

27. ECOSYSTEM BASED ADAPTATION

Drafted by the Secretariat of the Pacific Regional Environment Programme

A Social and Ecological Imperative for Ecosystem based Adaptation to Climate Change in Pacific Islands.

SUMMARY

Promote ecosystem based adaptation options so that they are properly addressed in climate change adaptation strategies, policies and implementation at all levels, from national to communities.

Encourage multi-partner and multi-sector approaches to climate change adaptation that are based on community-based adaptation that promotes local skills and knowledge of ecosystems into the adaptation strategy.

Engage in ridge to reef, island ecosystem based management approaches, recognizing the inter-linkages between terrestrial and coastal and marine biodiversity.

Promote the importance of the role healthy ecosystems can play in helping people adapt to climate change.

Balance climate change initiatives that have focused on the use of technologies and the design of climate resilient infrastructure with ecosystem based alternatives to ensure good decisions are made that consider economical, social and environmental factors.

Communicate key messages that healthy ecosystems, such as forests, wetlands, mangroves and coral reefs have a greater potential to adapt to climate change, and recover more easily from extreme weather events.

Encourage sustainable use of natural resources through promoting the value of ecosystem services and linking to livelihoods and national economies.

Strengthen local ownership of adaptation actions by engaging traditional ecological knowledge systems and local adaptation action to ensure long term adaptation action.

EbA reduces vulnerability to both climate and non-climate risks and provides multiple economic, social, environmental and cultural benefits, including, disaster risk reduction, livelihood sustenance and food security, biodiversity conservation, carbon sequestration and sustainable water management.

KEY ISSUES

Fundamental guiding principles for developing effective Ecosystem based Adaptation strategies¹ important to the Pacific Islands include:

Involving local communities

- EbA options are often based on activities that can be carried out by local people and based on their traditional knowledge systems. Large machinery or outside contractors are often not required as they are in infrastructure based adaptation.
- Community participation in both planning and implementation of EbA is important to its success as EbA measures often require long-term commitment (e.g. revegetation).
- Linking land owners and other stakeholders across multiple tenures and land use priorities to develop catchment wide approaches to ecosystem management.

Focusing on reducing non-climate stresses

- Deforestation, poor agricultural practice, removal of mangroves and socio-economic issues such as over-population, migration to urban centres and linked environmental issues like pollution and poor waste management are some of the direct human impacts that are weakening people's resilience to climate change.
- EbA approaches target non-climate stressors as well as direct climate change adaptation issues.

Multi-partner adaptation approach

- Climate change is a cross cutting issue and there is a need for a multi-partner and multi-sectoral approach to address the range of complex development factors contributing to people's vulnerability and capacity to adapt to climate change. Collaboration between indigenous land owners, governments, development agencies, natural resource managers and other stakeholders that closely link adaptation with livelihoods are critical for success.
- EbA presents a tangible opportunity to solve climate change problems with local communities by aligning conservation, development and poverty alleviation interests.
- In the Pacific islands region the close connectivity between terrestrial, coastal and marine ecosystems makes a ridge to reef approach to resource management and development an essential adaptation framework.

Building upon existing good practices in natural resource management

- EbA options can also include actions which are likely to reduce societal vulnerability to climate change - such as developing locally managed marine areas as an adaptation strategy.
- EbA strategies should follow established best practices in land, water and natural resource management to tackle some of the new challenges posed by climate change.

- EbA must focus on livelihoods and people's interaction with ecosystem services - economic argument for maintaining ecological services.
- Protection of riparian vegetation or mangrove stands is strengthening resilience to climate change. An EbA action could be to help governments and communities protect ecosystem services through better land and resource use decisions.
- Establishing and effectively managing protected ecosystems to ensure the continued delivery of ecosystem services that increase resilience to climate change.

EbA should be integrated with wider adaptation strategies

- EbA should be part of wider adaptation strategy and can be integrated with other risk management components, such as early warning systems and in some cases with physical infrastructural interventions.
- EbA options can often be cheaper than hard infrastructure options - i.e. mangrove rehabilitation and development setbacks vs sea walls.
- National Adaptation Programmes of Action (NAPAs) do consider EbA options in a number of Pacific Island countries, however, EbA action is determined by a number of other factors such as technical knowledge and coordination between relevant divisions of Government and other organisations.

Adopting sustainable and innovative adaptation approaches

- Ecosystem based approaches are often based on longer term adaptation strategies and therefore are often more uncertain. EbA approaches should be adaptive and facilitate learning for future adaptation action.
- The effectiveness of EbA actions should be monitored closely so that management actions can be adjusted.

