



Asia Pacific Co-operation for the Sustainable Use  
of Renewable Resources in Biosphere Reserves  
and Similarly Managed Areas

# The Fourth ASPACO

Olmué and Juan Fernández, Chile  
6 to 12 November 2003

Interregional Meeting and Training Seminar  
for Chilean Biosphere Reserve Managers

Conservation and Development  
in Pacific Coastal Biosphere  
Reserves and Similar Areas  
and Protection of Its Fragile  
Ecosystems

Organized by:  
UNESCO MAB, Paris and  
Gobierno de Chile, CONAF

Supported by  
UNESCO Offices in  
Montevideo and Jakarta

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# Conservation and development in Pacific coastal biosphere reserves and similarly managed areas and protection of its fragile ecosystems

by Dr. Miguel Clüsener-Godt  
Division of Ecological Sciences  
UNESCO - MAB

Review of ASPACO co-operation project:  
Meeting objectives and expected results.

## Brief Project Description

### Primary function of the ASPACO Project:

- Assist Member States in implementing the recommendations of the *World Conference on Science*
- Identify national strategies for biodiversity protection in biosphere reserves and similarly managed areas with special emphasis on coastal areas, small islands and mangroves
- South-South technology transfer and intensive training for the management of renewable natural resources in selected case studies throughout specific developing countries.

The project aims to act in co-operation with the International Society for Mangrove Ecosystems (ISME) and the United Nations University (UNU) and to put into action the recommendations of the aspects on science education which stipulate that:

*“Governments should provide increased support to regional and international programmes of higher education and to networking of graduate and postgraduate institutions, with special emphasis on North-South and South-South Co-operation, since they are important means of helping all countries, especially the smaller or least developed among them, to strengthen their scientific and technological resource base.”*

The project shall give emphasis to the role of biosphere reserves as catalysts for both conservation and development. The complementary roles of UNESCO, ISME and UNU being strongly involved in scientific issues of nature preservation and sustainable use of natural resources is eminent for the action in the following programme areas:

- a) Integrated management and sustainable development of coastal areas, including economic zones, preservation of natural and cultural heritage via ‘Ethical Tourism’,

- b) Mangrove forest environmental protection,
- c) Sustainable use and conservation of renewable natural resources under national jurisdiction,
- d) Strengthening international, including regional, co-operation and co-ordination.

## Background

Ecosystems of coastal areas, small islands and mangroves in particular have an important economic value for local population living from both terrestrial and marine resources. More than 60 % of the world’s population is living within 60 kilometres of the coast and more than two thirds of the cities with over 2.5 million inhabitants are situated in these areas. Due to population growth and persistent migration of people living inside the country towards large urban centres, the number of people living in coastal zones is constantly growing. Moreover, coastal zones and islands are under permanent pressure for the needs of tourism.

This situation leads to constant degradation of natural resources in coastal zones and islands linked with social conflicts and environmental degradation. Furthermore, the loss of traditional land use and fishery practices leads to over fishing, erosion and loss of coastal land.

## Scope of the Project and Expected Results

This project, through the above-listed activities, aims to improve the living conditions of local populations by harmonising the relationship of nature conservation with the needs for development of the use of natural renewable resources.



Mangroves in the Delta of the Amazon

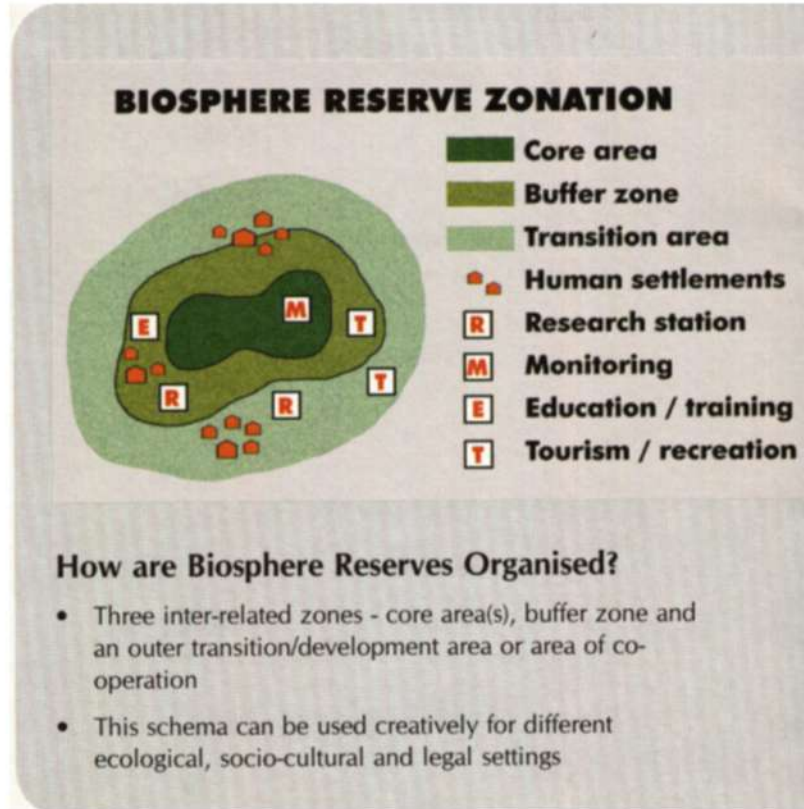
## UNESCO/MAB's Action in Biosphere Reserves and Similarly Managed Areas

For the last twenty years UNESCO has executed projects in coastal zones and small islands. For example, in Fiji, Papua New Guinea, Mauritius, Cuba, Madagascar, Comoros, and Zanzibar.

Furthermore, many projects have been implemented in coastal biosphere reserves, such as Mata Atlântica (Brazil), Mananara-Nord (Madagascar), Rio Plátano (Honduras), Galapagos (Ecuador), and Omo (Nigeria).

## Managing a Biosphere Reserve

- Mananara-Nord Biosphere Reserve in Madagascar
- Project on Integrated Conservation and Development
- Monitoring of Conservation of Forests through Remote Sensing



## The World Network of Biosphere Reserves

- Formally recognised by 188 Member States of UNESCO
- Presently 440 biosphere reserves in 97 countries
- Tool for conservation of biodiversity and sustainable use of biological resources (thus contributing to the Convention on Biological Diversity)
- Individual biosphere reserves remain under the sovereign jurisdiction of the States where they are situated



UNESCO organised in co-operation with UNU and ISME the International Workshop on “Asia-Pacific Co-operation on Research for Conservation of Mangroves”, 26 – 30 March 2000, Okinawa, Japan. This workshop laid the basis for the ASPACO project.

## Capacity-Building

The project aims at:

- increasing local capabilities for research,
- training and management of sustainable use of renewable resources,
- conservation of mangrove ecosystems and environmental awareness-raising among local populations,
- establish an exchange of information, research results and scientists,
- disseminate knowledge of comparative research through publications or/and network databases, mainly in collaboration with ISME, which operates a network of around 700 scientists on mangroves and coastal areas all around the world.

## Training

Environmental education in the context of wise use of coastal natural resources. Exchange of experience in buffer-zone development of biosphere reserves and training of biosphere reserve managers of senior and junior management level.

## Publications

Publications be produced in developing countries guaranteeing thus the capacity-building aspect of the project in editing and publishing results. Websites established at UNESCO, ISME and other partners.

## Networks

Existing networks, such as REDBIOS, IberoMAB, EABRN or the Southeast Asian Biosphere Reserve Network. Participation guarantees the strong involvement of both the governmental authorities and the local stake holders. The creation of a Pacific Island Network is envisaged.

## Implementation of the Project

1. International support and collaboration
2. Regional and national activities of the project
3. Interregional co-ordination of the project at UNESCO-Headquarters

## ASPACO

### Main Activities of ASPACO:

- 1<sup>st</sup> Steering Committee Meeting, Bali, Indonesia, 19-21 February 2001.
- Pacific Small Islands States Meeting, Apia, Samoa, 7-10 November 2001.
- 6<sup>th</sup> National Symposium in Marine Science, Siliman University, Philippines, 19-21 October 2001.
- 10<sup>th</sup> Ecotone Workshop, Hanoi, Vietnam, 19-23 November 2001.
- Project: Local Participation in the Management of the Siberut Biosphere Reserve, Indonesia.
- Support to Training Course on Coastal Biodiversity in Mangrove Ecosystems, Annamalai University, India, February-March 2001-2003.
- Project: Shankou Mangrove Nature Reserve Eco-Tourism Technology Training and Eco-tourism Development, Shankou, China, 2001-2003.
- Project: Shankou Mangrove Nature Reserve Public Education and Community Participation, Shankou, China, 2001-2003.
- 2<sup>nd</sup> Steering Committee Meeting, Okinawa, Japan, October 2002.
- Support to Third UNU–ORI Joint International Workshop on Marine Environment Coastal Ecology, Nutrient Cycles and Pollution, Otsuchi, Japan, 21-26 October, 2001.
- Support to publication of the proceedings of the “International Mangrove Symposium 2001”, Tokyo, Japan.
- Project on “Protection and Sustainable Management of the Mount Kuwol Nature Park and its Adjacent Areas in DPR Korea”.
- Support to the project on “Tumen River Area Transboundary Biosphere Reserve (TRATBR) for Conservation and Sustainable Development: Preparation for the Establishment and Functioning”. The Tumen area includes Rajin-Sonbong Economic and Trade Zone in the DPR Korea, Eastern Mongolia, Yanbian Korean Autonomous Prefecture in Jilin Province of China, and Primorsky Territory in the Russian Far East region.









UNITED NATIONS  
UNIVERSITY

by **Dr. Zafar Adeel**  
United Nations University -  
International Network on Water,  
Environment and Health  
(UNU-INWEH)

# UNU's Role in Coastal Ecosystem Management

Perspectives from the Asia-Pacific Region

## Overview

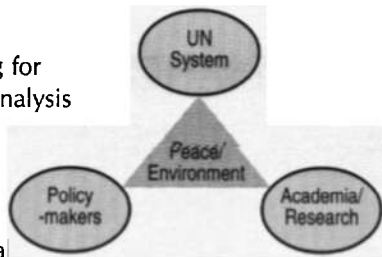
- Introduction to UNU
- UNU's focus on Coastal Management
- Project activities
- Summary of findings
- Key accomplishments

## UNU-INWEH's Thematic Emphasis

- Dryland Water Management
- Integrated Coastal Zone Management
- Groundwater and Water Quality Management
- Training and Distance Education in Water
- Centers of Excellence

## UNU's Role in the UN System

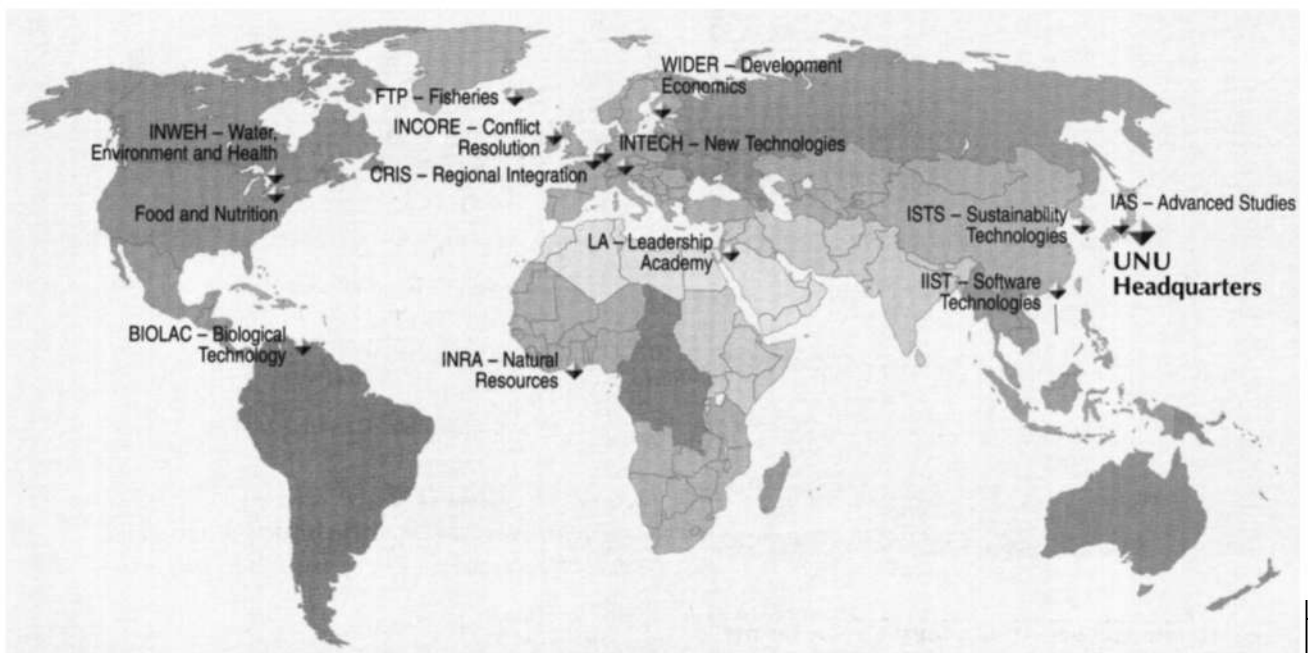
- Created: 1972
- Capacity building for monitoring and analysis
- Integration
  - Regional
  - Thematic and methodological - across disciplines
- Public awareness
- Policy recommendation



## Focus on Coastal Management

- Coastal zones contain unique ecosystems and resources
- Adjacent coastlines posed shared threats, challenges and opportunities
- Coastal resources are vital to local communities
- Increasing conflicts over competing uses
  - Tourism
  - Industrial activities
  - Shipping
  - Urbanization

## UNU's Institutional Network







## Challenges in Asia Pacific Coastal Zones

### Land-based pollution

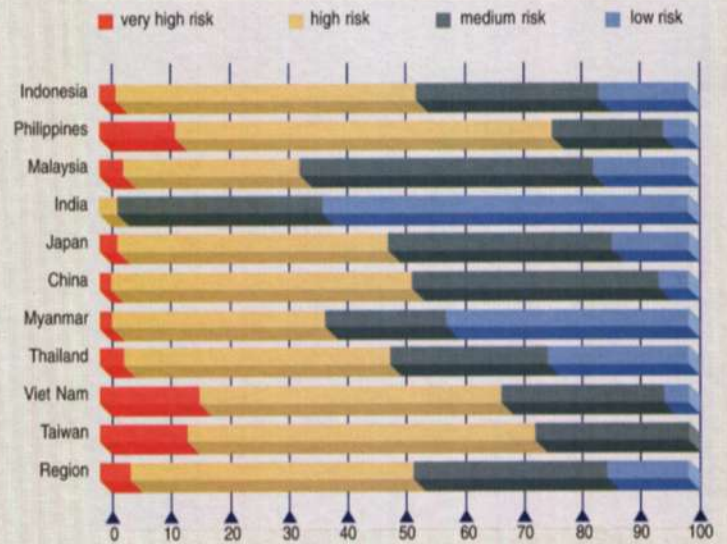
- Agriculture
- Industries
- Domestic wastes
- Sewage discharges

### Degradation of mangrove ecosystems

- Shrimp farming (aquaculture)
- Urbanization, alternative land use and pollution
- Excessive logging and charcoal/firewood production

### Destruction of coral reefs

- Coral mining
- Fishing (including dynamite fishing)
- Coastal development and tourism
- Global climate change



Source: WRI, October 2000, Reefs at Risk in Southeast Asia

Levels of threats to coral reefs in various Asia Pacific countries

## UNU's Activities

Environmental Monitoring and Governance in the East Asian Coastal Hydrosphere

- Building International Partnership
- Monitoring the Environment
- Striving for Sustainable Mangroves



## UNU's Partner:



## Project Activities – Monitoring Programme

- Pre-designed sampling programme
- Conducted annually
- Two sampling rounds
- QA/QC and data archiving by UNU

Key partner: SHIMADZU Kyoto, Japan

## Project Activities – Capacity Building

- Equipment for chemical analysis – GC/MS
- Hands-on training for young professionals

## Project Activities - Researcher Network

- UNU-ORI Joint International Workshops on Marine Environment
  - Focus: Asia and Pacific
- Supported by:
  - Iwate Prefectural Government
  - UNESCO
  - Japan Society for Promotion of Science
- Web-based dissemination of research results

## Project Activities – Conservation of Mangroves

- UNU-UNESCO-ISME Workshop Asia Pacific Cooperation for Research on Mangroves, Okinawa, Japan, 26-30 March, 2000
  - Mangroves Action Plan
  - Book Publication
- Cooperation with Asia Pacific Cooperation on Biosphere reserves and similarly managed Areas (ASPACO)
- UNU-UNESCO International Training Course on Biodiversity in Mangroves, Annamalai University, India

## Project Activities – Policy-Relevant Synthesis

- Policy synthesis reports
- Targeted publications

## Project Activities – Information Dissemination

- Conferences, symposia and workshops
- LandBase website: Landbase.hq.unu.edu
- Quarterly electronic newsletter: East Asia Monitor

## Project Activities – Upcoming Events

### 2004

- International Training Workshop on Conservation of Coastal Ecosystems, Otsuchi, Japan, 11-15 February 2004
- Mangroves Training Course, Annamalai University, India, April 2004
- UNU International Symposium "POPs and Urban Areas" Beijing, China, 14-15 May 2004

### 2005

- UNU International Symposium, Bangkok, Thailand, April 2005
- International Conference on Persistent Organic Pollutants (POPs), Tokyo, Japan, September 2005

## Project Findings - 1

- Governments to play a key role
  - Improved environmental governance: Government as a facilitator rather than provider
  - Management and dissemination of information
  - Smoother coordination of sectoral planning related to coastal management

- Development of regional policy frameworks
  - Regional challenges (pollution transport, stress on fisheries, etc.)
  - Regional opportunities (regional institutions, frameworks)
- Focus on community-based coastal development
  - Creation of increased opportunities for the rural poor
  - Raising local living standards through education, training and human resources development
- Awareness raising
  - Recognition of Ecosystem-livelihood connection
  - Information about threats from destructive fishing practices and alternatives
  - Importance of communities in sustainable coastal resources management
  - Information about law enforcement for protection of coastal resources

## Project Findings - 2

- Human institutional capacity development
  - Focus on coastal managers
  - Development of researcher networks
  - Improved South-South collaboration
- Need for consistent, long-term monitoring and assessment
  - Systematic collection of ecosystem health and threats data
  - Synthesize data into policy-relevant information
- Mapping of threats and prioritizing action
  - Focus on identifying vulnerable populations
  - Prioritizing financial resource allocation

## Key Project Accomplishments

- Sustained focus on coastal management and pollution monitoring
- Successful capacity development
- Development of an international network of experts
- Brought policy focus on pollution and Endocrine Disrupting Chemicals (EDC) issues
- Model for:
  - UN - private sector partnerships
  - Multi-agency UN collaboration

by Ms Kumiko Tsukamoto  
United Nations University

# Ecotourism in the Context of Coastal Management

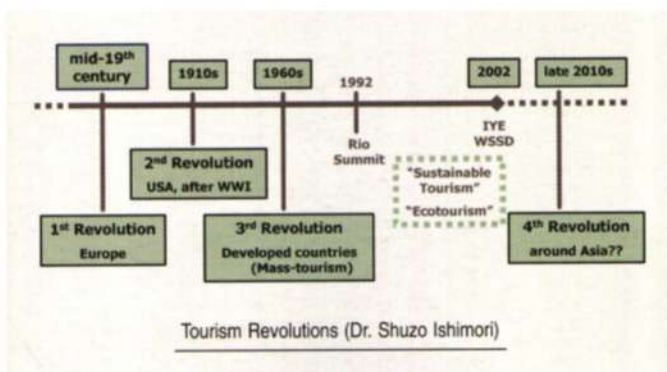
## Ecotourism & the ASPACO

- The third ASPACO meeting - October 2002, Okinawa

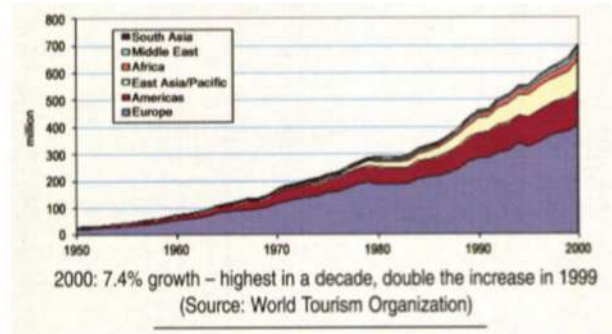


- Ecotourism session
  - Academics
  - UN organizations- UNU, UN ESCAP
  - Ecotourism consultants
  - Conservationists
- In other sessions issues related to ecotourism were also discussed

## History and Impact of Tourism - An Overview -



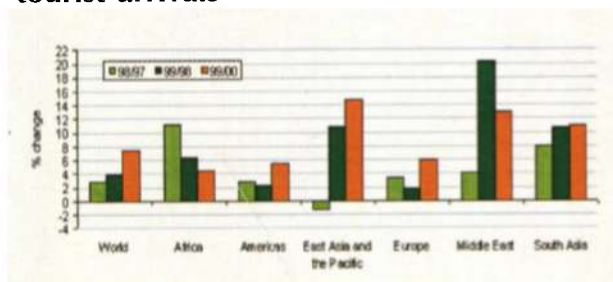
## International Tourist Arrivals 1950-2000



## Worldwide export earnings 1999 (WTO)

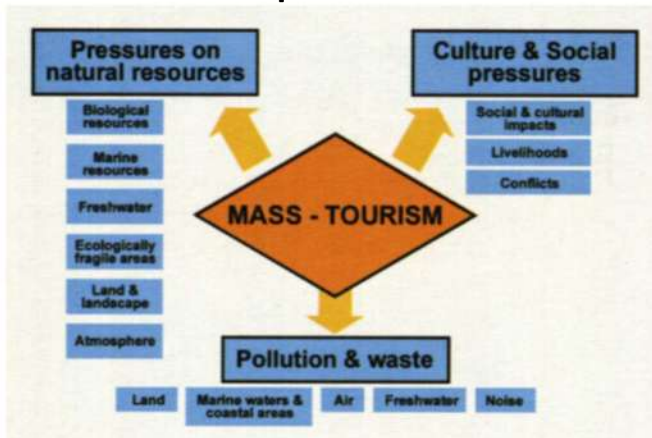


## Regional growth trends: international tourist arrivals





## Environmental impact

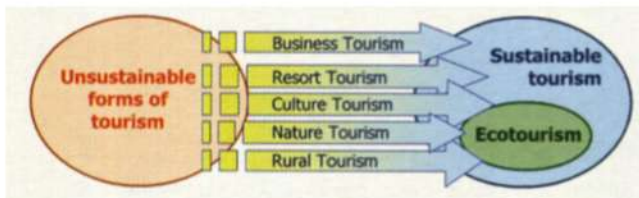


## Ecotourism

### Definition problem:

“Responsible travel to natural areas that conserves the environment and sustains the well-being of local people” (TIES)

### Ecotourism as a Sustainable Development Concept



### Basic elements (UNEP)

- contributes to conservation of biodiversity
- sustains the well-being of local people
- includes an interpretation / learning experience
- involves responsible action on the part of tourists and tourism industry
- delivered primarily to small groups by small-scale businesses
- with lowest possible consumption of nonrenewable resources
- stresses local participation, ownership and business opportunities, particularly for rural people

### Ecotourism as a market segment



### Case study 1 - Galapagos Islands -

- World Heritage site, Biosphere Reserve
- Benefits from (eco-)tourism
  - Increased income both to the Galapagos Islands and to the locals
  - More employment opportunities to the locals
  - More emphasis on conservation
- Challenges
  - Increased immigrants
  - Introduction of foreign species
  - High leakage – a large portion of profits goes to the owners of boats etc.



### Case study 2 - Monteverde, Costa Rica

- Largest private non-profit reserve in the world
- Protects 12,000 hectares of primary cloud forests
- Benefits
  - Increased income
  - Better infrastructure
  - More employment opportunity
  - Commitment to conservation- start of recycling, a conservationist ethic
- Challenges
  - Urbanization
  - Lack of the government policies
  - Pressure to increase profits as the funds come from outside the community etc.



## Ecotourism

- Ecotourism- recognized as a valid conservation & development tool
- Though not without problems
  - High leakage of profits, urbanization, degradation of the environment, lack of governmental policies etc.
- Lack of guidelines
  - Ambiguity between adventure tourism and ecotourism
- Tourism fastest growing in Asia & the Pacific
  - Need more attention to sustainable tourism in the region

## What can we do in the context of coastal management?

- Database development- ecotourism in biosphere reserves
- Objectives
  - To understand the current situation of ecotourism in BRs
  - To develop the database in relation to the current situation of ecotourism in BRs
  - To disseminate information
  - To develop a network for those involved
  - To contribute to capacity development regarding ecotourism activities

## Database development

### Key activities

- Preparation period
  - List up target BRs
  - Questionnaire development to be distributed to the target BRs
    - To obtain initial information on ecotourism
    - To seek potential target BRs for case studies
    - To develop the index of the database
    - To initiate personal communication
- ASPACO II
  - Field research at the selected BRs
  - Database development
  - Dissemination
  - Network development

## Points for Follow-up – 1

### Key items to be included in UNU initiative:

- Identification of indicators/indices for:
  - Local ownership
  - Flow of benefits – wellbeing of local communities
  - Biodiversity conservation
  - Capacity development
  - Scale of operation
  - Consumption of nonrenewable services (water, etc.)
  - Presence/implementation of guidelines for tourists
  - Generation of waste and pollution
- Linkage with and inclusion of scientific research
- Valuation of services
  - Consumptive use (e.g., harvesting of species for handicrafts, exploitation of coral reefs, use of water/food resources)
  - Non-consumptive use (e.g., whale-watching, swimming w/ dolphins and sharks)

## Points for Follow-up – 2

### Formulate a workplan

- Target: draft database by year 2005

### Development of a concept note

- Include a description of the categories of indicators

### Development of a questionnaire

### Invitation to ASPACO members to follow

- Send the concept note
- Those who agree receive a questionnaire

### Involvement of new Project Assistant



# Case Studies of Asian Countries

## Indonesia

by Mr Herwasono Soedjito  
MAB Indonesia

## Challenge and Opportunities for Biosphere Reserves in Indonesia

### Abstracts

*The big issues facing Indonesia now is deforestation that has a direct impact to increase problems of critical lands, water and loss of biodiversity in the near future including biosphere reserve areas. Indonesia has six biosphere reserves (BR) comprising Cibodas BR (Gede-Pangrango National Park), Tanjung Puting BR, Lore Lindu BR, Komodo BR, Leuser BR, and Siberut Island BR. After more than 20 years since the designation of the above-mentioned six biosphere reserves, it is deemed necessary to evaluate and update data they contain. This is especially important in the era of regional autonomy where land encroachment and illegal logging are rampant and boundaries of conservation areas are not respected.*

*The Indonesian MAB National Committee developed a 5 years program to tackle those problems and is directed towards answering the challenges of harmonizing biodiversity conservation and sustainable development. It is in line with Seville Strategy of MLA (Main Line of Actions) 1, dealing with natural resource management and development issues, and MLA 2 concerned with advancing scientific basis, capacity building and communications.*

*Plan and priority activities of the Indonesian MAB program are grouped into awareness program on BR, human resources development, BR management, BR*

*network, economy alternative development, research, development as well as monitoring, and workshop. Research use bioregional approaches including its social, cultural and economy aspects. The main research subjects are biodiversity inventory, bioprospecting and chemical prospecting of useful plants, as well as restoration and rehabilitation of the degraded ecosystems, especially surrounding BRs.*

*The main partners of MAB Indonesia include MAB - UNESCO, Indonesian National Commission for UNESCO of the Department of National Education, Department of Forestry, Department of Interior, Ministry of Environment, and local governments. Other important partners are donor agencies as well as local and international NGOs, such as the World Wide Fund for Nature (WWF), Conservation International (CI), The Nature Conservancy (TNC), Wetlands International (WI), Fauna & Flora International (FFI), United Nations Development Program (UNDP), and United States Agency for International Development (USAID).*

*To improve Biosphere Reserve management, education and training is needed. The most important themes of training needed are management plan development, zonation and buffer zone management including community participation, economics of conservation areas and ecosystems valuation, as well as ecotourism.*

### Introduction

The big challenge for Indonesia now is deforestation that has a direct impact to increase problems of critical lands, water and loss of biodiversity including in biosphere reserve areas. Indonesia has six biosphere reserves (BR): Cibodas BR (Gede-Pangrango National Park), Tanjung Puting BR, Lore Lindu BR, Komodo BR, Leuser BR, and Siberut Island BR which are area of interest for Man And the Biosphere (MAB) Indonesia.

The MAB Program in Indonesia has a long history, started in 1972 after UNESCO the MAB Program inception by UNESCO in 1968. Structurally the Indonesian National MAB Committee is attached to the

Office of the Deputy for Life Sciences of the Indonesian Institute of Sciences (LIPI). The program is implemented in collaboration with the International MAB Program of UNESCO and the Indonesian National Commission for UNESCO.

The MAB Program is adaptive changing situations in order to be able to answer new challenges and to anticipate prevailing issues at the time. It takes into its attention such documents as the Indonesian Country Study on Biological Diversity issued by the Office of the Minister of Environment in 1993 and the Biodiversity Action Plan for Indonesia - 1993 (BAPI 1993) prepared by the National Development Planning Agency (BAPPENAS) in 1993 and the Indonesian Biodiversity



Strategy and Action Plan 2003 – 2020 (IBSAP 2003-2020).

The Indonesian MAB National Committee developed a 5 years program which is directed towards answering the challenges of harmonizing biodiversity conservation and sustainable development in the era of regional autonomy.

## Forest in Indonesia

Indonesia possesses more tropical forest than any other single African or Asian country and is second only to Brazil worldwide in tropical forest area (McNeely et al. 1990, Mittermeier et al. 1997, Primack et al. 1998, BAPPENAS 2003). Total classified forest cover was about 119 million hectares which is grouped into 15 natural forest formations. In total, Indonesia at least has 47 distinct natural and man-made ecosystems (Sastrapradja et al. 1989) and later BAPPENAS (2003) reclassified about 90 ecosystem types. These type of ecosystem range from ice mountain ecosystem and alpine grassland on the high mountain in Papua (altitude > 5,000 m asl), variation of tropical rainforest ecosystems from low land to mountain, shallow swamps to deep lakes, from mangroves to algae communities and coral reefs, as well as ocean ecosystem as deep as 8,000 m bellow sea level (MoF/FAO 1991).

Indonesia not only has extensive true terrestrial tropical rainforests but also has natural wetlands, including many of international importance. These wetlands are found in the low-lying alluvial plains and basins, flat-bottomed valleys and mangrove estuaries of Sumatera, Kalimantan, and Papua (Haeruman 1988, IUCN 1992).

Some example of Indonesian forest ecosystems are mangrove, Nypa-Sago forest, peat swamp forest, heat forest (kerangas), low-land Dipterocaps forest, low-land non-Dipterocarps forest, limestone forest, sub-montane forest, montane forest, moonson forest, Ericaceae forest, sub-alpine forest, alpine forest, etc. (Kartawinata 1990). There are 7 majors bioregions and their changes of forest condition is presented in table 1.

Indonesia has been and is known as a mega-diversity country – biologically and culturally. Mittermeier et al. (1997) noted that Indonesia has the second highest total value after Brazil, even number one for endemism value (Table 2). In term of plant diversity, Indonesia ranks fifth in the world, with more than 38,000 species (55% endemic). Palm diversity in Indonesia ranks first in the world, with 477 species (225 of which are endemic). More than half of the timber producing tree species (350) with economic value (members of the Dipterocarps family) are found in this country, 155 of which are endemic to Kalimantan (Dephut 1994, Newman et al.1999).

It has been identified that at least 25,000 species of plant, mostly from natural forests – useful for human (Burkill 1966, Heyne 1950). A great many of these forest resources have direct impact for traditional life including medicinal plants. In Indonesia, about 2.518 species of plants is reported have medicinal values (Anonym 1995), but only 847 species have been studied (Anonym 1999).

## People of Indonesia

Indonesia has 336 cultural ethnic groups, the third highest cultural diversity in the world after Papua New Guinea and India (Mittermeier et al. 1997). As an illustration, Indonesia has 665 different local languages which is distributed in Papua 250, Mollucas 133, Sulawesi 105, Kalimantan 77, Lesser Sunda Islands 53, Sumatera 38, and Jawa-Bali 9. Some of Indonesia people primarily tribes in Papua, Kalimantan, and Sumatera still live isolated and traditionally that dependent on forest products.

Diverse local cultures are also associated with knowledge systems on biodiversity utilization. However, this traditional knowledge is disappearing because cultural diversity is threatened with extinction. This valuable traditional knowledge is decreasing due to ignorant of young generation to learn it from older generation. In addition, degradation of forests, the home of most of these cultural ethnic groups is also in alarming condition. The extinction of ethnic groups together with their traditional wisdom is threat to the sustainable of biological diversity.

## MAB Indonesia

Indonesian MAB (Man and the Biosphere) Program was started in year 1972.

Structurally The Indonesian National MAB Committee is attached to the Office the Deputy for Life Sciences of the Indonesian Institute of Sciences (LIPI).

Implementation of the program is supported by International MAB - UNESCO Programme throught UNESCO Jakarta Office and colaborate with Indonesian National Commission for UNESCO under Ministry of National Education.

The National Committee has the duty to: (1) develop the policy of the MAB Program; (2) direct and promote the activities of the MAB Program undertaken by institutions in Indonesia; (3) develop a networking with various institutions in the country and abroad to expand MAB Program in Indonesia; and (4) represent Indonesia in various activities of UNESCO's MAB Program and other international fora.

## Biosphere Reserves in Indonesia

Indonesia has six biosphere reserves (BR) comprising Cibodas BR (Gede-Pangrango National Park), Tanjung Puting BR, Lore Lindu BR, Komodo BR, Leuser BR, and Siberut Island BR. In 1977 for the first phase, MAB-UNESCO endorsed four national parks (NP), i.e. Gede - Pangrango NP (26,000 ha), Tanjung Puting NP (415,040 ha), Lore Lindu NP (229,000 ha) and Komodo NP (173,000 ha) as the core zones. Later the Gunung Leuser NP (792,675 ha) and the Siberut Island which includes the Siberut NP (190,500 ha) were endorsed in 1981. In response to the proposal of the Indonesian National World Heritage Committee/Government of Indonesia, in 1989 UNESCO also designated the Komodo NP as the World Heritage Site.

Indonesia's conservation area covers a total area of 23.05 million hectares, consisting of sanctuary reserves (strict nature reserves and wildlife sanctuaries), nature conservation areas (national parks, biosphere reserves, nature recreation parks, and grand forest parks), as well as game reserves.

## Challenges

Indonesian forest resources and forest ecosystems are threatening by deforestation, fragmentation, and its conversion. Deforestation increased dramatically in the beginning of 1970s when large scale commercial logging operated. Indonesia forest cover decreased from about 193.7 million ha in 1950s (Hannibal 1950), to 119.7 million ha in 1985 and 100 million ha in 1997 (GOI/World Bank) to only 98 million ha in 2000s (FWI/GFW 2001). The rate of deforestation increases from 1 million ha in 1980s to 1.7 million ha in 1990s and become 2 million ha since 1996. Lowland forests has been gone in Sulawesi (Celebes Island) and it is predicted for Sumatera will be gone in 2005 and in Kalimantan (Indonesian Borneo Island) in 2010, if the same rate of deforestation occurred (Holmes 2000). About halve of Indonesian forest has been fragmented by new network road and other development activities such as development of plantations and tree crops plantation (see also table 1).

Forest fires are also one of the cause of the depletion and degradation of forest ecosystem. In 1997 – 1998, forest and land fires burnt no less than 9.75 million hectares of forest in the five major islands of Indonesia. In Kalimantan and Sumatera, 3.1 million hectares of lowland forest and 1.45 million hectares of peat swamp forest were damaged by the fire (BAPPENAS 2003). Forest depletion and degradation threatens the integrity of forest ecosystems and the wildlife living in it.

Deforestation in Indonesia mostly was an impact from mis-policy and mis-use of natural resources. Economic and policy system tended to see that natural resources,

primarily forests as sources of income. It is worsen that forest concessions operates without firm control and then they manage forest un-sustainably. Those kinds of forest disturbances not only decrease species diversity but will also increase erosion of genetic variety. Ironically, Indonesian biodiversity is not well documented therefore She wills probably loss many of Her assets without knowing their value and their uses.

In regard of biosphere reserve, there is insufficient legal frame work for management. It is mentioned in the Act No. 5 Year 1990, but no specific direction how to manage it.

## Progress and Opportunities

After more than 20 years since the designation of the above-mentioned six biosphere reserves, it is deemed necessary to evaluate and update data they contain. This is especially important in the era of regional autonomy where land encroachment and illegal logging are rampant and boundaries of conservation areas are not respected. This is due to the fact that the law enforcement is very weak and the objectives of long-term development and the biosphere reserve functions are not well understood. Improvement of such understanding and concern is imperative for the traditional communities living within and adjacent to forests and other ecosystems as well as for modern communities living in urban environment.

The MAB Indonesia developed a 5 years program and is directed towards answering the challenges of harmonizing biodiversity conservation and sustainable development.

The development of Indonesia MAB Program is based on the outcome of the meeting of the 17th MAB International Coordinating Council in March 2002. The meeting agreed that the World Network of Biosphere Reserves is the main sites to implement MAB activities, which can be grouped into: MLA (Main Line of Actions) 1, dealing with natural resource management and development issues, and MLA 2 concerned with advancing scientific basis, capacity building and communications.

As such the plans of activities of the Indonesian National MAB Committee have to refer to International MAB Program and the Seville Strategy but should be adapted to the Indonesian situations. The policy on regional autonomy should be taken into considerations since ultimately the outcomes should be used for the welfare of the people living within and in the vicinity of biosphere reserves. The "Plan and Priorities of Indonesian MAB Activities for the Period of 2003-2007" is attached.



## Activities

Priority activities of this 5 years program are :

1. Awareness Program on Biosphere Reserve;
2. Human Resources Development/Capacity Building;
3. Biosphere Reserve Management;
4. Biosphere Reserve Network;
5. Economy Alternative Development;
6. Research, Development and Monitoring;
7. Workshop; and
8. Fund Raising

## Progress in the Period of September 2002 – September 2003

### Activities conducted by Indonesian National MAB Committee

#### 1. Workshop on BR and National Committee Meeting, 19-20 December 2002

The workshop was participated by 42 delegations consist of all Biosphere Reserve managers in Indonesia, members of National Committee and related stakeholders. Latest conditions of six biosphere reserves including problems and possible solutions, the facilities, and activities conducted as well as future program were discussed. The significant outcome of the workshop was "The Cisarua Declaration" that strongly stated to stop illegal activities especially illegal logging within biosphere reserves. In addition, recommendations were also documented for each specific site. Proceeding of this workshop is being published.

#### 2. Ad Hoc Team Meetings

An ad hoc team was appointed on the second day of the workshop to developed 5 years program based on issues outlined during the workshop in December 2002. The team conducted several meeting for consultation to the National Committee to produce final "Program of The Indonesian National MAB Committee 2003-2007". The final program is also attached with this report. A great many copies of the program have been disseminated to stakeholders and related agencies who interested in biosphere reserve issues.

#### 3. Actions to solve emerging urgent problem

Biosphere Reserve of Siberut Island is facing serious problem. The manager of Siberut National Park reported that logging activities are being uncontrolled in surrounding park areas.

Activities conducted related to this problem were conducted official meetings with scientific community (Andalas University, Bung Hatta University, Research and Assessment Center, District Research Division of Local Government in West

Sumatra). The Chairman of LIPI lobbied with the Rector of Andalas University and the Governor of West Sumatera to obtain their opinion on the status of Siberut Island BR. Then wrote official letters to the related institutions that was suspected to conduct illegal logging and other important stakeholders. Developed White Paper of Siberut Island Biosphere Reserve and supporting documents regarding recent situation in Siberut Island and these documents were sent to the President of Republic Indonesia.

