

SYMPOSIUM INTERNATIONAL 2023

LIFE ADAPT'ISLAND

CLIMATE CHANGE AND COASTAL ECOSYSTEMS

PRESENTERS BIOGRAPHIES AND SUMMARY OF THEIR TOPIC



THE MEMBERS OF THE SCIENTIFIC COMMITTEE AND THEIR CONTRIBUTION



Dr. Donovan CAMPBELL - *University of the West Indies, Mona, Jamaica, Searcher* « Climate Change Adaptation and Disaster Resilience in Small Island Developing States ».

“ Socio-economic impact assessment and monitoring system ”

Strategies to foster local well-being and strengthen climate resilience in coastal systems are complex. Near-shore development, aquaculture intensification, the expansion of capture fisheries, and climate change (sea-level rise, acidification) are combining to produce situations of rapid coastal change. In the Caribbean, the fisheries have been in decline over recent decades, which poses ecological, social and food security challenges that are being exacerbated by climate change. To combat chronic overfishing, marine biodiversity loss, and improve social well-being in local fishing communities, some governments have established a network of Fish Sanctuaries (Special Fishery Conservation Areas), amongst other measures. This presentation presents emerging insights from two coastal case studies on the socio-ecological trade-offs, synergies, and co-benefits associated with Fish Sanctuaries and coastal communities. The research focuses on using inter and transdisciplinary research tools and techniques to capture the relationships between ecosystems, their physical functions, value, and the services they provide to human well-being. In each stretch of coast where we are working, there are also ongoing management initiatives, including co-management efforts linked to the emergence of marine conservation and protected areas, adaptation to sea-level rise, and efforts to manage interconnected uses of coastal space (such as tourism, fisheries, and conservation). The case studies demonstrate how multidisciplinary approaches can provide linked social-ecological insights to design and implement conservation and resource management interventions and processes, including resource rights allocations, zoning for protection and use, and flexible institutions. These approaches are particularly appropriate in rapidly changing coastal systems.

In 2019, the GPMG obtained LIFE funding to carry out the LIFE Adapt'island project, one of the objectives of which is to develop nature-based solutions to mitigate the effects of climate change on the territory.

On the occasion of the 4th year of this project, the Grand Port Maritime de la Guadeloupe and its partners are organizing an international symposium on July 4 and 5 on the theme: Climate Change and Coastal Ecosystems.

It will bring together international researchers and managers of natural areas and will highlight the contributions of the scientific committee on three fundamental ecosystems: mangroves, sea grass beds and coral reefs.

The expertise of the guest researchers, integrated into the Scientific Committee of the Life Adapt'Island project, makes it possible to choose the best scientific and technical protocols, indicators and monitoring methods for the smooth running of the project.



Dr. Norman Clive DUKE - James Cook University (JCU), Australia, **Senior Research Scientist** - **"Adaptation to mangroves and climate change, vegetation mapping, pollution and assessment of the state of coastal habitats"**.

"Caring about Mangroves Ecosystems is Caring about people"

There is a worldwide trend with people taking greater responsibility for mangrove ecosystems and caring more about the condition and well-being of these natural places.

People prosper from healthy mangroves. Mangroves provide immense benefits from their products and services. Products like wood for daily energy needs and construction.

Services like essential habitat for associated fishery harvests, removing carbon from the atmosphere, and protection of shorelines from the threats of increasingly severe storms, as well as rapidly rising sea levels. There is a problem however. These natural ecosystem benefits are finite and vulnerable in the face of ever-increasing human demands as populations become ever-larger and more harmful. Such changes are placing unsustainable pressures on the finite capacity of mangroves, and the natural shoreline resources they provide.

Mangroves and their dependent wildlife are intimately linked to climatic and biogeographic factors. As these factors shift and change, mangroves must relocate if they are to survive. Where the world has become warmer, mangroves are shifting into higher latitudes. Where rainfall levels increase or decrease, mangrove stands are correspondingly expanding or contracting locally. Where sea levels rise, mangroves are relocating progressively upland, newly occupying supratidal margins whilst retreating from sea edges. Where storms become ever-more severe, recovery of damaged mangroves unfortunately approaches a breaking point beyond which the integrity of habitat will be lost.

