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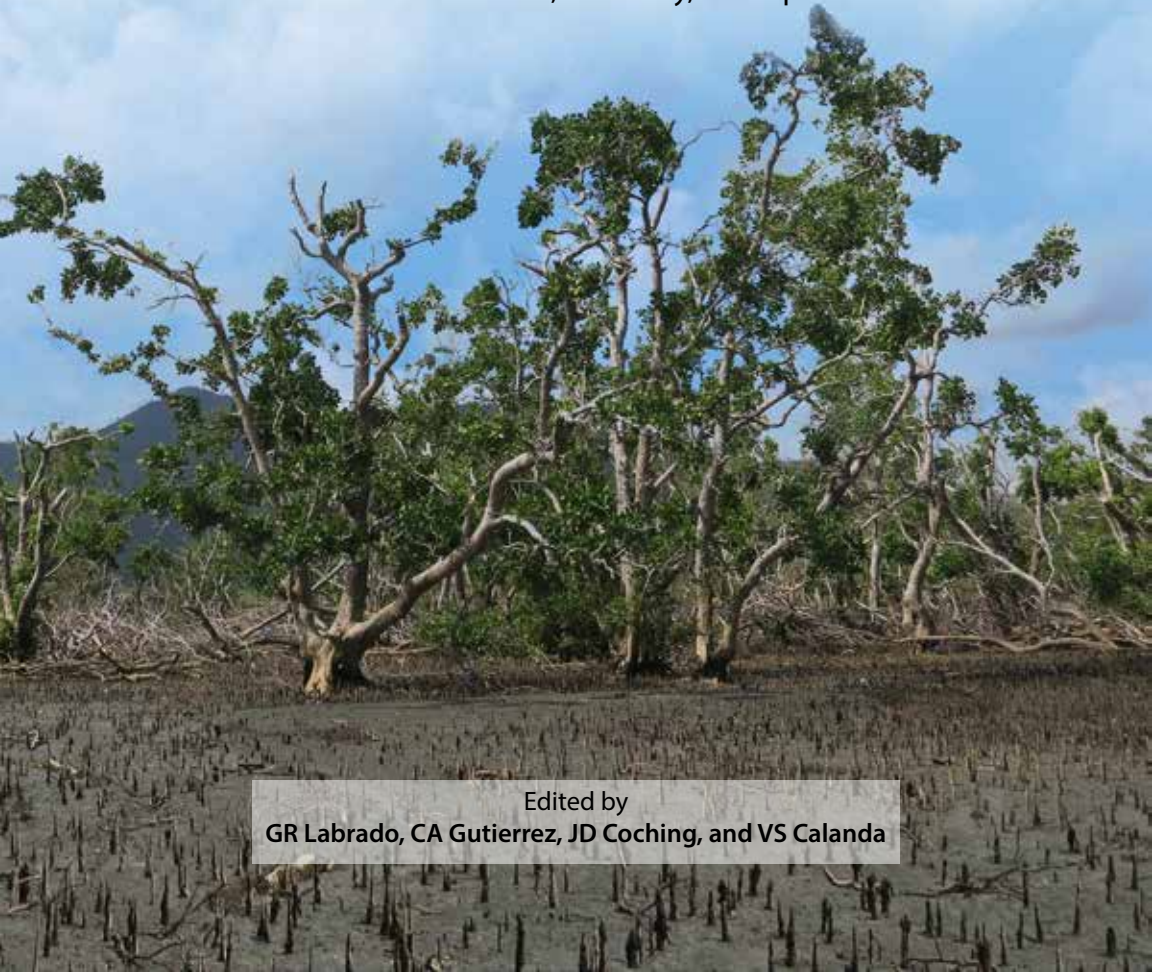


## PROCEEDINGS OF THE

### 2<sup>Nd</sup> National Mangrove Conference

#### **“Science-based Approaches to Mangrove and Beach Forest Rehabilitation: Sharing Experiences and Lessons on post-Yolanda Mangrove Recovery Work”**

MO2 Westown Hotel, Iloilo City, 1-3 Sep 2015



Edited by  
GR Labrado, CA Gutierrez, JD Coching, and VS Calanda

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on post-Yolanda Mangrove Recovery Work”**

MO2 Westown Hotel, Iloilo City, 1-3 Sep 2015

GR Labrado, C Gutierrez, JD Coching, and VS Calanda  
(editors)

Organized by

Zoological Society of London–Philippines  
Barangay Pedada Fisherfolk Association

Sponsored by

Turing Foundation; Darwin Initiative; Christian Aid; The Waterloo Foundation;  
Oxfam; DENR-Biodiversity Management Bureau; Foundation for the Philippine  
Environment; Philippine Tropical Forest Conservation Foundation; Philippine  
Disaster Recovery Foundation; The Oscar M. Lopez Center



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2nd NATIONAL  
**Mangrove**  
CONFERENCE

**Science-based Approaches to Mangrove and  
Beach Forest Rehabilitation**

*Sharing Experiences and Lessons on  
Post-Yolanda Mangrove Recovery Work*



Participants, resource persons and organizers during the 2nd National Mangrove Conference held 1-3 September 2015 in Iloilo City

## Foreword



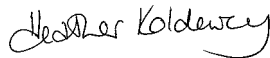
In 2013, super-typhoon Yolanda destroyed homes, lives and livelihoods on a massive scale that will take many years to recover. Mangroves are nature's bioshields, having evolved to reduce the impact of wave action and storm surges. Unfortunately, over half the mangrove forests in the Philippines are already gone and the country has the highest human population to mangrove area ratio in Southeast Asia. Never has there been a more important time to value mangroves and to rapidly scale up protection and rehabilitation efforts. Unfortunately, well-meaning but misguided efforts in mangrove rehabilitation can lead to more harm than good, such as high mortality of replanted mangroves and the destruction of other important habitats, like sea-grass beds.

In September 2015, the Zoological Society of London (ZSL) Philippines organized the 2nd National Mangrove Conference in Iloilo. The theme '*Science-based approaches to mangrove and beach forest rehabilitation: sharing experiences and lessons on post-Yolanda mangrove recovery work*' set out to share scientific and technical knowledge among different sectors. Through presentations, panel discussions, workshop sessions and more informal dialogue, this conference engaged 143 scientists, practitioners, government (local and national), people's organizations (POs), NGOs, humanitarian aid agencies and the private sector. In collaboration with the Barangay Pedada Fisherfolk Association (BPFA), participants joined a field trip and gained first-hand experience of effective, community-led interventions to restore mangroves in response to Typhoon Haiyan.

This conference participants shared experiences that identified the importance of science-based approaches to mangrove planting, particularly after large-scale disasters, and encouraged the support of appropriate legislation, such as the National Coastal Greenbelt Bill (SB 2179 and HB 5948).

Organizing a conference like this one takes considerable efforts by all involved. I would like to thank

the commitment and hard work of the ZSL-Philippines team of biologists, community organisers and operations staff, our partner communities and our donors for their support. The success of this gathering can be attributed to the high quality presentations and discussions and the cross-sectoral nature of the participants. We hope this conference and associated proceedings will be an invaluable tool as we work together to support the recovery efforts post-Yolanda, building social and environmental resilience.



**DR HEATHER KOLDEWEY**  
Head of Marine and Freshwater  
Zoological Society of London

## Foreword

The conduct of the 2<sup>nd</sup> National Mangrove Conference carrying the theme “Science-based Approaches to Mangrove and Beach Forest Rehabilitation: Sharing Experience and Lessons on Post-Yolanda Mangrove Recovery Work” could not have come at a better time. The trauma that the strongest typhoon ever recorded led to panic and outright decision to make coastal barriers out of mangroves – some of which resulted to negative impacts as natural habitats were altered. Rehabilitation activities have emerged nationwide in an effort to save coastal communities from further damage to natural calamities even without the scientific basis to foresee its impact.



These developments are alarming. What was once a dense forest in the country; mangroves have declined to less than fifty (50) percent of its natural state and are being threatened to further destruction. As the lead

agency for environmental conservation, we at the Department of Environment and Natural Resources (DENR) led by Secretary Ramon J.P. Paje, are dedicated to developing efficient and effective programs to restore our mangroves. We recognize the role of the scientific community in our undertakings as we continue to participate in learning exchanges such as the 2<sup>nd</sup> National Mangrove Conference.

The Conference provided us a venue to present the best practices in mangrove rehabilitation and make constructive criticisms out of it to correct our future plans. It was eye opener for most of us as the Conference highlighted the need to develop incentive schemes to engage community groups/Local Government Units (LGUs) involved in mangrove conservation and rehabilitation.

It is of our great pleasure to work hand in hand with the scientific community to implement sound activities and to share the realities of our implementation on the ground. Let the Call To Action on Mangrove Rehabilitation serve as our guiding principles to bring better outcome to our stakeholders.

The DENR-Biodiversity Management Bureau (BMB) looks forward to continue its partnership with the Zoological Society of London and forge new ones with other civil society organizations. We shall continue to aim high and dig deep into our knowledge to promote science-based actions to protect and uplift the lives of the coastal communities.

A handwritten signature in black ink, appearing to read 'Theresa Lim'.

**THERESA MUNDITA S. LIM**

Director

Biodiversity Management Bureau



## Foreword



It is impressive and at the same time encouraging to see how the civil society, government, academe, and communities come and work together through this conference in the pursuit of enriching mangrove rehabilitation and recovery strategies – mangroves being one important natural defense system against waves and storm-induced coastal surges. It has already been two years since the country first experienced the onslaught of super typhoon Yolanda, the strongest typhoon ever recorded to make landfall in the Philippines to date, thus, it is but imperative and timely to share promising results and lessons from short- to medium-term ecosystem rehabilitation efforts.

The conference particularly encouraged the interaction of community partners, government and non-government organizations with the academic and research community in a dialogue to present and discuss past, ongoing and new work. Case study and project areas covered the severely-hit islands of Eastern Samar, Leyte, Bohol, Cebu and Panay, lending comprehensive coverage. All of these is neatly captured in this proceedings which makes for a good reference to stimulate further discussion in crafting new action plans or continuing current initiatives.

On behalf of the Foundation for the Philippine Environment, I congratulate the conference organizers – Zoological Society of London-Philippines and Barangay Pedada Fishermen Association, guests, presenters and participants for their contributions in this collaborative effort. An even greater challenge lies ahead as we move forward, responding to the call of action set forth during the conference – to effectively carry out ecosystem rehabilitation in the context of building the resiliency of coastal communities to unrelenting climate change impacts.

A handwritten signature in black ink, appearing to read 'Godofredo T. Villapando, Jr.', written over a horizontal line.

**MR. GODOFREDO T. VILLAPANDO, JR.**  
Executive Director  
Foundation for the Philippine Environment



## Foreword



Congratulations to the Zoological Society of London (ZSL) for the meaningful 2nd National Mangrove Conference. We at the Philippine Tropical Forest Conservation Foundation (PTFCF) are truly proud to be your partner; and we are one with the rest of the participants in calling for the application of ecological principles in forest rehabilitation.

We earnestly hope that along with the lessons from post-Yolanda recovery work, we will have the right mindset to do what is truly necessary for our forests, that is, aim for better and long-term results and commit to accomplish them despite the challenges. Rest assured of PTFCF's continuing commitment to improve the state of our forests, to safeguard not only the biodiversity that thrives therein, but more importantly the people that seek protection and livelihood from them.

Again, congratulations and we look forward to more collaborative undertakings for our forests.

A handwritten signature in black ink that reads "J. Canivel".



**ATTY. JOSE ANDRES A. CANIVEL**  
Executive Director  
Philippine Tropical Forest Conservation  
Foundation, Inc.

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# Introduction

In the Philippines, public perception of the role of mangroves in coastal protection was limited until Typhoon Haiyan hit the central Philippines on 8 November 2013. This typhoon, the strongest ever to hit landfall, affected 16 million people (16% of the Philippines' population), making 4 million homeless, killing 6,166, injuring 28,626, with 1,785 people remaining missing (Philippines Government official figures, published 13th January 2014). The cost of reconstruction alone over the next four years is estimated at \$8 billion.<sup>1</sup> This was exacerbated by the fact that over half of all mangroves in the Philippines have been destroyed, primarily to make space for fish and shrimp ponds, many of which are now unproductive or abandoned (Primavera, 2000).

In January and March 2014, on-site assessments were done by a multi-sectoral team of scientists from ZSL, University of the Philippines-Diliman, University of the Philippines-Tacloban, Ateneo de Manila University, and De La Salle University, staff from Department of the Environment and Natural Resources Region 8, and two other international and three local NGOs involved in mangrove conservation. The study focused on mangrove areas in 6 municipalities in Eastern Samar, and 5 municipalities and 2 cities in Leyte. The assessments have shown the value of mangrove forests in saving lives and property during typhoons and storm surges, and that nature always finds a way – most mangrove stands in the 14 locations showed only minimal to partial damage. As for trees that were completely defoliated, leaves began to appear on their branches and trunks only a full 2.5 to 4.5 months after Haiyan hit. New mangrove seedlings are actually coming out of the ground in most of the assessed areas, showing promising potential for full recovery.

If not done properly, planned government reforestation programmes may involve “clearing” operations that kill viable trees mistakenly perceived to be dead, and trampling of seedlings that could contribute to new generations of mangroves. If the existing viable mangroves are cleared and new mangrove seedlings replanted, they will need about 6-10 years to grow to maturity; whereas recovering mangrove trees and seedlings/saplings already present will take only 3-5 years to fully regenerate, if properly protected. Improper clearing operations may cause greater damage in terms of lives and property as what could have developed into storm barriers are removed in order to plant new mangroves which will take years to develop. Where reforestation will be conducted, it should be ensured that only dead mangroves will be cleared. Any mangrove rehabilitation activities should be based on scientific assessments.

ZSL-Philippines (a registered foreign office of ZSL) has been gaining ground in mangrove conservation, ranging from in-situ rehabilitation projects; development of science-based mangrove planting protocols and methods (Primavera et al., 2013); research and knowledge dissemination on mangrove reversion of abandoned, unproductive and unutilised (AUU) fishponds (Primavera et al., 2014); integration of mangrove protection into coastal resource management plans and marine protected areas

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<sup>1</sup>(<http://www.worldfinance.com/markets/philippine-economy-shows-resilience-after-typhoon-haiyan>).

(MPAs), and national level policy advocacy on fishpond reversion and restoration of coastal greenbelts. In the aftermath of Typhoon Haiyan, ZSL's expertise on mangrove restoration is being actively sought from across all sectors in the country, including government, NGOs, communities and the corporate sector. There is enormous pressure on very few individuals to support the many requests for advice and training as government, NGOs and communities look to rebuild coastal greenbelts and provide more effective bioshields for the future.

This project was part of a bigger project of ZSL Philippines "Supporting Effective Recovery of Mangroves and Marine Protected Areas in the Philippine following Typhoon Haiyan" supported by the Turing Foundation which aims to address current problems associated with: a) lack of awareness of importance of coastal greenbelts for protection and rehabilitation (from communities to governments); b) low survival rates of mangrove reforestation programmes due to planting by convenience and not ecology; c) well-intentioned but poorly implemented existing and planned government replanting programmes that waste effort and resources; d) severe lack of mangrove and beach forest experts among the few Filipino marine biologists in the current generation; and e) poor policy environment for mangroves and beach forests, and ineffective enforcement where policies are available.

# Workshop Proceedings

**Day 1**

**September 1, 2015, Tuesday**

## I. Opening Ceremonies

Day 1 of the 2<sup>nd</sup> National Mangrove Conference started at 9:05 AM with Ms. Ma. Victoria Maglana, serving as moderator, introducing Ms. Norma Babiera of the Brgy. Pedada Fisherfolk Association (BPFA) to lead the singing of the Philippine National Anthem, and Ms. Jonalyn Ruiz, also of BPFA, invoking the opening prayer.

### A. Messages

#### Opening Remarks

**Mr. Glenn Labrado**

**Country Manager, Zoological Society of London – Philippines**

To formally open the conference, welcome remarks were delivered from the organizing institutions. Mr. Glenn Labrado, ZSL Country Manager, was the first to give his:

*DENR Director Mundita Lim, Asst. Director Mayumi Quintos, distinguished conference speakers, government, NGO, academic and PO partners, our donors and sponsors, ladies and gentlemen, good morning!*

*In behalf of the conference organizers, the Zoological Society of London (ZSL)-Philippines, and the Barangay Pedada Fisherfolk Association (BPFA), I warmly welcome you all to Iloilo City, and to this 2<sup>nd</sup> National Mangrove Conference, with the theme: Science-based Approaches to Mangrove and Beach Forest Rehabilitation: Sharing Experiences and Lessons on Post-Yolanda Mangrove Recovery Work.*

*Let's face it, public awareness of the role of mangroves in coastal protection in the country was limited, until typhoon Yolanda hit Central Philippines on 8 November 2013, nearly two years ago. Typhoon Yolanda, the strongest ever to hit landfall, affected 16 million people, making 4 million homeless, killing 6,000 people, injuring 28,000 and so on. It was exacerbated by the fact that over half of all mangroves in the Philippines have been destroyed, primarily to make space for fish and shrimp ponds, many of which are now unproductive or abandoned.*

*Mangroves (and beach forests) serve as natural protective barriers to wave action and storm impacts, including storm surge. Scientific studies have established that wave energy of storm surges are reduced by 5-50 cm for every kilometre of mangroves, and 50-99% of wave energy of wind or swell waves for every half a kilometre of mangrove forest. And there are other a lot more of ecological functions and services mangroves provide. However, mangroves can only effectively fulfil these roles if they are healthy*

*and diverse. Thus, protection and rehabilitation of mangrove forests and other associated ecosystems are essential to the recovery and resiliency of coastal communities.*

*ZSL Philippines is gathering 150 participants today and tomorrow to:*

- 1. Share results of and lessons from implementation of major mangrove rehabilitation programs;*
- 2. Assess post-disaster mangrove damage and recovery;*
- 3. Share experiences and lessons on the importance of mangroves in building coastal resilience and adaptation to climate change; and,*
- 4. Revisit mangrove rehabilitation strategies implemented in the context of post-disaster humanitarian assistance.*

*At the end of the two-day conference workshop, we hope we can come up with a statement or call to duty-bearers and mangrove practitioners on effective and appropriate strategies to rehabilitate and protect our remaining mangrove and beach forests utilizing science-informed approaches and practices.*

*Lastly, at this early stage, I would like to extend our deep gratitude to the generous support of our donors and sponsors: the Department of Environment and Natural Resources Biodiversity Management Bureau, Turing Foundation, Darwin Initiative, Waterloo Foundation, Oxfam, Christian Aid, Foundation for the Philippine Environment, the Philippine Tropical Forest Conservation Foundation, the Philippine Disaster Recovery Foundation and the Oscar M. Lopez Center in making this conference a success.*

*Again, welcome and I look forward to a fruitful two-day conference ahead. Thank you.*

Ms. Maglana, citing that this is the 2<sup>nd</sup> National Mangrove Conference, went on to establish the number of participants who attended the first one by asking them to raise their hands. Only a handful (about 10 hands) in the room did. She said that the current batch of participants is fortunate in that they have the opportunity to reinvent the National Mangrove Conference by sharing best practices and lessons learned that can be derived from each other's experiences. To show the diversity of the participants, she called on the organizations present from various sectors, such as non-government organizations, government agencies, the academe, and requested the rest of the audience to acknowledge the presence of each organization with a clap of their hands. She also acknowledged the presence of the organizers.

Since the first national mangrove conference, there were enabling institutions that pursued the work, who consequently, gave their own messages:

**Message from DENR Secretary Hon. Ramon Paje  
Ms. Mayumi Quintos-Natividad  
Assistant Director, Forest Management Bureau, DENR**

Ms. Natividad extended the regrets of Hon. Ramon Paje, DENR Secretary, who could not make it to the conference. She went on to read the Secretary's message.

*Honorable members and partners of ZSL headed by Country Manager Mr. Glenn Labrado, Mr. Ramon Barbata, Barangay Pedada Fisherfolk Association, Mr. Dominador Co, representative of the good city mayor of Iloilo, esteemed collaborators from the academe and research institutions, fellow workers in government, civil society, beloved participants, friends, good morning!*

*We are indeed pleased to be part of this two-day mangrove conference and share experiences and practices as well as responses to challenges that confront mangroves. The greater challenge for mangroves that ZSL and partners have to contend with is adaptation to climate change, the fury of which we have witnessed in the chain of storms and surges. In looking after the state of Philippine environment, we adopt the ridge to reef (watershed ecosystem) approach in order to address environmental concerns from interactive viewpoints. With each ecosystem having distinct characteristics, we cannot veer away from what scientists refer to as cooperative relationships that promote harmonious integration of ecosystems. In dealing with complex interdependence of all forms of life, we believe that only science-based approach in rehabilitation and restoration activities can save the day so to speak.*

*In so far as the country's forest is concerned, we get an average of 38,000 hectares per year covered by the reforestation initiatives for the last 20 years, we face the grim reality of 210 years more before some 8 million hectares of unproductive, open, denuded and degraded areas of the country could be regreened. Meanwhile, the wrath of typhoons and storm surges urgently calls for measures to transform the country into resilient communities. This is the rationale behind the National Greening Program (NGP) and its adoption of science-based forestry to differentiate it from past reforestation efforts.*

*We would like to inform you that the NGP has already surpassed the 1 million-hectare mark. This 2015, we shall cover planting areas totalling 350,000 hectares. In covering areas for development including mangroves, the NGP adheres to site characterization principles, with site-specific matching governing the selection of planting sites. Indigenous species are planted in protected areas, with forestry concentrated in production zones. The same principles apply to the commodity road map, which serves as guide to the appropriate species including mangroves, to plant in each region in the country, with special consideration for climate and rainfall distribution.*

*Under the NGP, some 47,305,284 propagules and seedlings have been planted covering a total of 21,840 hectares nationwide from 2011 to 2013. On the other hand, our Ecosystem Research and Development Bureau (ERDB) now promotes the strategy of planting potted mangroves seedlings of appropriate species, such as *Avicennia* sp. The launch of the Mangrove and Beach Forest Development Program of the DENR through the ERDB complements the NGP addressed the environmental concerns of*



*the areas affected by Typhoon Yolanda. The Forest Management Bureau, in cooperation with the ERDB, has drafted guidelines specifically for the Mangrove and Beach Forest Development Program and issued bulletins to guide implementers in the conduct of component activities, such as site validation and assessment, baseline survey of project sites, nursery establishment and management, and plantation development and management. The program took significant findings of mangrove experts, such as Dr. Jurgenne Primavera, on mangrove rehabilitation. For the total target of 41,694 hectares of affected areas, those validated and assessed totalled 33,006 hectares, with plantations established reaching 2,399 hectares as of July this year.*

*Meanwhile, based on assessment undertaken by the ERDB in 30 out of the 42 provinces targeted for baselining in the priority regions of 4A, 4B, 5, 6, 7, 8 and 13 to determine the bio-physical condition of MBFDP sites prior to planting, monitoring and evaluation of areas planted shall be done to measure survival of mangrove species as well as introduce improvements in the surrounding environment, including the communities. Involving coastal communities is a must as well as other agencies, the local governments, academe and other sectors for concerted efforts in protecting our mangroves. Close coordination also expects us to monitor compliance to relevant policies, and likewise, recommend actions. This was the direction taken in the case of the Integrated Coastal Resource Management Project that was implemented in 18 municipalities by the DENR. The ICRMP promoted the ridge-to-reef approach in sustainably managing the coastal resources. It also provided fisherfolk greater access to livelihood opportunities. One component of the ICRMP promoted biodiversity conservation practices as well as supported the rehabilitation and reforestation of mangrove and watershed areas with active participation of local communities complementing our NGP.*

*In our march towards sustainable forest management, and how we could improve the integrity of the function of our forests and watersheds in relation to our ecosystem, we acknowledge the significant role of mangroves in the web of life. And we acknowledge the indefatigable efforts of ZSL and other marine scientists and experts in providing due attention to our forests of the sea – our mangroves.*

*On this note, I wish you all a fruitful conference. Thank you, all!*

With Iloilo owning the distinction as host of the past national mangrove conference, Ms. Maglana called on the Iloilo City Mayor's representative to give a message on his behalf.

**Message from Iloilo City Mayor Hon. Jed Patrick Mabilog**  
**Mr. Dominador Co**  
**Executive Assistant, Office of the City Mayor**

Mr. Co was tasked by the City Mayor to represent him as the schedule of the national conference was in conflict with an official function. After greeting the participants and conveying his pleasure to be among the stakeholders of mangrove protection, he proceeded to read the message of the Mayor:

*First, I'd like to thank the Zoological Society of London (ZSL)-Philippines for choosing Iloilo City as the venue for the 2<sup>nd</sup> National Mangrove Conference.*

*I'd like to add the significance of this conference is not lost in the minds of Iloilo's advocates for environmental protection and preservation, particularly this administration who has supported and encouraged mangrove reforestation over the last five years in the Iloilo and Batiano Rivers here.*

*Ilonggos are likewise honoured and glad the 2<sup>nd</sup> National Mangrove Conference is held here in Iloilo City. The honor and the joy spring from the fact that the mighty and rejuvenated Iloilo River is just a few hundred yards away from where you sit. Iloilo River, ladies and gentlemen, is home to 22 of the country's 35 mangrove species. The river's mangroves is also home to the rare emerald shrimp species *metapenaeus insolitus* and serves as habitat and nursery for a variety of important fish species as well.*

*We've also had plenty of mangrove-planting activities involving the private sector over the last five years. Most of these were done in the Iloilo River. The city government, assisted by non-government environmental organizations, has taught and educated our people about the significance of mangroves and mangrove reforestation. I believe the Ilonggo community has developed a sharp awareness of the benefits and vulnerability of mangroves. Ilonggos now fully understand and equate mangrove preservation with increasing fish population, enhanced biodiversity and reduced siltation and coastal flooding.*

*Our mangrove reforestation, coupled with extensive dredging, brought the once moribund Iloilo River back to life.*

*A few years ago, Dr. Resurreccion Sadaba and Dr. Jurgenne Primavera, mangrove specialists from the University of the Philippines-Visayas and the Southeast Asian Fisheries Development Center, apprised me of the dwindling mangrove areas we have here in Panay and the rest of the country. With the help of concerned private and non-government groups and government agencies, we did something here in Iloilo and not only saved what remains of our mangroves but also increased their number.*

*Still, over time, we all must continue to adapt new strategies to cope with different or anticipated conditions – like climate change – if we are to preserve the rich, natural heritage of mangroves all over the archipelago. Cooperation, collaboration and awareness will ensure a better future for our mangroves and our people.*

*Ladies and gentlemen, the 2<sup>nd</sup> National Mangrove Conference will, without doubt, further raise our people's awareness and sharpen their desire to protect our mangrove forests from degradation and destruction. I'm confident the fruits of this conference will benefit the nation.*

*Thank you and wishing you a pleasant and productive gathering!*

**Message from Mr. Ramon Barbata**  
**Board Member**  
**Brgy. Pedada Fisherfolk Association**

*Distinguished guests, Hon. Mabilog, Mayor of Iloilo, Hon. Mayumi Natividad, Asst. Director of FMB-DENR, DENR-BMB Director Mundita Lim and the rest of the staff of DENR and BFAR, local chief executive from various LGUs, representatives of NGOs and people from academe, other stakeholders, fellow advocates and members of dynamic people's organizations, everyone of them all the way from Baguio to Davao, the supportive team from ZSL, we are glad that our journey was safe, Maayong Aga!*

*We are happy to welcome you all to Iloilo. It is an honor for us, the BPFA, to be part of the 2<sup>nd</sup> National Mangrove Conference. I am happy and personally proud of the opportunity for our organization to help organize this gathering. The importance of the two-day activity is crucial and particular to everyone present. We came from a small barangay from the Municipality of Ajuy, Province of Iloilo and belong to a tribe of fisherfolk whose pride is century-old mangroves. Like many Filipinos living in the coastal areas, our lives depend on the bounty of our marine ecosystems. I was a seafarer by profession but I was a fisherman's son and I know how important mangroves are to this day. Like many of you, I have this aspiration to preserve and conserve what is left of our mangroves. Our organization, BPFA, just like you, have our fair share of rains and days collecting seedlings, and planting pagatpat almost everywhere. Just like many of you, we preserve to plant again the next day. Like you, we also work with the tides, marking our calendars and the mangroves to grow. But BPFA learned about mangroves the hard way in 2009. With the guidance of ZSL, we started rehabilitating without pay, we learned to build our breakwater with rocks, we developed a small organization which wanted to improve the lives of fishfolk, until BPFA became a trusted organization of many NGOs, the LGU and other agencies after Typhoon Yolanda. We were deeply affected by Yolanda, but just like the mangroves that protected our barangay, we built back like the unbending branches of pagatpat, longing to live until today.*

*And so we, from the BPFA, are hoping that this gathering will further strengthen everyone's commitment to forward our advocacies for nature. We hope that this gathering will be fruitful and the presence of all leaders from different institutions who came here, will transform words into action, advocacies into well-implemented policies, figures and numbers into healthy and resilient mangroves.*

*Let us plant the seeds for a future that is bright. Let us plant it right.*

*With great honor, I welcome you all to the 2<sup>nd</sup> National Mangrove Conference!*

Ms. Maglana went on to acknowledge the presence of other guests, such as GIZ, the iRelief Foundation, UPMSI, UP Institute of Science and Meteorology, Project NOAH of DOST and various PO representatives. She then presented the expectations of the participants which were gathered prior to the start of the conference.

## **B. Expectations of Conference Participants**

### **Expectations on Topics:**

- Best practices
- Sharing of effective practices and knowledge
- Science-based principles, practices
- Discussion on policy updates
- Green-Grey approach: how to harmonize?
- What are appropriate for greenbelts? - mangroves associates vs beach forest trees
- Higher respect for seagrass beds, sandflats
- Share challenges and lessons learned on ecosystem-based disaster mitigation activities
- To develop deeper awareness on mangrove conservation
- Know the latest updates on mangroves
- Updates on mangrove restoration and researches - ecological, cutting capacity and economics
- Techniques on mangrove rehabilitation
- Project update on mangrove plantation
- Mangrove and climate change
- Simulation results of mangrove effectiveness for coastal erosion
- Inputs from LGU/NGA on their programs related to mangrove reforestation, climate change adaptation-from national, regional, local level
- Role of mangrove in climate resilient communities

### **Expectations from Resource Persons:**

- Clarity on the delivery of the topics being lectured
- Provide non-technical terminologies on the inputs
- Provide excellent technical advices/ knowledge
- Comprehensive results from research activities
- Knowledgeable
- Ask questions
- Well-discussed topics

### **Expectations on Logistics:**

- Veggies
- Brewed coffee
- Well-organized
- Sound system should be clear
- Provide references both hard and soft copies
- Provide soft copies (PDF) of presentations

## C. Objectives

**The Conference Objectives were as follows:**

1. Share results of and lessons from implementation of major mangrove rehabilitation programs;
2. Assess post-disaster mangrove damage and recovery;
3. Share experiences and lessons on the importance of mangroves in building coastal resilience and adaptation to climate change; and
4. Revisit mangrove rehabilitation strategies implemented in the context of post-disaster humanitarian assistance.

Furthermore, the expected conference results were:

*Outputs:*

1. Participants have:
  - a. Full information on the mangrove scientific assessments conducted in Eastern Samar and Leyte;
  - b. Broader perspective on the importance of mangroves in the context of Typhoon Yolanda; and
  - c. Knowledge of role of mangroves in coastal protection and mitigation, in light of national policy and international conventions;
2. Produce conference call to action and proceedings.

*Outcomes:*

1. DENR, LGUs, NGOs, POs, private sector improve protocols using available scientific knowledge on mangrove rehabilitation and management;
2. State universities and colleges underpin continuing instruction and extension work with scientific knowledge and perspective; and
3. Mangrove rehabilitation is integrated into disaster preparedness, relief and recovery planning.

After presenting a framework of the conference sessions, whose end result is a conference statement that will capture the issues and concerns, good experiences and lessons learned and recommended actions, Ms. Maglana invited the participants to be active on social media and get people to talk about the conference by using the Twitter and Facebook hashtag: #2PHmangroveconfab.

To proceed with the conference proper, Ms. Maglana called on Ms. Ma. Theresa Aquino, Mr. Smith Bajon, and Dr. Yasmin Primavera-Tirol to discuss topics under the first objective. Ms. Maglana gave a few tips to ensure shared time management and responsibilities to facilitate smooth presentations and subsequent interventions from the floor.

- The resource persons are given 25 minutes per presentation;
- Yellow card means speaker has 5 minutes left;
- Pink card means speaker only has 1 minute to wrap up the presentation.

## II. Presentations

### A. Status of the DENR National Greening Program (NGP) – Mangrove Rehabilitation Component

Ms. Ma. Theresa Aquino

Chief, Forest Management Bureau, DENR

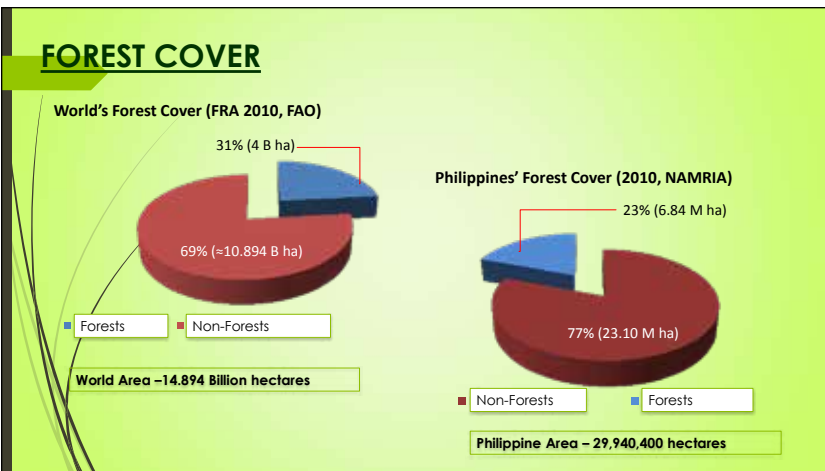
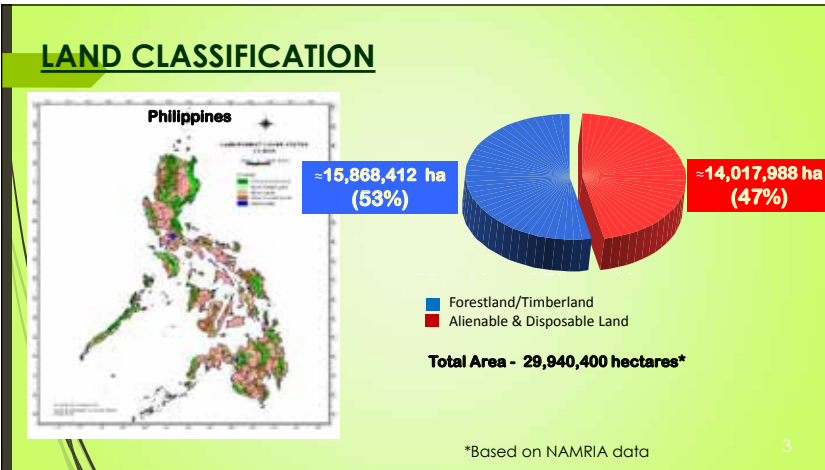
9:55 - 10:34 AM

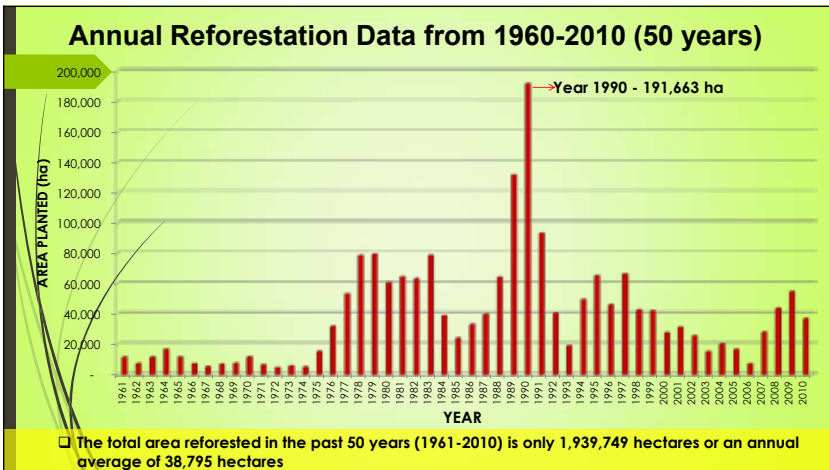
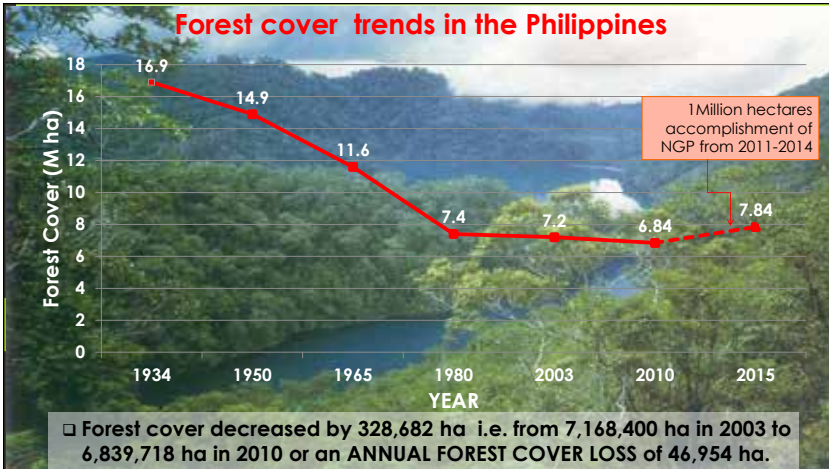
Highlights of the presentation included the following:

- State of the Forest
- Forest Cover Trends in the Philippines
- Annual Reforestation Data from 1960-2010
- NGP Rationale
- Background
- Coverage
- NGP Areas for Development
- NGP Mission
- Activities
- NGP Commodity Roadmap
- Mangrove and Beach Forest Development Program (MBFDP)
- Objectives
- Criteria for Selection
- Salient Features of the Project
- Expected Outputs
- Implementation Schedule
- NGP Milestones
- NGP Accomplishments from 2011 to Aug 2014
- 2015 Targets
- Good Governance (NGP Measures)
- Geo-tagged Actual Accomplishments



# STATE OF THE FOREST








## NATIONAL GREENING PROGRAM

**NGP RATIONALE: The Areas**

At an average of 38,000 hectares reforestation accomplishment per year...  
 ....it would take 210 years to reforest/rehabilitate the 8 M hectares of unproductive, open, denuded or degraded areas





7



## NATIONAL GREENING PROGRAM

### Background

- ❑ Executive Order No. 26 signed on February 24, 2011



## NATIONAL GREENING PROGRAM



### Coverage

The National Greening Program shall plant some 1.5 Billion trees covering about 1.5 Million hectares for a period of six (6) years from 2011 to 2016.



## NGP AREAS FOR DEVELOPMENT



- Open, Degraded & Denuded Forestlands
- Protected Areas and Mangrove



## NGP AREAS FOR DEVELOPMENT



- **Ancestral domains**





- **Civil and military reservations**





Fort Magsaysay

## NGP AREAS FOR DEVELOPMENT



- **Urban areas under the greening plan of LGUs**





- **Inactive and abandoned mine sites**




Claver, Surigao del Norte

Zamboanga del Sur

## NATIONAL GREENING PROGRAM



■
■
■
**NGP: MORE THAN REFORESTATION**

**OUR MISSION**

- Poverty Reduction
- Food Security
- Environmental Stability
- Biodiversity Conservation
- Climate Change Mitigation & Adaptation

Bringing together agencies, efforts, people:





Convergence Works.



