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# Coastal Community Resilience (CCR) Workshop Overview

May 23-25, 2006 Bangkok, Thailand

June, 2006

Prepared for the United States Agency for International Development  
By the IRG-Tetra Tech Joint Venture



**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE



**COASTAL RESOURCES CENTER**  
*University of Rhode Island*





## U.S. INDIAN OCEAN TSUNAMI WARNING SYSTEM (IOTWS) PROGRAM

# Coastal Community Resilience (CCR) Workshop Overview

May 23-25, 2006  
Center Point Hotel, Wireless Road  
Bangkok, Thailand

### Prepared by:

Atiq Kainan Ahmed, Social Scientist, US IOTWS Program (Email: [atiq@iotws.org](mailto:atiq@iotws.org))  
with contributions from the CCR Core Team members.

### CCR Core Team:

Atiq Kainan Ahmed  
Kitty Courtney  
Russell Jackson  
Charlie Macpherson  
David McKinnie  
Pam Rubinoff  
Adam Stein  
Arjunapermal Subbiah  
Ratirose Supaporn  
Alan White

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Integrated Water and Coastal Resources Management IQC  
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## LIST OF ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
AIT	Asian Institute of Technology
CBDRM	community based disaster risk management
CBO	community based organization
CCR	coastal community resilience
CONOPS	concept of operations
COP	Chief of Party
CRC	Coastal Resources Center
CRMP	Coastal Resources Management Project
CVAT	Community Vulnerability Assessment Tool
DAD	Development Assistance Database
DP	disaster preparedness
DRR	disaster risks reduction
EIA	Environmental Impact Assessment
EWS	early warning system
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environmental Facility
ICG	Intergovernmental Coordination Group of the IOC
ICM	integrated coastal management
ICS	incidence command system
IDEP	Indonesian Development of Education and Permaculture
IEC	information, education and communication
INGO	international non-governmental organization
IOC	Intergovernmental Oceanographic Commission
IOTWS	Indian Ocean Tsunami Warning System (as used to describe U.S. government program)
IRG-Tetra Tech	International Resources Group & Tetra Tech Joint Venture
ISDR	International Strategy for Disaster Reduction
ITDG	Intermediate Technology Development Group (now Practical Action)
NGO	non-governmental organization
NOAA	National Oceanic and Atmospheric Administration (United States)
NORAD	Norwegian Agency for Development Cooperation
PA	program area
PI	Program Integrator (USAID contractor supporting US IOTWS Program)
RDM/A	Regional Development Mission/Asia of USAID
RUK	Rekawa Ussangoda Kalmetiya
SGP	Small Grants Program
SIP	Safe Islands Program
TRC	tsunami resilient communities
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
URI	University of Rhode Island
US	United States
USAID	United States Agency for International Development
WWF	World Wildlife Fund



# **1. INTRODUCTION**

## **1.1 Background**

On December 26, 2004, a major earthquake followed by a tsunami hit Asia and Africa, devastating many coastal areas. Almost 200,000 people in eight countries perished in a few hours, and over 100,000 are missing. Many more had their homes and livelihoods swept away. As a result of this disaster, the United States (US) and the international community are joining efforts to establish the first operational tsunami warning system for the Indian Ocean, modeled after the system currently operating in the Pacific.

The US IOTWS Program supports efforts to develop an “end-to-end” early warning system for tsunamis and other natural disasters in coordination with the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), other donor nations, and national governments in the region.

## **1.2 The Coastal Community Resilience (CCR) Guide**

Local knowledge and preparedness to act is a vital component of an end-to-end warning system. Local communities must not only receive warnings but know how to respond. The US IOTWS Program is supporting work with partner countries to enhance community initiatives towards the development of a guide to Coastal Community Resilience (CCR). The CCR guide will provide a framework and tools to assist practitioners integrate elements of community resilience to coastal hazards in local implementation plans and programs.