#### 4. Workshop, Education and training

Participated in an International workshop organized by UNESCO, IUCN, and Chinese Academy of Sciences. The workshop title was "The Importance of Sacred Natural Sites for Biodiversity Conservation" conducted in Kunming and Xishuangbanna Biosphere Reserve (People's Republic of China), on 17 – 20 February 2003. The director of program, Dr. Herwasono Soedjito presented a paper entitled " Sacred Sites Of West Timor: Biodiversity Treasure And Cultural Heritage"

Coordination meeting between MAB Indonesia, all BR Managers as well other important stakeholders. was held on 3-4 June 2003 in Cisarua, Bogor. The agenda of the meeting, among others, are: to compile all necessary documents that have not been collected by the Secretariat, to draft proposals for raising funds for each BR, to determine suitable alternative livelihoods for each BR and assist the completion of Periodic Review sent by UNESCO which has to be filled by each BR manager.

Environmental education programmers for High School Students in Jawa was enacted in Cibodas Biosphere Reserve on 23 – 27 June 2003.

Combination of class lectures and field observation was gave by experts and senior scientists and followed by lesson how to write reports. The students were happy and appreciated for this kind of direct learning from the first hand source of information. The alumni established mailinglists with the address: plpa2003@yahoo.com .

The Indonesian national MAB Committee was invited by CI to give presentation on ecotourism in the biosphere reserves. CI together with local government and Tanjung Putting Biosphere Reserve authority organized a workshop on ecotourism in Pangkalan Bun, Central Kalimantan, 18 – 21 September 2003. A paper entitled "Biosphere Reserves and Development of Ecotourism in Indonesia" was presented.

#### 5. Field activities

A visit to Gede-Pangrango has been made and the result of the visit is summarized as follows: (1) no significant problems aroused in the area, (2) the relation between the management and local

community has been going well although it still needs to be strengthened, (3) up to 8000 research of various topics have taken place in the area but only 600 research results are available which data base has been collected by the National Committee Secretariat, (4) partnership with stakeholders is considered very good as many of them still actively conserve the area, (5) potential non timber forest product such as “konyal” and “saninten” as alternative livelihood needs to be further assessed.

A visit to Padang and Siberut BR was implemented in 2-3 May and 3-11 May 2003. The follow up actions made after visiting Siberut BR: to provide school book for local students and conduct inventory on superior local “durian” fruit trees and propagate using grafting which resulting planting materials will be given to the local community. With these actions, it is expected that the community will give the trust back as at the moment there are two groups of people i.e. one group is pro illegal loggers who against any negotiation offered by the BR Management or NGOs, and another group is the one that live in harmony with the nature and support conservation of the area.

## Current conditions of Biosphere Reserves in Indonesia

The latest conditions of Biosphere Reserves were obtained from the Park manager presentations and discussion during the workshop as well as from gathering data and information from visits to the sites. In general, detailed zoning of Indonesian Biosphere Reserves has not been determined, except Cibodas Biosphere Reserve. The core area is fixed which is the whole National Park area, but the buffer zone and transition area located outside core area are under different authorization. In addition, the determination of borders of each zone is hampered with the lack of commitment of central and local government, which leads to the unavailability of budget to conduct such activity. Decentralization era has made the degree of problem higher. When the legal status of the BRs is strengthened with the establishment of Official Regulation as a Guideline to implement the Act No. 5/1990 on the BR Management proposed during the 2002 workshop is formalized, the realization of the zonation will be automatically facilitated.

## Partners

In this era of globalization with very dynamic development, it is not possible to implement tasks without collaboration with others. The Indonesian National MAB Committee feels that partnership with all stakeholders is a must in handling various problems. The stakeholders include research and educational

institutions, central and local governments, non-governmental institutions, private sectors, local leaders and communities in areas where activities are to be implemented.

The main partners include MAB - UNESCO, Indonesian National Commission for UNESCO of the Department of National Education, Department of Forestry, Department of Interior, Ministry of Environment, and local governments. Other important partners are donor agencies as well as local and international NGOs, such as the World Wide Fund for Nature (WWF), Conservation International (CI), The Nature Conservancy (TNC), Wetlands International (WI), Fauna & Flora International (FFI), United Nations Development Program (UNDP), United States Agency for International Development (USAID), etc.

## Funding

The activities of the Indonesian MAB Program are funded by LIPI, with supports from UNESCO and other donors. In the long run fund raising will be undertaken, for which it is necessary to involve various donors, including government institutions, private sectors, communities, and national and international NGOs. It is hoped that an endowment fund can be instituted to sustain the implementation of the MAB Program in Indonesia.

## Suggestions

- ASPACO is necessary to share experiences to Asian countries. Meet regularly and conduct it in different places with different ecosystems.
- Develop proposal among members for training in:
  1. management plan development,
  2. zonation and buffer zone management,
  3. economics of conservation areas,
  4. BR valuation, and
  5. ecotourism.
- Education and capacity building, especially using other place for research to pursue degree.

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## Appendixes:

**Table 1. Forest Condition in Indonesia**

Bioregion-forest use	1993 – hectare	2001 – hectare	2002 – hectare
<b>Sumatera Bioregion</b>	<b>26,481,554.02</b>	<b>14,665,210.00</b>	<b>28,475,500.00</b>
1. Protected Forest	5,772,249.25	4,276,343.00	6,265,100.00
2. Conservation Forest	4,049,224.62	4,210,356.00	4,534,100.00
Reserve Forests	9,821,473.87	8,486,699.00	10,799,200.00
3. Limited Production	6,179,561.15	1,057,321.00	5,067,100.00
4. Permanent Production	6,695,415.00	4,500,399.00	6,878,200.00
5. Conversion Forest	3,785,104.00	620,791.00	5,731,000.00
<b>Java - Bali Bioregion</b>	<b>3,190,088.30</b>	<b>3,419,818.00</b>	<b>3,258,800.00</b>
1. Protected Forest	684,970.29	729,314.00	772,400.00
2. Conservation Forest	476,933.01	733,415.00	451,500.00
Reserve Forests	1,161,903.30	1,462,729.00	1,313,900.00
3. Limited Production	7,650.44	394,316.00	366,700.00
4. Permanent Production	2,020,534.56	1,562,773.00	1,668,200.00
5. Conversion Forest	0	0	0
<b>Kalimantan Bioregion</b>	<b>38,467,884.02</b>	<b>25,669,807.00</b>	<b>40,396,500.00</b>
1. Protected Forest	6,923,471.00	5,612,886.00	6,411,100.00
2. Conservation Forest	4,174,084.00	3,986,343.00	4,150,600.00
Reserve Forests	11,097,555.00	9,599,229.00	10,561,700.00
3. Limited Production	11,347,825.00	7,214,218.00	11,103,400.00
4. Permanent Production	4,229,084.00	8,076,372.00	13,753,400.00
5. Conversion Forest	11,793,420.00	779,988.00	4,978,000.00
<b>Sulawesi Bioregion</b>	<b>13,554,559.00</b>	<b>12,489,910.00</b>	<b>11,511,300.00</b>
1. Protected Forest	4,475,015.00	4,837,056.00	4,732,200.00
2. Conservation Forest	1,394,368.20	2,257,513.00	1,525,400.00
Reserve Forests	5,869,383.20	7,094,569.00	6,257,600.00
3. Limited Production	4,704,003.00	3,303,863.00	3,299,300.00
4. Permanent Production	1,487,197.80	1,490,614.00	1,393,300.00
5. Conversion Forest	1,494,015.00	600,864.00	561,100.00
<b>Lesser Sunda Bioregion</b>	<b>2,731,235.20</b>	<b>2,830,153.00</b>	<b>2,791,700.00</b>
1. Protected Forest	1,159,282.80	1,152,671.00	1,185,200.00
2. Conservation Forest	266,649.20	489,355.00	472,400.00
Reserve Forests	1,425,932.00	1,642,028.00	1,657,600.00
3. Limited Production	621,665.50	531,659.00	538,300.00
4. Permanent Production	502,267.70	554,638.00	482,900.00
5. Conversion Forest	181,370.00	101,830.00	112,900.00
<b>Moluccas Bioregion</b>	<b>5,096,883.20</b>	<b>7,264,707.00</b>	<b>7,142,700.00</b>
1. Protected Forest	1,550,356.00	1,809,634.00	1,356,900.00
2. Conservation Forest	440,955.76	443,345.00	451,300.00
Reserve Forests	1,991,311.76	2,252,979.00	1,808,200.00
3. Limited Production	1,807,107.38	1,653,625.00	1,580,900.00
4. Permanent Production	1,298,464.06	1,053,171.00	1,188,700.00
5. Conversion Forest	0	2,304,932.00	2,564,000.00
<b>Papua Bioregion</b>	<b>40,591,660.00</b>	<b>42,224,840.00</b>	
1. Protected Forest	8,648,610.00	10,619,090.00	
2. Conservation Forest	8,311,820.00	9,704,300.00	
Reserve Forests	16,960,430.00	20,323,390.00	NO DATA
3. Limited Production	4,732,360.00	2,054,110.00	
4. Permanent Production	7,123,450.00	10,585,210.00	
5. Conversion Forest	11,775,420.00	9,262,130.00	

Quoted from FWI 2001



**Table 2. Countries with highest diversity and endemism**

Country	Diversity Value	Endemism Value	Total Value
Brazil	30	18	48
Indonesia	18	22	40
Colombia	26	10	36
Australia	5	16	21
Mexico	8	7	15
Madagascar	2	12	14
Peru	9	3	12
China	7	2	9
Philippine	0	8	8
India	4	4	8
Ecuador	5	0	5
Venezuela	3	0	3

Source: Mittermeier et al. 1997

**Table 3. Knowledge of medicinal plants among various ethnics in Indonesia**

No.	Location	Ethnicity	Bioregion	Species
1	Marpunga + Gumpang, NAD <sup>2, 12</sup>	Alas, Acehnese	Sumatera	158
2	Anak Dalam, South Sumatera <sup>1, 2</sup>	Kubu	Sumatera	54
3	Seberida, Riau <sup>2</sup>	Talang Mamak	Sumatera	36
4	Seberida, Riau <sup>23</sup>	Talang Lakat	Sumatera	100+
5	Singkep, Riau <sup>41</sup>	Melayu	Sumatera	31
6	Rejang Lebong, Bengkulu <sup>2</sup>	Rejang	Sumatera	71
7	Siberut Island, West Sumatera <sup>2</sup>	Mentawai	Sumatera	70/223
8	Tapos, West Jawa <sup>2</sup>	Sundanese	Jawa & Bali	57
9	Halimun, West Jawa <sup>34</sup>	Sundanese	Jawa & Bali	140
10	Panggung, Yogyakarta <sup>2</sup>	Javanese	Jawa & Bali	12
11	Sampang, Madura <sup>2</sup>	Madurese	Jawa & Bali	68
12	Bali <sup>2</sup>	Balinese	Jawa & Bali	87
13	Lombok, Lesser Sunda Islands <sup>35</sup>	Sasak	Lesser Sunda	72
14	Sumbawa, Lesser Sunda Islands <sup>2</sup>	Samawa	Lesser Sunda	44
15	Insana, West Timor <sup>29</sup>	Dawan	Lesser Sunda	12
16	Sadap, West Kalimantan <sup>46</sup>	Iban, Dayak	Kalimantan	34
17	Sei Ulu' palin, West Kalimantan <sup>46</sup>	Tamambaloh, Dayak	Kalimantan	27
18	Nanga Potan, West Kalimantan <sup>46</sup>	Kantu', Dayak	Kalimantan	28
19	Along Hovat, West Kalimantan <sup>46</sup>	Bukat, Punan	Kalimantan	23
10	Nanga Bungan, West Kalimantan <sup>7, 46</sup>	Punan	Kalimantan	68/23
21	Harowu, Central Kalimantan <sup>2</sup>	Ngaju, Dayak	Kalimantan	100
22	Apo Kayan, East Kalimantan <sup>2</sup>	Kenyah, Dayak	Kalimantan	213
23	Long Alango, East Kalimantan <sup>9</sup>	Kenyah, Dayak	Kalimantan	192
24	Dumoga-Bone, North Sulawesi <sup>2</sup>	Minahasa	Sulawesi	99
25	Toraja, South Sulawesi <sup>2</sup>	Toraja	Sulawesi	22
26	Goal, Moluccas <sup>2</sup>	Halmahera	Moluccas	57
27	Buru & Seram Islands, Moluccas <sup>47</sup>	Sepa & Nuaulu	Moluccas	57
28	Tanimbar-Kei Islands <sup>2</sup>	Tanimbar-Kei	Papua	164
29	Wamena, West Papua <sup>2</sup>	Dani	Papua	193

Quoted from Zuhud and Haryanto (1994) and various sources

# Case Studies of Asian Countries

## Vietnam

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## Stakeholder Analysis and Integrated Management of Coastal Biosphere Reserves

Case studies: Can Gio Mangrove Biosphere Reserve and proposed Provincial Trans-boundary Biosphere Reserve of Coastal Wetlands in Red River Delta, Vietnam.

This report presents an initiative to use the stakeholder analysis as tools for supporting the decision making and management of multiple objectives in protected areas in general and coastal biosphere reserves in particular. This analysis is used to identify local stakeholders, assess their relatively important and influence, their interests in establishing an evaluation framework and models for selected criteria in social-ecological monitoring as apart of the UNESCO-MAB-ASPACO Project on 'Initiation of Social-ecological Monitoring in the Nominated Biosphere Reserve of Coastal Wetlands in Red River Delta. This analysis is also used to define criteria, decision problem and choose alternative future scenarios for tourism development in biosphere reserves in the context of the UNESCO-MAB-ASPACO Project on 'Improvement of Legal and Institutional Framework for Integrated Management of Can Gio Mangrove Biosphere Reserve'

Initial results are presented by diagrams of categorizing stakeholders into priority groups i.e. primary, secondary and external stakeholders. Their interests and levels of involvements in local decision making are also presented by matrix/tables. Stakeholder groups are described by socio-economic classification, including income level, occupational group, and employment status, also by degree of formal involvement in decision making processes in terms of group cohesion, formal or informal structures.

Stakeholders are also characterized into priority groups by their level of influence (control or access to power and resources) and important to the decision makers (power, legitimacy, urgency) in which poor people who use direct and indirect the resource is most important, and three set of stakeholders (Definitive stakeholders, Expectant stakeholders, Latent stakeholders) are considered in making the classification.

Interests of the stakeholders that are linked to their perceived, actual property and use rights at existing scales (macro-to-micro) and across stakeholder groups

are analyzed to understand the stakeholder conflicts and trade-off analysis. The preference of the stakeholder groups is also understandable through participating dialogues of stakeholders to deliberate and discuss resource management issues in order to develop or refine their preferences.

The information including scientific information (ecosystem, distribution of economic cost and benefits), local resources and their management preferences is used to weight up the advantages and disadvantages of any management options and assess how the net benefits can be maximized. The decision making process is the most appropriate when considering the engagement of different types of stakeholder groups in which who to include and who to exclude from the deliberation.

However, stakeholders may move from one category to another by iterating the analysis over time. The attempt to use stakeholder analysis as a tool in management for multiple objectives should be conducted by generating information about decision problems in order to effectively generate solutions (alternatives) and provide a transparent understanding of the structure and contents of the decision problem. It can be concluded that management for multiple objectives in the biosphere reserves is less effective when key stakeholders are excluded from decision making and management. They include both people with power to control the use and management of the resource, and those with no power or influence whose livelihoods are affected by the changing use and management of the resource.

# Case Studies of Asian Countries

## Philippines

by Ms J.H. Primavera  
Aquaculture Department  
Southeast Asian Fisheries  
Development Center  
Tigbauan, Iloilo 5021, Philippines

## Mangrove Legislation and Protection in the Philippines

In the early 1900s, the extraordinary diversity of Philippines mangroves was matched only by their vast expanse covering at least half a million hectares. This wide distribution can be seen from the countless coastal towns and villages – first among them the premier city of Manila – named after mangroves and their associated species. Yet overexploitation for fuel, timber and other forest products, and conversion to aquaculture, agriculture, settlements and industry have drastically reduced mangrove area. Much needed protection for mangrove forests is provided by a plethora of laws, decrees, proclamations, circulars and the like from various government agencies at the local, regional and national levels. Working on the premise that local communities are resource exploiters and abusers, early legislation focused on the declaration of reserves, wilderness areas, national parks and greenbelts and the prosecution of violators. However, such laws have not stopped the decline of mangroves because of weak law enforcement and an inefficient bureaucracy with overlapping agencies. Hence there has been a paradigm shift to local communities as *de facto* resource managers (rather than potential violators) with the establishment of land tenure instruments and community-based management schemes.

The paper discusses mangrove legislation, conservation and management in the Philippines and their attendant strategies, e.g., CB-CRM (community-based coastal resource management), mangrove rehabilitation, mangrove-friendly aquaculture and information dissemination (formal/informal education networks, mangrove curricula and field guidebooks). Finally, several case studies – in Infanta, Quezon; Bais Bay, Negros Oriental; Sagay, Negros Occidental and Kalibo, Aklan – are dissected for lessons behind successful mangrove protection in the Philippine setting.

Already, the culture of seaweeds, mollusks and fish in cages in subtidal mangrove is both compatible with mangroves and amenable to small-scale, family level operations (Primavera, 1993, 1995). But there remains a need for Mangrove-Friendly Aquaculture (MFA) technology in the intertidal forest or swamp that does not require clearing of the trees. MFA may be defined on two levels: a) silvofisheries or aquasilviculture where

the low-density culture of crabs, shrimp and fish is integrated with mangroves, and b) mangrove filters where mangrove forests are used to absorb effluents from high-density culture ponds. This review aims to evaluate existing MFA practices belonging to the first category (although pioneering research on the use of natural or constructed mangrove wetlands to treat pond effluents holds much promise towards making aquaculture sustainable).

However, there are aquaculture technologies that are more responsive to ecological and social concerns, i.e. they have minimal effects on the environment while being amenable to small-scale, family-level operation (Smith, 1984). These include stake, raft and bottom culture of oysters, mussels and cockles; seaweed culture; and cage/pen culture of finfish (Velasco, 1979b; Jara, 1987; Singh, 1987). Income of the mangrove leaseholders under the CVRP is supplemented by family-operated finfish culture in cages, shellfish culture and amatong (Yao and Bojos, 1988). The latter is an indigenous technology in which intertidal excavations filled with rocks and big branches serve as a niche for siganids, groupers, crabs, etc. As with the traditional brush park fisheries in some African countries (Kapetsky, 1981), fish are harvested regularly for home consumption or for sale in local markets.

On the other hand, mangroves and aquaculture ponds may not be completely incompatible. In the early Indonesian tambak, it was customary to plant *Avicennia* and *Rhizophora* along the dikes and *Sonneratia*, *Bruguiera* and *Xylocarpus* on seaward tidal flats for protection against wave action, for firewood, and for green manure (from decaying leaves) to stimulate plankton growth (Schuster, 1952). A modern updating of this scheme is the *tumpang sari* which combines aquaculture or agriculture with forestry (Naamin, 1986). In one prototype, 20% of the area of a 5-ha mangrove plantation is converted to 5-m wide canals along the periphery for stocking fish or shrimp, while the second model features the planting of rice or other crops in the inner, clear-felled area of the plantation (Aksornkae, 1989). The mangrove greenbelt retained around the plantation continues to support fish and shellfish production.



*Yet no amount of legislation (DENR, 1990) will ensure the protection of these No Touch reserves unless there is effective law enforcement by local and national government agencies and compliance of all stakeholders. Toward this end, local communities who utilize mangroves and other marine resources for livelihood must be allowed access to buffer zones (domestic fuel, shellfish gleaning, forage for livestock, etc.). Other sustainable mangrove management strategies include mangrove-friendly aquaculture (of seaweeds, crabs, fish in cages) and mangrove rehabilitation through enrichment planting or replanting of degraded and completely deforested areas.*

*The official government policy of encouraging mangrove development into fishponds in the 1950s and 1960s changed to a more conservation-oriented approach with the issuance of a whole suite of decrees and orders designed to protect remaining mangrove areas and to maximize production from existing culture ponds. Unfortunately, effective enforcement of these laws is hampered by lack of manpower and facilities, and corruption at many levels of the bureaucracy. A 1989 trip to coastal villages in Central Visayas revealed to the author everyday occurrences of mangroves being cut and burned, in spite of their protected status. Financing for development of the area could invariably be traced to businessmen or politicians.*

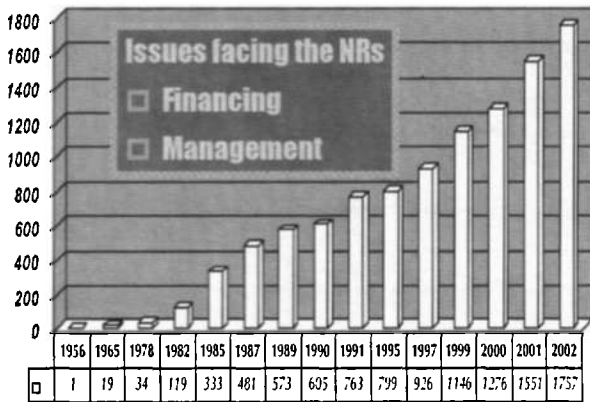
# Case Studies of Asian Countries

## China

by Mr Han Nianyong  
Chinese National Committee  
for MAB

## Case Studies of ASPACO Project in China

### Nature Reserve Development in China



### Sustainable Management of China's Nature Reserves Policy Study: Two kinds of problems identified (2000)

#### Lack of C & D Integration

- Lack of integrated goals in management
- Lack of institution arrangement
- Lack of mechanism for integrating interests
- Lack of sustainable policy for resources use
- Lack of partnership

#### Weakness in System itself

- Less input due to un-clear responsibility
- Self-support of NR increasing conflicts
- Ill-defined of status of NR institution
- Fragmentation of departments in charge
- No categories for NR management





## Shankou Mangrove Biosphere Reserve: ASPACO Project 2001-2002

### Main Problem:

Mangrove function on ecosystem service and economic value are not recognized and mangroves are threatened by irrational use, and many disappeared

Shankou BR also faces the threat from people in and surrounding areas

### Problems in Land Use:

- Shrimp Pond
- Collecting & hunting
- Tourism development
  - Diesel pollution
  - Garbage
  - Disease

### Project focus:

- Ecotourism planning
- Public Education: Posters, panels, magazines
- Local (clan) participation



Use tourism as alternative and the planning includes: carrying capacity, route control, green products, etc.



### Project activities:

- Green products: Bee, Duck Egg  
To enable local people to benefit from tourism, the local products have been investigated and some of them selected as green products, and put on the logo of the BR to increase their competitive capability in marketing

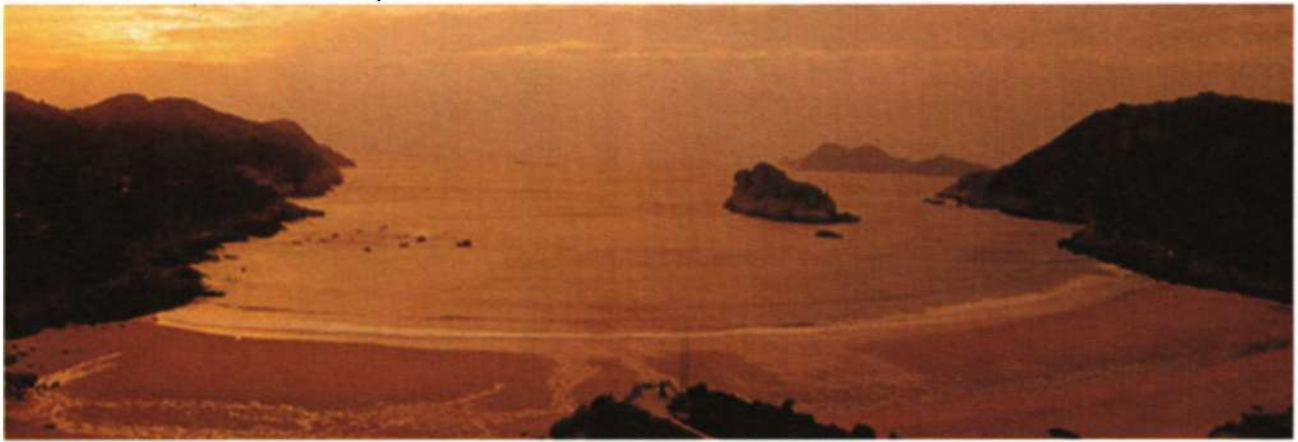
### Main Results of ASPACO Shankou Project

- Direct
  - Ecotourism: *plan and carrying capacity*
  - Public Education: *training, poster, CD, magazine, newsletter*
  - Green products: *label and brand for bee and duck egg.*
- Indirect
  - Working together exercise  
*Provincial Marine Administration, Mangrove Institute, Local Community, Shankou BR*
  - Linking with other projects by UNESCO-ASPACO seed-funding  
*GEF, USA, Domestic projects*



Birds netting in Auterm





## Nanjilie Island Biosphere Reserve

### Problems

- Protecting Algae and Shellfish in Tide Belt
- Challenge: Development pressure
- Ways of use
  - Fishing
  - Collecting shellfish
  - Shellfish breeding
  - Fish breeding net-box
- Ecotourism
  - Invested business by companies
  - Hotel
  - Fish breeding farm
- Local people involvement
- Fresh water is limited



### Project focus:

- Explore ways to ensure EQUITY in sustainable use of resources
- Identify ecosystem service and economic value to meet development demands to ensure sustainable development
- Reform Institution arrangement for equity and sustainability



It is only about 60 km distance, but there is a big gap in development. The government and people in the Island demand strongly to fill the gap and this become a challenge to the BR



## Yancheng Biosphere Reserve

**Problem:** Habitat decreasing

**Causes:** Land use and land tuner

- Shrimp pond
- Fish pond
- Salt Farm
- Collecting Clamworm
- Harvesting reed
- Agriculture
- Small Port
- Bird-watching Tourism
- Crossing 5 counties and Dealing with various stakeholders

### Project focus:

- Explore land use pattern benefit to both habitat and people needs
- Explore land tuner management mechanism in transition zone
- Establishment mechanism of working together

### Overall Benefits from ASPACO Projects

- Projects filling the gaps covering marine type of PA in China
- Management-oriented projects being highlighted
- The Case Studies on China's BR management being diversified in terms of management issues

# Case Studies of Asian Countries

## Japan

by Mr Kunio Iwatsuki  
Chairperson, MAB-Japan

## MAB-Japan's Activities in relation to ASPACO

In relation to ASPACO, I may better introduce here recent activities of Japanese scientists working on mangrove research. Mangrove research in Japan had its peak in 1970s and '80s, and at that time I myself also collaborated in this field (in addition to my own special field in botany), actually publishing a purely botanical paper on floral morphology of *Buergeria* and others. Recent mangrove research by Japanese scientists was beautifully summarized in the third ASPACO workshop in Naha, and several papers were presented at the workshop, the report of which is now elegantly summarized, edited and issued from Jakarta regional office of UNESCO. Therefore, I do not like to repeat the same topics here.

International collaborations from Japanese scientists on mangrove research are usually through two channels: one is through the activities of ISME, on which Professor Baba will present a paper on the third day of this workshop, and the other is through oversea research projects under MEXT. Scientists are usually independent from each other and propose their research projects based on their own ideas on science. It is difficult to control the direction of scientific activities by governmental organization as MAB-Japan, and I hope the research projects of Japanese scientists on mangroves are in general successfully carried out, usually collaborating with scientists from various other countries.

Then, I will concentrate my presentation here to the national activities of MAB National Committee, Japan.

ASPACO is supported by the Trust-in-Fund from Japanese government through the Ministry of Foreign Affairs, but the MAB-Japan is under the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Biosphere Reserves are strictly concerned to the environmental issues, and most of the environmental affairs in Japan are mostly under maintenance of Ministry of Environment and Agency of Forestry. Thus, the MAB activities are multi-ministerial, and as in the case of many countries, inter-ministerial collaboration in Japan is often hardly performed.

When the National Strategy for Biodiversity was revised in 2002, government officers involved in biodiversity issues had careful and detailed talks on this subject and they succeeded in having a well organized document of it. When the second version of the Strategy was ready, I

gave a comment: 'the first version of the National Strategy of Biodiversity was just a bound of various documents sent from 11 related ministries and agencies at that time, but the second version was well edited to have a single document; however, it was not our intention to issue a document but to succeed in a sustainable use of biodiversity, and I would watch in which way this well edited document would be in action. Then, we had recently a first year monitoring of the National Strategy of Biodiversity, and we saw a variety of trial performed by inter-ministerial efforts, and I can expect to have a development of such a collaboration as far as the biodiversity issues are concerned. Based on such a new raise of collaboration in the government, we are trying to develop the biosphere reserves in Japan including those in relation to ASPACO.

It is a pity to note that the secretariat of MAB-Japan is not very powerful comparing with the secretariats of many other countries. Then, the ordinary activities of MAB-Japan are made by a working group of younger scientists, or by Coordinating Committee under the umbrella of MAB National Committee, Japan. We regularly issue Newsletter and Annual Report, and web-site is available to record recent activities of MAB-Japan. You can visit the web-site at any time, and I guess most of you received the Newsletters and Annual Report. (In case you do not receive these documents regularly, you may contact MAB-Japan in correcting our mailing list.)

In Japan, we have registered four biosphere reserves, and several years ago the status at that time was reviewed by the Coordinating Committee with a publication issued in 1999. This is, however, just the collection of original data, and no actual evaluation was made at that time, as the data were not sufficient for a complete evaluation. Raising a small budget from MEXT, we actually started the scientific monitoring of four biosphere reserves, expecting to include all the data available in the Ministry of Environment and Agency of Forestry. We recruited appropriate scientists in this project, and the above two organizations are collaborative with us on the line of National Strategy of Biodiversity.

Among the four biosphere reserves in Japan, only one, Island of Yakushima, includes coastal area, and the other three do not have any further relation to ASPACO.



It is a pity to note that Biosphere Reserves are not very popular in Japan, comparing with World Heritages. In Japan, we have registered two World Natural Heritages, and we expect to have additional registration.

Biosphere Reserves are under MEXT, but World Natural Heritages are under control of Ministry of Environment and Agency of Forestry. Recently, these two organizations made a general survey of reserved sites in Japan to screen the candidates for new registration of world natural heritages. Careful screening was made by a committee consisted in the scientists, and 19 possible candidates were screened. Then, the concept of world natural heritages is carefully applied to these sites, comparing the ever registered sites, and considering the conservation activities by the local people, we listed up three sites as the possible candidates of new registration for the world natural heritages.

In screening the natural protected areas, we consider the concept of biosphere reserves, as two among six committee members are those of MAB-Japan, Professor Ohsawa and myself served as the chairperson. After we had a conclusion on the candidates of new registration of world natural heritage, MAB-Japan will start a screening of candidates of additional registration of biosphere reserves from Japan. In the list of possible candidates, there are sites with coastal areas which are in relation to ASPACO. In screening the possible candidates of biosphere reserves, we can use all the basic data on the protected areas available in the Ministry of Environment and Agency of Forestry. In such a way we can depend on the multi-ministerial collaboration in promoting such an activity. For nearly 30 years, MAB-Japan has not proposed any new registration of biosphere reserves, and I hope a new registration will bring a visibility of biosphere reserves up to have more collaboration from general public to have sustainable use of biodiversity in protected areas.

These are short introduction of recent activities of MAB-Japan, mostly within Japan.

# Case Studies of Pacific Islands Countries

## Samoa Case Study – A Proposed Biosphere Reserve for Samoa

(Located in Central Savaii, Samoa)

### Background Information

Samoa is a small developing island state, which became independent in 1962 after a period of administration by New Zealand as a trust territory of the United Nations. It has a population of approximately 170,000 most living on both islands of Upolu and Savaii. The island group is located in the south-west Pacific between 13° 25' and 14° 05' south of the equator and between 171° 23' and 172° 48' west longitudes. Its total land area is about 2820 square kilometers with the two main islands of Upolu and Savaii containing 1115 and 1700 sq km respectively. The climate of this Pacific island nation is tropical, with the heaviest rainfall occurring between October and March.

The economy is narrowly based on agriculture, tourism, small-scale manufacturing and fisheries. About two thirds of households rely on mixture of subsistence agriculture and cash income with subsistence agriculture contributing about half of total agricultural output.

### Savaii Biosphere Reserve Information

The Biosphere Reserve Project is proposed as an integral component of the UNDP/GEF project for the conservation of the central Savaii forest, which is currently being developed with actual implementation expected to commence in 2004. The overall objective of the Savaii project is

*“to conserve a forest ecosystem that has been identified by several biodiversity surveys as one of the two most important in the South Pacific. The project has been designed based on a community-based management approach. Most of the land in the project site is in the customary ownership of village communities. The management of the overall biodiversity and productivity of forest resources and ecosystems is largely in the hands of these communities”.*

The project will work on four complementary avenues of action.

- The first is to support communities in defining goals for sustainable use of their biodiversity resources and changes in current land use patterns required to achieve these goals.
- The second is to assist communities in strengthening their decision-making mechanisms for enforcing their own regulations (particularly their agreed biodiversity use goals) and improve the efficacy of their own conflict resolution structures (particularly as they refer to resource use conflicts). This will include an assessment of whether national legislation and regulations could be improved to assist communities in achieving sustainable use of biodiversity and its conservation.
- The third avenue of action is to support the diversification of income activities so as to decrease the pressure on biodiversity resources and improve techniques for current resource use that minimizes impact on the ecosystem.
- Finally, the project will assist communities and the government in taking stock of lessons learned for replication in a second wave of communities after project termination date.
- Implicit in the overall objectives of the project is the need for awareness, education and capacity building activities, which provides the basis for sustaining the resource beyond the timeframe of the project.

It is logical to integrate the two projects as they both attempt to address the same issues and aim for the same goals. Thus this is the rationale for combining the two and it also helps to promote synergies and linkages not only with these two projects but also with other projects and initiatives relevant to the conservation of central Savaii forest. At this stage, no detailed information is available yet on the exact size and area to be covered by the project, but it is expected that all the areas remaining with intact forest will be included in the project. The Savaii conservation project is expected to map out areas which might be called ‘no take zones’



where development activities are prohibited, it will also map out areas that could be used for sustainable type of activities to take place, and incorporate areas that will act as buffer zones. Such information is important to the Biosphere Reserve project.

## Conservation attributes of selected sites

The forests of Central Savaii have been identified as one of the highest priority for conservation in the country. The National Biodiversity Strategy and Action Plan (NBSAP) and Samoa's First National Report to the Convention on Biological Diversity (CBD) makes specific reference to the need to protect and conserve the proposed project target areas in view of their ecological importance. The BSAP also specifically endorses the strategy of this project by stating the goal of "Empowering and encouraging traditional communities to protect, conserve and sustainably use and manage our biodiversity".

The National Environment Management Strategy (NEMS) identified 'Combating Deforestation', 'Conservation of Biodiversity' and Protection of the quality and supply of freshwater' as three of its Target Environmental Components. It listed as one of its priorities "the Protection and Sustainable Use of the Lowland Forests of Aopo, Letui and Sasina", which are sites targeted by this project. Finally, other relevant sectoral policies such as the Forestry Policy, Water Policy and Land Use Policy stress the need to conserve Samoa's forests because of their close linkages to all other sectors and, particularly, their ecological value on the sustainable livelihoods of the Samoan people.

The World Wildlife Fund for Nature (WWF) identified Samoa and the group of South Pacific islands as one of the most vulnerable forest sites worldwide. Only 0.2% of threatened forest ecosystems are under protected status. A review of the conservation value of 226 South Pacific islands ranked Savaii, where this project is to take place, as 23 (Dahl, 1986). The flora is one of the most diverse in Polynesia with about 25% of the species endemic and a similar proportion of endemism among birds (23%). Samoa has been identified as one of the world's "Endemic Bird Areas" in need of "urgent" conservation attention (ICBP, 1992).

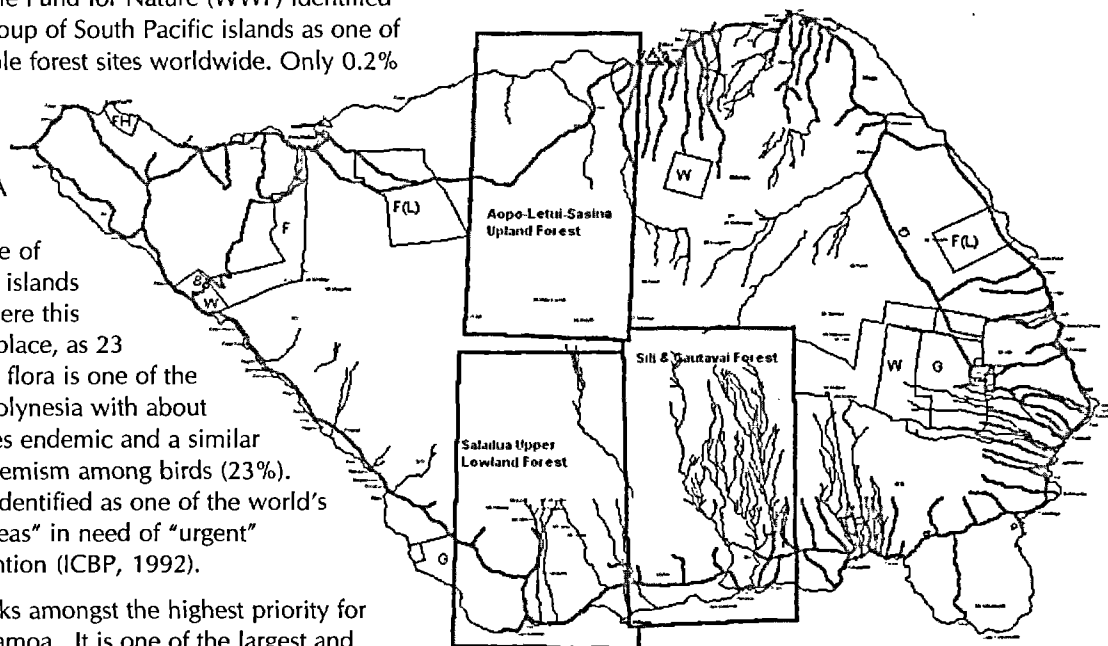
Central Savaii ranks amongst the highest priority for conservation in Samoa. It is one of the largest and

continuous forest ecosystems that remain in Samoa and contains the highest levels of biodiversity, density of avifauna and forest species. The project target area comprises globally and nationally significant and threatened ecosystems such as lowland tropical forests, volcanic vegetation, watershed areas and montane forests. The high altitude forest areas have the greatest bird abundance and species richness. Amongst the threatened, endemic, and rare flora and fauna are Island thrush, Samoan silvereye, Tooth-billed pigeon, Scarlet Robin, Parrotfinch, Mao, Samoan triller, Samoan fantail; *Dysoxylum maota*, *Dysoxylum huntii*, *Arytera samoensis*, *Intsia bijuga*, *Mammea glauca*, *Agalaia samoensis*, *Diospyros samoensis*, *Anacolosa insularis* and others. The area also contains one of the major water catchment areas significant for continuous supply of water to the island of Savaii.

The northern section of the project site, which comprises the district of Gagaifomauga III, was found to contain 30 of the country's 35 bird species and was the only site where all the threatened species (tooth-billed pigeon, friendly ground dove, mao, Samoan triller, island thrush and Samoan white-eye) were found. The southern part of the project site, named Palauli West, had the highest density of pigeons and doves of any sites and was the area where the possibly extinct Samoan woodhen was last seen.

The project site stands as the most continuous area of relatively intact indigenous ecosystems left in Samoa. This extends from lowland forests, which were graded 1 and 2 by Park et al. (1992), through foothill forest, volcanic succession, montane forest and montane bogs to cloud forest.

Selected Project Sites on Savaii Island





## Threats to sustainability of the forests in Central Savaii

This forest area is under immediate threat from land clearance for agriculture, commercial logging operations and other activities. It is also large enough for parts of it to survive the different types of natural disasters that regularly beset Samoa, like fires and cyclones.