### NATIONAL GREENING PROGRAM

#### NGP Commodity Roadmap (Including NGP Acceleration for CY 2011-2014)

Region	Timber	Fuelwood	Coffee	Cash	Rubber	Sambor	Kamau	Other Fruit Trees	Indigenous Species		Mangrove	Urban	Mixed Commodity Sites*	Total
									Protection Forest	Protected Area				
AR	34,205	3,560	8,372	806	488	311	1,320	4,377	5,621	181		3,282	918	2,094
BAR	13,943	18,949	1,843	1,116		724	33	4,984	318	581	83	40	1,524	68,963
Region 1	17,816	190	6,436	2,432	34	112	1,085	7,886	376	184	100	180	8,524	41,840
Region 2	18,735	6,471	4,273	9,508	174	4,951	5,527	5,730	5,251	4,188	548	130	1,487	56,931
Region 4A	18,515	9,337	1,025	782	2,015	1,867	4,770	1,786	7,607	4,871	2,015	3,629	6,251	58,953
Region 4B	24,109	1,438	1,341	174	110	61	38	4,999	6,058	3	807	75	6,545	48,748
Region 5	22,763	4,063	2,648	2,518	38	1,843	302	7,144	5,748	1,864	3,236	812	2,511	48,176
Region 6	11,488	3,581	1,537	732	18	194	200	3,032	6,598	3,819	752	143	5,585	35,138
Region 7	25,960	4,821	8,212	2,839	1,641	1,791	1,884	4,883	2,583	1,210	1,821	302	1,189	56,896
Region 8	19,450	1,812	150	67		790	5,321	2,282	3,903	134	4,600	71	3,523	46,372
Region 9	6,479	756	882	881	22,942	145	1,101	671	918		2,891	278	15,104	51,071
Region 10	11,397	710	1,268	747	5,819	815	548	1,527	10,250	2,240	204	241	5,216	48,580
Region 11	4,614	4,515	4,889	6,239	6,692	81		5,730	4,773	456	77	808	5,546	44,981
Region 12	19,881	173	9,548	1,652	8,440	424		1,217	1,012	617	221	1,188	7,826	45,311
Region 13	17,878	949	157	148	8,294	215		2,654	7,881	588	1,401	144	0	41,809
Other Industries	3,030		10			12		842		400	3,914	124	55,894	79,841
Other Plantations			615	824	884				1,432				318,800	278,195
GRAND TOTAL	244,136	58,124	52,734	27,718	57,052	9,357	18,473	58,794	72,084	20,891	21,840	4,200	34,284	1,011,784
2013 Targets	136,188	19,820	20,347	14,305	8,076	2,419	11,177	29,702	323	1,112	3,264	321	11,818	300,000
2014 Targets														910,784



### **Objective of the Mangrove and Beach Forest Development Project (MBFDP)**

To undertake a science- based mangrove and beach forest development in areas affected by typhoons and other disasters ( e.g. siege and earthquake) that hit several regions in the country and develop a Mangrove and Beach Forest Management Plan for each concerned region to ensure the sustainability of all the initiatives under the MBFDP

### **Criteria for the selection of Priority Sites for the Mangrove and Beach Forest Development Project:**

- 1. Areas affected by Typhoon Yolanda (Regions 4a, 4b, 5, 6,7,8,9,10,11 and 13)**
- 2. Areas affected by Siege and Unrest (Region 9: Zamboanga Sibugay)**
- 3. Areas damaged by Earthquake (Region 7: Cebu and Bohol)**
- 4. Other areas damaged by Typhoon Pablo (Regions 11 and 13)**

### **Salient Features of the Project:**

- 1. Importance of mapping and baseline data collection on bio-physical characteristics of target sites as basis for future impact assessments**
- 2. Implementation of cash-for-work scheme in the different stages of plantation development including nursery establishment**
- 3. Incorporation of capacity- building and sustainability mechanism strategies**
- 4. Distinct target sites from that of regular NGP-mangrove**
- 5. Emphasis on sustainability which necessitates extension of project life beyond 2015**
- 6. Strong monitoring and evaluation system**

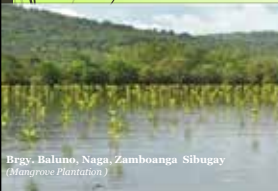


# NGP MILESTONES


## NATIONAL GREENING PROGRAM

### Accomplishments in AREA PLANTED (ha) CY 2011 – Aug 24, 2015

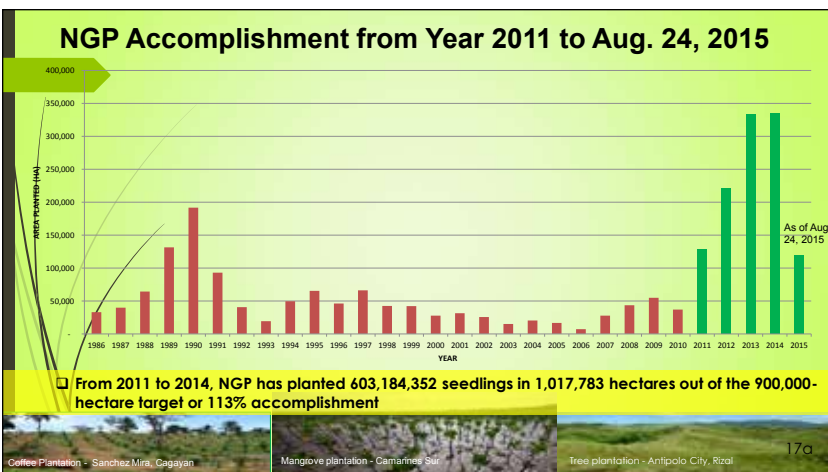
2011		2012		2013		2014		2015 (as of Aug24)		Total	
Target	Accom	Target	Accom	Target	Accom	Target	Accom	Target	Accom	Target	Accom
100,000	<b>128,558</b> (129%)	200,000	<b>221,763</b> (110%)	300,000	<b>333,161</b> (111%)	300,000	<b>334,302</b> (111%)	300,000	<b>119,211</b> (40%)	<b>1,200,000</b>	<b>1,136,995</b> (95%)



Brgy. Baluno, Naga, Zamboanga Sibugay  
(Mangrove Plantation)



Brgy. Banban, Ayungon, Negros Oriental  
(Mangrove Plantation)



NATIONAL GREENING PROGRAM						
Accomplishments (Job Generated) CY 2011-2014						
Major Program/Project	Performance Indicator	2011	2012	2013	2014	Total
National Greening Program	Jobs generated (no.)	335,078	380,696	466,990	1,079,792	<b>2,262,556</b>
	Persons employed	47,868	55,146	65,198	152,008	<b>320,220</b>



Reforestation in Mt. Malindang, Misamis Occidental



Nursery operations in Mt. Malindang, Misamis Occidental

## NATIONAL GREENING PROGRAM

### FY 2015 TARGET

- 350,000 ha of area to be planted
- 1,033,160\* ha planted area to be maintained and protected
- 22 clonal nurseries to be maintained
- 5 mechanized nurseries to be operationalized
- 8 additional mechanized nurseries for establishment

\* Including the 100,000 ha for the unprogrammed budget subject to DBM approval

Construction Phase

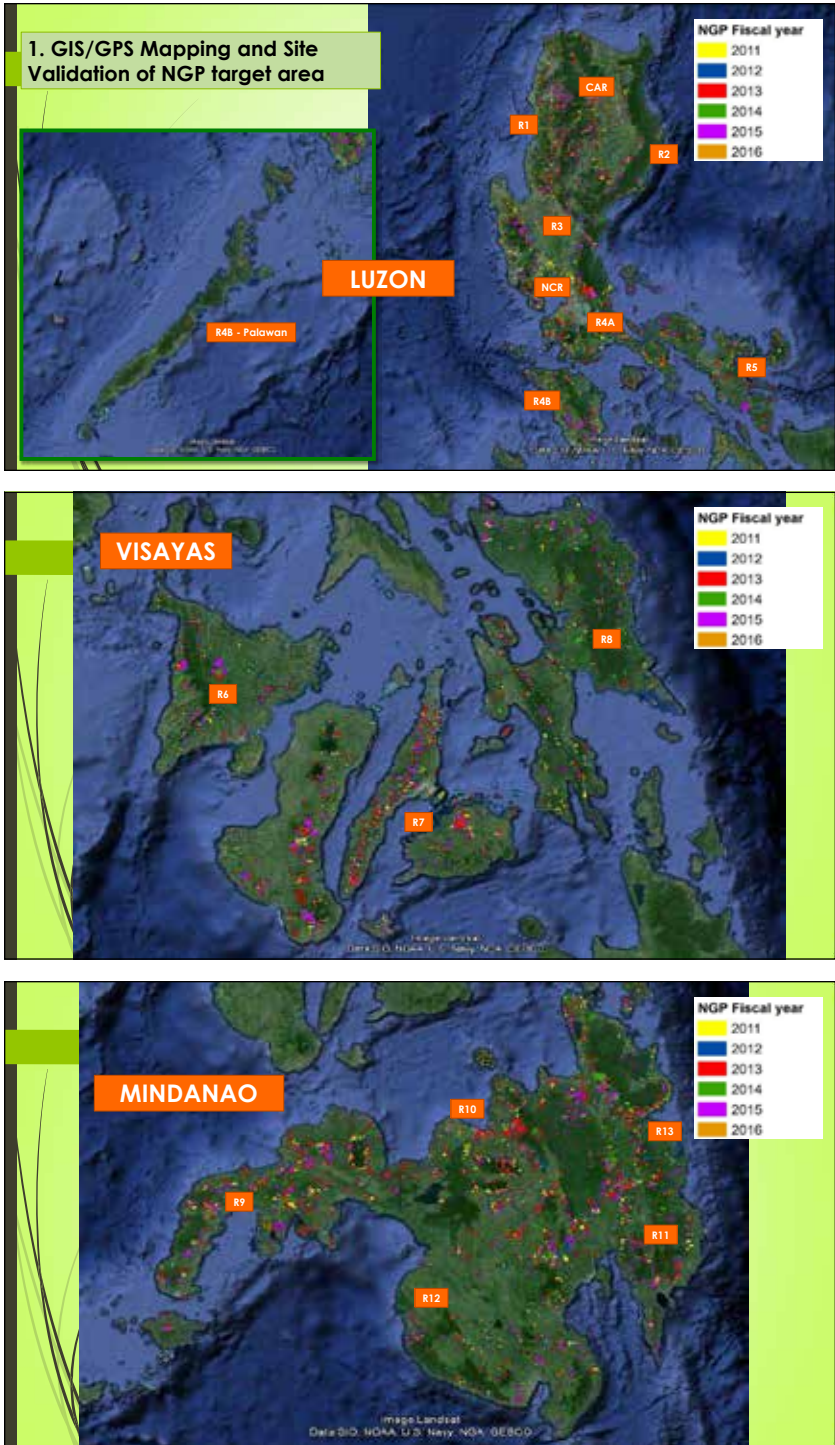
Distribution of Seedlings

Barotac Nuevo, Iloilo  
(Clonal Nursery)

Mechanized Nursery in Ayungon, Negros Oriental

# GOOD GOVERNANCE


## MEASURES FOR NGP




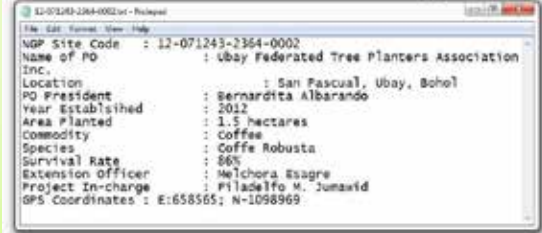


## NATIONAL GREENING PROGRAM

### 2. ALL PROGRAM SITES GEO-TAGGED



Geo-tagged photo taken using GEOCAM

## NATIONAL GREENING PROGRAM

### 3. WEB BASED ACCESS TO NGP CODED MAPS AND GEOTAGGED PHOTOS



[www.ngp.denr.gov.ph](http://www.ngp.denr.gov.ph)

**SAMPLE SITES**

11-074602-0722-0008 Ayungon, Negros Oriental

11-071242-0015-0004 Calape Bohol

#### Site Profile



## NATIONAL GREENING PROGRAM

### 4. Map coding of all NGP Sites in accordance to PSGC accesible through the NGP Website ([www.ngp.denr.gov.ph](http://www.ngp.denr.gov.ph))

NGP CODE FORMAT

YEAR	RESPONSIBLE DENR FIELD OFFICE	PLANTING SITE NUMBER	AREA
YY	RRPPCC	NNNN	AAAA

CODE	CODE NAME	DESCRIPTION
YY	Year	code based on the last two digit numbers of the year when the NGP plantation was established
RRPPCC	Responsible DENR Field Office	code based on the Philippine Standard Geographic Code (PSGC)* for each DENR Field Office responsible for the site
NNNN	Planting Site Number	code based on assigned numeral by continuously numbering all NGP Plantation Sites established for the specific year per Region
AAAA	Area	code based on the area of the NGP Planting Site in hectares rounded off to the nearest ones

## NGP PLANTING SITE CODING SYSTEM

Example:

12.4 hectares, NGP Plantation Site 342, established on June 6, 2011 in Jones, Isabela .

	YEAR	REGION	PENRO	CENRO	PLANTATION NUMBER	AREA
SITE DETAILS	2011	Cagayan Valley	Isabela	Jones is under CENRO San Isidro	342	12.4
SITE CODE	11	02	31	29	0342	0012

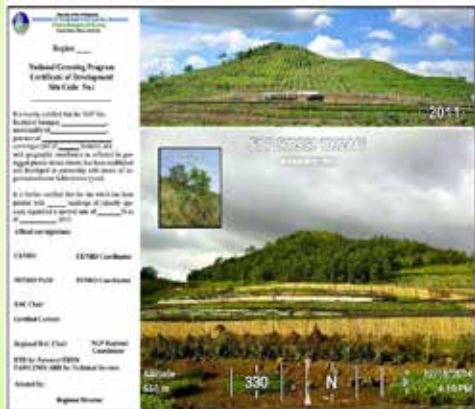
## NGP PLANTATION SITE CODE

**11-023129-0342-0012**

### 5. Submission of Certificate of Site Development

Year	No. of Site
2011	13,727
2012	21,674
2013	28,404
2014	5,698
2015	*3,655
<b>TOTAL</b>	<b>73,158</b>

\* for submission this year 2015



Certificates of Site Development submitted by the DENR Regional Offices covering the 2011-2014 NGP Sites





..... GOOD GOVERNANCE

### 9. Checkless Transaction (Advice to Debit Account-ADA)

**ADA** - refers to an authorization issued by the National Agencies/Operating Unit appearing in the lower portion of the List of Due and Demandable Accounts Payable (LDDAP). It serves as instruction to the Modified Disbursement System-Government Servicing Bank (MDS-GSB) to debit a specified amount from its available Notice of Cash Allocation (NCA) balance under the regular MDS sub-account for payment of creditors/payees thru Modified Disbursement Payment System (MDPS)

Ref: DBM Circular Letter No.2013-16 dated Dec 23, 2013

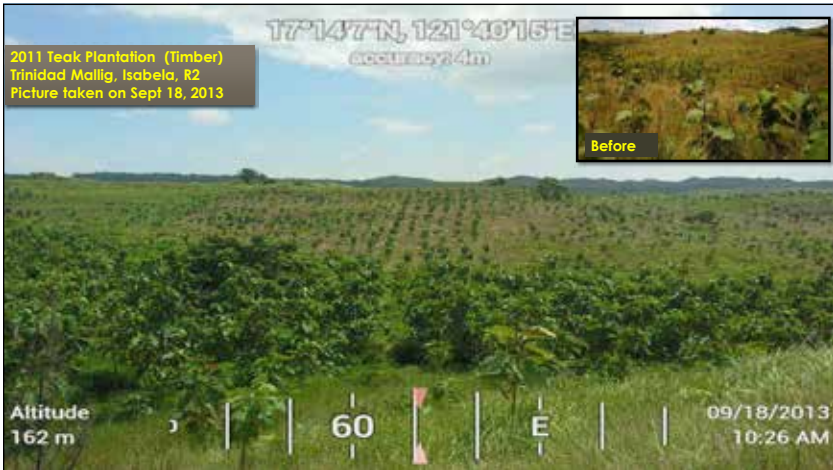
## NATIONAL GREENING PROGRAM

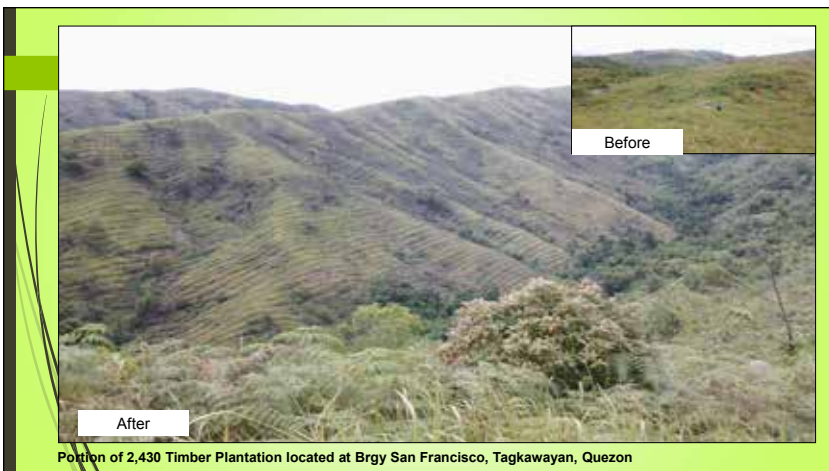
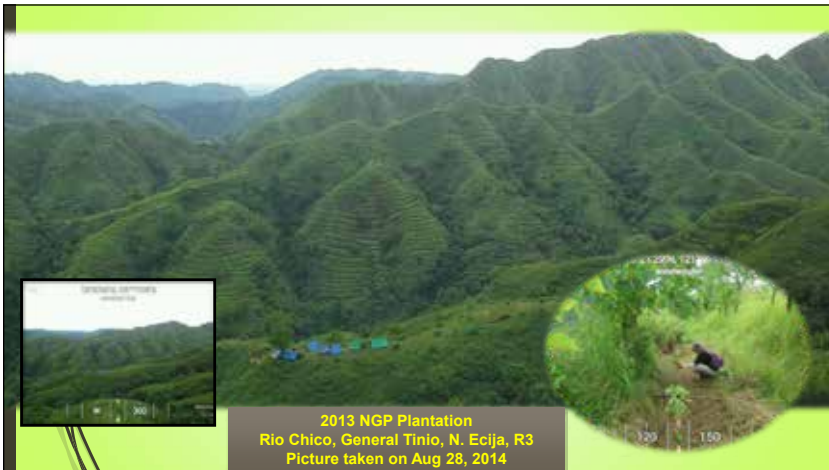
10. Compliant with procurement law



**Geo-tagged Actual Accomplishments**







Picture taken in September 2014



2011 Mangium Plantation in Banban, Ayungon, Negros Oriental, Region VII

Picture taken in 2011



2012 Coffee Plantation  
San Pascual, Ubay, Bohol  
Picture taken on May 22, 2014

2012 Mangium Plantation  
Banban, Ayungon, Negros Oriental (R7)



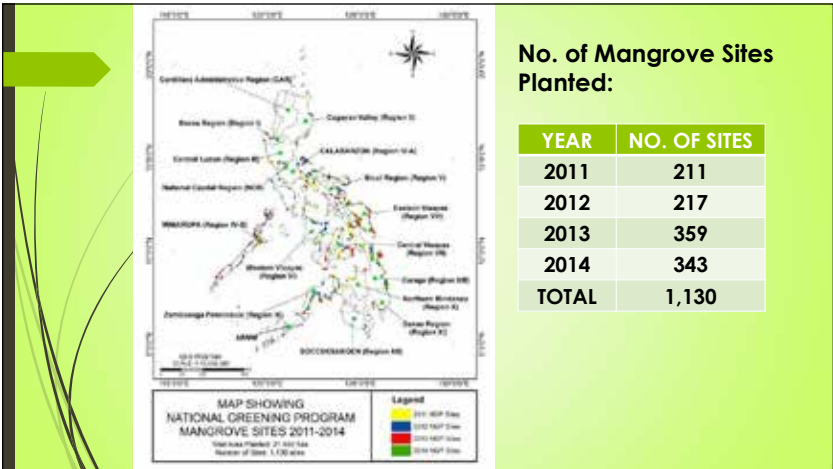








**2012 Falcata Plantation**  
Digkilaan, Manticao, Misamis Oriental, R10



**Casantaan, Sto. Tomas, La Union (R1)**  
2012 NGP Mangrove Plantation



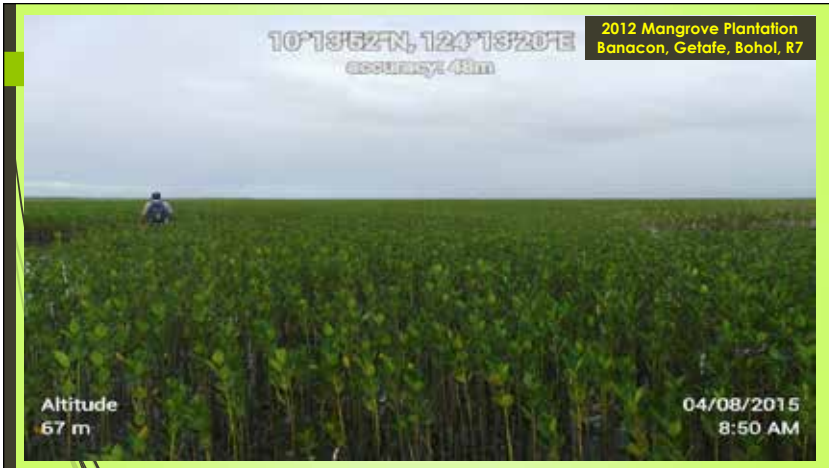




2011 Mangrove Plantation in Brgy. Tarahid, Panganiban, Catanduanes, Region V















2011 Mangrove Plantation  
Panubigon, Surigao City, Surigao del Norte, R13  
Picture taken on Sept 12, 2013

09/12/2013  
9:20 AM



2011 Mangrove Plantation  
Lipata, Surigao City  
Surigao del Norte

09°43'12"N, 125°27'25"E  
26/02/2014

26/02/2014  
2:41 PM



2012 Mangrove Plantation  
San Juan, Hinatuan, Surigao del Sur, R13  
Picture taken on Aug 13, 2014

08/13/2014

## **B. Sharing of Experiences of POs Implementing Mangrove Rehabilitation in the NGP**

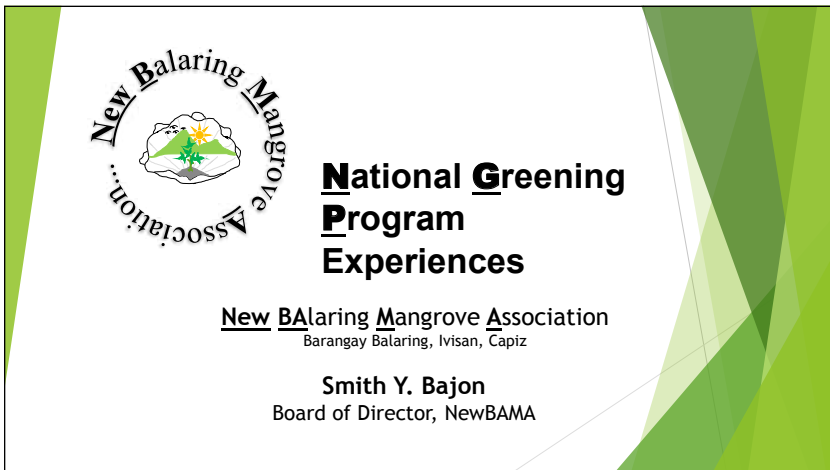
**Mr. Smith Bajon**

**BOD Member, New Balarang Mangrove Association**

**10:35 AM – 10:50 AM**

Highlights of the presentation included the following:

- Component of the project
- NewBAMA tasks
  - Planting
  - Other Strategies on Planting
  - Maintenance
- Lessons learned from the project
  - Bad experiences
  - Positive gains
  - Negative effect on NewBAMA members





Name of Project:

## National Greening Program

September 2012-June 2013

**PhP 390,000.00**

Contracted amount



### ■ Component of the project:


- Provide assistance in the site identification and the conduct of survey, mapping and planning of the site.
- To bag 108,355 seedlings including the 10% (10,835) mortality allowance and to plant the 65 has surveyed planting site; 37.5 for Balarang, 10.5 has. for Agustin Navarra in Ivisan and 17 has for Gabuc in Pontevedra, Capiz. NewBAMA plays the role of contractor while 2 areas are under the umbrella of our PO.



### ■ NewBAMA was tasked to:

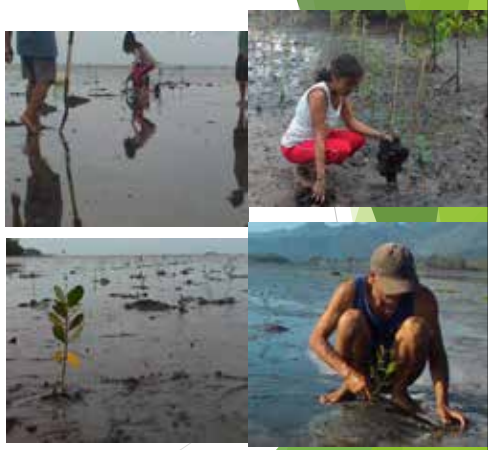
- ❖ See to it that the required seedlings will be produced in Balarang and to the 2 assisted POs in Agustin Navarra and Gabuc.
- ❖ Construct and establish nursery in Balarang.
- ❖ Conduct monitoring and physical counting on bagging and planting activities in each sites.
- ❖ Disburse allocated funds for the payment to the members for each PO
- ❖ Do reporting to the DENR for accomplishments of the project.





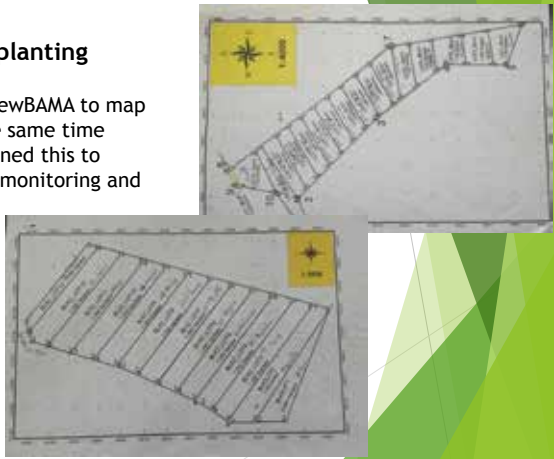
## ■ Planting


➤ 37.5 hectares of planting site is very huge for only 30 members of NewBAMA but with the help of Zoological Society of London who facilitated the MOA signing with different Universities, Academe and High schools planting was easier for us, even until now some of those academe come back yearly for mangrove planting in Balarang.



## ■ Other strategies on planting


- DENR/PENRO helped NewBAMA to map the planting site at the same time plotted areas and assigned this to members for planting, monitoring and maintenance.
- Each member was assigned to plant 2,084 pcs. of seedlings to the planting area of 1.25 has with a spacing Of 2x2.5 meters





## ■ Maintenance

- Maintaining our planting sites in Balarang is challenging. Barangay Balarang catches all garbage thrown by our friends in the neighboring barangays of Roxas City and part of Aklan province.
- Algae removal- done twice a year or every time the adjacent fishpond applied fertilizer and/or wash their ponds. Algae covers the planted seedling that caused deaths to our newly planted mangroves.





## • After Super Typhoon Yolanda!

- 3 days after Typhoon Yolanda devastated our place out of 63,000 seedlings planted only 12,637 were monitored to be alive and standing. When typhoon Ruby came the remaining planted mangrove was again totally damaged since they were covered with sand.



Mangrove Rehabilitation Project Under the  
National Greening Program  
**“CASH FOR WORK”**  
January-December 2014

**Php 240,000.00**  
Contracted Amount

### Component:

- 16,000 mangrove seedlings bagged, planted, maintained and Protected in 8 has with spacing of 2x2.5 mts. in Balarang, Ivisan, Capiz.



## Lessons learned from this project:

- Difficult to plant Mangrove in Balarang
- Difficult in monitoring of different sites like Gabuc - need a boat because it is an Island Barangay of Pontevedra Capiz
- There's always a need to follow the science based protocols on planting mangrove for example no planting on water logged areas.
- Don't let any amount paid for planting mangrove ruin the learnings we got from our partner especially with ZSL
- **NO PLANTING OF MANGROVES IN THE MIDDLE OF THE SEA!!!**



## ▪ Bad experiences

- Taking pictures during night time for reporting purposes
- Planted in the middle of the sea
- Planting in the water logged portion of Balarig
- Massive mortality
- Planting of wrong species in the wrong place
- No Pagatpat germination knowledge during that time
- **OVER COLLECTION OF SEEDLINGS AND WILDINGS**



## Positive gains:

- It promoted good camaraderie among all members of NewBAMA during the first year of implementation.
- Bagging and planting activities served as the venues of sharing personal experiences.
- We received money in cash in return for our planting activities
- Some of our members was able to buy food and build their houses with the money earned, others used the amount they received as capital for livelihood and for the education of their children.
- It helped increase the awareness of others about the importance of mangrove



## ▪ Negative effect on NewBAMA members

- Some member will not engage in planting anymore if there is no money to compensate them
- There are members who always misunderstood their co-members because of money
- Forgetting the learning and inputs we learned from ZSL in order for us to get the money



## C. Sharing of Experiences of Philippine National Aquasilviculture Program (PNAP) Mangrove Rehabilitation Implemented by State Universities

**Dr. Yasmin Primavera-Tirol**

Campus Director, Aklan State University

10:52 – 11:16 AM

Highlights of the presentation included the following:

- Significance
- Situation prior to the intervention
- General objectives
- Budgetary requirements
- Issues encountered
- Insights
- Rationale for 2015 PNAP



### Significant because..



**Food Security,**



**Coastal Resilience**

- "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks" (Walker et al. 2004)

**Resource Sustainability and Alleviation of Poverty**



**Philippine National Aquasilviculture Program**

Bureau of Fisheries and Aquatic Resources  
**AKLAN STATE UNIVERSITY**  
College of Fisheries and Marine Sciences

- 2012 – mangrove rehabilitation, aquasilviculture, multi-species and laying –in hatchery
- 2013 – mangrove rehabilitation
- 2014 – mangrove rehabilitation

12/07/2012

## SITUATION PRIOR TO THE INTERVENTION

- Prior the intervention, the swamplands exhibit barren islets. Most of these areas are **Abandoned, Undeveloped or Unutilized (AUU)** fishponds. Other areas had been denuded through firewood gathering and other human activities such as construction of dwelling and/or fishing gears along the periphery of rivers. The rivers seem to promise bountiful catch for the livelihood of fisherfolk and sufficient fish for the community if provided with proper intervention such as reforestation and aquasilviculture.

## General Objectives

- To rehabilitate the denuded mangrove areas in Batan and New Washington, Aklan
- To engage fisherfolk and local communities toward sustainable stewardship of coastal resources

## SPECIFIC OBJECTIVES

- To plant 125,000 mangrove propagules/wildlings/ Saplings to cover 15 Ha. Wetland in the municipality of Batan, Aklan
- To increase responsiveness & sense of ownership of the members of people’s organization (PO’s) fisherfolk organization associations in the environment that they are protecting & managing.
- To strengthen the capability of fisherfolk & people’s org. in protecting, managing & developing the mangrove areas in the locality.

## BUDGETARY REQUIREMENTS- 2014

• R/H REHABILITATION - PHP	<b>812,500.00</b>
• ADMINISTRATIVE COST	<b>228,000.00</b>
– Community Organizer	120,000.00
– Management/Admin. Fee	102,000.00
– Communication	6,000.00
<b>TOTAL PROJECT COST</b>	<b>PHP 1,040,500.00</b>

## PROJECT SITE SELECTION

- AREAS SUITABLE FOR MANGROVE REFORESTATION
- ABANDONED, UNDEVELOPED & UNDERUTILIZED (AUU) FLA
- AREAS COVERED BY CO-MANAGEMENT AGREEMENT BETWEEN DA, DENR, LGUs

## SELECTION OF BENEFICIARIES

### CRITERIA:

- Primary Beneficiaries are those with active participation in the resource rehabilitation
- Members of Registered Peoples Organization (POs)
- Have an easy access to the project site

## Kinds of mangroves planted

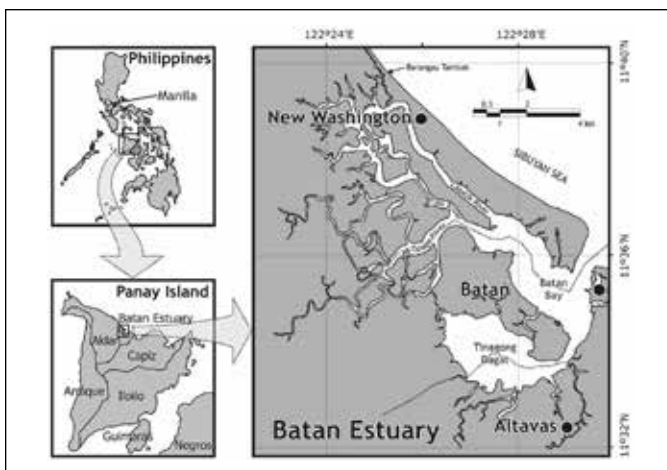
- *Rhizophora* spp. (BAKHAW) - 2012, 2013, 2014
- *Avicennia* spp. (PIYAPI) - 2013, 2014
- *Sonneratia* spp. (PAGATPAT) - 2013, 2014

## PLANTING DESIGN

- STANDARD DISTANCE – 1.5m x 2.0m between Propagules/wilding
- PLANTING DENSITY – 7,500 / Ha.
- Bamboo staking – 2.5 ft

## Strategies Implemented

- Conducted courtesy calls with the Municipal Mayors and Municipal Agriculture Officers of targeted areas
- Orientation on the mechanics of the project among Punong Barangays of selected sites for the project
- Conducted training/orientation on Aquasilviculture and Mangrove Rehabilitation for and among beneficiaries





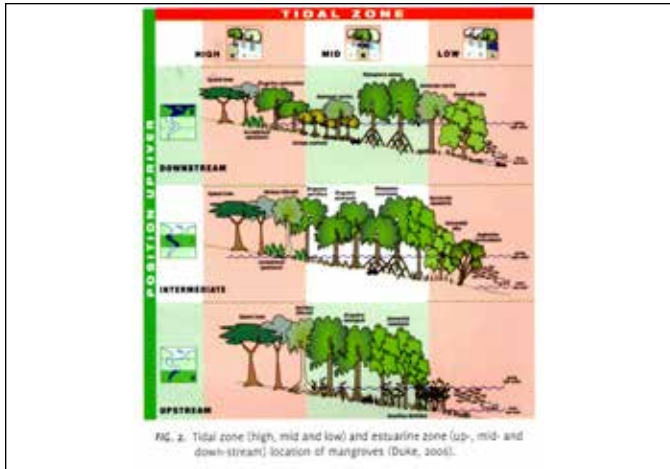
### Project – 5 Polo

N 11°37.412"E 122°26.968" N 11°37.411"E 122° 26.955"  
 N 11°37.943" E 122°26.415" N 11°37.941"E 122° 26.413"



### Project 8 – Dumaguít

N 11°36.069" E 122° 28.783" N 11°36.069" E 122° 28.780"  
 N 11°36.361"E 122° 28.578" N 11°36.361" E 122° 28.578"



### Results- Status Report Mangrove Rehabilitation for years 2012-2014

	Targeted No. of propagules/ seedlings/ wildlings for planting	No. of propagules/ seedlings/ wildlings planted	Number and Percentage of Survival	Remarks
2012	183,300 Pcs	183,300 Pcs	39,079 Pcs (21.32%)	<i>Rhizophora</i> spp.
2013	100,000 Pcs	100,000 Pcs	15,886 Pcs (15.89%)	Low survival rate due to devastation of Super Typhoon Yolanda
2014	125,000 Pcs	113,636 Pcs	91, 339 pcs 73.07%	<i>Rhizophora</i> spp. <i>Avicennia</i> spp. <i>Sonneratia</i> spp.