## **1.3 CCR Workshop and Objectives**

The overall purpose of the CCR workshop was to assemble practitioners and program implementers from the region to characterize the elements of coastal community resilience. The CCR workshop was held May 23 to 25, 2006 at the Center Point Hotel, Bangkok, Thailand. Participants from the five program countries were invited to participate and contribute to the workshop. The overall objectives of this CCR workshop were to:

- Develop a common understanding of the main elements of coastal community resilience
- Identify strategies and tools to achieve coastal community resilience
- Explore opportunities for coordination and collaboration among partners in the development of a CCR Guide.

## **1.4 Workshop Participants and Process**

The workshop participants included practitioners from around the region who work directly with communities or with organizations (regional or country-based) implementing projects addressing elements of coastal community resilience as well as the core team members of the US IOTWS Program. Countries represented included Indonesia, India, Thailand, Maldives, and Sri Lanka. A total of thirty two participants attended the workshop including resource persons. The workshop format was included case study presentations by participants and used break-out groups to provide opportunities for participation and input of the participants as resource persons and partners in developing the framework for CCR. The overall process of the CCR workshop is outlined schematically below.

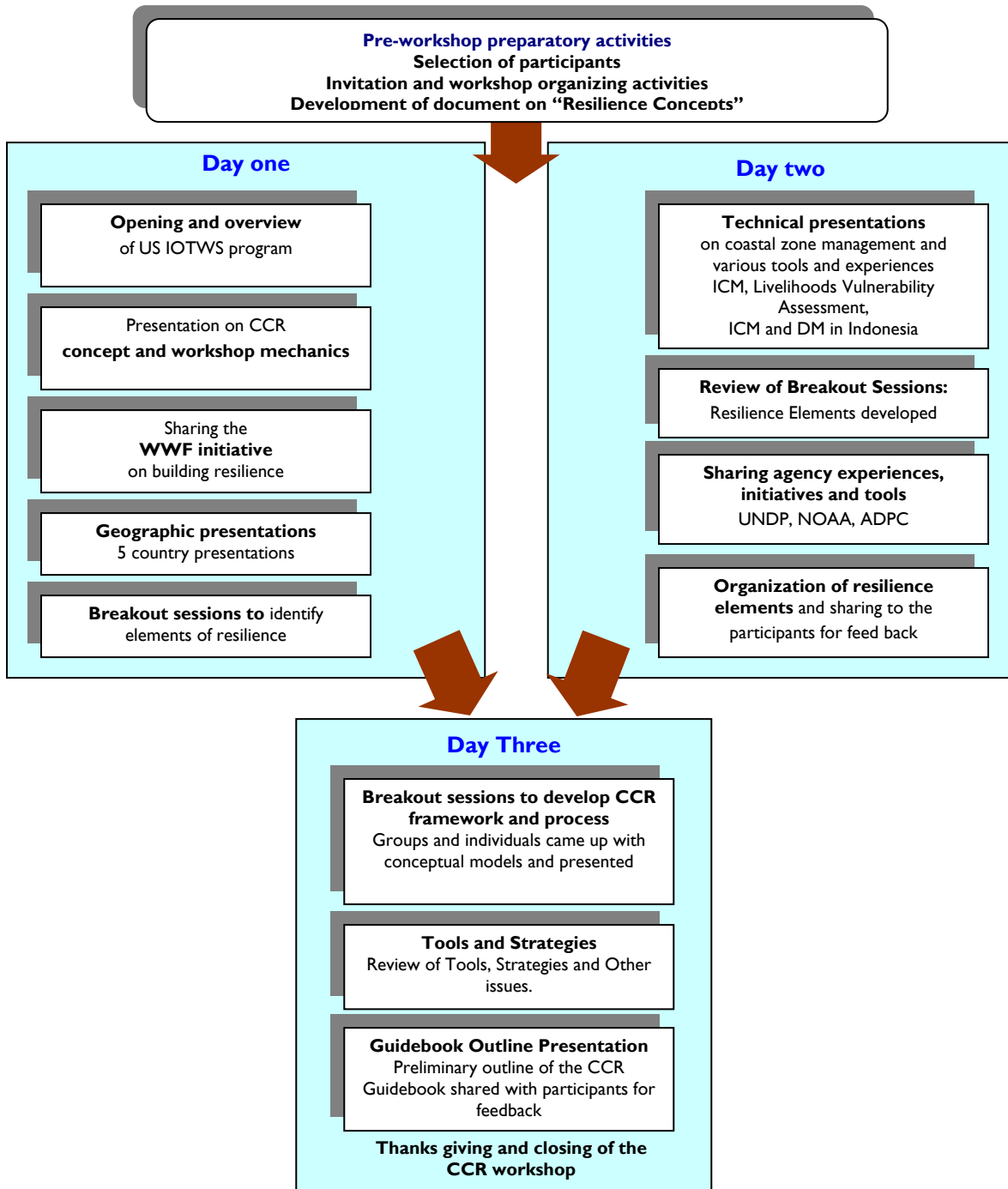


Figure 1. A schematic overview of the workshop process and activities by day.



## 2. WORKSHOP OPENING

The CCR Workshop began with the introduction of all participants from the five countries, technical professionals, and representatives from various agencies.

Mr. Richard Whelden, Deputy Mission Director, USAID/ASIA gave the welcome address. An overview of the US IOTWS program was presented by Mr. Orestes Anastasia, US IOTWS Program Manager from the USAID Regional Development Mission/Asia. Mr. Anastasia described the US IOTWS program objectives as strategic support towards the development of an integrated, end-to-end IOTWS in contribution to UNESCO/IOC and ICG/IOTWS. In his presentation, Mr. Anastasia graphically showed how the program is being implemented with the collaboration of various program partners. He also highlighted the US IOTWS program areas to the participants. He suggested that the program areas are:



