the island itself. Since the main tourism-product being sold on the resorts is the tropical setting in a pristine natural environment, some resorts do not have many hard structures that are used for shore-protection. However, some areas have hard structures (groynes, and seawall or revetments) to mitigate the effects of seasonal sand movement and erosion. Resorts cope and adapt to climate change with a combination of the soft and hard engineering solutions. The Maldives are planning to add in their NDC the importance of coral reefs/ mangroves.



## **United States of America (USA)**

Coral reefs reduce wave energy by an average of 97%, functioning as effectively as or better than artificial breakwaters, and self-sustaining as long as they remain healthy (Ferrario et al 2014). U.S. flood damages averted due to coral reefs are estimated at \$94 million annually with the U.S. ranking in the top 10 of countries to receive risk reduction benefits from reefs, but if just the top 1 meter of coral reefs were lost, the annual expected damages from flooding would more than double globally.<sup>1</sup>

## **Great Barrier Reef Foundation (GBRF), Australia**

The GBRF are exploring opportunities, in conjunction with TNC and the Rockefeller Foundation, for valuing the coastal protection role of the GBR with the view to potentially piloting innovative financing options such as insurance products like the one launched in Mexico earlier this year.

## **Reef-World Foundation**

Under a successful grant application to the National Fish and Wildlife Foundation (NFWF), The Reef-World Foundation are further supporting the implementation of the Green Fins initiative in the Philippines at sites that have been specifically highlighted as sites affected by climate change. The project titled, '*Managing a sustainable marine tourism industry in the Philippines using the Green Fins approach*' will be implemented between September 1, 2016 to August 30, 2018. Using state-of-art information on climate vulnerability that uses downscaled climate model projections in relation to the onset of annual severe bleaching is used to target actions that reduce stress on reefs caused by human activities. This project focuses on meeting this best-practice standard in the Philippines and will focus on building capacity of managers to support a sustainable marine tourism industry within Apo Reef, Marinduque, Ticao Island and Bantayan Island. State-of-art downscaled climate modelling indicates these locations are have the best chance of persisting as disturbance frequencies increase. Consequently, management actions in these locations have the greatest chance of being effective long-term. Marine tourism industries are currently rapidly expanding in these areas, which are all protected under the National Integrated Protected Area System (NIPAS) or are locally managed MPAs. Under this approach, building the capacity of resource managers specifically on how implementing best practice within marine tourism activities can help to build the resilience of coral reefs to wider scale threats such as raising

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<sup>1</sup> Ferrario, F., M. W. Beck, C. D. Storlazzi, F. Micheli, C. C. Shepard, and L. Airoidi (2014) "The Effectiveness of Coral Reefs for Coastal Hazard Risk Reduction and Adaptation." *Nature Communications*, 5:3794.



sea temperatures and subsequent bleaching events.

As part of the Green Fins initiative, all staff at businesses that are taking part as active members undergo an annual training session by training Green Fins Assessors who provide an in-depth training session at the business premises that provides information on the importance of healthy and functioning marine habitats (coral reefs, seagrasses and mangroves) that can help protect coastlines against the increase in severity and frequency of storm caused by climate change. This information helps to inspire and empower resources managers and those in a position to act and help protect and conserve these habitats whilst ensuring tourism related businesses are using them in a sustainable manner.

### **The Nature Conservancy**

To help improve decisions about coastal development in coral reef regions and to reduce risk to vulnerable communities and economies, the Conservancy has partnered with Swiss Re, one of the world's largest reinsurance companies. Leveraging the Conservancy's science on nature-based defences and Swiss Re's expertise in risk modelling, the project has found that a healthy coral reef can lessen the impact of storms and prevent erosion by 97%. These and other coastal ecosystems are the first line of defences for many cities around the world, from Miami to Manila. Along Mexico's Yucatan Peninsula, the Conservancy and partners in the hotel industry are collaborating to develop new insurance programs designed to sustain the protection benefits reefs provide in the face of hurricanes and tropical storms.

The Conservancy has partnered with SECORE International and California Academy of Sciences to help maintain corals' genetic diversity and maximize their ability to adapt to future conditions. Coral nurseries have been established off the coasts of several countries and in Florida and the US Virgin Islands, where TNC are growing corals that will be transplanted to depleted reefs across the region. The Conservancy has provided expertise and guidance to similar coral nursery projects in the Cayman Islands, Bahamas, British Virgin Islands, Dominican Republic, Grenada, Jamaica and Cuba.

Developed and launched the Corals & Climate Adaptation Planning: Adaptation Design Tool online course- developed for coral reef managers and practitioners as a collaborative project of the Climate Change Working Group of the interagency U.S. Coral Reef Task Force and The Nature Conservancy. It is based on the user guide, *Adaptation Design Tool: Corals & Climate Adaptation Planning*.

Continued maintenance of the Conservancy's online hub ([reefresilience.org](http://reefresilience.org)) of case studies, article summaries and webinars for coral reef managers to easily find resources based on the location, management challenges, and topics of interest. In 2016, 100,000 individuals visited the RR Toolkit and had access to more than 128 resilience science article summaries and 56 case studies and the Conservancy's webinars have received over



4,500 views.

TNC released the Atlas of Ocean Wealth, the planet's largest collection of spatial information tracking the natural resources provided by oceans. The database quantifies what the oceans provide to people, how much they provide and where those benefits accrue. Accessible to anyone, the online Atlas allows decision-makers to answer such questions as:

- How much money are coral reefs saving our city by reducing the force of incoming waves?
- Where are the most valuable reefs for supporting tourism?
- Which reefs produce the most fish for supporting local fisheries?