Date Started: June, 2012

Amount Granted: PhP 3,672,000.00

(PhP 1,099,800.00- mangrove rehabilitation)

Project Site	No. of Beneficiaries	No. of Planted Propagules/Wildlings	No. of Survival of Mangrove Propagules/Wildlings
1. Isla Kapisipan	6	11,456 Pcs	3,972 Pcs (34.67 %)
1. Mabilo (Site B)	5	11,456 Pcs	2,015 Pcs (17.59 %)
1. Dum-eog	5	11,456 Pcs	6,136 Pcs (37.52 %)
1. Moto	5	11,456 Pcs	2,447 Pcs (21.36 %)
1. Polo	4	11,456 Pcs	2,015 Pcs (17.59 %)
1. Cawayan	5	11,456 Pcs	2,072 Pcs (18.09 %)
1. Ochando	5	11,456 Pcs	2,026 Pcs (17.69 %)
1. Dumaguít	5	11,456 Pcs	2,767 Pcs (24.15 %)
1. Lawa-an (Site A)	5	11,456 Pcs	1,055 Pcs (9.21 %)
1. Lawa-an (Site B)	5	11,323 Pcs	1,078 Pcs (9.49 %)
1. Guinbaliwan (Site A)	5	11,456 Pcs	3,214 Pcs (28.06 %)
1. Guinbaliwan (Site B)	5	11,456 Pcs	1,804 Pcs (15.74 %)
1. Pinamuk-an (Site A)	5	11,456 Pcs	4,754 Pcs (41.50 %)
1. Pinamuk-an (Site B)	5	11,457 Pcs	1,339 Pcs (11.69 %)
1. Pinamuk-an (Site C)	5	11,457 Pcs	2,385 Pcs (20.80 %)

Date Started: June 2013

Amount Granted: PhP 959,000.00

Project Site	Number of Beneficiaries	No. of Planted Mangrove Propagules/Wildlings	No. of Survival of Mangrove Propagules/Wildlings
1. Guinbaliwan (A)	5	10,000 Pcs	430 Pcs (4.30 %)
2. Guinbaliwan (B)	5	10,000 Pcs	250 Pcs (2.50 %)
3. Pinamuk-an (G)	5	10,000 Pcs	526 Pcs (5.26 %)
4. Pinamuk-an (A)	5	10,000 Pcs	504 Pcs (5.04 %)
5. Pinamuk-an (B)	5	10,000 Pcs	1521 Pcs (15.21 %)
6. Pinamuk-an (C)	5	10,000 Pcs	3621 Pcs (36.21 %)
7. Pinamuk-an (D)	5	10,000 Pcs	3411 Pcs (34.11 %)
8. Pinamuk-an (E)	5	10,000 Pcs	Totally Destroyed
9. Pinamuk-an (F)	5	10,000 Pcs	5623 Pcs (56.23 %)
10. Isla Kapisipan	11	10,000 Pcs	Totally Destroyed

**TERMINAL REPORT-** As of June 19, 2015  
Date Started: June, 2014 (PhP 1,040,000.00)

Project Site	No. of Beneficiaries	Planted		Survival		Percent
		Number	Date	Number	Date	
Lupit	5	11,364	Mar. 5-23, 2015	10,335	June 2, 2015	90.95 %
Cabugao	5	11,364	Nov.12-Dec.04, 2014	9,322	June 1, 2015	82.03 %
Maggpag-ong	5	11,364	Nov.26-Dec.15, 2014	9,414	May 16, 2015	82.84 %
Mandong	5	11,364	Sept. 22-29, 2014	7,870	March 25, 2015	69.25 %
Camanci	5	11,364	Feb. 10-17, 2015	10,236	June 15, 2015	90.07 %
Mabuquaio	5	11,364	Oct. 09-14, 2014	2,814	April 7, 2015	24.76 %
Ambolong	5	11,364	Sept.25-Oct.18, 2014	10,341	March 26, 2015	91.00 %
Napti	5	11,363	Nov. 9-28, 2014	880	April 17, 2015	7.74 %
Tabon	5	11,363	Oct. 30-Nov. 25, 2014	9,261	May 2, 2015	81.50 %
Bay-ang	5	11,363	Nov. 11- Dec. 03, 2014	10,071	April 22, 2015	88.63 %
Ipil	5	11,363	Oct. 05-20, 2014	10,795	April 18, 2015	95.00 %
<b>Total/ Mean</b>	<b>55</b>	<b>125,000</b>		<b>91,339</b>		<b>73.07 %</b>

### ISSUES AND PROBLEMS ENCOUNTERED

- **The beneficiaries just want to get on with the planting as soon as possible to be able to receive their payments**
- **Lack of budgetary support for community organizing and educational campaigns**
- **Lack of support for manpower to ensure optimum project implementation**
- **Lack of information dissemination and training on detailed technical procedures/ protocols regarding mangrove rehabilitation**

### Insights

- Need for mangrove technical assessment and evaluation to increase survival rate
- Need for stronger social and policy support from LGUs concerned for effective implementation of the mangrove reforestation in their respective municipalities.
- Need for greater investment on social and technical interventions (HC, IEC, CO, MPA)
- Need for longer-term impact assessment (socio-economics and bio-physical)



### **Rationale for 2015 PNAP**

- Insights from previous PNAP Projects- 2012, 2013, 2014
- Low survival rates – less than 40% (2012, 2013)
- Submit for realignment to include:
  - quantitative/ qualitative site assessment
  - mangrove nursery
  - training (with practicals)
  - quantitative monitoring 6 months - 1 year

### **General Objectives**

- Improve the survival of out-planted mangroves in mangrove rehabilitation sites
- Assess the community structure of mangroves before and after out-planting
- Engage the stakeholders/cooperators in a long-term and more sustainable manner

Specific Objectives- To conduct the following:

1. Assessment and evaluation to select appropriate sites for mangrove nursery establishment, outplanting, suitable species to plant, and to determine the willingness of the cooperators/ stakeholders
2. Trainings on Mangrove Biology and Ecology, Mangrove Conservation and Rehabilitation, Nursery Establishment, Outplanting, and Monitoring for the identified cooperators/ stakeholders
3. Establishment of mangrove nurseries to eliminate direct planting and reduce mortality rate
4. Planting of a total of 71,200 mangroves
5. Monitoring of the survival of the planted mangroves



### General Expected Outputs

- Improved survival (greater than 40%) of out-planted mangroves
- Comparison of the community structure of the degraded mangrove areas before and after out-planting/ rehabilitation
- Conservation of mangrove resources in a more sustainable way through the engagement of local stakeholders/ cooperators

### Specific Expected Outputs

- Established mangrove nurseries, appropriate mangrove species suitable to the identified rehabilitation sites planted and willing and committed stakeholders/beneficiaries and cooperators engaged
- Trained about 90-105 cooperators in mangrove conservation and rehabilitation, mangrove nursery establishment, out-planting and monitoring
- Suitable sites for mangrove nurseries identified and the nurseries established
- Reduced mortalities of out-planted mangroves in identified mangrove rehabilitation sites
- Survival of out-planted mangroves monitored after 6 months
- Longer-term impact assesment on socio-economic and biophysical impact of mangrove rehabilitation in the area

Dr. Tirol ended her talk by showing pictures of their (COA) auditors who were at least 60 years old and tirelessly checking and monitoring the mangroves.

## Open Forum

**11:17 – 11:40 AM**

Q.1 A participant wanted to know what are the tenurial instruments issued to mangroves and beach forest areas under the NGP, what is the total area planted and whether the NGP and NCFMP will continue beyond 2016?

*Ms. Aquino replied that the Department is currently reviewing tenurial instruments (TIs) for the mangrove and beach forest program. It is crucial what TIs they are going to grant the beneficiaries. 21,000 hectares are planted so far for mangrove and beach forest. Updated figures still have to be obtained from the research division as the program is still being implemented.*

*As far as prospects for the NGP, the Department is contemplating successor programs that are needed to protect and sustain the gains of NGP. Among the programs they are thinking of forest restoration.*

Q.2 Ms. Maglana asked what the plant species were based on.

*Ms. Aquino answered that they depend on the area planted, number of seedlings, and finally, their survival mode.*

Q.3: Ms. Marge dela Cruz of GDFI noted that the NGP planted only one type of species. What happened, therefore, to the other program objective which is biodiversity?

*Ms. Aquino explained that it so happened that was only what was presented. For the record, they are also planting other species. There are “pagatpat,” “piyapi,” “bakhaw babae,” “bakhaw bato,” “bakhaw lalaki.”*

Q.4: A representative from UP Visayas asked the DENR and BFAR how much is the budget per seedling for planting. He added that for UPV, for example, it is P7.00 (for the PNAP, it is P6.00). They are already in the second phase, but their original beneficiaries are no longer with them, since the DENR came in offering P12.00. He observed that they are all trying to achieve the same objective but are doing it with different styles, which may not be very effective.

*Ms Aquino said that it is P16,500 up to three years. She added that the DENR and BFAR do need to talk to each other to come up with common strategies to achieve the same goal. As for the NGP and MBFDP, the aim is to use the same unit cost. The DENR has funds for mangrove rehabilitation. They are basing development considering characteristics of area, and different species. They do site area survey and mapping. She was curious to know how the POs decide what species to use.*

*A Board Member of NewBAMA clarified that in the MOA they signed, the species to be planted is clearly stated based on the assessment of NGP.*

Q.5: Dr. Jurgen of GIZ pointed out to Dr. Tirol the need for support for social preparation, and initial investment. He further asked whether she thought one could sustain the use of firewood?

*Dr. Tirol agreed that social capital is very crucial. From their own experiences, the links between social institutions to have a longer term impact and sustainability of mangrove rehabilitation is very critical. The link between government, PO, academe, funding agencies, etc is important, so they will have to experience. Admittedly, sometimes, there is lack of coordination. PNAP has aquasilviculture. They encourage the beneficiaries to have a fishpen somewhere suitable or adjacent to area where they are going to plant so they will have additional income. But what was supposed to be income was destroyed by Yolanda. Territorial rights is basic to any activities, and common mistakes like overfishing. Perhaps, forest management rights with sustainable use for wood, and mangrove wood could also be a way to maintain engagement of the community. They will have a sense of ownership if it happens on daily basis, instead of just leaving it there. This happens when linkages are weak. Additional money can*

*come for planting, and NGP can replant in old sites again. It has to be improved so social capital will truly be implemented.*

Q.6: Mr. Napoleon from Cordillera shared that his province has three major mining companies, and Nueva Vizcaya has two. They fear that places that are suitable for mangrove planting might be affected by chemicals from mining companies.

*Ms Aquino said that one presentation later will address this concern, but she concurred that these are basically the effects.*

Q.7: A participant asked Dr. Tirol and Ms. Aquino what their agencies are doing in terms of sustainability. Particularly for Dr. Tirol, he wanted to know the number of seedlings to be planted per hectare, the spacing and the monitoring and evaluation scheme to ensure survival. With the program good for 2-3 years, what happens after the third year? How do they ensure that the seedlings survived?

*Dr. Tirol answered that for the 1<sup>st</sup> question, the 700 in the table shown in the presentation is just approximate, because of perennial problem of monitoring. The common limitations are: the community organizer is not there when they plant; they have other sites that they cannot all go to. It is just an average to show that it is not easy; realistically, if you do not have support so objectives can be met, the challenges make it equally difficult to meet that. Because of the number of sites, the COs are not able to maintain the 6 months required for monitoring. Then there are delays in planting, and reports to be made at the end of the year. The COA has deadlines. The CO has to go back to site before the 6 months end, so there is a tendency for monitoring not be strictly followed. For present projects, they have already set research agenda for university and thesis for student, growth monitoring and detailed data collection. They now look forward to do 1-2 months of monitoring; growth rate is high as it becomes bigger, so hopefully, it can catch up with the targets.*

*Ms. Aquino added that, as regards sustainability, the Department is already thinking of successor programs after NGP. The assistance to POs is usually for three years - first is planting, second to third year, for protection so that by the end of the third year, it is already established. But there are unforeseen circumstances like typhoons, so we came up with policies such as adoption of area, where we partner with other organizations in maintaining the area until plants reach maturity and produce crops that are beneficial to participants. These partners can assist other partners, because NGP involves other community-based organizations that can assist on site, especially during critical times when POs need the support of LGUs and people on the ground.*

Due to time constraints, the open forum had to be cut short to give way to a group photo session at 11:43 AM.

The group took a lunch break and resumed the session at exactly 1:00 PM.

Ms. Maglana announced that the next topics will cover Objective 2: Assess post-disaster mangrove damage and recovery.

## D. Prediction and Observed Storm Surges

**Ms. Christine Ladiero**

**Senior Science Research Specialist, Project NOAH-DOST**

**1:02 – 1:29 PM**

Highlights of the presentation included the following:

- Philippines as a climate hotspot
- A storm surge is a rise...
- Factors affecting storm surge
- Vulnerability of the coastal zone to storm surges
- Storm surge forecasting workflow
- Forecasting storm surges
- Typhoon Haiyan
- Observation points
- Changes in forecasting



**Prediction And Observed Storm Surges  
Along the Path of Haiyan:**  
Applications to Disaster Risk Reduction and Rehabilitation Programs

Prepared by:




### PHILIPPINES AS A CLIMATE HOTSPOT

- Geographically prone to tropical cyclones.
- 20 tropical cyclones per year; 9 make landfall
- Ranked 3<sup>rd</sup> in UN's list of countries most at risk to climate change

2

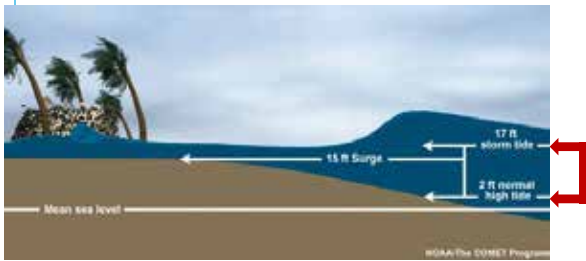
## PHILIPPINES AS A CLIMATE HOTSPOT



- Number of tropical cyclones with with maximum sustained winds of greater than 150 kph and above during El Niño slightly increased (PAGASA 2011)
- An indicative 1m-rise in sea level is projected to affect 64 out of 81 provinces, at least 703 municipalities, almost 1.38M sq. m. of land (Greenpeace 2007)

Thus, Philippines is vulnerable to tropical cyclone related hazards such as storm surge.

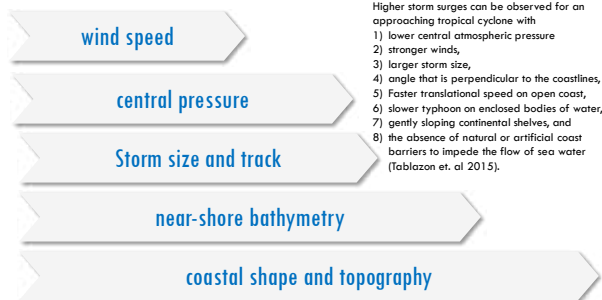
3



A storm surge is a rise in the water level over and above the **predicted astronomical tide** due to the **presence of the storm** (US-NOAA).

4

## FACTORS AFFECTING STORM SURGE

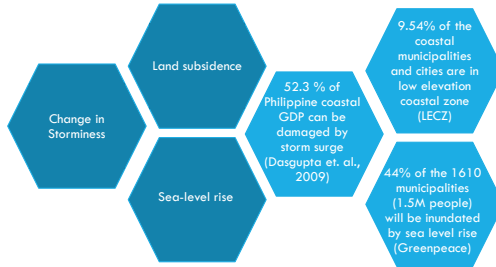


Higher storm surges can be observed for an approaching tropical cyclone with

- 1) lower central atmospheric pressure
- 2) stronger winds,
- 3) larger storm size,
- 4) angle that is perpendicular to the coastlines,
- 5) Faster translational speed on open coast,
- 6) slower typhoon on enclosed bodies of water,
- 7) gently sloping continental shelves, and
- 8) the absence of natural or artificial coast barriers to impede the flow of sea water (Tablazon et. al 2015).

5

## VULNERABILITY OF THE COASTAL ZONE TO STORM SURGES (IPCC, 2007)



6



TYPHOON NESAT (PEDRING) STORM SURGES CRASHED OVER SEAWALLS IN MANILA BAY, FLOODED A HOSPITAL, A FIVE-STAR HOTEL AND THE US EMBASSY NEAR MANILA, AND SUBMERGED SEVERAL TOWNS IN 2011

7



A TOTAL OF 6,300 DEAD, 1,051 MISSING AND 28,689 INJURED IN HAIYAN'S AFTERMATH

Source: NDRRMC, 2014  
Image source: <http://metrok2.files.wordpress.com>

8

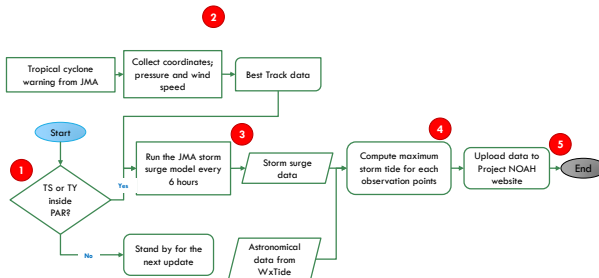


## SYSTEM TO IDENTIFY, QUANTIFY, AND MAP STORM SURGE THREAT TO PHILIPPINE COASTS

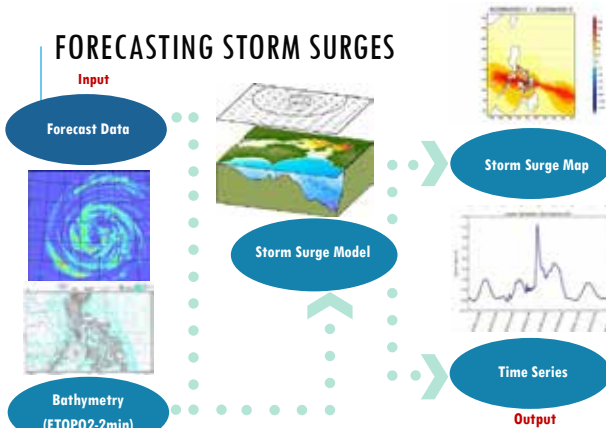


- DOST-Project NOAH was established in 06 July 2012 to undertake **disaster science research and development** using **cutting edge technologies** and **high resolution data** to recommend innovative information services in support of the government's disaster prevention and mitigation efforts.
- In August 2012, **Storm Surge** became a new component of Project NOAH tasked to identify storm surge **vulnerable areas** in the country and provide **36-hour storm surge forecasts** of upcoming tropical cyclones.
- Typhoon Yolanda (2013), Typhoon Domeng (2014), Typhoon Glenda (2014), Typhoon Ruby (2014), and Typhoon Chedeng (2015)

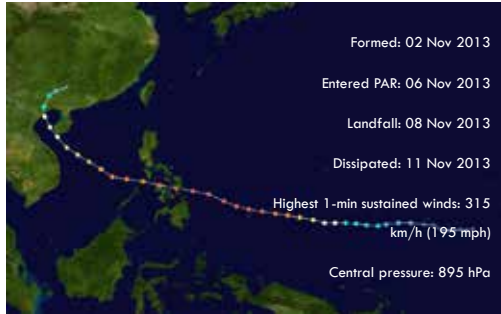
## STORM SURGE FORECASTING WORKFLOW



## FORECASTING STORM SURGES



## TYPHOON HAIYAN (YOLANDA)



14

## OBSERVATION POINTS

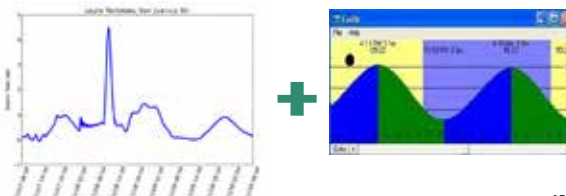
- ❑ WXTide is a software that predicts the time of high-tides and low-tides as well as altitude from existing measuring points in coastal areas over the world
- ❑ 149 WXTide stations within PAR served as observation points for tide and storm surge height



16

## STORM TIDE DATA

The tide data was gathered using WXTide. The tide data, combined with the JMA Simulation produced the Storm Tide Data that was released on the NOAA website.



17

## OFFICIAL LIST OF TYPHOON YOLANDA HIGHEST PREDICTED STORM SURGE AND TIDE

Provided to DILG, NDRRMC on  
November 7 (Thursday)

**Storm surge warning was given by  
President Aquino in his televised public  
address Thursday evening**

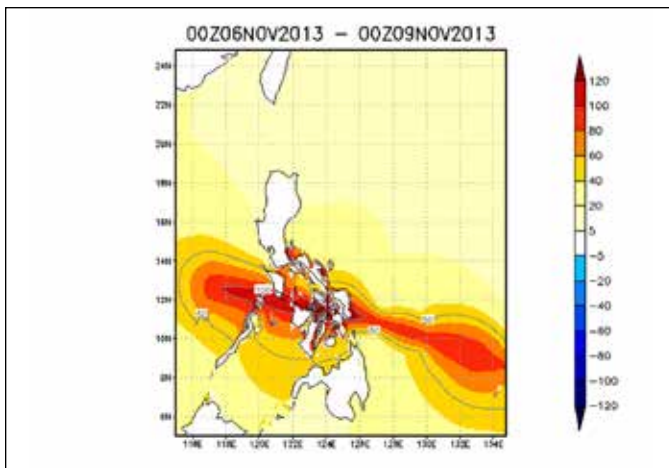
Updates to the simulation runs are made  
every 6 hours

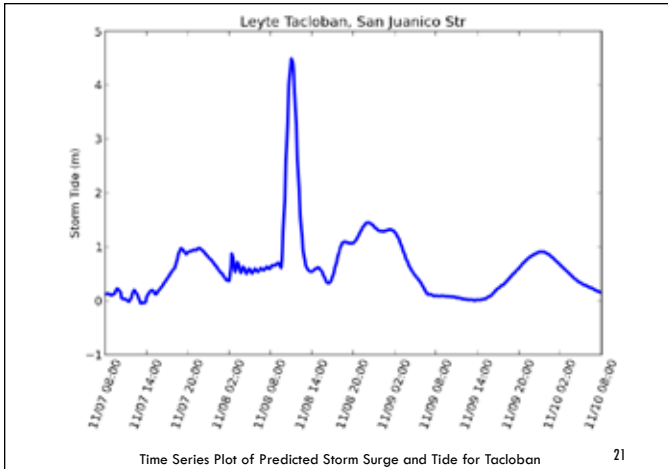
**Project NOAA**  
Nationwide Operational Assessment of Hazards

This list is an update of today's earlier model run with more than 100 specified localities with storm surge + tide values. Updates to the simulation runs are made every 6 hours and details of the storm surge + tide heights can be seen in the [Project NOAA website](#) under the Weather Stations tab labeled Yolanda/HK Storm Tide Level.

Province	Location	Storm Tide (m)	Date and Time of Peak Height
Eastern Samar	Mactanas Bay	5.3	11-08-2013 09:30
Western Samar	San Jose del Monte	4.7	11-08-2013 12:30
<b>Leyte</b>	<b>Tacloban, San Juanon Bay</b>	<b>4.5</b>	<b>11-08-2013 11:30</b>
Quezon	Port Puzos	4.4	11-09-2013 02:30
Eastern Samar	Jinili Island, Port Borongan	4.3	11-08-2013 09:30
Quezon	Sanicris Harbor	4.2	11-09-2013 02:30
Palawan	Port Barton	3.8	11-05-2013 02:00
Iloilo	Koronado	3.8	11-05-2013 02:30
Leyte	Palompon	3.8	11-08-2013 11:40
Leyte	Koronado	3.8	11-08-2013 13:00
Northern Samar	Port of Pamblico, Camay Bay	3.7	11-08-2013 09:30
Davao	Tuburan	3.2	11-08-2013 12:30
Negros Occidental	Himagsan River Est.	3.1	11-08-2013 14:00
Negros Occidental	Cadia	3.0	11-08-2013 09:30
Mindanao	Bojo Bay	3.0	11-08-2013 11:30
Camarines Sur	Cabagan Island, San Miguel Bay	2.9	11-08-2013 08:30

Tacloban, Leyte placed third on the list – 4.5m predicted height





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## TYPHOON HAGUPIT (RUBY)



22

## TYPHOON HAGUPIT (RUBY)



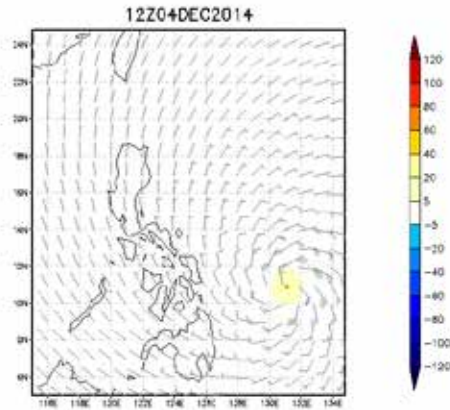
Conflicting tracks of Typhoon Hagupit by different meteorological agencies (Dimacali, 2014 and Montenegro, 2014).

23

## TYPHOON HAGUPIT (RUBY)



24



25

## TYPHOON HAGUPIT (RUBY)

Capocoran Leyte	3.29 - 4.29
Layte Leyte	3.29 - 4.29
Cargasa Leyte	3.33 - 4.33
Marigo Leyte	3.38 - 4.38
Cabugayan Biliran	3.83 - 4.83
San Miguel Leyte	2.82 - 3.82
Calube Biliran	2.85 - 3.85
Calibiran Biliran	2.85 - 3.85
Bababingon Leyte	2.77 - 3.77
Daram Samar	2.70 - 3.70
Sia Rita Samar	2.69 - 3.69
Talakea Samar	2.69 - 3.69
Zumaraga Samar	2.62 - 3.62
Villareal Samar	2.64 - 3.64
Kawayan Biliran	2.57 - 3.57
Cebuán Leyte	2.11 - 3.11
Amihan Agutay Oriental	2.12 - 3.12
Sandican Cebu	2.12 - 3.12
San Jose Negros Oriental	2.12 - 3.12
Santander Cebu	2.01 - 3.01

04 Dec 2014, 5:00am Forecast (Posted 04 Dec, 5:00am)

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## TYPHOON HAGUPIT (RUBY)

Catubogon Samar	3.8-4.8
Madate Samar	3.8-4.8
Sta. Margarita Samar	3.8-4.8
Tanauan Samar	3.6-4.6
Mobo Masbate	3.4-4.4
Uson Masbate	3.4-4.4
Dimasalang Masbate	2.9-3.9
Batuan Masbate	2.9-3.9
Darem Samar	2.6-3.6
Placer Masbate	2.6-3.6
Cawayan Masbate	2.6-3.6
Palimas Masbate	2.5-3.5
Esperanza Masbate	2.4-3.4
Zamtraga Samar	2.3-3.3
Jabong Samar	2.3-3.3
Modillon Cebu	2.1-3.1
San Remigio Cebu	2.1-3.1
Merizo Leyte	2.1-3.1
Ormoc Leyte	2.1-3.1

06 Dec 2014, 8:00am Forecast (Posted: 06 Dec, 2:00pm)

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## CHANGES IN FORECASTING

- ❑ Storm Surge Advisories (SSA) were introduced
- ❑ Date and Time of Peak Height was dropped
- ❑ Storm Tide given in range
- ❑ Observation points scaled up from bay-wide to barangay level
- ❑ Availability of inundation maps



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## STORM SURGE ADVISORIES (SSA)



- ❑ JMA Storm Surge simulation of best track data of 721 tropical cyclones that entered the PAR from 1951 to 2013 using 4,996 observation stations distributed to coastal barangays.

- ❑ 10-min HVT were used to generate storm surge inundation and hazard maps

29

## OBSERVATION POINTS

- From 149 WXTide stations within PAR, it was increased to 4996 stations to represent each coastal barangay



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## INUNDATION AND HAZARD MAPPING

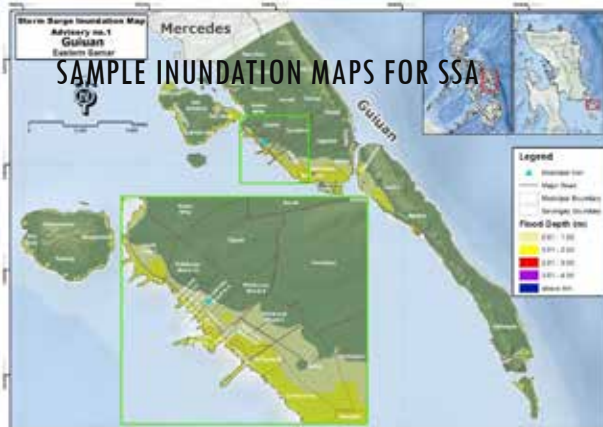
### INPUTS

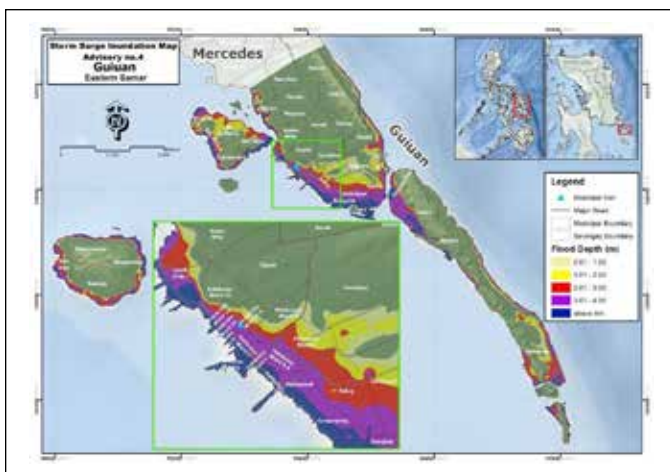
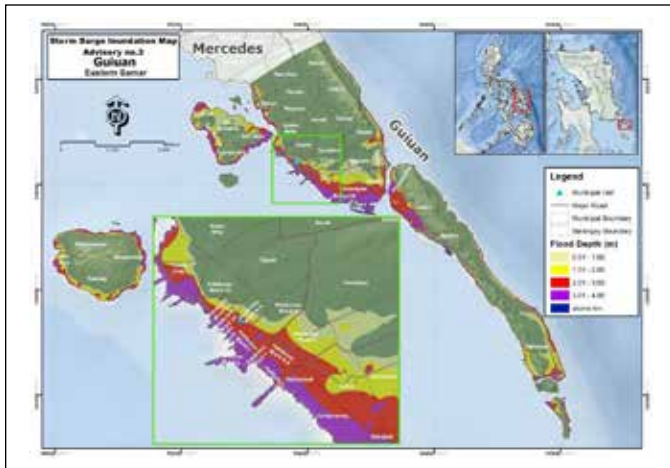
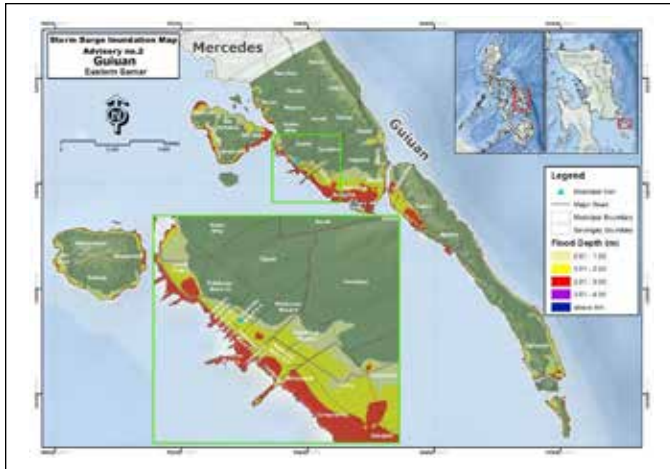
- Time series converted to 10-min HVT (water level at time element)
- IF SAR-derived DTM at 5-meter resolution (topography)



31

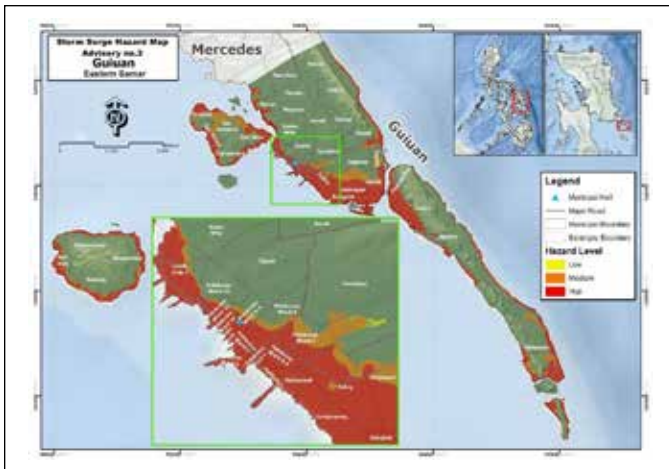
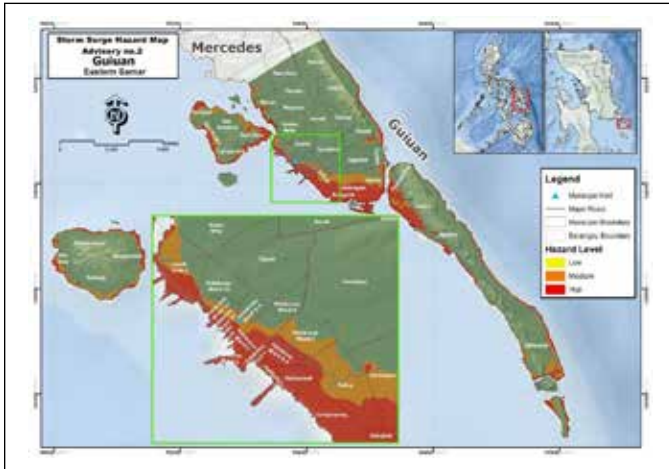
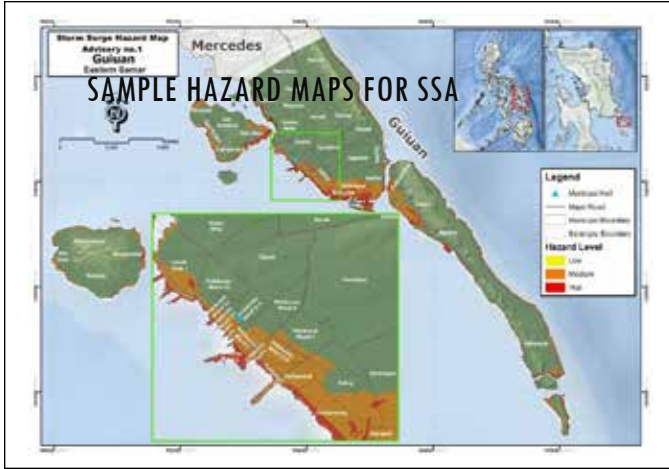
## SAMPLE INUNDATION MAPS FOR SSA

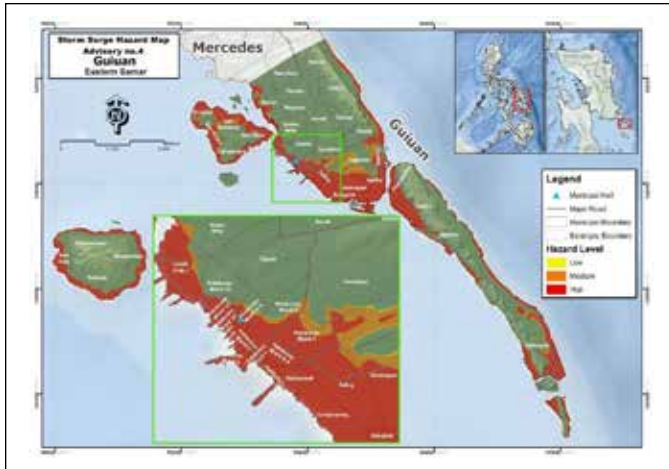




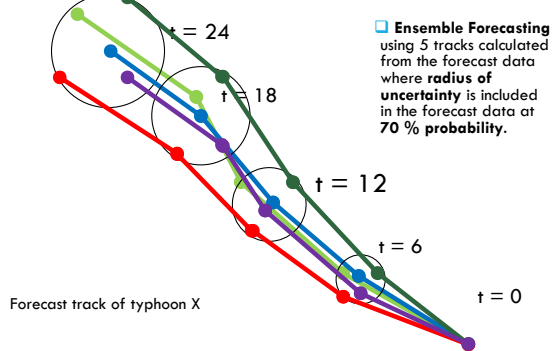


SAMPLE HAZARD MAPS FOR SSA





### TIDAL VALIDATION: BEFORE HAIYAN



### TIDAL VALIDATION: BEFORE HAIYAN

- Simulated 36 hr. forecasts for Typhoons Pablo (2012), Quinta (2012), and Pedring (2011) and best track data of Ofel (2012) and Quiel (2011)
- Ensemble forecasting improved the accuracy of the storm surge prediction for the case of Pedring. However, there is a significant discrepancy in the case of Pablo and Quinta.
- JMA model predicts that a storm surge will occur but NAMRIA records show normal water levels even during the presence of the typhoons.

## TIDAL VALIDATION: BEFORE HAIYAN

- ❑ Instead of using forecast tracks, recorded tracks of historical typhoons are used for the storm surge simulation. If simulation results now agree with recorded data, it can be concluded that the source of error is in the forecast information
- ❑ NAMRIA records show that there is no abnormal rise in the water level during Typhoons Ofel (2012) and Quiel (2011) using best track data.
- ❑ Further Examination is needed.

## TIDAL VALIDATION: TYPHOON HAIYAN

- ❑ There is not enough tidal data to assess the uncertainty of storm surge heights from JMA Model.
- ❑ Compared forecasting and hindcasting result of storm tide (Surge + Height)
- ❑ RMSE 1.53

$$RMSE = \sqrt{\frac{\sum_{i=1}^n (\text{Predicted}_i - \text{Observed}_i)^2}{n}}$$

Province	Location	Storm Tide Forecast	Storm Tide (JMA/JM)	Difference
Eastern Samar	Mactapan Bay	0.3	0.3	0.00
Eastern Samar	Para Island, Ormoc Bay	0.7	0.7	0.00
Eastern Samar	Malibyam, San Juanico Strait	0.7	0.8	0.09
Eastern Samar	San Jose	0.4	0.5	0.11
Eastern Samar	San Isidro, Port Bisayan	0.2	0.7	0.51
Eastern Samar	San Carlos, Baybay	0.2	0.9	0.71
Eastern Samar	San Mateo	0.4	1.1	0.74
Western Samar	Alabatani	0.8	0.7	0.09
Western Samar	San Antonio	0.8	0.7	0.11
Western Samar	San Jose	0.8	0.8	0.00
Western Samar	San Antonio, Ormoc Bay	0.7	0.7	0.04
Western Samar	San Jose	0.2	0.8	0.61
Western Samar	San Antonio, Port Bisayan	0.2	0.8	0.60
Western Samar	San Jose	0	0.8	0.80
Western Samar	San Jose	0	0.8	0.80
Western Samar	San Jose, San Mateo Bay	0.8	0.8	0.00
Western Samar	San Jose, San Mateo Bay	0.8	0.4	0.40
Western Samar	San Jose, San Mateo Bay	0.8	0.9	0.04
Western Samar	San Jose	0.8	0.8	0.00

## INUNDATION VALIDATION: TYPHOON HAIYAN

- ❑ Collection of tropical cyclones' flood extent, height and duration of the storm surge inundation, evidences of storm surges
- ❑ Quality depends on eyewitness' accounts of the typhoon and the number of interviewed households within the flood-affected area
- ❑ Comparison of observed storm surge flood depths and predicted inundation level
- ❑ Flood depths ranges from 0.0 to 1.0 meter
- ❑ RMSE was computed by barangay.

## INUNDATION VALIDATION: TYPHOON HAIYAN



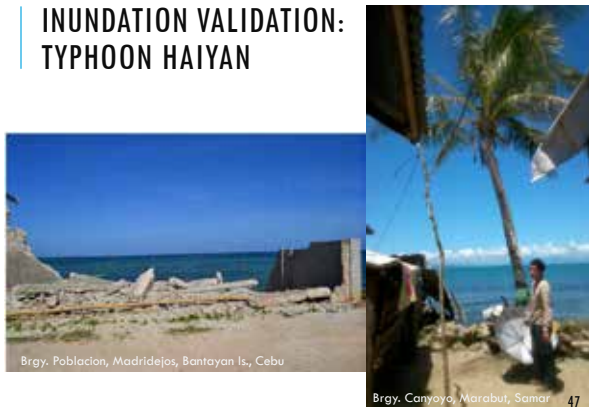
45

## INUNDATION VALIDATION: TYPHOON HAIYAN



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## INUNDATION VALIDATION: TYPHOON HAIYAN



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## INUNDATION VALIDATION: TYPHOON YOLANDA

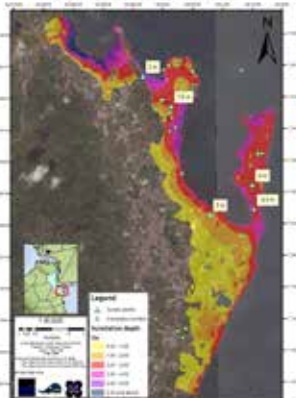


## INUNDATION VALIDATION:TYPHOON HAIYAN



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## STORM SURGE + TIDE DURING TYPHOON YOLANDA, NOV. 2013 INUNDATION MAP: Tacloban Ctg., Leyte



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## APPLICATIONS IN DISASTER RISK REDUCTION: EARLY WARNING



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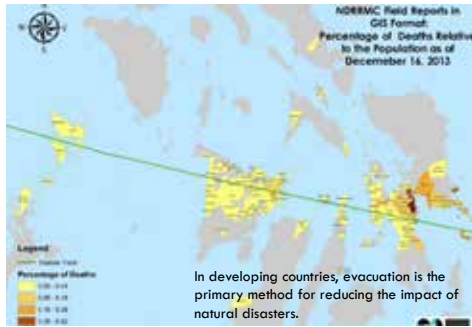
## APPLICATIONS IN DISASTER RISK REDUCTION: EARLY WARNING



## APPLICATIONS IN DISASTER RISK REDUCTION: EARLY WARNING



## APPLICATION IN DISASTER RISK REDUCTION: EARLY WARNING



In developing countries, evacuation is the primary method for reducing the impact of natural disasters.