This talk raises awareness of such fundamental changes and the acute risks faced by mangrove ecosystems. The talk further identifies strategies to help preserve and protect these highly-valued natural environments. Community education and participation is pivotal to this goal, in partnership with specialist researchers and government agencies.

Knowledge disseminated by outreach partner programs must be accurate, science-based and trust-worthy. They must also have a longer-term view capable of covering landscape-scales. One program meeting these goals is MangroveWatch with its use of the shoreline video assessment method (Fig. 1).

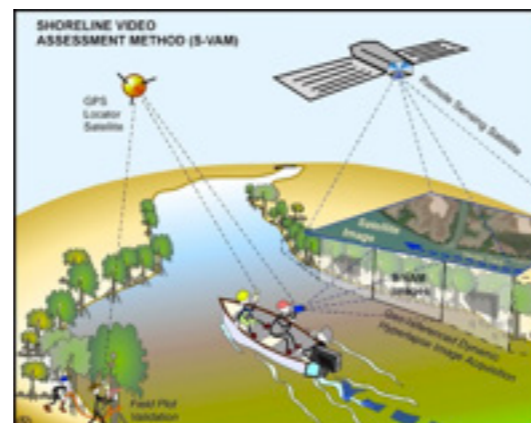


Figure 1. Innovative mangrove shoreline monitoring by researchers and community groups using the shoreline video assessment method in the MangroveWatch program (<http://mangrovetwatch.org.au/>).



Dr. Reia GUPPY - Centre for Maritime and Ocean Studies, The University of Trinidad and Tobago, Trinidad **Assistant Professor Biological and Ecological Research on Coral and Marine Coasts / Biodiversity and Conservation of Natural Resources**

"Trials and tribulations of transplantations- the plight of coral husbandry in the Caribbean"

Coral reefs are well established as valuable assets as far as ecosystems go. They are important sources of food, protectors of shorelines, providers of nursery habitats, destination spots for tourism and sports to name a few. Much of these however are directly related to the builders of the reefs: the corals. In the

Caribbean, our reefs are known as a biodiversity hotspot. Since the 1970s however, our reefs are also hotspots for coral disease. Over the last 50 years, diseases have resulted in major declines in key reef

building corals throughout the Caribbean. Coral resilience has been further impacted due to factors associated with climate change and anthropogenic influences. As such, efforts are being made to

artificially increase coral diversity and density, either through the use of clones (via fragmentation) or settlement of coral larvae. The success rate of coral transplantations however has been relatively low

compared to the effort. This talk provides an overview of the common strategies used within the Caribbean for coral transplantation, from both asexual and sexual mechanisms, as well as considerations leading to either success or failure of transplantation. Lastly, this talk will highlight efforts undergone in Guadeloupe under the Life Adapt'Island project.



Dr. Fanny KERNINON LEMAR - University of Western Brittany (UBO) Brest, France.

Post-doctoral student - Evaluation of the ecological state of tropical seagrass beds and French coastal waters.

“ The importance of seagrass beds in adapting to climate change: management and conservation challenges in a transitioning world ”

Seagrass beds are present in various parts of the world, yet the significance of this complex and productive coastal ecosystem has often been underestimated. Due to the myriad of services they provide, especially in mitigating climate change, they are progressively receiving more attention. This is also justified by the fact that seagrass beds are in decline worldwide as a result of multiple pressures. The Caribbean basin, in particular, is undergoing a population growth, increased human activity, and extreme weather events. For the past fifteen years it has also been dealing with the arrival of an invasive seagrass species and recurrent mass strandings of pelagic sargassum. These pressures represent severe threats to the integrity of this vulnerable ecosystem and the species directly linked to it. In fact, this region has recorded the most significant loss of seagrass bed areas worldwide.

