

PECC International Project 2011-2012

Seminar 1: Oceans at Risk - Protection from the ocean to the coast, sharing marine resources

Summary of discussions and recommendations from PECC seminar, Noumea, New Caledonia, November 22-24, 2011

The Pacific Economic Cooperation Council (PECC) commenced its two-year international project by holding the first of a series of three seminars on the protection of marine resources in Nouméa, New Caledonia, on November 22-24, 2011.¹ The seminar brought together academics, scientists, policy-makers, and business executives to discuss and examine the consequences of climate change on oceans; exploitative versus responsible usage of marine resources including food, energy, and goods; treatment of solid and liquid waste in coastal areas; and ways to achieve sustainable biodiversity in and around the oceans. Best practices, empirical studies, and innovative approaches were put forward and discussed at the seminar.

The seminar addressed three main issues:

- What are the consequences of climate change on the economic development of the Pacific Rim region? Perceived and real impacts;
- Protection of the marine environment for sustainable economic development; and
- Mitigating urban and industrial impact on the quality of marine resources and protecting the ocean from pollutions.

Discussions and recommendations presented during the two-day seminar are summarized as follows:

1. Recognize the vulnerabilities exposed by man-made and natural climate changes

At present, as much as 40% of world population lives within 100km from coastlines. Those living closer to the coastline will find themselves in situations more vulnerable to climatic changes and rising sea levels than others. In addition, with the continued trend of urbanization along the coastlines coupled with our growing dependence on resources from the sea, it is evident that there are significant social, political and economic challenges that need to be tackled. In the Pacific Island Countries and Territories (PICTs), for example, increasing populations will put great strains on livelihoods and food security, not to mention habitat degradation occurring due to destructive fishing practices and land-based sources of

¹ The second seminar is scheduled to take place in Hawaii during March 26-28, 2012. For more information on the project, please refer to: www.pecc.org/research/marine-resources

pollution. Weak governance including subsidies, policies lagging behind science and technology, lack of sustained research and inadequate data pose as main challenges to the situation.² Far too often, such challenges are not made obvious from the local levels and by same token, high-level initiatives or policies are often criticized for not fully taking into consideration the local communities' sovereignty or indigenous lifestyle. The European Union works in partnership with local governments and communities within the framework of the EU Global Climate Change Alliance initiative. Approximately 130 Euros have been allocated as a joint initiative for the six-year period of 2008-2013 to address a wide range of climate change impacts.³

Climate changes such as rising sea levels, rising water temperature, and ocean acidification have had significant impact on the fish stock and the local economies of the Pacific islands. And while effective adaptation needs to be based on sound understanding of such vulnerabilities, climate change is not the only challenge faced by vulnerable populations; other social, human factors and conditions should not be overlooked. For example, the black pearl industry in the French Polynesia has also been suffering from climate changes and steep losses in productivity since the pearl prices peaked in the mid 1990s.⁴ Many of these PICTs need to increase local access to tuna, and develop small-pond aquaculture, put in place integrated coastal zone management, set limits to the harvest of coastal fish stocks, in order to secure adequate food and income in the future.⁵

Although climate change ultimately poses a grave risk to coastal resources, there are many other drivers that threaten the sustainable use of these valuable assets in the shorter term. For Pacific Island countries and other coastal areas, the main driver is population growth, with its attendant problems of degradation of coastal habitats and overfishing of coastal stocks. Integrated coastal zone management, limits to the harvest of coastal fish stocks, increased access to tuna, and development of pond aquaculture for tilapia are needed to provide food security. Adaptations are required that address the pressures from other drivers in the short term, and build resilience to climate change in the long term.

RECOMMENDATIONS

- Effective adaptation of economies and communities to climate change needs to be based on a sound understanding of their vulnerability. This understanding can only

² From "The Role of Regional and Multilateral Regulators in the Management of Shared Fish Stocks," Andrew Wright, Executive Secretary, Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).

³ From "The European Union Action on Climate Change in the Pacific," Abdoul Aziz M'Baye, Head of Delegation of the European Union to the Pacific.

⁴ From "The Tahitian Black Pearl Industry and Climate Change; Impacts and prospects of adaptation," Bran Quinquis, PhD Candidate, University of French Polynesia.