The threat of possible logging of the area is very high, the villages on both the north and the south of the island are being pressured to log the forest for village developments and because they hold the only indigenous forest left on the island for timber mill companies. The lowland, mid-slope and upland areas of central Savaii are continuously under pressure from a number of threats, resulting in the increasing direct loss of significant species and the degradation of biodiversity habitat. Direct threats include:

### Habitat Loss and Degradation

- Forest clearance for agricultural purposes
- The expansion of village plantations to critical forest areas is rapidly increasing.
- Timber collection for fuel and construction

### Direct Species Loss

- Uncontrolled exploitation of highly valued species, in particular medicinal plants by researchers for commercial purposes.
- Unsustainable levels of hunting for subsistence and trade

### Potential Threats

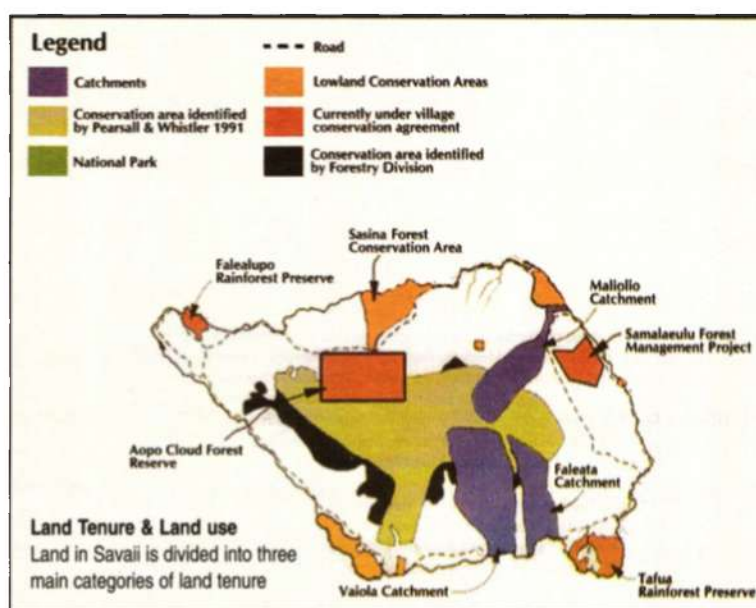
- The area has been identified as having commercial timber values. No approvals have been made and the opportunity exists to ensure critical areas of globally significant biodiversity are conserved.

## Response to Threats

Since most of the country's native flora and fauna species are found in the rainforests, the depletion of the latter decreases the viability of habitat for those species. Several endemic birds species are now believed to be near extinction. Native rainforests covers the country's major water catchments and their destruction have noticeably reduced water supply and river flows throughout the country. Deforestation has become the most common cause of severe flooding and soil erosion during the last two decades of the past century.

In recognition of the threats to biodiversity in Savaii, the Government of Samoa is looking at ways to address the

underlying causes of the threats. Thus one of the major initiatives by Government in collaboration with villages involves the conservation of the remaining forest areas in central Savaii. The overall objective of the proposed intervention is to conserve globally significant biodiversity by developing mechanisms to conserve, restore and sustainably manage the largest continuous ecosystem in Samoa.



In addition to current environmental programmes and plans the Government is proposing to conserve these remaining forest areas, past similar initiative have been undertaken in Savaii for sites that also have potential conservation characteristics. Most of these were set up under village agreements with various local and external organizations to conserve forest areas of significant conservation potentials. On-going awareness programmes are undertaken by Non-Governmental Organizations in Samoa to help increase awareness and understanding of conservation issues and to advocate for sustainable use and management of forest resources of local and global significance. A number of conservation areas have been set up in Savaii and these are illustrated in the map below. One of the overall aims is to build a network of conservation sites/areas to demonstrate the importance of forest resources and the biodiversity found therein not only to present but also for future generations.

## Land Tenure & Land use

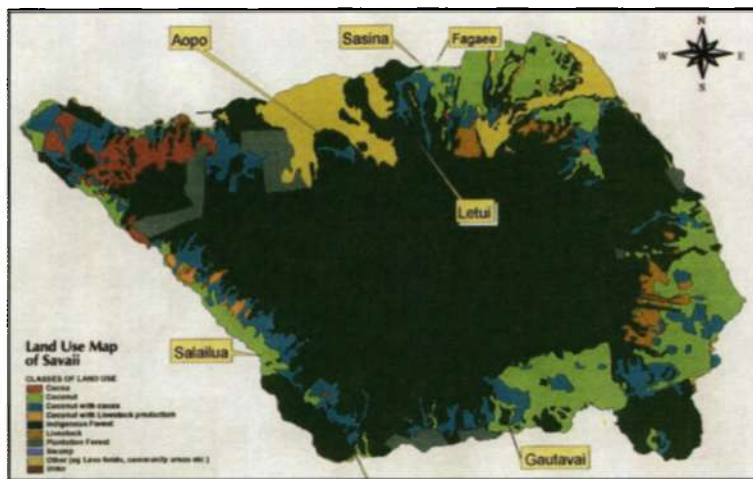
Land in Savaii is divided into three main categories of land tenure:

1. Customary
2. Freehold
3. Government/public lands

About 80% of all land is under customary ownership. This is land held by communities in accordance to existing laws based on Samoan traditional customs and land use. In the rural communities, land remains primarily under customary ownership and a large proportion of it is under cultivation.

Public land constitutes 16% and as its name indicates is reserved for public purposes. It also includes all land lying below the line of the high water mark, land vested in the Samoa Trust Estates Corporation (STEC) and more recently the Samoa Land Corporation (SLC). Freehold land is land held for a fee and constitutes only 4% of all land.

The predominant land use apart from indigenous forests is agriculture. A common land use pattern in the villages consists of a residential area with a village common ground or "malae" on a kilometer wide strip of land along the coastline. Next inland is a mixed cropping zone of fruit trees, bananas and coconuts, and further inland is a zone of primary food crops of taro, taamu and yams. The present land use pattern has developed from a blending of two farming systems where subsistence village cropping has had a plantation cropping system imposed upon it after contact with European settlers.



According to the 1999 Agricultural Census, 90% of land holdings under agricultural use are on customary land. About 87% of land is under crops, 4.7% under livestock, which has increased in the last ten years, 4.3% under bush and fallow while land under non-agricultural use has diminished to just 3.4% from 17% in 1989. This reflects a strong demand for agricultural land and conversion of land previously under non-agricultural use to agricultural use.

National Parks and all State Reserves are the responsibility of the Division of Environment and Conservation (DEC), which is a unit under the Ministry of Natural Resources and Environment (MNRE). The Forestry Division (FD), also under the MNRE, has responsibilities for the development of the country's forest and land resources.

## Village Decision Making

To put village issues and decision making arrangements into perspective, it is important to understand village protocols and how the administration of village affairs are carried out. A typical Samoan village is made up of a series of families. An extended family or kinship group is called an "Aiga". A "Matai" (high chief) leads the Aiga, and is selected by members of the group. A family member is anyone who is related to the Matai by birth, marriage, or adoption. The matais of a village form a council, called the "Fono", which governs the affairs of the village. Each Matai is responsible for the labor, activities, well-being, and housing of his family. Other traditional structures in the village include the "aumaga" (untitled men), "komiti a tamaitai" or women's committees and youth or "autalavou". Traditional customs oblige family members to share their food and other possessions with the extended family and, to some extent, with the entire village. Land is held in trusteeship in the name of the Matai. Extended families normally have 20 to 30 members. Samoan society is hierarchical and takes pride in maintaining the "fa'a Samoa" (the Samoan way of life).

Most of Samoan community matters are addressed at the village level and initially most project activities will be delivered in this way. However, greater coordination and cooperation among villages is necessary. Coordination among fonos' decisions regarding land use and protection of forests has been historically low. This reflects the fact that for most of Samoa's history, villages inflicted little impact on each other thus making individual fonos the relevant decision-making units and close coordination among them not crucial. The situation, however, has changed. Closer coordination has become necessary after large-scale logging started to operate in Samoa (the impact of logging in one village can affect others) and after individuals started to encroach into other villages' lands. Most importantly, the conservation of biodiversity in Savaii requires an ecosystem approach. Individual fonos without

coordination with one another are ill equipped for this task. There would be major benefits if villages cooperated together as larger units (district level) to address large-scale and holistic management of the forest areas under threat.

## Development

(Foster economic and human development, which is socio-culturally and ecologically sustainable).

Collaboration amongst all the involved villages within the districts under the proposed biosphere area will be facilitated in order to promote the concept of shared resources for conservation purposes and ensure that these resources are managed sustainably. In doing so, options to provide incentives to the local communities will be



explored, such as alternative income generating activities, while at the same time promoting and participating in conservation initiatives and activities. Focus will be on developing sustainable resource use options for the communities as incentives for conservation, such as assisting with the establishment of new income generating activities and improving small-scale eco-tourism activities currently being implemented by the villages.

Lessons learnt from similar past interventions will be picked up by this project and explore them further to ensure more sustainable approaches are undertaken and considered. It is anticipated that improved eco-tourism activities will assist in sustaining the project financially. The project will, furthermore, look into exploring the establishment of a trust fund to sustain the project and release the pressure from over harvesting the resources. With proper legal mechanisms and local capacity in place, the communities could also benefit from bio-prospecting activities, which in the past were often conducted without the communities' full consent and knowledge of the financial and biological implications involved.

## Management Arrangements (Logistic Support)

As alluded to earlier, the biosphere reserve is envisaged by the Government to be an integral component of a much larger project for the conservation of the forest of central Savaii. The latter is currently under preparation with funding from UNDP/GEF. The biosphere reserve project complements the objectives of the conservation project thus providing opportunities for building synergies and linkages, which also fosters greater coordination between the two projects and amongst those parties involved.

The UNDP/GEF funded conservation project will provide support for environmental education, training, research and monitoring related to local, national, regional and global issues of conservation and sustainable development. The Ministry of Natural Resources and Environment (MNRE) through the Division of Environment and Conservation (DEC) will take the lead in this project in close collaboration with relevant national agencies, non-governmental organizations, academic institutions, and particularly the local communities in the selected sites.

The indigenous/customary resource owners, who are the main landowners, play a critical role in to develop mechanisms to conserve and sustainably manage the largest continuous forest ecosystem in Samoa. Support will be provided to facilitate awareness and education programmes to raise awareness and understanding of the importance of the conservation areas as well as the benefits received from it. It is envisaged that this

initiative will result in increased awareness and understanding of the concepts of conservation, and in particular on the ecological importance of the whole ecosystem (in national, regional and global terms) and the diversity of fauna and flora therein. Another outcome would be the integration of the principles of conservation into school curriculum and being taught in the district and village schools.

## Partnership - Funding

The Savaii Conservation Project is currently being developed with funds from UNDP, GEF, UNESCO, and in-kind support from the Government of Samoa. At the moment, the project is trying to gauge and secure financial support from other partners to provide co-financing towards the project. With the MAB project being one of the key activities under the Savaii project, it is envisaged that financial and technical assistance could be provided for under the MAB to implement key activities for the setting up of the Biosphere Reserve as part of the Savaii project. In addition, other potential donors or organizations with interest in biodiversity conservation relevant to the objectives of the Savaii project are most welcome to join in as partners and to collaborate in making a difference to conservation efforts in Samoa which ultimately will contribute to the conservation of local biodiversity with global significance.

## Timeframe

The Savaii Conservation Project is envisaged to start implementation in 2004 assuming that adequate co-financing is secured for the project. The project duration is expected to take at least seven years. Thus, the Biosphere Reserve project activity will also take place within this timeframe.

### For more information, please contact the following:

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# Case Studies of Pacific Islands Countries

## Palau

by Alma Ridep-Morris

## Ngaremeduu CA in Palau Progress with ASPACO



### NCA progress with ASPACO

- Introduction to ASPACO in November 2001
- NCA Proposal for ASPACO funding in 2002
- NCA funding from ASPACO in 2003
- NCA Activities with ASPACO funding



Sedimentation  
Monitoring



Compact Road Project

### Ngaremeduu Conservation Area

Palau – over 350 islands, 7 inhabited

### NCA – high biodiversity

- Manta Ray
- Underwater Paradise
- Dugong
- Marine Turtle
- Crocodile



### Water Quality Monitoring

#### Parameters

- Temperature
- Dissolved Oxygen
- pH
- Turbidity
- Fecal Coliform Bacteria

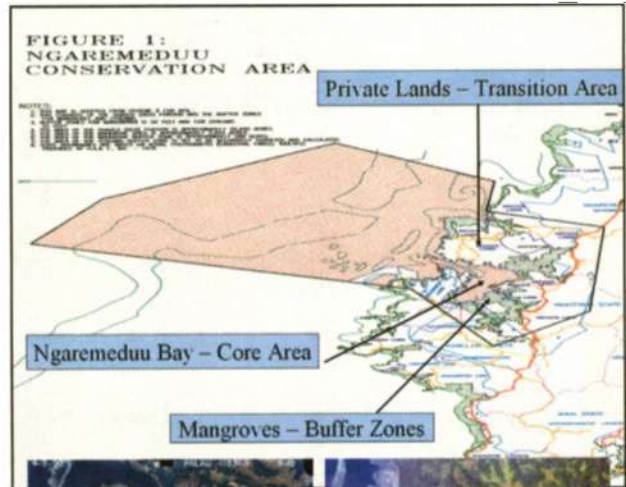




### NCA Ecotourism Project (Kayak Tours)



Purchase of kayaks



Ngaremeduu in 1992



Ngaremeduu in 2001



Education Awareness Programs

CACC Retreat



### Other potential ecotourism projects in NCA



NCA dedicated team

*We do not inherit the earth from our ancestors,  
We are borrowing it from our children*



# Case Studies of Pacific Islands Countries

## Papua New Guinea in Brief

- PNG has a total land area of 467,500 square kilometres;
- Second largest island country in the world and the largest of the Pacific Islands;
- Population: recent census accounts for about 5.3 million people
- Location: North of Australia and east of Republic of Indonesia. It shows many similarities in regard to its biodiversity;
- Forest Cover: 77% and it is claimed by international scientists as the 3rd largest forested areas in the world behind Amazon in Brazil and Congo Basin in South Africa.
- Of greater significance is the retention of large tracts of dipterocarp trees intact in the canopy of the lowland rain forests which account for over 80% of the world's trade in tropical hardwoods;
- Endemism: particularly for flora at generic level 84, the number is expected to increase;
- PNG is about 1.5% of the world's land mass and accounts for about 7% of the world's biodiversity;
- Land ownership: 97% of the land is owned by the people
- The plants & animals that inhabit these processes that support them are very poorly documented.
- At the same time ongoing exploitation of many of these environments threatens their viability in the long term.
- A major effort is needed to survey & study these environments.
- Additional information is needed to develop guidelines for the maintenance & suitable use of marine systems.
- 10 ecologically - defined classes of forest comprise 65% of PNG's land area
- Conservation of representative tracts of all of these forest environments is imperative for the long-term well-being of PNG's economy & its forest industry.
- Imposition of logging moratorium entering into its 2nd year.
- 17 areas of major importance are delineated to conserve PNG's forest environments.

### Forest

- **Range:** Humid tropical country rich in freshwater wetlands. This includes > 5000 lowland & highland lakes, herbaceous swamps, savanna swamp, woodland swamps & swamp forest.
- Lakes & woodland & herbaceous swamps are most abundant in the lowlands. The highland zone has scattered montane lakes & herbaceous swamps. These wetland environments are very rich in wildlife (esp. fishes) & comprise an economically important resource for many of PNG's subsistence economies. 30 wetland areas are designated of major importance to conserve.
- The coastal & marine ecosystems rival the terrestrial environments in diversity & richness. These include extensive coastal & estuarine mangroves; fringing barrier & patchy reefs; small & large island systems, atolls, seamounts, & deep-water upwellings.
- At least 15,000 species of vascular plants & the pteridophyte flora are poorly known - need further field & herbarium study.
- Warm-blooded fauna includes 644 species of breeding birds & 214 species of 11 mammals. 66 birds spp are endemic/55 spp of mammals. Birds are the best known animal group while the mammals are for less well-known, mainly because of their nocturnal lifestyle.
- 30 areas are determined to be of major biological importance to the warm-blooded vertebrate fauna.
- The cold-blooded vertebrates include 785 spp - 282 spp of freshwater fishes & 505 spp of amphibians & reptiles.
- 46% of these are endemic.
- PNG invertebrate fauna is exceedingly rich & only superficially enumerated, butterflies, larger beetle taxa are well known, but are poorly studied & most spp have not been described taxonomically however there are reviews presented on the terrestrial insects, aquatic insects, freshwater decapod crustacea and non-marine mollusca.



## World Heritage Nominations

### 3 sites

- Kuk
- Bobongara/Sialum
- Varirata National Park - mixed

## Conservation/PA's

### PA's

	IUCN category
1. National Park	11 - 5
2. Wildlife Sanctuary (Ex-situ)	unassigned - 2
3. Nature Reserves	IV - 1
4. Reserves	1
5. Scenic Reserves	1
6. Marine Parks	1
7. Provincial Parks	4 - (15)
8. WMAs	IV - 22
/ potential for BRS and/or Cas	VIII - 2

## National Park Act

Proposals 78 - 100

## Integrated Conservation Development Plan (ICDPs)

- Lak
- Misin Integrated Conservation and Development Association (MICAD)
  - Involvement of people
  - Globalization /IO's
  - Conservation constraints by enabling budget
  - PNG approach - refer main paper
  - One case study - example Managed PAs
  - International obligation
  - CITES
  - Ramsar Convention **What controls measure your organization**
  - Enviromental Impact Assessment (EIA) of road EP
  - No take areas in Marine Park - now enforcement compliance is undertaken/ - rough seas
  - Customary fishing - limits of catch
  - Meaningful participation - which work & which doesn't - bottom up/top down

# Case Studies of Pacific Islands Countries

## Papua New Guinea

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## Varirata National Park - A Case Study

Participatory Rural Appraisal (PRA) processes and/or approaches engaged into whilst entering into a community and having to make do with all the odds in formalizing the documentation of a Biosphere Reserve nomination/inscription to UNESCO for the first PNG 's Biosphere Reserve proposal

### Executive Summary

Participatory Rural Appraisal (PRA) processes in entering into a expecting and/or unexpected community, requires some careful analysis before any community entry options can be considered. This is basically essential in that one needs to make himself/herself fully ascertain, not to lead into creating false expectations of the people. People are the resource owners and their interests and aspirations must take precedent over every anything. Rural communities in PNG have come a long way, they have experienced many false negotiations and they can no longer be treated as easy access now than a few decades ago.

In the similar manner, formal dedication of areas to come under any form of protected areas, whether they be a national park, world heritage sites, biosphere reserve or any other category of protected area, the communities would like to see themselves as the first beneficiaries. The decision-making process among diverse interest groups can take over a fairly lengthy period. This is relatively essential because the long viability and effectiveness of the end result will count in the end. Communities have raised concerns making specific reference to issues such as forgone development opportunities, e.g., forest logging. Such opportunities are increasingly becoming compromised when a protected area eventually become declared.

One area of particular importance is that people have now realized that they do not wish to rush into any form of conservation agreements for protected area establishment in a time space of a year. It would probably take some years, say for example five (5) years or longer. They claim they have paid so dearly for the mistakes made in the past years whilst rushing into

formalizing conservation agreements in setting aside areas for any form of development(s). In the similar manner setting aside land for any form of protected area purpose is and can be a contentious use.

To enlighten you a bit on this issue, participatory and/or consultative negotiations with the local communities to actually establish a protected area take a maximum of ten (10) years, or lucky it might take less than 5 years. Over the last thirty (30) years, the number of protected areas in PNG stood at about 47. The delivery rate of acquiring protected areas since 1966 is relatively slow. It can be deduced then that acquiring land for protected areas purpose can take many forms of community entry protocols thus awareness and advocacy programs must be spot on otherwise its may seem clear "no go". One may ask as to why people turns to behave in such a manner. There may be no quick-fix solutions to this dilemma, but one thing is certain, and that is, people do not want to be forced into making decisions, they prefer to be left alone until such time when they are ready to take on new challenges. The notion of empowering the people to let go their land ownership is like signing away their livelihood. What benefit(s) would they received, if they can be assured of employment opportunities and other business related spin-offs. These can and are just arbitrary. They just do not want to be marginalized and appear as mere spectators from the peripheries of their own land as to what is going on in their land.

A series of questions arise here, and these are: How might can this situation be averted or changed for the better? What's needs to be done? And how best can it be done? I guess the following answers are and can be most probable scenarios in having and making people agree and these can be (a), total or if not partial



empowerment (in the likely ratio of 60/40) responsibility over the resource management and administration capabilities of a protected area and this must be longer lasting without any abrupt changes emanating from within the higher structure of the host organization, (b), early involvement of the people in any decision-making powers on any new changes in the management, (c), engagement or deployment of local landowners in any gainful employment activities within a protected area whether these be casual or permanent for their own people as paid workers and/or, (d), rendering of contractual engagements for small-scale maintenance projects in a protected area, on non-abstract areas like access road improvement, building maintenance, firewood gathering and grass cutting. The more abstract areas where application of more advance knowledge is required, such as guided tours around protected areas, protected area planning, land-use capability studies to allow for installation of public recreation amenities, scientific research, and small-scale project proposals for outside funding are by far the higher level obligatory requirements of a host protected area agency.

There has been instances where on a number of occasions, the landowners have argued for their "common property rights". This sometimes become highly contentious and requires amicable solutions between the parties, thus proper accurate and clearer interpretation of governing laws or legislation covering a protected area should be clearly understood and partners reaching common consensus with lasting understanding on how the conservation laws work. If the protected area laws become violated due to disregarded or disrespected, what are the consequences that may befall a defaulter, should the law be allowed to take its natural course without fear or favour.

There is need for equitable benefit(s) sharing between partners in any potential remuneration packages earned either in cash or kind through any form of conservation-based research and development(s) within a protected area. Should bio-prospecting or bio-discovery takes place within a protected area, the end result should be rendered to the landowners as the original owners of the rights of the intellectual property (IPR) discovered. The landowners should then claim all rights leading to acquisitions of all genetic materials, as far as patents rights and so forth. The application of biotechnology in culturing new living organisms from the parent genetic materials has also become an added incentive favouring landowners. The relevant articles of the Convention on Biological Diversity (CBD) is still unknown to most landowners in PNG and they must or should be well informed on this. There are other international obligations such as bio-safety and clean

development mechanisms (CDM), climate change aspects alluding to carbon sequestration (carbon offset and sinks) using the biomass of the natural resources, particularly non-timber forest products (NTFPs), and other commercialised minor forest products such as the trade of sandalwood, eaglewood, orchids and vanilla exports and insects ranching (butterflies) in protected areas. These economic opportunities holds a huge potential and therefore requires some careful planning. The success of such planning should emanate both from the *top-down* and *bottom-up* approaches so that people are not misled with latest scientific innovations and/or interventions.

The PNG government has recognized such an huge economic potential in retrospect to science and technology. It has likewise developed new policy mechanisms, thus calling for (in PNG Pidgin English "*Stretim Nau Bilong Tumora*" meaning "Do it now for tomorrow" implying that the future generation(s) will be the major beneficiaries of today new scientific discoveries. Subsequently there has been double preparations in a space of two years from 1977 to 2003 and 2003 to 2007 on National Sustainable Development Strategies (NSDS) impinging upon priorities such as primary health care, education, transport infrastructure and promotion of the private sector as a means of addressing further the development problems. Further refinement of the NSDS also underpins others but most relevant priorities such as rural poverty reduction through rural development projects with the general principles being: (a), fostering and enabling environment for private sector activities and (b), adherence to the World Bank Structural Adjustment Program and the expenditure priorities being (1), basic education, (2), primary health care, (3), transport infrastructure and maintenance, (4), law and order and (5), income earning opportunities especially in the rural areas.

Other most profound future building blocks are such things like building trust and synergies with resource owners in a more harmonious manner with enabling conservation-based research and development through the so-called process of *top down* and *bottom-up* mainstreaming. It is presumptuous that this would from the very essence of meaningful dialogue and consultations (PRAs)

Protected areas in PNG have a fairly wide legislative coverage (*National Parks Act, Conservation Areas Act, and Fauna Protection and Control Act*) and to have them systematically blend in with other pieces of community based legislations such as the *Organic Law on Provincial and Local Level Governments*, and *Integrated Land Group Act*, there is some hope at last where peoples participation will be further enhanced

## Background/Introduction

Varirata National Park has its origins imbedded as the nucleus of the world's parks concept originally emanated from the famous Yellowstone National Park in the US. The idea first got home from a Papua New Guinean, who first visited the Yellowstone National Park and was thrilled to perceive the enormity of the limestone Yellowstone country. Upon his return, he presented a government white paper as a private member's bill to the then PNG's House of Assembly (now PNG National Parliament). It was reliably surprising that there was no long delay in getting the PNG government endorsement and approval, where the birth of PNG's first national park came into being, replicating the idea of what he actually saw.

During the novel events of the early 1960's whilst PNG was still very much under the colonial administration of then Sir Donald Cleland, the national parks idea was tossed about, finally resulting in having the park established in the local Koiari native land. It is here that PNG tries to grasp the ideal concept of the global term national park or protected areas. The locality of the park also justifies the close proximity of the travelling city residents, whose leisure needs began to prosper in the proceeding years as Port Moresby city began to expand. The outdoor leisure recreation spectrum was merely having a strong hold on those well-nationals at higher earning capacities and expatriates alike who frequented the park.

Constant dialogue and consultative negotiations ensued with three key primary landowner clans being Nadeka, Omani and Ianari together with a sole secondary stakeholder, Burns Phillip Company which used the area under a short-term lease for its piggery project. The piggery project became abandoned and the initial negotiations took place. It may seem to many as a straight-forward case, it was not. It occurred that all the process took nearly 13 years to get some consensus. Consequently Varirata stands proud to be inaugurated as the first PNG's national park by one of the PNG senior statesmen, Sir Albert Maori Kiki on the 18th October 1973. The park was formally declared and gazetted in PNG Gazette No. 7 of 18 December 1969 under the Lands Ordinance (1962-1967) and subsequently under National Parks and Gardens Ordinance (1966).

The meticulous landowners, Nadeka, Omani and Ianari formally agreed with the State to set aside their land on free-hold basis, in other words it was a gift to the crown and wanted their land to remain as a symbolic token of an indicator or a road map for others to follow and to show their genuine exemplary generosity to their future generations and that of PNG at large and they profoundly declined and resisted any offer of financial remunerations for giving away their land.

The current land area of Varirata is relatively small (1,063 hectares) by world standards however from the

very humble beginning till now it has surpassed about 30 years of existence and over the many years the area uniquely harbours a number of new discoveries of species.

With the oncoming new Biosphere Reserve proposal, it is hoped that the size of the area will tripled with the new enlargement of the buffer zone and transitional area surrounding it. Both the buffer and transitional areas will remain to be kept under the unilateral traditional ownership whilst the core area becomes the core business of the Biosphere Reserve, which it is hoped that it will act as the replenishing agent to its outer areas in the years to come.

## Short description of ecological environment

### Nature of community mobilization/ involvement cooperative, traditional indigenous co-management, extractive reserve, and others Incentive measures

Under the CBD the Convention provides for the adoption of economically and socially sound incentive measures, such as proper pricing of biological resources and the use of tradeable use rights in their management. Such measures can be an effective means of encouraging the conservation and sustainable use of biological diversity.

### Minimising adverse impacts

PNG is a party to CBD. It is therefore possible to introduce appropriate procedures for environmental impact assessment on projects, programs and policies that are likely to have significant adverse effects on biological diversity. The Convention will also provide for the notification of activities which will likely to significantly damage biological diversity and the promotion of emergency response arrangements.

### Access to genetic resources

Genetic resources are materials of plant, animal, microbial or other origin that contain genetic building blocks (such as chromosomes, genes and DNA) and have actual or potential value. They may form an important part of biological diversity and a basis of commercial activities, including the development of improved agricultural varieties and a wide range of pharmaceuticals. The Convention requires Parties to facilitate access to their genetic resources for environmentally sound uses while affirming national sovereignty and enables Parties to obtain a fair and equitable share of benefits arising from the use of their genetic resources by other Parties.



## Capacity building

Effective global action requires the expansion of national capacities, particularly in developing countries, for the conservation and sustainable use of biological diversity. In this regard the Convention provides for national and international action on research, training, the exchange of public information, and scientific and technical cooperation with emphasis on building national capabilities through human resource development and institutional building. Provisions for encouraging public understanding of the significance of biological diversity and the measures required for its conservation will be sought.

## Technology transfer

Access to and transfer of technology are essential elements for achieving the Convention objectives. Parties are therefore required to provide and/or facilitate access to and transfer of relevant technologies, such as survey and inventory techniques and methods for the control of pest species. Access and transfer are to be consistent with the adequate and effective protection of IPRs, for example patents. Benefits derived from technologies developed from genetic resources are to be shared with the Parties providing the resources

## Biotechnology

The Convention makes provision for Parties which provide genetic resources for biotechnological research to participate in and share in the result and benefits arising from such research. There are also requirements relating to the safe trade in genetically modified organisms, (GMOs).

## Indigenous peoples

Many indigenous communities have a close and traditional dependence on biological resources and can make a significant contribution to the conservation and sustainable use of biological diversity. The Convention requires Parties to protect and encourage customary use of biological resources in accordance with sustainable traditional practices. It also provides for the maintenance and wider application of relevant indigenous knowledge, innovations and practices and the equitable sharing of benefits arising from their use.

## Financial resources

Developing countries require financial assistance to enable them to implement the Convention and benefit from its provisions. Under the Convention developed countries are to provide new and additional financial resources to developing countries. Parties have a key role in funding matters for example in determining policy, strategy, program priorities and eligibility criteria which proven access to and the use of Convention funds

## Institutional arrangements

The Convention establishes a number of institutional arrangements necessary to ensure effective implementation.

The Conference of the Parties is the key decision-making body responsible for monitoring the implementation of the Convention and has a major role in funding matters. Parties are required to submit reports on measures taken from the implementation of the Convention, including the status of biological diversity and the effectiveness of measures taken to give effect to the Convention. It also has a major role in identifying technologies for the conservation and sustainable use of biological diversity suitable for transfer to developing countries.

## Appendix A: Framework for the Preparation of Case Study

### General questions that we are trying to address:

- What processes and mechanisms have been used to address conflict in community consultation (PRA) processes in PNG?
- Which processes have worked? Which have not? And why not?

### Background/introduction

- General information on the project being described
- Location, brief history, goals
- Short description of ecological environment
- Nature of community involvement in managing protected areas (cooperative, traditional indigenous community management, extractive reserve, other)
- How often is this type of project found in PNG? Therefore, how generally useful will the lessons learned from analysing conflict resolution issues surrounding it be?

### The problem or conflict

- What were or are the problems or conflicts that arose in trying to achieve the project's goals? Was this part of a larger situation? If so how did it relate to the larger context?
- What were or are the issues at stake?
- Who was affected by the issues? How did they get involved? Could some of the parties be described as "primary stakeholders", i.e., those directly involved, whilst others are "secondary stakeholders parties" involved more indirectly?
- Were the issues stated differently by different groups involved in the situation?
- What were the underlying needs and concerns of each of the major groups? (stakeholders analysis – provide examples).



### Attempts at dispute resolution

- A. What traditional means of resolving the disputes were available? Were they used? Why or why not?
- B. What public (as opposed to behind closed door) efforts have been made to address the problem?
- Meetings for information exchange or building confidence/consensus between some or all of the parties involved;
- Direct negotiations/consultation (*from the bottom-up*) between some or all of the parties involved;
- Mediation in a open transparent manner between the parties by someone not directly involved, such as a independent consultant/advisor from an NGO, a trusted government official or a neutral member of the community;
- Setting up an arbitration or advisory council to address problems as they arise
- Fact-finding by someone who could communicate conveniently with all sides
- Who initiated the dispute resolution efforts? What was their relation to the other parties in the dispute or problem? What was their motivation to resolve the dispute? Why were their efforts accepted or rejected?
- How was the process started? Was a meeting of the parties called? Did the convening groups or mediator talk to the various sides one by one basis?
- What were the general features of the process? How long did it last? How many meetings were held? Which stakeholders attended which meetings? How formal or informal were the meetings?
- Why were the parties willing to enter into a dispute resolution process at that time? Did one of the parties change its position, thereby making the others willing to negotiate? Or did the costs of continuing without a resolution of the conflict become very high?
- Did a trusted intermediary or advisor play a role by suggesting a credible negotiation process? Other reasons?

- What happened at the first meeting or other type of session organized to formally begin addressing the conflict among various sides? What issues were discussed?
- What have been some of the subsequent dynamics of the process? Example of the type of thing that sometimes happens includes: What solutions have been proposed? Who proposed them?
- New issues or individual emerges as a leader;
- Groups from alliances among themselves or with powerful outside actors;
- One group or individual emerges as a leader;
- Partial agreements are reached, but failure by some sides to comply with the accord creates distrust on other issues;
- What solutions have been proposed? Who proposed them? How were these ideas received by the other parties involved?
- Did the meetings continue smoothly or did they sometimes break off? What got them going again?

### Results/outcomes

- A. Was any agreement reached?
- B. Does the agreement cover all the major issues at stake or only some? If only some, which ones?
- C. What form did the agreement take? Was it written? Verbal? A Plan? In either case, what does it cover?
- D. Did the agreement clearly outline steps for carrying it out (implementation)?
- E. Have the parties complied with the agreements so far? If not, why not?
- F. What has happened to relations between the parties after one side violated the agreement?

### Lessons/conclusions

Based on the experience described in the case study, what recommendation(s) would you make for future efforts at resolving similar community conservation disputes?



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# Case Studies of Pacific Islands Countries

## Tonga Éua Island Case Study

by Mr Asipeli Palaki

### Introduction

The Kingdom of Tonga is located in the Central South Pacific and consists of 174 scattered islands of which 37 are inhabited. The present population is scattered over the four main groups of Tonga. The total population of Tonga is approximately 100,000 people spread over a total land areas of 800 sq miles.

Owing to limited natural resources, the population are largely subsistence farmers and fishermen. Overseas earnings comes from agricultural products, tourism and remittances from Tongans abroad.

The island of Éua lies at the south-eastern end of the archipelago that makes up the Kingdom of Tonga. Éua lies 20 km south west of the main island of Tongatapu and at approximately 90 sq km in land size. The island rises from the west to east along a series of raised terraces to high cliffs above the eastern coast. Éua is the closest island

In Tonga to the deepest water in the world (Tonga trench)

### Éua

#### Geology:

Although marine limestone is the major rock type of the island, Éua is originally of volcanic origin, beginning as eruptions on the Tonga ridge between 46 and 40 million years ago.

#### Soils:

There are two parent materials that the soil on Éua were derived from, i.e ancient basalts and raised coral reef limestones. Both the parent materials are covered by tephra or more recent volcanic ash.

#### Freshwater resources

The major stream catchments of Éua flow from the central area of the island within the forest farm north to the harbour and the town in Éua. These are the only water supply for domestic use and agriculture even though there few catchments in some other areas in

Éua. Cement tanks are building in households to combat water shortage when the streams are dried out during winter season.

### Climate

South-east trade winds prevailing over Éua. From April to November the winds blow from east to south east.

The average annual rainfall for the island of Éua is 2700 mm and more than half of which falls between the wet season from November to April.

Éua including the whole of Tonga have been hit by cyclones almost every year. The average cyclone that cross Tonga annually is approximately 3 cyclones during the last ten years. This year is a record year for number of cyclone across Tonga which is 5 cyclones.

### Vegetation

Only 6 % of the land areas covered by rain forest in Tonga. 4 % of which are from the island of Éua.

### Conservation in Tonga

#### Brief history

- The concept of parks and reserves is not new to Tonga
- The first ever established park and reserve was in 1946 by a royal command
- This set the legal precedent of parks and reserves coming under the Ministry of Lands, Survey and Natural Resources and demonstrate the foresight on the part of the Tongan government
- In 1979 established 2 national parks and 5 marine protected areas
- in the 90's established 2 more national parks on outer island groups
- In 1972 another Royal command to establish 2 more reserves

#### Established National Parks and Reserves

- there are 6 national parks in Tonga now
- 5 marine protected areas
- 1 conservation areas (the whole island groups of Haápai)



## Legislation

- Fish and Preservation Act of 1915
- Parks and Reserves Act of 1976

## Problems / constraints

- Enforcement of park boundaries and regulations is poor
- Protected areas do not have a good record in the Pacific including Tonga
- Local communities do not respect the protected areas
- Lack of funding
- Lack of government's commitment (conservation is still not the priority area)
- Lack of local expertise in the area of conservation

## Way forward

- Community involvement in every phase of establishing a protected area
- Community consultation and awareness programme in place
- Appraise the amount of surveillance/enforcement required for each protected area
- Capacity building
- Development of a management plan for each protected area

## Éua Man and Biosphere Project

The Éua Man and Biosphere Project (EMB) is a model for sustainable development in the Kingdom of Tonga by attempting to balance economic development, natural resources conservation and cultural integrity.

The EMB consists of a transition strategy to incorporate community involvement in the management of the pristine environment and surrounding areas that comprises the entire island of Éua.

Strategies to support long-term finance of the biosphere reserve are pivotal, including income-generating mechanisms such as ecotourism to develop more local responsibility.

