

# **Vulnerability Assessment of Major Wetlands in the Asia-Pacific Region**

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REPORT TO ASIA PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH

<p><b>Workshop on the Vulnerability of Olango Island to Climate Change and Sea Level Rise Costabella Tropical Beach Resort, Mactan Island, Philippines 9-10 December 1998</b></p>
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## **Introduction**

### **Background of the project**

ERISS received funds from the Asia-Pacific Network for Global Change (APN) for a project titled “*Vulnerability assessment of major wetlands in the Asia-Pacific region*”. The project involved assessing the vulnerability of two important coastal wetland sites to climate change and sea level rise. The two sites chosen were Yellow River Delta, China, and Olango Island, Philippines. The project involved a researcher from both sites working at ERISS (Jabiru, northern Australia) for one month to learn about vulnerability assessment procedures and to commence the vulnerability assessment for the China/Philippines sites. The assessments were to be completed upon returning to the respective countries, following a workshop to explain and discuss the methodology and results to relevant local and national agencies/organizations. This report summarises the proceedings and outcomes of the Olango Island workshop, held on Mactan Island, Central Visayas, Philippines, on December 9-10 1998.

### **Description of Olango Island**

Olango Island is a coral reef island situated in close proximity to the urban centre comprising Cebu City, Mindaue City and Lapu Lapu city, in the central Visayas of the Philippines. It covers an area of approximately 1041 ha. The coastline is a mixture of rocky cliffs, sandy beaches, mangrove communities, seagrass beds and mud flats. At the southern end of Olango is a large inter-tidal bay that is a Sanctuary and has been declared a Wetland of International Importance under the Ramsar Convention on Wetlands. The bay is an important stop-over site for migratory shorebirds, with the mangroves providing good shelter and the exposed mud flats a plentiful supply of food, and accordingly is included in the Shorebird Reserve Network of the East Asian-Australian Flyway. A Nature Centre, boardwalks and three bird hides for visitors/tourist have been established on the eastern side of the Sanctuary.

Olango does not exhibit distinct wet and dry seasons, although the majority of rain falls during November-December. The island is exposed to both the north-east and south-west monsoons, each bringing with them winds and rain from the respective directions. Typhoons

are a hazard during November and December. El Nino had a major effect on Olango during 1997-98, with little rain and subsequent freshwater supply problems.

Olango Island has an estimated human population of 10,000. The population exerts severe pressure on Olango's natural resources. The local fishery resources have suffered through over-fishing and illegal fishing methods (dynamite and cyanide fishing) forcing the local fishermen to travel long distances in order to obtain sufficient fish catch. Other livelihoods include shell and shellfish collecting, seaweed harvesting, and mangrove cutting and forestation.

Olango's freshwater supply comes solely from a groundwater aquifer, which receives re-charge during the wet season. However, the freshwater from the various wells often becomes brackish during high tide, while in recent years over-extraction of groundwater during the dry season has seen the water become almost permanently brackish, prior to wet season re-charge. No sewage system exists on Olango, raising the possibility of potential contamination of the groundwater. Power is supplied to only parts of the island from three non-continuous generators.

Olango is governed by eight local councils, termed Barangays, all of which are overseen by the Lapu Lapu City Government.

Olango Island is one of six sites in the Philippines chosen for the USAID funded Coastal Resource Management Program (CRMP). This is a five year program aimed at promoting, developing and implementing coastal resource management plans for each site. An area profile, describing the major attributes and coastal hazards and developing plans to reduce the impacts of the hazards, has just been completed. The program's success relies heavily on the participation of the local people and their willingness to learn and adapt.

## The workshop

### Major objective

- Increase awareness of local and national decision makers about the potential impact of climate change and sea level rise;
- Present the preliminary result of an assessment of the vulnerability of Olango Island to climate change and sea level rise;
- Obtain feed back on the assessment;
- Identify information gaps;
- Discuss potential management strategies to respond to climate change and sea level rise; and
- Identify mechanisms to incorporate potential strategies into coastal planning in the Philippines.

### Venue and arrangements

The workshop was held on 9-10 December 1998 at Costabella Tropical Beach Resort, Mactan Island. Primary coordination and secretariat functions were provided by the Philippines Department of Environment and Natural resources (DENR), region 7. The workshop facilitators were Amuerfino (Momoy) Mapalo (DENR), Rick van Dem (ERISS, Jabiru, Australia), Doug Watkins (Wetlands International, Canberra, Australia).