This presentation will provide a comprehensive review of the significant role of seagrass beds play in a world under pressure, particularly in the context of climate change. The challenges of environmental monitoring with the aim to document the long-term evolution of these habitats and identify the primary causes of change will be addressed through the case study of Caribbean seagrass beds. There remains the opportunity to delay or reverse current declining trends by implementing conservation and preservation actions. Initiatives within the Adapt'island project, currently underway in Guadeloupe, will be presented. These Nature-based Solutions focus on the protection (through the installation of eco-moorings) and restoration (via seed cultivation and shoot transplantation experiments) of seagrass beds. The project to create an educational underwater trail will also be discussed.



Virginie DUVAT - Professor at La Rochelle University and researcher at LIENSs, Tropical environments Specialist

“ Assessing nature-based coastal defence projects : lessons learnt from Caribbean Islands ”

Due to the concentration of human assets in coastal areas and increasing climate-related pressures, Tropical Small Islands (TSI) are hot spots of coastal risks worldwide (Magnan et al., 2019). Over the past decade, TSI experienced increased flooding, coastal erosion, and soil and groundwater salinization (Mycoo et al., 2022). In TSI, there is still limited evidence about which adaptation measures are used and the extent to which they are effective to reduce risk (Nicholls, 2018; Magnan et al., 2019). Evaluating adaptation actions is therefore urgently needed to support the design of efficient and context-specific climate adaptation policies, and to improve the understanding of adaptation levers (Klöck and Nunn, 2019).

Assessing adaptation actions requires resolving a methodological challenge. As highlighted by Ruangpan and colleagues (2020) for Nature-based Solutions (NbS), most assessment frameworks are ex-ante and were designed to guide actors in implementation. Few ex-post assessment frameworks exist, except for the recent IUCN Standard for NbS (IUCN, 2020). However, because few applications of this Standard exist, its usefulness and usability to track NbS progress remains unknown.

This presentation will address two objectives. It firstly aims at proposing an operational methodological framework to assess coastal nature-based defence projects. This framework uses the existing IUCN Standard as an in-depth literature review as a starting point and was co-designed by scientists and practitioners involved in coastal nature-based defence projects in TSI. It considers eight areas to be covered when conducting an ex-post assessment of nature-based defence projects: (1) the local context, (2) governance arrangements, (3) funding, (4) social acceptability, (5) technical effectiveness, (6) studies, monitoring and evaluation, (7) co-benefits and disbenefits, and (8) the project's contribution to adaptation progress. This framework secondly aims at providing a first assessment of nature-based coastal defence in the Caribbean region, based on an application to 10 projects implemented in Guadeloupe and Martinique.

Les résultats de l'évaluation mettent en évidence :

- L'émergence récente (début des années 2000) de la défense côtière basée sur la nature dans les îles étudiées. La plupart des projets sont des projets pilotes à petite échelle. En raison de leur caractère récent, leur efficacité technique ne peut pas encore être évaluée.
- La diversité des SfN utilisées : les projets ciblent des écosystèmes marins ou terrestres, voire les deux ; certains projets visent à préserver des écosystèmes sains et les dynamiques physiques à l'origine de leur persistance, tandis que d'autres consistent à restaurer des écosystèmes, voire à recréer des écosystèmes disparus.
- Le rôle majeur des acteurs publics dans la conception et la mise en œuvre de ces projets et l'implication limitée du secteur privé à ce jour.

Findings

The results of the assessment highlight:

- The recent emergence (early 2000s) of nature-based coastal defence in study islands. Most projects are pilot small-scale projects. Because they are recent, their technical effectiveness cannot be assessed yet.
- The diversity of the NbS used: projects target either marine or terrestrial ecosystems or even both; some projects aim at preserving healthy ecosystems and the physical dynamics driving their persistence, whereas others consist in restoring ecosystems or even in recreating vanished ecosystems.

- The major role of public actors in the design and implementation of such projects and limited involvement of the private sector to date.

- The diversity of the funding sources used to promote NbS (local, national, European).