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## APPLICATIONS IN DISASTER RISK REDUCTION: EARLY WARNING

GMA NEWS ONLINE  
SUN STAR  
How to c Advisorie  
Typhoon Budy (Fengying) surge could go as high as the main surge (SWA)  
Project TDRAP supports National Management of storm surge workshop  
SWA 2: 2 meters above  
SWA 3: 3 meters above  
SWA 4: 4 meters above  
December 16, 2013  
Typhoon Budy (Fengying) surge could go as high as the main surge (SWA)  
Project TDRAP supports National Management of storm surge workshop  
SWA 2: 2 meters above  
SWA 3: 3 meters above  
SWA 4: 4 meters above  
December 16, 2013

### How a small Samar town survived deadly storm surges

As the country prepares for typhoon Chedeng, learn how a coastal town in Samar successfully weathered typhoon Budy by capitalizing on organized response as well as timely, specific and localized early warning information

Journal: Disaster Preparedness

Voluntaristic to storm surge

Substitution is a winter village in the rolling part of Samar, a third class town in Western Samar with more than 5,000 households or about 40,000 residents. It faces the Samar Sea that separates Samar Island from Leyte.

Coastal communities in Samar and neighboring provinces of Leyte and Iloilo are among the areas in the country identified as "highly vulnerable to occurrence of high surges," according to a study conducted by the Department of Science and Technology after Super Typhoon Isidoro (Yolanda). They are frequently hit by typhoons and are located along gently sloping coasts with shallow bays.



The town of Samar was largely spared by Isidoro, which devastated the region in November 2013, almost a year after the tragedy. Isidoro, it was hit by typhoon Budy, the strongest typhoon it ever experienced in recent memory.

Only partial measures sustained winds of 75 knots near the water, and gusts of up to 110 knots, according to the storm watcher Bureau PHOCSA. It generated storm surges of up to 8.5 meters and made waves.

Samar was identified by Project TDRAP, the government's disaster information center, as the hot spot where the forecast storm surge was expected to be highest - between 2.8 to 3.5 meters.

The storm surge warnings were released 30 hours before the typhoon hit land. Storm surge remained 1.5 to 2 meters, caused by give 40% of storm surge height from 2 to 3 meters.

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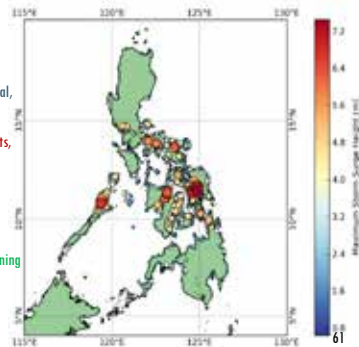
## ZERO TO MINIMAL CASUALTY DURING TYPHOON RUBY

## AREAS VULNERABLE TO STORM SURGE

Samar, Leyte, Iloilo, Palawan, Cebu, Negros, Bohol, Bicol, Quezon, Metro Manila, Bulacan, Surigao (Lapidez et. al, 2015)

These areas have gently sloping coasts, shallow bays and are also frequently passed by typhoons

Site-specific flood risk management solutions, Disaster-risk land use planning



## REHABILITATION



## DENR-DILG-DND-DPWH-DOST JMC 2014-01

It provides information on how to use the multi-hazard maps in future reconstruction and rehabilitation efforts of areas struck by disasters.

Examples of activities that the JMC guides are:

- Where to put evacuation centers
- What to do if your property is located in a hazard susceptible area

It was signed by the Cabinet Secretaries of the author agencies on November 5, 2014 and has been implemented since this date.

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## DENR-DILG-DND-DPWH-DOST JMC 2014-01



## CONCLUSION

- It provides highly accurate storm surge prediction to further storm surge preparedness
- Project NOAH has built its storm surge prediction over strong technical foundations and good knowledge of the storm surge risks through its multi-disciplinary team.
- Storm Surge Advisories made available through the Project NOAH blog, social media sites and disseminated to key officials in both the national and local government levels
- Storm surge warning and maps have empowered individuals and communities of vulnerable coastal areas in the country to respond timely and appropriately to storm surge hazards
- the zero-casualty after Typhoon Hagupit was made possible through lesson learned during Haiyan and collaboration of various government agencies and local government units (LGUs) in disaster preparedness, monitoring, relief and rescue operations, and information dissemination

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## RECOMMENDATIONS

- ❑ Improve tidal monitoring system by installing additional tide gauges
- ❑ Improved bathymetry resolution
- ❑ Adoption of the high resolution maps by local government units in the coastal areas.
- ❑ Increased Information and Education Campaign
- ❑ Collaboration with other agencies and academe for a DRR education and map usage at grass roots level

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## E. The Typhoon Haiyan Storm Surge Models and Estimating Exposure of Leyte Gulf to Storm Surges

**Dr. Cesar Villanoy**

Marine Science Institute, UP Diliman

1:31 – 1:47 PM

Highlights of the presentation included the following:

- A comparison between JMA and JWTC typhoon track data
- Importance of wave coupling
- Air pressure during landfall

### Storm surge models and estimating exposure of Leyte Gulf to storm surges

Cesar Villanoy<sup>1</sup>, Olivia Cabrera<sup>2</sup>, Prncess Hope Bilgera<sup>1</sup>, Socorro Rodrigo<sup>3</sup>

<sup>1</sup>Marine Science Institute, University of the Philippines

<sup>2</sup>Institute of Environmental Science and Meteorology, University of the Philippines

<sup>3</sup>Ateneo de Manila University

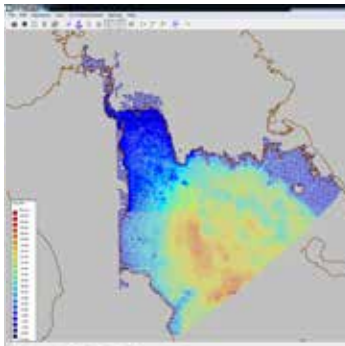
## Outline

- Understanding the Typhoon Haiyan Storm Surge
- Factors influencing the magnitude of the Haiyan Storm Surge
- Estimating exposure of Leyte Gulf to storm surge using synthetic storms

2

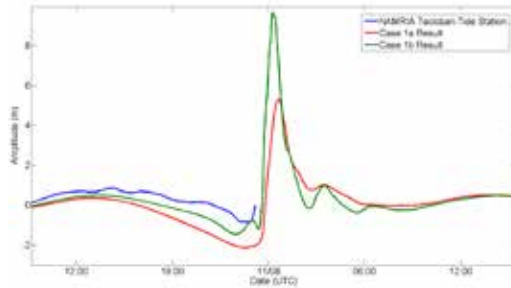
The screenshot shows the American Meteorological Society (AMS) website. The main header includes the AMS logo and navigation links for Home, Journals, Education, and Information. Below the header, there is a section for 'Early Online Release' featuring a cover image of the journal 'BATS: SNOW STORMS'. The main content area displays the title of the article: 'Hazard storm surge diameter of Typhoon Haiyan and its 1997 precursor in the Philippines' by Jesus C. Lee A. Soria and Alan D. Swave. The authors' affiliations are listed as Earth Observatory of Singapore, Nanyang Technological University, Singapore, and the School of the Environment, Nanyang Technological University. Other authors mentioned include Cesar L. Yllusco, Hermoso M. Erika, Priscilla Raga E. Bilgera, Elvira C. Cabrera, Fernando P. Nieraga, and Yvonne Vascon-Ste. Maria, and Elvira B. Ramos. The journal information section on the left provides details about the journal 'BATS: SNOW STORMS', including its ISSN (1550-0671) and frequency (quarterly).

## Leyte Gulf Delft3D Storm Surge Model



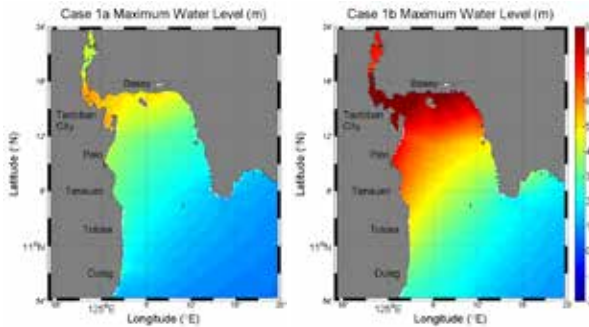
- Storm Surge Model [Soria *et al.*, 2015]
- Grid resolution: 200m-1.2km
- Simulation Period: November 5 – 11, 2013
- Bathymetry: digitized from Philippine navigational charts (100m-1km resolution)
- Wind/Typhoon Track data: Joint Typhoon Warning Center (JTWC)

### Comparison between JMA (1a) and JTWC (1b) Typhoon Track Data



Case 1b negative surge is closer to the recorded negative surge (-0.84m) height in Tacloban City

5

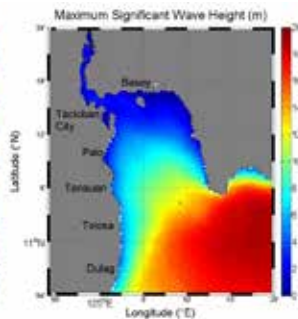


The weaker maximum wind speed of the JMA data is unable to produce a surge level greater than the maximum surge heights measured in the field. Soria et al. (2015) measured a maximum surge of around 7m in Tacloban while Tajima et al. (2015) measured surge heights exceeding 6m.

6

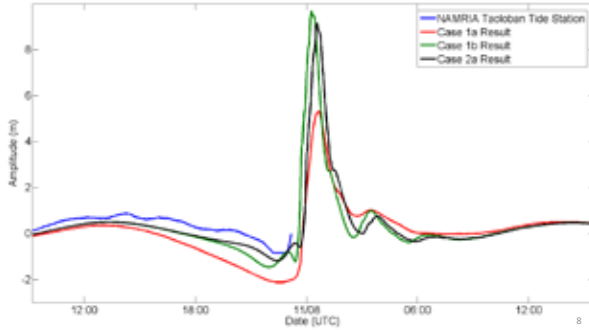
### Importance of wave coupling

- maximum significant wave height reached up to 20m at the mouth of Leyte Gulf and decreases to less than 5m northwards near Tacloban City
- in agreement with *Bricker et al. [2014]* simulation results
- storm surge near Tacloban City is highly influenced by wind-driven setup due to its sheltered location from waves

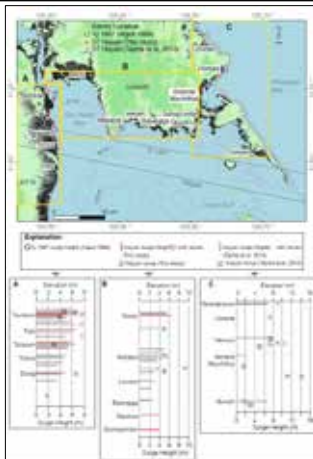
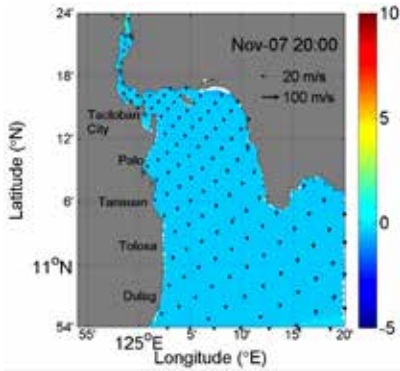


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wave coupling actually inhibited higher surge from developing due to energy dissipation from white capping, bottom friction, and depth-induced breaking

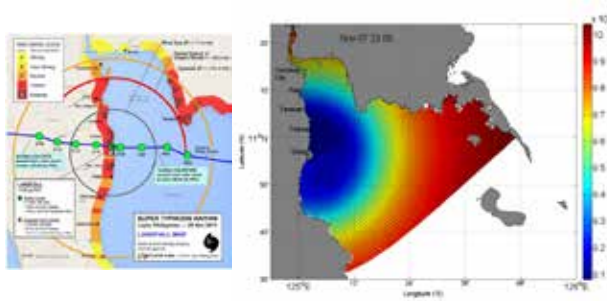


TYPHOON STORM SURGE LEVEL (CONTOURS) AND DIRECTION (ARROWS) GENERATED FROM TYPHOON HAIYAN TRACK DATA



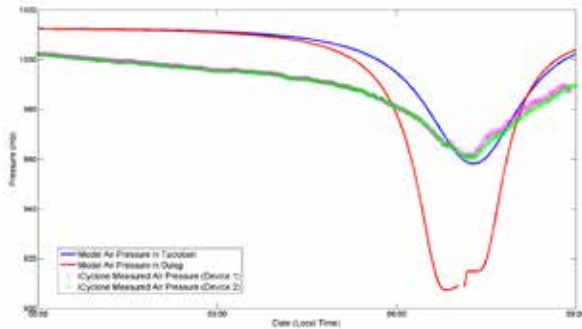
[Soria et al., 2015]

### Air Pressure during landfall



11

### Modelled and measured minimum pressure in Tacloban



12

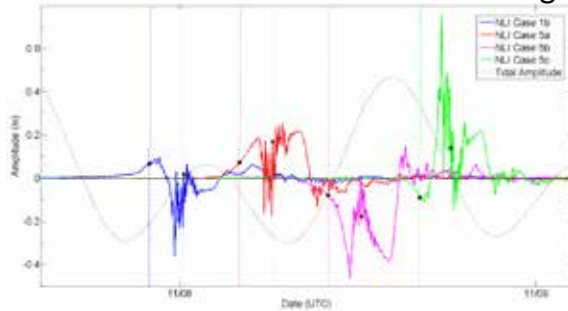
### Nonlinear tide and surge interaction

- A = tide only simulation
- B = surge only simulation
- AB = coupled tide and surge simulation
- NI = Nonlinear Interaction

$$NI=AB-(A+B)$$

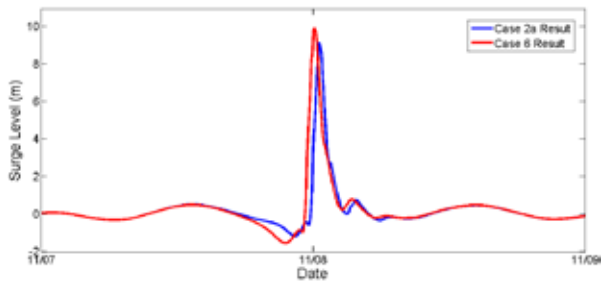
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## Nonlinear interaction of tide and surge



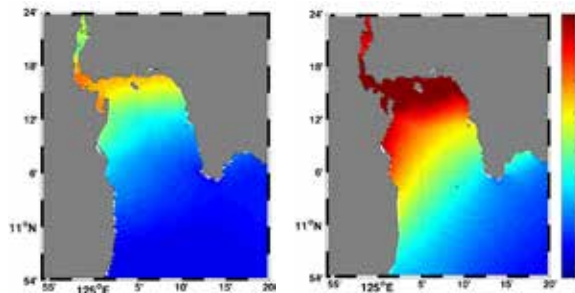
In the case of Tacloban City, the effect of tides was actually neither linear nor additive to the surge, with higher surge coincident to low tides and lower surge coincident to high tides

## Translation speed

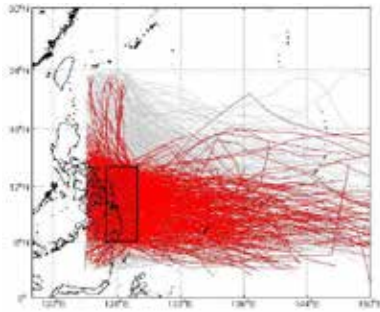


Hurricane with slow (fast) translation speeds yield larger (smaller) surges [Lin et al., 2010; Peng et al., 2004; Tablazon et al., 2015; Weisberg and Zheng, 2006]

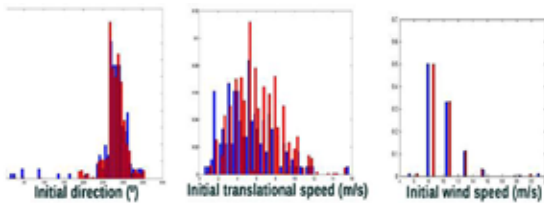
Maximum Surge Level during Ty1897 (left) and Typhoon Haiyan (right)



## Synthetic storm tracks equivalent to 100 years



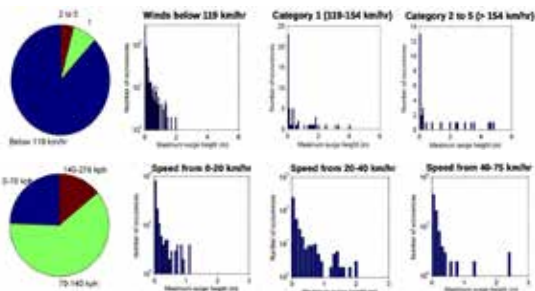
17



- Synthetic storms needed to increase the number of simulations so that the estimated probabilities are statistically robust
- Synthetic storms must be statistically similar to actual storms (normalized frequency distributions (red-synthetic storms, blue-actual storms))

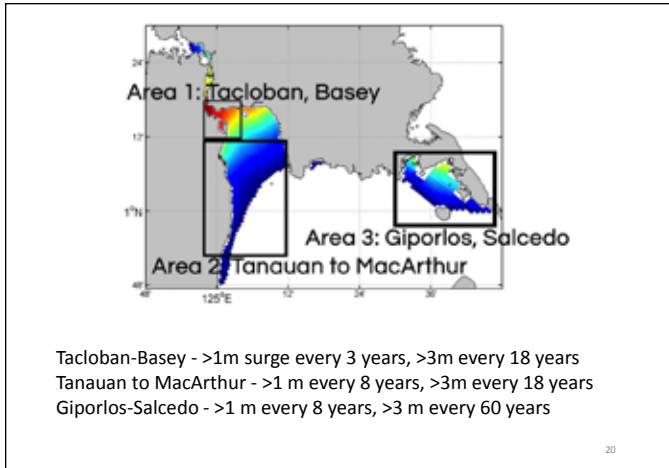
18

## Histograms of surge heights from synthetic storm simulations



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## Open forum

1:48 – 2:07 PM

Q.1: Ms. Dindin observed that this is their first time to encounter a synthetic storm. She asked whether there are ongoing talks between Project NOAH and the UP Team to synthesize their efforts, and what are their collaborative efforts to polish how to present to the general public when it comes to storm surges?

*Dr. Villanoy pointed out that UP and Project NOAH are actually just two buildings away from each other, so they have no choice but to talk. NOAH's focus is more on forecasting and as UP learns more, maybe they can also get a feel for forecasting and help improve the forecasts of Project NOAH. Ms. Ladiero added that the mandate of Project NOAH is to identify vulnerable areas. It is a one-year project and there is so little time, but UP-MSI and NOAH are collaborating on modelling and are always having a regular exchange of ideas.*

Q.2: Mr. Menardo Mankin of Bantayan asked that mild surges always occur when typhoons hit their island. Since the upcoming months, particularly November, will be typhoon season, he asked what advice the panellists can give them, especially the participants from Sta Fe and Madridejos?

*Dr. Villanoy said that, in terms of storm surge, the advantage is once they know it is coming, it is easier to predict the exact time that it will hit a certain area, so they have time to prepare. However, there is no way to predict storms in November, although a typhoon's path, once the typhoon is oncoming, can be determined days before they hit land. They also say that the El Nino phenomenon that is happening right now is the strongest it has been, and this will have a big effect on weather systems. Still, the best thing to do is prepare, and hopefully we have enough knowledge to do that.*

*Ms. Ladiero added that they have collaboration with other agencies. They give lists to the Office of the Civil Defense, NDRRMCs, and DILG and they communicate directly to the LGUs to spread information given to them. Information is also made available*

on the internet, blogs, Twitter, and Facebook accounts. It is also distributed or disseminated through mainstream media, like TV, radio and newspapers. Once a warning is raised, it is in the best interest of the people to immediately evacuate. For third world countries, evacuation is the foremost mitigation.

Q.:3 Ms. Flores of Oceana was struck by what Dr. Villanoy said that their bay characteristics were what made the Tacloban amazing. What other bays will have similar effects should another Haiyan-like storm hit the country?

*Dr. Villanoy stated that we have a complicated coastline. Our problem is we do not document a lot of these things, we cannot find it in our history. There is not so much information, just a report saying that there was a surge but no measurements. Sometimes, it is even just anecdotal. Project NOAH, PAG-ASA, and NAMRIA are currently doing what they can to measure pressure gauges in the country as pressure gauges may be storm surge-proof.*

Q.4 Ms. Maglana asked what are the guidelines in storm wave to minimize storm surges.

*Ms. Ladiero urged the participants to talk to engineers. They must take into consideration local features, how they can mitigate storms surges, what can be used in modeling. For Project NOAH, we can model bare waves, but we have no wave breakers. It is always good to consult with engineers.*

Q.5 Dr. Jurgen of GIZ inquired if they have any figures or research simulation on effect on mangroves for 3-5 meter surge?

*Dr. Villanoy disclosed that there is an interesting paper that came out recently. We have this notion that if we have flat reefs, it protects us from wave pressure or storm surge. But in this research, it turned out that reef flat can actually enhance the surge. He will look it up and share with the group later.*

To this end, Ms. Maglana followed up whether they have designs to prevent mangroves from being uprooted during surges. Dr. Jurgenne Primavera replied that it would part of her presentation later.

Q.6 A participant from the Technological Institute of the Philippines asked that, since they were able to approximate statistics, how likely is it that combination of Haiyan characteristics, would a storm happen again with the same set of characteristics and use it as precursor to predict, if it exists in another storm? Do we have time to anticipate that a storm surge can happen again? What are the parameters and characteristics in terms of track, wind speed?

*Dr. Villanoy replied that when they did the experiment, they did with many storms. Haiyan-storm characteristics are rare. They had to add another thousand to get more data points on the surge. If they look at historical data, the one closest is 1897 so it's almost been 100 years. For large Haiyan types, he admitted that they were able to gather only a few data points. In extreme statistics that are not followed by central density some countries even go as far as 1000 storms.*

Q.7 Ms. Angie Nellas of ZSL was mulling over how technology can predict typhoons and what they have seen in Tacloban during Haiyan. As scientists and officers from predicting office, how can they move forward or what are the recommendations for the resettlement? There are people still living there who act as if nothing happened. For other areas with same characteristics, given that our coastlines are complicated, what is their advice for Tacloban and other Haiyan-hit areas?

*Ms. Ladiero answered that for Project NOAH, they do not have the authority to hold people back on their decision to live or settle where they want to after a calamity. They just can't say, "Don't build your house there!" They can only give out information on high risk areas. They did hear about some areas that were warned against high level rise, but apparently, the rehabilitation cost is very high. On their part, they communicate the risk and talk to the concerned agencies for public awareness.*

*Dr Villanoy said that all they have to do is observe the 40 meter from coast rule. If they observe that, it can save a lot of lives.*

Q.8 A participant wanted to know some facts about converting abandoned ponds.

*Dr. Primavera responded that the problem of abandoned ponds is tenure. If abandoned pond is extensive, and shallow, it is relatively easy to restore the flow. Anyone can do it naturally, but wait for the result in 20 years. Tenure is the key. If not corrected, that's where problem is.*

Ms. Maglana noted that collaborative work has been done for and by agencies on modelling. The concern now is how to communicate it to people and its guidance on our social lives. She urged the participants to give a great big hand for the speakers. Remaining questions from the open forum with the panelists from the just-concluded sessions will be posted on the wall.

## F. Impact Assessment of Typhoon Yolanda on Selected Mangrove Ecosystems in Leyte and Eastern Samar

**Mr. Carlo Carlos**

**Researcher, The Oscar M. Lopez Center**

**2:10 –2:35 PM**

Highlights of the presentation included the following:

- Introduction
- Documented cyclone impacts on mangroves
- Damages
- Typhoon Impacts: Vegetation
- Mangrove recovery
- Typhoon Impacts: Soil
- Key Messages
- Coastal Bioshield Modeling
- Restoration Scenario: Typical Zone
- Restoration Scenario: More Inland Zone
- Eco-Engineering Scenarios
- Water Level Height
- Water velocity
- Lessons Learned from the Scenarios

The slide features a blue header with the OML Center logo on the left and partnership logos for the World Agroforestry Centre (ICRAF) Philippines and World Agroforestry Centre on the right. The main title is centered in a white box with a blue border. Below the title, the presenter's name and affiliation are listed, followed by the conference details. The background includes a stylized illustration of mangrove trees and a blue sky with birds.

**OML Center**  
Center for Ocean Mangrove and Land Use Research

In partnership with:  
World Agroforestry Centre  
(ICRAF) Philippines

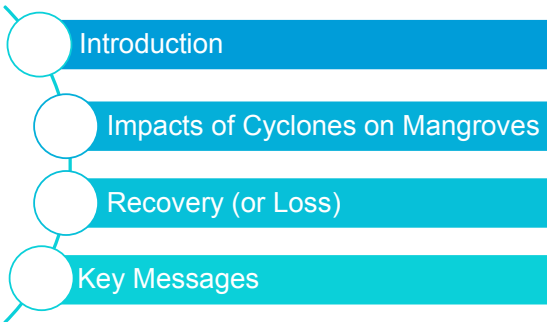
**World Agroforestry Centre**

**IMPACT ASSESSMENT OF TYPHOON YOLANDA  
ON SELECTED MANGROVE ECOSYSTEMS IN  
LEYTE AND EASTERN SAMAR**

**Carlo M. Carlos**  
*The Oscar M. Lopez Center for Climate Change  
and Disaster Risk Management Foundation, Inc.*

*2<sup>nd</sup> National Mangrove Conference  
1 September 2015  
M02 Westown Hotel  
Iloilo City*

## Overview



## Introduction

- Mangroves as ecosystems designed to withstand unfavorable conditions
- Subject to frequent stresses
- Mangroves as coastal protectors
- Typhoon Yolanda as an episodic event
- Lack of documented typhoon impacts on mangroves

## Documented Cyclone Impacts on Mangroves

ATLANTIC	INDO-PACIFIC
<b>USA (Florida)</b> Mexico Belize Dominican Republic Mexico West French Indies Honduras	India Micronesia Philippines

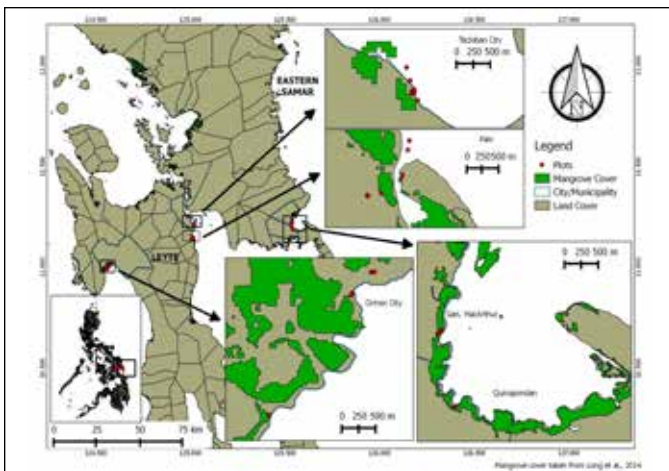
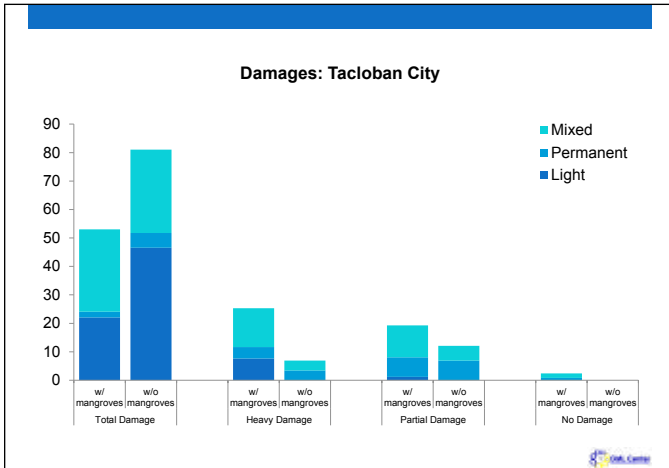
**Standing leaves to save the living. The resilient Mangroves of Samar**

**A town saved by mangroves**

**DENR to restore mangrove forest in Yolanda-hit areas**

**'Yolanda'-stricken mangroves in Leyte need long-term protection**

*By Hazel Hernandez*



### Typhoon Impacts: Vegetation



### Typhoon Impacts: Vegetation

*Rhizophora sp.*

*Avicennia sp.*



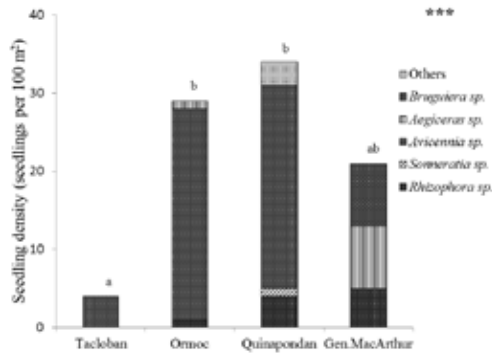
### Typhoon Impacts: Vegetation



## Mangrove Recovery



## Mangrove Recovery



May 2014

Palo, Leyte



June 2015



## Typhoon Impacts: Soil

- Loss OR Gain of sediments on existing mangrove area



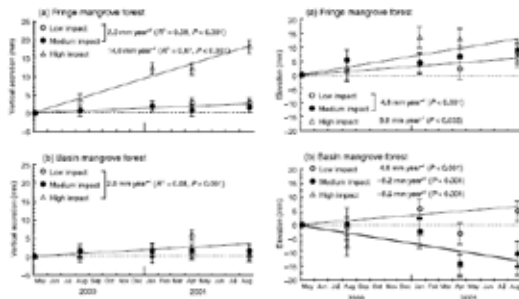
## Typhoon Impacts: Soil



- Honduras
- Hurricane Mitch (1998) – Cat. 4
- Mangrove tree mass mortality 2 years post-hurricane

Photo taken from Cahoon et al., 2003

## Typhoon Impacts: Soil

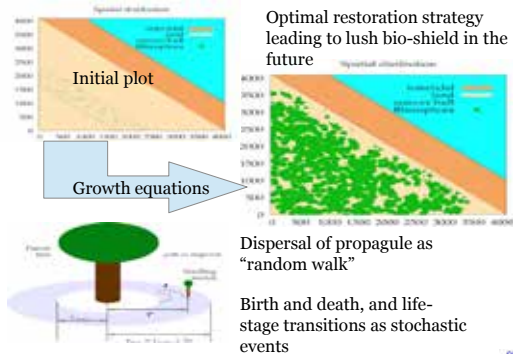


taken from Cahoon et al., 2003

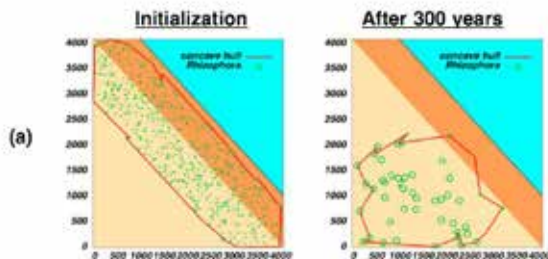
## Key Messages

- Importance of healthy, intact and continuous coastal greenbelts for mangrove recovery
- The need to monitor long-term post-typhoon impacts on mangroves
- Natural regeneration yields better results than human-intervened reforestation

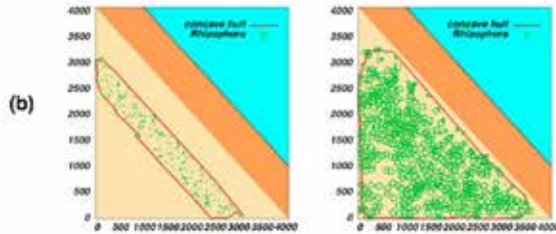
## Coastal Bioshield Modeling



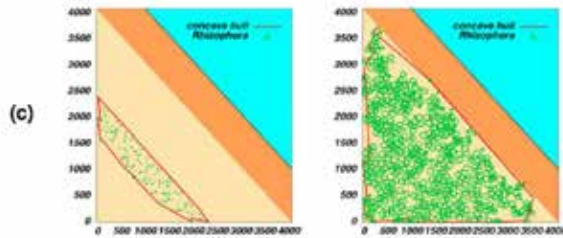
## Restoration Scenario: Typical Zone



## Restoration Scenario: more inland zone



## Restoration Scenario: most inland zone



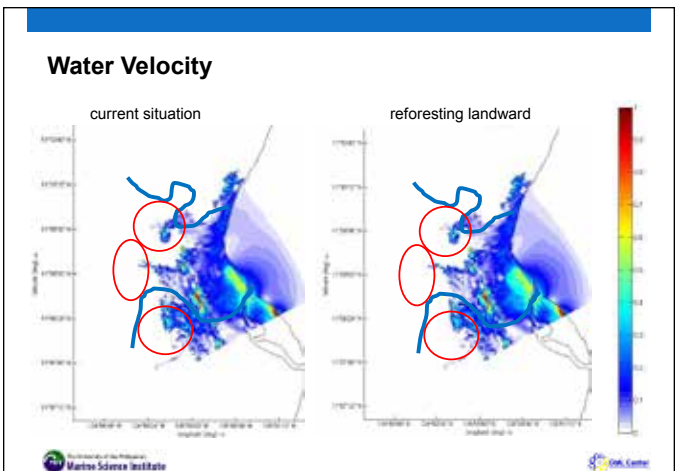
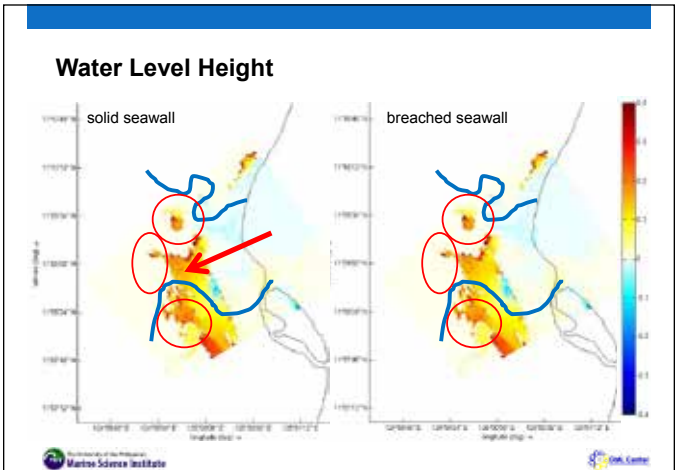
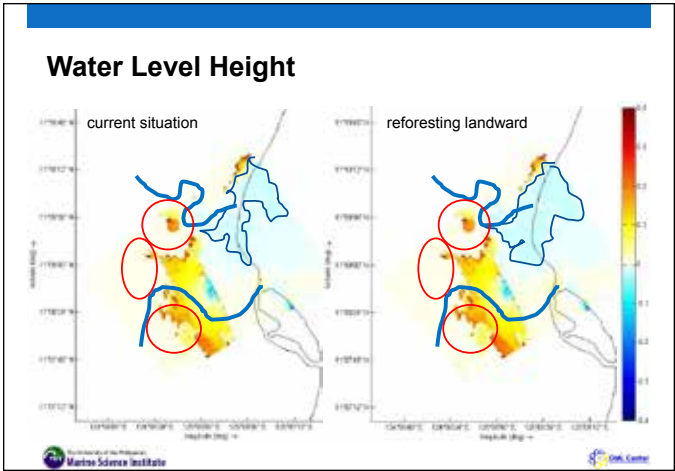
## Eco-engineering Scenarios

**Scenario 1: Current Situation**  
 Manning's roughness coefficient  
 0.15 for a strip of mangrove  
 plantation to simulate the current  
 situation

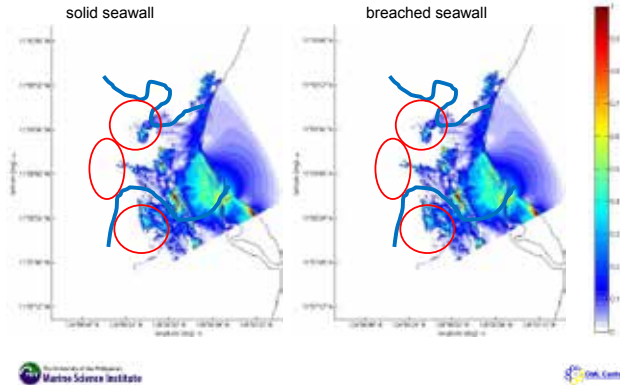
**Scenario 2: Reforesting  
 landward**  
 same coefficient for mangrove  
 but double the thickness of  
 mangrove plantation to simulate  
 potential benefits (if any) of  
 reforesting landward of the  
 current stands

**Scenario 3: Solid Seawall**  
 instead of 0.15 coefficient,  
 sparse dry points were used.  
 This simulates a solid seawall

**Scenario 4: Breached Seawall**  
 sparse dry points were used  
 with channels in between the dry  
 points. This simulates the  
 situation where a seawall is  
 breached



## Water Velocity



### LESSONS LEARNED FROM THE SCENARIOS

- This model only ran simulations for 4 scenarios. Of these four, **the scenario that doubles the thickness of mangrove plantation by reforesting landwards (2), showed the best potential benefit**. There is reduction of sea level height north of the mangrove area.
- However, the same scenario showed increased water velocity locally, which means **no settlement or essential structure should be placed near the reforested mangroves**.
- The scenario of a **seawall (3) is the worst option** since it amplifies the water level near the rivers and it funnels intense water velocity towards its neighbouring areas.
- Overall, however it can be seen that the **worst impact is near the rivers** and no amount of protection at the coast can significantly reduce the impact of incoming storm surge.
- It should therefore be emphasized that **no structures should be placed near rivers**.

## Acknowledgements

The OML Center would like to thank:

- ICRAF-Philippines, UP MSI, TIP
- Respondents
- Field assistants
- Enumerators
- Encoders
- LGU representatives
- NSJMPA
- UP Tacloban (Ms. Brenda)
- DENR, BFAR, DA

## G. Attributes in the Earthquake-Uplifted Intertidal Habitats and their Implications to the Maribojoc-Loon Coastal Fisheries

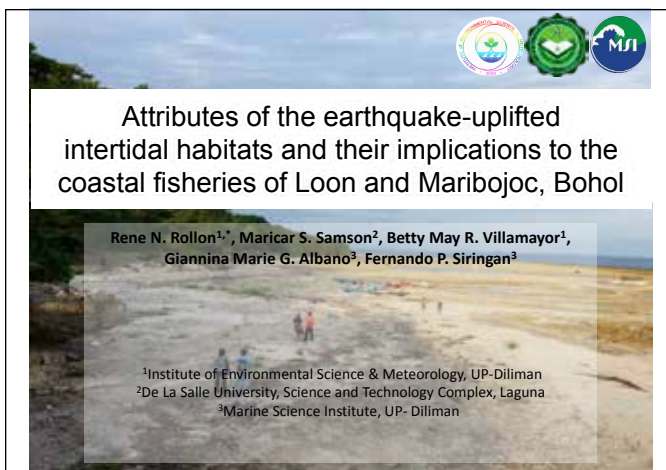
**Dr. Rene Rollon**

Director, Institute of Environmental Science and Meteorology  
UP Diliman

2:40 – 3:04 PM

Highlights from the presentation included:

- The Bohol earthquake: Some facts
- Significance / Objectives
- Methods
- Species distribution across transect
- What was there: Stressed mangroves
- What was there: Terrestrial colonization
- What was there: Dead seagrass
- What was there: Living seagrass
- What was there: Dead and surviving seagrass
- What was there: Seagrass and bivalves
- What was there: Benthic fauna
- What should we do?
- Tidal inundation of existing mangroves
- Tidal inundation of newly planted propagules
- Implications
- What should we do?
- Summary



The slide features three logos at the top: a circular logo with a tree and water, a green circular logo with a leaf, and a blue circular logo with 'MSI'. The title is centered in a white box. Below the title is a photograph of a beach with people. At the bottom, there is a list of authors and their affiliations.