Communication and Education

For EbA to be successful it must focus on knowledge transfer, capacity building, the integration of science with local knowledge and raising awareness about climate change impacts and the importance of managing ecosystems.

BACKGROUND

Climate change is predicted to have a range of impacts on Pacific island ecosystems and the services they provide for current and future development and it is increasingly recognised that a relevant response to these predicted impacts is the application of ecosystem-based adaptation (EbA) approaches^{2,3}. That is, the use of biodiversity and ecosystem services as part of an overall adaptation strategy to the adverse effects of climate change. By taking into account the ecosystem services on which people depend for their livelihoods and social and economic security, EbA integrates sustainable use of biodiversity and ecosystem services in a comprehensive adaptation strategy⁴ (CBD 2009).

There are a wide variety of interpretations of EbA, and evidence of success is scattered across various disciplines⁵. The most widely accepted definition from the Convention on Biological Diversity (CBD):

Ecosystem-based approaches to adaptation may include sustainable management as well as conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for governments and local communities.

(CBD 2nd Ad Hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change)

This definition places EbA at the intersection of climate change adaptation, development and conservation. The health of Pacific ecosystems and biodiversity is widely acknowledged to already be under significant threat as a result of habitat modification, over-exploitation of resources, invasive species and pollution, many of which are predicted to be further exacerbated by climate change^{6,7,8}. Also, there has been a general failure to implement effective environmental management policy in Pacific island countries^{9,10}.

A number of international organisations have begun to provide general guidance on EbA to help buffer communities from the worst impacts of climate change^{1,11} and the critical test for such guidance is whether it facilitates practical consideration of EbA across the full spectrum of adaptation contexts, including in the Pacific Islands. Advocates for adaptation approaches that target the specific vulnerabilities of the Pacific Islands have made significant contributions to global discussion of this issue in both policy and technical fora^{12,13}. This interest has translated into adaptation action in many Pacific Island countries and territories, which increasingly show inclusion of biodiversity and ecosystems in priority activities described under National Adaptation Programmes for Action¹⁴.

There are a number of characteristics that can make adaptation approaches that utilize the benefits of ecosystems a compelling and viable alternative to other adaptation approaches. In Pacific island countries, implementing EbA requires a number of pre-conditions: effective governance regimes, policy instruments and must be economically efficient¹⁵.

Two of the potential barriers to EbA in the context of the Pacific Islands are a) understanding the linkages of ecosystem values and services with climate change resilience and adaptation (i.e. technical feasibility/viability) and b) the compatibility of adaptation planning processes with EbA requirements.

There is clear evidence that consideration of ecosystems is embedded within Pacific Island adaptation planning, and that this has resulted from diverse approaches to the management of this issue¹⁶. This diversity can be explained both through a non-prescriptive approach to NAPA establishment, but also the wide range of jurisdictional imperatives that relate to the management of pressures on natural resources.

However, there is divergence between the conceptual rationale for EbA and its application in practice. Specifically, there is little evidence that the relative benefits provided by alternative coastal protection options (i.e. EbA and hard infrastructure) were directly compared in a given context, for example by applying the available impact models for both applications. As a result, either both hard and soft options are articulated as part of a long list of priorities, or the 'default' approach of hard infrastructure is given preference.

It is suggested therefore that there are two dominant approaches to the application of EbA¹⁶, based on the extent to which the alternative adaptation solutions to a specific form of societal vulnerability are explored:

- a) **Targeted EbA:** an adaptation choice based on the appraisal of different adaptation options and their relative capacity to reduce societal vulnerability to climate change – such as comparing a bioshield for storm surge protection with development setbacks and seawall construction.
- b) **General EbA:** an adaptation choice based on the expected delivery of a wide range of services from ecosystems, including those which are likely to reduce societal vulnerability to climate change – such as developing locally managed marine areas as an adaptation strategy. This typically focuses on management approaches that reduce non-climate stressors.

Under this classification, targeted actions will generally have more sophisticated data and analytical requirements, while more general approaches are more appropriate in context where there is interest in increasing resilience to future changes but where there is high uncertainty of the local climate future, limited analytical capacity and/or limited resources for design, implementation and/or maintenance.

