

PACE-NET Key Stakeholder Conference

*Strengthening Pacific-European  
Collaboration in Research,  
Development and Innovation*

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#6

# Climate Change and Biodiversity (Ecosystems Management) in the Pacific



SPC  
Secretariat  
of the Pacific  
Community



## Key Messages

- No other places in the world shelter terrestrial and marine biodiversity as diverse and unique as the tropical Pacific islands, but this biodiversity has experienced and is still experiencing the world's strongest extinction processes due to anthropogenic impacts. These islands support more rare and endangered species per capita than anywhere else on earth. This urges for a voluntarist reinforcement of (i) researches dedicated to the study of men-nature relationships and of (ii) implementation of large sustainable protected areas for biodiversity conservation.
- In the context of global change, Pacific nations are too small to undertake relevant research to monitor and to follow at every scale the changes that experienced biodiversity. But effective strategies to cope with the consequences of global change for sustainable livelihood of human populations can only be achieved through collaborative and long term research on ecosystems. The scale of the region offer unique opportunities for comparative multi-scale and multi-sites approaches, multidisciplinary integration combining social and natural sciences, local stakeholders' involvement, and bottom up/community-driven priority setting.
- Ecosystem (or 'socio-ecosystem') should be favoured as research entry-gate, rather than biodiversity, in order to raise relevant questions from livelihood perspective rather than from the sole natural sciences categories.
- An overview of biodiversity policy frameworks at country/territory, regional (South Pacific) and international levels (including articulation and model transfers between levels of governance) is also needed.
- Context-specific knowledge and indicators on biodiversity, taking the diversity of situations and viewpoints into account would help policy makers in crafting adapted regulatory frameworks.





## Abstract

No other places in the world shelter terrestrial and marine biodiversity as diverse and unique as the tropical Pacific islands, but this biodiversity is experiencing the world's strongest extinction processes due to anthropogenic impacts.

In the context of global change, Pacific nations need effective strategies for sustainable livelihood of human populations that can only be achieved through collaborative and long-term research on ecosystems. The scale of the region offer unique opportunities for comparative multi-scale and multi-sites approaches, multidisciplinary integration combining social and natural sciences, local stakeholders' involvement, and bottom up/community-driven priority setting. An overview of biodiversity policy frameworks at country/territory, regional and international levels is also needed.

In terms of research, we need to fill the gaps of knowledge on marine and terrestrial biodiversity and services; to set up long-term observatories and data banks on biodiversity. In terms of development and innovation, it is suggested to implement large sustainable protected areas network for biodiversity conservation, a Pacific observatory on Invasive Alien species. We should also promote the prediction of biodiversity evolution based on downscaled climate models and conceptual models for restoration of biodiversity for sustainable uses and services.

It is also essential to support and reinforce existing technical and research human resources in Pacific countries, to reinforce partnerships with local communities and associations, NGOs, local governments and to strengthen collaborations with funding countries and agencies (regional, bilateral, multilateral) as well as with private firms.





## Significance of the Sector

### Biodiversity Issues

The notion of biodiversity, popularised by evolutionist E.O. Wilson in 1988 basically expresses the totality of genes, species, and ecosystems of a region; it thus can be used at any scale, from a single species level to an islet lagoon level to an eco-region level like the South Pacific. The number of life-forms on Earth is unknown, but there may be some 20–30 million species, of which only about 1.8 million are known to science (Mora et al. 2011). Biodiversity political success is linked to the rising awareness of a high speed species extinction and environmental degradation. This situation is synthesised by the notion of biodiversity hotspot, defined as a region with a significant reservoir of biodiversity (a high rate of endemism, and they house most of the undiscovered species; Joppa et al., 2011) that is under threat from humans (for the Pacific region: Eastern Melanesian Islands, New Caledonia, New Zealand, Polynesia-Micronesia; see Myers et al., 2000 and Kier et al., 2009 who stress the very high rate of endemism in island regions compared to mainland areas). This means that biodiversity, as a complex web of living organisms, incorporates, and interacts with social, political and economic systems. These interactions are currently tackled at policy level, for instance through the controversial notion of ecosystem services (controversial because indicators are not very robust and above all because the monetary conversion of all the services that ecosystems provide raises scientific/methodological doubts, let alone the trend toward the commoditization of nature it implies). These interactions, not only the natural science dimension of biodiversity, are taken into account by PACE-Net initiative.



### South Pacific Situation Summary

The Pacific region is rich of its diversity: as a “sea of islands” (Hau’ofa, 1993), it features a high unbalance between marine and terrestrial surfaces. The region stretches some 10 000 km from east to west and 5 000 km from north to south, with a combined exclusive economic zone (EEZ) of close to 30 million km<sup>2</sup>. In contrast, the total land area is just over 500 000 km<sup>2</sup>.