### The primary goals of the project are:

- Establish and conserve an area of unique biodiversity whereby the surrounding communities and national manager develops traditional and sustainable uses of its natural resources
- Establish a management scheme on Éua and within the legal infrastructure empowering the surrounding

- communities to efficiently administer the biosphere
- Coordination among agencies and communities
- Capacity building on sustainable development issues
- Creation of new legislation or guidelines for the biosphere
- Development of monitoring system
- Creation of strategies that will build both economically suitable and ecologically sustainable platforms by which Éua will develop sustainably

## Strategic Areas

1. Institutional strengthening and community capacity building mechanism
2. Monitoring and analysis systems to provide baseline data and subsequent inventory to allow EMB accountability and scientific research
3. Fiscal and legal mechanisms to ensure the EMB is properly managed
4. Proper feedback loop and continuous training promoting information exchange and technology transfer to keep managers and community members current on the latest management techniques and strategies

## Issues

1. Roles and Capabilities of government agencies
  - Key agencies are not present in Éua
  - Legislative confusion – agencies responsibilities unclear or duplicate
2. Land use conflicts
  - Clearance of indigenous forest for agriculture
  - Continued access by local people to the resources of protected areas while sustaining the resources
  - Conversion of indigenous forests to plantation forestry
  - Delineation of the park
3. Safeguarding the natural values of the natural parks
  - Impacts of the introduced pests and weeds
  - Risk of fires
  - Status of native plants and animals
  - Protecting of physical features
  - Viability and long term viability
  - Protecting of an archaeological sites
  - Potential exploitation of pharmaceutical plants and animals
  - Military maneuvers
4. Development of tourism and recreation
  - Inadequate planning
  - Potential impacts of tourism on natural features

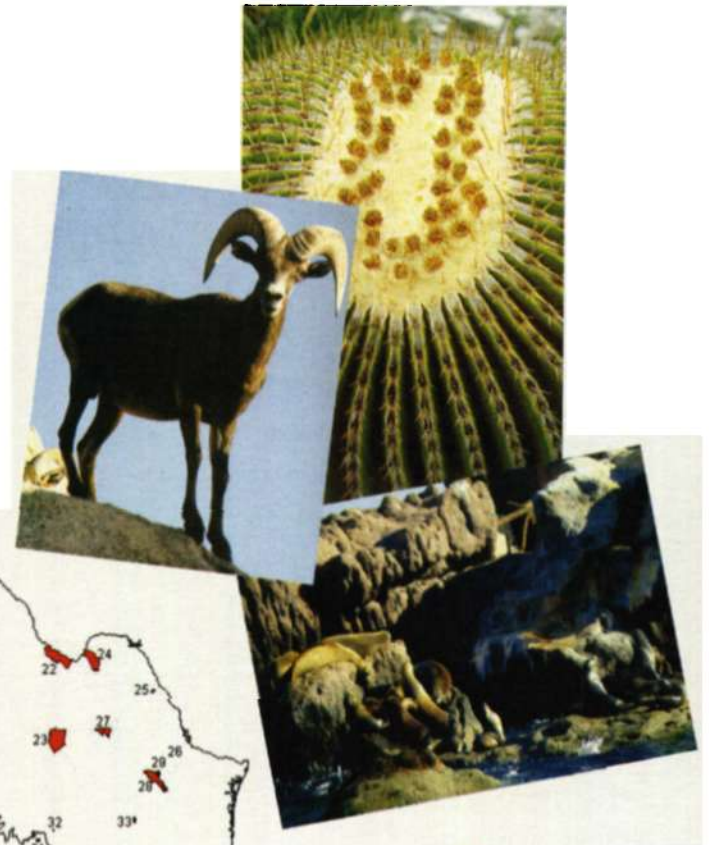
# Case Studies of Pacific Latin America and the Caribbean Countries

## Mexico A Case Study of Conservation and Development in a Mexican Biosphere Reserve of the Pacific Coast

by Ms Laura Arriaga

### Structure

- Natural protected areas with marine influence in the Pacific coast of Mexico
- El Vizcaíno Biosphere Reserve
  - Natural and historic values
  - Conservation programs
  - Use of natural resources
  - Compatibility between conservation and development



### Natural Protected Areas in Mexico

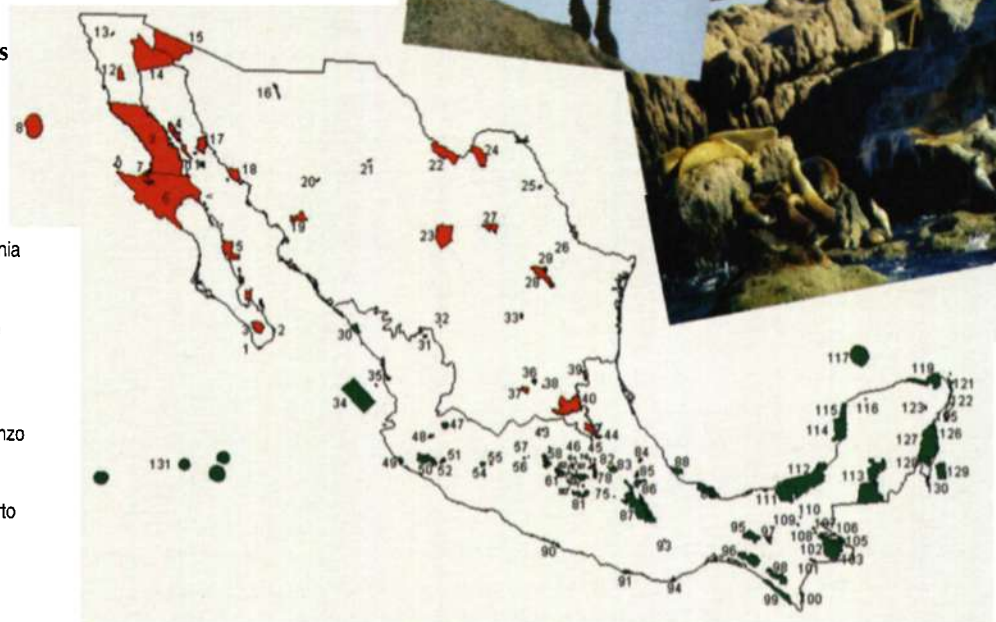
#### Natural Protected Areas with Marine Influence along the Pacific Coast

##### Aridamerica

1. Cabo San Lucas
2. Cabo Pulmo
4. Islas Del Golfo De California
5. Bahia De Loreto
6. El Vizcaino
7. Complejo Lagunar Ojo De Liebre
8. Isla De Guadalupe
9. Valle De Los Cirios
11. Archipelago De San Lorenzo
14. Alto Golfo De California Y Delta Del Río Colorado
15. El Pinacate Y Gran Desierto De Altar
17. Isla Tiburón
18. Cajón Del Diablo

##### Mesoamerica

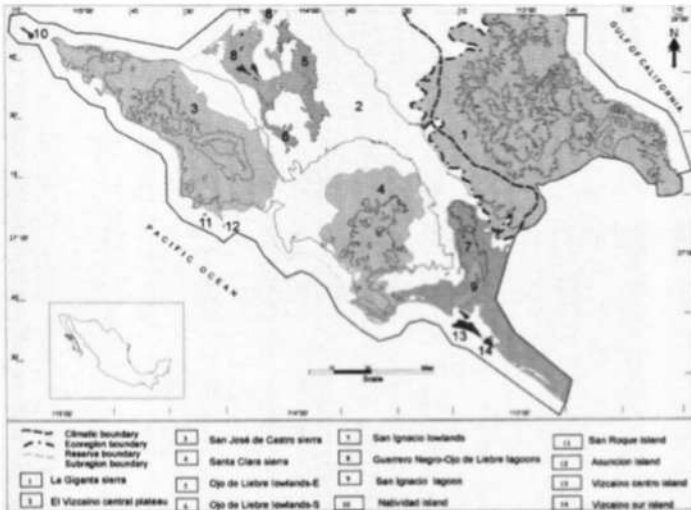
- |                        |                          |
|------------------------|--------------------------|
| 30. Meseta De Cacaxtla | 91. Lagunas De Chacahua  |
| 34. Islas Marias       | 94. Huatulco             |
| 35. Isla Isabel        | 99. La Encrucijada       |
| 49. Chamela-Cuixmala   | 131. Islas Revillagigedo |
| 90. El Veladero        |                          |



Biogeographic and Cultural Regions	Number NPA	Surface (km <sup>2</sup> )	Surface (%)
Aridamerica	37	98,080	60
Mesoamerica	91	65,498	40



## The Vizcaino Biosphere Reserve



Source: Castellanos A., L. Arriaga & C. López. 2002. El Vizcaino Biosphere Reserve: A case study of conservation and development in Mexico. *Natural Areas Journal* 22: 331-339.

### Legal framework

- 1972, 1979 & 1980. Manuela, Guerrero Negro, Ojo de Liebre & San Ignacio Lagoons. Federal Decree as Whale Refuges.
- 1972 Ojo de Liebre and San Ignacio Lagoons. Federal Decrees as Refugees for migratory birds and wildlife
- 1988 Federal Decree as Biosphere Reserve
  - Includes 2,546,790 ha under protection.
  - 16 core areas covering 363,438 ha and the remaining 2,183,352 ha comprise buffer zones
- 1993 part of MAB-UNESCO Program

### Natural and historic values

#### Human settlements and land tenure

#### Industrial and productive activities

- Salt production, agriculture, fisheries, livestock raising, and ecotourism

### Natural Values: Physical environment and species diversity

- Six climate subtypes all part of the general type BW (arid, hot, and dry climate).
- Diverse physiography and geomorphology: sierras, flatlands, small islands, coastal lagoons, and wetland complexes.
- Ten different vegetation types, bearing 447 species of vascular plants with 10% of endemics.
- 308 terrestrial vertebrate species (fish not included): 4 amphibians, 43 reptiles, 192 birds, and 69 mammals, 2 of these endemic.
- 65 taxa federally protected, mostly reptiles, waterbirds, and mammals, including 10 endangered species.

## El Vizcaíno Biosphere Reserve Federal Management Plan (2000)

### Include 8 components:

1. World Heritage
2. Conservation, management and use of natural resources
  - Key-species oriented
  - 9 priority species or groups of species: peninsular pronghorn, gray whale, golden eagle, bighorn desert sheep, marine turtles, agaves, cacti, ironwood, boojum tree
3. Public and recreational use
4. Monitoring and research
5. Environmental protection
6. Operational
7. Management and coordination
8. Legal framework

## Conservation Programs

### Key-species oriented

Grey whale (*Eschrichtius robustus*).

Special protection

- 6,000 grey whales arrive to Mexican lagoons, 1,200 arrive to Ojo de Liebre lagoon and 350 to San Ignacio lagoon.
- Tourism and fisheries regulation



Peninsular pronghorn (*Antilocapra americana peninsularis*). Endangered species (175-150 individuals)

- Intensive and extensive management of the population
- Environmental education



Desert bighorn sheep (*Ovis canadensis*). Special protection. Appendix II CITES (> 300 individuals)

- Major game species
- UMA "ejido" Alfredo V. Bonfil
- 3 permits to hunt/season on average, during the last 4 years
- Ejido's fund (\$95,000 US)



### Not relevant species in federal programs

Resident and migratory birds

- 29 resident species which include: 9 endangered species (2 Appendix 1 CITES, 1 Appendix 2 CITES)
- Birds have limited protection through the reserve. Single-species conservation program





## Flora

- Government only highlights the need to start restoration.
- Lack of a diagnosis of which species must be restored, which areas, lack of scientific and technical tools to do it.

## Other species not even considered

- Desert fox

## Historic Values

### World Heritage Site 1993 by UNESCO

- Laguna Ojo de Liebre: Whale sanctuary
- Laguna de San Ignacio: Whale sanctuary
- Sierra de San Francisco: Prehistoric cave paintings

### Sierra de San Francisco

- Prehistoric cave paintings (300 sites) and petroglyphs.
- Most ancient ones are 10,500 years old done with mineral pigments
- Nomadic ethnic group (cochimiés) whose living was based in fruit and seafood recollection

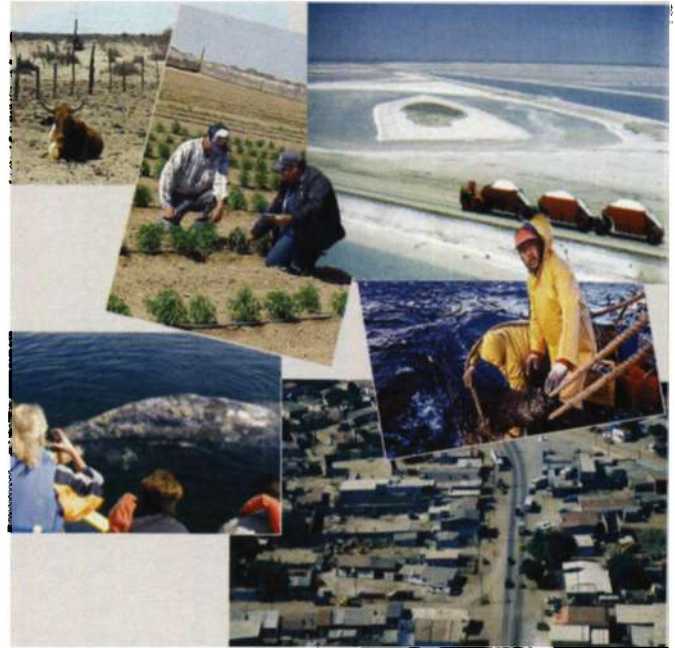
## Use of natural resources

### Salt Production (Exportadora de Sal - ESSA)

- Joint venture of the Mexican federal government and foreign private investment
- Operation since 1954
- ESSA facilities consist of 34,000 ha of 1 m-deep evaporation ponds, built over natural impermeable hypersaline soils
- Clean process which includes pumping water (2 million m<sup>3</sup> per day) to evaporation ponds and gradual evaporation of marine water.
- Salt mechanically harvested after 2 years, piled, and transported to a dock (Ojo de Liebre Lagoon)
- Salt production 7,000,000 tons/year
- Employs 1,200 persons (4,000 economic active population in Guerrero Negro)
- 70% of the gross income of Guerrero Negro
- Clean industry certificate (Profepa, 2000)

### Agriculture

- Restricted to the central plateau of the Vizcaíno Desert
- Limited availability of underground water (137 wells, water consumption de 6,877 l/seg)
- Local land and water resources restricted for the use of "ejidos" or community members



- Small and patchy land surface suitable for agriculture (10,697 ha) mostly irrigated (71%)
- Private farms (61%) and communal units within "ejidos" (39%)
- Combined set of products for local commerce and self sustenance (tomato, alfalfa, chilli, strawberry, corn, figs, date, garlic, pea and beans)

### Livestock raising

- 418 cattle-raisers. Cows, goats, sheep, pigs, and chicken
- Milk production 2,892, 790 l/year

### Fisheries

- Commercial fisheries for international markets
- West coastal zones of Guerrero Negro, Punta Abreojos, Laguna de San Ignacio
- Several species: abalone (*Haliotis fulgens* y *H. corrugata*) and spiny lobster (*Panulirus interruptus*), 6 clam species, squid, hrimps, several species of fish (sardines, anchovies, and tuna) and other commercial invertebrates
- Abalone (400 tons/year) and lobster (600 tons/year) major products
- 3 species of abalone overexploited and sea cucumber. Pearl oyster species (*Pinctada mazatlanica* and *Pteria sterna*) closed fisheries since 1980s. 5 species of turtles endangered due to illegal practices
- Aquaculture includes abalone and an exotic species (*Crassostrea gigas*)
- 20 social organizations and 35 private productive units, mostly in the Northern Pacific Region (Punta Abreojos)



## Tourism

- Whale watching regulated (NOM-131-ECOL-1998) from December to April (low income activity for local inhabitants)
- Not a traditional activity (fishermen)
- Tours organized by outside-based companies
- \$3.3 million spent by tourists visiting the lagoon, but less than \$26,000 (<1%) was spent on salaries and purchases in the area (1994)
- Foreign services almost not regulated

## Human settlements

- Include 8 localities, 200 rural communities and ca. 35,000 inhabitants. Most important Guerrero Negro.
- Land tenure 72% of the land are "ejidos" and 17% is public (federal) land
- 22 "ejidos", 28 land to be regulated, 1 federal franchise (ESSA), 50 private lands, 5 public (state government) lands, 14 islands, 2 lagoons, and public (federal) land.
- Federal lands have a Public Property Record (12/1998)(Reg. No. 24282) SRA

## Compatibility between conservation and use of natural resources

- Overall extractive land uses comprise 2.5% of the reserve's land surface
- Extractive activities are spatially confined and differentiated
- Increase in the number of marine bird species breeding in the lagoons, islands and wetlands of the biosphere reserve.
  - 17 species were recorded during early 1900s and now 29 resident species are recorded as resident species
- Increase in the number of whales observed in the lagoons during the last decades.
- Important private efforts (ESSA & Ford Motor Co.) to recover pronghorn without being successful
- Sustainable hunting of the desert bighorn sheep

## Potential Growth of Productive Activities

### Salt Production (ESSA)

- Cancelled project to expand to San Ignacio lagoon
- Loss in the international market

### Agriculture Restricted

- Water-demanding activity
- Inefficient use of water (86% of the Vizcaino watershed)

### Livestock raising Restricted

## Fisheries

- Overexploitation
- Aquaculture

Fisheries vs Ecotourism (4 months/year)

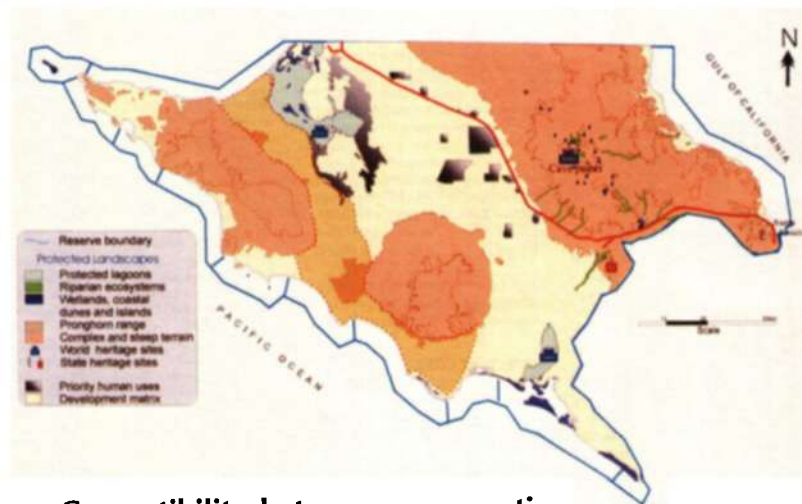
## Ecotourism

- Benefits for local inhabitants need to be documented

## Human settlements

- Irregular human settlements (San Ignacio Lagoon)
- Problems managing solid and water residuals

## Network of Protected Landscapes and Development Matrix



## Compatibility between conservation and use of natural resources

### Limitations of the Biosphere Reserve Concept

- Biosphere reserves: Representative biomes, relatively undisturbed by humans, where traditional land uses can continue indefinitely
- Development that goes beyond meeting the subsistence needs of residents is not part of this framework
- traditional use vs multiple uses?
- traditional use vs intensive use of natural resources?
- what are the limits for development in local and rural communities in biosphere reserves, particularly in countries like Mexico, where land tenure is multiple?

## Acknowledgements

Some photos were kindly provided by:

- Guillermo Aldana
- Alfredo Ortega
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# Case Studies of Pacific Latin America and the Caribbean Countries

## Costa Rica



by Mr Mario A. Boza  
The Leatherback Trust/Costa Rica

## Promotion of Responsible Fishing and Consolidation of Marine-coastal Protected Areas in Central America

### Synopsis

The sub-project "Promotion of Responsible Fishing and Consolidation of Marine-Coastal Protected Areas in Central America" has been included in the ASPACO/Central-America Project. During the first phase (May 2002 to October 2003), the activities were concentrated on a Central American evaluation of the development and trends of coastal and pelagic fisheries, as well as on a listing of Marine and Coastal Protected Areas, including conservation and legal status. Local conservationists carried out a national study in Guatemala, Honduras, El Salvador, Nicaragua and Costa Rica. Following this phase, a workshop was organised in El Salvador with representatives of government institutions, fishermen, and conservation groups. The meeting provided an occasion to identify the problems associated with coastal areas and the search for solutions on a regional level.

The general situation is one of depletion of marine resources, which is due to pollution, urban development, the destruction of reproduction sites for migratory species and the over-exploitation of fish as well as modest and inadequate protected areas.

During the second phase (2004 to 2006) a regional strategic plan will be implemented. The guidelines have been identified as follows:

- Reduce pressure on fish and accidental fishing.
- Create new legislation and the application of existing legislation
- Promote non-consumptive marine and coastal resources
- Introduce environmental education
- Strengthen conservation institutions and organizations
- Establish national, regional and international co-operation
- Designate biosphere reserves and the protection of marine and coastal areas

### Promoción de la pesca responsable y consolidación de Areas protegidas marino-costeras en centroamerica

### Introducción

De mayo del 2002 a octubre del 2003 se desarrolló en Centroamérica (de Guatemala a Costa Rica) el subproyecto denominado "Cooperación Centroamericana para el Desarrollo de Pesquerías Responsables y el Manejo de Areas Marinas Protegidas" (Proyecto ASPACO/Centroamérica). Durante la primera fase de este subproyecto se llevó a cabo una evaluación sobre las pesquerías costeras y pelágicas, y sus tendencias a través del tiempo, y un análisis de la situación actual de las áreas protegidas marinas y costeras y de los problemas que las aquejan. La información sobre estos temas para cada uno de los 5 países participantes se ha incluido en la Estrategia Regional del Pacífico Centroamericano para Promover Pesquerías Responsables y la Consolidación de las Areas Protegidas Marinas de la Región, recién publicada.

Como actividad final del subproyecto, se llevó a cabo un Taller en El Salvador, en septiembre pasado, entre pescadores, conservacionistas y representantes de entidades gubernamentales, todos relacionados con el aprovechamiento y la conservación de los recursos marinos y costeros. Esta actividad tuvo el propósito de dialogar sobre la situación de estos recursos y de buscar soluciones a los problemas identificados en un contexto regional. El resultado final del subproyecto ASPACO/Centroamérica fue la elaboración de la Estrategia Regional antes mencionada.

Con base en las discusiones del Taller de El Salvador, las entrevistas llevadas a cabo y la literatura consultada, se pudo documentar la severa disminución, las tasas de crecimiento negativas y hasta el agotamiento de las poblaciones de una gran cantidad de especies marinas. La pesca masiva e incidental, la destrucción de sitios clave de reproducción por el desarrollo urbanístico, la contaminación, el hecho de que gran cantidad de las especies marinas son migratorias y la crisis en que se encuentran los parques y reservas marinos y costeros, han provocado una seria disminución de las poblaciones de casi todas las especies que viven en los mares de la región en forma permanente o estacional, al extremo de que las actuales flotas están en general sobredimensionadas (la flota camaronera de Costa Rica lo está en un 30%).

Un reciente informe para la región cita que “la competencia por los recursos y el afán de aumentar la cantidad y la variedad de las capturas menguan por igual las poblaciones de pargo de la mancha (*Lutjanus guttatus*), cabrilla gris (*Epinephelus itajara*) y corvina coliamarilla (*Cynoscion stolzmanni*), entre otras” (Sucumben, 2003). Otras de la gran cantidad de especies amenazadas son 3 de las cinco especies de tortugas marinas que desovan en las playas centroamericanas [baulta (*Dermochelys coriacea*), negra (*Chelonia agassizi*) y carey (*Eretmochelys imbricata*)], los tiburones costeros, como el toro (*Carcharhinus leucas*), el azul (*Prionace glauca*) y el gris (*Carcharhinus amblyrhynchos*), y oceánicos, como el ballena (*Rhincodon typus*), el punta plateada (*Carcharhinus albimarginatus*), el sedoso (*Carcharhinus falciformis*) y el martillo (*Sphyrna mokarran*); delfines nariz de botella (*Tursiops truncatus*), manchado (*Stenella attenuata*) y común (*Delphinus delphis*); ballenas jorobadas (*Megaptera novaeangliae*), piloto (*Globicephala macrorhynchus*) y orcas (*Orcinus orca*); peces sierra (*Pristis perotteti*), pulpos, peces picudos como el vela (*Istiophorus platypterus*), el merlín (*Makaira mazara*) y el espada (*Xiphias gladius*) –que quedan atrapados en las palangres-; camarones (en Guatemala, la población de camarones y camaroncillos costeros se encuentra ya sobreexplotada), langostas, algunas especies de atunes (*Thunnus spp.*) y sardinas (*Odontognathus spp.*); y peces de arrecife en general.

El caso de la tortuga baulta del Pacífico (*Dermochelys coriacea*) es uno de los más dramáticos; su población se redujo de 1367 individuos en 1988-89 anidando en Playa Grande, Parque Nacional Las Baulas, Costa Rica, a 200 en 1999-2000 (Spotila, 2000), y a 68 en 2002-2003.

Sobre el tema del agotamiento del recurso, el Centro de Pesquería de la Universidad de la Columbia Británica ha indicado que el sector pesquero del istmo centroamericano sufre una severa crisis, al igual que las pesquerías mundiales en general. La causa principal de esta crisis es la sobrepesca (Pauly, 2002). A

consecuencia de ello, “cada vez hay menos peces en el mar”, como dijo un pescador de Puntarenas, Costa Rica (Alvarado, 2003), y “los recursos marinos se agotan”, como dijo otro pescador de Honduras (Sucumben, 2003). Esta situación adquiere dimensiones dramáticas al tomar en cuenta que en toda Centroamérica, la pesca es una importante fuente de trabajo en las zonas costeras; se estima que en Guatemala, Honduras y El Salvador 258 mil personas viven de la pesca artesanal e industrial (Sucumben, 2003).

Pero también existe la degradación de los hábitats marinos de mayor importancia para la reproducción y crecimiento de diversas especies, tales como manglares (muchos de ellos talados para leña, invadidos o transformados en lagunas de crianza de camarones), arrecifes de coral (afectados por la contaminación, la sedimentación, el turismo no sostenible y la extracción masiva de especies) y playas (alteradas por el desarrollo masivo de casas y hoteles debido al agradable clima del Pacífico mesoamericano).

Asimismo, existe en toda la región un grave problema de contaminación, debido a la descarga de aguas negras, de plaguicidas y de toda clase de residuos y desechos urbanos e industriales, agravado por la contaminación producida por los barcos al limpiar sus bodegas y echar sus basuras. En Costa Rica, por ejemplo, el último informe del Estado de la Nación (Estado de la Nación, 2002), hace referencia al deterioro de las poblaciones de especies costeras debido a la sobrepesca y a la contaminación.” En esta nación, el golfo de Nicoya y la desembocadura del río Tárcoles son las áreas más afectadas por la contaminación en todo el país (Avalos, 2003).

Por supuesto que la situación en Centroamérica no es muy diferente a lo que está sucediendo en todo el mundo con los recursos marinos y costeros. Con base en la amplia literatura que existe sobre la situación de estos recursos, es muy claro que nos estamos acercando a la pauperización de los mares, y que de seguir la situación, en un futuro cercano los mares del planeta serán grandes desiertos biológicos. El Fondo Mundial para la Naturaleza (WWF), con base en su Informe Planeta Vivo, ha estimado que el mundo está perdiendo su biodiversidad, tanto terrestre como marina, “a un ritmo comparable al de las grandes extinciones masivas del pasado” (WWF, 2002); y las Naciones Unidas han expresado preocupación “por la cantidad considerable de capturas incidentales, en particular de peces jóvenes y descartes en la pesca en varias de las pesquerías del mundo...” (Asamblea General, 2003).

Sobre el mismo tema, y a manera de ejemplo, según un estudio publicado en la revista Nature, se estima que el 90% de las especies de peces grandes y de mayor importancia económica, como los tiburones, los peces espada, los atunes y los merlines, han desaparecido del mundo en los últimos 50 años, como resultado

devastador de la pesca industrial (Steiner, 2003 & Walton, 2003). Sobre el mismo tema, Myers & Worm (2003) han indicado que la biomasa de los grandes peces predadores es hoy en día sólo cerca del 10% de los niveles preindustriales. Por otra parte, durante el reciente V Congreso Mundial de Parques, se resaltó el hecho de que menos del 0,5% de los mares y océanos del planeta forman parte de reservas o parques naturales (Koch, 2003).

Ante este escenario, es evidente que se hace necesario poner en práctica en Centroamérica, una amplia serie de medidas, tales como limitar el esfuerzo pesquero, establecer y consolidar parques, santuarios marinos y zonas de veda, promover la prohibición de métodos tan destructivos como la pesca con palangres y trasmallos, involucrar al público en general en el problema, lograr el apoyo de los que promueven actividades marinas no consuntivas –como el turismo ético y la pesca deportiva responsable–, mejorar la legislación nacional y la internacional, prohibir el comercio internacional de especies amenazadas, aumentar la capacidad de controlar las violaciones a las leyes y regulaciones vigentes, promover el consumo de productos certificados, lograr el trabajo en equipo de las instituciones y organizaciones interesadas en conservación marina y promover un aumento de la eficiencia de las autoridades pesqueras.

Las áreas protegidas, el turismo ético y la pesca deportiva merecieron particular atención en el Taller de El Salvador. Con respecto a las áreas protegidas marinas, se ha indicado que son “una condición necesaria para la continuación de la existencia de la pesca” (Pauly, 2003). Por otra parte, el turismo como base en la lucha contra la pobreza, mediante el aprovechamiento del “extraordinario patrimonio natural de la región iberoamericana” –lo que incluye, por supuesto, los recursos del mar–, fue considerado como una prioridad durante la III Conferencia Iberoamericana de Ministros de Turismo, celebrada en septiembre pasado en Bolivia (Turismo, 2003). El mejor ejemplo del potencial que tiene el ecoturismo lo constituye la ballena jorobada (*Megaptera novaeangliae*) en Costa Rica. Es bien conocida la importancia de este país para la crianza de estas ballenas, por cuanto se sabe que desde el Parque Nacional Santa Rosa, en el Pacífico Norte, hasta la península de Osa, en el Pacífico Sur, es posible observar tanto a las que vienen desde California como las que emigran desde la Antártida.

Sobre el tema de la pesca deportiva responsable, la Organización del Sector Pesquero y Acuícola del Istmo Centroamericano (OSPESCA) concretará en los próximos meses una estrategia regional para el desarrollo de este deporte, asociada con el turismo, la cual le podría generar a la región ingresos por unos US\$ 500 millones (Murillo, 2003). Las inversiones en Costa Rica en este rubro son de más de US\$ 34 millones, y en

Guatemala se están construyendo hoteles especializados en el tema. Un importante ejemplo de esta actividad en la región lo constituye la competencia de pesca del pez vela que se efectúa cada año en el Pacífico de Guatemala.

## Resolución de Bahía del Sol, El Salvador

Los participantes al Taller de El Salvador, que tuvo lugar en septiembre pasado, aprobaron por unanimidad la siguiente resolución (se omiten los considerandos, los cuales aparecen en la Estrategia Regional):

“Nosotros, los abajo firmantes, participantes en el Taller sobre Cooperación Centroamericana para el Desarrollo de Pesquerías Responsables y el Manejo de Areas Marinas y Costeras Protegidas en la Costa Pacífica”, celebrado en el Hotel Bahía del Sol, en El Salvador, del 24 al 27 de septiembre del 2003, tomando en cuenta la gran necesidad de obtener cooperación técnica y económica internacional para lograr, a nivel del Pacífico de toda la región, el desarrollo de una pesquería responsable y la consolidación de sus áreas protegidas marinas y costeras, resolvemos solicitar:

Al Gobierno del Japón, el financiamiento de una segunda fase del Proyecto “Asian Pacific Cooperation for the Sustainable Use of Renewable Natural Resources in Biosphere Reserves and Similarly Managed Areas (ASPACO/Centroamérica II), que se extendería de los años 2004 al 2006:

A la UNESCO/MAB, la continuación del subproyecto para Centroamérica basado en la “Estrategia de Cooperación Centroamericana para el Desarrollo de Pesquerías Responsables y el Manejo de Areas Marinas y Costeras Protegidas en la Costa Pacífica”. Este subproyecto haría énfasis en actividades relacionadas con la reducción de la pesca de fauna acompañante durante operaciones pesqueras comerciales, consolidación de áreas protegidas existentes, creación de nuevas áreas protegidas y elevación a categoría de manejo internacional para las áreas protegidas que lo ameriten, conservación y restauración de manglares, arrecifes de coral y de poblaciones de peces pelágicos, cetáceos, tortugas marinas y aves costero-marinas; aplicación de la legislación vigente nacional e internacional, creación de nueva legislación, fomento de la educación ambiental, el ecoturismo y la investigación



científica; búsqueda de cooperación internacional y fortalecimiento de instituciones gubernamentales, de organizaciones conservacionistas y de asociaciones de pescadores artesanales y comunidades marino-costeras.”



Fig. Nº 1. Los asistentes al Taller de El Salvador solicitaron al Gobierno del Japón y a UNESCO/MAB el financiamiento de una segunda fase del Proyecto ASPACO y la continuación del subproyecto ASPACO/Centroamérica. (Fotografía cortesía de PRETOMA/Costa Rica).

## Los siete grandes temas identificados

Tanto durante el Taller de El Salvador como durante las fases previas de desarrollo del subproyecto ASPACO/Centroamérica, se identificaron 7 grandes temas los cuales hay que promover muy activamente con el propósito de avanzar en el desarrollo de una pesquería responsable y una consolidación de las áreas protegidas marinas y costeras. En otras palabras, se llegó a un consenso sobre lo que hay que hacer para avanzar rápidamente en este sector.

Para llevar a cabo estos grandes temas y sus principales actividades, es necesario el establecimiento de un nuevo subproyecto ASPACO/Centroamérica, que se desarrolle en los 6 países de la región que tengan costas sobre el Pacífico. Este subproyecto debería ser independiente de los gobiernos, aunque trabajaría en estrecho contacto con las instituciones relacionadas con la pesca y la conservación marina, y debería contar con los fondos y el personal necesarios para llevar a cabo las acciones prioritarias identificadas y las nuevas acciones que surgirían conforme el subproyecto avance.

Los 7 grandes temas identificados son los siguientes:

### I. Reducción del esfuerzo pesquero y de la pesca incidental.

Este tema tiene que ver con la reducción en forma general del esfuerzo pesquero sobre un recurso cada vez más exiguo, con investigaciones sobre la situación actual, con la puesta en práctica de técnicas que reduzcan la pesca incidental y eviten la enorme matanza de aves marinas, tortugas y tiburones, y con la aplicación del código de pesca responsable y de planes de acción.

Las acciones prioritarias por desarrollar en este tema son:

#### 1. Reducción del esfuerzo pesquero.

Es muy evidente que en la región, al igual que en todo el mundo, el esfuerzo pesquero sobrepasa a las reducidas poblaciones de la mayoría de las especies buscadas. La situación llega al extremo de que se están pescando, por ejemplo, tiburones juveniles sexualmente inmaduros en casi todos los países de la región, con lo cual se puede asegurar el “exterminio” de sus poblaciones. Si el esfuerzo pesquero pudiera reducirse vedando áreas y poniendo restricciones a la pesca, las poblaciones de peces y crustáceos se recuperarían sorprendentemente rápido (Walton, 2003).

Por esta razón es necesario poner en práctica las siguientes recomendaciones aprobadas en el Taller de El Salvador: 1) reducir el número de barcos ofreciendo compensaciones, 2) no otorgar nuevas licencias de pesca (particularmente a barcos sancionados por pesca ilegal), 3) no permitir la descarga de aletas sin el cuerpo del tiburón, 4) prohibir la operación de flotas extranjeras en la Zona Económica Exclusiva de Centroamérica, 5) prohibir la pesca de arrastre en la franja de 5 millas fuera de la costa, 6) reducir el tiempo de arrastre para disminuir la mortalidad de la fauna acompañante y 7) promover actividades sustitutivas como el ecoturismo marino-costero –ver más abajo.

Por otra parte, en este Taller se hizo énfasis en la necesidad de que en cada país y a nivel regional, se cuente con un plan de ordenamiento y desarrollo pesquero, que regule la extracción de especies, brinde opciones económicas al sector artesanal, promueva los estudios de dinámica de poblaciones y del tamaño de la luz de malla, que fomente la creación de arrecifes artificiales y que analice otras opciones de uso para los recursos marinos que todavía existen en la región (Sucumben, 2003). La Comisión Centroamericana de Ambiente y Desarrollo (CCAD) podría participar en estos aspectos.

Adicionalmente, es necesario que la institución encargada de dar las licencias de pesca le exija a los

interesados la presentación de las estadísticas pesqueras de las especies que deseen pescar, como forma de tener mejor información sobre el estado de las poblaciones, o bien que exijan la presencia de observadores de ONGs conservacionistas a bordo de los barcos. Esto sería independiente a los monitoreos –con tecnología satelital, por ejemplo- y a las evaluaciones que haga el propio gobierno, antes de decidir si la pesca de una determinada especie debe vedarse o prohibirse, y de establecer nuevas áreas protegidas.

Con base en lo discutido en el Taller de El Salvador, la reducción del esfuerzo pesquero debe, a la larga, beneficiar al pequeño pescador, el que pesca en forma artesanal, y que lejos de poseer barcos, crédito y acceso a mercados internacional, cuenta sólo con un bote y tiene la responsabilidad de alimentar a su familia. Esta es la clase de persona que está siendo desplazada por la pesca masiva y por la drástica reducción de las poblaciones de las especies que tradicionalmente ha pescado.

## 2. Investigaciones sobre la situación del recurso marino.

Es necesario tener un buen conocimiento sobre la situación del recurso marino en cada uno de los países de la región, y hacerlo del conocimiento de pescadores, decisores y de todas las personas físicas y jurídicas relacionadas con el recurso, como mejor forma de justificar las medidas de reducción del esfuerzo pesquero que deban aplicarse. Este análisis incluiría estudios sobre biología, dinámica y disponibilidad del recurso pesquero; situación de degradación de hábitats costeros, impacto del desarrollo en las playas de anidación de tortugas y poblaciones de las especies que pueden sustentar el turismo ético y la pesca deportiva. El establecimiento de convenios entre instituciones, ONGs y universidades, para estos propósitos, fue particularmente recomendado en el Taller de El Salvador.

## 3. Utilización de técnicas que reduzcan la pesca incidental.

Se sabe que existen artes de pesca, metodologías y tecnologías que pueden reducir la captura de la fauna acompañante, lográndose así reducir considerablemente la matanza de, por ejemplo, tortugas y delfines. Las tortugas, en particular, mueren en gran cantidad en lugares como Barra de Santiago, en El Salvador, y Ostional, en Costa Rica, como consecuencia de la extracción del camarón en sitios donde existen playas tortugueras.

Para este propósito se recomienda promover las siguientes acciones: 1) regionalizar mediante normas y regulaciones el uso del TED en la captura del camarón (su uso se exige en todos los países pero falla su aplicación en la práctica, a veces por rebeldía de los

capitanes), 2) exigir el uso de desanzueladores (dehookers) para evitar la muerte de tortugas, 3) promover el uso de la carnada azul, la utilización de anzuelos offset, circulares y de mayor tamaño en la flota palangrera, por ser más selectivos en la pesca de las especies deseadas, 4) prohibir el uso de redes de malla fina (que atrapan camarones juveniles), 5) reducir el tiempo de arrastre para disminuir la mortalidad de la fauna acompañante, 6) capacitar a las tripulaciones en el suministro de primeros auxilios a tortugas y delfines heridos, 7) establecer la certificación de artes de pesca que reduzcan la pesca incidental, 9) prohibir el uso de explosivos y 9) utilizar sardinas como carnada en vez de calamares.

Igualmente, es necesario aumentar la presencia de observadores a bordo, de prohibir en puertos centroamericanos la descarga de aletas de tiburón y de intensificar la experiencia que se ha iniciado de convertir barcos camarones en naves de pesca del atún –para preparar sushi- con caña y anzuelo, lo cual evita la muerte de delfines; para este propósito se dedicarían zonas exclusivas a este tipo de pesca. Estas medidas deben ir acompañadas de capacitación a los pescadores y capitanes de barcos, para que se familiaricen con el uso de estas técnicas, y de campañas de divulgación para todos los ciudadanos, para que se comprenda mejor la importancia de estas técnicas en el mantenimiento de la diversidad marina.

Junto con todas estas medidas, debe también promoverse la oferta al público –y su consumo por los ciudadanos- de productos marinos pescados o capturados sin perjudicar delfines, tortugas y otras especies amenazadas (dolphin safe, turtle safe, etc.).

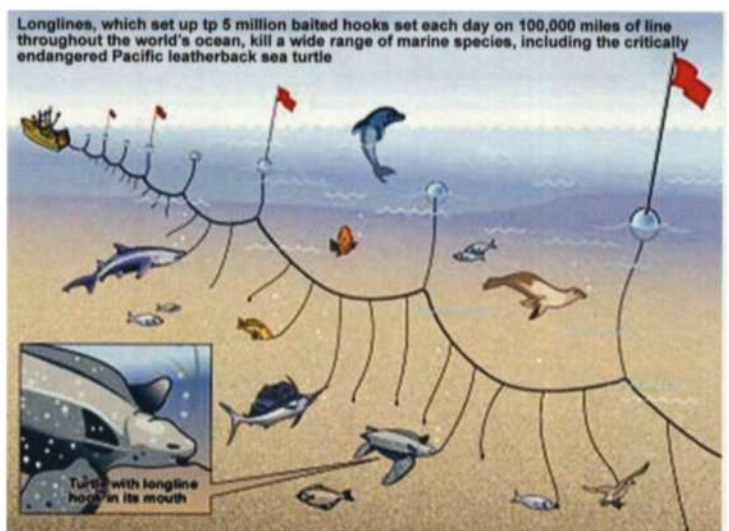


Fig. Nº 2. La utilización de técnicas que reduzcan la pesca incidental, como tiburones, tortugas y picudos en la pesca con palangres, es una necesidad imperiosa en el Pacífico centroamericano. (Dibujo cortesía de PRETOMA/ Costa Rica).

#### 4. Aplicación del Código de la FAO e implementación de planes de acción.

Se debe promover la aplicación estricta del Código de Conducta para la Pesca Responsable de la FAO, de 1995. Para este propósito se debe promover la legislación que obligue a su aplicación en Honduras y Nicaragua (en Costa Rica, El Salvador y Guatemala ya está incluido en su legislación pesquera), y deben desarrollarse programas educativos para que el pescador comprenda la importancia de su aplicación para evitar el agotamiento del recurso marino. Igualmente, debe promoverse la aplicación de planes de acción internacionales, como el de la conservación de tiburones.

## II. Nueva legislación y aplicación de la legislación vigente

Este tema incluye tanto la promulgación de nueva legislación pesquera y de conservación y restauración de los recursos marinos y costeros, así como la divulgación y aplicación de la legislación vigente.

Las acciones prioritarias por desarrollar en este tema son:

### 1. Aprobación de nuevas leyes sobre pesca y acuicultura.

Será necesaria la elaboración de proyectos de ley en El Salvador, Honduras y Nicaragua, que sustituyan a leyes vigentes que son muy antiguas y obsoletas (la de Honduras, por ejemplo, data de 1959). En Costa Rica existe ya un proyecto en el Congreso, y en Guatemala existe también un proyecto que está siendo estudiado por las autoridades correspondientes. Una vez que estos proyectos estén redactados y presentados a los respectivos congresos, se hace necesaria la contratación de cabilderos que promuevan su pronta aprobación.