Attributes of the earthquake-uplifted intertidal habitats and their implications to the coastal fisheries of Loon and Maribojoc, Bohol

Rene N. Rollon<sup>1\*</sup>, Maricar S. Samson<sup>2</sup>, Betty May R. Villamayor<sup>1</sup>,  
Giannina Marie G. Albano<sup>3</sup>, Fernando P. Siringan<sup>3</sup>

<sup>1</sup>Institute of Environmental Science & Meteorology, UP-Diliman  
<sup>2</sup>De La Salle University, Science and Technology Complex, Laguna  
<sup>3</sup>Marine Science Institute, UP- Diliman

Wetland & Coastal Management 19 (2015) 98–104

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Journal homepage: [www.elsevier.com/locate/oceanman](http://www.elsevier.com/locate/oceanman)

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**Attributes of the earthquake-uplifted intertidal habitats and their implications to the Maribojoc and Loon coastal fisheries**

Rene N. Rolton <sup>a,\*</sup>, Maricar S. Samson <sup>b</sup>, Betty May R. Villantayor <sup>c</sup>,  
Gianrina Marie C. Albano <sup>c</sup>, Fernando P. Siringan <sup>d</sup>

<sup>a</sup> *Division of Environmental Science & Microbiology, College of Science, University of the Philippines, Diliman, 1501 Quezon City, Philippines*  
<sup>b</sup> *The La Salle University, Science and Technology Complex, Division of Science, Cebu, 4014 Lapasan, Philippines*  
<sup>c</sup> *Marine Science Institute, College of Science, University of the Philippines, Diliman, 1501 Quezon City, Philippines*

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**Keywords:**  
 7.2 Mw, Bohol earthquake  
 Marine loss of intertidal habitats

**ABSTRACT**

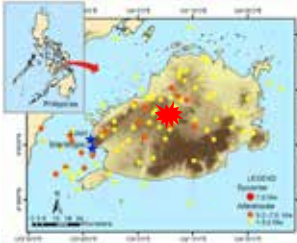

Other than the devastating impact on infrastructure and human lives, the 7.2 Mw earthquake that struck Bohol and its vicinity in October 2013 also apparently caused massive damage on the coastal habitats. (I) collapse of mangrove wetlands (mangroves) interspersed by artificial cracks, mostly > 1 m wide, increasing the permeability and porosity; (II) substantial ground subsidence (< -1 m in Cebu) and vicinity with sea-level-rise implications to the existing mangrove and seagrass beds; and, (III) massive loss of intertidal habitats due significant ground uplift, drying up extensive areas of mangroves, seagrass beds, shellfish and rocky shore particularly to the coastal habitats of Maribojoc and Loon. This paper provides quantification of the attributes of the uplifted area, determining the geo-quo extent of the intertidal habitats, and attempting to reconstruct near intertidal (intertidal) ecosystems based on post-quake satellite. We determined the total extent of the intertidal area normally affected by the coastal earth movement by

## The Bohol Earthquake: Some Facts

**15**  
October 2013

**7.2**  
magnitude

**10**  
historical churches

**71,000**  
displaced families

**222**  
dead

Ground uplift .....

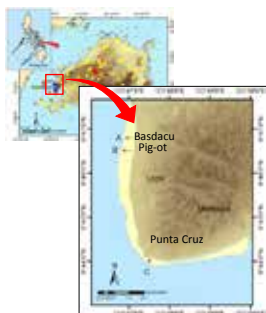
Significance
Objectives

“... rare opportunity of understanding ground uplift and its implications to coastal communities”



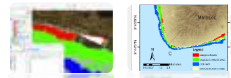
What was there?  
Where?  
How much?  
What should we do?

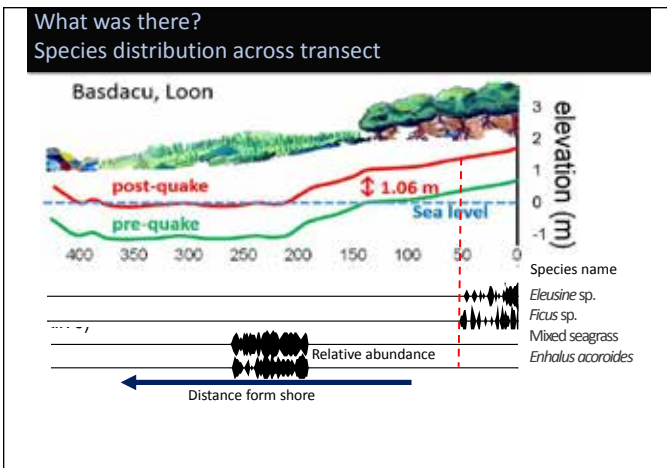
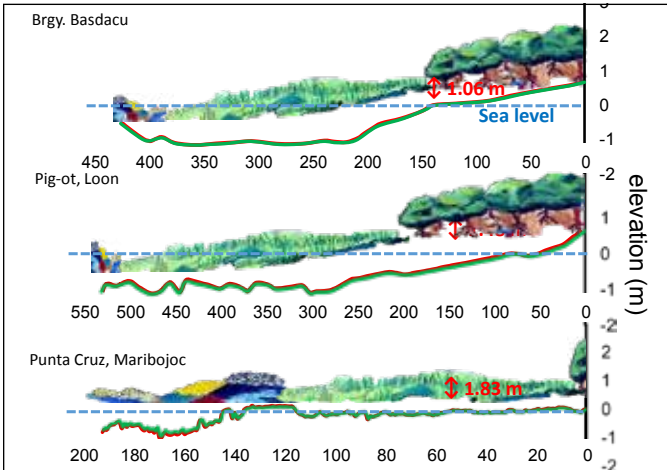
## Methods

### STUDY SITES

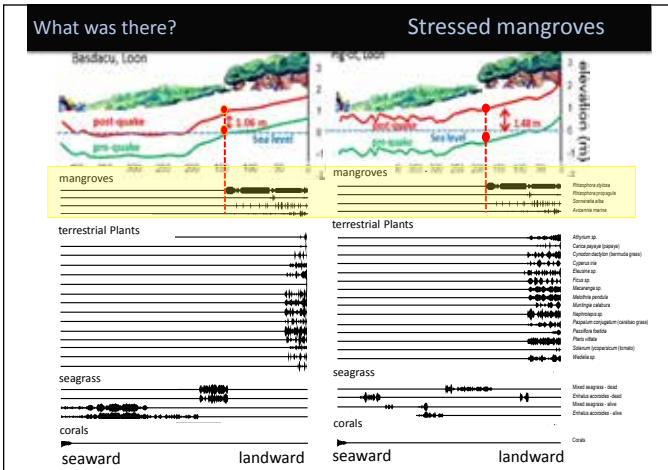
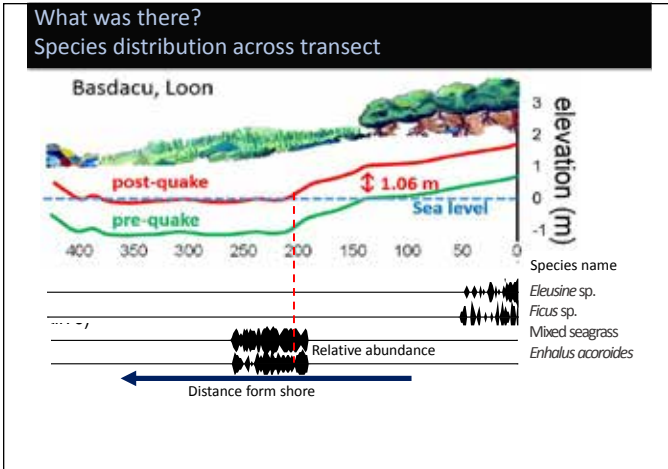


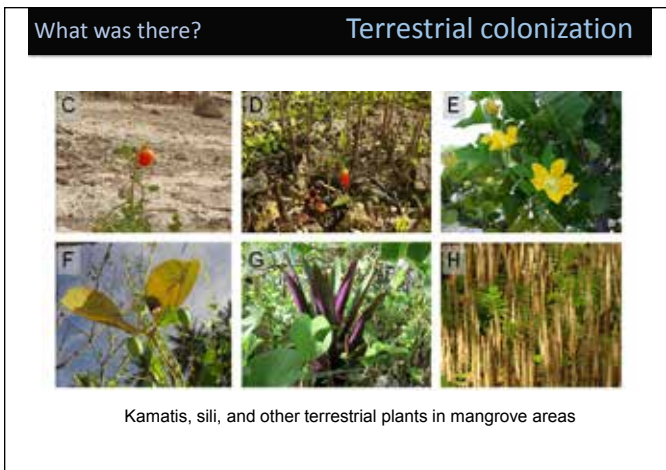
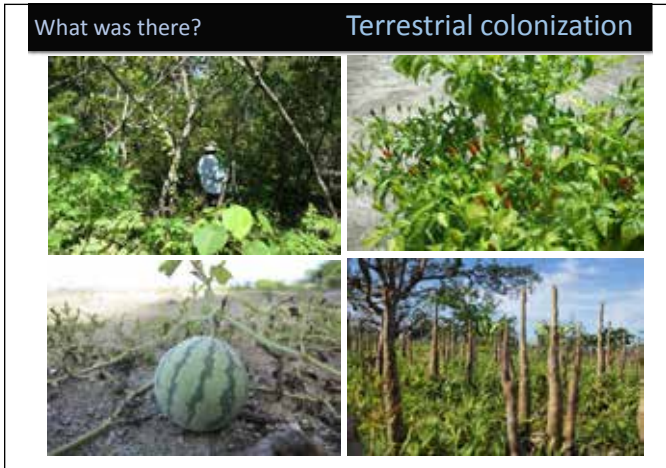
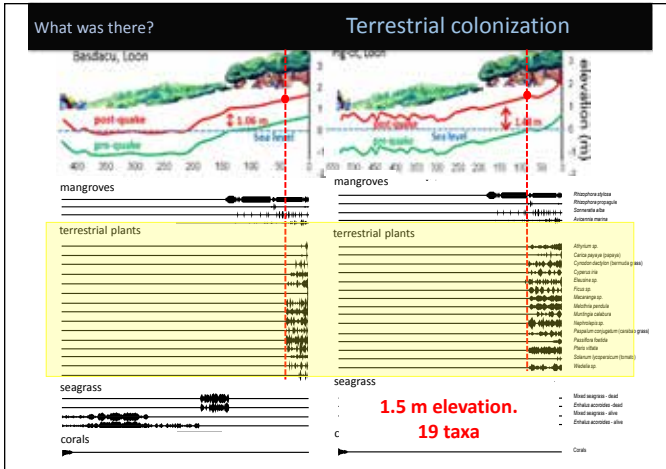
Areas with the highest reported coastal uplift

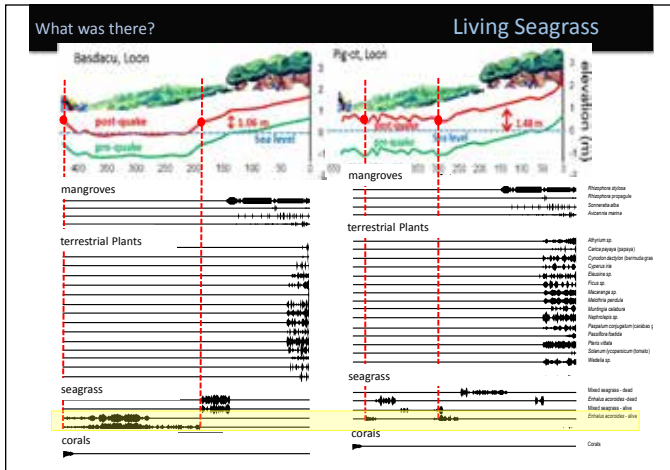
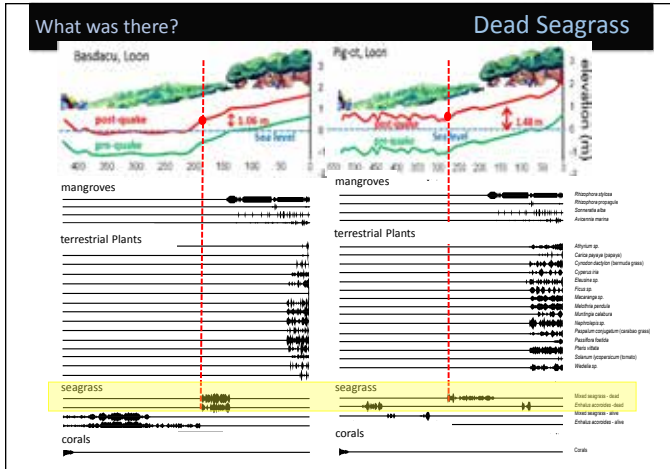
1. Elevation-profiling
  - measure vertical displacement (post- and pre-quake)
2. Survey of pre- and post-intertidal assemblages
  - Terrestrial plants, mangroves, seagrass, assoc. fauna
3. Mapping of habitats
  - Google Earth and NAMRIA maps
4. Review of existing management strategies

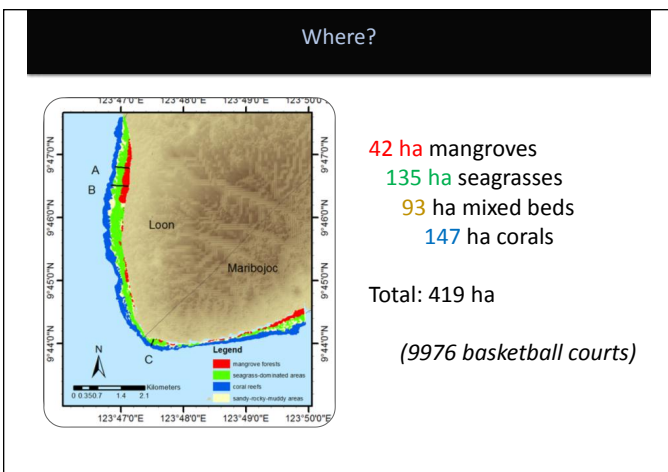
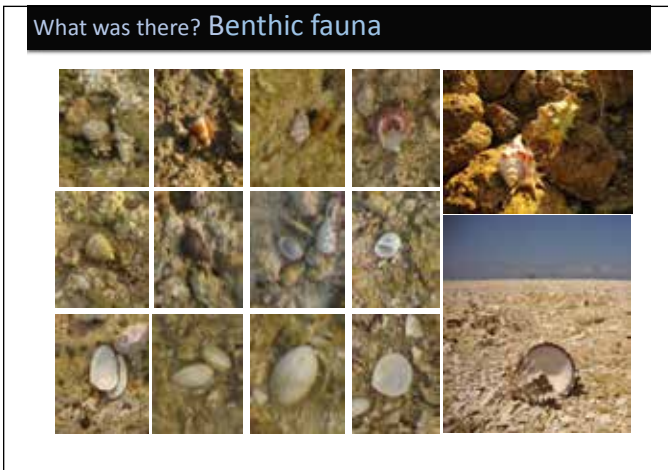
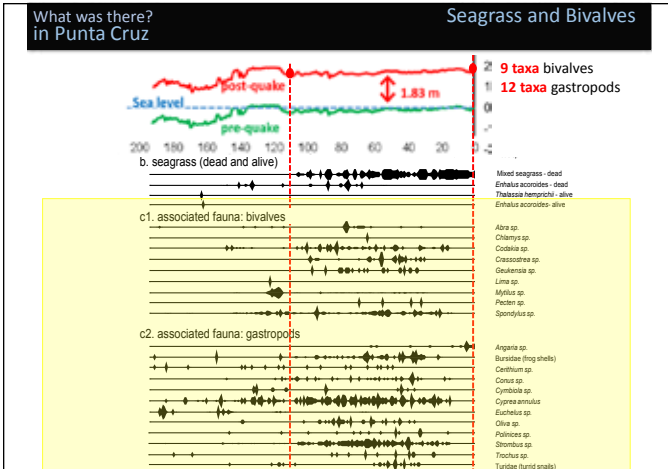








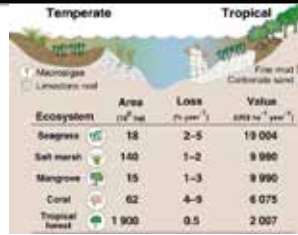




### How much?

#### Ecosystem services

- food source
- fish nursery and habitat
- nutrient production
- carbon fixation



(Figure from Duarte et al. 2008)

=Value (Php ha<sup>-1</sup>yr<sup>-1</sup>)\*Area (ha)

Total estimated loss of

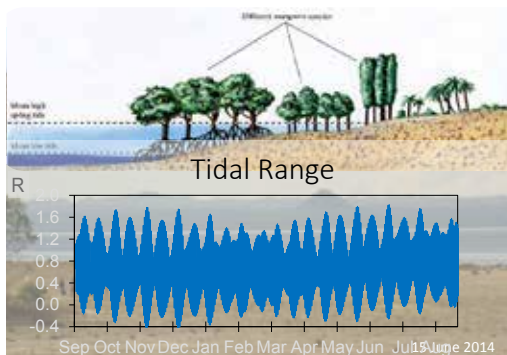
**Php 197 million** per year

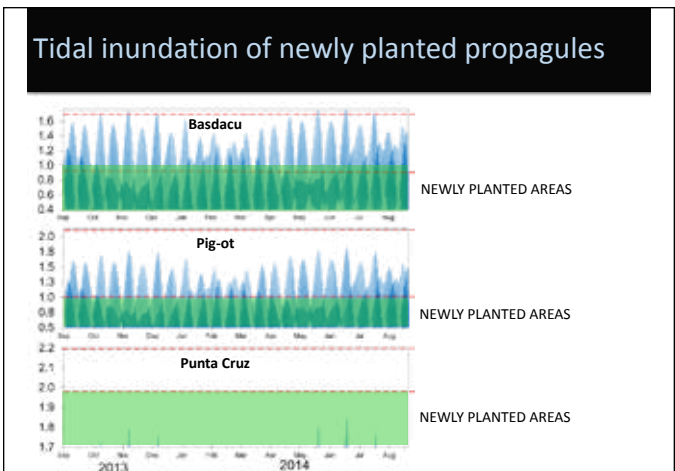
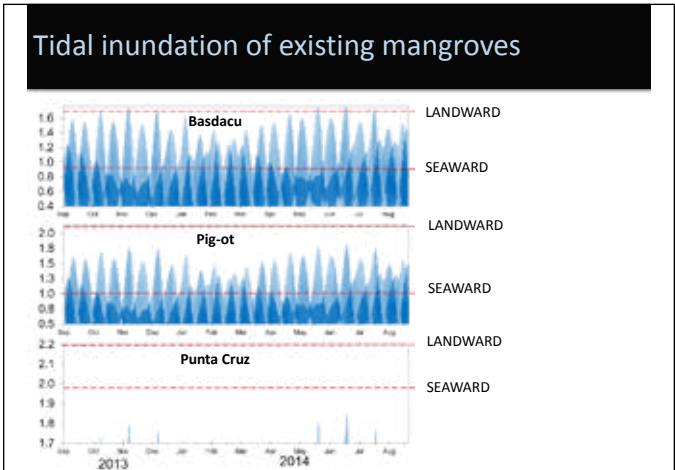
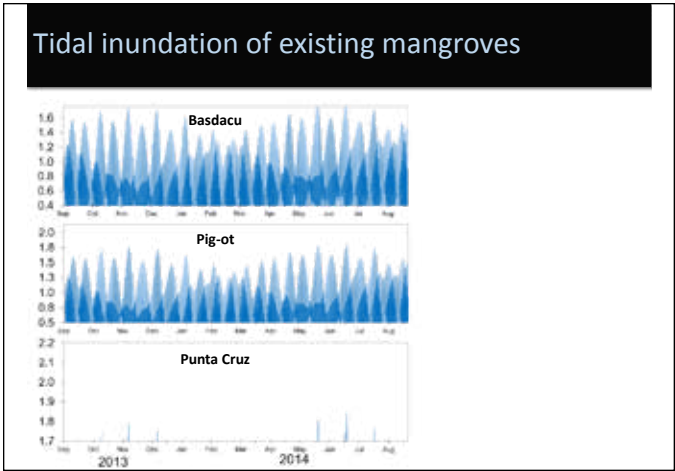
### What should we do?

Mangrove planting activities ... ???



### What should we do?





## Implications

- Loon and Maribojoc fishers largely depend on nearshore coastal fisheries
- need for alternative livelihood and post-quake supplemental income sources
- Decline in off-shore production



## What should we do?

Careful CRM **planning** and **implementation**

**Monitoring** of existing mangrove areas

**Colonization** of terrestrial taxa should be studied

The initial efforts of mangrove planting in the uplifted area should be carefully **reviewed**.

In general, the new tidal regime in the area is **not suitable** for new plantings (*Rhizophora*, *Sonneratia*, *Avicennia*)



## What should we do?

June 2014

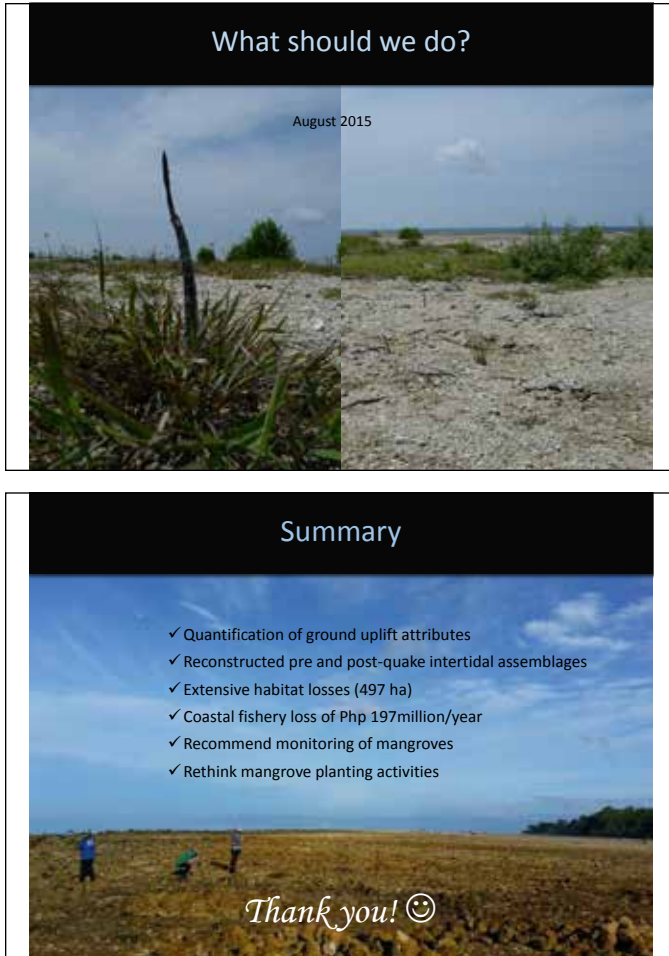


August 2015









## **H. Mangrove Rehabilitation in Post-Oil Spill Disaster in Cordova, Cebu**

**Dr. Resurreccion Sadaba**  
 Dean, College of Arts and Sciences  
 UP Visayas  
 3:05 – 3:28 PM

Highlights from the presentation included:

- M/V St Thomas Aquinas Oil Spill
- The Accident: Collision
- Level of visual oiling in impact areas
- Content of Talk
- Claims/Report of Damage by various agencies

- Where are these affected areas?
- Results
- Clean-up response
- Sites with mangrove mortality
- Percentage of mortality by area
- Community structure
- Over-all species classification
- Species composition
- “Rehabilitation” efforts
- Mangrove replanting projects
- Recommendations
- Indicative recovery periods of various habitats
- Recovery of the environment
- Recovery of mangrove deforested areas from M/T Solar I oil spill in Guimaras

## Mangrove Rehabilitation in post-oil Spill Disaster in Cordova, Cebu

**Sadaba RB**

Division of Biological Sciences,  
College of Arts and Sciences  
UP Visayas, Miagao, Iloilo

### M/V ST THOMAS AQUINAS OIL SPILL



# The Accident: Collision

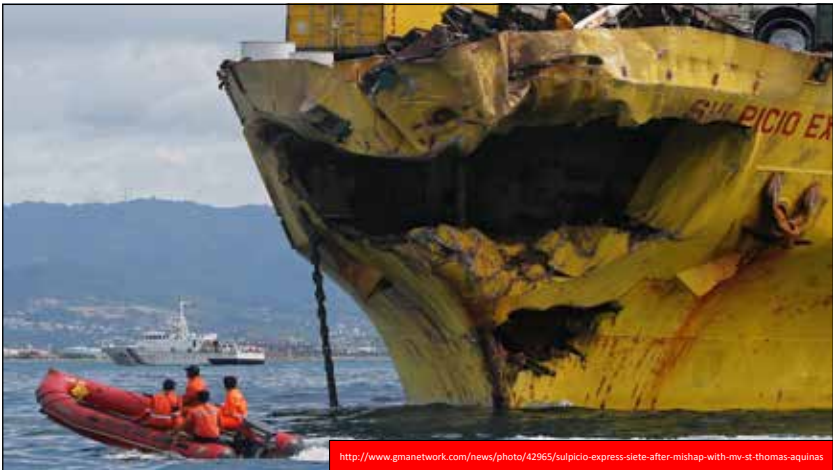
## M/V ST THOMAS AQUINAS vs. SULPICIO EXPRESS 7

Date: August 16, 2013



- 120,000 li (bunker oil)
- 20,000 li (diesel)

Ref: newsinfo.inquirer.net. Accessed Aug. 19, 2013



<http://www.gmanetwork.com/news/photo/42965/sulpicio-express-siete-after-mishap-with-mv-st-thomas-aquinas>

### Level of visual oiling in impacted areas

- Light oiling
- Moderate oiling
- Heavy oiling
- Banica survey route



Source of Slide: Dr. F. Laurelle

## Contents of Talk

- Results of damage assessments
  - 1) mapping of degree of oiling;
  - 2) overall community structure;
  - 3) sapling, wildlings and tree percentage mortality
- Observed “rehabilitation efforts”
- Recommendations

## Claims/Report of Damage by various agencies



<http://www.abs-cbnnews.com/nation/regions/08/18/13/oil-spill-reaches-shoreline-cordova-cebu>

## 2 days after the spill.....PhilStar.

- CEBU, Philippines - The **Department of Environment and Natural Resources-7** will impose a penalty on those responsible for the sinking of a passenger ship that resulted in the oil spill affecting **more than 500 hectares of mangroves and sea grasses in Cordova.**

Reference: [philstar.com](http://philstar.com), *Philippine News for the Filipino Global Community*  
Masthead, pagematch: 1, <http://www.philstar.com/cebu-news/2013/08/21/1115451/denr-assessing-oil-spill-damage-penalties-eyed-those-liable>

- Based on the data released by the Protected Area, Wildlife and Coastal Zone and Management Services (PAWCZMS), about **66 people's organizations were contracted in mangrove rehabilitation and reforestation** efforts in Cordova and Lapu-Lapu City.
- Under the contract, **DENR-7 will provide P25,000 per hectare for mangrove rehabilitation and reforestation.**

August 21, 2013...Positive NewsMedia (PNM)

## DENR to slap P13-million fine on spill culprit

- Based on initial assessment, at least **613 hectares of newly planted and natural stand mangroves** in 12 coastal barangay of Cordova and Lapu-Lapu City were affected by the spill.
- "As of today, our inventory and assessment showed that **328 hectares of newly planted mangrove areas** under the integrated coastal resources management project [ICRMP] were affected," he said.

August 21, 2013 9:03 pm by JAMES KONSTANTIN GALVEZ

## BFAR-7 prepares 105,000 propagules to replant mangroves damaged by oil spill

- Poquita said the BFAR 7 is ready to give beneficiaries **one peso per mangrove propagule** that they will prepare for planting to replenish the lost trees in the oil spill-affected areas.
- An **additional three pesos** will be given for each propagule planted and after one year, each propagule that survives will yield **another peso** for the beneficiary.

<http://positivenewsmedia.com/blog/2013/08/bfar-7-prepares-105000-propagules-to-replant-mangroves-damaged-by-oil-spill/>

October 8, 2013...ABS-CBN News Cebu....

## DENR imposes P41-M fine over Cebu oil spill

- In his demand letters to the two firms, DENR Secretary Mario Montejo said the oil spill destroyed aquatic resources worth P35.7 million, and some **328 hectares of newly planted mangroves** worth about P6 million.

By Aiza Layage, ABS-CBN News Cebu. Posted at 10/08/2013 11:48 AM

Freeman. 4 October 2014.

## 2GO, Span Asia fined P41M for oil spill damage

MARGOLD R. LEBLANCAGE  
Staff Member

The Department of Environment and Natural Resources-7 has fined 2GO and Philippine Span/Asia Cruise Corp, the owners of the two ships that collided in Loro Loro last month, P41.3 million for environmental damage.

This after the oil spill from the M/V St. Thomas, which sank as a result of the collision.

The DENR also ordered the companies to plant 100,000 mangrove propagules in 12 barangays in Cebu.

DENR already sent demand letters dated last October 1 to PSACC Chairman of

the Board Enrique Go and 2GO Group Inc. Chairman of the Board Francis C. Chua to pay and settle the total amount of P41,704,600 on or before November 12, 2013.

"We are demanding such amount to the owners as we would like to proceed with providing alternative livelihood options to those people's organizations who have been affected by the incident and carefully design our reconstruction programs like rehabilitation and reforestation efforts," said DENR-7 Regional Executive Director Leahito Montejo in a statement.

Turn to page 2

# 2GO, Span Asia fined P41M for oil spill damage

From page 3

In the demand letter signed by Montajo, it indicated that 97,033,200 worth of mangroves planted by covering 328 hectares were destroyed.

planted funded by the DENR's integrated coastal resource management with funding support from the Asian Development Bank, said DENR-7 spokeswoman Ed Llansada.

The cost of the attempt, P32,769,600, is the equivalent of fish lost in a year for every hectare of mangrove destroyed.

Llansada said that the computation was based on the 113 hectares of natural stand or productive mangroves which were also destroyed.

"It is noteworthy that

a hectare of mangrove produces up to 3.6 tons of fish per year per hectare thus providing a lot of food for marine life. Also, in every hectare of mangrove destroyed, some 1.08 tons of fish per year per hectare will be lost," Llansada explained.

If the two companies agree the fine, Montajo said they will file charges in court.

Montajo said that a technical conference with the two companies will be scheduled for October 9 at 1 p.m. at the DENR-7 Conference Hall in Baguio Baguio, Mountain City.

The demand letters were sent yesterday via express registered mail, and due to the two companies.

In a completed inventory of environmental reports last August 21 which was

submitted by a seven-member quick response team led by Coastal and Marine Management division chief Edmundo Arrigada of the Protected Area, Wildlife and Coastal Zone and Management Services, it was found that 328 hectares of newly planted mangroves contracted by nine peoples' organizations in Cordona zones and one RA in Lapu-Lapu City were severely destroyed. Some 113 hectares of natural stand mangroves were also ruined.

The IDPCs under contract with DENR-7's CRMP whose mangrove plantations were hardest hit by the oil spill are Makabuhisan Mangrove in Bangharing, Cebuano Fishermen Association, Kamasaray Fishfolk Association, Pilipino Fishermen Association,

Alagna Fishermen Association, Bagan sa Manganaga sa Bataanay San Miguel, Pangabuharing sa Dayaway Mangrove, and Gintongan Baguioay San Miguel and Gintongan Water Distributor and Resource Management Multi-purpose Cooperative, all in Cordona and Negabuhisan Mangrove sa Calawanan in Lapu-Lapu City.

The team led by Arrigada assessed nine hectares in Cordona severely hit by the oil spill, Bangharing, Banggong, Dayaway, Cebuano, Poblacion, Alegria, Gahi, Pilipino and San Miguel, Bataanay sa Calawanan, Bahog and Suba-buhisan in Lapu-Lapu City were also affected.


The human toll from the disaster currently stands at 115 dead and 22 still missing. —BSP

Where are these affected areas?

RESULTS

**Cordova, Cebu:**  
Total No. of affected barangays: 13

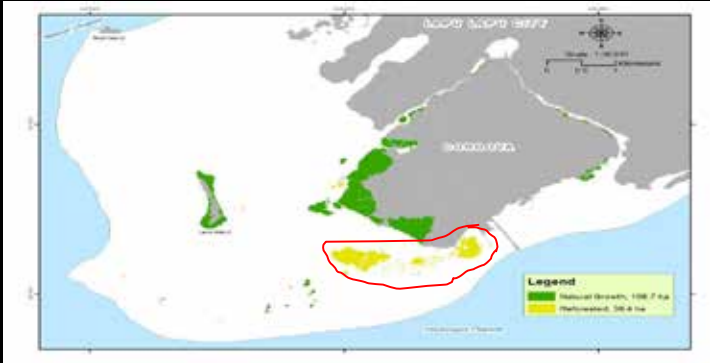
1. Alegria
2. **Buagsong**
3. San Miguel
4. Catarman
5. Cogon
6. Dapitan
7. **Day-as**
8. Gabi
9. Gilutongan
10. Ibabao
11. Pilipog
12. Poblacion
13. **Bangbang**



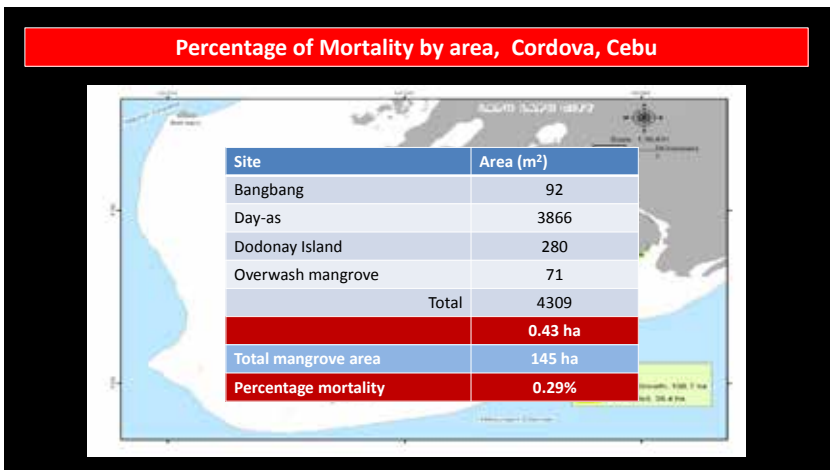
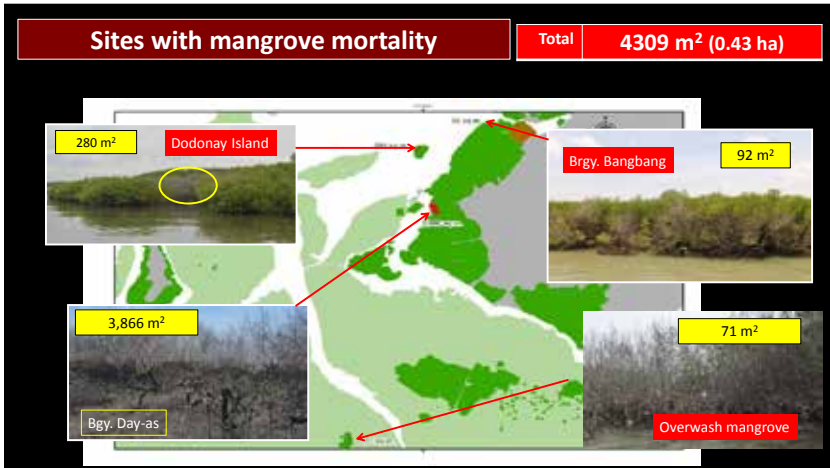
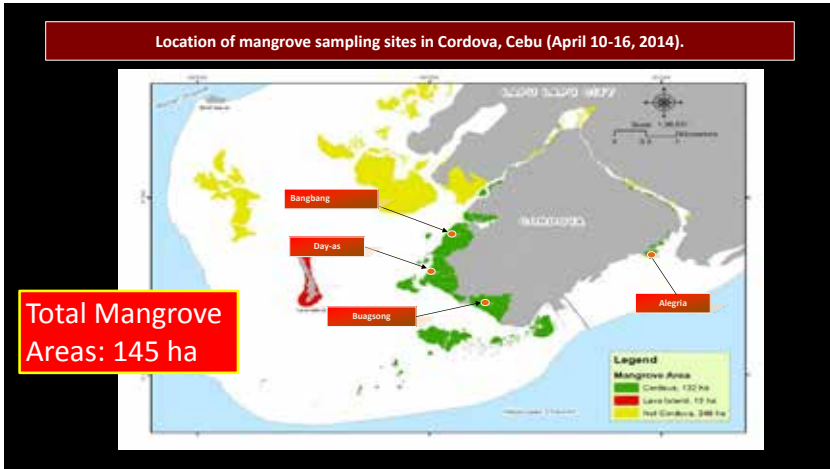
**Clean up Response**



**Mangrove Areas: Cordova, Cebu**







# Community Structure

## Overall Species Composition

Family	Species	SITE/BARANGAY			
		Day-as	Bangbang	Buagsiong	Alegria
1. Acanthaceae	1. <i>Avicennia marina</i>	X	X	X	X
2. Combretaceae	2. <i>Lumnitzera racemosa</i>	X	X	X	X
3. Euphorbiaceae	3. <i>Excoecaria agallocha</i>	X		X	X
4. Lythraceae	4. <i>Pemphis acidula</i>	X		X	X
5. Rhizophoraceae	5. <i>Ceriops decandra</i>	X		X	
	6. <i>Ceriops tagal</i>	X	X		
	7. <i>Rhizophora apiculata</i>	X	X	X	X
	8. <i>Rhizophora mucronata</i>	X	X	X	X
	9. <i>Rhizophora stylasa</i>	X	X	X	X
6. Sonneratiaceae	10. <i>Sonneratia alba</i>	X	X	X	X
<b>Total Number of Species</b>		<b>10</b>	<b>7</b>	<b>9</b>	<b>8</b>
<b>Total Number of Families</b>		<b>6</b>	<b>4</b>	<b>6</b>	<b>6</b>

## Species Composition



*Avicennia marina*

*Ceriops decandra*



*Ceriops tagal*



*Excoecaria agallocha*



*Lumnitzera racemosa*



*Pemphis acidula*



*Rhizophora apiculata*



*Rhizophora mucronata*



*Rhizophora stylosa*



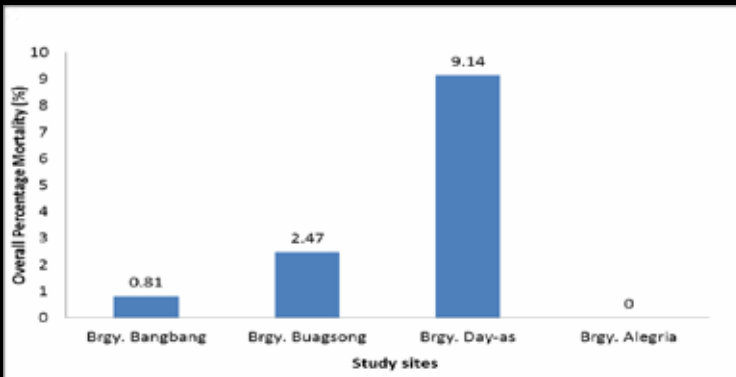
*Sonneratia alba*



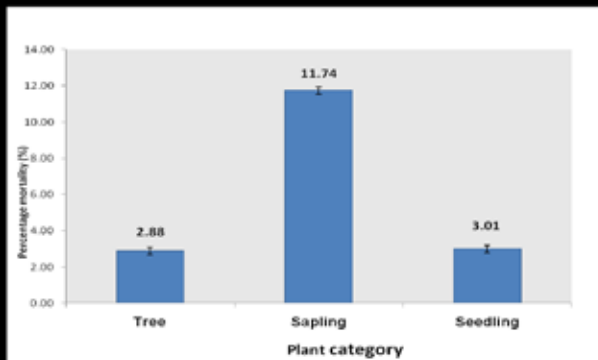
Table 1. Structural Characteristics of Mangrove Species: All sites. (April 10-16, 2014).