⁵ From "Implications of Climate Change for Contributions by Fisheries and Aquaculture to Economies and Communities in the Tropical Pacific," Johann Bell, Principal Fisheries Scientist, Secretariat of the Pacific Community.

come from: 1) improved models of the responses of the ocean, and the natural living resources it supports, to global warming and increased carbon dioxide emissions; 2) long-term monitoring to inform and validate these models; and 3) comprehensive vulnerability assessments. To ensure that the billions of dollars committed to assist developing economies adapt to climate change are used effectively, adequate funds are also needed for the necessary modelling, monitoring and vulnerability assessments. Because developing economies do not have the capacities to do this work themselves, it must be done on their behalf by advance scientific institutions and international/ regional organizations.

- Meeting the climate change challenges mentioned above requires mitigation and adaptation efforts at an unprecedented level by all communities at all scales. Developing the commitment to do what is necessary will require information and understanding. Developing necessary information flows from community to policy makers and expert advisors and back is a central requirement. Community priorities need to be understood in order to determine what technical information is required, and communities need to understand the outcomes of climate science which are relevant to these priorities.
- PECC should alert the senior policy-makers at high political levels, in particular those of APEC, of the short and medium challenges arising from the various man-made and natural climate change with the aim of securing increased political support leading to increased funding for: 1) predictive modelling so that scenarios can be discussed with improved confidence that they represent plausible outcomes; and 2) improved mitigation and adaptation initiatives for vulnerable populations in exposed environments such as the Pacific Islands region.
- PECC should contribute to worldwide efforts to manage climate changes by reinforcing the message that global warming is an imminent threat to the international security and well-being.⁶

2. Strengthen the solidarity for collective action and regional cooperation

Economies and communities with Pacific coastlines are all connected through the ocean waters and through shared marine ecosystems. Ocean acidification and rising sea levels are shared concerns. Rapid deteriorations in the marine and coastal environment can be mitigated only through collective action and by including multiple stakeholders. Scientists and researchers at the seminar voiced that PECC should try to remain inclusive and involve as many sectors and communities as possible. They also emphasized that more solidarity among the Pacific economies would be needed to achieve regionally autonomous models of cooperation.

⁶ Michel Rocard, Chair of France Pacific Territories committee for PECC and former prime minister of France.

RECOMMENDATIONS

- On topics relating to the protection of marine resources in the Pacific, PECC should involve participation of local communities and notably the Pacific Islands Forum (PIF) which is a full member of PECC; their involvement would help to ensure compatibility with local development goals and sovereignty.
- As a hybrid network with access to high-level policy-making process, PECC could further provide input to regional and global decision-making processes and fora on matters relating to climate change and management of marine resources (e.g. APEC, MDGs, Rio+20). As the only non-governmental official observer of APEC, PECC must strive to better connect to the APEC process on issues relating to maritime and fishery affairs. The best added value of PECC is its wide network and potential to reach out even further.
- Strengthen the regional cooperation and promote capacity building while respecting local sovereignty and culture. From an operational point of view, the challenge is to translate the results of scientific research into relevant and efficient management practices. We must find ways to facilitate sharing of best practices across industries and across borders, and strengthen communications between the relevant industries to the policy-makers.
- With the general aim of achieving a better understanding of marine ecosystems in the Pacific Rim, we should enhance our regional network of marine observatories. This would entail sharing coordination, linking and unlinking the existing marine alliances, and monitoring health indicators.

3. Knowledge-sharing and innovation

Global warming is real and international efforts still fall far short of what is needed to mitigate the adverse effects of climate changes on our ecosystem. Greenhouse gas emissions are rising rapidly and not enough commitments have been made to reduce the emissions level with aims to curb the global temperature from rising two degrees, or even as high as four degree by the end of the century. The ocean acidification is becoming more evident and this may have devastating impacts on the marine ecosystem while the global demand for food from fisheries and their prices continue to rise.

International efforts to manage the challenges mentioned above should include the Pacific Islands and their local communities. A knowledge-action methodology developed by the Association of Pacific Rim Universities World Initiative – Climate Mitigation and Adaptation (CMAS) research program is an effort to centrally tackle the multifaceted challenges by facilitating the two-way information flows from community to policy makers and expert advisors. The initiative consists of an international collaboration of researchers working

together around an integrated model that combines both the social and technical dimension dynamics of a community in interaction with a water system.⁷

NET-BIOME is funded by the European Commission to support a biodiversity research initiative of local authorities of the Outermost Regions of France, Portugal, Spain, and Overseas Territories of the UK and the Netherlands. The project aims to coordinate research activities specific to the tropical and subtropical regions and territories which have direct effects on the local economies consisting of agriculture, fisheries, tourism, biotechnologies, etc.⁸