### Participants

The workshop participants included local Barangay captains from several of Olango's Barangays, representatives of the Lapu Lapu City Government, the Philippines Tourism

Association (PTA), the University of San Carlos, the Philippines Coastguard, the Philippine Atmospheric and Astronomical Services Administration (PAGASA), the Department of Public works and Highways (DPWH), and the CRMP. Of the 45 participants invited, 38 attended (see Attachments 1).

### **Structure and content**

The workshop schedule is described in detail in Attachment 2.

Opening addresses were heard from a representative of the Mayor of Lapu Lapu City, and from Jeremias L. Dolino, the Regional Executive Director of DENR Region 7 (Attachment 3). Each participant and the organisation they represented were introduced. The facilitators then gave an overview of the project, describing how and why it was established, why Olango was chosen, and the expected outputs of both the project and the workshop.

Following this, keynote presentations were given:

- CRMP Concerns and Approaches in Olango Island, presented by **Dr Catherine Courtney**, CRMP Chief of Party:  
(focussing on work done on a coastal environmental profile, alternative livelihood options, development of a GIS and resource map for Olango)
- Coastal vulnerability assessment: assessing vulnerability to climate change and sea level rise, presented by **Dr Rick van Dam**, ERISS (van Dam 1999):  
(focussing on the process of coastal vulnerability assessment, with a simplified example from the Alligator Rivers Region, Australia)
- Predicted regional climate change and sea level rise scenario, presented by **Mr Momoy Mapalo**, DENR:  
(focussing on predicted effects of global warming globally, in tropical Asia and for small island; introducing the predicted sea level rise of 30cm by year 2030 and 95cm by 2100, for Olango Island)
- Likely impacts of climate change and sea level rise, presented by **Dr Rosa Perez**, PAGASA:  
(focussing on climatological data; introducing the proposed National Action Plan for Climate Change and sea level rise; effective in raising the participants' awareness of the problems that climate change and sea level rise could pose)

The remaining day and a half was allocated to discussion of the preliminary vulnerability assessment.

- Discussion on attributes of Olango and relevant forcing factors:  
Mr Mapalo outlined the major attributes of Olango Island, grouped as )geophysical, )biological and ) socio-economic, cultural and political. Several more were added to this list following discussion. He then outlined the major natural and anthropogenic forcing factors (coastal hazards) acting upon these attribute. Again, following discussion, particularly with people familiar with Olango Island, several other anthropogenic forcing factors were added. The majority of these dealt with unsustainable natural resource utilisation, and will be grouped under such a heading in the final project report. Along with the predicted climate change scenario outlined earlier in the day, this summary provided the foundation for the sessions to assess the vulnerability of Olango Island to

current forcing factors and predicted climate change and sea level rise.

- Discussion on current vulnerability and vulnerability to climate change and sea level rise: The participants divided into three groups according to their expertise and were assisted by the facilitators. Each group was to discuss and assess vulnerability to either the geophysical, biological or socio-economic and cultural attributes of Olango Island. The most common approach, given the limited time frame, was to construct a matrix of forcing factors versus attributes, and to rank each attribute's susceptibility to each forcing factor. This provided a preliminary indication of what attributes were going to be more vulnerable to ( ) current forcing factors or ( ) climate change and sea level rise. The outcomes of each group discussion were presented to all of the workshop participants by a nominated group leader.
- Identification of current response to coastal hazards on Olango Island: The aim of this discussion was to identify all major planning and policy documents, infrastructure and monitoring programs that exist for Olango Island which in some way serve to minimise or address current issued/coastal hazard. In detail, the purpose was two-fold:
  - to identify mechanisms for incorporating management responses to climate change and sea level rise; and
  - to identify whether or not some current responses already help to protect various attributes of Olango from impacts of Climate Change and sea level rise (eg. Formation of a buffer zone around the Ramsar-listed sanctuary would also serve to protect parts pf the island from increased storminess and storm surge).
- Development of possible management responses to climate change and sea level rise: The participants again divided into the three groups. The idea was to focus on those attributes that had been determined the previous day to be most vulnerable to climate change and sea level rise. For the geophysical group (biological and socio-economics and cultural) had considerably more attributes to consider. The discussion lasted approximately 90 minutes. A plenary session was held to hear the group output presentations.
- Presentation of each group's proposed management strategies: These involved identification of mitigation/adaptation/protection measures, monitoring requirements, and in some cases, responsible agencies. Each presentation was followed by approximately 20 minutes of discussion on the outcomes and their feasibility and practicality. The outcomes of this final session will be used to construct the latter sections of the vulnerability assessment of Olango Island.