In a Pacific Island context, the mix of *targeted* versus *general* EbA actions is related to 1) demand from decision-makers for information on the full range of EbA and non-EbA solutions (often influenced by awareness of options and jurisdictional interests), and 2) the level of access to reliable data on the relative merits of alternative options in consideration of the local climate context, typically limited by relevant expertise, early-stage planning tools and associated financial resources for analysis, design, implementation and maintenance. In the Pacific, where natural capital is a greater proportion of wealth, these issues present a serious barrier to fully realizing EbA as other forms of capital are required to effectively unlock this potential. Further, given the scale of donor investment in adaptation in the Pacific Islands, the main barrier to releasing this potential is not likely to be financial capital, but stable technical capacity within government departments to advise on EbA opportunities. Such capacity would likely create a broader uptake of targeted EbA efforts (including at the community level) and improve both the cost effectiveness and distribution of the adaptation investment portfolio across the region. An additional factor is the need for donor organisations to also ensure that funds for climate change adaptation are applied following appropriate assessments of all relevant adaptation options including EbA.

REFERENCES

1. Colls, A., Ash, N. & Ikkala, N. 2009. *Ecosystem based Adaptation: a natural response to climate change*. Gland, Switzerland: IUCN. 16pp.
2. Reid H, Swiderska K (2008) *Biodiversity, climate change and poverty: exploring the links*. IIED, London.
3. World Bank (2010) *Natural hazards, unnatural disasters: The economics of effective prevention*. The World Bank and the United Nations, Washington
4. CBD [Convention on Biological Diversity] (2009) *Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change*. Technical Series No. 41

5. Reid H (2011) *Improving the Evidence for Ecosystem-based Adaptation*. IIED, London.
6. Kingsford, RT, JEM Watson, CJ Lundquist, O Venter, L. Hughes, EL Johnston, J Atherton, M Gawel, DA Keith, BG Mackey, C. Morley, HP Possingham, B Raynor, HF Recher and KA Wilson (2009). Major Conservation Policy Issues for Biodiversity in Oceania. In *Conservation Biology*, Volume 23, No. 4, 834–840.
7. Bell J D, Reid C, Batty M J, Allison E H, Lehodey P, Rodwell L, Pickering T D, Gillet R, Johnson J E, Hobday A J and Demmke A (2011) Implications of climate change for contributions by fisheries and aquaculture to Pacific Island economies and communities. In: JD Bell, JE Johnson, and AJ Hobday (eds) *Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change*. Secretariat of the Pacific Community, Noumea, New Caledonia.
8. Polidoro, B., CT Elfes, JC Sanciangco, H. Pippard and KE Carpenter (2011). Conservation Status of Marine Biodiversity in Oceania: An Analysis of Marine Species on the IUCN Red List of Threatened Species. In *Journal of Marine Biology* Volume 2011 14 pages
9. Asian Development Bank (ADB) (2004). *Pacific Region Environmental Strategy 2005-2009 - Volume 1: Strategy Document*. Manila.
10. McIntyre, M. (2005). *Pacific Environment Outlook*. United Nations Environment Programme and the Secretariat of the Pacific Regional Environment Programme.
11. Andrade A, Córdoba, R, Dave R, Girot, P, Herrera-F B, Munroe R, Oglethorpe J, Paaby P, Pramova E, Watson E, Vergar W, Suarez I (2012) Principles and Guidelines for Integrating Ecosystem-based Approaches to Adaptation in Project and Policy Design. IUCN- CEM, CATIE. Turrialba, Costa Rica. 4p
12. Mimura, N., L. Nurse, et al. (2007). *Small Island States Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. V. D. Linden and C. E. Hanson. Cambridge, Cambridge University Press: 687-716.
13. UNEP-WCMC (2006). *In the front line: shoreline protection and other ecosystem services from mangroves and coral reefs*. Cambridge, UK, UNEP-WCMC.
14. Pramova E (2010) *Ecosystem based Adaptation In the National Adaptation Programmes of Action (NAPAs)*. Held at NCCARF 2010 Climate Adaptation Futures Conference, Gold Coast Australia, 29 June July 2010.
15. Grantham H S, McLeod E, Brooks A, Jupiter S D, Hardcastle J, Richardson A J, Poloczanska E S, Hills T, Mieszkowska N, Klein C J and Watson J E M (2011) Ecosystem-based adaptation in marine ecosystems of tropical Oceania in response to climate change, *Pacific Conservation Biology*, Vol. 17: 241–258. Surrey Beatty & Sons, Sydney.
16. Hills T, Carruthers T.J.B., Chape S and Donohoe P. A Social and Ecological Imperative for Ecosystem based Adaptation to Climate Change in Pacific Islands. (In Press)

KEY DOCUMENTS & HYPERLINKS

1. Pacific Island Biodiversity, Ecosystems and Climate Change Adaptation: Building on Nature's Resilience

http://www.sprep.org/attachments/Publications/000931_PIBioEcoCCAdaptation.pdf