The Pacific is the world’s largest ocean, with about 30,000 islands with high ecosystems diversity ranging from island’s offshore marine realms, coral reefs, shoreline atolls, mangroves, coastal plains, lowland forest, mountain forests and wetlands. However, it faces a high demographic and urban growth (8.6 million in 2004, t. i. 1.9 million people over the last decade; SPC, 2003/04), complex issues as regards resource exploitation (mine, fisheries, agriculture) and many Pacific countries strongly rely on development aid. The region comprises 22 independent countries and non/semi independent territories, displaying a high diversity of political regimes and statutes as regards both democratization and sovereignty, let alone the cultural and linguistic extraordinary variety.

Pacific islands therefore constitute living laboratories as regards biological evolution and diversity (but these islands support more rare and endangered species per capita than anywhere else on earth; see for instance Steadman 2006), as well as in terms of nature/culture interactions. They are microcosms of our world, dramatically highlighting the interdependence of living species with land, freshwater, and marine environments.

Though there has been a long history of ecosystem modification and species extinction across the Pacific, this trend has accelerated with recent development pressures (urbanisation, mining, etc.). While climate change is at present at the forefront of regional concerns, ongoing issues of pollution and waste, deforestation and other negative land use changes, population growth, and marine resource depletion continue to threaten biodiversity, though the situation of Pacific countries and territories is diverse as regards environment and development issues.



### Rationale of Biodiversity Threat in the Pacific

Demographic pressure, economic development and urbanisation (concentrated on coastal areas) are the main human factors threatening regional biodiversity, either directly, by overexploiting/over-harvesting specific animals or plants, or indirectly by the grabbing, destruction or pollution of their natural habitat (see Crocombe, 2008): mining activities (especially open-pit mining like in Papua New Guinea, New Caledonia or Solomon Islands), mono-cropping plantations, overfishing, land clearing for agriculture or housing. In this respect, insularity can be seen as a constraint (a factor of vulnerability) and the feature explaining the originality of the Pacific, its very essence.

The threat can be phrased in terms of the direct loss of genetic, species and ecosystem diversity (aggravated by insularity: the highest rate of extinct species on the long run; Steadman 2006) and indirectly, as regards the impacts on ecosystem services: coastal protection from tsunami, water supply, direct resources for livelihood, etc. (see diagram below).

Small Pacific islands, especially when small and low, conceived as complete ecosystems, are vulnerable to the impacts of climate change

Ecological pressure and damages are also generated by invasive species (feral/domestic animals: rat, cat, pig, ants, deer..., non cultivated and cultivated plants: Pinus, Miconia, etc...).

### EU Priorities in the Field of Biodiversity

In March 2010, EU leaders recognised that the 2010 biodiversity target would not be met despite some major successes, such as establishing Natura 2000, the world's largest network of protected areas. They therefore endorsed the long-term vision and ambitious headline target proposed by the Commission in its Communication 'Options for an EU vision and target for biodiversity beyond 2010'.

The tenth Conference of the Parties (CoP10) to the Convention on Biological Diversity (CBD), held in Nagoya in 2010, led to the adoption of a global Strategic Plan for biodiversity 2011-2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their utilization (ABS Protocol), and a strategy to mobilize resources for global biodiversity.

=>2020 headline target

*Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.* The EU 2020 biodiversity target is underpinned by the recognition that, in addition to its intrinsic value, biodiversity and the services it provides have significant economic value that is seldom captured in markets. Because it escapes pricing and is not reflected in society's accounts, biodiversity often falls victim to competing claims on nature and its use.

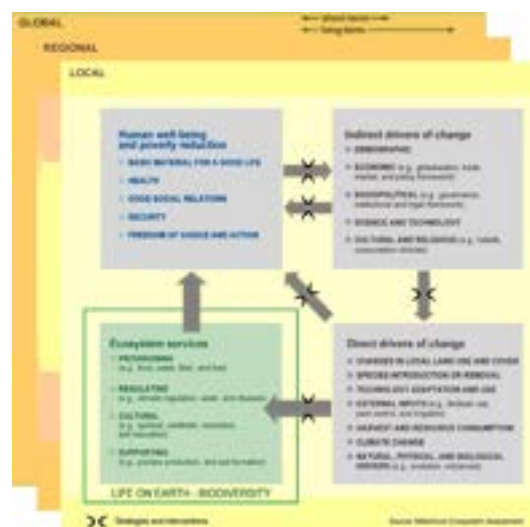
=>2050 vision

*By 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.*

The 2020 & 2050 strategies are aimed at reversing biodiversity loss and speeding up the EU's transition towards a resource efficient and green economy.