The workshop was formally closed at around 4 pm on 10 December.

A field trip to Olango Island was undertaken by several participants on 11 December. This is provided opportunities to view migratory shorebirds, local people harvesting natural resources and mangrove plantations and to better appreciate many of the issues raised during the workshop.

### **Outcomes and products from the Workshop**

Current vulnerability and vulnerability to climate change and sea level rise (see Attachment 4)

For the geophysical group, the major attributes of concern were topography and

hydrology. Both were considered extremely vulnerable to climate change and sea level rise, while hydrology was considered to be more vulnerable to current forcing factors than topography. Topography would be altered by sea level rise and coastal erosion from more intense storminess and storm surge. Hydrology was vulnerable due to saltwater intrusion of the groundwater lens as a result of sea level rise and storm surge, but also through over-extraction. A potential benefit of climate change (increased rainfall) was an increase in the fresh groundwater lens, and therefore, water supply. The biological group considered mangrove communities, coral reefs and fish communities very vulnerable to climate change and sea level rise. They also raised the issue of terrestrial vegetation being at risk due to saltwater intrusion of the groundwater. Hydrology/groundwater issues crossed all three boundaries of attributes. Freshwater supply, fishing and other livelihood activities were seen to be the most vulnerable socio-economic attributes of Olango, both currently and to predicted climate change and sea level rise

### **Identification of current response to coastal hazards on Olango Island**

The major government and non-government agencies involved with Olango Island are Lapu Lapu City Government DENR, CRMP, University of San Carlos, the Philippines Coastguard and the Department of Education, Culture and Sport (DECS). Lapu Lapu City Government outlines its draft management plan for Olango Island, with particular emphasis on land use, and the CRMP outlines its proposed management plan for sustainable management of the coastal resources. DENR presented its plans for management of the Sanctuary. Other major documents, programs and agencies were identified

### **Presentation of proposed management strategies (see Attachment 5)**

These involved identification of mitigation/adaptation/protection measures, monitoring requirement, and in some cases, responsible agencies. Each presentation was followed by approximately 20 minutes discussion on the outcomes and their feasibility and practicality. There was a definite emphasis on monitoring programs to better understand many of the natural processes (eg. Sand movement, water currents, vegetation dynamics) occurring on and around Olango. The major issue of concern appeared to be that of fresh water supply and measures that could be taken to minimise both current pressure on the groundwater lens and also that potentially imposed by climate change and sea level rise. In some cases there was conflict or potential conflict between plans; potential solutions were discussed.

### **Major outcomes**

- The participants, incorporating people from a wide range of relevant council/agencies/organisations, developed an exceptional understanding of the concepts of climate change and sea level rise, and coastal vulnerability assessment. It is hoped that they will be able to apply this knowledge in further projects of a similar nature in the future
- There was an overall acceptance that the issue of climate change and sea level rise is in fact real, and that it needs to be incorporated into decisions about the future management of Olango Island.
- The CRMP is keen to incorporate the findings of the Olango Island vulnerability assessment into its larger coastal resource management plan. Thus, there is a means by

which the issue of climate change and sea level rise will continue to be addressed and considered.

- PAGASA is keen to utilise the Olango Island vulnerability assessment as an example of a small-scale local assessment, in its National Action Plan for climate change and sea level rise. It recognises the need for more such assessments.
- The workshop participants provided a great deal information that will be incorporated into the final vulnerability assessment report. Thus, the vulnerability assessment will reflect the concerns of those who best know, and care most for, the study area.
- The final vulnerability assessment should be able to serve as a good model for other such assessments throughout the Asia-Pacific region.

### **References**

Van Dam, R. 1999. Coastal vulnerability assessment: assessing vulnerability to climate change and sea level rise. ERISS Internal Report 313, Jabiru, Australia.