### 2. Aprobación de leyes sobre conservación de recursos marinos y costeros.

En todos los 5 países se hace también necesaria la elaboración y promulgación de una ley que promueva la conservación y restauración de las especies y los hábitats marinos y costeros. En particular es muy necesaria nueva legislación que establezca sanciones fuertes contra la pesca ilegal, la contaminación y el comercio con especies que estén en peligro de extinción, y la capacitación de jueces y fiscales en su aplicación. En el Taller de El Salvador se discutió sobre el problema de la impunidad, debido a la debilidad de las leyes actuales y a la falta de aplicación de la legislación vigente.

### 3. Aplicación de la legislación vigente.

La ciudadanía de algunos países de la región es bastante conciente sobre la necesidad de proteger y restaurar los recursos marinos y costeros, pero en otros países tal conciencia casi no existe. Por ello debe fomentarse una cultura de responsabilidad ambiental, que impulse a los ciudadanos a colaborar en la aplicación de las leyes vigentes, tanto nacionales como convenciones internacionales. Sin embargo, las personas normalmente no saben cómo presentar una denuncia por aparición de tortugas muertas, tala de manglares, no uso de TEDs o pesca con explosivos. Por ello se hace necesario elaborar, publicar y distribuir una compilación sobre la legislación marina y costera vigente, e información sobre cómo un ciudadano puede proceder a presentar una denuncia contra un delito ambiental.

## III. Promoción de usos no consuntivos de recursos marinos y costeros

Este tema se relaciona con la necesidad de promover en Centroamérica un cambio en el uso de los recursos marinos y costeros, de consuntivos a no consuntivos. El turismo ético, la investigación científica, la pesca responsable y la maricultura son parte de este cambio de usos.

Las acciones prioritarias por desarrollar en este tema son:

### 1. Promoción del turismo ético y la investigación científica con base en el recurso marino.

En países como Belice y Costa Rica, el "turismo ético" o ecoturismo y la investigación científica han demostrado ser excelentes alternativas para usos destructivos de ecosistemas como los bosques nublados y los manglares, y de especies como las tortugas, los tiburones y las ballenas; a la vez que un negocio de extraordinaria importancia nacional.



Fig. N° 3. La investigación científica y el turismo ético o ecoturismo con base en el recurso marino, son algunas de las actividades no consuntivas que deben promoverse en el Pacífico centroamericano. (Fotografía cortesía de F. Paladino).



Se trata, por lo tanto, de aprovechar la existencia de cámaras y asociaciones de turismo –como la Comisión para el Turismo del Golfo de Fonseca-, de ecoturismo – como la Cámara de Ecoturismo de Costa Rica- y de pesca deportiva, y de organizaciones académicas que promueven la investigación, para organizarlas y crear presión a favor de la investigación, conservación y uso responsable y sostenible de los recursos marinos y costeros, tomando en cuenta que en todos los países existe un gran interés por el cambio de uso de consuntivo a no consuntivo. La idea es promover inversión pública y privada en actividades de observación e investigación de tiburones, tortugas, mantarrayas, ballenas y delfines, de recorridos por manglares, de pesca deportiva y de buceo en arrecifes de coral, para contrabalancear las actividades de pesca destructiva que tienen lugar actualmente en todos los países de la región. El establecimiento de un centro regional centroamericano de investigaciones pesqueras fue también sugerido en el Taller de El Salvador.

## **2. Valoración económica de los recursos marinos y costeros.**

Es necesario darle valor a los ecosistemas y las especies marinos y costeros, mediante estudios de economía ecológica llevados a cabo por instituciones académicas con experiencia en este tema, para demostrar en mejor forma la necesidad del cambio a usos sostenibles. La identificación de todos los bienes y servicios que suministran estos ecosistemas y en particular las áreas protegidas, debe ser parte de estos estudios.

## **3. Promoción de la maricultura.**

Involucraría la investigación y promoción relacionada con el cultivo de diversas especies de peces y de crustáceos y moluscos –como ostras (*Ostrea iridescens*), camarones (*Penaeus spp.*) y pianguas y chuchecas (*Anadara spp.*)-, actividades que ya se llevan a cabo en países como El Salvador y Costa Rica. Esta actividad debe incluir no sólo la búsqueda de nuevas especies que se puedan desarrollar, sino también el aumento de productividad de las que ya se cultivan.

## **IV. Educación ambiental**

Se refiere a las acciones que deben desarrollarse para formar conciencia entre el público en general, y la juventud y los decisores en particular, sobre la situación de los recursos marinos (en especial su despilfarro y mal manejo), la crueldad con que se llevan a cabo labores como el aleteo, por ejemplo; la necesidad de buscar usos no consuntivos y muy en particular, lo que cada ciudadano podría hacer por ayudar en la presente situación de crisis.

Las acciones prioritarias por desarrollar en este tema son:

### **1. Desarrollo de actividades permanentes en educación e información sobre conservación marina.**

Estas actividades tendrían que ver con el desarrollo de campañas, publicación de literatura para niños y el público en general –incluyendo pescadores-, proyección de videos cortos e impactantes por TV, publicación regular de artículos por la prensa, labores de limpieza en las playas y de salvamento de animales heridos y otras actividades afines. Para este propósito se trabajaría en muy estrecho contacto con las ONGs interesadas en los temas marinos que se identifiquen en cada uno de los 6 países.

### **2. Inclusión de temas sobre conservación marina en los currícula.**

El propósito es incluir en los currícula de primera y segunda enseñanzas, temas relacionados con la situación de los mares a niveles mundial y regional, biología marina, ecosistemas y especies marinos, legislación y conservación marinas e insostenibilidad y crueldad de las prácticas pesqueras actuales. Para este propósito se trabajaría con los ministerios de educación de cada uno de los países de la región, y se prepararía material educativo de carácter regional para los educadores. La capacitación de maestros, profesores e incluso de líderes locales, en el uso de estos materiales, fue también recomendada en el Taller de El Salvador.

### **3. Ofrecimiento de cursos para periodistas ambientalistas.**

La idea es ofrecerle a los periodistas identificados como de mayor interés en temas de la naturaleza, cursos cortos sobre la situación de los mares y sus recursos, legislación nacional e internacional, utilización no consuntiva de los recursos marinos y el poder de los ciudadanos –y de la prensa misma. Igualmente, darles material informativo impreso y fotografías que puedan utilizar en la preparación de artículos. Este sería otro curso semejantes a los que ya ofrece en la región el Programa de Comunicaciones del Neotrópico de Rainforest Alliance.

## **V. Fortalecimiento institucional y de organizaciones conservacionistas**

Este tema incluye lo relacionado con la necesidad de fortalecer las direcciones o institutos de pesca, de crear mecanismos de coordinación entre las diversas instituciones que tienen que ver con aprovechamiento y conservación de recursos marinos y costeros (incluyendo el turismo), de mejorar las estadísticas pesqueras, de promover una más activa participación de los guardacostas en protección marina, de fomentar la creación de organizaciones privadas sin fines de lucro dedicadas a la conservación marina y costera, y de apoyar los convenios regionales.





financiación y métodos de gestión costoeficaces para las redes y sistemas de áreas protegidas terrestres, de humedales y marinas". Para este propósito se requiere la formación de una oficina de cooperación nacional e internacional, dentro de un ministerio del ambiente o equivalente, que trabaje en coordinación con ONGs conservacionistas, en la búsqueda de donantes potenciales, en la elaboración de propuestas y en el seguimiento a la cooperación que se haya obtenido.

## 2. Establecimiento de convenios con países a los cuales emigran especies nacionales.

Debido a que muchas de las especies marinas de la región son altamente migratorias, como las tortugas marinas, las ballenas y los peces picudos, se debe promover la firma de convenios de cooperación con aquellos países a los cuales esas especies emigran.

## 3. Apoyo de sociedades y fundaciones regionales e internacionales.

Es necesario promover la formación de consorcios con las instituciones y organizaciones internacionales relacionadas con la investigación y conservación de los recursos marinos. Algunas de estas son la International Sea Turtle Society, el Proyecto Ambiental Regional para Centroamérica, U.S. National Marine Fisheries Service, The Nature Conservancy, World Wildlife Fund, Conservation International, The Ocean Conservancy, Hubbs Sea World Research Institute, Unión Mundial para la Naturaleza, varias organizaciones de las Naciones Unidas y varias universidades de los Estados Unidos. La necesidad de que la Comisión Centroamericana de Ambiente y Desarrollo (CCAD) promueva proyectos regionales de conservación marino-costera, fue también mencionada en el Taller de El Salvador.

## VII. Creación de reservas de biosfera y protección de los mares y de las áreas protegidas marino-costeras

Este tema se refiere a la necesidad de crear nuevas reservas de biosfera y sitios del patrimonio mundial en el Pacífico y en la costa pacífica de Centroamérica, en la necesidad de aumentar la capacidad de los países de la región para proteger su Zona Económica Exclusiva (ZEE), las especies amenazadas y las 34 áreas protegidas marianas y costeras que existen en todos los países – excepto en El Salvador-; a la importancia de establecer nuevas áreas protegidas y corredores marinos que protejan ecosistemas poco o nada representados, y a la necesidad de lograr la consolidación económica de los sistemas nacionales de áreas protegidas. Se refiere también al establecimiento de áreas cerradas a la pesca y de lograr el cumplimiento de vedas y otras medidas que tiendan a la protección y restauración de especies y hábitats.

Las acciones prioritarias por desarrollar en este tema son:

### 1. Creación de nuevas reservas de biosfera y sitios del patrimonio mundial en el Pacífico Centroamericano.

En el Taller de El Salvador se discutió ampliamente sobre la importancia de establecer más reservas de biosfera –como catalizadoras de la conservación y el desarrollo- y sitios del patrimonio mundial, debido principalmente a que sólo existe una reserva de biosfera (el Parque Nacional Darién, en Panamá) y tres sitios del patrimonio mundial (el Parque Nacional Darién y el Parque Nacional Isla del Coco y la Zona de Conservación Guanacaste, en Costa Rica) en la costa pacífica y en el océano Pacífico de Centroamérica. Para este propósito se hace necesario llevar a cabo un estudio que identifique y promueva la pronta creación de ambas categorías internacionales de manejo con base en áreas protegidas existentes o potenciales. Igual gestión deberá hacerse para establecer nuevos sitios Ramsar (el golfo de Fonseca -sección de Honduras- es ya un Sitio Ramsar).



Fig. N° 5. Se propone la creación de una nueva reserva de biosfera en el Parque Nacional Isla del Coco, Costa Rica, con base en los extraordinarios recursos marino-costeros de esta área protegida. (Fotografía cortesía de INCAFO/CR).

### 2. Protección marina en general.

Es muy limitada la capacidad de todos los países centroamericanos con costas sobre el Pacífico para ejercer una buena protección contra la pesca ilegal (piratería), la contaminación en alta mar, la protección de la sección marina de las áreas protegidas, el narcotráfico encubierto por la pesca, el contrabando y otras actividades delictivas en su ZEE. En el Taller de El Salvador se discutió particularmente sobre el incremento de la presencia ilegal de flotas extranjeras faenando en la ZEE de todos los países de Centroamérica.

Por esta razón, en el Taller de El Salvador se le dio particular énfasis a la necesidad de mejorar la protección marina en general mediante el



fortalecimiento de sus servicios de guardacostas. Para este propósito deben fomentarse la coordinación de patrullajes con las otras instituciones relacionadas con el recurso marino, establecer convenios de cooperación semejante al que tiene Costa Rica con el Servicio de Guardacostas de los Estados Unidos, gestionar cooperación internacional de ONGs interesadas en la conservación marina y promover legislación que le permita a los servicios de guardacostas retener las multas y vender los equipos, la pesca, los productos y los materiales decomisados en operaciones contra actividades ilegales.

### 3. Protección y consolidación económica del sistema de áreas protegidas.

Sobre este tema, en el reciente Congreso de Parques (2003) se recomendó aumentar sustancialmente para el 2012 la extensión de las áreas marinas y costeras protegidas, hacer hincapié en que las áreas marinas protegidas son un componente integral de la ordenación sostenible de la pesca, establecer áreas protegidas marinas en alta mar e identificar ecosistemas y focos de riqueza de biodiversidad marina para establecer áreas marinas protegidas. Igualmente, un mensaje del Grupo de Especialistas en Tiburones de la UICN, difundido en este Congreso, establece que las áreas protegidas pueden ser la única esperanza para algunas especies amenazadas de tiburones (Marine protected, 2003).

La mayor parte de las áreas protegidas de la región tienen –en mayor o menor grado– problemas comunes de pesca y caza furtiva y de extracción ilegal de especies marino-costeras, que conducen a la degradación de especies y hábitats, de pequeño tamaño (insuficiente para proteger un área mínima crítica), de escasa representatividad (muchos ecosistemas no están representados) y de desarrollo exiguo (casi no existen instalaciones ni se dan servicios a los visitantes). Se llega al extremo de que algunas áreas protegidas son parques de papel, al igual que lo son muchas de las 2.267 áreas protegidas de América Latina y el Caribe (Márquez, 2003).

Debido a estas situaciones debe asegurarse la protección absoluta de la zona marina y de las lagunas y manglares costeros de estas áreas (prohibición total de pesca comercial, artesanal o deportiva), para que sirvan de verdadero refugio para la reproducción, desove y alimentación de gran cantidad de especies que interactúan con la costa. Promocionar el voluntariado, particularmente entre la juventud, es otra necesidad identificada en la región. La elaboración de planes de manejo como herramienta para la protección y el desarrollo de las áreas protegidas, la demarcación con boyas de los límites en la zona marítima y la realización de monitoreos del estado de las poblaciones, son también necesidades para todas las áreas protegidas marinas de la región. Para estos propósitos debe

gestionarse cooperación nacional e internacional, y lograrse un alto grado de autofinanciamiento.

Sobre este último tema, es muy importante indicar que en Costa Rica se está desarrollando un proceso a alto nivel gubernamental y con apoyo de varias ONGs conservacionistas, para lograr que el sistema de áreas protegidas adquiera independencia económica (mediante ingresos propios, el cobro del servicio ambiental agua, la cooperación nacional e internacional y otras fuentes). Este proceso obviamente también beneficiaría a los parques y reservas marinos y marino-costeros. Debido a la enorme importancia de este tema, se recomienda estudiar este proceso para analizar su aplicación en los otros países de Centroamérica.

### 4. Identificación de áreas potenciales para parques y reservas marinas.

Este estudio identificaría aquellas áreas que constituyen sitios de agregación de especies, playas tortugueras, corredores de migración y ecosistemas marino-costeros nada o poco representados, y que deban declararse como parques nacionales o reservas equivalentes. En el Taller de El Salvador se dio particular importancia a la creación de nuevos parques y reservas que protejan arrecifes de coral, manglares y playas de anidación de tortugas, algunas de las cuales ya han sido identificados, como el caso del propuesto Parque Marino Los Cóbano, en El Salvador. Al respecto, el Plan de Acción de Durban (Congreso de Parques, 2003) recomienda prestar mayor atención para efectos de áreas protegidas, a los peces, incluyendo a los tiburones, entre otros grupos de especies.

### 5. Desarrollo de programas especiales de protección de especies amenazadas.

Se refiere en forma muy particular a tortugas marinas y tiburones, cuya declinación es alarmante en toda la región. De acuerdo con el Programa de Restauración de Tortugas Marinas (PRETOMA, 2003), muchas de las 400 especies de tiburones están en peligro de desaparecer a



Fig. Nº 6. El aleteo es una práctica cruel e insensata que está conduciendo a los tiburones a su exterminio. (Fotografía cortesía de PRETOMA/Costa Rica).

causa del aleteo para surtir la demanda de aletas de tiburón, particularmente en los países asiáticos. Los mismos pescadores indican que “antes era posible ver tiburones a pocos metros de la playa, mientras que hoy sólo se encuentran en aguas profundas” (Estrategia ASPACO, 2003).

Un grave problema asociado es que en la pesca de tiburones con palangres, mueren en los anzuelos una gran cantidad de otras especies, como tortugas y peces picudos. A pesar de que el aleteo –cortar y utilizar únicamente las aletas del tiburón- está prohibido en algunos países, esta regulación es burlada constantemente debido a la ineficiencia de las autoridades pesqueras. De hecho, es frecuente encontrar en las playas tortugas muertas con anzuelos atorados en sus aletas o en la boca, con restos de trasmallos y con diversos golpes.

En el Taller de El Salvador se recomendó el desarrollo de una campaña regional de conservación de tortugas y tiburones, que incluya el establecimiento de legislación más restrictiva que proteja a estas especies (en el caso de tiburones, de legislación sobre prohibición de que barcos extranjeros descarguen aletas en puertos centroamericanos y de que se comercialicen las aletas sin el cuerpo del tiburón), la elaboración de materiales educativos sobre la situación de estas especies y que demuestre la crueldad de que son objeto, la recolecta de firmas para convencer a los decisores y el involucramiento de los medios de comunicación.

## 6. Creación de corredores biológicos marinos.

En el Taller de El Salvador se propuso que el Proyecto ASPACO/Centroamérica II apoye a dos proyectos de corredores marinos que se están llevando a cabo en Guatemala y en Costa Rica. En el primer caso se trata del Corredor Biológico Costa Sur, que uniría las cinco áreas protegidas marino-costeras del Pacífico de este país; y en el segundo, del Corredor Marino Cocos-Baulas, que conectaría el Parque Nacional Isla del Coco –Sitio del Patrimonio Mundial- con el Parque Nacional Marino Las Baulas, en tierra firme. Este último segmento



Fig. Nº 7. El propuesto Corredor Marino Cocos-Baulas uniría dos parques nacionales marinos de Costa Rica, Isla del Coco y Las Baulas, y sería parte del gran corredor Galápagos-Cocos que promueven diversas instituciones y organizaciones de la región. (Mapa cortesía de Conservation International).

es a la vez parte de una iniciativa mayor, el Corredor Marino Galápagos-Cocos, que está siendo promovido por la UICN, Conservation International, el PNUD y los gobiernos de Costa Rica, Panamá, Colombia, Perú y Ecuador (CI, 2003). El establecimiento de conexiones entre sistemas ecológicos terrestres y marinos acaba de ser recomendado en el Plan de Acción de Durban (Congreso de Parques, 2003), el cual establece que deberán promoverse “vínculos entre áreas terrestres, costeras y marinas”.

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# Case Studies of Pacific Latin America and the Caribbean Countries

## Ecuador Galápagos Submarine:

by Danilo Silva Chiriboga, M.Sc  
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Quito, Ecuador

The Challenge of the Ecuador for the Future

### Synopsis

Galápagos National Park (PNG) designed in 1959, benefits from important international recognition of various statutes: it is a Natural World Heritage Site since 1978, a Biosphere Reserve since 1984, and the marine area surrounding the Island has recently been nominated a Marine Biosphere Reserve in 1998 for its diversity and importance. Subsequently, the World Heritage Committee included the Marine area as a Natural World Heritage Site in 2001.

In spite of this recognition, the National park has been affected by the over-exploitation of its marine resources due to the considerable economic crisis experienced by Ecuador. To resolve this problem, the PNG made an agreement with the EcoCiencia Foundation and with support from the ASPACO project since 2002, they have defined activities with the follow objectives:

- to increase awareness among the island and continent population about the importance of protecting the island;
- to emphasize the role of PNG, and
- to strengthen the relationship between government and civil society in responsibility-taking and benefit distribution.

As follow-up activities to these objectives, a video of the Marine Biosphere was made entitled "Where Life is Born" and fora in six different cities in Ecuador were held on 9 May 2003. To accomplish these activities, the National Park authorities and the Ministry of Environment took part as leaders in biosphere reserve management and organized interviews with the various stakeholders to identify the problems in the protection of the Galápagos. As a result of the information compiled the video was made as a dissemination tool, and a total of 443 participants attended the fora that included a wide representation of society associated with this area as well as government institutions. The main result of these activities was to create a discussion forum where communities and government representatives can exchange information and discuss the future of this area.

### Galápagos submarino: El reto del Ecuador para el futuro

#### Antecedentes

Pocos ecosistemas en nuestro planeta han captado tanto la atención mundial como el Archipiélago de Galápagos, un conjunto de islas volcánicas a casi 1000 kilómetros de la costa continental del Ecuador. La singular flora y fauna de las islas ha sido, sin lugar a dudas fuente de inspiración, curiosidad, e investigación, principalmente a nivel internacional. La creación del Parque Nacional Galápagos (PNG) en 1959 y el inmediato establecimiento de la Fundación y Estación Científica Charles Darwin, como apoyo a las actividades del Gobierno del Ecuador ratifican el interés y presión internacional por la conservación del archipiélago. Después de cuatro décadas de un continuo trabajo y esfuerzo se podría decir que la labor de conservación ha sido exitosa y que gran parte de este logro se ha alcanzado con el apoyo de la comunidad conservacionista a nivel mundial. Galápagos fue reconocida en 1978 como Patrimonio Natural de la Humanidad por el Comité del Patrimonio Mundial. En 1984 UNESCO reconoce al Archipiélago como **Reserva de Biosfera**, categoría del programa MAB (Hombre y Biosfera), por la importancia de la relación entre la conservación y el desarrollo local de la población en la zona.

Posteriormente, las innumerables investigaciones realizadas por científicos nacionales y extranjeros revelaron la existencia de un nuevo ambiente, tan diverso y único como el terrestre: el ecosistema marino que rodea a las islas. Sus características de biodiversidad, endemismo y fragilidad motivaron para que el Gobierno del Ecuador, en 1998, establezca la Reserva Marina de Galápagos, considerada también como una de las 7 maravillas del mundo submarino. Recientemente (2001) el Comité del Patrimonio Mundial ha extendido la





categoría de Patrimonio Natural de la Humanidad también a la Reserva Marina.

A pesar de esto es innegable que el manejo de Galápagos no puede, y de hecho no ha estado, al margen de los requerimientos de una sociedad de mercado. En los últimos años, detener la explotación de sus recursos marinos (langosta, pepino de mar, tiburones, entre otros) ha copado gran parte de los esfuerzos conservacionistas en las islas. La cada vez más crítica situación económica de la población ecuatoriana y el embate de la globalización han originado que se usen y exploten los recursos de las islas con diferentes fines y de diferentes formas.

Por esta razón, el PNG consciente de la necesidad de generar apoyo para la conservación de las islas y su entorno en la población del Ecuador continental, estableció un convenio de cooperación institucional con la Fundación EcoCiencia para desarrollar conjuntamente un esfuerzo de sensibilización e invitar a otras entidades a que se sumen en este objetivo.

En conversaciones entre el Parque Nacional Galápagos y EcoCiencia se consideró de altísima prioridad el concentrar los esfuerzos de este proyecto en difundir, a nivel nacional, la importancia de la conservación de los recursos marinos de Galápagos por las siguientes razones:

- 1) De su conservación depende la integridad de todo el ecosistema,
- 2) Por la creciente presión para uso y explotación irracional de sus recursos, y porque
- 3) El Ecuador estaba a punto de atravesar por un período electoral que podía agravar el conflicto existente entre los diversos usuarios de la Reserva Marina.

Por tal motivo, el PNG y EcoCiencia, presentaron a UNESCO una propuesta de financiamiento denominada "Galápagos Submarino: el nuevo reto de Ecuador para el Futuro", la cual fue aprobada por el proyecto **ASPACO** (Cooperación Asia Pacífico para el Uso Sostenible de los Recursos Naturales Renovables en las Reservas de Biosfera y Áreas Naturales Similares).

Para el efecto, el Parque Nacional Galápagos (PNG) y EcoCiencia decidieron realizar un convenio de cooperación para la ejecución de este proyecto. Esto se llevó a cabo en 17 de junio de 2002, luego de haber obtenido la aprobación de financiamiento por parte de UNESCO.

Los objetivos de este proyecto fueron:

- Apoyar el desarrollo de una conducta en los ciudadanos ecuatorianos que redunde en la conservación de la Reserva Marina de Galápagos.
- Fortalecer la imagen del Servicio del Parque Nacional Galápagos en el ámbito nacional e internacional.

- Fortalecer las relaciones Estado-Sociedad para el beneficio de la conservación de la Reserva Marina.
- Para poder cumplir con estos objetivos, se planificó el diseño y producción de un vídeo sobre la Reserva Marina y la realización de un foro dirigido a seis ciudades del Ecuador en donde se pueda divulgar y sensibilizar sobre la temática del manejo de dicha reserva.
- Se colectó numerosa documentación que ayudó a clarificar la problemática existente alrededor de los conflictos de interés y el manejo de la RMG. Dicha información fue proporcionada tanto por el PNG como de diversas personas e instituciones que tienen relación con las Islas Galápagos.

## Resultados.

### Entrevistas

A más de la información documental, se creyó necesario el realizar una serie de entrevistas y conversaciones con actores clave dentro del manejo de la RMG.

Durante estas reuniones se evidenció que la RMG tiene algunos conflictos de manejo, los cuales deberían ser puntualizados en los foros y en el vídeo. Estos problemas son: la pesca industrial por parte de pescadores del continente, la pesca artesanal al sobre explotar los recursos, el turismo naviero y la falta de concienciación de la población acerca del manejo adecuado de los mismos.

Se determinó en las reuniones efectuadas en las oficinas de UNESCO, entre el PNG, UNESCO y EcoCiencia que para el Parque era importante tocar estos temas desde el punto de vista de la sensibilización de la sociedad tanto del continente como insular, de forma que se conozca la importancia de la Reserva, pero al mismo tiempo que exista mayor claridad sobre los problemas que enfrenta.

### Imagen institucional del PNG

Uno de los objetivos propuestos en

este proyecto fue el fortalecimiento de la imagen institucional del PNG como la entidad que lidera las acciones de conservación y manejo de la RMG. Este fortalecimiento se dio a través de asignar al PNG y al Ministerio del Ambiente la función protagónica de convocante a este debate y también a través de la producción y difusión de un vídeo oficial acerca de la RMG.

### Apoyo al fortalecimiento de la comunicación del PNG

Sobre la base de las actividades realizadas en este proyecto, existe actualmente un reconocimiento por

parte de los funcionarios del PNG de la importancia que tienen los procesos de comunicación y sensibilización sobre la RMG en el continente. El PNG ha manifestado su interés de continuar con estos procesos e iniciativas que fortalecen su imagen como autoridad ambiental y sensibilizan a la población sobre la importancia de la conservación de la RMG.

## Documental

Como parte de este proyecto se realizó la producción de un vídeo denominado "Donde Nace la Vida". Para lograr obtener imágenes de calidad, un equipo de filmación se trasladó a las Islas Galápagos y a Manta para realizar las tomas respectivas.

La elaboración y producción del vídeo "Donde Nace la Vida" ha llenado un vacío de comunicación existente en el PNG, el cual hasta el momento no contaba con una herramienta gráfica que le permita enseñar a los sectores público y privado, nacional e internacional, la importancia ecológica y económica de la RMG. El vídeo de este proyecto será considerado como un documental oficial de esta Reserva.

## Establecimiento de acuerdos

Uno de los temas de discusión en el sector pesquero del Ecuador ha sido la falta de reconocimiento por parte de la autoridad de pesca, sobre la importancia de la conservación de la Reserva Marina de Galápagos y de la validez y vigencia de Ley Especial de Galápagos. En el foro, el representante de la Subsecretaría de Pesca enfatizó que esta instancia gubernamental reconoce que la ley para las islas elimina las actividades de pesca industrial dentro de las aguas de la Reserva.

## Foro

Para convocar al foro se diseñaron e imprimieron invitaciones que fueron repartidas en el ámbito de las 6 ciudades en donde se planeó la presentación del mismo. Las invitaciones fueron repartidas a los siguientes sectores

- Sector Político (Congreso Nacional)
- Sector Público (Ministerios, organismos descentralizados, gobiernos seccionales).
- Sector Académico (universidades).
- Sector Productivo (Cámaras de la producción, en especial a las Cámaras de Turismo y de Pesca, operadores turísticos, asociaciones de pescadores artesanales).
- Cooperación Internacional (Agencias internacionales que trabajan en Galápagos).
- Sector Conservacionista (ONG vinculadas al tema Galápagos).
- Actores sociales en general

Los exponentes en el foro fueron las siguientes personas:

- Sr. Edgar Isch, Ministro del Ambiente
- Sr. Gustavo López Ospina, representante Regional de UNESCO
- Dr Luis Arriaga por parte de la Subsecretaría Nacional de Pesca.
- Dr Mario Piu, Director Reserva Marina del Parque Nacional Galápagos.
- Dr. Fernando Espinoza, Director Ejecutivo, Fundación Charles Darwin.
- Sra. María López, Rectora del Colegio Nacional Galápagos.

Se realizaron algunos contactos institucionales para que la señal fuera transmitida desde Quito a las siguientes ciudades:

- Puerto Ayora, Provincia de Galápagos con el auspicio del PNG
- Guayaquil, Provincia del Guayas, con el auspicio de la Universidad Estatal de Guayaquil, Facultad de Ciencias Naturales.
- Manta, Provincia de Manabí, con el auspicio de la Escuela de Pesca del Pacífico Oriental, EPESPO.
- Loja, Provincia de Loja, con el auspicio de la Universidad Técnica Particular de Loja, UTPL.
- Riobamba, Provincia de Chimborazo, con el auspicio de la Escuela de Ecoturismo de la Facultad de Recursos Naturales de la Escuela Politécnica del Chimborazo, ESPOCH.

Se diseñó y envió a las diferentes ciudades, un formulario de registro de los asistentes y un formulario de preguntas para ser entregado después de cada ponencia.

Asistieron en las 6 ciudades **un total de 443 personas** de los sectores anteriormente mencionados. El foro duró 2 horas 15 minutos que incluye la presentación del vídeo, las ponencias de los invitados y las preguntas y respuestas de los auditorios.

El resultado de todas estas actividades ha sido el poner en la mesa de discusión, que Galápagos requiere estructurar una dinámica en donde los pobladores y autoridades puedan discutir ampliamente sobre los temas de conservación y desarrollo. Indudablemente, la Junta Participativa de Manejo y la Autoridad Interinstitucional de Manejo, instancias promovidas por la Ley Especial de Galápagos, son elementos claves que tienen que ser promovidos como los espacios adecuados para establecer alianzas, acuerdos y visión de futuro sobre un Archipiélago que tiene tanto reconocimiento a nivel mundial.

# Case Studies of Pacific Latin America and the Caribbean Countries

## Chile

## Biosphere Reserve National Park Forest Fray Jorge



by Mr José Miguel T. Jefe,  
Regional Unidad de Gestión Patrimonio Silvestre  
Eugenio Ruiz,  
Administrador Parque Nacional Bosque Fray Jorge

Region IV Coquimbo, Chile

### Synopsis

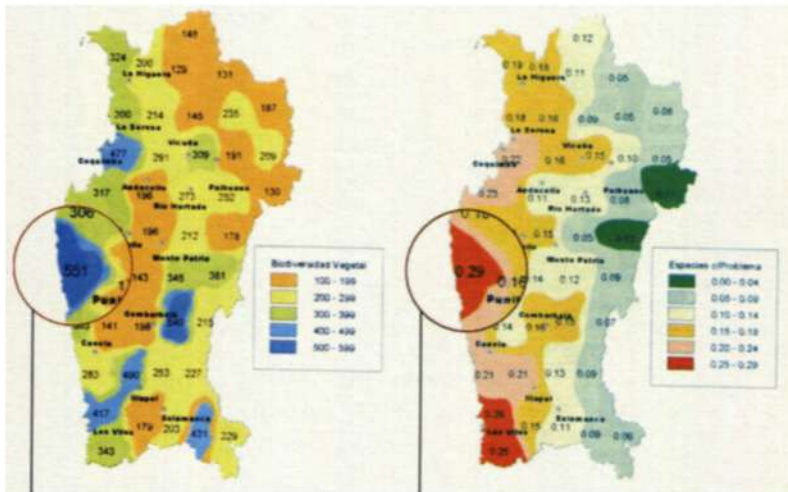
This presentation highlights the remarkable conservation role that Coquimbo region has played in protecting its faunal and floral biodiversity and its initiative to strengthen Bosque Fray Jorge National Park through its internationally recognised designation, in 1977, as a UNESCO Biosphere Reserve. The presentation exposes a general description of this protected area as well as the two projects currently being carried out. The first project involves the development of the buffer zone (2003-2009) where such integrated parameters like the flux of tourism, capacity building of the managers and the links between offer and demand will be analyzed. This project is also being developed with assistance from the consultative council made up of the local community. The second project takes place in the coastal area and describes the inherent threat. In addition, it emphasizes the different marine protected areas potential not only inside the National Park but also in the entire Coquimbo region and includes the RAMSAR nominated site of Bosque Fray Jorge NP.

The terms of reference of the document can be found in the annexe. A consultancy for the Chilean Forest Service (CONAF) was appointed to inform CONAF staff working in the Chilean Biosphere Reserves and other stakeholders of the MAB programme on its policy on Biosphere Reserve management and its successes in Latin America. Following analysis of the results in 1999, the MAB Committee review identified the potential problems and possible actions and a National strategy for Biosphere Reserves was developed. Furthermore, this document describes the methodology employed.

### Reserva de la Biosféra Parque Nacional Bosque Fray Jorge IV Región Coquimbo, Chile



## Región de Coquimbo

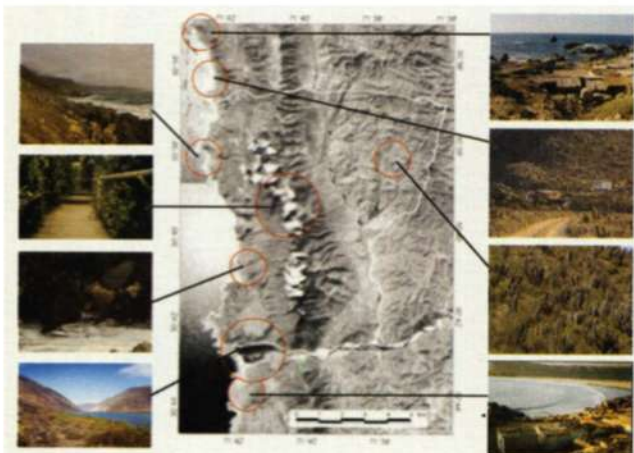


Concentración de biodiversidad. (Número de especies / 900 Km2)

Concentración de especies con problemas de conservación. Sitios de interés para la conservación de la diversidad vegetal.

## R. B. Parque Nacional Bosque Fray Jorge

- Creación: 15 Abril de 1941
- Superficie: 9.959 ha.
- Declaración de Reserva de la Biosfera UNESCO 1977
- Número de Visitantes al año: 13.000



## Proceso

### Proyecto:

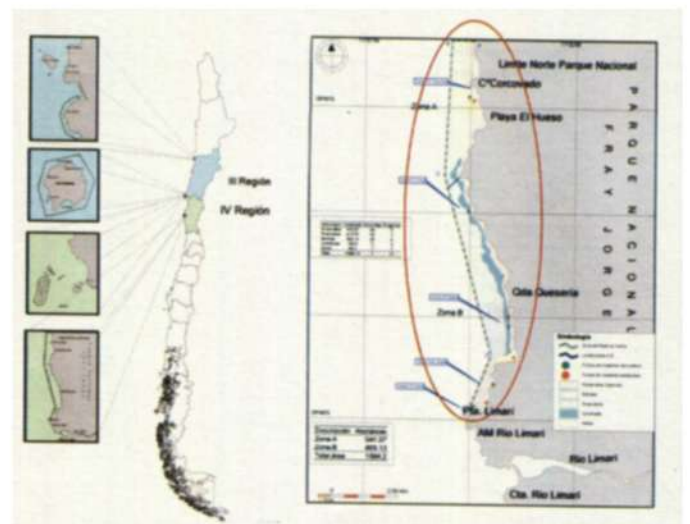
- Desarrollo de la zona de Amortiguación de la Reserva de la Biosfera Parque Nacional Bosque Fray Jorge (2003-2009)



- Líneas de Trabajo
  - Flujo Turístico
  - Capacitación
  - Encadenamiento de Servicio y Producto (CLUSTERS)
- Consejo Consultivo 2004

## Borde Costero

- Presiones de Uso
  - Caleta El Toro
  - Caleta Talcaruca
  - Caleta El Sauce



- Potencial Área Marina Protegida (AMP)
- Localización AMP Parque Nacional Bosque Fray Jorge

## Humedal Costero

Sitio RAMSAR Zonificación Zona Costera Región de Coquimbo





## Annexe:

### Terminos de referencia

#### Asesoría a CONAF con relación a las Reservas de la Biósfera de Chile

#### Antecedentes

Chile cuenta con 7 Reservas de la Biósfera (RB), designadas por la UNESCO entre 1977 y 1984. Las mismas han sido objeto de una revisión periódica por dicha institución, en 1999, de acuerdo con el artículo 9 del Marco Estatutario de la Red Mundial de Reservas de Biosfera.

Todas ellas corresponden a áreas protegidas administradas por la Corporación Nacional Forestal (CONAF), entidad gubernamental dependiente del Ministerio de Agricultura. Dichas reservas y las áreas protegidas que las conforman son las siguientes:

RESERVA BIOSFERA	Áreas Protegidas	Superficie Áreas	Superficie Reserva
LAUCA	PN Lauca	137.883	
	RN Las Vicuñas	209.131	<b>358.312</b>
	MN Salar de Surire	11.298	
BOSQUE FRAY JORGE	PN Fray Jorge	9.845	<b>9.845</b>
LA CAMPANA - PEÑUELAS	PN La Campana	8.000	
	RN Peñuelas	9.095	<b>17.095</b>
ARCH. JUAN FERNANDEZ	PN Juan Fernández	9.967	<b>9.967</b>
ARAUCARIAS	PN Conguillío	60.832	
	RN Alto Bío-Bío	35.000	<b>93.833</b>
LAGUNA SAN RAFAEL	PN Laguna San Rafael	1.742.000	<b>1.742.000</b>
TORRES DEL PAINE	PN Torres del Paine	184.414	<b>184.414</b>
<b>Superficies totales</b>	<b>PN = 7 RN = 3 MN = 1</b>	<b>2.152.941 253.226 11.298</b>	<b>2.415.466</b>

PN = Parque Nacional  
RN = Reserva Nacional  
MN = Monumento Natural

A continuación se indican algunas características básicas que constituyen el marco jurídico y administrativo de las RB chilenas.

- Las RB indicadas se localizan en 6 de las 13 regiones administrativas del país.

- No existe en la legislación la categoría de Reserva de la Biosfera, por lo que los terrenos privados incluidos en las actuales RB o los que se planteen incorporar a ellas no están ni podrán estar sujetos a regulaciones legales, a excepción que se produzca un compromiso formal de sus propietarios para acatar voluntariamente algunas normas que se determinen de común acuerdo. Tampoco existe una normativa que permita establecer regulaciones para el uso del territorio en espacios rurales, aunque si hay disposiciones de carácter sectorial referidas a recursos naturales específicos de competencia de distintas instituciones.
- El financiamiento gubernamental para la investigación en el país opera a través de concursos, priorizándose la asignación de recursos a universidades e institutos de investigación, quienes privilegian sus áreas temáticas de interés.

#### Objetivos de la asesoría:

- Dar a conocer a personal de CONAF y de otras entidades, los lineamientos actuales del Programa MAB para el manejo de RB y los casos exitosos en Latinoamérica como resultado de su aplicación.
- Analizar las propuestas efectuadas por el Comité Consultivo sobre Reservas de Biosfera de UNESCO, con motivo de la evaluación realizada en 1999, y las posibilidades y limitaciones para superar las deficiencias detectadas en esa ocasión, acorde a la realidad del país en esta temática indicada en el punto 1.
- Proponer una estrategia para el desarrollo de las reservas de biosferas a nivel nacional, basada en el análisis de la situación de todas las reservas de biosfera, así como de los aspectos jurídicos y administrativos del país.

#### Actividades a desarrollar:

La asesoría se desarrollará en dos fases. La primera en el mes de abril, abarcando tres de las RB, y la segunda en noviembre para las cuatro restantes.