PACE-Net is another example of international cooperation and capacity-building effort financed by the European Union. It is scheduled to last three years starting May 2013 and aims to strengthen dialogue between the EU and the Pacific islands while providing platform for knowledge-sharing of science and technology in respect to the priorities of the Pacific region.⁹

RECOMMENDATIONS

- Enhance public education and involve the local communities. The first step to transferring diagnosis into action is education. Public education and campaigns will help to raise awareness on the sustainable and responsible use of marine resources among local communities. It was also noted that equipping women with knowledge and thereby empowering them would be an effective and necessary approach.
- Research-funding is needed on a long-term basis. Scientists and academics should also look for ways to facilitate information-sharing to encourage joint research projects, and widen the access to information regarding the available funds. Participants at the seminar stressed that in order for studies to be more reliable and useful, it was important that research funding and investments on data-gathering be secured on a long-term basis.
- With the general aim of achieving a better understanding of marine ecosystems in the Pacific Rim, regional network of marine observatories should be enhanced. It was proposed that an international network of actors involved in management of pacific marine resources be established to collectively commit to: sharing of data collection tools, methodologies and know-how for comprehensive monitoring and management of marine ecosystems. For example, different stakeholders could share

⁷ From “Confronting climate change in the Pacific: Knowledge-action approaches and the APRU World Institute CMAS Program,” Jim Falk, Climate Mitigation and Adaptation Research Director, APRU World Initiative.

⁸ From “NET-BIOME: NETworking Tropical and Subtropical Biodiversity Research in the Outermost Regions and Territories of Europe in Support of Sustainable Development,” Josiane Irissin-Mangata, Research Project Officer, Regional Council of Reunion Island and Coordinator for NET-BIOME project.

⁹ From “Regional Networks in the Pacific – PACENET,” Claude Payri and Fadhila Le Meur, IRD (Institute of Research for Development), France

naval means used for data acquisition, establish linkage between existing marine environment observatories such as the French Grand Observatoire du Pacifique Sud (GOPS), the Australian Integrated Marine Observation System (IMOS), and the Global Ocean Observing System. There could also be a better harmonization of marine environment health indicators.¹⁰

4. Development of new local economic models

Most economic activities are concentrated in cities and most cities are located in coastal areas. The World Bank states that by 2025, 6 billion people, or 75% of the world population will live within 60km from coast. It is imperative that cities find new models to break the link between income generation on the one hand and consumption of natural resources and emission of environmental pollution on the other.¹¹ New economic models will succeed where there is cost reduction from becoming more eco-friendly and where the economic models are local models, blending local resources with local uses.

We have to change the existing natural resource and space-hungry growth into a thriftier form of growth. This implies a three-pronged approach to our economy: de-carbonating it, de-materializing it, and dehydrating it. Several options could be implemented for public local services such as water, waste management or energy:

- Instituting performance-based remuneration partially disconnected from volumes sold. In this economic system, there is no point in selling more cubic meters of water or kWh if an operator wants to boost its revenues; rather, the aim is to meet the objectives set by the client;
- Shifting from a volume-based economy to one based on “non-volumes” that remunerates natural resources saved (such as energy performance contracts which remunerate “*negawatts*”);
- Changing raw materials and energy sources, rather than the method of remuneration. Renewable energy is inexhaustible, so when we use it to produce electricity, we leave problems of scarcity and its constraints behind. Using recycled waste or recycled wastewater separates volumes sold from volumes drawn from earth and sea.

It is also crucial that we enhance business-to-business connections – e.g. industrial by-products should be put to better usage with optimized recycling technologies and innovation. One example is the nickel slag which can provide solution to economies needing

¹⁰ Remarks from Jean-Yves Perrot, CEO, IFREMER.

¹¹ From “New Economic Models to Preserve Natural Resources and to Limit Pollutants Discharged into the Oceans,” Nicolas Renard, Veolia Environnement.

to diversify sources of materials for building or sea embankment constructions. Logistics, cost, environmental and political concerns pose as various considerations but there is considerable potential for nickel slag to turn into commercial by-product in the near future with the development of environmentally-friendly and cost-effective recycling methods.¹²

New Caledonia produces 3 to 5 tons of fish waste per day which are simply buried in controlled landfills. There is potentially significant gain to be reaped by innovating ways to treat and turn the daily fish waste produced by the local fishing companies into rich liquid fish fertilizer for agriculture and aquaculture as well as mining re-vegetation, and pet food.¹³ Another potentially valuable source of income for the local communities of the PICTs and other developing economies in the Pacific Rim is in aquaculture: in addition to freshwater fish such as tilapia, pearls, seaweed, microalgae, shrimps, and marine ornamentals are also possible commodities.