Figure 2. Mr. Richard Whelden welcoming the workshop participants

- Regional hazard detection, observation, and forecasting (tsunami and earthquake detection, communications),
- National warning formulation and communication (warning center operations, warning dissemination),
- Local preparedness and mitigation (coastal community resilience, mitigation), and
- Cross-Cutting (exchanges and training and small grants).



Figure 3. Mr. Orestes Anastasia is giving the US IOTWS program overview.

The US IOTWS Program approach focuses on:

a) activities in regional, national, and local level interventions for capacity building with targeted technology transfer, b) multi-hazard: tsunamis and other coastal hazards, c) catalytic impact in terms of regional institutions strengthened for long-term IOTWS support and sustainability, and a combination of model actions at national levels with regional replication of best practices, and partnerships and coordination. Mr. Anastasia expressed hope that the CCR Workshop would serve as an important step towards guiding coastal community resilience in the region.



Figure 4. The "End-to-End" tsunami warning system of US-IOTWS program discussed in the overview presentation.



### 3. WORKSHOP PRESENTATIONS AND DISCUSSIONS

#### 3.1 Country Presentations

Country presentations provided the context and status of relevant initiatives in building coastal community resilience. Case studies were presented from the Maldives, Thailand, Sri Lanka, India, and Indonesia.

##### *Maldives Case Study*

**Mr. Thoriq Ibrahim** of Ministry of Planning and National Development, Maldives presented. The Maldives is extremely vulnerable to coastal hazards as evidenced by:

- highest elevation being 1.5 m above sea level
- 88 inhabited islands face perennial beach erosion
- wide dispersal of population across very small islands
- remoteness and inaccessibility of islands
- extremely high economic dependence on tourism
- high import dependence

With the 24 December 2004 tsunami, the flooding status in the Maldives became very critical. 69 islands were completely flooded while only 9 islands remain non flooded.