Species	SBA	Stems per Ha	Relative Density	Relative Freq.	Relative Dom.	Imp. Value
	m <sup>2</sup> ha <sup>-1</sup>	(n ha <sup>-1</sup> )	(%)	(%)	(%)	(iv)
1. <i>Avicennia marina</i>	4.47	4247.22	69.41	34.65	42.57	146.63
2. <i>Ceriops decandra</i>	0	2.78	0.05	0.99	0	1.04
3. <i>Ceriops tagaf</i>	0	2.78	0.05	0.99	0	1.04
4. <i>Excoecaria agallocha</i>	0.01	2.78	0.05	0.99	0.07	1.1
5. <i>Pemphis acidula</i>	0	22.22	0.36	1.98	0	2.34
6. <i>Rhizophora apiculata</i>	2.34	236.11	3.86	18.81	22.24	44.91
7. <i>Rhizophora mucronata</i>	0	2.78	0.05	0.99	0	1.04
8. <i>Rhizophora stylosa</i>	3.51	1575	25.74	35.64	33.39	94.78
9. <i>Sonneratia alba</i>	0.18	27.78	0.45	4.95	1.73	7.13
Total	10.51	6119.44	100	100	100	300

Overall percentage of mortality of all plant categories by site. Cordova, Cebu, April 10-16, 2014.



Percentage of Mortality by Plant Category, all sites in Cordova, Cebu. April 10-16, 2014



Dead mangrove trees at Brgy Bangbang, Cordova. April 10-16, 2014.



Dead and defoliated trees at an overwash mangrove. April 10-16, 2014.



Newly formed Pencil type of pneumatophores of *Avicennia marina*.



Dead leaves of *Rhizophora stylosa*. April 10-16, 2014.



Defoliated *Avicennia marina* trees.  
April 10-16, 2014.



Dead *R. stylosa* trees. Note the cut trees despite the warning not to remove dead trees, Brgy. Day-as, Cordova. April 10-16, 2014.





Man-made structure that alters the regular regime of tidal flow in the area. April 10-16, 2014.



High density of new wildling recruits of *Avicennia marina*, Brgy. Day-as, Cordova. April 10-16, 2014.



Oil bands on surviving mangroves. April 10-16, 2014.



## “Rehabilitation” Efforts

### Brgy Buagsong



October 10, 2013

Seedlings of *R. stylosa* for planting. Where?

### Buagsong, Cordova (Oct 10, 2013)



### Brgy. Day-as



### Brgy. Day-as



**Wrong Technique**

**Wrong Site!!!**



Poblacion, Cordova, Cebu (Dec 18, 2013)



**Mangrove replanting projects:**

- It was also noted that many of the replanted seedlings were of either one or two species and that this did not reflect the species compositions found in naturally occurring, mature stands.

**Recommendation:**

- Multi-species planting

## RECOMMENDATIONS

### 1. Mangrove monitoring:

- Assign some funds to enable monitoring of mature natural stands by the local community.
- Periodically monitor the mangrove stands in Day-as to discern any changes over time.

### 2. Mangrove replanting projects:

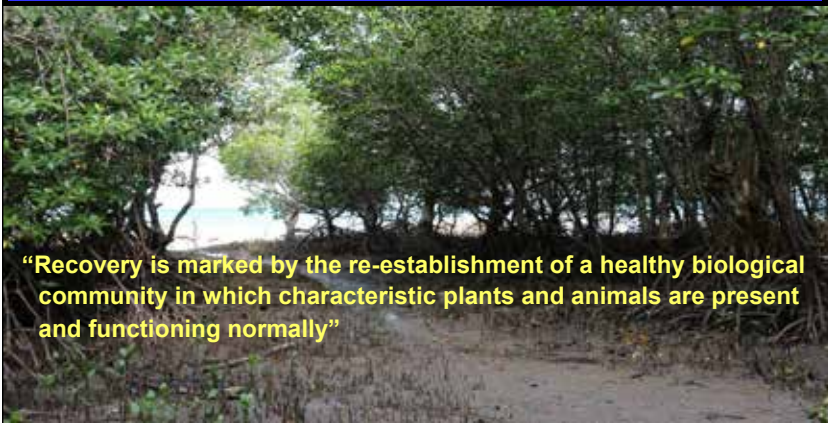
- It is recommended that future projects ensure that community replanting efforts are coordinated to complement and support resilience of natural, mature stands.

### Indicative recovery periods of various habitats

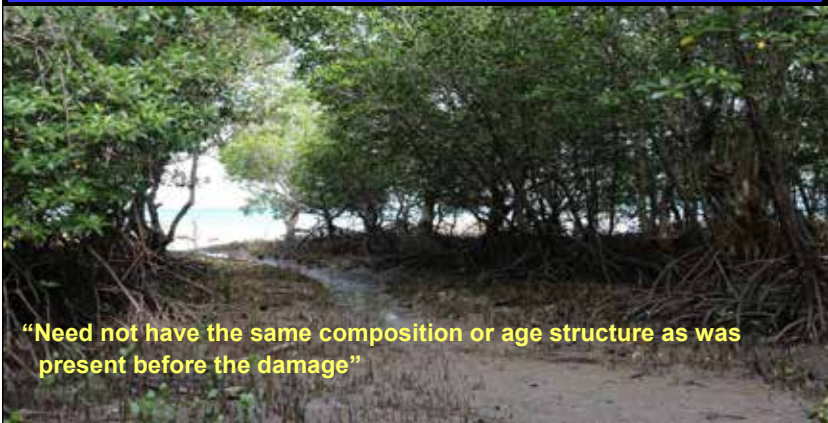
Habitat	Recovery
Plankton	Weeks/months
Sand beaches	1-2 years
Exposed rocky shores	1-3 years
Sheltered rocky shores	1-5 years
Saltmarsh	3-5 years
<b>Mangroves</b>	<b>10 years and greater</b>

ITOPF 2012

#### Recovery Of The Environment

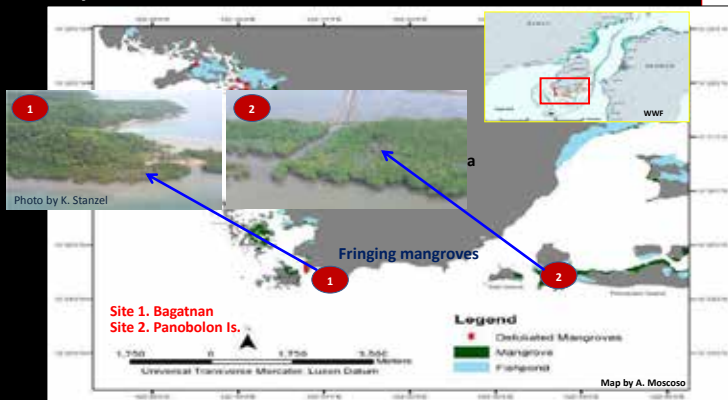


#### Recovery Of The Environment



## Recovery of mangrove deforested areas from M/T Solar I oil spill in Guimaras, Philippines

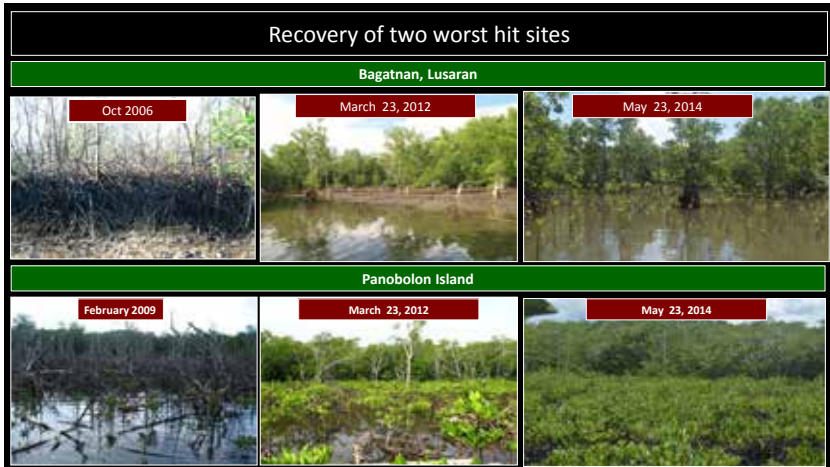
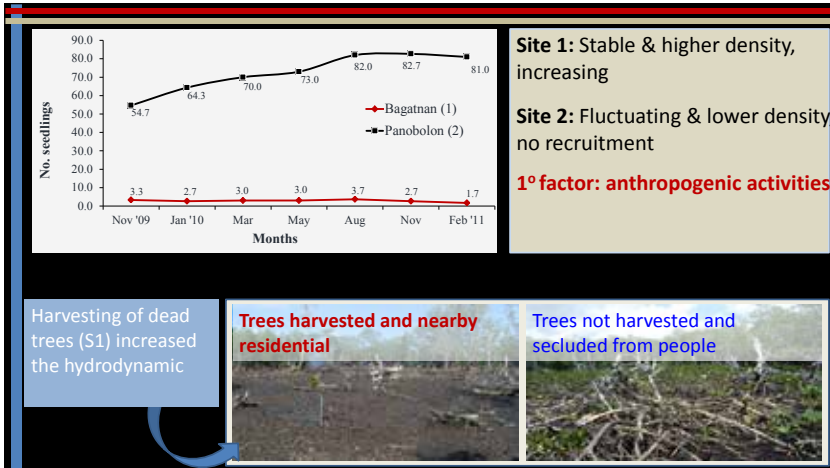
### Study sites



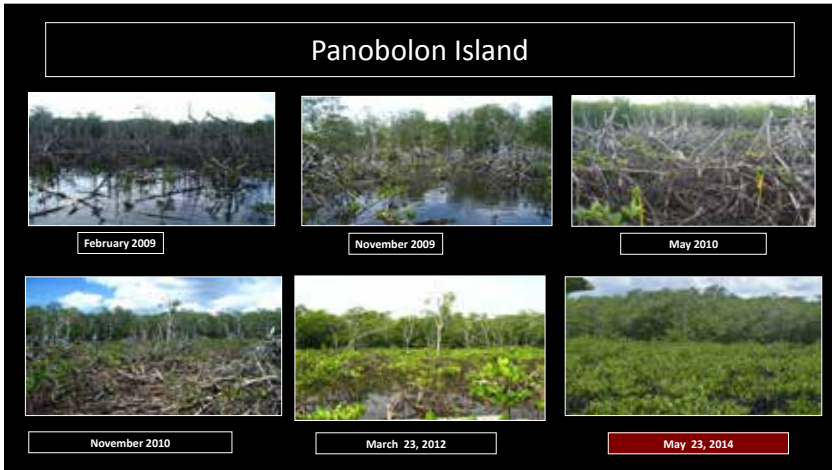
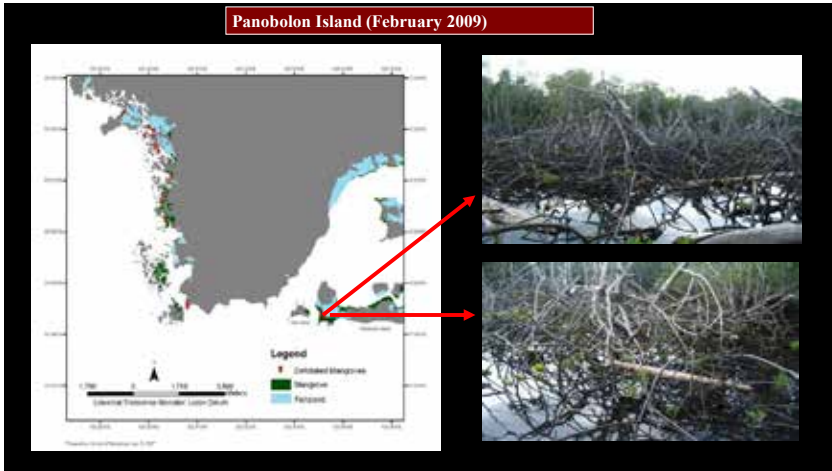
Observation	Bagatnan (1)	Panobolon (2)
Species present	5 species	5 species
Area deforested	0.490 ha	0.389 ha
Forest type	Fringing	Fringing
Hydrodynamics	Low (sheltered)	Low (sheltered)
Human access	Residential	Non-residential

### Study period

- ☐ November 2009 to February 2011 (15 months)
- ❖ Every 2 months (first 6 months)
- ❖ Every 3 months (succeeding 9 months)







## ACKNOWLEDGEMENT

- This assessment was also coordinated with the ff:
  - Gov. Hilario Davide III
  - Cordova Mayor Adelino Sitoy
  - Regional Director Isabelo R. Montejo of DENR-7, Cebu City,
  - Dr. Filipina B. Sotto (University of San Carlos)
  - Prof. Judith Silapan (UP Cebu College).

## ACKNOWLEDGEMENT

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- For field work assistance:
  - Laverna Jade A. Siarot (DENR-7, PAWCZMS),
  - Brisneve Adylantes (UP Cebu College)
  - Harold Haosen (University of San Carlos)

## Open Forum

3:29 – 4:00 PM

Q.1: Ms. Nena of RAFI asked, given the location and possible expansion of infrastructure in the Cordova area, whether they have suggestions for mangrove/seagrass protection?

*Dr. Sadaba stressed that the battle has been there for years. They are for mangroves/seagrass protection but at the end of the day, it's all up to the LGU. A case was filed against the mayor to halt construction because there are plans for a new/third bridge from Cordova to South Road Proper (SRP). It depends on the groups in Cebu to make their voices heard to prevent damage to these sensitive habitats.*

Q.2 Ms. Ramie of FPE asked who, ultimately, is in control to decide what is right when it comes to correct the notion that mangrove planting is allowed anywhere just as

long as they can plant mangroves. She is of the premise that mangrove planting started with good intentions. People and agencies just wanted to help, since 1970s, and '80s. The premise is, in the beginning, we thought that seagrass are more important than mangroves, and we don't have to add mangroves on sea grass, but let's not add to that wrong practice anymore. Cebu actually has been destroying a lot – look at Cansaga Bay. If you look at old maps, Tanke, Talisay is a very nice mangrove area, but it's now all SRP. SM SRP should be a nice seagrass bed. It's development in our perspective but not for the environment.

*Dr Sadaba concurred that it has been discussed in several conferences by several science groups over and over again. People doing the planting are aware of that, but the convenience, demand and pressure to come up with a figure for hectarage is high. It is the precision of these agencies. Events like this, you have the know how to inform others. That's our purpose here – to get information to share with others.*

*Mr. Carlos shared these sentiments. According to him, it is really more of pressure in attaining targets. If they can't achieve those targets, they might lose their jobs or they might lost the project. Something has to be achieved in the level of making people aware that this is not always the case.*

Q:3: Ms. Mymy of FPE thanked Dr. Rollon for a very interesting topic. She expressed dismay over the destruction of hectares of mangroves. Dr. Rollon mentioned that fishers are given alternative livelihood because they are now far from the coastline. She wanted to find out whether they have looked at anecdotal data on fish productivity, and whether the fishers mentioned that the loss of fish catch was due to destroyed fishing grounds.

*Dr. Rollon said that everyone can see on TV fishers saying that catch is declining, and recommending close monitoring of catch. How mangroves are performing, no one is closely monitoring the entire thing. Four hundred or so hectares should translate in decreasing yield because you lost habitats and mangrove areas, but there has been no study yet along that line. He added that a declared area in a geographical monument canal can be good, but first you have to think about the impact canals passing by mangroves again. They can look at the rock formation of Bohol for reference. Unless you're sure, don't do it.*

Q:4: Mr. Nathaniel Aniasco of UPV College of Fisheries relayed that he was in Bohol, doing research on coastal fishing, fishers doing gleaning, shallow area fishing. The fishermen told them there were changes, that they observed more sea urchins. It is important for Dr Rollon's presentation to include that in the adjacent municipality of Cortes, there was also a sinking. Many mangroves were dying, and inundated by water. They should look into it as well.

A participant also pointed out that based on what he has seen in Maribojoc, some of the plants, even coconut, are dying. Water is receding. He requested that a follow up study of what was presented can have a holistic view of what is actually happening in Maribojoc and Loon, so they can monitor changes in what brings about calamities. In relation to Dr Sadaba's presentation, there are lots of issues in Cordova, such as the assessment of area, the changes brought along by initiatives of

the LGU, as well as what other organizations are doing to prevent further damage of oilspill.

A DENR representative raised the concern that the agency shares with other agencies, such as the planting of monospecies in some areas. They are thankful to partners especially when it comes to their IEC because they have helped improve the mangrove rehabilitation process. They have included other species in their work plan, and as a result, they were able to lobby for an increased budget. As Dr. Rollon has mentioned, the intentions are good. There are indeed people doing admirable rehabilitation work. She also appreciated Dr Sadaba's presentation on the impact to the community, but would like to know further about the impact on the ecosystem, whether there is a study on impact on invertebrates, the penalty for culprits, and basically the mangrove ecosystem as a whole.

*Dr Sadaba explained that mangroves are biogenic. Once you remove mangroves, you remove the ecosystem. And that is why we focus first on mangroves. There have been intensive studies in Guimaras, and the results have long been published. They are available online. The impacts of oil spill on various components of environment are also available there. In the case of Cordova, vegetation was only done due to financial constraints. They have a follow-up research, a tie up with UP Cebu and USC. You can link up with them.*

Q.5: Ms. Maglana asked whether there are recorded impacts for mangrove communities like invertebrates and how different bioshield is from greenbelt? If so, what can you recommend for bioshield?

*Dr. Sadaba replied that for inland bioshield, he cannot make recommendations. For scenario development, focus must be on the bigger picture, the impact on communities. He admitted that they didn't make much of a survey on invertebrates. There was a study in Pangasinan, on the pre-typhoon state of invertebrates, like shells. There was a shift in composition in species, the amount in 2009 compared to the amount four years after; there's a change but in terms of change in people, we haven't documented much of it.*

Q.6: Ms. Flores of Oceana recommended for scientists to put up call for DENR and BFAR to give proper scientific guidelines on how to plant mangroves, and assign who will put it on paper. She further proposed to organize a national conference, like they did with IIRR, where they came up with paper and sent it to DENR.

*Ms. Maglana responded that a workshop will be done tomorrow where they can identify recommendations and produce a paper to be submitted to concerned agencies. She reminded Ms. Flores to bring up this particular issue.*

*A representative from the Forest Management Bureau related that there are planting guidelines from ERDB and FMB in terms of planting mangroves. They actually had a meeting before regarding the connectivity of mangroves and seagrass beds where they asked scientists if it is possible for mangroves to be planted on seagrass beds. The answer was no of course, because these are natural ecosystems, so it's like you're removing a natural ecosystem for another ecosystem.*

Q.7: Mr. Jed of ARTB wanted to clarify, from the quantifiable data presented earlier, whether resilience species are more appropriate species for rehabilitation?

*Mr. Carlos advised them to do dual assessment first. For dual areas, it's Avicennia and Rhizophora; citing these two species are the best. On rare occasions, there are also other species from seafront. They must take environmental considerations in planting. Therefore, they must observe their coast.*

Dr Sadaba added that it may make ecology sound like a commodity. This doesn't mean that the decision lies solely on scientific judgements for a specific area. There are other factors to be considered as well.

Ms. Maglana referred to the above observation as preface for the next session. The question of whether there is a mangrove greenbelt model available for planners will be tackled more in the succeeding sessions that aim to address Objective 3.

## **I. Area Coastal Protection: A Combination of Mangroves and Engineering Approaches**

**Dr Klauss Schmitt**

**Chief Advisor, GIZ**

**4:03 – 4:29 PM**

Highlights of the presentation included:


- Introduction
- Experience from GIZ in the Mekong Delta
- Experience from ZSL Sites in the Philippines
- Coastal processes
- Coastal dynamic
- Coastal dynamics influenced by human activities
- Area coastal protection
- Restoration of eroded floodplains through T-fences
- Reason for gaps
- Mangrove co-management: Shared governance
- Conclusion



# Area coastal protection a combination of mangroves and engineering approaches

Klaus Schmitt  
01.09.2015


Page 1



## Introduction

- Coastal regions face a threat from sea-level rise and increased erosion, flooding and storms due to climate change
- This increases the need for effective coastal protection, particularly in densely populated areas
- The traditional response of building dykes and seawalls is not only very expensive, it also does not work on the soft soils of mud coasts
- Sustainable coastal protection strategies need to be developed which include a diverse and site-specific range of approaches to ensure that adaptation conflicts, maladaptations, or path dependencies can be avoided
- Holistic approach which considers the floodplains or mangroves in front of the dyke as part of an area coastal protection system

Page 2



## Experience from GIZ in the Mekong Delta

- Project in Soc Trang started in 03/2007 with BMZ funding
- 2008 Kien Giang (BMZ, AusAid) and Bac Lieu (BMU)
- 2011 BMZ AusAid funded Programme
- 2014-2017 Integrated Coastal Management Programme (ICMP) jointly financed by Germany and Australia




Page 3

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## Experience from ZSL sites in the Philippines

- Balaring (north Panay Island)
- Bantayan Island (north of Cebu Island)



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## Coastal processes

- "Common knowledge/wisdom" does not necessarily work along the coast; sound knowledge about coastal processes/engineering is required
- Trees are used to effectively protect upland slopes from erosion – based on this some people may argue that planting trees on the seaside slope of the dyke will protect the dyke from erosion

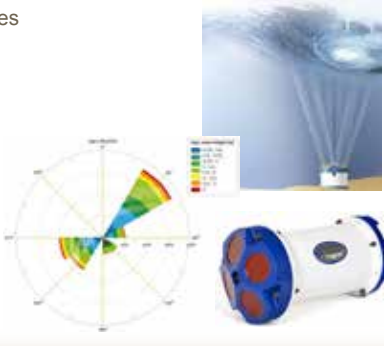


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## Coastal processes

- Waves
- Tides
- Currents
- Sediment transport
- Morphodynamics



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**Coastal Protection in the Lower Mekong Delta**

[http://daln.gov.vn/r/files/ICMP-CCCEP/tai\\_lieu/Document/Soc-trang/Shoreline-Management-Guidelines.pdf](http://daln.gov.vn/r/files/ICMP-CCCEP/tai_lieu/Document/Soc-trang/Shoreline-Management-Guidelines.pdf)

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1904  
1965  
2012

**Coastal dynamic**

- Because of coastal dynamics looking at the *status quo* is not enough
- Not all shoreline changes are mono-directional



Coastal dune ridge


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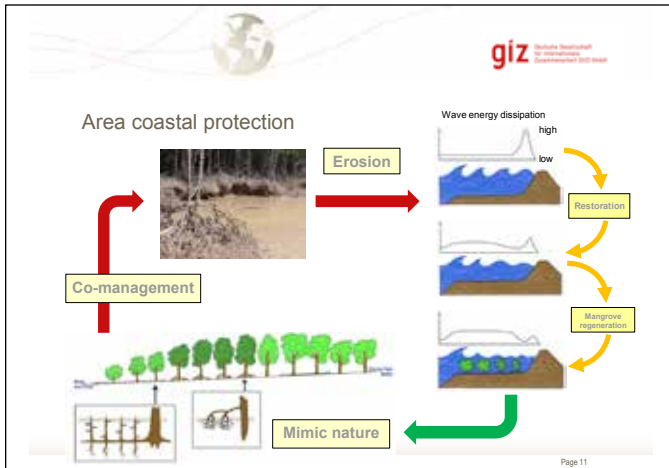
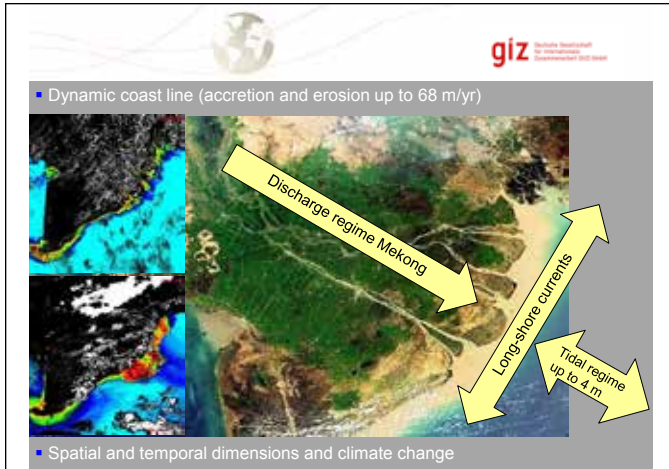
**Coastal dynamics influenced by human activities**

- Sediment balance
- Hydrology
- Mangroves forest degradation and destruction
- Mangrove rehabilitation using the wrong species
- Climate change



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### Bamboo t-fence construction

DAY 1




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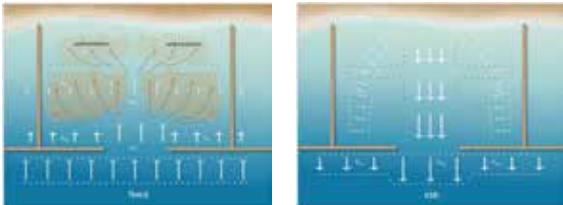



- The actual placement (positioning) of the T-fences is done in such a way that they more or less recreate the original coastline by connecting existing headlands with mangrove vegetation; i.e. they do not interfere with prevailing currents and will not cause downdrift erosion

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### Reason for gaps



- "Common knowledge/wisdom" does not necessarily work along the coast; sound coastal engineering knowledge is required

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- In suitable sites, mangrove regenerate naturally as long as they are protected from human destruction and if propagules are available
- Natural regeneration of *Avicennia* on restored floodplain at sluice gate 4 (Soc Trang Province, VN) from construction of the T-fences in October 2012 until January 2015 [11/2012, 02/2013, 11/2013, 01/2015]

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### Mangrove co-management: shared governance

Mangrove rehabilitation and planting efforts will be of little use if the seedlings and forests are not sustainably protected from destructive/degrading human impacts. This can best be achieved through shared governance.

- Co-management is an effective way of maintaining and enhancing the protection function of the mangrove forest belt
- Co-management contributes to better governance
- Co-management provides livelihood for local communities



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### Balaring (north Panay)

- If the objective of mangrove management is coastal protection, a decision must be made whether to focus on conserving existing forests or on mangrove planting
- When planting, it is essential to select: suitable planting sites, appropriate species, and the best-suited planting technique and planting time for a given site
- Site-selection should be based on an analysis and understanding of natural processes (coastal processes and dynamics) and historic changes, complemented by observation of natural regeneration (appropriate species, planting techniques and time)
- Balaring: the site is suitable for mangrove growth BUT is subject to strong waves and winds, therefore additional measures must be put in place to protect the seedlings

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- permeable groins almost perpendicular to the shoreline
- coast-parallel breakwaters



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### Bantayan (Cebu) – sandy beach erosion

- Beaches are dynamic landforms and their size and shape reflect the local balance between the deposition or accretion (gain) and erosion (loss)
- This is driven by littoral transport or the movement of sand and sediments in the nearshore area by waves and currents (long-shore and offshore)
- Santa Fe Port solid jetty built mid-1980s
- Interrupts the long-shore movement of sand to beaches south of the port
- The beaches that once dissipated wave energy are no longer present
- Concrete seawalls (significant cost)



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### Bantayan – engineering solution

- Beach nourishment: A sand-water mixture is transported by barges to the erosion area and dumped or pumped onto the eroded beach. This method has a certain half-life depending on the hydrodynamic boundary conditions. The nourishment forms a buffer for storms and serves as a sand reservoir.
- Sand by-passing: If the borrow area is close to the erosion area, a sand-water mixture can be pumped through pipelines to the erosion area and there distributed by graders. The pipelines can be installed permanently. This reduces the costs in the long run compared to nourishment by ships
- Nourishment does not eliminate the cause of erosion (long-term costs)

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## Conclusion

- An area coastal protection strategy (ecosystem-based) is more effective than use of a single coastal protection element and provides co-benefits
- Coastal protection and climate change adaptation measures must be site-specific and appropriate
- Based on a sound understanding of natural processes and numeric modelling
- Bamboo t-fences are an (1) effective way of coastal protection, to (2) restore floodplains and to (3) create conditions for mangrove regeneration (rehabilitation) in erosion sites
- Just planting mangroves is of little use without protection - conserving mangrove ecosystems through co-management is important for sustainability
- Part of an integrated approach to coastal area management (integration of sectors, agencies and scientific disciplines, participation and co-management, ecosystem-based management and adaptive management)

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## Thank you for your attention!



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[http://www.dinstruments.com/images/web\\_sentinel1105.jpg](http://www.dinstruments.com/images/web_sentinel1105.jpg), Albers et al. 2013 p. 18  
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Slide 11: K. Schmitt, Albers and Schmitt 2015  
Slide 12: Albers et al. 2013, p. 108 and 110  
Slide 14: Cong Ly and GE Wind  
Slide 15: Albers et al. 2013 p. 71  
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Slide 17: GIZ Soc Trang  
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Slide 20: Google Earth 11.11.2013  
Slide 23: K. Schmitt

Layout  
Klaus Schmitt

In cooperation with



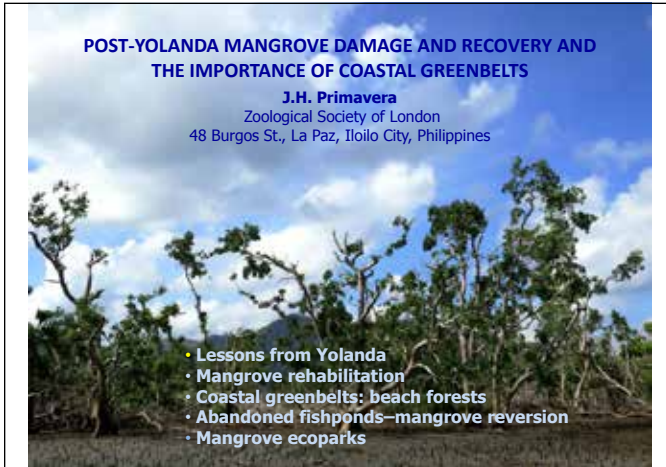
Page 24

# J. Post-Yolanda Mangrove Damage and Recovery and the Importance of Coastal Greenbelts

**Dr. Jurgenne Primavera**  
 Chief Mangrove Scientific Advisor, ZSL  
 4:32 – 4:54 PM

Highlights of the presentation included:

- Lessons from Yolanda
- Mangrove rehabilitation
- Coastal greenbelts
- Abandoned fishponds – mangrove reversion
- Mangrove ecoparks






**PHL to plant more mangroves in wake of super typhoon Yolanda**  
 November 25, 2013 8:19am, Agence France-Presse

DENR PLAN Year 1 (PhP1 billion/US\$22 million): **To replant 380 km coastline = 1,900 ha of mangrove + beach forest**

## PhP64 QUESTION – DO WE NEED TO PLANT MANGROVES??

TO ANSWER THE QUESTION

### Who

**2 teams/ 17 participants** from NGOs (ZSL, GDFI, ELTI, Haribon, C.I. and Tambuyog) and academe (UP Diliman, UP Tacloban, Ateneo de Manila University and La Salle University) and DENR Region 6 (assisted by UP Tacloban students)

### Where (total 14 sites in E. Samar & Leyte)

- Eastern Samar (7 sites/ 6 municipalities: Quinapondan, Guiuan (Bagongbanwa Is. and Maliwaliv Is.), Salcedo, General MacArthur, Hernani , Lawaan )
- Leyte (5 municipalities + 2 cities: Ormoc City, Palompon, Isabel, Merida, Carigara, Palo, and Tacloban City)

### What: assessed mangrove damage & recovery potential

- a) Mangrove Community Structure (estimating counts and biomass of live seedlings, saplings and trees in a 100 sq m plot)
- b) degree of defoliation /other damage classified as Not Damaged, Partially Damaged , or Totally Damaged

**When: Jan/2.5 mo & March/4.5 mo** 2014 (total 7 days)



Survey sites of mangrove damage and recovery in Eastern Samar, Philippines, January and March 2014.

Comparison of mangrove species and counts in Eastern Samar, January and March 2014 (Primavera et al, unpub. report)

Municipality	Maslog, Lawaan	Sto. Niño, Quinapondan	Anahaw, Gen. MacArthur	Maliwaliv, Salcedo	Batang, Hernani	Abeja, Salcedo	Bagongbanua, Guiuan
Coordinates: Latitude	11° 7'22" N	11° 8'49" N	11° 15'9" N	11° 5'54" N	11° 18'5" N	11° 11'23" N	11° 3'18" N
: Longitude	125° 19'52" E	125° 31'30" E	125° 33'17" E	125° 35'3" E	125° 36'18" E	125° 36'30" E	125° 39'44" E
Kind of Mangrove	Plantation (80% planted)	Natural	Natural	Plantation (90% planted)	Natural	Natural	Natural
Dominant species	Rhizophora spp.	Mixed	Sonneratia alba, Aegiceras floridum	Rhizophora spp.	Sonneratia alba, Aegiceras floridum	Mixed	Sonneratia alba, Aegiceras floridum
Trees (no/ha)	2,460.0	2,787.5	720.0	7,320.0	735.3	2,800.0	6,775.0
No Damage (%)	400 (16.3)	1,587.5 (57.0)	106.7 (14.8)	0 (0)	0 (0)	2,000 (71.4)	0 (0)
Partially Damaged (%)	1,320 (53.7)	993.8 (35.1)	533.3 (74.1)	1,940 (26.5)	100.6 (13.7)	800 (28.6)	1,925 (28.4)
Totally Damaged (%)	740 (30.1)	206.3 (7.4)	80 (11.1)	5,380 (73.5)	634.8 (86.3)	0 (0)	4,850 (71.6)

Kind of Mangrove	NATURAL	PLANTED
Damage: trees - counts (no/ha)		
No Damage (%)	1,293.8 (56.8)	200 (4.1)
Partially Damaged (%)	722.0 (31.7)	1,630 (33.3)
Totally Damaged (%)	261.8 (11.5)	3,060 (62.6)
Recovery		
Total counts (no/ha)	17,700.6	8,690.0
Trees	2,277.6	4,890.0
Saplings	3,289.7	550.0
Seedlings	12,133.3	3,250.0

PHILIPPINE DAILY INQUIRER

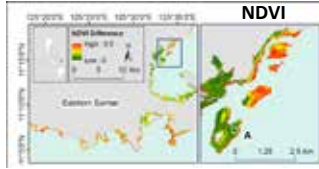
# OPINION

TUESDAY, JUNE 17, 2014

## Planted 'bakhaw' sustained worst 'Yolanda' damage

MAY I place in proper perspective the study of the Ecosystems and Environment Bureau (FERDB) of the Department of Environ-

Anahao Is., Matarinao Bay  
Landsat results (Long et al, unpub ms)



- Landsat change analysis Anahao Is., Matarinao Bay E. Samar: **mangrove damage minimal** (NDVI decreased by 0.1)
- **Ground observation** validated damage map showing minimal damage to mangrove.

Republic of the Philippines  
Province of Eastern Samar  
MUNICIPALITY OF GENERAL MACARTHUR

**Gen. MacArthur  
Rehabilitation Plan**

Mangrove along the coastline of Gen. MacArthur and in the **islands of Anahao**, Capocanacan and Lalawigan were **totally devastated**. These islands are the primarily shield of Gen. Mac- Arthur during typhoon especially from big and strong waves.



TREES		
Species	Diameter	Degree of damage
Af		Pd
Af		Df
Af	(5+4)	Pd
Af	(4+4+5+5)	Intact
Af	4	Pd
Af	(4+4)	Intact
Af	4	Intact
Sa	23	Intact
Am	22	Defoliated
Ra	12	10% damage
Af	7	Pd
Am	30	Defoliated
Sa		Broken trunk
Af	(4+3)	Intact
Af	3	Pd
Sa	22	Pd
Sa		Totally damaged
Sa		Totally damaged
Sa		Dead
Sa		Dead
Cp	10 cm	80% damaged
Af	(8+5)	
Cp	(18+10)	70% damage
Sa	(26+42)	Intact
Cp	(5+5)	80% Damaged
Sa	29	Pd
Cp	(16+9+9+9)	50% Damaged
Sa	29	Pd
Sa		Almost Completely Damaged
	15	



**PhP1B for Mangrove Rehab, Yolanda Areas  
(UP Diliman, 22 March 2014)**


- **Protect** natural mangroves
- **Mangrove rehabilitation (if needed) - nurseries, community-based**
- **Resettle** vulnerable coastal communities
- Enforce **no-build zones for greenbelts**
- Establish **100-m coastal greenbelts**
- Enforce **mangrove reversion of abandoned ponds**

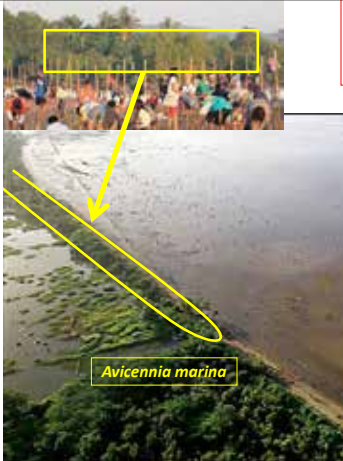


**OFFICIAL GAZETTE**  
 Department of Budget and Management  
**DENR mangrove-beach forest plan gets P400-M seed fund**  
 Posted on [March 18, 2015](#)

The DBM released an initial **P400 million to the DENR for Mangrove and Beach Forest Development Project** under the National Greening Program ... representing 40% of total P1 billion funding ... concerned stakeholders from LGUs and private sector/NGOs ... will develop mangroves and beach forests in Yolanda/disaster areas.

PROGRAM/PROJECT/ACTIVITY	INITIAL RELEASE	
Site validation & assessment	12,330,000	(3.0%)
Baseline site data collection (research)	20,550,000	(5.1%)
Site preparation	54,800,000	(14.7%)
<b>Nursery - barangay/community</b>	<b>8,550,000</b>	<b>(2.1%)</b>
<b>Wildings/propagules collection</b>	<b>240,070,400</b>	<b>(60.0%)</b>
Plantation establishment	27,400,000	(6.8%)
<b>Community capacity building</b>	<b>174,000</b>	<b>(0.04%)</b>
Project monitoring & supervision	36,125,600	(9.0%)
<b>TOTAL</b>	<b>P400,000,000</b>	<b>(100.0%)</b>





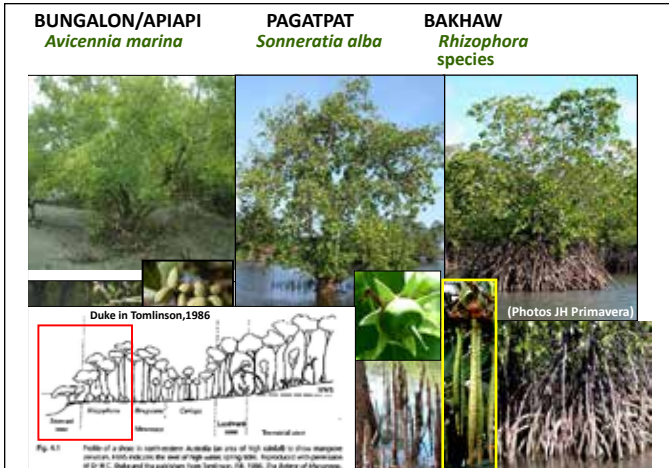



WRONG SPECIES!!