### Global objectives

- Conserving and restoring nature;
- Maintaining and enhancing Ecosystems and their services;
- Ensuring the sustainability of agriculture, forestry and fisheries;
- Combating invasive alien species (IAS);
- Addressing the global biodiversity crisis;
- Contributions from other environmental policies and initiatives.



Conceptual framework (Millennium ecosystem assessment)

## Regional and National Policy Frameworks

### National Biodiversity Strategies & Action Plans (NBSAP)

NBSAP development and implementation in the ACP Pacific countries is varied; from some countries still awaiting funding to begin their NBSAP development process, to others that are busy undertaking implementation activities.

### Regional Strategies

Secretariat of the Pacific Environment Programme (SPREP) Strategic plan/framework (biodiversity & ecosystem management section), 2011–2015

The Island Biodiversity Programme of Work (IB-PoW). This PoW outlines “a set of priority and supporting actions to implement the objectives of the Convention on Biological Diversity (CBD) in islands”. It recognizes that “all islands, and Small Island Developing States (SIDS) in particular, rely on biodiversity for sustainable development, have close links between culture and environment, have special concerns and particular vulnerabilities, have limited land area, have high levels of endemism and extensive coastal and marine biodiversity”.

Millennium Ecosystem assessment criteria which highlight urgent need for regional assessments at Pacific and infra-Pacific levels

## Proposed Adaptations and Supporting Policies

The EU has an opportunity to help address the shortage of science & technology capacity and infrastructure in the Pacific and enable it to better address the current and future threats to its biodiversity and ecosystems (habitat destruction, invasive species, urbanisation, climate change, overharvesting, cultural degradation, etc...),

- Development of human resources and capacity.
- Students' exchange programmes
- Development of cooperation with institutions in and outside of the region, in order to protect and improve its environment and to ensure sustainable development for present and future generations.
- Retain and enhance community-based biodiversity education activities
- Train local experts to collect traditional knowledge on biodiversity and uses
- Use aspects of traditional social organization consciously and systematically in order to overcome ecological and economic constraints

- typical of small islands. The already existing strategies could be developed further for improving sustainable uses of biodiversity, promote food security.
- **Promote biosecurity policies and invasive management at both local and regional scales**



Marine-protected area / Ouano region (New Caledonia)



## Research, Development and Innovation Areas Needing Action in the Pacific

The study of biodiversity in the Pacific has been disciplinary and regionally segmented and it lacks integration so far.

Research in the field of ecosystems/biodiversity should favour comparative multi-scale and multi-sites approaches, multidisciplinary integration combining social and natural sciences, local stakeholders' involvement, and bottom up/community driven priority setting. Therefore, ecosystem (or 'socio-ecosystem') should be favoured as research entry-gate, rather than biodiversity, in order to raise relevant questions from livelihood perspective rather than solely from natural sciences categories.

Such an approach would help to encompass 'ordinary' and 'exceptional' biodiversity in the same framework and to tackle issues that are relevant at once from the research, policy and local communities viewpoints. The current tendency to focus on 'exceptional' biodiversity (hotspot, endemism, endangered species) forgets that the livelihood of most of the people relies on 'ordinary' biodiversity (so-called 'cold spots'; see Kareiva and Marvier, 2003). This is why research design should involve local actors and institutions (civil society and local governments) and take account of societal needs and knowledge.

In the Pacific islanders' environmental conceptions, marine and terrestrial domains are conceived as a continuum. Thus, it is urgent to develop a comprehensive approach bridging the academic and policy divide as biodiversity goes across both domains. Such a comprehensive approach could apply to various ecosystem types: reef, coastal, freshwater, forest, agricultural...

The four themes highlighted in this section delineate overall orientations for research and do not imply that nothing has been done in these domains. What is needed is a deepening of the investigations on biodiversity that would address the strong disparities of situations and knowledge between regions, countries, domains, etc. These four lines need progress and integration.