Mr. Thoriq discussed the Safe Islands Program (SIP) to address coastal hazards through enhancement, mitigation and redevelopment. Program elements include:

- Regional development and population consolidation
- Development of larger islands with better economic opportunities
- A market driven strategy providing incentives for voluntary migration to alternative islands
- Some of the evacuated islands will not be resettled
- Strengthen environmental resilience – safe islands program



Figure 5. A typical vulnerable island in the Maldives.

He suggested that the Maldives is inherently vulnerable to environmental disasters but that the December 2004 tsunami created a new urgency to enhance environmental mitigation measures, redesign the physical development features of islands including wider environmental protection zones, and to develop elevated areas for vertical evacuation in the event of floods.

## Thailand Case Study

**Mr. Christopher Dunbar**, Ranong Field Supervisor of CRC-URI-AIT Post Tsunami Sustainable Livelihood Program presented.

The Post Tsunami Sustainable Coastal Livelihoods Program in Ranong Province of Thailand is modeled on five rural coastal communities and the program is now working on four major activities:

- consensus building
- sustainable diversified livelihoods
- coastal public infrastructure
- capacity building.

This case identified some of the characteristics and commitments of the community to become a “Resilient Community” including diversifying livelihoods, public planning, and disaster preparedness.



The Post Tsunami Sustainable Coastal Livelihoods Program has conducted three training programs in community based disaster risk management reaching over 325 people in 7 communities. Training courses cover community based disaster risk management (CBDRM) principles and concepts, risk mapping, and planning. The program has plans to develop activities for school programs, first aid/first responder/search and rescue among others.

Some of the lessons learned from this program are:

- Training materials need to be geared to appropriate level (school curriculum, community materials, government)
- Community representative selection (well connected, well known and at right level)
- Outreach and extension should be in local language of participants
- Need to link CBDRM to national and regional IO Networks
- Share experience and lessons learned in CBDRM with region.

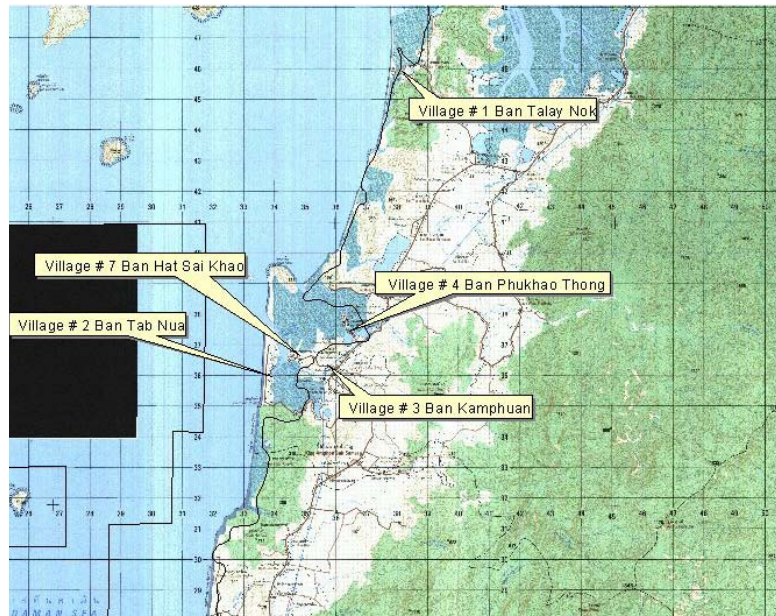


Figure 6. USAID Post Tsunami Sustainable Livelihoods Program area locations.