In particular, microalgae, which use solar energy to convert CO₂ and nutrients into carbohydrates and other molecules, can play a major role in the future for aquaculture as useful animal feed.¹⁴ Microalgae biotechnology research became commercialized with large-scale culture started in the early 1960s in Japan with the cultivation of *Chlorella*. It has diversified and grown significantly in volume since then. Microalgae can play a major role in meeting the future demands for terrestrial and aquatic animal feed as aquaculture continues to grow in many part of the world. Currently, more than 40 species of microalgae are used for the purpose depending on the specific requirements of local seafood production. Other potential applications and products from microalgae are biofuel, biological sequestration of CO₂, wastewater treatment, food additive and human health, cosmetics, etc.

Continuous innovation and creative thinking to optimize the available resources will allow us to generate economic wealth while preserving the nature and its resources; moreover, for them to become mutually reinforcing.

RECOMMENDATIONS

- For operators: Institute performance-based remuneration partially disconnected from volume of water, energy, or waste services sold.

¹² From "An Example of an Efficient Management of Industrial Waste for Coastal Preservation in the PIC: Use of nickel slag," Pierre Kolb (A2EP), Dominique Chu Van (Société Le Nickel), and Michel Allenbach (University of New Caledonia).

¹³ From "Fish Waste Valorisation in New Caledonia: A sustainable development approach towards the management of industrial waste," Manuel Ducrocq (ZoNéCo, ADECAL, New Caledonia).

¹⁴ From "Potential for Microalgae R&D in New Caledonia," Jean-Paul Cadoret (IFREMER, Nantes, France), Liet Chim (IFREMER, New Caledonia), Adrien Rivaton (ADECAL, New Caledonia), and Fabrice Colin (ADECAL, New Caledonia).

- Switch from limited and exhaustible fossil energies and raw materials to renewable and inexhaustible resources.
- Reap additional commercial benefit by treating wastes from fishery, mining, and other forms of conventional industrial activities and transforming them into reusable products.
- Innovate new economic activities such as microalgae culture to meet the growing demands for animal feed or aquaculture.

5. Establish new forms of governance and better manage the maritime areas

A crucial challenge is to translate the results of scientific research into relevant and efficient management practices. We must find ways to facilitate sharing of best practices across industries and across borders, while strengthening communications between the relevant industries and policy-makers. Such forms of governance for conservation and management should be integrated, based on ecosystem, and based on scientific research; they should include addressing land and offshore sources of pollution and debris, use of spatial planning and continued establishment of marine protected areas (MPAs).¹⁵

a) Management of conflicting interests

Areas near water are often subject to conflict of interests over usage and exploitation. The key is to attain a stable balance between biodiversity conservation and socio-economic benefits from the use of ecosystem products and services (e.g. exploitation of biological resources, tourism, industrial development, and shipping).¹⁶ An integrated coastal management approach at the local level and regional cooperation through multilateral agreements must take place side by side.

Marine protection areas must be reinforced in certain areas; effective marine education and implementation of coastal management are key factors that must improve as seen through Chinese Taipei's Turtle Island Marine Spatial Planning example.¹⁷

However, government efforts to establish and manage marine protected areas through regulations are often challenging. In the case of Japan, the costs of conservation are shared by the local fishers' group and the government licensing scheme to secure the rights-based management of fishing allowing fishers' group to reap benefits from the conservation

¹⁵ From "Food Security and Vulnerable Populations: Perspectives on fish and the sustainable use of marine resources," Gillian Bowser (Office of Marine Conservation, US Department of State).

¹⁶ Jean-Yves Perrot, CEO, IFREMER

¹⁷ From "Critical Indicators on Marine Spatial Planning and Community Renaissance around Turtle Island, Chinese Taipei," Ching-Ta Chuang, Professor and Director, Institute of Marine Affairs and Resource Management, National Taiwan Ocean University.

activities in the future.¹⁸ Challenges lie ahead as the Japanese fishing industry becomes weaker and the Japanese economy continues to stagnate.

b) Food security

According to the 2010 statistics from Food and Agriculture Organization (FAO) of the United Nations, 925 million people are estimated to be undernourished. Micronutrient deficiencies affect about two billion people. According to the same FAO report, global food production must double in order to feed a world population of 9.2 billion in 2050. In this light, sustainable fisheries are critical to global food security.¹⁹ Food insecurity, which may exacerbate given the increasing climate uncertainties, can become a significant debilitating factor for global peace if not addressed in a timely fashion. At the sustainable development summit of Rio in 2012, the US Government will be underscoring the importance of promoting sustainable fisheries, small-scale aquaculture and education of women as key strategies towards global food security. Specific actions include control over illegal fishing, addressing marine pollution, promotion of global data collection, development of sustainable aquaculture and fisheries, as well as continued establishment of marine protected areas.