Las actividades que se señalan a continuación corresponden a la primera de ellas en cuanto a su especificidad; no obstante, la segunda fase será similar en cuanto al tipo de actividades a llevar a cabo. En todo caso, para esta última podrá modificarse las actividades aquí consideradas, a la luz de los resultados y experiencias adquiridas en la primera fase.

Luego de la segunda fase se contempla la formulación de una estrategia nacional para la gestión del conjunto de RB del país.

- a) Entregar información a funcionarios de CONAF y de otras entidades públicas o privadas involucradas



sobre los aspectos esenciales del programa MAB en la actualidad y de casos exitosos en la gestión de este tipo de áreas, dando cuenta de aspectos tales como planificación emprendida, alianzas desarrolladas, beneficios logrados, problemas encontrados y costos involucrados, entre otras materias.

- b) Efectuar un reconocimiento de terreno de tres de las reservas y celebrar las reuniones de trabajo que sean necesarias con funcionarios de CONAF y autoridades, entidades y propietarios locales, para obtener antecedentes y recabar opiniones.
- c) Elaborar un informe relativo a las tres RB contempladas en la primera fase, teniendo en cuenta los resultados logrados en el desarrollo de las dos actividades anteriormente descritas y los antecedentes indicados en el punto 1. Dicho informe deberá considerar, entre otras materias:
  - Un análisis de las recomendaciones efectuadas por el Comité Consultivo de UNESCO para las tres RB consideradas en la primera fase, entregando una opinión fundada sobre la pertinencia o factibilidad de la aplicación de dichas recomendaciones para estructurar y gestionar dichas reservas, en concordancia con la Estrategia de Sevilla, el Marco Estatutario de la Red y otros planteamientos y acuerdos internacionales del Programa MAB actualmente vigentes.
  - La identificación, en términos globales, para cada una de las RB, los compromisos y aportes mínimos de parte de los entes que deberían estar involucrados en la gestión de ellas, los beneficios factibles de alcanzar y los plazos requeridos, entre otros aspectos.
  - Una propuesta, en los casos que así se estime, de incorporación de nuevos sectores como RB, como asimismo la exclusión de aquellos actualmente incluidos, con la finalidad de lograr una mejor adecuación al concepto de Reserva de la Biósfera y un mayor cumplimiento de los objetivos y funciones definidos por UNESCO.
  - La identificación de los aspectos críticos de carácter general y específicos para cada una de la RB que deberán enfrentarse para lograr una gestión adecuada de ellas, señalando las líneas de acción y actividades principales que será necesario desarrollar. En este sentido, debe ponerse énfasis en la manera de comprometer a propietarios privados y comunidades aledañas en las regulaciones que sea necesario contemplar para el adecuado manejo de la RB, preferentemente en la zona de amortiguación.

## Localización geográfica de las RB:

- a) Primera fase: Reservas de la Biósfera Lauca, La Campana – Peñuelas y Fray Jorge
- b) Segunda fase: Reservas de la Biósfera Araucarias, Juan Fernández, Laguna San Rafael y Torres del Paine.

## Duración de la asesoría

Se estima que la asesoría para la primera fase debería durar 7 días efectivos, de acuerdo al siguiente itinerario tentativo:

- Día 1: Llegada a Arica
- Día 2:
  - a) Viaje terrestre hasta Putre. Presentación de los antecedentes esenciales de la RB Lauca por parte de personal de CONAF y actividades desarrolladas en ella.
  - b) Inicio del recorrido de la R.B. Lauca (conformada por el Parque Nacional Lauca, Reserva Nacional Las Vicuñas y Monumento Natural Salar de Surire)
- Día 3:
  - a) Continuación del recorrido
  - b) Pernoctación en Putre
- Día 4:
  - a) Regreso a Arica
  - b) Reunión evaluativa con personal de CONAF de la Oficina Regional
  - c) Regreso a Santiago
- Día 5:
  - a) Salida vía terrestre hacia la ciudad de Viña del Mar
  - b) Visita a la R. B. (Reserva Nacional Peñuelas y Parque Nacional La Campana)
  - c) Pernoctación en Viña
- Día 6:
  - a) Reunión evaluativa con personal de CONAF de la Oficina Regional
  - b) Regreso a Santiago
- Día 7:
  - a) Salida vía aérea a la ciudad de La Serena
  - b) Visita a la Reserva de la Biósfera Fray Jorge (Parque Nacional Fray Jorge)
  - c) Pernoctación en La Serena
- Día 8:
  - a) Reunión evaluativa con personal de CONAF de la Oficina Regional
  - b) Regreso a Santiago
- Día 9: Regreso a países de origen

by **Dr. Shigeyuki BABA**  
Associate Professor, University of the Ryukyus  
Executive Secretary of ISME (Voluntary)

## ISME's Activities in Relation to ASPACO

### International Society for Mangrove Ecosystems (ISME)

- ISME was inaugurated in 1990 as an international NGO (Non Governmental Organization) and NPO (Non Profit Organization).
- To date, ISME has nearly 850 individual and 37 institutional members from 80 countries/regions.



#### ISME always meets financial difficulties

- I always seek funding agencies to support ISME's activities.
- Due to ISME's financial difficulties, ISME can support few activities of ASPACO. It is, therefore, I am trying to seek alternatives.

#### I have learned a lot through ISME's activities

1990-1993 Studies on present states of mangrove forests in Asia and the Pacific, Africa and Latin America and the Caribbean

The follows are some examples:

- less available scientific and technical information – scattered information
- less practical knowledge on mangrove nursery activities
- less materials for public education
- less information of extension of mangrove forests
- less available human resource, etc.

#### To solve less available scientific and technical information on mangroves

To collect scattered scientific and technical information and to disseminate those information, ISME prepared the project proposal of GLOMIS (Global Mangrove Database and Information System) and sought funds to establish a mangrove database.

It took more than 5 years to get funds, but finally ITTO kindly supports the GLOMIS project.

*We cannot do many things at the same time, but we can do a few things step by step.*

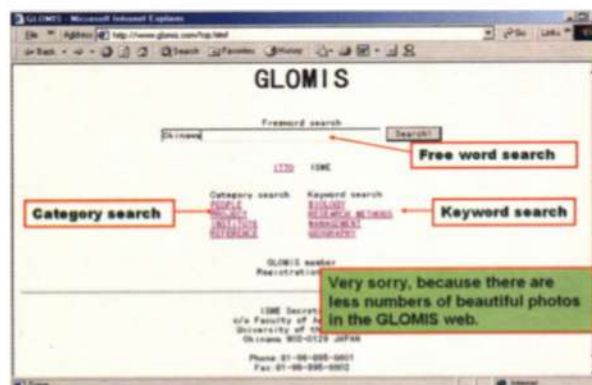
### GLOMIS as one of International Information Exchange Systems on Mangroves

Exchange of necessary information on Mangroves

- a) Need of improvement and expansion of ISME web-site;
- b) Need of improvement and expansion of GLOMIS Database.



#### Three retrieval methods



#### Phase III of GLOMIS

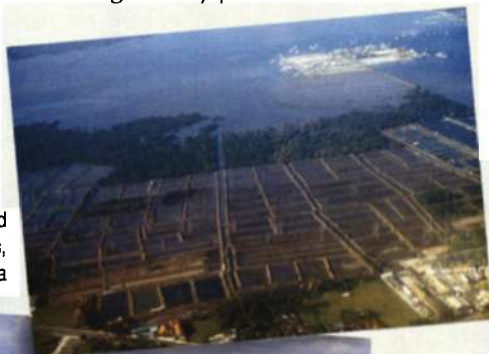
- Phase II of GLOMIS Phase II is going to terminate by the end of December 2003.
- The progress report of GLOMIS Phase II was accepted by ITTC on 4 November 2003.
- New project of GLOMIS extension (GLOMIS Phase III) was accepted by ITTC on 5 November 2003.
- Duration of GLOMIS Phase III will be 2 years.

## To solve less practical knowledge on mangrove nursery activities

We learned a lot from Bangladesh, but we needed more information.

- I asked JICA mangrove project in Bali (1992 – 1999) to select proper sites and collect data for nursery practices, phenological issues and mangrove restoration techniques at abandoned shrimp ponds.
- Because most of Japanese experts dispatched by JICA were my trainees.
- Finally we could get many practical data.

Abandoned shrimp ponds, Bali, Indonesia



Experimental plantation, Bali

## To solve less materials for public education

- Prepared two kinds of project proposals to produce two colored slide sets with textbooks for primary and junior high schools – French, English, Japanese, Thai and Vietnamese – more than 1,000 copies were distributed.
- Prepared two kinds of projects proposals to produce videos – “What tides bring” shot in Fiji, and “Living with mangroves” shot in Thailand. Distributed more than 400 copies with free of charges.
- Prepared a project proposal to publish Japanese booklet entitled “Mangrove forests as ocean forests” for Japanese primary and junior high school



Lectures at small schools, Iriomote Island, Japan

students. Distributed more than 2,000 copies to all elementary, junior high and high schools in Okinawa prefecture, Japan.

## To solve less information of extension of mangrove forests

- Prepared a project proposal, and sought funding agencies.
- ITTO kindly accepted our project proposal, and we could produce World Mangrove Atlas, Restoration Mangrove Ecosystems and Journey amongst Mangroves.

## To solve less available human resource

- ISME prepared necessary documents to implement Mangrove Training Course
- Then JICA kindly has provided necessary funds to implement Mangrove Training Course since 1995.



Survey in Thailand

JICA field survey, Iriomote Island, Japan



## JICA training course implemented by ISME

- Training courses “Sustainable Management of Mangrove Ecology” since 1995, 60 trainees from 32 countries as of June 2003
  - 17 from Latin America and the Caribbean  
Belize -1, Brazil -2, Colombia -1, Costa Rica -2, Cuba -2, Ecuador -1, Grenada -1, Jamaica -1, Mexico -1, Panama- 3, Peru -1, Venezuela -1
  - 9 from the Pacific  
Fiji-3, Micronesia-3, PNG-2, Samoa-1
  - 20 from Asia  
Bangladesh-4, Indonesia-1, Thailand-4, Maldives-1, Myanmar-4, the Philippines-3, Sri Lanka-1, Vietnam-2



## Technical and financial supports

- Since ISME is requested to send a senior technical adviser to Tuvalu to raise mangrove nurseries and experimental plantation.
- Since ISME is requested financial supports to mangrove activities in Samoa, we are seeking financial agencies to support their activities.
- Since ISME is requested inventory research and experimental mangrove plantation in Maldives, we are trying to get financial supports to activities in Maldives.
- Since I was requested by JICA to extend a new project of coastal ecosystem conservation including mangroves, I strongly requested JICA to implement their project in the Pacific. But JICA does not decided yet.

## New World Mangrove Atlas

- ISME will submit a project proposal to publish New World Mangrove Atlas in cooperation with ITTO, UNESCO, UNU, FAO, UNEP-WCMC and other organizations.
- 4 – 6 November 2003, I talked about a project proposal with officers and representatives concerned. This is one of the reasons why I arrived here yesterday.
- I appreciate very much for all of your kind supports to collect accurate data on existing mangrove areas, and problems faced.

## JICA training courses implemented by University of the Ryukyus

- Training Course “Effective Utilization of Tropical Agriculture and Forest Resources” implemented by Faculty of Agriculture since 1984
  - Number of total participants 98 as of May 2003 63 from Asia, 6 from the Pacific (Fiji-1, Micronesia-2, PNG-2, Samoa-1), and 18 from Latin America and the Caribbean
- Training Course “Forest Soil” implemented by Faculty of Agriculture since 1985



Field survey of JICA Forest Soil Training Course

- Number of total participants 122 as of October 2003. 60 from Asia, 22 from Latin America and the Caribbean, and 1 from PNG as the Pacific
- Training Course “Information Technology for Primary and Secondary School Teachers” implemented by Faculty of Engineering since 2001
  - Number of total participants 28 as of 2002.
  - Trainees in 2001; Cambodia-1, Cook Islands-1, Kiribati-1, Laos-1, Nauru-1, Niue-1, Palau-1, PNG-2, the Phillipines-1, Samoa-2, Tonga-1, Tuvalu-1

All participants were school teachers from Asia and the Pacific

## ISME Brazil Charter

- ISME Brazil Charter was established in 2000, but it did not work actively.
- Earlier this year, New president was elected.
- I hope that ISME Brazil Charter works progressively soon.

## ISME’s contribution for the mangrove ecosystem

“The Cord of Conduct for the sustainable management of mangrove forest ecosystems” prepared by WB, ISME and Centre for Tropical Ecosystems Research (CenTER) of Aarhus University

The long-term objective is to arrest the recent and rapid destruction of mangrove ecosystems, to improve their management, and to conserve biodiversity in these critical natural habitats. “The Code of Conduct” soon be available!

I believe that this cord will be one of good guideline for your further mangrove activities.

- Various numbers of authorities and NGOs, private concerns and individuals are restoring coastal ecosystems worldwide.
- However, since funds are limited, unnecessary duplication of efforts should be avoided.
- Further cooperation and exchange of scientific and practical knowledge will help to ensure the productivity of mangrove ecosystems and sustainable use of mangrove ecosystem resources.

ISME always seeks alternatives, because ISME’s fund is very limited.



# ASPACO in the Region

## Asia **ASPACO contribution to the Biosphere Reserves in SeaBRnet**

by Mr Han Qunli  
Programme Specialist for  
Environmental Sciences at UNESCO  
Office Jakarta - Regional Science  
Bureau for Asia and Pasific

### Southeast Asian Biosphere Reserve Network (SeaBRnet)

- Established in 1998 in Can Gio MAB workshop
- 2<sup>nd</sup> meeting in 2001 at Ecotone X Seminar, Hanoi
- 3<sup>rd</sup> Meeting in Tonle Sap BR, Cambodia in October 2003
- Statutes adopted at the Cambodia meeting October 2003
- A network supported by MAB and Ecotone cooperation – and ASPACO

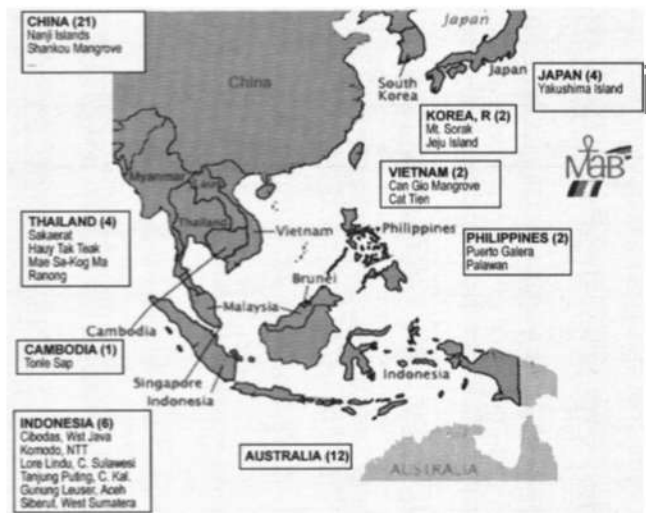
#### Members

- Cambodia
- China
- DPR Laos
- Indonesia
- Japan
- Malaysia
- Myanmar
- Philippines
- Thailand
- Vietnam

#### Main objectives of SeaBRnet:

- to provide an institutional mechanism for Southeast and East Asian countries to exchange information, knowledge and experience on the management of biosphere reserves in line the main goals of the Seville Strategy for Biosphere Reserves;
- to provide support through activities, such as case studies and pilot projects, to biosphere reserves in Southeast and East Asia in order for them to function as models for sustainable development and conservation and areas where the Ecosystem Approach is put in practice;
- to improve capacity in biosphere reserve management through training and advisory services and broader partnerships with scientific communities, management authorities, policy makers, local communities and other relevant stakeholders;

### Existing and potential Biosphere Reserves in SeaBRnet



### Primary goals of Biosphere Reserves

- Goal I: Use BRs to identify and conserve natural and cultural diversity
- Goal II: Utilize BRs as models of land management and of approaches to sustainable development
- Goal III: Use BRs for research, monitoring, education and training

#### Lore Lindu - 1977

Great significance for its biological diversity and contains viable populations of **most of Sulawesi's endemic mammals and avifauna**. The proximity of some of Indonesia's finest archaeological sites and a dramatic natural setting further enhances the importance for both research and recreation. In addition, maintenance of the forest, particularly the northern watershed around **Lake Lindu**, is essential for the protection of local fisheries and agricultural production.





### One of the most challenging case in Tonle Sap

A large scale environmental management project established by **Government fund, ADB loan, GEF**

**UNESCO** assisted in the legal and institutional framework, conservation and monitoring and provided basis for large intervention

Also involved in two components in ADB Loan Project

### Can Gio BR, Vietnam, 1999

A 75,740 ha mangrove dominated reserve. More than 200 species of fauna and 52 species of flora. A first BR for rehabilitated mangrove ecosystems. An interplay area between Ho Chi Minh city and the sea and ‘green lungs’ for the city. Local population 58,000 mainly on agriculture, fisheries, aquaculture and salt production. Activities include research, education, ecosystem valuation, ecotourism, institutional and legal system improvement, and support on communities for rural development.



Can Gio BR (rehabilitated mangroves) Ho Chi Minh City -Vietnam-1999



### Potential Biosphere Reserves in SeaBRnet

A regional list of potential Biosphere Reserves will be established in 2004. Decided at Ecotone-SeaBRnet meeting in Cambodia October 2003



Cat Ba, 3<sup>rd</sup> BR and Red River Delta nomination with ASPACO support



Mahakam Delta and its upstream catchment area, East Kalimantan





As part of overall effort for capacity in Biosphere Reserves, ASPACO has been used to

- Improve capacity at national and site levels for the implementation of Seville Strategy.
- Provide technical assistance and seed funding for Biosphere Reserves
- Narrow gap in studies that have social and economic aspects

### ASPACO Support: Cambodia

- Consultation with Cambodian Government on a national assessment of coastal conservation system completed, and a study to be commenced in November 2003
- A Personal Computer + GPS for the floating station of Tonle Sap BR provided

### ASPACO Support: China

- Shankou Mangrove BR Project.
- Nanjilie Islands BR.
- Yancheng BR.
- Support for two young experts working on coastal BR (Yancheng and Nanjilie Islands) at BIOTROP-UNESCO Eutrophication Regional Training, August 2002, Bogor, Indonesia

### ASPACO Support: DPR Korea

Support for a national study on sustainable management of Mount Kuwol and its surrounding coastal wetlands and the preparation of the Mount Kuwol and its coastal wetlands BR nomination – ASPACO and EABRN

### ASPACO Support: Indonesia

- Project in Siberut with Ommersteyn Foundation (On-going)
- Support for an expert from PHKA to attend training in Netherlands on wetland management.
- Support to the publication of a national guidebook of 40 National Parks including Biosphere Reserves and Natural WH sites

### ASPACO Support: Philippines

- Preparation of handbook of mangroves
- Equipment for production of information materials
- Funds ready to support Palawan BR follow up, after SeaBRnet workshop in Cambodia October 2003

### ASPACO Support: Vietnam

- Support for the preparation of Red River Delta BR nomination – transboundary issue cross provincial borders (complete)

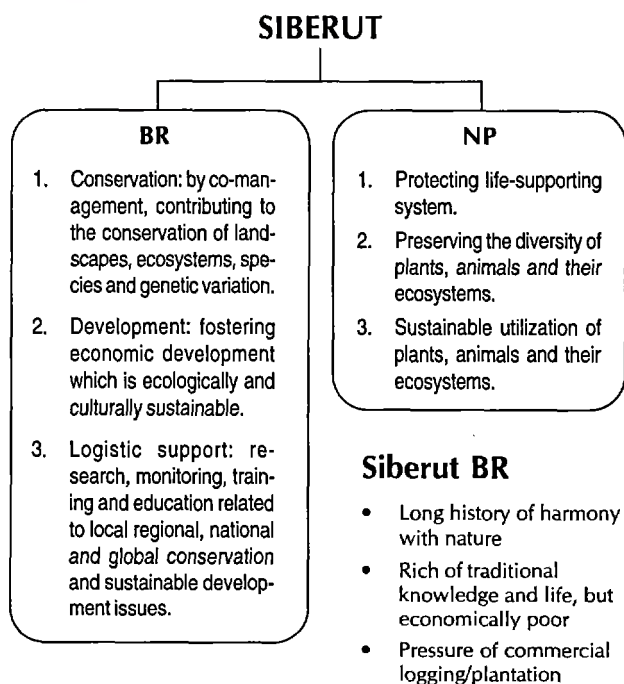
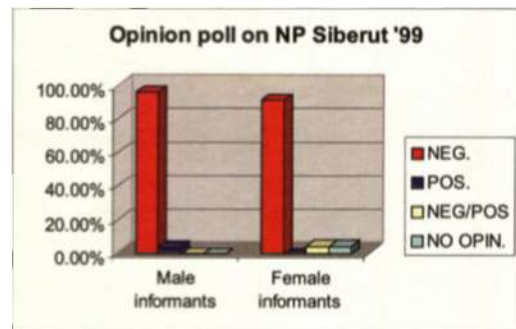
- Improving legal and institutional framework of Can Gio BR
- Ecological and social monitoring of Red River Delta
- One young expert to attend BIOTROP-UNESCO Eutrophication Regional Training
- BR publications

### ASPACO Support for the region

- A training course on integrated management of coastal ecosystems to be organized
- Grants for people from BRs to attend MAB workshops
- Publications in association with MAB, SeaBRnet and Ecotone

### ASPACO in Siberut Island BR

The reserve (3,857 km) comprises one of the world's major reservoirs of plant genetic resources. In addition, high levels of endemism, and the traditional culture of the indigenous population make Siberut a unique part of Indonesia's natural and cultural heritage.

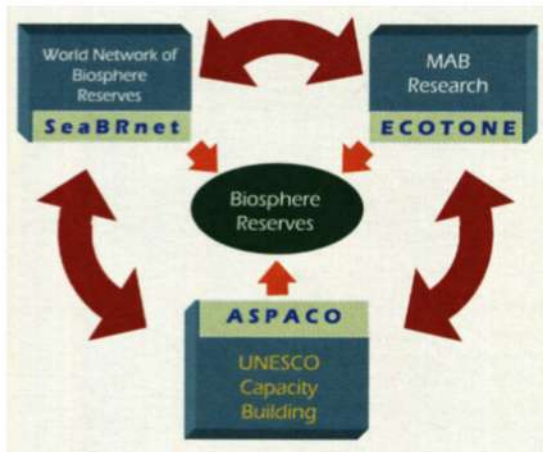


### Site intervention

- LIPI-PHKA-CI-UNESCO partnership
- Co-management
- Education
- Economic alternatives
- Technical training to local NGOs
- Water project
- Ecotourism
- Anti large scale commercial logging

### Co-management: A New Approach Towards Conservation in Siberut

- Developing alternative economic activity for local villages in Siberut Biosphere Reserves
- The path to a success is still long and bumpy, but there is still hope.



### Plan for future MAB activities in SeaBRnet

- Regular MAB Programme 2004-2005
- FIT Support of various sources (2004-2007)
- ASPACO – Phase II

### New MAB Training in SeaBRnet

- Specific technical training goes to existing courses
- Short-term training (one week to ten days) and based on BR site and real case: possible proposals:
- Fast biodiversity assessment (sea grass and mangroves) using Ranong BR, Thailand
- Ecosystem economic valuation (mangroves) using Can Gio BR, Vietnam
- Management of marine biosphere reserve, using Komodo BR, Indonesia
- New mechanisms in ecotourism development, using Jiuzhaigou China or Halong Bay (WH, Vietnam)
- Sustainable aquaculture for BRs, Philippines

### Subjects in Ecotone-SeaBRnet

- Integrated ecosystem and BR management (including terrestrial and coastal BRs)
- Quality economy in BRs (MAB labelling, certifying, ecotourism, aquaculture)
- Biosphere Reserve financing
- BR as model in large scale of freshwater ecosystem context
- Ecosystem rehabilitation and conservation
- Economic valuation and policy interpretation
- Cultural dimension of biodiversity conservation
- Transboundary cooperation
- Long-term monitoring systems

### Many BRs do have major freshwater components



### Major challenge to BR model

- Legislation: no major instrument for the protection of the lake system.
- How to set up a proper zonation that has a useful core, buffer and transition zone.

### Middle Mahakam

- Cluster of shallow lakes: Semayang, Melintang, Jempang etc. East Kalimantan Total area app. 450km<sup>2</sup>, max 6 meters in depth
- Freshwater dolphin (*Orcaelia brevirostris*) habitat – IUCN insufficient know species (1988). Population in these lakes about 100-150.
- Human impacts include intensive fishing on whitefish species (Cyprinid group) that are the main food of dolphin a threat, transportation and industrial pollution at the lower part of the Mahakam River.
- It is not a PA and perhaps difficult to set up core areas, should BR be considered.

(Lukman and Gunawan, 1997)



## Zoning in Tonle Sap : management of core areas – careful reflection needed



- Large wetlands at Lao Cambodia border
- Siphandone Area
- And other possibilities in Malaysia, Vietnam, China



Map from ABC Protected Areas Systems Review of the Indo-Malayan Realm (Lao and its neighbours)

## Great Mekong Cluster

- Large watershed - transboundary cluster.
- Presently cooperation focus on economic development, hydropower, irrigation, agriculture development, transportation, trade.
- Already many conservation areas established, including BRs and WHs, more will add in.
- Large projects on wetlands by GEF, ADB going on.
- However, roles of conservation areas in the Great Mekong region, especially vis-à-vis long-term development interest, have not been effectively clarified and communicated.

## WH sites - number continue to increase in East and Southeast Asia

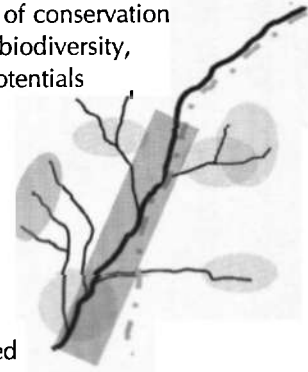


## Cluster WH nomination: 10 million people rely on the water supply from the areas

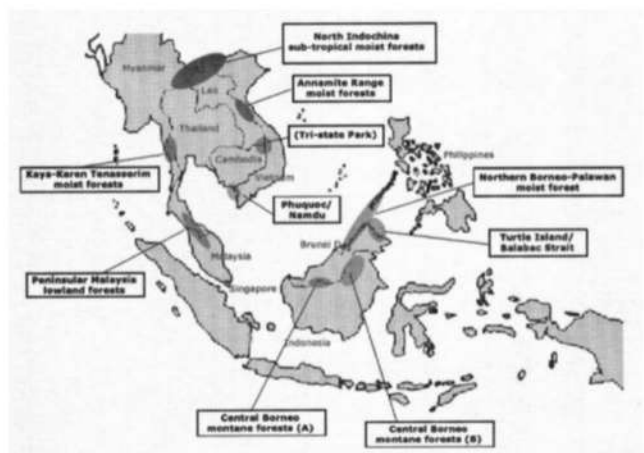
(Sumatra montane and lowland forests cluster)



- Roles and contributions of conservation areas must be clarified: biodiversity, hydrology, economic potentials
- A river basin based PA strategy taking into account the biological, hydrological but particularly socio-economic, cultural context needed.
- Technical systems related to conservation for all the areas must be improved to enable practical design, enforcement, monitoring and communication. An issue for long-term subregional cooperation – not for project of a few years



## Working with ASEAN on Transboundary Issues



Current and Potential Trans-boundary Reserves in Southeast Asia



## Conclusion:

- Biosphere Reserves including potential sites in the region have extraordinary values and challenges, provide interesting locations for exploring ways for sustainable ecosystem management, including to the testing and evolution of the Ecosystem Approach Principles.
- In SeaBRnet range, there has been a comprehensive profile of MAB intervention, representing major types of ecosystems in different social-cultural contexts.
- ASPACO has contributed in a relatively wide range to support capacity building in sites in relatively short-time of implementation.
- ASPACO activities are relevant as they are geared with the overall MAB programming and synergized with other on-going initiatives to maximize the effect.
- Capacity building in Biosphere Reserves is a long-term task, for which adaptable approach is needed – extension of ASPACO will be needed.
- New MAB priorities have been identified for cooperation in UNESCO Regular Programme and Ecotone-SeaBRnet during 2004-2005. It is time to set up new set of activities in ASPACO.

## Annex: List of Biosphere Reserves

No.	Name (year of nomination)	Size (hectares)	Type of Ecosystems
<b>SOUTHEAST ASIA</b>			
<b>Cambodia</b>			
1	Tonle Sap (1997)	1,481,257	Tropical dry or deciduous forest (incl. Monsoon forests); freshwater lake and wetlands
<b>Indonesia</b>			
2	Cibodas (1977)	57,532	Tropical humid forest
3	Gunung Leuser (1981)	792,675	Tropical humid forest with mixed mountain ecosystems
4	Komodo (1977)	173,300	Tropical savannas and grasslands with coastal/marine components (coral reefs and some mangroves)
5	Lore Lindu (1977)	217,982	Montane rain forest
6	Siberut (1981)	405,070	Tropical rainforest with coastal/marine components (mangroves and coral reefs)
7	Tanjung Puting (1977)	415,040	Tropical humid forest including mangroves
<b>Philippines</b>			
8	Palawan (1990)	1,150,800	Tropical humid forests with coastal/marine component including mangroves
9	Puerto Galera (1977)	23,247	Tropical humid forests with coastal/marine component
<b>Thailand</b>			
10	Hauy Tak Teak (1977)	4,700	Tropical dry or deciduous forest (incl. Monsoon forests)
11	Mae Sa-Kog Ma (1977)	42,084	Tropical dry or deciduous forest (incl. Monsoon forests)
12	Ranong (1997)	29,936	Tropical humid forest and mangrove forests
13	Sakaerat (1977)	7,808	Tropical dry or deciduous forest (incl. Monsoon forests)
<b>Vietnam</b>			
14	Can Gio Mangrove (2000)	75,740	Mangrove forests
15	Cat Tien (2001)	257,357	Tropical humid forest
16	Cat Ba Island (2003)		
<b>EAST ASIA (only coastal areas, islands and tropical forests are mentioned)</b>			
<b>China (24 BRs in total)</b>			
5	Dinghushan (1979)	1,133	Tropical humid forest
8	Gaoligong Mountain (2001)	293,564	Mixed mountain and highland systems
12	Nanji Islands (2000)	20,629	Marine archipelago in interface between temperate and tropical zones
14	Shankou Mangrove (2000)	8,000	Mangrove forests
20	Xishuangbanna (1994)	241,700	Tropical dry or deciduous forests (incl. Monsoon forests); mixed mountain and highland systems
21	Yancheng (1992)	280,000	Temperate forest and coastal wetlands
<b>Japan (4 BRs in total)</b>			
25	Yakushima Island (1980)	18,958	Sub-tropical and temperate rainforests
<b>Korea, DPR (1 BR, one under nomination)</b>			
26	Mt Kuwol and its coastal wetlands (2002 nomination)	About 24,000	Temperate and sub-polar broadleaf forests and coastal wetlands
<b>Korea, Republic of (2 BRs)</b>			
27	Jeju Island (2002 nomination)		Temperate and sub-polar broadleaf forests or woodlands
<b>Russia (Far East)</b>			
31	Sikhote-Alin (1978)	469,088	Temperate broadleaf forests or woodlands (Mountain Manchurian mixed forest)

# ASPACO in the Region

## Pacific MAB - Pacific Perspectives

by Mr Hans Dencker Thulstrup  
UNESCO Office for the Pacific States

### Characteristics of the Pacific

- High degree of customary land tenure
- High degree of community autonomy
- Limited land mass
- Close and complex community-nature relationships

### Conventional and adaptive approaches to conservation in the Pacific

#### Conventional conservation approaches:

Limited success due to limited recognition of locally specific characteristics.

#### The ecosystem approach in the Pacific context

- **Principle 1:** The objectives of management of land, water and living resources are a matter of societal choice
- **Principle 10:** The approach should seek appropriate balance between, and integration of, conservation and use of BD.
- **Principle 11:** The ecosystem should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices
- **Principle 12:** The approach should involve all relevant sectors of society and scientific disciplines.

### MAB in the Pacific - advantages

- A soft tool – flexible, approachable, and voluntary
- Not a convention - no formal ratification necessary
- Not bureaucratic – easy to work with
- Management-focused
- Centered on human-nature interaction
- Links easily with existing programmes, both Pacific and global (Ecosystem Approach)

### Pacific MAB requirements

- Will not yield good results unless partners are actively participating
- Must be voluntary and country/site driven
- Must correspond to UNESCO's capacity to support and follow up

### Towards a network: the people

- Marshall Islands: Mr. John Bungitak
- Samoa: Mr. Faumuina Pati Liu
- Kiribati: Ms. Tessie Eria Lambourne
- Vanuatu: Mr. Ernest Bani
- Papua New Guinea: alternates Dr. Kwapena and Mr. Vagi Genorupa
- Tuvalu: Mr. Mataia Tekinene
- Fiji: Mr. Manasa Sovaki
- Niue: Ms. Fili Richmond-Rex
- Solomon Islands: Mr. Moses Biliki
- Palau: Hon. Fritz Koshiba
- Federated States of Micronesia: Mr. Willy Kostka
- Nauru: Mr. Roxen Agadio
- Tonga: Mr. Uilou Samani

...however, some countries are more active than others!

### A note of caution

- The decentralized and locally specific contexts of Pacific island nature conservation sites may cause a comparatively long time lapse from the identification of a project site to the full fruition of the project.
- The limited human resource base of the relevant government agencies lend departments vulnerable to shifts in personnel, brain drain, and staff absences.

As natural as these constraints may seem, they do have the potential to pose a considerable constraint for projects of limited duration.

## The ASPACO project

### Savai'i Island, Samoa

- MAB-ASPACO is partner in the UNDP-GEF PDF-B project Saving Threatened Lowland and Upland Rainforests of Savai'i through Community-based Management
- Targets sustainable community-based management of the Savaii tropical forests
- Includes the nomination of parts of or the entire island of Savaii as a Biosphere Reserve.

### Ngaremeduu, Babeldaob Island, Palau

- MAB-ASPACO project implemented since mid-2002
- Addresses capacity building for effective implementation of management plan
- Examines and prepares a possible Biosphere Reserve nomination

### Éua, Kingdom of Tonga

- MAB-ASPACO project approved for implementation in mid-2003
- Targets the elaboration of an integrated MAB-based management framework for Éua Island
- Prepares a Biosphere Reserve nomination



### Sogeri Plateau/ Variarata National Park, PNG

- Preparation of Biosphere Reserve nomination currently in progress following extensive community consultations
- Site originally suggested as a Natural World Heritage site



### Other possible BR's include...

- And Atoll, Pohnpei, FSM
- Utwe-Walung, Kosrae, FSM
- Huvalu, Niue
- ... and more



## The Future of Pacific MAB

- Identification and operation of focal points formalized
- Ongoing and new MAB and ASPACO projects implemented
- Network building processes begun – second Pacific MAB meeting (ultimo 2004)
- Establishment of PacMAB – inscription of first Pacific Biosphere Reserves (2005)

# ASPACO in the Region

## Latin America and the Caribbean

## Biosphere Reserves in Latin America

by Ms Claudia Santiago Karez  
UNESCO Montevideo Office

### Island and Coastal Biosphere Reserves of the Region

There are 70 biosphere reserves in Latin America and the Caribbean, distributed throughout 18 countries. Approximately 29 biosphere reserves were declared over the last decade -between 1993 and 2003-, thus revealing a renewable interest in the concept of biosphere reserves in the region. Some 22 biosphere reserves include coastal marine ecosystems such as wetlands, mangroves and coral reefs located in the Caribbean (11), the Atlantic (4) and the Pacific (7).

The largest coastal biosphere reserve in Latin America is Mata Atlántica in Brazil, which extends over more than 5000 km along the Brazilian littoral.

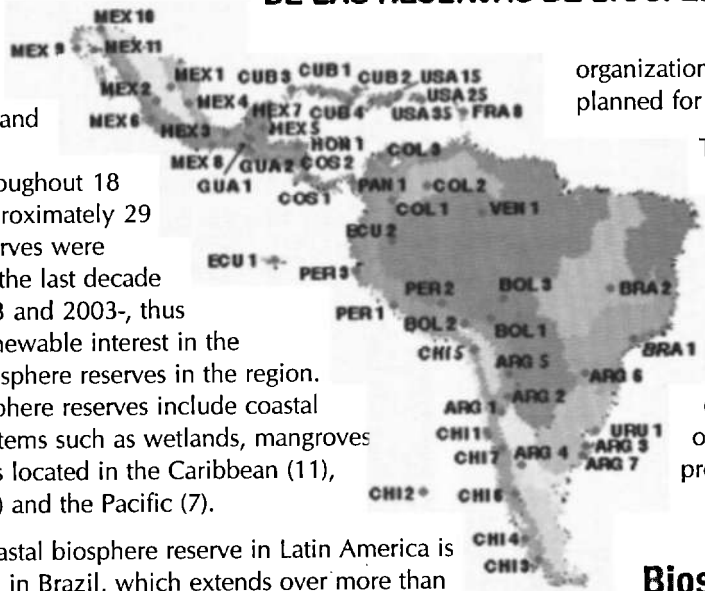
In Latin American and Caribbean, 3 Pacific and 2 Caribbean islands are biosphere reserves.

- In the Pacific these are:
  - Juan Fernández (Chile)
  - Galapagos (Ecuador)
  - Islands of Gulf of California (Mexico)
- In the Caribbean:
  - Seaflower (Colombia)
  - Chinchorro (Mexico)

In the last few years, coastal ecosystems have been the subject of discussion at meetings of MAB Programme, particularly in the Atlantic, where greater coordination is proposed for the management of the coastal reserves of South Eastern Atlantic. Concerns focus on local development and the conservation and development of coastal areas in South Eastern Atlantic, taking traditional coastal communities into account.

The Caribbean has a higher number of coastal biosphere reserves, Cuba has six sites declared, five of

MAPA DE LOCALIZACION  
DE LAS RESERVAS DE BIOSFERA



which are coastal reserves and there are also major biosphere reserves in Colombia, the Dominican Republic and Mexico. A meeting for the organization of a regional network in Caribbean is planned for December 2003.

The Pacific has a only one coastal biosphere reserve in Central American region named Darien (Panama). South America has 5 coastal biosphere reserves in the Pacific, most of which are located in Chile. Particularly through the ASPACO project, a significant experience-sharing process with the other countries participating in the project have been initiated.

### Biosphere Reserves and Integrated Coastal Management

Biosphere reserves can be an important tool for the integrated management of coastal areas and islands.

Integrated coastal management is understood as a *“dynamic process whereby strategies are coordinated for the use and distribution of resources with conservation and development aims.”*

A few Latin America and Caribbean countries have integrated coastal management policies such as Ecuador, Belize, Barbados, Brazil, Costa Rica, Cuba, Uruguay and Mexico, at different stages of development.

Biosphere reserves thus play a significant role in coastal management. They enable a zonation of terrestrial and marine ecosystems into different zones, facilitating the integrated management of natural resources and providing a coordination among the various stakeholders: scientists, decision-makers and communities.

The three zones of biosphere reserves are:

- **Core zones**, where the main objective focus is protecting their ecosystems.
- **Buffer zones**, where the existing activities have a very low negative impact on the core zones.
- **Transition or cooperation zones**, which are terrestrial and marine zones where there are practically no restrictions on human activities, but which nonetheless require the assessment and monitoring of environmental quality of the zone, with the involvement of all stakeholders.

Costal biosphere reserves and islands count on a great number of environmental scientific data that are indispensable for the management of these areas.

There is an interest among Latin American and Caribbean countries in applying the concept of biosphere reserves in islands and coastal areas, creating both multiple use and restricted protection areas that call for an integrated coastal management.

Zonation is both an important tool and a challenge, because it often entails the participation of different national sector bodies and local organizations. Although in Latin America, many biosphere reserves were created and managed by bodies in charge of Protected Natural Areas, today, there exist different types of bodies or mechanisms to manage biosphere reserves.

One of the main issues for integrated coastal management in the Region is fishery, which constitutes a significant economic contribution to the exports of several countries such as: Peru, Chile in particular, Argentina and Uruguay, Mexico and Panama. In Central America countries obtain important social and cultural benefits from fishing activities that are vital for several fishing communities.