## Sri Lanka Case Study

**Mr. Indra Ranasinghe** presented and focused on the Pilot Case for Kalametiya Special Management Area and presented in association of Tsunami Resilience Community activities in Sri Lanka. He highlighted that in Sri Lanka there are various existing projects and programs such as:

- Kalametiya Special Area Management Program funded by the Asian Development Bank (ADB) and the Government of Netherlands under CRMP
- Rekawa Ussangoda Kalmetiya (RUK) Biodiversity Conservation Project funded by GEF/UNDP,
- Hambantota Integrated Coastal Zone Management Project Funded by NORAD, and
- Tsunami rehabilitation programs implemented by Practical Action (ITDG), FAO, Green Movement & Other INGO/NGO/CBO

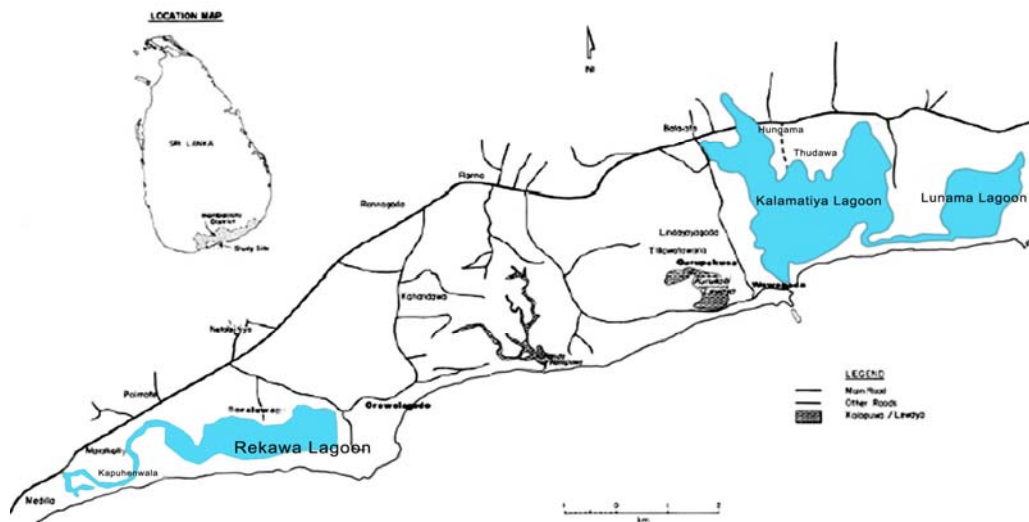


Figure 7. Location of study area Rakawa and Kalamatiya.

Legal and institutional arrangements for disaster mandate and coastal management in Sri Lanka were outlined in this presentation.

National Level Agency	Local Level Agencies
Ministry of Disaster Management Disaster Management Center Ministry of Fisheries & Aquatic Resources Department of Wild Life Conservation Central Environmental Authority Marine Pollution Prevention Authority  Relevant Legislation: National Disaster Management Act Coast Conservation act No.57 of 1981 Fisheries & Aquatic Resource Act No.2 of 1996 FAUNA & Flora Protection Ordinance 1937 National Environmental Act No. 47 of 1980 Marine Pollution Prevention Act of 1981	Southern Provincial Council Ambalantota Local Authority District Secretariat Divisional Secretariat  Relevant Legislation: Provincial Council Act Pradesiya Saba Act No. 15 of 1987 Specific powers Delegated Specific Powers Delegated



Mr. Ranasinghe concluded by describing several ongoing activities on coastal management and in other sectors which have commitments to build resilience at community level. These commitments both from Government and from the community can be a useful building block for developing CCR. Some of these commitments both at government level as well as community level came out in the case study are as follows:

#### Government Commitments:

- Establishment of Disaster Management Ministry and National Disaster Management Center
- Introduction of new legislation to improve disaster management
- Delineation of new buffer zones to protect people and the properties
- Identification and establishment of early warning system and incidence command system (ICS) as priority activities
- Seeking donor assistance to manage future disasters.

#### Community commitments:

- Creation of a common fund to deal with future disasters
- Setting up of disaster management committees at village level
- Enhancing natural coastal buffers by planting vegetation
- Identification of public education and awareness as a priority.