*Rhizophora* spp.

(Collage by JH Primavera)



**April 10, 2007: Birthday of Dumangas, Iloilo Mayor Distura**

**Free Mass Wedding Ceremony**  
 TO BE SOLEMNIZED BY MUNICIPAL MAYOR HON. ROLANDO U. DISTURA  
 APRIL 10, 2007

**NEWS**  
**No tree planting = no wedding, baptism, burial in Ilo**

By [Name]

The Catholic Bishops' Conference in the Philippines...

The Archbishop of Iloilo and the provincial government in this previous rules signed as a program regarding education, gathering, tourism of the department as well as parks and gardens of capabilities for tourism to flourish before they are under the Catholic rule, according to a news...

The ordinance of agreement...

Ordinary Attorney General and Director Jim Sanguino of the Department of Environment and Natural Resources (DENR) view of the ordinance also...

Makulu stated it was important to show the anniversary that the 40-year-old ordinance...

Makulu also emphasized the...

and regulations on the...

The NICA is still...

and call them to...

to ensure that...

"The Park of Life"

A place called "The Park of Life" within the Bungal area to each...

participate in the planting...

to be...



NGP (Nat'l Greening Program) planted 37.5 ha in 2013; 5% survival

IVISAN, Capiz: ZSL-CMRP planted ~6.6 ha in 2009-2011 at 50-80% survival

**DENR/NGP success: % seedlings/ha planted (beginning)**  
**Biological success: % survival, ha of forest (end)**

### ENGAGE LOCAL GOVERNMENTS

**SOCIOPOLITICAL STRATEGIES**  
 (Primavera et al, 2013)

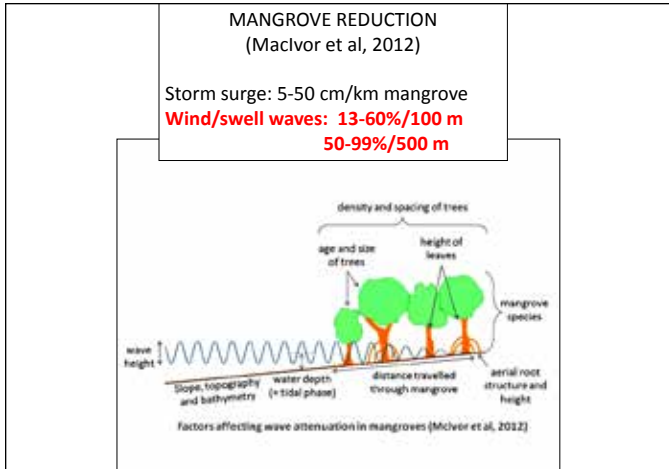
- **Networking**
- **Labor for planting**
  1. paid (per piece, per ha basis) – reduces planting activity to a **business transaction** after which planter can forget plants
  2. not paid (transpo, snacks/meals provided); community/PO **labor** contribution is basis for **ownership**, and obligates them to

**NO PAY/VOLUNTEER PLANTING** (people's organizations)

**MANUAL ON COMMUNITY-BASED MANGROVE REHABILITATION**

**COMMUNITY-BASED MANGROVE REHABILITATION TRAINING MANUAL**

ZSL



<b>PHILIPPINE MANGROVE GREENBELT/OTHER LAWS</b>	
P.D. 705 (1975)	Revised Forestry Code: mangrove strips in islands providing protection from high winds, typhoons shall not be alienated
P.D. 953 (1976)	Fishpond/mangrove lease holders required to <b>retain or replant 20-m mangrove strip</b> along rivers, creeks
BFD A.O. 2 (1979)	Min. 25% of total mangrove forest in given area completely protected as Mangrove Wilderness Areas
P.P. 2151 & 2152 (1981)	Declaration of 4,326 ha mangroves as wilderness areas, 74,767 ha as forest reserves
MNR A.O. 42 (1986)	Expansion of <b>mangrove belt in storm surge, typhoon areas: 100 m along shorelines, 50 m along riverbanks</b>
DENR A.O. 76 (1987)	Establishment of <b>buffer zone: 50 m fronting seas/oceans and 20 m along riverbanks</b> ; lessees of FLA ponds to plant <b>20-50 m-mangrove strip</b>
DENR A.O. 77 (1988)	Integrated Social Forestry Program (provision of <b>legal tenure</b> incentives for co-management of forest resources)
DENR A.O. 123 (1990)	Award of 25-yr Community Forestry Management Agreement for small scale mangrove use, <i>Rhizophora</i> and <i>Nyssa</i> plantations, aquaculture
DENR A.O. 15 (1990)	Policies on communal forests, plantations, tenure through Mangrove Stewardship Contracts; revert abandoned ponds to forest; <b>ban cutting</b> of trees in FLA areas; <b>prohibit conversion</b> of thickly vegetated areas
DENR A.O. 3 (1991)	Policies and guidelines for Mangrove Stewardship Agreement
DENR A.O. 23 (1993)	Combined 3-yr Mangrove Reforestation Contract and 25-yr Forest Land Management Agreement into 25-yr FLMA for families (1-10 ha) and communities (10-1,000 ha)
R.A. 8550 (1998 Fisheries Code)	Pond lessee: undertake <b>reforestation for riverbanks, bays ... seashore fronting dike</b>

**storm surge: 7-15 km**  
**wind/swell waves: 100/500 m**

**MNR A.O. 42 (1986): 50-100 m**  
**Water Code (1976): 40 m**

**Coastal greenbelts** - a strip of natural or planted coastal vegetation, stretching at least **100 meters** in width from the sea towards land, primarily of mangrove and beach forest species, which are designed to prevent coastal erosion, and mitigate the adverse impacts of natural coastal hazards on human lives and property.

**KALIBO, AKLAN** Photo Mark Man

<p><i>Pandanus tectorius</i> (pandan)</p> <p><i>Millettia pinnata</i> (bani, balukbaluk)</p> <p><i>Sterculia caramica</i> (banilad)</p> <p><i>Sterculia foetida</i> (calumpang, bobog)</p>	<p>Pandan, Antique Pandan, Tubigon, Bohol Bani, Pangasinan Bani, Tinambac, Cam. Sur Banilad, Dumaguete, Neg. Or. Banilad, Cebu Cabubugan, Guimbal, Iloilo Bobog, S. Lorenzo, Guimaras Bubog, Sibunag, Guimaras Bubog, Talisay City, Neg. Occ. Calumpang, Molo, Iloilo City Calumpang, Estancia, Iloilo Talisay, Barotac Nvo., Iloilo Talisay, Cebu</p>
<p><i>Terminalia catappa</i></p>	

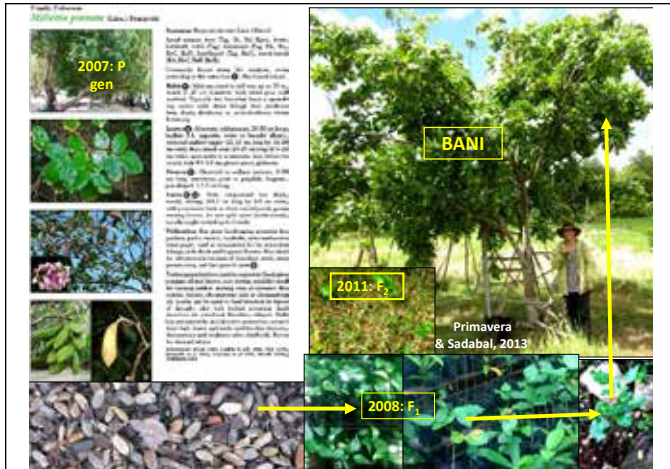
**140 = total species x 50% trees**  
**70 = tree species (mostly pioneers/colonizers)**  
**50 = (70 – 20 need beach) tree spp. for reforestation**

<p>(banago)</p> <p><i>Vitex parviflora</i> (tugas, mulawon, molave)</p>	<p>Tugas, Kaitbo, Aklan Tugas, Makato, Aklan Tugas, Tanjay, Negros Or. Tugas, Baybay, Leyte Tugas, C.P. Garcia, Bohol Tugas, Getafe, Bohol Tugas, Carrascal, Surigao Sur Tugas, Ballangao, Mis. Occ Mulawon, Pan-ay, Capiz Molave, Zamboanga del Norte</p>
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**ZSL-Oxfam Project**  
**Bantayan, Cebu (Mar 2015):**  
**11,800 seedlings/25 species**  
**from 5 P.O. Nurseries**

**DENR Nursery: 8,000 seedlings/2 species (80% molave)**

Photo collage by JHPrimavera

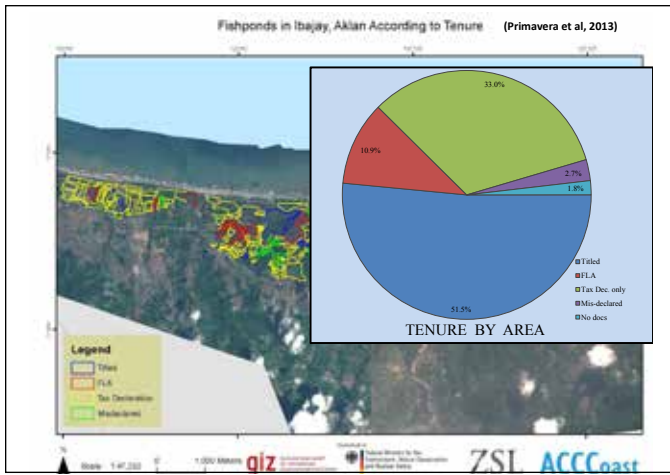





- B'WATER PONDS: TENURE**
- Private: titled (private property)
  - Public/govt: Fishpond Lease Agreement (FLA)
  - Public institutions, eg LGUs, SUCs: Deed of Usufruct
  - **Others (illegal?):**
    - tax declaration
    - misdeclared (as ricefield, subdivision)
    - undocumented

**Classification of Fishponds (Primavera, 2013)**



- B'WATER PONDS: STATUS**
- **Operational**
  - **Non-operational (=abandoned: broken dikes, mangrove growth)**
  - **Converted (ricefield, subdivision)**



<p><b>FOREST REVERSION/REHABILITATION</b></p> <p><b>DENR A.O. 15 (1990)</b> Revert abandoned ponds to forest</p> <p><b>DA-DENR Memo. Order 3 (1991)</b> Guidelines for FLA cancellation-reversion to mangrove forest under DENR</p> <p><b>DA-DENR Gen. M.O. 3 (1991)</b> Reversion to forest of mangrove areas released to ponds but not utilized, abandoned after <b>5 yrs</b></p> <p><b>DENR A.O. 17 (1998)</b> Fishpond conversion major cause of mangrove deforestation, prohibited further zonation/release for ponds of already zoned forests</p> <p><b>R.A. 8550 (1998)</b> Reversion to mangroves of abandoned/underdeveloped/underutilised ponds</p> <p><b>DA-DENR-DILG JAO 1 (2008)</b> Convene TWG on mangrove reversion of abandoned FLA ponds</p>	  <p><i>By Paolo Romero   Philippine Star 23 August 2015</i>  <a href="https://sg.news.yahoo.com/house-oks-bill-revert-idle-00000716.html">https://sg.news.yahoo.com/house-oks-bill-revert-idle-00000716.html</a></p> <p>The House of Representatives has approved on third and final reading a bill that seeks to revert fishponds that <b>have been unutilized or abandoned for three years</b> to forestlands. House Bill 5845 shortens the process of reverting idle fishponds, which is seen to spur</p> 
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TIMELINE OF EVENTS		ZSL	SEA LIFE	PEW FELLOWS PROGRAM IN MARINE CONSERVATION
<b>1980s</b>	Some of the first mangrove reforestation projects in the Philippines were initiated.			
<b>1996</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			
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<b>2002-2005</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			
<b>2004</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			
<b>2006-2007</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			
<b>2008</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			
<b>2009</b>	First mangrove reforestation project in the Philippines was initiated in the Iloilo region.			

### Open Forum

4:55 – 5:15 PM

Dr. Primavera described a site in Ajuy, where there was 1½ meters erosion. Engineers were commissioned to do a study. Mr. Schmitt of GIZ advised to do science, on which inputs can be based before structure design. Two breakwaters were designed in Ajuy and finished in 2010. Bakhaw were planted, but all died. In 2002, Avicennia were planted, and they all survived. After Yolanda, not a single tree died. This should answer question on how to prevent uprooting.

Q.1: Ms. Maglana asked, that with all modern technology and methodologies that agencies have established, whether they can say that adverse effects of Yolanda can be mitigated?

*Dr Schmitt, having just come to the Philippines fairly recently, could not speak authoritatively about Yolanda. However, he said that if they look back in time, they can understand what will happen in future. Mangroves go back a long time. There have been periodic disturbance, and storms are natural phenomena in coastal areas. For over 100 years mangroves can regenerate, they will not be damaged for long. They will suffer to a certain extent but they have the capacity to recover. They cannot expect 100% protection, but they can protect and ensure fast recovery.*

*Dr Primavera added that if the mangroves that remain can be protected, they recover. In Samar, it is recovering; in Leyte, not as much, but they're not hopeless. What worries her is that for the budget of P400M, 60% is going to bakhaw propaganda use, which is not scientifically based. She instead poses the question, "Why not divert that to abandoned fishponds where they used to be?" It will be very good adaptation. People have to be relocated, and when they get asked if they like their relocation sites, they answer no, but that they do not have a choice. LGUs must relocate its citizens away from harm and disaster. The LGU has to have great political will, and do things correctly. The budget of a billion pesos is not up to DENR - it's taxpayers' money. For our position paper tomorrow, this must be seriously looked into. It will have a great effect on our communities. Dr. Primavera further emphasized: "As our heroes said, there are no tyrants if there are no slaves, so please let us not be slaves."*

**Q.2:** A participant observed that this is a roomful of people that can do something about the environment. The point is how they can integrate into each other's circle all the things that we are doing. They can identify a venue after conference to talk and draw and identify common grounds where they can see where they can lift each other up. The issues may be too much for BFAR, DENR, and NGOs to take on themselves so they must form a cohesive unit to get this thing going.

*Dr Schmitt assured that he can be available to give advice, along with others like Ms. Jo Savaris and Dr. Primavera who have been around a long time, but it's the younger people that must keep the momentum in doing things right in treating the environment right. He agreed that NGOs, academe, and government must come together in another venue and asked Mr. Labrado whether it is possible.*

*Mr. Labrado replied that this activity is actually part of continuing dialogue and engagement between all sectors involved in mangrove rehabilitation. It is part of one big project that is about building capacities. ZSL has run a number of trainings, and a number of their partners have been using advocacies, tools, scientific approaches developed by ZSL. They are continuously finding ways to propagate these approaches, such that everyone can espouse them. It should start with basic concepts of scientific assessments and undertaking science-based protocols in rehabilitation. They can only do so much at ZSL's level - in fact, it has been cause of tension within ZSL - but they also have to look at creating positive environment on how to involve other NGOs, particularly humanitarian NGOs. A common knee jerk reaction to rehabilitation is being done through cash for work without clear scientific approaches, and some are doing it wrong. ZSL can continue, together with partners like GIZ, programs on how to do this correctly and scientifically.*

*Ms. Rosalie of ZSL noted that a lot has been done for DRR, thanks to GIZ. For a clear showcase of building back better, there must be parameters on what we should consider. The challenge for us is how we can incorporate in development work what all of them are currently doing that can address the ecosystem. They need risk assessment. If we can do it for humans, why not for the ecosystem?*

Q.3: A participant, a GIS Specialist, from Haribon wanted to know about other mangrove species, aside for bakhawan, that can be used for rehabilitation.

*Dr. Primavera stressed that one of the important factors of mangrove is elevation. In protected coves, it is higher in elevation. If you are talking about seafront planting, you are limited, exposed to extreme environment, like the waves. You do not look for biodiversity in the seafront.*

*Dr Schmitt added that a natural system doesn't have to be too thick and populated. In Germany, there is a dense canopy but no other plants are thriving. Biodiversity is more in terms of species, in terms of mangroves, high diversity.*

Ms. Maglana announced the conclusion of the sessions and thanked Dr. Primavera and Dr. Schmitt. She reviewed expectations and matched them with the sessions that were presented during the day. Tomorrow, the participants will identify common ground and how to move it forward. She further announced the workshop groups for the next day, namely bio-physical, socio-economic and institutional arrangements, and instructed that it is on a first sign-up, first accommodated basis.

After some administrative announcements, the awarding of tokens for the speakers led by Mr. Labrado and Ms. Savaris was held.

The PTFCF representative, Ms. Ann Rubenecia, was then introduced to help launch the poster on Philippine mangrove.

Ms. Ann said she was happy and delighted to introduce the material that PTCF and ZSL jointly produced to fill a wide gap in various groups implementing mangrove rehabilitation. After Yolanda, both organizations collaborated to beef up community, and technical expertise of POs in mangrove rehabilitation and livelihood. They also packaged a community-based mangrove rehabilitation manual developed by ZSL scientists and technical experts led by Dr. Primavera. They have shared manuals and field guides to partner POs and NGOs, as well as municipal and planning development officers within Yolanda-hit areas through the Development Academy of the Philippines. The poster that is about to be introduced has a simple message. The material is still being finalized and suggestions are welcome to improve it. She expressed her thanks to ZSL for the collaborative work that are most helpful to ensure successful mangrove rehabilitation efforts. Each participant will be given one poster each to help popularize this mangrove species so more of us can be critical of what mangroves can do for our areas.

Dr. Primavera, speaking for ZSL, was also happy to see the material that will hopefully educate Filipinos that there is more than one mangrove species. The poster will show that there are many other species. She also looks forward to working and collaborating with other partners to continue the advocacy.

Dr. Primavera, Mr. Labrado and Ms. Ann proceeded to unveil the poster and present it to the audience.

Day 1 ended at 5:45 PM.

## **Day 2**

### **September 2, 2015**

The second and last day of the conference began at 8:15 AM with Ms. Maglana introducing Dr. Theresa Mundita Lim of DENR-BMB for her message.

## **Message**

**Dr. Theresa Mundita Lim**  
**Director, DENR-Biodiversity Management Bureau**

Dr. Theresa Mundita Lim shared some thoughts on the agency's mangrove program.

*DENR for a time, had been doing mangrove planting – one of minimally funded – for communities and private sector since the upland was more prioritized. It is what government is more hard-wired to do, being more focused on timber production. Through the years, however, there were pockets of advocates that saw mangroves for eco-tourism, food production and lately, for climate change adaptation and disaster mitigation. With those advocacies, a small budget survived, lodged with the PAO under the forestry sector. The advocacy continued with limited budget, and planting went on in some areas but it was not really a major priority. Suddenly, they experienced the brunt of new normal and elected a president who wanted to do away with corruption and reach the grassroots. They saw the impact of Haiyan and realized where the budget should go. With a new president that supported the advocacy, the budget of tens of thousands suddenly ran to millions, with enough funds remaining for mangrove and beach forest rehabilitation. However, there is limited time. During an executive meeting where they presented a proposal for greenbelt and mangrove planting, they realized that they should have done a lot of things – they should have established a nursery, especially for other mangrove species, not just bakhaw babae and bakhaw lalaki; should have done site assessment, community capacitating, and equally advocated for soft marine bottoms. More importantly, everything should have been done yesterday. But they would like to think all is not lost, after all, they are meeting now. Today is the start of the future of beach ecosystem. There are more partners and advocates and much better science to know what they want and need to know. Everyone is enjoined to harness all this now, to do what they should have done years ago. We do not look forward to the day when someone in this room would say years from now, “I told you so!”*

Ms. Maglana thanked Dr. Theresa Mundita Lim for inspiring the group to think about the future and what should have been done yesterday. She then gave a recap of the previous day's highlights.

A few administrative reminders were made before the sessions related to Objective 4: Experiences and lessons from mangrove rehabilitations in the context of humanitarian assistance: mangrove planting through cash for work schemes, began.

## **K. The Early Response Assistance to Typhoon Haiyan Victims in North Cebu**

**Mr. Romel Kirit**

**Former Project Manager, ZSL-Philippines**

**8:40 – 8:57 AM**

Highlights of the presentation included:

- Background
- Post-Haiyan scenario
- Purpose of project
- Identification of CFW beneficiaries
- Preparatory activities
- Implementation of the workplan
- Lessons learned/recommendations

**The Early Response Assistance to  
Typhoon Haiyan Victims in Northern  
Cebu, Philippines**

**"A Humanitarian Project in the context of environmental  
rehabilitation"**

**Romel D. Kirit**  
Coastal Resource Management Consultant  
Municipality of Moalboal  
Province of Cebu

### Background:

- funded by Oxfam GB
- Project sites:
  - Bantayan Island
  - San Remigio
  - Daanbantayan

### Project components:

- habitat assessment
- Cash for work
- value chain study



### Post Haiyan scenario

- Across all typhoon hit-provinces, life-saving assistance is still urgently required, particularly food, water and shelter.
- “recovery of livelihoods in the fishing and farming industries is a key priority as many lack cash to buy food and rebuild their houses.”



### Purpose of the project:

- 
- The project intends to provide early response assistance to typhoon victims in coastal and island communities in the five municipalities of said province through various identified strategies.

### Project Component 2. Cash-for-work for mangroves rehabilitation

- To implement cash-for-work (CFW) to affected fishing and coastal families in the three municipalities.
- Activities will mainly involve the establishment of community and municipal mangrove and beach forest nurseries and outplanting of mangrove seedlings/rehabilitation in existing mangrove forests damaged by the typhoon

### Identification of CFW beneficiaries

- Target beneficiary: Fisherfolk organizations
- Been performing CRM related activities in partnership with the LGU, NGO, GAs and other stakeholders
- Internal selection: Criteria
  - fishing as main source of income/living;
  - with dependents (children, PWD, women);
  - 18-59 years old;
  - no permanent income; and
  - 1 family-1 beneficiary scheme.

### ZSL-Oxfam Project Beneficiaries

Name of Organization/ Location	No. of Members	CRM Activity engaged in
Pundok sa Gagmayng Managat (PGM), Barangay Okoy, Sta Fe	80	Marine Sanctuary management
Balidbid Women's Association (BWA) and Balidbid Farmers & Fisherman's Association (BFFA), Barangay Balidbid, Sta Fe	44	Mangrove Planting
Marikaban Small Fishermen's Association (MASFA), Barangay Marikaban, Sta Fe	35	Marine Sanctuary management
Pantugan Farmers and Fishermen's Association (PFFA), Barangay Sulangan, Bantayan	35	Mangrove planting
Obo-ob Mangrove Garden Integrated Ecotourism and Conservation Association (OMAGIECA),Barangay Obo-ob, Bantayan	42	Mangrove eco-park
Malbago Farmers and Fishermen's Association (MAFFA), Barangay Malbago, Madridejos	58	--
Kaungood Farmers and Fishermen's Association (KAFFA), Barangay Kaungood, Madridejos	40	Mangrove Planting
Kodia Fishfolks Association (KODFA), Barangay Kodia, Madridejos	72	Mangrove Planting
Lambusan Community-basedResource Management Association (LCBRMA), Barangay Lambusan, San Remigio	100	Mangrove planting
Tambungan United Farmers and Fishermen's Association (TUFFA), Barangay Tambungan, San Remigio	50	Mangrove Planting
Tacup Farmers and Fishermen's Association (TAFFA), Barangay Tacup, San Remigio	103	Mangrove Planting
Busogon Farmers and Fishermen's Association (BUFFA), Barangay Busogon, San Remigio	100	Mangrove Planting
Kinawahon Farmers and Fishermen's Association (KAFFA), Barangay Kinawahon, San Remigio	66	Mangrove Planting
Total	825	

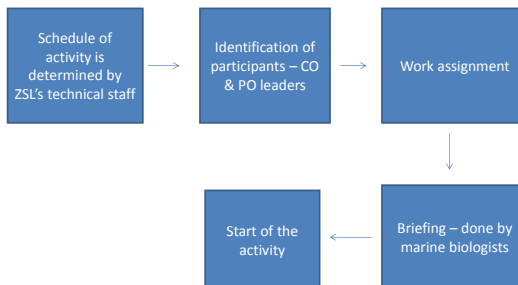
### Preparatory activities

- Consultation with the LGU & the community
- Mangrove and Beach Forest Training Course
- Orientation on statutory requirements and humanitarian standards (min. wage, magna carta for women, labor code, etc.)



Nursery Establishment	Activity	No. of Workdays	No. of persons involved
a) Site preparation			
	Cleaning	5	5
	Area layout	5	5
	Nursery construction	5	5
b) preparation of planting materials and bagging	potting medium	5	5
	wildlings collection	7	10
	potting/bagging	12	5
	Filling	5	5
	seedbox construction	3	5
c) maintenance and protection			
	replacement planting	7	3
	cleaning of nursery		
	collection of seeds for Germination	7	3
	Germination		
<b>Total</b>		<b>61</b>	<b>51</b>
<b>Out-planting</b>			
a) Site preparation			
	Staking	5	10
	hole digging	5	10
	Hauling	5	10
b) Plantation activities			
	Planting	14	10
c) Maintenance & protection			
Patrol works			
First pass			
	Replanting	5	5
	removal of debris	5	5

### Implementation of the work plan





## Mangrove and Beach Forest Outplanting Output

- Nurseries established - 13
- Mangroves (*Avicennia sp* & *Sonneratia sp*) outplanted- 33,634 (2.9 hectares)
- Beach forest - 994 (3.14 hectares)



9/3/2015

OVERALL SUMMARY TABLE OF CFW BENEFICIARIES

Municipality	Barangay	Name of PO's	PO member			Total Cash Received					
			Male	Female	Total	1st Payout	2nd Payout	3rd Payout	4th Payout	5th Payout	Total
Santa Fe	Balibid	Balibid Farmers and Fishermen Association (BAFFA)	7	1	8	20,304.00	0	24,816.00	0.00	0.00	45,120.00
	Balibid	Balibid Women's Association	0	42	42	27,918.00	87,420.00	121,542.00	0.00	0.00	236,880.00
	Marikaban	Marikaban Small Fishermen's Association	25	11	36	96,162.00	2,820.00	101,520.00	0.00	0.00	200,502.00
	Okoy	Pundok Sa Gagmayng Mananagat	59	1	60	22,724.00	16,638.00	169,200.00	137,616.00	0.00	346,178.00
			91	55	146						828,680.00
Bantayan	Sulangan	Planitugan Farmers Association (PAFA)	40	2	42	56,400.00	56,118.00	118,440.00	0.00	0.00	230,958.00
	Oboob	Oboob Mangrove Garden Integrated Ecotourism and Conservation Assn. (OMAGIECA)	24	21	45	6,768.00	0	126,900.00	120,132.00	0.00	253,800.00
			64	23	87						484,758.00
Madridejos	Kadia	Kodia Fishers Association (KODFA)	20	85	105	18,048.00	197,682.00	374,496.00	0.00	0.00	590,226.00
	Kaangkod	Kaangkod Fishermen Association (KAFA)	36	12	48	20,304.00	94,752.00	153,408.00	0.00	0.00	268,464.00
	Malbago	Malbago Small Fishers and Farmers Assn. (MALSFFA)	50	0	50	0	0	74,730.00	207,270.00	0.00	282,000.00
			106	97	203						1,140,690.00

### Summary of CFW Payments in San Remigio

PO	male	female	total	1st payout	2nd payout	3rd payout	4th payout	5th payout	Total
TUFFA	27	23	50	69,090	84,600	33,840	94,470		282,000
TAFFA	39	64	103	73,884	76,140	7,050	356,448	54,426	567,948
BUFFA	40	57	97	87,702	150.87	190,068	112,320		390,241
LCBRMA	48	45	93	57,810	0	118,158	262,824	56,964	495,756
KFCBRMA	28	37	95	36,400	91,650	93,624	124,926	346,600	346,600

2,082,545

## Total Cash for Work

- Sta. Fe :       Php 828,680
- Bantayan:        Php 484,758
- Madridejos:    Php 1,140,690
- San Remigio:    Php 2,082,545
  
- Total: Php **4,536,673**

## Lessons learned/recommendations

- Should be implemented in the context of CRM
- CFW should be understood as an incentive/reward
- Better implemented with concomitant sustainable mechanism
- Capacity of the working area (habitat) should be considered
- Prior briefing is necessary
- Better awarded to People's organization/s performing CRM related activity/activities

## Lessons learned/recommendations

- Coordination with the LGU and Brgy. LGU is necessary – there is already contact and relationship
- Use existing remittance system
- follow declared wage rate and avoid artificially inflating wages



## L. Cash for Work Greenworks Project

**Prof. Margarita dela Cruz**

Executive Director, Guiuan Development Foundation, Inc.

8:58 – 9:15

Highlights of the presentation included:

- Post-Haiyan/Yolanda situation
- Greenworks Project Objectives
- Strategy
- Mapping
- Results/Observations
- Outcomes
- Final Note



Cash for Work: Greenworks Project

- **After Typhoon Haiyan/Yolanda**

Mangroves seemed dead, brown, totally defoliated

Rapid assessment after 2-3 months – debris, broken branches, garbage, seedling, saplings, sprouting

Protocol in mangrove damage assessment and cleaning

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Cash for Work: Greenworks Project

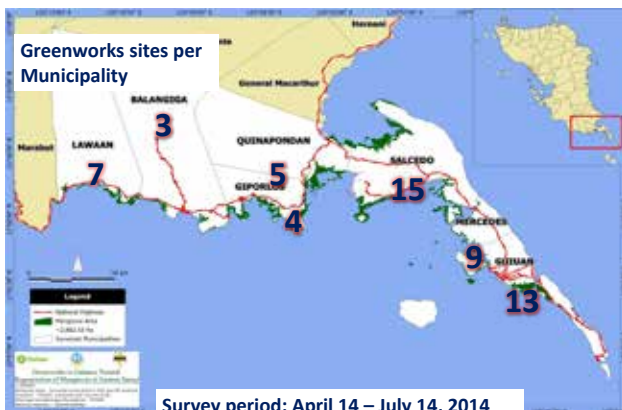
- **Greenworks Project Objectives:**

Enhance/facilitate natural recovery of mangrove forests.

Provide much needed intermediate cash income to families

Determine extent of mangrove forest in selected sites.

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### Cash for Work: Greenworks Project

- **Strategy:**

#### **Cash for work (Mangrove clean-up)**

- Beneficiary selection (fishing families)
- Orientation on proper mangrove cleaning
- Distribution of protective gears
- Work supervision by community mobilizers
- Payment

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### Cash for Work: Greenworks Project

#### **Mapping**

- Survey of selected sites using GPS
- Estimate damage and recovery
- Identify widely distributed and other species
- Note presence of seedlings and saplings
- Visualize data and determine extent of mangrove stand.

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## in GUIUAN...

Widely Distributed Species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> – 12 locations <b>Nipa</b> – 1 Barangay	Saging-saging, Pagatpat, Tabao and Miyapi	63%	37%	Abundant

Mangrove Area ≈ 379.40 ha

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## in MERCEDES...

Widely distributed species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> 9	Saging-saging, Pagatpat, and Nipa	78%	22%	Abundant

Mangrove Area ≈ 102.81 ha

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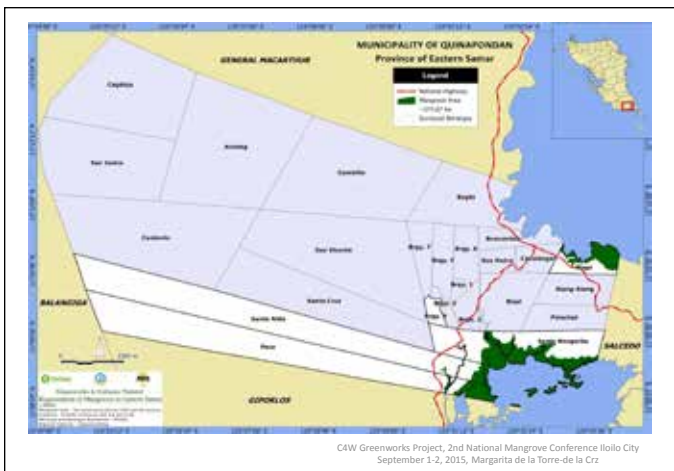
## in SALCEDO...

Widely Distributed Species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> – 14 <b>Pagatpat</b> – 12	Saging-saging, Miyapi and Nipa	77%	23%	Abundant

**Mangrove Area 1,129.81 ha**



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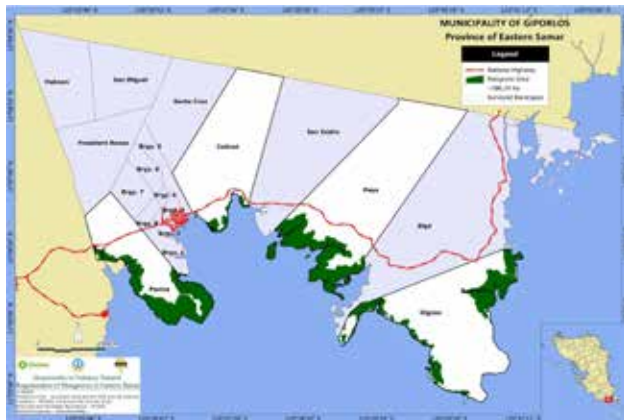


## in QUINAPONDAN...

Widely distributed species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> 5	Nipa, Pagatpat, and Miyapi	62%	38%	Abundant

**Mangrove Area** 📏 374.67 ha

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## in GIPORLOS...

Widely distributed species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> 4	Saging-saging, Pagatpat, Nipa and Miyapi	65%	35%	Abundant

**Mangrove Area** 📏 386.24 ha

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## in BALANGIGA...

Widely distributed species	Less Dominant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> <b>3</b>	Saging-saging, Pagatpat, and Nipa	63%	37%	Abundant

**Mangrove Area** ≈ 192.37 ha

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## in LAWAAN...

Widely distributed species	Less Abundant Species	Sprouting	Still Defoliated	Presence of Seedlings/Saplings
<b>Bakhaw</b> 7	Miyapi, Pagatpat, and Nipa	73%	27%	Abundant

**Mangrove Area** ≈ 297.25 ha

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Cash for Work: Greenworks Project

### Results/Observations:

- Total of 2,862.55 ha. mapped; average of 32% (area wise) still defoliated as of July 2014
- Recovery of mangroves is fast in natural /diverse stands
- *Bakawan* species are slow to recover especially the planted monoculture of *Bakawan*, some may no longer recover
- Older *Bakawan* trees are even slower to recover
- *Pagatpat, miyapi, saging saging, buta-buta/lipata, and tabao* are most resilient, fast to recover
- Abundant seedlings and saplings of *bakawan, saging saging, pagatpat, miyapi* and *tabao* in most areas contribute to fast recovery.

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Cash for Work: Greenworks Project

### Outcomes:

- Proper clean up facilitated recovery of mangroves
- Cutting of defoliated trees with potential for recovery prevented
- DSWD sponsored cash for work adopted our method expanding the orientation to include biology and ecology of mangroves and as a result, Brgy. Officials in 4 Brgys. prevented Bayani Challenge from planting mangroves in their areas.

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Cash for Work: Greenworks Project

**Final Note. . .**

- Less than a year after Typhoon Haiyan, natural mangrove forests have recovered fully but only about 10% of planted *Rhizophora* recovered. However, seedlings and saplings are growing thus there is no need for replanting especially as these plantations are located on seagrass beds.
- Greenworks project was able to engage a total of 3,500 beneficiaries for 15-25 days work @P260/day.

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### GUIUAN



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### MERCEDES



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## BALANGIGA

Nipa



Pagatpat



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## LAWAAN



Miyapi



Nipa



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## **M. Experiences and Lessons from Mangrove Rehabilitation in the Context of Humanitarian Assistance: Mangrove Planting through Cash for Work Schemes**

**Ms. Josephine Savaris**  
Programme Manager, ZSL–Philippines  
9:16 –9:34 AM

Highlights of the presentation included:

- Mangrove Rehabilitation (Post-Yolanda)
- Project objectives
- Experiences and lessons learned



**Name of Project: Mangrove rehabilitation (Post Yolanda)**

Partner POs  
 1. Gabuc Fisherfolk  
 Association  
 2. New BAMA  
 3. BANECA  
 4. BPFA

Supported by  
**PTCO**


**Project Objectives:**

This project aims to provide a short-term response to rehabilitate the mangrove forests affected by the super-typhoon Yolanda.

**Duration: 3-6 months (Starting 2 January 2014)**

**Amount of Grant: 100,000-200,000/ PO**

**Specific objectives:**

1. Clean-up waste materials, debris, dead and decaying foliage or branches from mangrove forests
2. Rebuild/Reconstruct the damaged community mangrove nursery
3. Provide immediate livelihood support for the communities affected through cash-for-work scheme in conducting mangrove rehabilitation activities


**Experiences and lessons learned**
**1. Cleaning vs clearing**

Cleaning- picking up of waste materials, debris, dead and decaying foliage or branches

Clearing- implies cutting, limit trees chances of survival, will destroy seedlings


**2. Cash for work should be early response**

- If objective is to provide income for families
- Guidelines need to set and explained to beneficiaries
- Equal distribution to members

100,000/ 26 members /15 days = P256.40/day/member

**ZSL** | LET'S WORK FOR WILDLIFE

**3. Regulation in harvesting of wildlings**  
-danger of over harvesting




**4. Coordination between players of mangrove rehabilitation work on site**


- INGO – provided the materials needed, payment for cash for work
- ZSL- provided the technical training on proper site selection, nursery establishment



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**5. Implementation of rehabilitation work on the same site by 2-3 groups**

- BLGU assigns area for different groups to work on



- Assigned area to be validated whether plantable

**ZSL** | LET'S WORK FOR WILDLIFE

**6. Appropriateness of species for planting**

- Cash for Work is Fast and quick hence the choice for Bakhaw





VS



*Rhizophora spp.*                      *Avicennia marina*

**7. Target areas must be subjected to site assessment using science based protocols**

- Evaluate whether sites are plantable
- Defined area for planting
- Clearer target for number of wildings/ seedlings needed



2.5 ha x 10,000/ha (1m x 1m spacing)  
= 25,000 seedlings x 10% mortality allowance  
= 27,500 total seedling requirement

**8. In areas where "cash for work" scheme is plenty communities have the tendency to throw away the science based protocols taught to them**

- Pera pera lang yan
- Conducted refresher courses on mangrove- site selection, nursery establishment and outplanting



**Thank You.**



## Open Forum

### 9:35 – 10:10 AM

**Q.1:** Dr. Schmitt thanked the panel for their interesting presentations. He then raised two points. Cash for work has been presented with problems, because it is very short term. They must start thinking of long term-solution, do monitoring and protection, and not focus only on immediate action of planting. In the 100 years of evolution that has dealt with disasters, the last 99.99% of time, nobody has bothered to do clean up. Funds should be used not for clean up, but for education.