## ASPACO Projects in the Region

The three ASPACO projects in the Region are:

1. Reproduction and early larval stage culture of the Easter Island lobster (Chile)
2. Strengthening of the Galapagos Marine Reserve (Ecuador)
3. Promotion of responsible fishing practices and consolidation of marine-coastal protected areas in Central America.

Characteristics of the ASPACO projects:

1. ASPACO projects in Latin America have been aimed at the conservation and/or recovery of marine resources that are overexploited, even though many such resources are included in marine reserve areas.
2. A second important characteristic of ASPACO projects is the involvement of the population. Local

communities participate significantly in all three projects.

3. A third feature of ASPACO projects in Latin America is that the three of them have been implemented by conservationist non-governmental organizations in collaboration with governments.

These three projects are implemented in protected areas, biosphere reserves and World Heritage sites. All of them prioritize the problems of overexploitation of marine resources, ecosystem degradation, and non observance of the legislation on protected areas as well as competition between industrial and artisanal fisheries. Different strategies have been developed to deal with these issues: increasing scientific knowledge of certain species, strengthening protected areas, involving local communities and NGOs, and disseminating and raising awareness of the role and importance of protected areas. A summary of each project objectives and results is presented below.

## Easter Island (Chile)

The **Easter Island project** seeks to increase knowledge on the Easter Island lobster, as regards reproduction and larval stage development under controlled conditions. The project's main objective is to successfully recover this species, which constitutes an important economic resource for the local population.

The project intends to establish the scientific basis for the development of the Easter Island lobster (*Panulirus pascuensis*) under controlled conditions. Recovering this species would mean preventing the disappearance of an endemic species that is closely linked to the Rapa Nui culture, besides representing a significant means for the development of this community.

The idea for this project initiated in 2001, when funds were obtained from participating partners and from the National Indigenous Development Corporation (CONADI) which were mainly used to install a seawater supply system, suction pumps and ponds. Thus it was possible to work during two years because resources were not sufficient.

The main results obtained during this period was the characterization of lobster behavior in captivity (photoperiod, cannibalism, feeding preferences, feeding volume and frequency, interspecific behavior, manipulation and molting periods). It should be noted that this species is practically unknown and therefore this experience was based on the biology of other species, such as the *Panulirus argus* (Caribbean Lobster) and the *Jasus frontalis* (Juan Fernández Lobster).

Under the ASPACO project, material and equipment were supplied to allow rigorous work and record the environmental conditions provided for the organisms in





the hatchery in order to enhance control and management of parameters such as temperature, oxygen, salinity and pH.

## Galapagos (Ecuador)

In Galapagos, the ASPACO project sought to promote the dialogue and discussion about the conservation of marine resources in Galapagos Marine Reserve among political and private. Galapagos Islands are declared World Heritage site in 1978 and Biosphere Reserve in 1984. The Galapagos Marine Reserve has been created recently in 1998.

ASPACO project "Galapagos submarine: challenge of Ecuador for the future" was presented at this meeting by Mr. Danilo Silva from Ecociencia.

To carry out this project, in 2002 the Galapagos National Park and the NGO Ecociencia decided to sign a cooperation agreement, with the assistance of the UNESCO Office in Quito.

The final result of this project consisted of a national forum with the participation of the most important social and political actors and the education sector. The video entitled "Where the life is born" elaborated for this event was presented and participants to the forum had the opportunity to ask questions to panelists. The project and the forum took Galapagos out of the conservationist field and begun a process of dialogue about the conservation of the Marine Reserve with other sectors.

## The Central American Project

The **Central American Project** was aimed at preparing a regional strategy that involve five countries of the region (Guatemala, Costa Rica, Honduras, El Salvador and Nicaragua), with the participation of artisanal fishers, local and national governments, and conservationist NGOs.

The objective of this project was to identify a strategy to promote responsible fisheries and efficient management of protected areas.

Local conservationist organizations carried out national studies and established contacts with private fishing organizations, NGOs and governments.

At the meeting, Mr. Mario Boza, project coordinator for Central America, presented the Central American Pacific Regional Strategy for the Promotion of Responsible Fisheries and the Consolidation of the Marine Protected Areas of the Region.

Taking into account the critical situation of fishing resources, the creation of new biosphere reserves in the coastal areas has been identified as one of the priority actions to be undertaken for the protection and recovery of marine species and their ecosystems. For this purpose, it was suggested that a study be carried out with the aim of identifying and promoting the creation of biosphere reserves based on existing or potential protected areas.

# Presentation on Juan Fernández Biosphere Reserve

by Mr Homero Gallardo,  
Chile

## Chilean Biosphere Reserves

### Guidelines to Formulate a Governmental Policy on Chilean Biosphere Reserves

#### Background

There exist seven Biosphere Reserves in Chile, which were declared between 1977 and 1984. These Reserves total up to 2.4 million hectares (about 24,000 km<sup>2</sup>), corresponding to 11 Protected Areas, such as National Parks (7), National Reserves (3) and Natural Monuments (1), of which nearly all are state property.

This area represents almost 18% of all the territory pertaining to the National System of Government Protected Wildlife Areas. All of these reserves are managed by the Chilean Forest Service (CONAF), a governmental agency of the Ministry of Agriculture.

The creation of Reserves took place as a national strategy in order to stabilize many state protected areas, during the military government, when there was many people who proposed to sell all kind of state properties. The threat disappeared in 1990, so the concept of Biosphere Reserve became less important. Until 2000, no linking or networks between these areas existed, to enable the Sevilla Strategy to be put into practice. From that year on, ecological, economic and social associations with their environment have become a policy to apply to all 94 units of the system in Chile, with an especial emphasis on the seven Biosphere Reserves.

UNESCO is supporting Chile in this effort through the assistance of two international consultants to analyze the present situation and propose actions to be undertaken.

Boundaries of present Biosphere Reserves will be extended in order to incorporate buffer and transitional zones aiming at the development of the three functions defined by the Strategy.

#### Guidelines

**Application of Biosphere Reserves concept:** Boundaries of present Biosphere Reserves will be extended in order to incorporate buffer and transitional zones aiming at the development of the three functions defined by the Strategy.

**Conservation:** Considering that some places important for biodiversity conservation are outside the present Biosphere Reserves, but corresponding to the same ecosystem, the Chilean Government will try to incorporate them as nucleus zones, establishing networks of ecological connection to assure a better protection and integrity.

**Sustainable Development:** Keeping in mind that there exists well established infrastructure in the rural sector to carry out public and private projects with especial reference to environmental, social and economic aspects, the Chilean Government will promote its articulation with the Reserves, to increase its level of impact.

**Participation:** Within the context of the application of a recent institutional policy on the participation of communities in the management of the National System of Government Protected Wildlife Areas and according to the results obtained so far, additional efforts will be made to improve the active participation of institutions and communities involved. At present, one of the Chilean Biosphere Reserves, Torres del Paine National Park, has an Advisory Council, for the first time since it was created as a Park 43 years ago.

**Biogeographic Extension:** Due to a Protected Areas System with a great extension in the country (18% of its total surface), improving the biogeographic range is not a major concern in the establishment of a Biosphere Reserves network. Given this situation, initiatives will be focused on the extension and creation of new Reserves where possible and necessary, particularly in those areas that could serve as a model of management for the sustainable use of natural resources.



**Planning:** Each Reserve will have a Management Plan, which will be designed in a participatory manner, incorporating public agencies, private owners, NGO's, the productive sector, academic staff, community organizations and local governments. Furthermore, a clear inclusion of Biosphere Reserves in the regional development strategies and other planning and management instruments will be pursued, in order to obtain an articulation and coherence which maximizes the impacts of undertake actions.

**National Network:** In order to promote, coordinate and enhance the management of present and future Biosphere Reserves, a National Biosphere Reserves System will be implemented.

**Managing Reserves :** Considering that the new potential areas to be added to the current set of Reserves will present different types of land use, private owners, problems and potentials, Management Committees will be created as organizations to take decisions and coordinate different activities in order to develop planning by common consent.

**Financing:** From the obtained articulation of efforts made by several organizations for the planning and managing of the Reserves, several activities will be defined jointly in order to use institutional resources and to apply for public and private funding.

## Juan Fernández Islands Biosphere Reserve: A Special Case

The Juan Fernández Islands contain one of the most interesting floras of the world. Although protected as a National Park and World Biosphere Reserve, 400 years of human interference have left deep traces in the native plant communities. Repeated burning, overexploitation of species, and the introduction of animal and plant pests have lead 75% of the endemic vascular flora to the verge of extinction.

The flora of Juan Fernández islands comprise 131 endemic species (62.1% of the vascular native flora), 12 endemic genera, and 1 endemic family (Marticorena et al. 1998). They constitute an ideal natural laboratory for the reconstruction of the phylogeny of their endemic taxa and the testing of hypotheses concerning their modes of speciation (Stuessy et al. 1984, Pacheco et al. 1985, Stuessy et al. 1990). Moreover, given their human occupation for only 427 years, the islands permit the reconstruction of the vegetation's responses to climatic changes before the arrival of man and the influence of man and climate after their discovery (S. Haberle unpublished results). However, their important botanical uniqueness contrasts greatly with their conservation status, as 73% of the endemic angiosperms are threatened with extinction (Stuessy et al. 1992).

Thirty species, including various ferns, are in a critical state (P. Danton & J. Lesouef unpublished results).

In 1997, the Chilean Forest Service (Corporación Nacional Forestal, CONAF) started an ambitious project entitled "Conservation, Restoration and Development of the Juan Fernández Islands", whose objective is the recovery of this highly complex ecosystem with a socio-ecological focus. Firstly, Juan Fernández makes an interesting case, as the local people (600 inhabitants) practically live within the park, therefore impeding the exclusion of the people from any conservation program. Secondly, the relatively small size of the archipelago (100 km<sup>2</sup>) permits the observation of the effects of any modification in the ecosystem on small scales in time and space. Thirdly, the native and introduced biota are interrelated in such a way that human-caused changes in one species population may trigger off unexpected results amongst other, non-target species. The project mainly deals with the eradication or control of some animal and plant plagues, the active conservation and restoration of the flora and the inclusion of the local people in conservation planning. The Park's general problems, the strategy proposed to solve them as well as some preliminary results are presented below. This project shows the complexity of the conservation activities in practice, with diverse and complex interrelations and gaps in ecological knowledge. In this respect, the project may well serve as a model for similar programs in other places.

The governments of Chile and The Netherlands for a period of six years finance the project, whose objective is to maintain and recover the native flora, while contributing to the socio-economic development of the local people which is so intimately linked to the islands' natural resources.

The Juan Fernández Islands are located in the Pacific Ocean, some 670 km (about 360 marine miles) west of Valparaíso, Chile. The two principal islands are: Robinson Crusoe, with an area of 47.9 km<sup>2</sup> (78° 51' W, 33° 37' S) and Marinero Alejandro Selkirk, with an area of 49.5 km<sup>2</sup> at 187 km west from Robinson Crusoe (80° 45' W, 33° 45' S). There is a third smaller island called Santa Clara, 2.2 km<sup>2</sup> large, at a distance of 1.2 km south-west from the first one.

Although the islands were discovered in 1574, they only served as a refuge for occasional privateers and pirates in the XVII and XVIII century (Orellana et al. 1975, Brescia 1979). Spanish attempts to colonize have been recorded since 1591 (Castilla & Oliva 1987). Until the first part of the XIX century, Robinson Crusoe Island served as a place of exile (Brescia 1979). Only since 1877, the island started to be inhabited permanently, laying the foundations of the present village of San Juan Bautista with 600 residents (Orellana et al. 1975). Santa Clara is uninhabited, while Marinero Alejandro Selkirk offers refuge to a temporary

population of around 50 people in the period October-May (D. Arredondo personal communication).

With respect to the environmental problems, many human interventions have taken place: introduction of goats, pigs, dogs, sheep, various plant plagues, clear cutting, burning, erosion (Hoffmann & Marticorena 1987, Stuessy et al. 1998). The sandalwood (*Santalum fernandezianum*), an endemic tree species, has disappeared due to indiscriminate extraction (Skottsberg 1953). It made little difference or the same had happened to the Juan Fernández fur seal (*Arctocephalus philippii*), endemic to these and the Desventuradas islands, and whose population was estimated at only 459 individuals in 1969 (Aguayo & Maturana 1970, Torres 1987). In spite of early warnings by eminent scientists about these threats to the islands biota (e.g., Skottsberg 1911, 1922, Muñoz 1974), little or nothing had been done to effectively redress the situation up to the second half of the last century. Although the islands have been a Chilean National Park since 1935 (Brescia 1979), the Administration did not arrive until the end of the sixties. Until then, practices incompatible with national park objectives continued (Skottsberg 1953, Muñoz 1974). In 1977, UNESCO declared the park a World Biosphere Reserve (Hoffmann & Marticorena 1987). As of 1976, CONAF, charged with the administration and protection of the state wildlife areas, started with the propagation of endemic plant species in order to halt the decline in population sizes (R. Schiller, personal communication). Between 1988 and 1991 these activities gained impetus through a World Wide Fund for Nature funded a project entitled "Program for the Conservation and Recovery of Endangered Plants of Juan Fernández" (Ricci & Eaton 1994, Ricci 1996). What follows is a detailed analysis of the ongoing project.

The Juan Fernández National Park represents an example of the integrated concept between ecology and man, because of its island character and the local population's dependence on natural resources. The main economic activity on the islands is lobster (*Jasus frontalis*) fishing (Arana 1987), but in the long term however, overexploitation of the lobster (Arana 1987) may cause the inhabitants to engage in agriculture and animal husbandry at the expense of the National Park. In fact, the abundance of this crustacean has declined over the recent years (Arana 1987). A ban on its capture has therefore been declared for the period from May to October. The local population's dependence on the resources of the islands has led to the inclusion of various programs in the project with a social emphasis besides the natural resources management programs. Nevertheless, all programs have the same goal in common: preservation of the native flora. The following programs were carried out to face the problems:

- The island women
- Ecotourism
- Environmental education
- Exotic tree plantation management
- Control of livestock (protection of native forests)
- Rabbit control
- Goat control
- Plant pest control
- Restoring degraded areas
- *In situ* conservation of endangered species
- *Ex situ* conservation of endemic species
- Interactions between the various factors and between programs

# Presentation on Juan Fernández Biosphere Reserve

## Parque Nacional Archipiélago Juan Fernández

Medidas tomadas por la corporación nacional forestal a favor de su integridad y autenticidad

### Antecedentes generales

#### Ubicación geográfica y administrativa:

El Archipiélago de Juan Fernández de 9.398 hás. de superficie, está ubicado aproximadamente a 670 kms. de Chile Continental, al Oeste del Puerto de San Antonio. Lo conforman 3 islas: Robinson Crusoe de 4.711 hás., Santa Clara de 223 hás. y Marinero Alejandro Selkirk de 4.464 hás.

El Parque Nacional del mismo nombre que el Archipiélago, ocupa una superficie de 9.001,6 hás., siendo terrenos del Parque la totalidad del Area de Santa Clara y Alejandro Selkirk.

En el caso de la Isla Robinson Crusoe, 396 hás. aproximadamente están desafectadas como Parque, y corresponden a terreno urbano, donde se inserta el poblado San Juan Bautista, y a la Punta de Isla, en el extremo Sur poniente donde se encuentra el aeródromo.

Administrativamente, todo el Archipiélago pertenece a la Comuna de Juan Fernández, Provincia de Valparaíso, Quinta Región de Valparaíso.

#### Antecedentes histórico - culturales:

El Archipiélago fue descubierto por el navegante español Juan Fernández, el 22 de Noviembre de 1574, fecha que se asume como oficial (probablemente él introdujo las primeras cabras y vegetales exóticos).

En los siglos XVII y XVIII las islas fueron visitadas y utilizadas como refugio ocasional por corsarios y piratas.

Entre 1704 y 1709 vivió en la Isla Robinson Crusoe (ex Masatierra), el Marinero inglés Alejandro Selkirk, quien a su regreso a Inglaterra sirvió de inspiración para la famosa novela de Daniel Defoe "Robinson Crusoe".

Durante el siglo XIX, la principal isla del Archipiélago sirvió de lugar de deportación de patriotas chilenos y de colonia penal para reclusos.

A fines de ese siglo (1877), se estableció en esta isla el Barón Alfredo de Rodt, cuya llegada coincidió con una etapa de tranquilidad para la isla.

En 1935 el Archipiélago fue declarado Parque Nacional, y en 1977, a petición del Gobierno de Chile, es declarado Reserva de la Biosfera por la UNESCO.

Entre los sitios históricos interesantes de mencionar, se cuenta con la "Cueva de Robinson Crusoe" en Puerto Inglés, el "Mirador de Selkirk", restos de fortines como los del Fuerte Santa Bárbara, y el cementerio del poblado que contiene los restos de algunos tripulantes del DRESDEN que fuera hundido en la Bahía Cumberland en 1915.

### Recursos naturales:

#### 3.1. Flora y vegetación:

La vegetación del Archipiélago de Juan Fernández es aquel recurso que le ha dado mayor relevancia internacional. De acuerdo al científico Carl Skottsberg (The Natural History of Juan Fernández and Easter Islands. Estocolmo: Rickmuseum, 1952), en la Isla Robinson Crusoe se diferencian las siguientes comunidades vegetacionales:

- Bosque de montaña baja (500 - 600 msnm)
- Bosque de montaña alta (sobre 600 msnm)
- Grupos aislados de Luma (*Myrceugenia fernandeziana*)
- Matorral siempreverde (570 - 780 msnm)
- Formaciones gramíneas
- Asociaciones de compuestas arborescentes
- Matorral de Maqui (*Aristotelia chilensis*)

Además, se ha identificado una asociación propia de bosque, en la cumbre del cerro El Yunque.



En la Isla Marinero Alejandro Selkirk se han diferenciado las siguientes formaciones vegetacionales:

- Franja costera de plantas halófitas, hierbas hemicriptófitas y terófitas, y ciperáceas
- Estepa gramínea
- Grupos aislados de Luma (300 - 650 msnm)
- Bosque de montaña alta (950 - 1.100 msnm)
- Matorral de *Lophosoria*
- Estepa de altura de flora magallánica (sobre 1.000 msnm)

En la Isla Santa Clara existe, únicamente, una formación de estepa gramínea y algunas compuestas arborescentes formando manchas aisladas en la franja costera.

### 3.2. Flora y endemismo:

El Archipiélago de Juan Fernández contiene 361 especies de plantas vasculares, incluyendo 53 helechos, 65 monocotiledóneas y 243 dicotiledóneas. Se encuentran representadas 73 familias y 219 géneros.

Existe sólo una familia endémica (Lactoridaceae), 12 géneros endémicos, y 126 especies endémicas. La flora vascular nativa tiene un 11% de endemismo a nivel genérico y un 60% a nivel de especie. Entre las especies endémicas, 23 son helechos, 15 son monocotiledóneas, y 88 son dicotiledóneas.

### 3.3. fauna silvestre:

A diferencia de la gran diversidad vegetal, las especies endémicas de fauna son muy escasas. Sólo 11 especies de avifauna y un mamífero marino endémico se señalan para el Parque. Junto a esta especial fauna de vertebrados del Archipiélago, coexisten especies introducidas desde el Continente, algunas de las cuales se han asilvestrado y causan diversos grados de daño, tanto al recurso vegetal como edáfico.

Por su condición geográfica, las islas son escala obligada de aves marinas migratorias, así como residencia permanente de diversas especies terrestres. En la Isla Robinson Crusoe se encuentran el Picaflor de Juan Fernández (*Sephanoides fernandesis*) y el Cachudito de Juan Fernández (*Anairetes fernandezianus*), ambos endémicos y presentes únicamente en esta isla, junto al cernícalo y al neque.

En Isla Alejandro Selkirk se encuentran aves exclusivas de este lugar, entre las terrestres están *Aphrastura masafuerae*, rayadito de Masafuera, especie en peligro de Extinción por su bajo número poblacional estimado en 500 individuos. Otras aves que habitan sólo en esta isla y que se destacan son *Cinclodes outstaleti*, churrete de Juan Fernández y el aguilucho de Masafuera o blindado, cuyo nombre científico es *Buteo polyosoma exsul*.

Las aves marinas que se reproducen en el Archipiélago son 6, presentándose en forma exclusiva en una o dos islas; de éstas, cinco son fardelas y una es golondrina de mar.

Dentro de las especies de avifauna que visitan las islas o que se alimentan de su mar circundante, se pueden mencionar albatros, el petrel gigante y el petrel moteado entre las marinas, así como garzas y queltehues entre las terrestres.

## Problemática de las islas:

El Archipiélago fue sometido por un tiempo prolongado a importantes factores de deterioro ocasionados por causa antrópica, la que se remonta a poco después de su descubrimiento en 1574, produciendo como resultado profundos cambios en los ecosistemas locales.

### Principales factores de deterioro:

- Tala para explotación de madera e incendios forestales intencionales.
- Erosión antrópica.
- Talajeo producido por la introducción de la cabra europea (*Capra hircus*)
- Talajeo producido por ganado bovino, equino y mulares.
- Introducción de conejo (*Oryctolagus cuniculus*) y otras especies de fauna consideradas plagas, actualmente asilvestradas.
- Introducción de especies vegetales que se han convertido en plaga como zarzamora (*Rubus ulmifolius*), maqui (*Aristotelia chilensis*), murtilla (*Ugni molinae*), cardos (*Silybum marianum* y *Cynara cardunculus*), retamilla y amapola.

## Trabajos y proyectos realizados con la finalidad de favorecer la integridad y autenticidad de los recursos:

El Archipiélago de Juan Fernández se caracteriza por haber sido visitado por numerosos científicos y naturalistas desde principios del siglo pasado, los que han dado a conocer a través de publicaciones las características de estos ecosistemas insulares.

En general estos trabajos se han realizado a través de períodos cortos de permanencia, destacándose sólo algunos estudios donde las investigaciones se han realizado a través de varios períodos y años, lo que ha caracterizado a ciertas investigaciones botánicas y algunas sobre especies de fauna como es el Lobo Fino de Juan Fernández (*Arctocephalus philippii*) y la Langosta de Juan Fernández (*Jassus frontalis*).



## 5.1. Proyectos de Manejo y de Recursos Físicos del Archipiélago.

- **Plan de Manejo:** El Parque cuenta con un Plan de Manejo, el que, al momento de ser elaborado este informe se encuentra en etapa de actualización.
- **Estudio sobre los Recursos Físicos del Archipiélago de Juan Fernández:** lo realizó IREN - CORFO en 1982 y constituye una buena base sobre el estado de los recursos, pues proporcionó información de terreno y recopilación de antecedentes bibliográficos en relación a diferentes temas, proporcionando un set de mapas que ilustran y señalan las condiciones de los recursos.

Dentro de los temas tratados se encuentran erosión, carta vegetacional, estado de conservación de la vegetación, recursos geológicos, análisis y delimitación de cuencas, capacidad talajera y de carga animal y análisis de los recursos histórico/culturales del Parque.

- **Proyectos de Flora Silvestre:** Los estudios vegetacionales y florísticos más importantes y extensos son los realizados por Philippi (1864), Johow (1890), Skottsberg (1908 - 1955) y Sanders, Stuessy y Marticorena (1982).  
Considerando el estado de conservación de los recursos en el Archipiélago, CONAF formula y realiza con el apoyo financiero de la WWF el proyecto denominado "Programa de Conservación y Recuperación de Plantas Amenazadas de Juan Fernández". El proyecto se desarrolló entre 1988 y 1991 y ha permitido avanzar significativamente en el conocimiento de la flora.
- **Proyectos de Fauna Silvestre:** Dentro de los proyectos más relevantes se mencionan los siguientes:
  - **Proyecto Lobo Fino de Juan Fernández.** Este proyecto se inicia con el interés de sólo algunos científicos en la década del '60, los que realizan estimaciones poblacionales dando la esperanza de la recuperación de la especie. Posteriormente, en las décadas del '70 y '80 se realizan estimaciones totales de los lobos en el Archipiélago y comienzan actividades de marcaje de crías, estudio de dieta, reproducción, distribución y además, de protección y educación.  
Asimismo, a finales de la década de los '80 y principios de los '90, se profundizan los estudios del Lobo Fino con la participación de científicos nacionales y extranjeros. Los proyectos desarrollados han contado con financiamiento de la WWF, Instituto Antártico Chileno e Instituto Smithsonian de Estados Unidos.

El proyecto se considera exitoso, pues los ejemplares han aumentado desde unos 200 de las primeras estimaciones, a aproximadamente 16.000 en los últimos censos.

- **Proyecto Picaflor de Juan Fernández:** Esta especie de colibrí es una de las 11 aves endémicas del país y es considerada una de las 10 aves más amenazadas de Chile. La Corporación Nacional Forestal, desde 1987 ha realizado estudios sobre los aspectos más relevantes de su biología, efectuando estimaciones periódicas, las que muestran que la población es estable, pero que cuenta con un reducido número de ejemplares, alrededor de 500 a 800, detectándose que su conservación depende del estado en que se encuentre la vegetación nativa de este ecosistema insular y de la población de gatos domésticos presentes en el poblado.
- **Proyectos Comunitarios:** Desde el establecimiento de una administración del Parque Nacional a finales de la década del '60 que en principio correspondió al Servicio Agrícola y Ganadero, y desde 1972 a la Corporación Nacional Forestal, se han realizado diversas actividades con la comunidad, de las cuales destacan las siguientes:
  - **Forestación con especies introducidas.** Se plantaron entre 1968 y 1970 laderas erosionadas y desprovistas de vegetación que se encuentran aledañas al poblado, con la finalidad de controlar la erosión y que la población cuente con recurso maderable para las construcciones de casas y botes.
  - **Control de erosión:** Se efectuaron trabajos de diques de contención en las áreas más conflictivas.
  - **Educación Ambiental:** Desde 1986 se desarrollan actividades en la Escuela del poblado, con charlas, videos, concursos, salidas a terreno con los alumnos, y algunas actividades de capacitación a profesores.
  - **Huertos Familiares:** CONAF ha colaborado activamente en la capacitación de los pobladores en la formación de invernaderos y huertas caseras, cuya producción está orientada al consumo familiar para mejorar la calidad de la alimentación de los lugareños. Se efectuaron 2 proyectos: 1989-1990 y 1993-1994.

## 5.2. Proyecto "Conservación, Restauración y Desarrollo del Archipiélago de Juan Fernández"

Es, sin duda, el proyecto de mayor incidencia en el Archipiélago, por lo que será desarrollado en forma individual.

El Proyecto "Conservación, Restauración y Desarrollo del Archipiélago de Juan Fernández" fue puesto en marcha luego de un proceso de elaboración por parte de CONAF, quien lo postuló para financiamiento en el año 1993 al Gobierno de los Países Bajos, el cual lo aprobó a fines de 1997, fecha en la que se suscribe un convenio de donación entre el citado Gobierno y el Gobierno de Chile (01.12.97)

Se trata de un proyecto de cooperación internacional con el Gobierno de los Países Bajos, a través de la Agencia de Cooperación (AgCI), y la Corporación Nacional Forestal (CONAF) Región Valparaíso, a través del Ministerio de Agricultura. Se iniciaron las actividades en diciembre del año 1997 y la duración inicial era de cinco años. El presupuesto era de cerca de US\$ 2.565.000. Luego de una misión tripartita de evaluación en Septiembre del 2000, se aumentó el presupuesto en aproximadamente US\$ 500.000 y se añadió un sexto año de ejecución.

El objetivo general del proyecto es la "Recuperación de los recursos naturales del Archipiélago de Juan Fernández, por medio de la eliminación de las actuales plagas, la orientación positiva y coordinada hacia el desarrollo de la comunidad local, la conservación de las especies endémicas amenazadas de extinción, y la sensibilización de la comunidad local acerca de la importancia de la conservación de los recursos endémicos".

El proyecto considera el desarrollo de 15 programas agrupados en tres componentes, que se señalan a continuación:

- **Componente socio-económico:** Desarrollo de la Mujer Isleña, Diseño y Aplicación de un Sistema de Turismo Natural Guiado, Capacitación Comunitaria en Servicio Turístico, Pesca sustentable, Manejo Sustentable de Praderas, y Educación Ambiental.
- **Componente de Manejo de Recursos Naturales:** Protección del Bosque Nativo, Recuperación de Áreas Alteradas, Control Integrado de Plagas Vegetales, Control del Conejo Europeo y Rata, Control de Cabra Europea, y Plan de Ordenación del Bosque Exótico.
- **Componente de Investigación:** Conservación *in situ*, Conservación *ex situ*, Investigación Ecológica del Bosque Nativo.

Estos programas están a cargo de profesionales del continente, pero el trabajo de terreno es supervisado por el equipo insular dirigido por el administrador y cuentan con el apoyo permanente de profesionales de la Corporación Nacional Forestal Región de Valparaíso en el continente.

A continuación se señalan los Programas que se desarrollan en el Archipiélago:

## 5.2.1. Desarrollo De La Mujer Isleña

### 5.2.1.1. Objetivo general del programa

Estimular a la mujer isleña a realizar trabajos de artesanía que tiendan a desarrollar sus aptitudes artísticas y al mismo tiempo le permitan obtener un ingreso adicional e independiente.

### 5.2.1.2. Actividades ejecutadas hasta la fecha

El programa llevó a cabo una serie de diez cursos y talleres desde Agosto 1998 hasta Marzo 2000 a los cuales asistieron cerca de 80 mujeres, con un promedio entre dos y tres talleres por dama. Los temas fueron desarrollo personal, pintura en género, trabajos en cuero de pescado, preparación de conservas, huertos orgánicos, hierbas medicinales, corte y confección y un curso de administración empresarial.

A raíz de la misión de evaluación de medio tiempo en Septiembre 2000, se ha retomado el programa y se ha programado desde el año 2001 un estudio de mercado para la artesanía de las mujeres, la construcción de un módulo de exposición de artesanía y tres talleres.

## 5.2.2. Diseño y Aplicación de un Sistema de Turismo Natural Guiado

### 5.2.2.1. Objetivo general del programa

Diseñar y aplicar un Sistema de Turismo Natural Guiado, para resguardar, valorar y difundir los exclusivos y notables rasgos naturales e histórico-culturales del Archipiélago de Juan Fernández, y en especial establecer un Sistema de Turismo regulado que garantice un alto nivel de la calidad de la conservación de los frágiles y únicos ecosistemas del Parque Nacional Archipiélago de Juan Fernández, junto con elevar el nivel de la calidad de la atención del visitante, desarrollando la comunidad en torno a la actividad turística, la cual presenta un muy buen nivel de potencialidad económica.

### 5.2.2.2. Actividades ejecutadas hasta la fecha

- Construcción e implementación de un Centro de Educación e Información Ambiental, con su correspondiente equipamiento audiovisual.
- Realización de dos cursos para Guías de Turismo en 1998 y 1999, lográndose la capacitación y formación de 18 guías.
- Realización de un estudio de paisaje.
- Confección por parte de la Universidad Mayor de un Sistema de Información Geográfica adecuado para el manejo de recursos naturales y provisión de información turística a los visitantes.
- Edición de un libro de poemas y un CD con canciones propias de la Isla.



- Elaboración de rutas, confección de refugios y habilitación de lugares de camping en el interior del Parque.
- Implementación de señalética indicativa e informativa al interior del Parque
- Implementación de pórticos de acceso al Parque.

### 5.2.3. Capacitación Comunitaria en Servicio Turístico

#### 5.2.3.1. Objetivo general del programa

Mejorar el servicio ofrecido al turista por parte de la comunidad residente en la Isla Robinson Crusoe.

#### 5.2.3.2. Actividades ejecutadas hasta la fecha

- Diagnóstico del potencial turístico en la Isla en Noviembre del año 2000 por una empresa consultora (PET).
- Curso Excelencia en Servicio Turístico en Mayo-Junio del 2001 por la misma empresa con 37 personas capacitadas.
- Regularización de la afiliación de los hostales y restaurantes a Sernatur para la temporada 2001-2002.
- Reactivación de la Cámara de Comercio y Turismo en la Isla.

### 5.2.4. Pesca sustentable

#### 5.2.4.1. Objetivo general del programa

Promover la pesca artesanal sustentable de los recursos marinos capacitando a los pescadores. Recopilar los antecedentes que existen, entregárselo a los pescadores para orientarles en su toma de decisiones acerca del manejo sustentable de sus recursos. Incluye automonitoreo (monitoreo participativo).

### 5.2.5. Manejo sustentable de praderas

#### 5.2.5.1. Objetivo general del programa

Promover el manejo sustentable en las praderas asignadas para ese fin, en la zona de uso especial del territorio del Parque.

#### 5.2.5.2. Actividades ejecutadas hasta la fecha

Este es un nuevo programa que se ha incorporado en el Proyecto a raíz de la zonificación de varios sectores como son de uso especial del Parque, para ejecutar un manejo sustentable de praderas, las que serán aprovechadas en la crianza de bovinos que contribuya a la seguridad alimenticia. Antes del periodo no ha habido actividades consideradas.

### 5.2.6. Educación ambiental

#### 5.2.6.1. Objetivo general del programa

Lograr que la comunidad local, nacional y extranjera que se encuentre o llegue al Archipiélago de Juan

Fernández, conozca e internalice la importancia de los recursos allí presentes y vivencie la necesidad de colaborar en su conservación.

#### 5.2.6.2. Actividades ejecutadas hasta la fecha

- Programa de actividades permanente en la Escuela Dresden y en el Jardín infantil Sandalito, con actividades de aula y salidas a terreno, favoreciendo a la comunidad escolar conformada por unos 110 niños.
- Diseño de cuatro manuales de apoyo a la educación formal con contenidos medio ambientales para los niveles 1º y 2º básico y 3º y 4º básico.
- Folleto informativo del proyecto, Folleto del picaflor de Juan Fernández, Folleto de flora del Archipiélago de Juan Fernández.
- Afiche flora endémica, afiche avifauna endémica.
- Eventos con la participación de la comunidad, como concursos de pintura infantil, celebración del día del niño, celebración del día del árbol, salidas a terreno con adultos, programas radiales y apoyo a la radio local.
- Entrega de 2000 plantas nativas para el ornato de la zona urbana del poblado.
- El programa apoyó la realización de dos tesis de alumnas de la Universidad de Playa Ancha de Ciencias de la Educación, calificadas con distinción máxima, las cuales constituyen elementos de apoyo a la educación de los niños isleños, los títulos de estos trabajos fueron: "Diseño instruccional para la conservación de la flora y fauna del Archipiélago de Juan Fernández, en educación parvularia, nivel transición I y II" y "Diseño instruccional para la conservación de la flora y fauna del Archipiélago de Juan Fernández en 6º, 7º y 8º año de enseñanza básica en la Escuela Dresden".

### 5.2.7. Protección del Bosque Nativo

#### 5.2.7.1. Objetivo general del Programa

Minimizar el impacto provocado por el ganado sobre el recurso vegetacional nativo del Parque Nacional Archipiélago de Juan Fernández.

#### 5.2.7.2. Actividades ejecutadas hasta la fecha

Se han construido 7 km de cerco en tres sectores de la Isla Robinson Crusoe (Puerto Ingles, Piedra Agujereada y Villagra). Asociado a esta actividad, se construyeron 3 refugios básicos para el personal que laboró en estos lugares. En forma anexa se estableció un ensayo que permitirá evaluar los factores que amenazan el bosque nativo.

### 5.2.8. Recuperación de áreas alteradas

#### 5.2.8.1. Objetivo general del programa

Seleccionar técnicas de recuperación de zonas alteradas para ser utilizadas en la Isla Robinson Crusoe en los lugares donde los procesos erosivos puedan amenazar al bosque nativo.

#### 5.2.8.2. Actividades ejecutadas hasta la fecha

Durante el transcurso del programa se han construido 200 obras mecánicas, como diques de contención en madera tratada, zanjas de infiltración, terrazas, canales de desviación, entre otros. Estos fueron construidos en los sectores de Piedra con letras, Puerto Francés y Punta de Isla. Como tratamiento biológico se ha concretado la plantación y siembra directa de aproximadamente 5500 plantas nativas. Como resultado de una reorientación del programa se ha incluido la construcción de diques de piedra arriba de las obras ya realizadas.

### 5.2.9. Control integrado de plagas vegetales

#### 5.2.9.1. Objetivo general del programa

Determinar, evaluar y aplicar las alternativas más apropiadas para el control de las plagas vegetales más importantes, tales como la zarzamora (*Rubus ulmifolius*), maqui (*Aristotelia chilensis*), mutilla (*Ugni molinae*) y retamilla (*Teline monspessulana*).

#### 5.2.9.2. Actividades ejecutadas hasta la fecha

Con un equipo de 4 personas se ha desarrollado una metodología de control especialmente apto para parques nacionales que consiste en cortar tallos y a continuación pincelar una solución de tricopyr en diesel. Se ha trabajado en las siguientes actividades hasta la fecha:

- Control de focos incipientes de zarzamora en Isla Alejandro Selkirk, actividad que no estaba considerada en el programa original.
- Control de retamilla en la Isla Robinson Crusoe hasta el nivel de cero producción de frutos por plantas maduras, resultando en empobrecimiento del banco de semillas en el suelo. Hoy en día se ha reducido la germinación de semillas provenientes del banco de semillas en el suelo de 21 a 2 plántulas por m<sup>2</sup>.
- Se ha iniciado un control de zarzamora en el área del poblado San Juan Bautista, realizando así una labor de educación de la comunidad sobre la importancia de su control.
- Con la colaboración del proyecto PADEF se ha contribuido al control de la zarzamora en el área de la Plazoleta el Yunque en una superficie de 6 ha y de la misma forma se ha reducido la densidad de esta plaga en los principales senderos de la Isla Robinson Crusoe.

### 5.2.10. Control del conejo europeo y rata

#### 5.2.10.1. Objetivo general del programa

Determinar, evaluar y aplicar las alternativas más apropiadas para la posible erradicación del conejo europeo de las Islas Robinson Crusoe y Santa Clara.

#### 5.2.10.2. Actividades ejecutadas hasta la fecha

Desde Octubre de 1998 se ha puesto en marcha un control en principalmente 5 sectores en dos islas (Isla Santa Clara de 221 ha sin población humana, y la Isla Robinson Crusoe de 4794 ha con la población humana concentrada en un área de 396 ha) con un equipo de 4 – 6 cazadores profesionales que utilizan lazos y que cazan preferentemente durante la noche. Además se puede contar con la participación de la población que recibe una suma de 450 pesos (US\$ 0.67) por cola de conejo. Los censos efectuados hasta la fecha han mostrado una constante declinación en la población de los conejos en Santa Clara. En la Isla Robinson Crusoe el impacto es menos cierto, lo que ha motivado a ponerse la meta de buscar otros métodos de control durante el año en curso.

### 5.2.11. Control de cabra asilvestrada

#### 5.2.11.1. Objetivo general del programa

Ejecutar un plan a corto plazo de reducción de la cabra asilvestrada (*Capra hircus*) en la Isla Alejandro Selkirk.

#### 5.2.11.2. Actividades ejecutadas hasta la fecha

- Formación y equipamiento de un equipo de 2-3 cazadores de cabra.
- Refacción del antiguo refugio, de guardaparques como habitación para los cazadores de cabra.
- Construcción de un lugar para el faenado de las cabras cazadas.
- Formulación de una propuesta para operar con empresas interesadas en la caza turística de cabra en I. Alejandro Selkirk.
- Adquisición e instalación de un equipo radial VHF y su antena de fibra.
- Un censo pre-control y censos anuales de cabra.
- Control de focos de zarzamora (apoyo al programa de plagas vegetales).

### 5.2.12.- Plan de ordenación del bosque exótico

#### 5.2.12.1. Objetivo general del programa

Satisfacer ordenadamente y durablemente la demanda de productos leñosos provenientes del bosque compuesto por especies introducidas en la Isla Robinson Crusoe.





#### 5.2.12.2. Actividades ejecutadas hasta la fecha

La actividad más importante de este programa hasta ahora ha sido la elaboración del inventario y el plan de ordenamiento del bosque exótico de la Isla Robinson Crusoe. Intentos anteriores para mandar a tomar fotos aéreas han sido en vano por razones climáticas. La misión de evaluación de medio tiempo ha retomado esta actividad y además ha resaltado la necesidad de poner el Plan en práctica con un alto contenido de participación comunitaria y con énfasis en el incremento de la eficiencia en el aprovechamiento maderero de los árboles talados.