### India Case Study

The case study from Chennai, India was presented by **Mr. Ranganathan Santhanam** of Disaster Management and Mitigation India. The case study was based on the experiences of Akkaraipettai and Keechankuppam in Nagapattinam of Tamil Nadu province of India. However, before entering to the community level the presenter has discussed about the institutional setup of the national disaster management in India.

The presentation showed that the present structure of disaster risk management in India has three-tiers as follows:

- National government level: the Ministry of Home affairs acts as the nodal ministry.
- State Government Level: the Revenue department acts as the nodal department and the State Relief Commissioner is the nodal officer.
- District Level: the disaster management setup is headed by the District Collector.

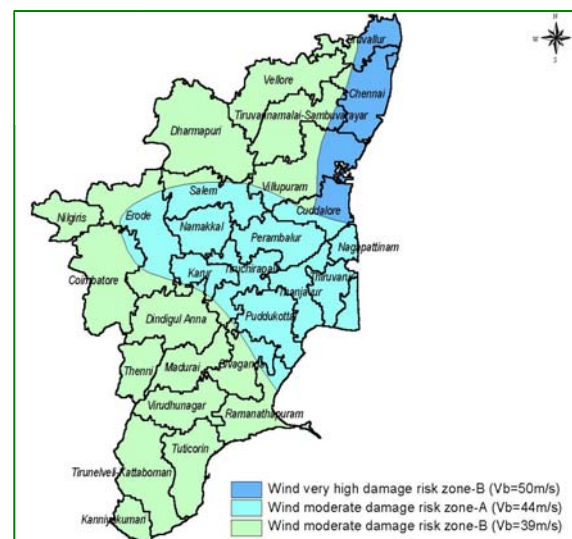


Figure 8. A risk zone map existing for Tamil Nadu province, India.

The key disaster management set up at the state level is comprised of disaster response which is critically monitored by the Chief Minister. There is a Disaster Management Authority that is headed by the Chief Secretary to Government with other Secretaries to Government as

members and it looks at: policy formulation, guidelines on quantum of relief, co-ordination and convergence of various departments and schemes, approval of disaster management plans, and monitoring and review of progress of relief work.

The Disaster Risk Management Program supported by UNDP is an ongoing program (2002-2007). The goal of this program is sustainable reduction in natural disaster risk in some of most hazard prone districts in selected states of India. The program is being implemented in six districts including Nagapattinam and two cities in Tamil Nadu.

Some of the issues this program is committed to resolve are capacity building, environmental protection, education, public awareness and strengthening the capacity at all levels in natural disaster risk management and sustainable recovery. The program is focused on multi-hazard preparedness, response and mitigation plans for the program at state, district, block, village *panchayat* and ward level. Networking knowledge on effective approaches, methods and tools for natural disasters risk management, developing and promoting policy frameworks are also part of the program.

In terms of the ongoing initiatives for building coastal community resilience, in India to address some significant issues. These are:

- Providing natural coastal barriers like sand dunes, shelter belt plantations, mangroves etc.
- Strengthening early warning systems
- Improving infrastructure e.g. disaster resistant houses
- Developing a techno-legal regime for each area
- Training and capacity building with a view to involving the community especially women in mitigation activities
- Preparing a coastal management plan

### **Indonesia Case Study**

**Dr. Michael Ricos** of Indonesian Development of Education and Permaculture (IDEP) Foundation presented a case study from Indonesia. In his presentation he discussed community level preparedness and mitigation issues. The case study highlighted several generic elements of disaster risk reduction: community based disaster management, effective national early warning and preparedness, policy on land-use and appropriate construction, risk assessment in development projects and planning, insurance (financial and social) and asset protection through social safety nets are crucial elements in disaster management in Indonesia.

Some very useful examples in developing community based disaster management materials (i.e. tools, plans, IEC materials) were shown. Several major factors in building resilience at the community level were highlighted including disaster planning, capacity building, disaster communication, public awareness.