In the Pacific Islands and Territories, where the level of demand for fish far exceeds harvests available from coastal fishes, tuna is needed to fill the gap. Due to several climate change factors impacting the Pacific, tuna are seen to be migrating eastward. The islands on the Western Pacific are expected to experience declines in tuna abundance while the overall demand for food to be met largely by fish is expected to increase. Hence, we need to improve the redistribution of tuna for the populations in the Pacific while ensuring that there is responsible fishing practice based on constant monitoring of the stock of fish in different areas of the Pacific. Meeting the demand through tuna will be the primary option while other options such as aquaculture and freshwater fishing or farming are to be pursued.

c) Clean water

Proper treatment of water after industrial use to be put back into the sea is an extremely important element of environmental protection. Wastewater treatment operator such as Caledonienne Des Eaux applies BioReactor Membrane (BRM) technology which is a process that combines biological treatment and clarification using membranes with microscopic pore size to create a physical barrier against almost all kinds of suspended solids, bacteria, and some virus.²⁰

¹⁸ From "Coastal Conservation Practices (Satoumi) and Marine Protected Areas in Japan: Institutional approach," Nobuyuki Yagi, Associate Professor, University of Tokyo.

¹⁹ From "Food Security and Vulnerable Populations: Perspectives on fish and the sustainable use of marine resources," Gillian Bowser (Office of Marine Conservation, US Department of State).

²⁰ From "The Development of Environmental Services to Mitigate Urban and Industrial Impact on the Quality of Marine Resources," Fabrice Polizzi, Caledonienne Des Eaux (CDE), New Caledonia.

Public opinions on the pros and cons over desalination remain divided and controversial. However, tremendous technological advancement has been made in the field of desalination over the recent years. There remain two key concerns with desalination: high cost of energy required for the process and the discharge of brine and chemicals into the environment. Brine discharge is a fluid waste from a desalination plant containing a high concentration of salt and other minerals. It can potentially kill certain marine organisms, disrupt the natural reproduction, and have other types of undesirable effects on the survival of marine species at various stages of life. Such concerns require a long-term monitoring and would necessitate the implementation of a thorough environmental management plan.²¹

RECOMMENDATIONS

- On marine protection areas (MPAs): There are fundamental benefits from MPAs on the aspects of conservation of marine patrimony and the sustainable development of their economic resources. Marine protection areas must be reinforced in certain areas; effective marine education and implementation of coastal management are key factors that must improve. It is recommended that an international network of actors involved in MPAs be set up to define, implement, manage, and help to define payment of economic services from the resources and territories around the Pacific Ocean. Such network could facilitate sharing practical experiences in the various types of MPAs (coastal and open seas) that the Pacific region can offer in order to harmonize the tools and methodologies regarding the implementation of MPAs.
- On fishery and food security: Work to dispel an “illusion of abundance” which poses as a barrier to establishing good and responsible fishing practices among the local communities. Reef fishes, in particular, are becoming increasingly endangered with the degradation of coral reefs and overfishing.²² They are obviously easier to catch compared to tuna or other deep-sea species and the primary step towards mitigating the impact of overexploitation would be enhancing awareness through public education and putting in place sound local governance supported by reliable monitoring system. It was also recommended that education and training particularly for women be included in global efforts to achieve sustainable fishing practices.
- On desalination: The effects of salinity, temperature and total alkalinity fluctuations, as a consequence of the brine discharge of the desalination plant, should be clarified. Modelling the plume of the brine discharge will be desirable in order to illustrate the diffusion area. Long-term monitoring is recommended. The implementation of a plan

²¹ From “Desalination: Chemical Impact on Oceans,” Henri Boyé, French Ministry of Sustainable Development (MEDDTL).

²² From “Management of Reef Fish Spawning Aggregations,” Henri Boyé, MEDDTL, in collaboration with Yvonne Sadovy (University of Hong Kong) and Eric Clua (Secretariat of the Pacific Community).

of environmental management of effluents is needed for the best prevention of impacts, and their minimization to an acceptable level. A preliminary analysis of the existing situation and of the sensitivity of the ecosystem downstream of the effluents is required for large-scale projects. For projects with potentially significant impacts, the implementation of an environmental management plan is necessary.