### A- KNOWLEDGE OF ECOSYSTEMS

Documenting local, scientific and other knowledge of ecosystems (and management) in the Pacific

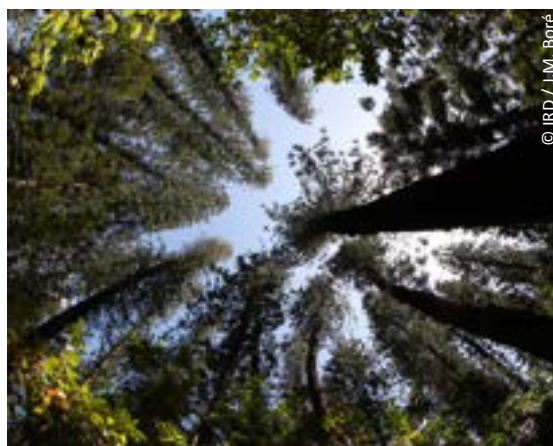
must be done on the basis of a sound prioritisation. Island Pacific offers a great scope for teams with S&T expertise across all the necessary disciplines. There is a strong need for the documentation of indigenous environmental knowledge and collaborative work between communities and external researchers. The objective is to develop a deeper understanding and evaluation of local forms of knowledge, practices and management as regards natural resources. The sound analysis of local knowledge on biodiversity will help design relevant legal frames for protecting them and regulate access to associated natural resources.

### B- BENEFITS FROM ECOSYSTEMS (GOODS and SERVICES)

Which ecosystem goods and services are at risk? Answering this question implies jointly taking into account the issues of traditional knowledge protection and benefit sharing. This includes sustainable resource use. A key issue is how to measure changes in ecosystems and the benefits of alternative management regimes

### C- ECOSYSTEM MANAGEMENT

How do social institutions manage resource access and use, and ensure effective land use planning and management. The key issue for local communities is how to adapt longstanding resource tenure systems (both land and marine), so they can be maintained under new, and often destructive external pressure (resource extraction projects and population increase).



Natural forest on Île des Pins (New Caledonia)

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#### D- DRIVERS OF ENVIRONMENTAL CHANGE

The drivers of environmental change must be identified, emphasising commonalities across PICTs as well as country-specific features. One needs to

go beyond the sole drivers' identification: there is a need to assess their changing impacts and propose recommendations and proposals about these changes.



### Investments Required in Research, Development Innovation

#### Research

- Research to fill the gaps of knowledge on marine and terrestrial biodiversity and services
- Set up long term observatories and data banks on biodiversity, marine and terrestrial ecosystems

#### Development and innovation

- Pacific observatory on Invasive Alien species
- Implementation of large sustainable protected areas network for biodiversity conservation
- Predicting biodiversity evolution based on downscaled climate models
- Promote conceptual model for restoration of biodiversity modified by human activities and CC for sustainable uses and services



Mount Humboldt (New Caledonia)



### Investment Strategies for Bridging the Research, Development and Innovation Needs of the Sector

- Support and reinforce existing technical and research human resources in Pacific countries. Support funding opportunities like ERANET-Netbiome research programme to strengthen the linkages between research institutions from Pacific independent countries, non- or semi-independent territories, Australia, New Zealand, and European universities and research institutions.
- Reinforce partnerships with local communities and associations, NGOs, local governments: by granting programmes like BEST (Voluntary scheme for Biodiversity and Ecosystem Services in Territories of the EU Outermost Regions and Overseas Countries and Territories)
- Strengthened collaborations with funding countries and agencies (regional, bilateral, multilateral) as well as with private firms.



### Expected Impacts of Investments

The following major outcomes have been identified:

- increasing scientific knowledge
- promoting social learning between actors involved in the field of biodiversity (which means recognizing all actors' agency)
- providing policy-makers and environment practitioners with management tools based on



- a sound knowledge of the social and ecological dimensions of biodiversity
- assessing the effects of climate change on biodiversity and impacts on ecosystems services
- assisting development and policy decision-making at local and regional scales on the basis of context-specific indicators and knowledge
- developing in-country capacities for analysing biodiversity-related issues
- protecting and valuing natural substances (local knowledge protection, innovation promotion and technology transfer)
- increasing pacific S&T capacity and infrastructure in key areas.

## Risks

The Incapacity to sustain a long-term effort in research and monitoring is a major risk to achieve the various goals and research outcomes that have been previously described.

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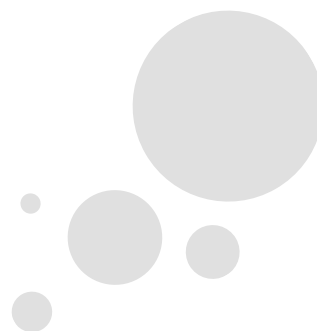
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## Imprint

The INCO-Net project PACE-NET, an EU Seventh Framework Programme (FP7)-funded initiative, was set up with the main goal of strengthening bi-regional Science and Technology cooperation between Europe and the Pacific (grant agreement 244514). The project specifically aims to provide a dialogue platform for enabling key stakeholders to present ideas and initiatives to the European Commission (EC), EU member states as well as international funding representatives on how this cooperation can be further strengthened.

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