This study also emphasized some major levers and barriers to the success of NbS:

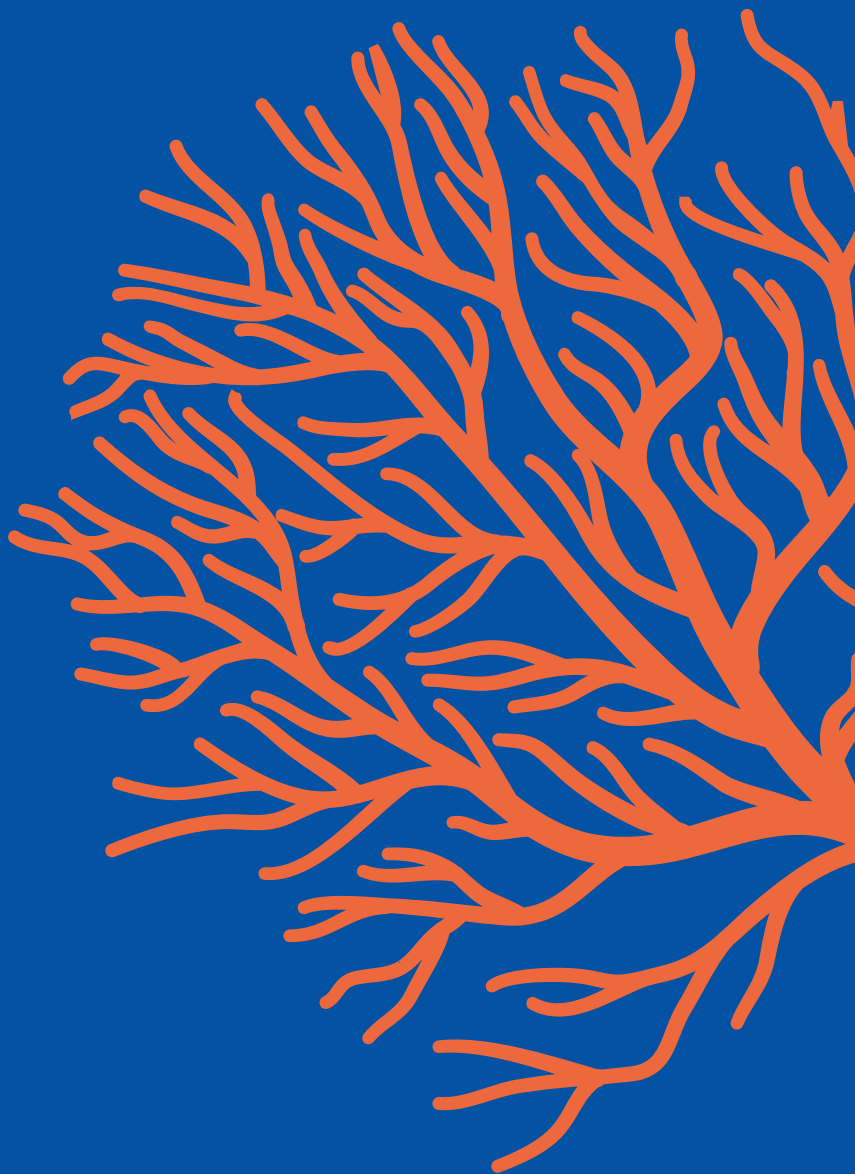
The key levers include:

- High social acceptability;
- Existence of local skills and experience on coastal vegetation restoration techniques;
- Transfer mechanisms of these techniques from one site/island/type of actor to another;
- Multiple co-benefits provided and limited disbenefits generated by NbS;
- Advantage of Guadeloupe compared to Martinique.

The major barriers include:

- Lack of local technical, human and financial capacities to adequately implement such projects, addressed through external collaboration (with experts located in mainland France and the Caribbean);
- The lack of upscaling of projects (reach the 'landscape scale'), which limits their potential impact on risk reduction;
- Absence of (i) a forward-looking vision and (ii) capacities to use climate and socioeconomic scenarios among stakeholders (including public authorities), and (iii) the absence of integration of NbS projects into a broader adaptation strategy.

Significance of the work for policy and practice
This work provides an operational and replicable methodology, which was co-designed and validated by concerned stakeholders. It highlights both the strengths of existing projects and the major barriers to NbS which should both be considered to promote more effectively NbS in the future.



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