## **UNEP Caribbean Environment Program, Jamaica**

UNEP-CEP Collaboration for an Ecosystem-Based Management of coral reef ecosystems:

### CLME+ Collaboration

The project Caribbean and North Brazil Shelf Large Marine Ecosystems Project (CLME+) seeks to guide harmonized sectoral policies and also strengthen cooperation between regional fisheries bodies and environmental organisations. In the context of ensuring an ecosystem-based management of coral reefs, UNEP-CEP supports CLME+ long-term objective of "Healthy Reef, Continental Shelf and Pelagic Ecosystems" and its strategy to "Enhance the governance arrangements for ecosystem-based management of reefs and associated ecosystems (e.g. seagrass beds, mangroves, reef slopes and coastal lagoons)". UNEP-CEP was responsible for the implementation of the initial Pilot Project in 2010-2013, and has since continued to be engaged in the implementation of the CLME + Project and its sub-strategies for reef associated fisheries such as for Queen Conch and Spiny Lobster.

### Blue Finance

The Regional Activity Centre for the Protocol concerning Specially Protected Areas and Wildlife (SPAW-RAC) under the Caribbean Environment Programme has also been involved in the innovative ecosystem-based management Blue Finance project (2015-2017), in partnership with GRID-Arendal, the Blue Solutions project, the French Initiative for Coral Reefs (IFRECOR), the Organization of American States and interested SPAW Parties.

It provides guidance on the use of economic instruments to finance reef management based on the ecosystem services contributed by coral reefs by involving the private sector from the tourism industry in particular. By drawing on existing methodologies for Payment for Ecosystem Services and other non-public funding mechanisms that have been successfully applied in terrestrial settings, the BlueFinance project adapts them to address the needs of the coral reef environment and ecosystem service uses. It aims to achieve environmental,



social and financial returns through strengthened collaborations with the private sector on coral reef conservation.

Sustainable financing mechanisms for marine managed areas are under consideration for Barbados, Antigua and Barbuda, Martinique and St. Kitts and Nevis.

### Global Coral Reef Partnership

In 2014, UN Environment and its Regional Seas Conventions and Action Plans ('Regional Seas') initiated a Global Coral Reef Partnership to support countries deliver internationally agreed coral reef commitments through ecosystem-based management of coral reefs, as called for in the Global Strategic Directions for the Regional Seas 2013-2016. Participating organizations, partners and networks include ICRI, the Global Coral Reef Monitoring Network (GCRMN), the National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program, the Reef-World Foundation, Green Fins Initiatives, UNEP-World Conservation Monitoring Centre and GRID-Arendal. The partnership directly contributes to implementation of these internationally agreed coral reef commitments, including Sustainable Development Goal 14; Aichi Biodiversity Target 10, 11 and 15; SAMOA pathway paragraph 58(e); and the ICRI Continuing Call to Action and Framework for Action.

### Caribbean Marine Protected Area Management (CaMPAM)

In order to address the need of ecosystem-based management of coral reefs and enhance the connectivity between reefs for coral resilience, UN Environment - CEP / RAC-SPAW has coordinated since 1997 a network to provide leadership and for building capacity of marine protected areas in the Wider Caribbean Region (CaMPAM), and implemented its programmes in collaboration with a number of partners and donors, including the Gulf and Caribbean Fisheries Institute (GCFI) and NOAA. CaMPAM uses the annual GCFI scientific meeting and workshops as its fora to discuss emergent issues related to the management of Marine Protected Areas and provides a network of capacity building programmes to leaders and members. Some of the major activities implemented by CaMPAM include:

- The Training of Trainers for Marine Protected Areas Managers
- The CaMPAM Mentorship Program
- Providing small and medium funds including grants to Promote Sustainable Fishing Practices and Alternative Livelihoods for Fishers
- The Marine Protected Area Database

In 2010, with funding from the Italian Ministry of Foreign Affairs, UN Environment - CEP / RAC-SPAW implemented through CaMPAM the project "Regional support for the Caribbean Challenge initiative: Networking, consolidation and regional coordination of Marine Protected Areas management" to support contracting parties of the SPAW Protocol and Caribbean Challenge objectives. The Caribbean Challenge Initiative was launched in 2008

with the support of The Nature Conservancy with the aim to meet protect 20% of the marine coastal environment by 2020, in line with Aichi Target 11. The project aims to strengthen linkages with the Global Island Network and other Small Island Developing States efforts.

- **Goal 1-2: encourage financing for projects and initiatives which help protect and restore coral reefs, mangroves and seagrasses**

### **UNEP Caribbean Environment Program, Jamaica**

#### Coral Restoration Consortium (CRC)

A collaboration among scientists, managers, and practitioners including NOAA, the Nature Conservancy, the Coral Restoration Foundation, UN Environment – CEP / SPAW RAC and various universities emerged in 2017, in response to priority recommendations from the November 2016 “Workshop to Advance the Science and Practice of Caribbean Coral Restoration” in the form of the Coral Restoration Consortium (CRC), to which CEP serves as a Steering Committee member.

The goals of CRC are particularly in line with ICRI’s Call for Action Goal 1.2.

The CRC’s mission is to foster collaboration and technology transfer among participants, and to facilitate scientific and practical ingenuity to demonstrate that restoration can achieve meaningful results at scales relevant to reefs in their roles of protecting coastlines, supporting fisheries, and serving as economic engines for coastal communities.

To help increase the scale and efficiency of coral restoration, the CRC focuses on the following topical priorities for the next three to five years:

- Scaling-up in-water, land-based, and larval propagation
- Designing projects to demonstrate multi-species ecosystem functioning and coastal protection
- Coordinating and fostering genetics science into adaptive restoration
- Developing restoration monitoring guidelines and common-access data platforms

For each priority, a dedicated Working Group has been established to develop solutions-oriented action plans and to help establish best management practices.