#### 5.2.13. Conservación In – Situ

##### 5.2.13.1. Objetivo general del programa

Recuperar algunas de las poblaciones de especies de la flora vascular del Archipiélago de Juan Fernández, conocer la composición florística de las asociaciones fitosociológicas que conforman las comunidades vegetacionales del área y realizar análisis de germinación y ensayos de propagación de especies endémicas del Archipiélago.

##### 5.2.13.2. Actividades ejecutadas hasta la fecha

- Construcción de un nuevo invernadero, la refacción del antiguo invernadero y la instalación de un sistema de riego para los invernaderos, el vivero y el jardín botánico.
- Incorporación del sistema Patrik, aporte de la Embajada de la República checa, como reemplazo del sistema tradicional de bolsas de polietileno en el vivero.
- Equipamiento del laboratorio con cámara de germinación, estufa de aire forzado, refrigerador para el banco de semillas y materiales misceláneos.
- Dos presentaciones en seminarios nacionales (Universidad Católica de la Santísima Concepción) e internacionales (Bariloche, Argentina).
- Creación de un banco de fotos y diapositivas de las especies endémicas del Parque.
- Instalación de parcelas permanentes para los estudios fitosociológicos en 17 sectores en Isla Robinson Crusoe, seis sectores en Isla Alejandro Selkirk y dos en Isla Santa Clara, lo que ya ha originado documentos técnicos que han servido y servirán de referencia a trabajos de restauración del ecosistema.
- Desde el inicio de este programa, se ha trabajado con cerca de 60 especies endémicas, de las cuales se han logrado avances importantes para la recuperación de algunas de ellas. Es el caso de *Dendroseris litoralis*, *Dendroseris neriifolia*, *Wahlenbergia larrainii*, *Chenopodium crusoeanum* y *Chenopodium sanctae-clarae*, de

las cuales quedaban menos de 10 individuos remanentes en sus poblaciones originales. En otros casos, las poblaciones son más abundantes, pero existen problemas de regeneración de modo que se han realizado plantaciones con protección, por ejemplo *Juania australis* y *Fagara mayu*.

#### 5.2.14. Conservación Ex – Situ

##### 5.2.14.1. Objetivo general del programa

Estudiar las técnicas de viverización para las especies de la flora vascular endémica del Archipiélago de Juan Fernández.

##### 5.2.14.2. Actividades ejecutadas hasta la fecha

Las principales actividades del programa desde que iniciara sus actividades han sido las siguientes:

- Construcción de un invernadero con sombra de 56 m<sup>2</sup>. Con esta ampliación se ha podido ampliar la gama de especies viverizadas del Archipiélago desde 30 a 56, de las cuales la mayoría corresponde a especies existentes en las Islas Robinson Crusoe y Santa Clara. Sólo se exceptúan cuatro, que son endémicas de la Isla Alejandro Selkirk.
- Se instaló un sistema de riego para el invernadero y el Jardín de las Islas Oceánicas.
- Se habilitó un laboratorio con entre otros una estufa de secado, refrigerador, balanza de precisión, lupa binocular, pH-metro, computador tipo notebook y un UPS.
- A través de un convenio por 3 años con la Universidad de Chile, se ha llevado a cabo ensayos con marcadores RAPD en *Wahlenbergia berteroi*, *Wahlenbergia fernandeziana*, *Wahlenbergia grahamae*, *Wahlenbergia larrainii* y *Nicotiana cordifolia*.
- Se publicaron dos trabajos científicos: Ricci, M. 2001.- Evaluation of conservation status of *Lactoris fernandeziana* Philippi (Lactoridaceae) in Chile. *Biodiversity and Conservation* 10: 2129 – 2138 y Ricci, M. 2001.- Archipiélago de Juan Fernández: riqueza botánica amenazada. *Gayana* 58: 53.
- La publicación de dos manuales y un informe técnico sobre la propagación de plantas.
- Se publicó un tríptico sobre la flora endémica del Archipiélago.

#### 5.2.15. Investigación ecológica del bosque nativo

##### 5.2.15.1. Objetivo general del programa

Crear vínculos con una universidad nacional para que ésta lleve a cabo un estudio a largo plazo sobre los mecanismos y factores que determinan la regeneración del bosque nativo.

#### 5.2.15.2. Actividades ejecutadas hasta la fecha

Este programa se encuentra en su etapa inicial.

### **Conclusión:**

La Corporación Nacional Forestal, comprendiendo la importancia internacional del Archipiélago de Juan Fernández, y haciendo uso de sus facultades como administradora del Parque Nacional del mismo nombre, está permanentemente preocupada por la integridad de los recursos naturales presentes en el conjunto de las islas que lo conforman, siendo prueba de ello la gran cantidad de proyectos que se desarrollan con esta finalidad.

### **Profesional Informante:**

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# Presentation on Easter Island

## Presentación del proyecto Re poblamiento de la langosta de Isla de Pascua

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(*Panulirus pascuensis*, Reed 1954)

### Synopsis

These documents presents the project proposal: the repopulation of lobster on Easter Island.

The lobster population has drastically declined during the past years. This condition is caused by global environmental changes and the over-exploitation of lobster due to increasing demand, as an income generating activity by local communities.

This project aims to restore the situation under controlled conditions in order to reduce the number of natural predators. Various experiments in this field have been carried out using local artisan methods on Caribbean lobster (*Panulirus argus*) and Juan Fernandez lobster (*Jasus frontalis*), where the project is based and on Easter Island.

The project will last one year. The first phase will involve the captive reproduction and cultivation during the first stages of life followed by its return to sea where the lobster larvae will continue its development. The reproductive individual will be adapted to a captive environment: its eggs fertilized and incubated, and where the larvae will evolve. When the individuals reach this state they are returned to the sea where they will continue their development under natural conditions.

After acquisition of the necessary equipment, the researchers will carry out and use the expected results for future studies on these species that have not yet been studied.

Isla de Pascua es el lugar habitado más aislado del mundo, en el viven actualmente 3000 personas, gran parte de ellas descendientes originarios de la etnia Rapa Nui. Isla de Pascua o Rapa Nui (en su lengua originaria) tiene una fuerte tradición marina, la cual se ve potenciada con la gran variedad de especies que pueblan sus aguas en mitad del Océano Pacífico. Parte importante de su economía se ve sustentada en estos recursos; entre los de mas importancia se encuentra el atún de fama internacional, los caracoles de mar para la fabricación de la artesanía y la langosta ampliamente apetecida por el creciente turismo de la isla. Este recurso ha sido consumido por la población isleña hace cientos de años, sin embargo hoy se encuentra en peligro de extinción. Junto con la extinción de la langosta, se termina toda una tradición ligada a su caza y su consumo, situación que nos impulsa con urgencia a preocuparnos por su cuidado y conservación.

### Antecedentes

En los últimos años, la extracción pesquera del país ha disminuido considerablemente producto esencialmente de cambios globales en el clima y de la descontrolada explotación a la que se han sometido los recursos hidrobiológicos. Además al aumentar la población mundial, la demanda de productos marinos se ha incrementado en forma proporcional, provocando una sobreexplotación de los recursos.

En la última década se ha comenzado a manejar los recursos económicamente importantes, de esta forma se han establecido tallas mínimas, cantidades máximas de extracción, se han realizado estudios de capacidad de carga y biomasa de los mismos, como una forma de explotar los recursos de manera racional y sustentable.

En Isla de Pascua, el único recurso marino sobre el cual se ha decretado veda temporal (entre Noviembre y Marzo de cada año), es la Langosta de Isla de Pascua (*Panulirus pascuensis*). Este es un crustáceo endémico de estas costas que ha sido fuertemente explotado por los habitantes de la isla, explotación que va de la mano con el crecimiento exponencial del turismo en esta

localidad, producto del alto valor económico que éste representará por ser el símbolo de un exuberante plato típico tropical.

Hace unos 30 años atrás era posible extraer manualmente las langostas desde los requerios costeros alrededor de la isla y se extraía lo suficiente para consumo familiar. Sin embargo, el aumento del turismo y la exportación de langostas hacia el continente hicieron de este recurso una actividad rentable, por lo que se produjo una extracción inmensurable e irracional extrayéndose incluso hembras con huevos visibles en su región abdominal los cuales eran arrancados por los mismos pescadores en la zona de pesca. Otro factor gatillante y determinante en la disminución del recurso es la utilización de focos y equipos de buceo además de la divulgación de sus hábitos nocturnos por lo que se comenzó a bucear durante la noche lo cual era mucho más fácil ya que éstas no se encuentran escondidas entre los requerios sino fuera de ellos.

Hoy la historia es muy distinta; La langosta sufrió una sobreexplotación de la cual no se ha podido recuperar. Preocupados por esta situación, en la década de los '80s se realizó en la isla una experiencia reproductiva de la Langosta de Isla de Pascua en una instalación y con equipos muy básicos, donde se completó el ciclo reproductivo hasta obtener langostas juveniles o Puerulus. Sin embargo, se tuvieron altas mortalidades debido fundamentalmente a problemas de alimentación de larvas, enfermedades y depredación (J. Edmunds, com pers.). No obstante, esta situación evidencia que la reproducción de este crustáceo en condiciones de cautiverio es totalmente factible.

Concientes de esta realidad, se ha formado una grupo de personas, compuesta principalmente por miembros de la etnia, cuyo objetivo es recuperar la Langosta de Isla de Pascua. Es así como, en agosto de 2000 se inició la implementación de una instalación en Isla de Pascua, con la cual se comenzó a concretar la idea.

El objetivo es evitar la pérdida de este recurso, repoblando de langostas los mares que rodean Rapa-Nui, obteniendo en primer lugar ejemplares sexualmente maduros desde el ambiente natural, acondicionarlos y reproducirlos bajo condiciones controladas y luego criar sus larvas hasta etapa juvenil, aproximadamente un año, los que al cabo de este período serían devueltos al mar donde continuarían su desarrollo en forma natural. De esta manera se logra disminuir la mortalidad en los primeros meses de vida de las langostas por la inexistencia de depredadores naturales, el riesgo de enfermedades sería minimizado por el tratamiento del agua y la alimentación se basará en Nauplios de Artemia. De este modo se manejarán los principales problemas de la experiencia realizada en 1983 y permitirá aumentar la sobrevivencia y por lo tanto la cantidad de langostas en el medio natural.

Realizando este procedimiento durante algunos años, controlando estrictamente su extracción y difundiendo en los medios locales la importancia de éste y otros recursos marinos en peligro, se lograría en un futuro no muy lejano recuperar la especie y evitar su extinción.

Lamentablemente, por tratarse de un proyecto sin fines de lucro, no se cuenta con la solvencia económica necesaria para terminar la implementación del proyecto y mantenerlo en el tiempo, por esta razón es indispensable presentarles la idea con el objeto de obtener el apoyo financiero necesario para completar y llevar a cabo este trabajo.

## Información sobre la institución

### Dirección

Policarpo Toro s/n Sector de Hanga Piko, Isla de Pascua.

Telefono: 56-32-100743, 56-32-100551301

### Experiencia relacionada con el proyecto

Las personas que constituyen la Sociedad, trabajan en el proyecto desde Septiembre de 2000. En este período se han familiarizado con la especie y han adquirido valiosa información acerca de su comportamiento en cautiverio.

### Proyectos aprobados o rechazados

El año 2000 fue aprobado por la Corporación Nacional de Desarrollo Indígena (CONADI) la suma de \$ 2.000.000 (US\$3.000), recurso que fue destinado en esa oportunidad a solventar los gastos de esta actividad.

### Representante legal

La administración y uso de la razón social corresponderá a la Srta. Nancy Rivera Chavez. Rut N° 12.685.502-8, quien representa legalmente a la Sociedad Preservadora de Recursos Marinos "HANGA PIKO Ltda".

## Información sobre el responsable

### Cargo o profesión:

Técnico en Pesquerías y Cultivos Marinos e Ingeniero Pesquero (E)

### Experiencia laboral relacionada con el proyecto

Desde el año 2000 investiga y trabaja activamente en el Proyecto de Repoblamiento de Langosta de Isla de Pascua, manteniendo contacto con diversos investigadores que hayan realizado estudios sobre esta y otras especies de langostas.



## Información sobre el proyecto

### Justificación

Hace algunas décadas atrás era posible extraer manualmente las langostas desde los requeríos costeros alrededor de la isla, donde se extraía lo suficiente para consumo familiar. Sin embargo, el aumento del turismo y la exportación de langostas hacia el continente aumentando su demanda e hicieron este recurso una actividad rentable, produciéndose en la localidad una extracción inmensurable e irracional del crustáceo y se extrajeron ejemplares bajo la talla comercial e incluso hembras con huevos, los cuales eran arrancados por los mismos pescadores en la zona de pesca. Otro factor gatillante y determinante en la disminución del recurso es la utilización de focos y equipos de buceo sofisticados y la divulgación de sus hábitos nocturnos por lo que se comenzó a bucear durante la noche lo cual era más fácil ya que las langostas se encuentran más expuestas y vulnerables.

La situación anterior produjo una sobreexplotación del recurso, motivo por el cual ha disminuido considerablemente su abundancia afectando la biodiversidad de nuestros recursos marinos y disminuyó también su captura provocando problemas de tipo social.

### Objetivos

- General : Reproducir la Langosta de Isla de Pascua en cautiverio bajo condiciones controladas.
- Específicos :
  - Determinar y manejar los principales parámetros ambientales para el desarrollo de la especie en cautiverio, esto es, durante su reproducción y los primeros estadios larvales.
  - Realizar estudios sobre el desarrollo embrionario, crecimiento, y mortalidad.

### Localización específica

El proyecto se realiza en Isla de Pascua, específicamente en el sector de Hanga Piko.

### Caracterización y cobertura de los participantes

JORGE PONT CHAVEZ, R.U.T.No. 6.264.133-9. Gestor del Proyecto. A realizado viajes al extranjero para informarse de los avances e investigaciones realizadas con otras especies de Langostas.

JULIO ARAKI TEPANO. R.U.T. No.8.860.620-5. Participa activamente en el Proyecto. Realiza la mayoría de las actividades desarrolladas diariamente y es el encargado del mantenimiento y buen funcionamiento del hatchery.

NANCY RIVERA CHAVEZ, R.U.T. No. 12.685.502-8. Responsable de las cotizaciones y adquisición de los equipos. Encargada de coordinar y gestionar la presentación del presente proyecto y de sus informes de avance y final.

### Descripción del plan de trabajo (anexo 1)

- **Estructuración de la instalación**  
Se deberá estructurar la instalación para la ubicación de los nuevos estanques y equipos necesarios para el funcionamiento del hatchery. Para ello, será necesario ampliar la red de cañerías con el objeto de distribuir el agua hacia todos los estanques. También será necesario contar con una red de evacuación del agua utilizada.
- **Reinstalación del sistema eléctrico e iluminación**  
La mayoría de los equipos utilizados en el hatchery son eléctricos, razón por la cual se debe cuidar el sistema de alimentación de energía para evitar daños en los equipos producto de eventuales fallas eléctricas. En este sentido es prioritario cambiar y reinstalar completamente el sistema eléctrico existente, debido a los innumerables problemas provocados por su mal estado y además es necesario mejorar la deficiente iluminación dentro del hatchery. El sistema comprende cables enchufes, interruptores, etc., los cuales deben ser ubicados en áreas con poca humedad dentro del hatchery y los materiales a utilizar deben ser compatibles con la actividad acuícola que se desarrolla en el lugar.
- **Adquisición e instalación de equipos**  
Los materiales y equipos necesarios que se adquirirán (Tabla 1), permitirán desarrollar un riguroso trabajo que permitirá llevar un detallado registro de las condiciones y requerimientos ambientales brindadas a los organismos dentro del hatchery. Estos datos ayudarán a controlar y manejar de mejor forma los parámetros de temperatura, oxígeno, salinidad y Ph de acuerdo a las necesidades vitales de la especie.
- **Acondicionamiento de reproductores**  
Una vez obtenidos los reproductores serán trasladados al hatchery y serán mantenidos en el estanque de fibra de vidrio de 2250 litros existente en la instalación. Se cambiará el 100% del agua semanalmente la cual se filtrará utilizando bolsas para filtros de 10 micras en la caída del agua, Se les proporcionará pescado fresco como alimento cada dos días, la aireación se mantendrá constante y la temperatura ambiente exceptuando los períodos de fecundación y desove en los cuales esta variable será manejada.
- **Fertilización y desove**  
Esta etapa se inicia después del proceso de muda, cuando las hembras, que aún se encuentran con sus caparazones blandas, son inseminadas por uno de los machos contenidos en el mismo estanque. El manejo de la temperatura y luminosidad induciría la muda de los organismos y por lo tanto la cópula de los mismos.



- **Incubación**

Transcurrido aproximadamente un mes después del proceso de muda (tiempo que depende de la temperatura del agua y de la viabilidad del semen) se obtendrán los huevos fertilizados que la hembra ubicará en sus pleópodos formando una masa de color rojizo cuya coloración variará a medida que el período de incubación avance. Se considera una pérdida de 35% por la limpieza que la misma hembra realiza a los huevos contenidos en su abdomen.

Con la finalidad de proporcionar las condiciones adecuadas a la hembra para lograr una incubación exitosa, las portadoras serán transferidas a estanques rectangulares de 219 litros de fibra de vidrio. El agua se cambiará diariamente en un 100% utilizando un sistema abierto (agua de mar circulando) y será tratada previamente con filtro de cartucho de (0.1, 1, 5 y 10 micras), y esterilizada con luz ultravioleta para minimizar el riesgo de infecciones o algún tipo de enfermedad. La aireación se mantendrá constante y la temperatura fluctuará entre 23°C y 25°C utilizando un calentador de agua en caso que se requiera.

La alimentación consistirá en pescado fresco cada dos días, ofreciéndose aproximadamente 10 gramos / langosta.

Esta actividad involucra un trabajo diario de aseo, eliminando desechos y restos de alimento que pudieran contaminar el agua por la eliminación de gases producto de la descomposición de materia orgánica.

De acuerdo a los antecedentes la incubación dura alrededor de tres meses, período durante el cual se mantendrán aisladas las hembras que porten huevos en su abdomen. El desarrollo embrionario se evidencia por el color oscuro de los huevos aún contenidos en la zona abdominal de la hembra.

- **Eclosión y cultivo de larvas**

La eclosión debe ser natural y masiva producida voluntariamente por la hembra, en este proceso las hembras deben estar aún en los estanques de 219 litros. Las larvas eclosionadas se deben cambiar de sistema de cultivo, serán lavadas y tamizadas en cedazos de aproximadamente 300 micras. El tamaño de las larvas retenidas varía entre 2.1 y 2.4 mm.

En esta etapa se considera la crianza de sólo el 50% de las larvas eclosionadas en ambiente controlado para minimizar los costos asociados y la inversión necesaria. Como primera parte de repoblamiento, las larvas restantes serán trasladadas a pozas intermareales donde se han avistado juveniles.

Las larvas recién eclosionadas que quedan en el hatchery, se trasladarán en baldes y se repartirán en estanques circulares de cultivo larval los cuales consisten en estanques de vinil industrial Hylapon de 1700 litros de capacidad con un diámetro de 1,82 m ,

donde se mantendrán las larvas con una densidad aproximada de 50 larvas por litro aproximadamente.

Esta etapa se considera la más crítica de debido a la alta mortalidad que se produce, donde sobrevive aproximadamente el 2% de las larvas eclosionadas y su duración varía entre 6 y 8 meses según los antecedentes recopilados.

Estas se cultivarán en sistema abierto con cambio diario de agua microfiltrada (1, 5, 10 micras), esterilizada con luz ultravioleta, aireación constante y temperatura constante (20°C).

En esta etapa se realizarán otras actividades, tales como muestreos periódicos con el fin de revisar y registrar la mortalidad y el crecimiento de las langostas. La alimentación se basará en Nauplios de artemia salina y se realizará desinfección de estanques, filtros y utensilios.

NOTA: Para el desarrollo de las actividades de alimentación, limpieza y cuidado de los organismos será necesario contar con un operario responsable de llevar a cabo diariamente las actividades descritas anteriormente.

- **Seguimiento del desarrollo embrionario**

Las hembras maduras recientemente mudadas se mantendrán a  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  en estanques separadas junto con machos en una proporción de 1:2 hasta el apareamiento y posterior desove. Una vez que la hembra fecundada haya desovado, se extraerán embriones desde los pleópodos de las hembras semanalmente. Estos serán observados y registrados en un microscopio computacional, estos embriones se compararan con embriones extraídos desde los pleópodos de otra hembras para ser transferidos y cultivados en matraces de 1 Lt. con flujo constante de AMF a 1 micra en circuito abierto y burbujeo constante de aire a través de una pipeta ubicada centralmente. Se utilizarán tres matraces a temperaturas 24, 26 y 28°C.

- **Seguimiento de crecimiento**

Los ejemplares serán marcados con el propósito de individualizarlos e identificar las caparzones recién mudadas. Las langostas serán revisadas para identificar los síntomas que evidencian la próxima muda. Luego se registrará su longitud cefalotorácica pre y post muda con la cual se llevara un riguroso registro y obtener el crecimiento de cada uno de ellos en el año. Con este propósito, se mantendrán también langostas juveniles en cautiverio las que serán extraídas desde su medio natural.

También se realizara un estudio de incremento en peso, para esto se pesarán las langostas mensualmente registrando además la cantidad de alimento proporcionado y el alimento no consumido por ellas, con el cual se obtendrá la cantidad de alimento ingerido obteniendo además la relación Longitud-peso de esta especie.



## Evaluación

El responsable del proyecto debe coordinar la presentación de informes de avance e informe final ante la UNESCO, donde se indicarán las actividades y gastos realizados durante el periodo de tiempo evaluado por cada informe, los cuales deberán concordar con el plan de trabajo presentado en el presente proyecto (Ver anexo 1)

## Duración

El plan de trabajo considerado es de un año, periodo en el cual se invertirá todo el financiamiento otorgado por UNESCO.

## Presupuesto

**Tabla 1. Inversiones**

Equipamiento	Costo (US\$)	Cantidad	Costo total
Bandas de identificación	54	1	54
Blower	112	1	112
Bombas de agua (3 HP)	383	1	383
Calentador de agua	119	3	358
Difusores de manguera de polietileno	81	2	162
Equipamiento de oficina	1.493	1	1.493
Estanque de acopio	635	1	635
Filtro de cartucho 1 micras	9	3	26
Filtro de cartucho 10 micras	10	3	29
Filtro de cartucho 5 micras	9	3	26
Filtros de bolsa	10	6	58
Fitting	299	1	299
Kit calibración	90	1	90
Medidor de longitud	82	1	82
Medidor de oxígeno	896	1	896
Estanque de Larvas(TP440)	317	3	952
Termómetro de inmersión	3	10	29
Flete	110	4	442
Balanza electrónica (5000 g x 2 g)	488	1	488
Eclosionador y separador de Nauplios	112	2	224
Equipo de disección	33	2	67
Equipos de iluminación fluorescente	171	3	513
Medidor de PH	61	1	61
Mesones y estantería	269	1	269
Microscopio	134	1	134
Pié de metro	45	2	91
Pisetas plásticas	2	2	4
Portaobjeto (caja)	3	2	6
Refrigerador	172	1	172
Termómetro ambiental	28	2	55
Tubos de ensayo c/tapa	9	10	89
<b>Total</b>			<b>8.298</b>
<b>Total C/IVA</b>			<b>9.792</b>

**Tabla 2. Gastos de operación**

Costos fijos	Costo total anual	Costo total mensual
Agua potable	358	30
Sueldos	5.374	448
Oficina	448	37
Aseo	597	49
Mantenimiento	179	15
Luz eléctrica	448	37
<b>SUBTOTAL</b>	<b>7.404</b>	<b>617</b>

Costos Variables	Costo total anual	Costo total mensual
Alimentación	2.485	207
Electricidad	1.515	126
Combustible	358	30
<b>SUBTOTAL</b>	<b>4.358</b>	<b>363</b>

<b>COSTO TOTAL ANUAL (US\$)</b>	<b>11.762</b>	<b>980</b>
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**Tabla 3. Resumen de gastos del proyecto ajustado para Su funcionamiento durante un año**

Item	Valor Total (Us\$)
Inversion	9.792
Costos Anuales	11.762
<b>Total Proyecto (Us\$)</b>	<b>21.553</b>

# Annex I

## 4<sup>th</sup> ASPACO Interregional Meeting and Training Seminar for Chilean Biosphere Reserve Managers Conservation and development in Pacific coastal biosphere reserves and similar areas and protection of its fragile ecosystems

Olmué and Juan Fernández, Chile  
from 6 to 12 November 2003

## Programme

### Thursday 6 November:

Arrival and transfer from Santiago to Olmué (90 Km)

#### Hotel Rosa Agustina

Lo Narváez 5551, Olmué

Tel: (56-33) 443022 and (56-33) 441690

e-mail: [info@rosaagustina.cl](mailto:info@rosaagustina.cl)

web-page: [www.rosaagustina.cl](http://www.rosaagustina.cl)

20:00 *Dinner*

### Friday 7 November:

07:00 *Breakfast*

08:30 Registration

09:00 Opening session:

- Welcome:
  - Mr. Tomas Aranda, Major of Olmué Municipality
  - Mr. Carlos Weber, National Director of the "Corporación Nacional Forestal (CONAF)"
- UNESCO:  
*The ASPACO project: three years of Interregional Co-operation throughout the Pacific, Mr. Miguel Clüsener-Godt*

09:30 UNU:  
*UNU's role in Management of Coastal Ecosystems – Perspectives from the Asia-Pacific region, Mr. Zafar Adeel*

10:00 *Coffee Break*

10:30 UNU:  
*Ecotourism in the context of coastal management, Ms. Kumiko Tsukamoto*

11:00 Case Studies  
of Asian Pacific countries

*Indonesia: Challenge and Opportunities for Biosphere Reserves in Indonesia, Mr. Herwasono Soedjito*

11:30 *Vietnam: Stakeholder Analysis and Integrated Management of Coastal Biosphere Reserves, Mr. Nguyen Hoang Tri*

12:00 Discussion

12:30 *Lunch*

14:30 *Philippines: Mangrove Legislation and Protection in the Philippines, Ms. Jurgenne Primavera*

15:00 *Thailand: Coastal Management in Thailand: Case study in Ranong Biosphere Reserve, Mr. Sonjai Havanond*

15:30 *China: Case Study of ASPACO Project in China, Mr. Han Nianyong*

16:00 *Coffee Break*

16:30 *Japan: MAB-Japan's Activities in relation to ASPACO, Mr. Kunio Iwatsuki*

17:00 Discussion

19:00 Local artistic presentation

20:00 *Dinner*



## Saturday 8 November:

- 07:30** **Breakfast**
- 09:00** Case Studies of Pacific small islands countries  
*Samoa: Conservation and management of threatened lowland and upland forest of Savaii*
- 09:30** **Palau:** Ngaremeduu Conservation Area in Palau - Progress with ASPACO, Ms. Alma Ridep-Morris
- 10:00** **Coffee Break**
- 10:30** **Papua New Guinea:** *The Participatory Processes of Community Entry in Formalizing the Nomination of PNG's first Biosphere Reserve*, Mr. Vagi Renagi Genorupa
- 11:00** **Tonga:** *Eua Man and Biosphere*, Mr. Asipeli Palaki
- 11:30** Discussion
- 12:30** **Lunch**
- 14:30** Case Studies of Pacific LAC countries  
*México: Mr. Flavio Cházaro (title to be confirmed)*  
*A case study of conservation and development in a Mexican Biosphere Reserve of the Pacific Coast*, Ms. Laura Arriaga
- 15:00** **Costa Rica:** *Promotion of Responsible Fishing and Consolidation of Marine-coastal Protected Areas in Central America*, Mr. Mario Boza
- 15:30** **Galapagos Submarine:** *The Challenges of its Conservation*, Mr. Danilo Silva
- 16:00** **Coffee Break**
- 16:30** Presentation of the Chilean Biosphere Reserve Fray Jorge, Mr. Jose Miguel Torres
- 17:00** Presentation of the Chilean Biosphere Reserve Laguna San Rafael, Mr. Dennis Aldridge
- 17:30** Discussion
- 18:00** *Coast to Coast: a Visit to the Coastal Biosphere Reserves on the Pacific*, Environmental Education Kit, Ms. Alejandra Mejía-Restrepo
- 20:00** **Dinner**

## Sunday 9 November:

- 07:30** **Breakfast**
- 09:00** ISME: *ISME's activities in relation to ASPACO*, Mr. Shigeyuki Baba
- 09:15** ASPACO in the regions
- Asian region
  - Small Pacific Islands
  - Latin America region
- 10:00** **Coffee Break**
- 10:15** Opportunities for regional cooperation among Pacific countries
- 11:30** Closure of the meeting
- 12:30** **Lunch**
- 16:00** Travel to Santiago
- 17:30** Arrival at Santiago
- Hotel Park Plaza**  
Av. Ricardo Lyon 207, Providencia  
Tel: (56-2) 233-6363 and 372-4000  
Fax: (56-2) 233-6668  
e-mail: bookings@parkplaza.cl  
web-page: www.parkplaza.cl

## Monday 10 November

- 08:00** First flight to Juan Fernandez (Arrival at 11:00 to Hostería)
- 13:00** **Lunch**
- 14:00** Second flight to Juan Fernandez (Arrival at 17:00 to Hostería)
- 19:00** Presentation Juan Fernández Biosphere Reserve, Mr. Leonardo Moder  
*(See detailed Programme in Annex attached)*

## Tuesday 11 November

- Field visit to Juan Fernandez Biosphere Reserve  
*(See detailed Programme in Annex attached)*

## Wednesday 12 November

- 09:00** First flight to Santiago (Arrival at 12:00)
- 15:30** Second flight to Santiago (Arrival at 18:30)

# Annex II

## 4<sup>th</sup> ASPACO Interregional Meeting and Training Seminar for Chilean Biosphere Reserve Managers

Conservation and development in Pacific coastal biosphere reserves and similar areas and protection of its fragile ecosystems

### Provisional Timetable

	Thursday 6 November	Friday 7 November	Saturday 8 November	Sunday 9 November	Monday 10 November	Tuesday 11 November	Wednesday 12 November
8:30	Arrival and transfer from Santiago to Olmué (90 Km)	Registration				Field visit to Juan Biosphere Reserve	Flight to Santiago
9:00		Opening session - Welcome (CONAF) - Conference: Review of ASPACO cooperation project. Meeting objectives and expected results	<b>Case Studies of Pacific small islands countries</b> 1. Samoa	<b>Advances of knowledge and experience in Pacific regions</b> 1. Asian region			
9:30		Conference: UNU	2. Palau	2. Small Pacific Islands			
10:00		Coffee Break					
10:30		<b>Case Studies of Asian Pacific countries</b> 1. Indonesia	3. Papua New Guinea	3. Latin America region			
11:00		2. Vietnam	4. Tonga	<b>Opportunities for regional cooperation among Pacific countries</b>			
11:30		Discussion	Discussion	Closure of the meeting			
12:00		Lunch					
14:30		3. Philippines	<b>Case Studies of Pacific LAC countries</b> 1. Mexico				
15:00		4. Thailand	2. Costa Rica				
15:30		5. China	3. Galapagos				Presentation of Juan Fernandez Biosphere Reserve
16:00		Coffee Break					
16:30		6. Japan	4. Presentation of the Chilean Biosphere Reserve Fray Jorge	Travel to Santiago			Discussion
17:00		Discussion	5. Presentation of the Chilean Biosphere Reserve Laguna San Rafael				
17:30			Discussion				



## Annex III

# Field Visit Programme in Juan Fernández Archipelago Biosphere Reserve, Chile

10-12 November 2003

### Monday 10 November 2003

**08:00** First flight to Juan Fernandez (Arrival at 11:00 to Hostería)

**14:00** Second flight to Juan Fernandez (Arrival at 17:00 to Hostería)

Programme of activities for the morning flight arriving group to Robinson Crusoe Island.

**13:00** Lunch at "Hostería El Pangal"

**15:00** Walk from Hostería to the National Park of Juan Fernández Archipelago Administration Offices, visit to facilities and Centre for Environmental Information.

**16:30** Walk through the village, House of Culture, Cemetery, Impact Area of the Dresden German Cruiser, dock Sector to learn about lobster fishing-related activities.

**18:00** Boat return to "Hostería El Pangal".

**18:00** Optional activity: sea-water bathing

**19:00** Presentation Juan Fernández Biosphere Reserve, Mr. Leonardo Moder

**10:00** Trekking to "Mirador"

**10:10** Visit to "Cueva de los Patriotas"

**10:45** Erosion control observation activities. Comments on the erosive processes in the archipelago.

**11:15** Observation of vegetal plagues, pointing out two of the most important ones: "maqui" (shrub) and "zarzamora" (blackberry bush/bramble). "La murtila", another plague widely extended will also be observed. Acquaintance of applied plague control system its methods and results. Future actions.

**11:45** Visit to the native forest, observation of endemic and native species.

**12:30** Arrival to the "Mirador de Alejandro Selkirk" observatory. Spectacular panoramic view of the island, observation of hilly geography, and visit to the commemorative plaques. Snack.

**13:00** Descent to "Sector de Villagra", in which other aspects of native forest and panoramic of the place can be seen.

**14:00** Arrival to "Sector de Villagra". Meeting point with the sea-borne group. This place is a Special Use area, where grasslands' use and management can be discussed.

**Lunch:** Barbecued fish, "cebiche" and other sea-food characteristic from the archipelago

**15:30** Trekking from "Villagra to Cordon El Gualpón". Panoramic view and comments on the areas seen from this place. Sea-borne return to Cumberland Bay.

**16:00** Arrival to road. Comments on erosive processes of the place and its agents.

**17:00** Arrival to the "Tres Puntas" boarding place.

**17:10** Approach to "Los Ramplones" area. Comments on the topography and landscape of the place.

**17:25** Arrival to "Cueva del Sur" seal area, comments on habitat, habits and population of fur seals.

**17:50** Visit to small island "El Verdugo", comments on plants and birds living in this place.

**18:20** Visit to the French Harbor ("Puerto Francés"). Comments on the works carried out in this area. Methodology, results and erosion problems.

### Tuesday 11 November

Considering the amount of visitors (28 persons) for one single day field visit, two simultaneous trails or routes are designed: Trail 1 will be land-borne; and Trail 2 will be sea-borne. Both will have a meeting point at the Villagra Sector where lunch will take place.

After lunch, the arriving sea-borne group will finish the trail by land; and the land-borne arriving group will finish by sea. Thus allowing both groups to get a better understanding of the several aspects of environmental and cultural reality of this Biosphere Reserve.

#### Trail 1: Observatory "Mirador Alejandro Selkirk - Sector Villagra – Sea-borne Return"

**09:30** Transfer from Hostería Pangal to Poblado San Juan Bautista

- 18:50** Visit to the English Harbor (“Puerto Inglés”).  
Comments on historic aspects, treasure hunting.
- 19:15** Return to “Hostería Pangal – Poblado San Juan Bautista”.

**Trail 2: South End of the Island Sea Route, Landing in “Tres Puntas” Area - Sector Villagra - Mirador De Alejandro Selkirk – Small Village**

- 09:30** Transfer from “Hostería Pangal to Poblado San Juan Bautista”.
- 09:45** Visit to the English Harbor (“Puerto Inglés”).  
Comments on historic aspects, treasure hunting.
- 10:15** Visit to the French Harbor (“Puerto Francés”).  
Comments on the works carried out in this area.  
Methodology, results and erosion problems.
- 10:50** Visit to small island “El Verdugo”, comments on plants and birds living in this place.
- 11:15** Arrival to “Cueva del Sur” seal area, comments on habitat, habits and population of fur seals.
- 11:30** Approach to “Los Ramplones” area. Comments on the topography and landscape of the place.
- 11:40** Arrival to the “Tres Puntas” boarding place.
- 12:20** Trekking to Sector Villagra.
- 13:00** Arrival to road. Comments on erosive processes of the place and its agents.
- 13:30** Cordón El Gualpón. Panoramic view and comments on the areas seen from this place.  
Sea-borne return to Cumberland Bay.
- 14:00** Arrival to “Sector Villagra”. Meeting place with land-borne visitors.
- 15:30** Trekking to Sector Villagra, where other aspects of the native forest and panoramic of the area may be seen
- 16:15** Visit to the native forest, observation of endemic and native species.
- 16:45** Arrival to “Mirador de Alejandro Selkirk” observatory. Spectacular panoramic view of the island, observation of irregular geography and visit to the commemorative plaques.
- 17:15** Return through the native forest, observation of endemic and native species.
- 17:45** Observation of vegetal plagues, pointing out two of the most important ones: ‘maqui’ and ‘zarzamora’. “La murtilla”, another plague widely extended will also be observed.  
Acquaintance with applied plague control system methods and results. Future actions.
- 18:15** Erosion control observation activities.  
Comments on the erosive processes in the archipelago.
- 18:35** Visit and history of Cueva de los Patriotas
- 18:45** Arrival to the small village (poblado).
- 19:00** Boat transfer to Hostería Pangal

## Wednesday 12 November

- 07:45** Boarding of the first group to Santiago towards the airfield
- 09:00** *First flight to Santiago (Arrival at 12:00)*

Programme activities for the group travelling to Santiago in the afternoon

### Alternative 1:

- 08:30** Trekking from Hostería to the Offices of the Administration of the Archipelago Juan Fernández National Park, visit to the premises and Environmental Information Centre.
- 09:45** Walk through the village, House of Culture, Cemetery, impact area of the Dresden German cruiser, dock area to learn about lobster fishing-related activities.
- 11:30** Boat return to Hostería Pangal.
- 12:00** **Lunch**
- 13:00** Boarding towards the airfield to return to Santiago

### Alternative 2:

- 09:30-11:00** Sea-water bathing. Diving services can be rented to learn first hand existing marine resources.

### Alternative 3:

- 09:00-11:00** Ascent and return to Centinela Hill
- 15:30** **Second flight to Santiago (Arrival at 18:30)**

# Annex IV

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# Annex V

## Abbreviation & Acronym

### A

ADB	Asian Development Bank
ASPACO	Asia Pacific Co-operation for the Sustainable Use of Renewable Natural Resources in Biosphere Reserves and Similarly Managed Areas

### B - C

BAPPENAS	National Development Planning Agency
BR	Biosphere Reserve
CA	Conservation Area
CB-CRM	Community-Based Coastal Resource Management
CBD	Convention on Biological Diversity
CERE	Centre for Environmental Research and Education
CITES	Convention International Trade in Endangered Species
CONADI	National Indigenous Development Corporation, Chile
CONAF	Chilean Forest Service
CVRP	Central Visayas Regional Project

### D - E - F

EABRN	East Asia Biosphere Reserve Network
EDC	Endocrine Disrupting Chemicals
ESCAP	Economic and Social Commission for Asia and the Pacific
ESSA	Exportadora de Sal, Mexico
FAO	Food and Agriculture Organization
FD	Forest Department
FSM	Federated States of Micronesia

### G - H - I - J

GEF	Global Environment Facility
GIS	Geographic Information System
GLOMIS	Global Mangrove Database and Information System
GOI	Government of Indonesia
IberoMAB	Latin Americans Biosphere Reserve Network
ISME	International Society for Mangrove Ecosystem
ITTO	International Tropical Timber Organization
IUCN	The World Conservation Union
JICA	Japan International Cooperation Agency

### K - L - M - N

LIPI	Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Sciences)
MAB	Man and the Biosphere Programme
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MFA	Mangrove-Friendly Aquaculture
MNRE	Ministry of Natural Resources and Environment, Samoa
NBSAP	National Biodiversity Strategy and Action Plan
NCA	Ngarameduu Conservation Area
NGO	Non Governmental Organization
NP	National Park
NPA	Nature Protected Area

### O - P - Q - R - S

ORI	Ocean Research Institute
PNG	Papua New Guinea
REDBIOS	Réseau Est Atlantique de Réserves de Biosphère
SeaBRnet	Southeast Asia Biosphere Reserve Network
SEAFDEC	Southeast Asian Fisheries Development Center

### T - U - V - W - X - Y - Z

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNU	United Nations University
WHC	World Heritage Center
WWF	World Wildlife Fund for Nature