*Ms. Dela Cruz agrees with Dr. Schmitt's point but raised that different situations must be considered. For example, their area, Eastern Visayas, is a typhoon belt. They did do a clean up after Typhoon Yolanda. It was necessary because all sorts of debris and garbage were there. Then they let the saplings grow, which they had to remove debris at first to hasten recovery. In ordinary cases, they did not have to do that. In oil spill, you let water do it for you. In their case, they had to do it but with supervision so people will not step on the saplings. It is also science-based. She further agreed that monitoring should be done and there is need for map-out, to be used as baseline. Other groups are following up on using baseline to do rehabilitation work. Cash for work necessary is not advisable all the time, but may be necessary in some cases.*

**Q.2:** A participant noted similarities in lessons learned from presenters. She therefore asked what are their plans in improving CFW programs and increasing awareness in areas heavily hit by disasters for everyone to realize that lessons and experiences in CFW are useful and helpful. If not, what are recommendations for CFW to be improved?

*Ms. Dela Cruz replied that she represents a local NGO based in Guiuan, which means that while they engage in CFW, it doesn't mean that they stop there. They continue to implement their environment and community activities, and volunteer work in CRM. Specifically, one of the islands they are working in have planted Rhizophora. Right now, the community is cutting the dead ones to give space for saplings. They are relocating families along the coast, and moving them back to safer place and replanting mangroves on places they are going to vacate. This will take care of the sustainability aspect. They will continue their DRR and greening programs, but in some instances, may do it differently, depending on the situation and adaptability of the community.*

*Ms. Savaris, for ZSL's part, stated that they will continue advocacy of science-based protocols, documenting important activities on site, call for partner's meetings with DENR to improve mangrove rehabilitation work. CFW and early response are already finished; they are now at the rehabilitation stage. They will continue research to increase performance in terms of getting better survival. She recognised the need to engage with more partners. ZSL is not segregating government agencies in addressing this. DENR and other INGOs are still on site to continue mangrove work. ZSL is doing trainings (ToTs) for mangrove and beach forest, and has done so for state universities, private sector and other NGOs. They are open to doing more. A third one is coming in October for LGUs. They can provide technical expertise as well. They have received*

many requests for assessments and trainings, but ZSL manpower is also limited that's why they do ToTs.

*Mr. Kirit, speaking as municipal consultant, stressed that the existence of a basic CRM program is what's important for each municipality and that it is implemented/enforced. CRM is one of the basic services that the LGU needs to deliver to constituents. Whether they are doing CRM, or MPA Management, whether there is CFW or not, as long as it is within the framework of CRM, and it is continuous. Basic CRM program is a law, so it has to be enforced.*

**Q.3:** Ms. Maglana cited that post-typhoon protocols are very valuable to prepare for future storms. Can organizations collaborate to manualize these lessons?

*Dr. Primavera said that some organizations, including ZSL, have started manualizing their stories. If we don't document and capture these experiences, we will only fall back to old mistakes. Some collaborations have been explored.*

*On the comment of Dir. Alice, the environment is under the purview of DENR, according to Dr. Primavera. On clearing/cleaning, she agrees with Dr Schmitt, but clearing cannot be done without people. Along this line, Ms. Dela Cruz is right, you need people to clear to give nature chance to recover.*

**Q.4:** A participant wanted to know about the possibility of CFW for abandoned fishponds. These areas are potential to plant *apiapi*. They have actually inquired from BFAR which had listings and they wanted reversion so mangroves could be planted there instead.

*Ms. Savaris clarified that it is not actually for CFW, but ZSL has had experience in terms of planting mangroves in abandoned fishponds in Leganes. The first thing is to take a look at its tenure. Even if it is not abandoned, but the FLA (fishpond lease agreement) is still active, you still need to do legal reversion. You still need to refer to BFAR. To cancel FLA, and turn it over, is a long process which we hope to do something about. Legality in tenure is still a real concern.*

*Mr. Labrado added, regarding the manualizing of experiences, that ZSL has a manual on Community-based Mangrove Rehabilitation and Conservation that they developed. It features a guide on mangrove damage and rehabilitation assessment, all the do's and don't's on managing recovery work on mangrove are there. They may download a copy from the PTFCF and ZSL website.*

**Q.5:** A participant commented that CFW can be difficult for people working on bancas. What can the panel advise for those who are constructing or building bancas and other structures but whose pay is not equivalent to the minimum wage, or even other CFW beneficiaries that are earning more with less work?

*Mr. Kirit responded that whatever rate or amount a CFW worker is earning must be the minimum wage in that area. If unfair pay is existing, you have to invoke what is required by law. There is a statutory basis for that. On mangrove reversion, Mr. Kirit is presently assisting the Municipality of Moalboal. They have 80 hectares of abandoned fishpond, and for five years, that area has not been developed. He suggested to*

*the mayor that the LGU apply the de facto principle, where the burden of proof is on grantee of lease. So they intend to plant on the abandoned fishpond. If the original leasee wants to claim later on, they can claim but they can't cut down mangroves. The Mayor and CENRO were agreeable so they're mobilizing the POs now.*

**Q:6:** A participant asked whether there are sub-cultural treatments and approaches for greenworks?

*Ms. Dela Cruz answered that the aquasilviculture is used by BFAR for mudcrab and fish rearing. Ms. Savaris added that aquasilviculture, on the other hand, does not require cutting down the mangroves, but putting fences around them for protection.*

**Q:7:** A participant narrated that his organization is doing tree surgery, which is not common among mangroves. They do it to preserve trees which are of historical value. They have the civic duty where you want to preserve it. They can do it with mangroves, especially big ones that need to be rehabilitated. They can remove rotten branches and apply technology to preserve them.

**Q:8:** Ms. Dindin of IRelief was struck by the P1 billion fund. She wondered if civil society can be privy to the process on how it is allocated and whether we can participate?

*Ms. Mendoza recalled that Dr. Theresa Mundita Lim talked about the whole DENR budget allocation process.*

*Ms. Alice added that site selection is previously identified and prepared by Ms. Tess under the NGP. The P1 billion is marked for different stakeholders, for different provinces, including non-Yolanda affected areas. They had various consultations on how to allocate. The P400 million has already been released to some areas. The NGP still lacks some 3,000 hectares of 5,000 hectares, and is until 2015 only. The full amount is still not released. DENR is still identifying areas for the remaining 3,144 hectares. They recently had a conference, but it is not sure if other provinces that want to join this have been identified. If they want details, they can coordinate with the ERDB Director.*

**Q:8:** Ms. Maglana wanted to find out what the proposal development process was.

*Ms. Dela Cruz shared that when they implemented the CFW clean-up, it was an immediate process so the barangays were not involved. Ideally for programs, the communities must be consulted.*

*Ms. Savaris revealed that right now, ZSL is developing a proposal for North Iloilo. They sat down with the community, but ZSL was there only to facilitate. The concept and ideas came from them – it was basically them who drafted proposal.*

*Mr. Kirit added that usually, there are researches conducted prior to project development, which are incorporated in packaging of the proposal. The knowledge really comes from the barangay.*



### III. The Workshop

Ms. Magalana wrapped up the open forum by acknowledging the speakers. She then oriented the participants about the next activity, the workshop.

The following were the workshop objectives:

- Surfacing inputs of the participants to contribute towards the achievement of conference objectives; and,
- Identify recommended actions

The workshop groupings were:

- Governance and institutional arrangements
- Socio-economic
- Bio-physical

Workshop questions were posed:

1. With respect to your assigned aspect of mangrove management and rehabilitation, and with the perspective of building coastal resilience and adaptation to climate change in the Philippines
  - a. what are the specific issues and concerns?
  - b. what are the good experiences and lessons learned?
2. Taking off from these issues/concerns and good approaches and lessons learned, what are the specific actions that we recommend to the following actors to improve mangrove management and rehabilitation and build coastal resilience and adaptation to climate change:
  - a. Government agencies
  - b. Congress
  - c. Local governments
  - d. Civil society (NGOs, POs, academe)
  - e. Humanitarian aid agencies
  - f. Private sector

The Workshop process was as follows:

1. Use meta cards to brainstorm on Question 1.a (pink cards) and 1.b (green cards); discuss to clarify and categorize
2. Discuss and agree on your specific recommendation actions (Question 2, yellow cards)
3. Agree on a reporter; 10 mins per presentation
4. Be back at the session hall by 12 nn

The suggested report template was presented as well:

## Question 1.a and 1.b

Aspect	
With respect to your assigned aspect of mangrove management and rehabilitation, and with the perspective of building coastal resilience and adaptation to climate change in the Philippines	
1.a Specific Issues and Concerns	1.b Good Experiences and Lessons Learned

## Question 2

Aspect	
Actor	2. Recommended Actions to Improve Mangrove Management and Rehabilitation, and Build Coastal Resilience and Adaptation to Climate Change
Government agencies	
Congress	
Local governments	
Civil society (NGOs, POs, academe)	
Humanitarian aid agencies	
Private sector	

After confirming that the instructions were clear, the participants went off to their respective groups and room assignments to commence the workshop.

The workshop was conducted from 10:18 to 1:15 PM.

The afternoon session resumed with administrative announcements regarding the field trip and remaining sessions.

The presentation of outputs thereafter followed.

## A. Bio-physical group

**Ms. Loi Marie Olaguir**

Technical Staff, DENR Caraga

1:35 – 1:43 PM

With respect to your assigned aspect of mangrove management and rehabilitation, and with the perspective of building coastal resilience and adaptation to climate change in the Philippines

Specific Issues and Concerns:

1. Improper mangrove rehabilitation practices

- Site-species appropriateness, proper planting site selection, zonation, planting on seagrass beds, planting strategy (spacing, substrate)
- 2. Lack of monitoring and maintenance
- 3. Coastal erosion
- 4. Poor solid waste management/ garbage disposal
- 5. Weak enforcement and implementation of mangrove laws and policies
- 6. Lack of awareness/knowledge gap
  - Mangrove and beach forest ecology and rehabilitation protocols
  - Fundamentals in conservation, protection, rehabilitation
  - Aquasilviculture
  - Damage assessment
  - When to rehabilitate
  - Appropriate and site-specific engineering measures
- 7. Lack of information dissemination
- 8. Illegal settlers in mangrove areas
- 9. Effects of mining activities on mangroves

Good experiences and lessons learned:

1. Community involvement and awareness on rehabilitation
2. Strong coordination with communities, government agencies, other key movers
3. Mangrove eco-parks for forest protection and management and livelihood of communities
4. Regular reporting and updating
5. Data and information dissemination
6. Memorandum of agreement for project implementation
7. Access to data and information
8. Ordinances in place and enforced
9. Conduct of site clean up
10. Science-based rehabilitation protocols
  - Well-managed nurseries
  - Site-species selection/suitability
  - No planting on seagrass beds and tidal flats
  - Well-monitored rehabilitation areas

Recommended Actions to Improve Mangrove Management and Rehabilitation, and Build Coastal Resilience and Adaptation to Climate Change

1. Government agencies
  - Intensify IEC
  - Use of science-based protocols
  - Implementation and enforcement of policies (RA 9003)
  - Conduct training for coastal areas, ecosystem training (DENR and SUCs)

- Executive Order on mangrove rehabilitation protocols
  - Access to data
  - Address issue on illegal settlers
  - To reassess/monitor NGP targets and indicators considering science-based practices
2. Congress
    - Push for the passing of the mangrove greenbelt bill
  3. Local governments
    - Implementation and enforcement of policies
    - Provide logistic support for rehabilitation projects
    - Pass a resolution on providing financial support for Bantay Katunggan enforcers
    - Integrate mangroves in CWLUP
    - Use 4Ps recipients as manpower (LGU, DSWD)
  4. Civil society (NGOs, POs, and Academe)
    - Intensify IEC
    - Youth mobilization
    - Data and information readily available
    - Manualize and document rehabilitation efforts
  5. Humanitarian aid agencies
    - Include sustainability mechanisms of programs
  6. Private sector
    - Encourage public-private partnerships for mangrove management and rehabilitation
  7. All sectors
    - Institutionalize mechanisms to: a) conduct baseline, integrated understanding of the coastal system (site specific); b) use baseline information to pass a CWLUP
    - Baseline Information and CWLUP should be prerequisites for rehabilitation projects; else, status quo?
    - Intensify IEC
    - Adopt co-management approach in the management of our coastal resources
    - Implementation of monitoring activities
    - Transparent and accessible data
    - Inter-agency coordination and collaboration

## **B. Socio-Economic group**

**Ms. Monyeen Nida Alava**

**Executive Director, Coastal Conservation and Education Foundation, Inc.**

**1:44 – 1:54 PM**

With respect to your assigned aspect of mangrove management and rehabilitation, and with the perspective of building coastal resilience and adaptation to climate change in the Philippines

Specific Issues and Concerns:

1. Settlement and zoning issues in mangrove/coastal areas specifically
  - Presence of settlers
  - Relocating settlers
  - Encroachment
  - Tenurial issues
  - Destructive human activities in mangrove and other protected areas

Good Experiences and Lessons Learned:

- Multi sectoral led mangrove rehabilitation effort is well coordinated POs as direct stakeholders should be involved
  - Other Humanitarian NGOs are now into mangrove rehabilitation work
  - Engagement in Eco-tourism as product of mangrove rehabilitation
  - Mangrove ecosystem as potential source of livelihood
2. Issues on incentives, rewards and trade-offs to stake holders engaged in mangrove work specifically
    - Source of funds for incentives
    - Overpayment and cash for work policy
    - Establishing sustainable livelihood versus Cash for Work
    - Ownership of the initiative and motivation to do mangrove work because of the introduction of cash incentives
    - Sustainability of the rehabilitation effort versus the availability of funds

Good Experiences and Lessons Learned:

- Mangrove rehabilitation should be part of the CRM strategy to a more holistic climate change adaptation strategy
  - Invest in community organizing
  - Long term plans are considered (for LGUs and other stakeholders)
  - Volunteerism for mangrove rehabilitation program (mobilizing students)
  - Multi-stakeholder are taking interest in science-based principled mangrove rehabilitation work
3. Issues on Capacity Building/Knowledge/Coordination
    - Lack of technical knowledge on mangroves and rehabilitation work
    - Lack of orientation
    - Engaging LGU and Community in the entire rehabilitation cycle

- Lack of sufficient investment in Community Organizing
- Issue with the data on mangroves and how it translates to actual policies and actions in relation to rehabilitation

Good Experiences and Lessons Learned:

- Sufficient social preparation is now done
- Increased Community Awareness and PO coordination
- BLGUs and their council are now taking interest in Mangrove rehabilitation work
- Realization that mangroves protect human lives in coastal communities
- Equal opportunity for men and women to engage in mangrove work
- Realized the need for more IECs

Recommended Actions to Improve Mangrove Management and Rehabilitation, and Build Coastal Resilience and Adaptation to Climate Change

1. Government agencies

- More investment on mangrove rehab from DENR and other line agencies
- Government to develop a guidelines on incentives for community in mangrove rehabilitation
- Co-management, clear counter parting scheme, incentive program for beneficiaries
- Strict implementation of EO 533 (ICM implementation)
- Appropriate incentives and recognition to community POs
- IEC should be intensified

2. Congress

- Develop incentive guidelines to recommend to NGAs and other stakeholders

3. Local governments

- Promoting of MMPAs
- Long term planning for LGU, NGA and other stakeholders
- Mandatory LGU land allocation for socialized housing
- Capacitate LGUs to implement ICM properly
- Co-management, clear counter parting scheme, incentive program for beneficiaries
- Appropriate incentives and recognition to community POs
- DRR ++

4. Civil society (NGOs, POs, Academe)

- The group to develop incentive guidelines to recommend to NGAs, and other stakeholders
- Appropriate incentives and recognition to community POs
- ZSL to provide Program of Instruction for Academe, LGUs and stakeholders for MBFTC
- Proper coordination and engagement of stakeholders in mangrove work operating in various areas
- Develop training for local Chief Executives and LGUs (MENRO, PENRO, etc.) on Mangrove Rehabilitation and ICM

5. Humanitarian aid agencies
  - Co-management, clear counter parting scheme, incentive program for beneficiaries
6. Private sector
  - Co-management, clear counter parting scheme, incentive program for beneficiaries
  - Continues rehabilitation activities
  - IECs should be intensified

## **C. Governance and Institutional Arrangements**

**Ms. Marlyn Mendoza**

**Chief Ecosystem Management Specialist, DENR-Biodiversity Management Bureau  
1:55 – 2:10 PM**

With respect to your assigned aspect of mangrove management and rehabilitation, and with the perspective of building coastal resilience and adaptation to climate change in the Philippines

Specific issues and concerns about mangrove rehabilitation and management:

1. Partner Communities
  - Difficulty of engaging apathetic stakeholders especially fishing communities
  - Community conflicts
  - Limited or no social preparation
  - Lack of shared responsibility in light of mangrove rehabilitation/maintenance/monitoring
  - Partisanship; approval/implementation of the projects depends on political affiliation/ alliances
  - Dependence of local communities on cash for work
2. Funding sustainability
  - Government/other institutions' initiated project without sustainability
  - Not sufficiently coordinated use of funds
  - Lack of venue for sharing of resources, money or otherwise
  - Lack of standard pricing of seedlings
3. Area/species for planting
  - Issue on right species and site matching
  - Difficulty of reverting abandoned fishponds
  - Lack of knowledge of LGUs on ecosystem-based approach to rehabilitation
  - Mangrove planting on seagrass beds and other coastal ecosystem e.g. mudflats or soft bottoms
  - Lack of information of communities on tenurial instruments that would secure management of the mangrove area
  - LGU not compliant to science-based approach to rehab

#### 4. Implementation and Monitoring

- Lack of enforcement of science-based mangrove rehabilitation on all areas across the country
- Conversion of mangrove areas to human settlements
- Lack of standard protocols to be followed
- CSOs lack of consultation by policy makers
- Mechanism for monitoring and reporting system not in place
- Unapproved JAO on AUU
- Coastal livelihood diversification were not identified as a strategy
- Weak law enforcement/protection of mangroves from illegal cutters
- Time bound funds for mangrove rehabilitation/reforestation

#### 5. Coordination mechanism

- Lack of coordination mechanism among groups/agencies/institutions/stakeholders
- Absence of mangrove management committee
- Lack/absence standardization/harmonization of processes among different institutions
- Absence of institutionalized mangrove reforestation/rehabilitation incentives to the LGUs

Good experiences and lessons learned that need to be harnessed to build coastal resilience and adaptation to climate change:

#### 1. Science-based

- Science has to come first
- Establishment of individual plus trees (IPT) DENR tagging mother trees as source of good quality planting materials
- Successful species-site matching
- Area assessment and geo-tagging on proposed sites per province
- Identification of resilient mangrove species to be planted
- Science-based assessment protocols are available
- In rehabilitating mangrove forests, best thing is to clean not clear
- No overharvesting of wildings
- LGU to do proper zoning in coastal areas
- Conservation trade off

#### 2. Partnership and coordination

- Coordination between stakeholders and implementing organizations
- Involving the students in mangrove rehabilitation activities
- LGU initiated and set up coordination meetings between key players
- Good sustainability plan

#### 3. Incentives

- Incentives for well-maintained and surviving mangroves instead of initially planted ones help ensure sustainability
- Bayanihan is still alive in some communities; let's not kill it with paid engagement
- Establishment of ecotourism parks managed by women's organizations



- Grades for work; requiring graduating students to plant 20 mangroves in abandoned fishponds

#### 4. Capacity Building

- Creation of venue for knowledge sharing and exchange e.g. NatManCon2
- Capacity building of different stakeholders
- Conducting lectures and seminars prior to mangrove rehabilitation activities to be more effective
- Consideration of natural processes as guide to policy making activities

Recommended actions to improve mangrove management and rehabilitation, and build coastal resilience and adaptation to climate change

#### 1. Government Agencies

- DENR to spearhead coastal greenbelt activities
- Updated inventory of AUU
- Capacity building for DENR, BFAR on science-based mangrove rehabilitation
- Look into the green-grey infra approach to address DRR
- Government agencies should take more proactive role in mangrove projects
- For DENR to implement programs on restoration of ecosystems factoring the need of the community's especially adaptation to climate change
- Disseminate guidelines on proper mangrove rehabilitation especially on areas hit by natural disasters
- DENR/BFAR needs to internalize ecosystem-based approaches to natural resources management
- Policies should always be in consonant to said principles
- DENR – engage all players in the ground and take lead in the program
- Budget support for the establishment of eco-park as livelihood project-DOT
- Continue monitoring and mapping mangrove areas (online database accessible to the public)
- On-line dissemination of technical advisories of guidelines (regular review of the guidelines)
- DENR – Issue AO regarding adoption of science-based mangrove rehabilitation strategy
- Strict implementation of mangrove protection (e.g. no approval of reclamation on mangroves)
- Clear guidelines on project implementation
- Review/revalidated targeted sites for mangrove rehabilitation based on science-based protocols
- Adopt conservation trade-off for sustained monitoring and maintenance of mangrove rehabilitation
- Provincial/regional department agencies should always be present in UNOCHA meetings and gatherings during disaster
- Review policies on foreshore lease agreement
- NEDA regional should continue the coordination between LGUs and NGOs actively working in each cluster

## 2. Congress

- Lobbying of policy for strict implementation of science-based mangrove rehabilitation
- Promulgate bills to mainstream ecosystem-based DRRM in LGU plans/investment/infrastructure development
- Policy that will provide ample budget for environmental management
- Appropriate funds to enable LGUs to purchase resettlement sites (lot) vacated area tour into greenbelt
- Prioritize and approve bills such as the proposed establishment of coastal greenbelts
- Creation of regional and national mangrove management committees

## 3. LGU

- Provide budget for environmental management projects (do more proactive role)
- Strengthening of LGU capacity in plantation maintenance and conservation
- LGUs/barangays should include in their WFP/targets – activities on mangrove rehabilitation/protection/provide funds
- Bantay Katunggan required
- Implementation of ordinance for mangrove rehabilitation
- Develop/implement a monitoring tool or evaluation tool to ensure sustainability
- Trainings and awareness on mangrove ecosystem protection to better aid them in protecting their mangrove forests for MLGUs/BLGUs/communities
- Emphasis on mangrove conservation in CRM program of LGUs
- Education for LGUs and barangay
- MDRRMC – should incorporate in their plan/target mangrove protection/rehabilitation
- All LGUs should be mandated to have a City ENRO/Municipal ENRO in place
- Should actively map out the players/actors engaged in CRM program and communicate this clearly to who is interested
- Stakeholders should be part of the proposal development/packaging for a need-based proposal
- Secure disturbed/cleared mangrove areas as part of the mangrove rehabilitation sites
- Strict law enforcement of LGUs of environmental code
- Resettle families in high risk zones and establish coastal greenbelts

## 4. Civil Society Organizations

- Avoid duplication of intervention. Collaborate/ coordinate with other players
- Need the support of Government Agencies (DENR/BFAR), CSOs and humanitarian aid agencies
- Involve target communities during project development
- Use of science-based protocols on mangrove rehab
- Harmonization of technical ideas among NGOs/academe
- Creation of CRM working group
- Act as a link/avenue between private sector, government and POs/community
- Consider national targets in developing their plans

5. Humanitarian Aid agencies
  - Provide funds more on a recovery/developmental approach
  - Recognize the behavioural-outcome of projects implemented to the beneficiaries for possible future projects
  - Adopt science-based approaches
6. Private sector
  - Documentation and reporting of best practices – knowledge sharing
  - Be proactive in assisting LGUs in DRRM
  - Needs audit scheme/form from DENR/BFAR
  - More CSR involvement on environmental management/mangrove protection since this will accrue to their income
  - Should coordinate with LGUS on their activities/initiatives

## IV. Plenary

2:11 – 2:25 PM

Ms. Maglana said that the workshops were engaging venue where many issues, lessons learned and recommendations can be looked at in terms of the areas that are within their control and have influence of all levels.

The following insights were further gleaned from the workshop:

- There are recommendations that can be introduced to their own organizations, even implemented, and for those with degree of expertise, they can move towards institutionalization;
- There were many presentations that are helpful and applicable to their respective organizations as well;
- There are others that may be not be on their level and beyond their control but they can help promote and converge.
- There are action points for national level, but there are blocks of action that can be done in their own municipalities, regions, and provinces where we operate. They can do promotive, and collaborative course of action at the national level.
- Even on an organizational level, they can do something together, and that is to work on a conference statement;
- The over-all recommendation of committee is to focus on recommended actions.

Due to time constraints, it was decided that the Steering Committee come up with text based on workshop reports.

## V. Conference Statement

**Mr. Glenn Labrado**

**ZSL–Philippines**

**2:26 – 2:30PM**

The draft conference statement, based on the key points from the discussions, open forum and workshops, was presented by Mr. Labrado.

The agreed process was to go line by line and make suggestions to improve the conference statement, if suggestions were appropriate or accurate with what they are trying to impart.

The first three lines were found to be satisfactory, but the succeeding lines involved further clarifications and discussion. Some of the comments raised were:

- There is no mention of academe. It's as if it is only strongly addressing government, like the DENR, but DENR is also a signatory of the call.
- It was cited that previous calls to action have invited government agencies, but they opted not to sign. Should there be difficulties, it is the option of the participant to sign or not to sign, but it will be binding for those who affix their signature. The concern is that non-signatories are part of the conference, and it might be disenfranchising to those who don't sign.
- Calls usually have deadlines, so the deadline for this particular statement has to be established. It was clarified that calls for action are usually binding until the next conference. The issues that are not addressed in the previous conference are carried forward to succeeding conference, unless otherwise stated.
- The grammar must be more precise. Call to action, call for action, call to act?
- It is a very good draft, but at the same time, very generic. It doesn't seem to capture what the three workshop groups experienced and discussed. The immediate call for action especially for DENR has to be further made clear. They need to identify what they really need from the policymakers/decision-makers. They must come up with actions that are practical, realistic and doable.
- Some things identified in the statement are already being undertaken by DENR and several organizations, e.g. site assessment and management, regular monitoring, weekly submission of reports. Perhaps, a change of success indicators is in order if they want a different set of result areas. In the meantime, it would be unfair to require the agencies to respond or act on things that are already being done.

Dr. Primavera believed that the draft statement was only a matter of word-smithing. The committee only had 1-2 hours of trying to cull out as many points as they could from the discussions. They had to identify issues that were for urgent call.

Ms. Maglana added that the nature of statement is advocacy, setting a timeframe for what might be a problem, time-bound and whether it can be addressed. The key points

discussed are in the draft document, and like Dr. Primavera mentioned, it is only a matter of adding/taking out the items that they find necessary. They can edit it if they want to make it a one-pager.

The focus now is to include in the statement issues and recommendations that are considered urgent.

Ms. Maglana noted that an impasse seems to have been reached on how to frame the message. A call to action here is an output that might be not agreed by everyone, and there could be other models that can be studied.

A participant proposed that they just come up with one page, prioritize three major issues from the reports. Those who don't sign are not amenable, and those who sign, will sign.

Ms. Maglana summarized that generally, the group simply wants to focus on the major issues and concerned stakeholders. The final draft of the statement was assigned to the following volunteers: Ms. Moonyen Alava (CCEF), Ms. Marlynn Mendoza (DENR-BMB), Dr. Alicia Lustica (DENR-ERDB), Dr. Jurgenne Primavera (ZSL), Mr. Glenn Labrado (ZSL-Philippines), Ms. Myrissa Lepiten-Tabao (FPE), Mr. Terence Dacles (GIZ), Ms. Josella Pangilinan (CI-Phils.), and Ms. Socorro Martha Meg-ay Daupan (University of Michigan).

The tokens of appreciation for the morning speakers were handed out before Mr. Wilson, OIC-MENRO of Leganes, gave an orientation for the field visit to Leganes Eco-park.

The two-day national conference was formally brought to a close at 6:00 PM.

# VI. Appendices

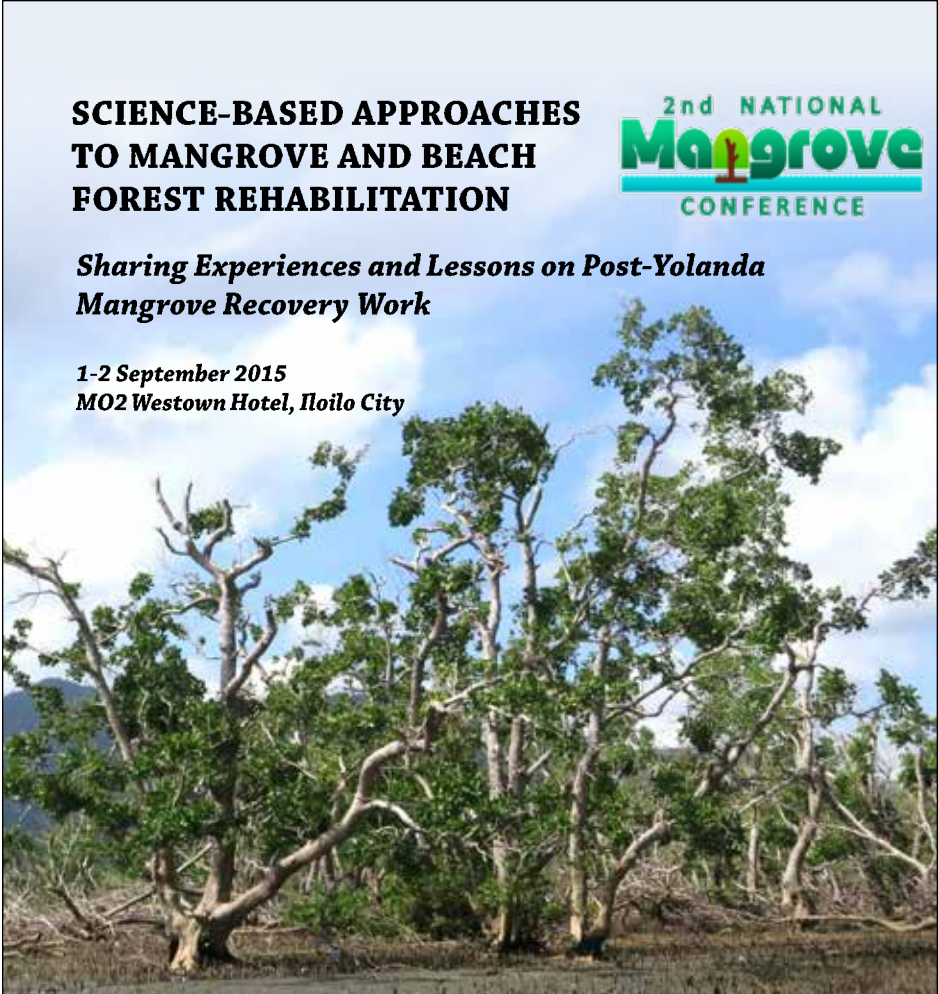
## A. Program of Activities

### SCIENCE-BASED APPROACHES TO MANGROVE AND BEACH FOREST REHABILITATION



*Sharing Experiences and Lessons on Post-Yolanda  
Mangrove Recovery Work*

*1-2 September 2015  
MO2 Westown Hotel, Iloilo City*



Time	Activity / Topic	Resource person
<b>Day 1 (September 1, 2015)</b>		
8:00-9:00	Arrival and Registration	ZSL Secretariat
9:00-9:45	Opening Program Invocation National Anthem Welcome Address	<b>Ms. Norma Babiera</b> , BPFA <b>Ms. Jonalyn Ruiz</b> , BPFA <b>Glenn R. Labrado</b> Country Manager ZSL-Philippines
	Introduction of Participants Message	<b>Hon. Ramon Paje</b> Secretary, DENR
	Objectives and Schedule	<b>Hon. Jed Patrick E. Mabilog</b> City Mayor, Iloilo City  <b>Mr. Ramon Barbata</b> , BPFA
<b>Objective 1: Share results of and lessons from implementation of major mangrove rehabilitation programs</b>		
9:45-10:10	Status of the of the DENR National Greening Program (NGP) - Mangrove Rehabilitation Component	<b>Dr. Ricardo L. Calderon</b> Director FMB, DENR
10:10-10:35	Sharing of experiences of POs implementing mangrove rehabilitation in the NGP	<b>Mr. Smith Bajon</b> BOD Member, New Balarang Mangrove Association
10:35-11:00	Sharing of experiences of PNAP mangrove rehabilitation implemented by State Universities and Colleges	<b>Dr. Yasmin Primavera-Tirol</b> Campus Director Aklan State University New Washington, Aklan
11:00-11:20	Open Forum	Moderator
11:20-11:30	Group Photo	
11:30-1:00	Press Conference and Lunch Break	
<b>Objective 2: Assess post disaster mangrove damage and recovery</b>		
1:00-1:25	Storm Surge Prediction and Applications to Disaster Risk and Rehabilitation Programs	<b>Dr. Alfredo Mahar Lagmay</b> Executive Director <b>Ms. Christine Ladiero</b> SSRS, Project NOAH DOST
1:25-1:50	Mangrove Greenbelt Modelling (Tacloban case study)	<b>Dr. Cesar Villanoy</b> Marine Science Institute UP Diliman
1:50-2:10	Open Forum	Moderator
2:10-2:35	Impact Assessment of Yolanda on Mangrove Ecosystem in Samar and Eastern Samar	<b>Mr. Carlo Carlos</b> Researcher, OML Center
2:35-3:00	Attributes of the earthquake-uplifted intertidal habitats and their implications to the Maribojoc and Loon coastal fisheries	<b>Dr. Rene Rollon</b> Director, IESM, UP Diliman

Time	Activity / Topic	Resource person
3:00-3:25	Mangrove Rehabilitation in post-oil Spill Disaster in Cordova, Cebu	<b>Dr. Resurreccion Sadaba</b> Dean, College of Arts and Sciences, UP Visayas
3:25-4:00	Open Forum	
<b>Objective 3: Share experiences and lessons on the importance of mangroves in building coastal resilience and adaptation to climate change</b>		
4:00-4:25	Area coastal protection – a combination of mangroves and engineering approaches	<b>Dr. Klaus Schmitt</b> Chief Advisor GIZ
4:25-4:50	Post-Yolanda mangrove damage and recovery and the importance of coastal greenbelts	<b>Dr. Jurgenne Primavera</b> Chief Mangrove Scientific Advisor ZSL-Philippines
4:50-5:10	Open Forum	
6:30-9:00	Dinner / Poster Launching	<b>Dr. Theresa Mundita Lim</b> Director, DENR-BMB
		<b>Atty. Jose Andres Canivel</b> Exec. Director, PTFCF
		<b>Dr. Jurgenne Primavera</b> Chief Mangrove Scientific Advisor ZSL-Philippines
<b>Day 2 (September 2, 2015)</b>		
<b>Objective 4. Revisit mangrove rehabilitation strategies implemented in the context of post disaster humanitarian assistance</b>		
8:00-9:00	Experiences and lessons from mangrove rehabilitation in the context of humanitarian assistance: mangrove planting through cash for work schemes	<b>Mr. Romel Kirit</b> Former Programme Manager ZSL-Philippines
		<b>Prof. Margarita dela Cruz</b> Exec. Director, Guiuan Development Foundation, Inc.
		<b>Ms. Josephine Savaris</b> Programme Manager ZSL-Philippines
9:20-9:55	Open Forum	Moderator
9:55-12:00	Workshop	
12:00-1:00	Lunch Break	
1:00-1:30	Presentation of Workshop Outputs	
1:30-2:30	Plenary	
2:30-3:00	Closing and Distribution of Certificates	
3:00-3:15	Short talk -Leganes Katunggan Mangrove Ecopark	<b>Mr. Wilson Batislaon</b> OIC-MENRO, Leganes MLGU
3:15-5:30	Field Trip to Leganes Ecopark and Ermita Pagatpat Plantation	
6:30-9:00	Dinner / Message	<b>Hon. Arthur Defensor, Sr.</b> Governor, Province of Iloilo



**To facilitate continuous flow of the conference, please kindly observe the following:**

- Participants are to **REGISTER DAILY**;
- **DO NOT INTERRUPT** the speakers and avoid side discussions during lectures and presentations;
- **OPEN FORUMS** are allotted to entertain questions.;
- **CONFERENCE CDs** will be provided along with certificates;
- Set all cellular phones to **SILENT MODE**;
- Meal coupons provided are to be collected **BEFORE EACH MEAL**;
- Katunggan It Ibjay (KII) Ecopark **FIELDTRIP is OPTIONAL** and expenses are **PAID BY PARTICIPANTS**.

**Visit the 44-ha Katunggan it Ibjay (KII) Mangrove Ecopark!**

KII Ecopark is a pristine forest in Ibajay, Aklan with 27 true mangrove species, 750-year old trees and a 1.1 km boardwalk.

Additional expenses:

- Van cost at PhP 400/pax)
- Lunch at KII Eco-park: PhP 300/pax
- Entrance fee: PhP 20
- Overnight accommodation: PhP 700-1,500



Itinerary for KII Fieldtrip	
September 3, 2015	
6:00 AM	Depart for KII Ecopark
11:00-11:30	Welcome by <b>Hon. Ma. Lourdes Miraflores</b> Mayor, Ibajay, Aklan
11:30-1:00	Lunch
1:00-2:00	Guided tour with POs
2:00 PM	Depart for Tangalan / Kalibo/ Iloilo

For overnight accommodations in Aklan, you may book with the following:

Name	Address	Contact no.
Devora Beach Resort	Tangalan, Aklan	09194019023
Gradel's Place Resort and Villas	Bugtongbato, Ibajay, Aklan	09394349976
Villa Candari	Bugtongbato, Ibajay, Aklan	09215436694

## B. Call to Action



### Science-based Approaches to Mangrove and Beach Forest Rehabilitation: Sharing experiences and lessons on post-Yolanda mangrove recovery work 2 September 2015, MO2 Westown Hotel, Iloilo City

#### CALL TO ACTION

WE, the participants of the 2<sup>nd</sup> National Mangrove Conference held 1-2 September 2015 in Iloilo City, call on mangrove and marine scientists and practitioners; academe; national government agencies, local governments; people's organizations; NGOs; humanitarian aid agencies; and the private sector to:

1. Follow science-based protocols in mangrove conservation and rehabilitation, such as planting the right species in the right sites. In general, seafronts should be rehabilitated with *Avicennia marina* (piapi) and *Sonneratia alba* (pagatpat) and not *Rhizophora spp.* (bakhaw). Post-Yolanda surveys showed that piapi and pagatpat were more resilient.
2. Strictly avoid mangrove planting on seagrass beds and tidal flats as they are highly productive ecosystems that buffer waves, stabilize substrates and improve water quality.
3. Focus post-disaster efforts and resources on:
  - a. Ground assessment as basis for site-specific and appropriate mangrove and beach forest recovery work;
  - b. Protection of recovering and remaining mangroves and beach forest through proper zoning in Comprehensive Land Use Plans (CLUPs), establishment of Bantay Gubat/Katunggan, and development of ecoparks, among others;
  - c. Reassessment of target planting area, e.g. Mangrove Beach Forest Development Project (MBFDP), Philippine National Aquasilviculture Program (PNAP), humanitarian and private sector initiatives.
4. Develop an accrediting/permitting/auditing system for mangrove and beach forest rehabilitation projects especially in post-disaster contexts.
5. Establish or adopt long-term success indicators such as survival rates and increase in forest area, in addition to short-term indicators such as no. of propagules/seedlings, no. of hectares planted.
6. Lobby for the passage of the National Coastal Greenbelt Bill (SB 2179 and HB 5948) and the reversion of abandoned fishponds to mangroves (HB 5845);
  - o Review and harmonize laws and policies on issuance of tax declarations, local taxation, titling, utilization of forest lands, land classification;
  - o Relocate coastal villages and beach resorts away from coastal greenbelt zone;
  - o Appropriate funds to effectively implement mandatory land allocation for socialized housing.
7. Adapt green-gray engineering approaches for coastal resilience building.
8. Develop incentive schemes to community groups/LGUs involved in mangrove conservation and rehabilitation, e.g. Best Mangrove Management Awards