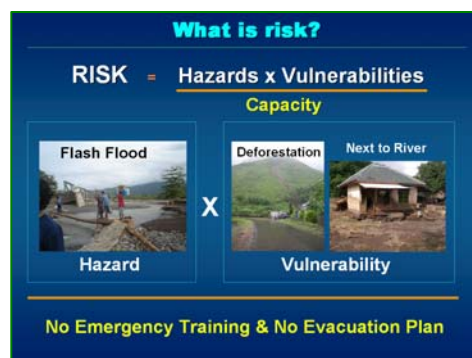


Figure 9. Risk definition adopted by IDEP.



Figure 10. Some IEC materials developed by IDEP foundation in Indonesia.

The Indonesia case study also pointed out some priority areas for community based disaster risk reduction in Indonesia. These include: the impact of CBDRR through distribution of CBDM manuals, IEC materials, institutionalization of the tools from various organizations, development of training programs, national standards/socialization of CBDM and funding arrangements for future.



### 3.2 Technical Presentations

The technical presentations covered integrated coastal management (ICM), and disaster management (DM) experiences drawing from various countries of the South and Southeast Asia (i.e. Philippines, Bangladesh, Indonesia etc.). These presentations identified both technical assessment tools and management issues useful for building coastal community resilience.

#### *CCR Concepts and Workshop Mechanics*

**Ms. Pam Rubinoff** of University of Rhodes Island presented an outline of the teams approach and intended technical activities, workshop process and outputs. The need and rationale for developing the CCR Guide and a self assessment tool for CCR was highlighted. The presentation included a discussion on the concepts of risk, vulnerability and resilience. It also highlighted the issue of identification and defining the concepts and hazards that needs to be addressed by the CCR Guide needs to be defined and refined. The process for building the resilience of coastal communities to mitigate against multiple hazards in the Indian Ocean region was a major point of discussion. The need for a conceptual framework that integrates disaster management and coastal management was expressed.

Hazards



Resilient communities

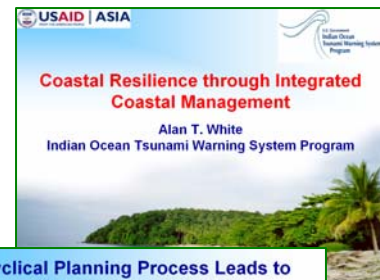
#### *WWF experiences of building resilience*

**Ms. Angie Woo**, Partnership Coordinator of WWF presented experiences and various attempts to build resilience in the context of WWF's working areas. She outlined the WWF conceptualization of coastal resiliency, WWF activities to build coastal resiliency and area of potential contribution of WWF to the CCR activities and Guide. Her presentation also highlighted the WWF experiences in developing the "Green Reconstruction Guidelines" for policy and implementation.



## ***Integrated Coastal Management***

**Dr. Alan T. White**, Chief of Party, Program Integrator, US IOTWS emphasized that coastal management provides a process and tools to address many hazards in the coastal zone. Drawing various experiences of coastal management in countries from the Indian Ocean and Pacific region, Dr. White's presentation provided an overview of the coastal management process that can be used to address coastal community resilience. Dr. Whites presentation discussed issues ranging from lead causes of eroding coastal resilience, identification of components of coastal resilience and ICM, basic elements of governance to support coastal resilience, benchmarking, and adopting best practices. The presentation emphasized a cyclic planning and implementation process that enables adaptive management for building coastal resilience. The presentation signified that ICM is growing and its potential to build coastal resilience -- both human and ecological -- is substantial. The presentation signified the opportunities to learn from the emerging lessons of ICM in building resilience.



## ***Coastal Livelihoods Vulnerability Assessments***

**Mr. Atiq Kainan Ahmed**, Social Scientist, PI-ADPC, US IOTWS, presented on the Coastal Livelihoods and illustrated the various uses of participatory tools and methods in developing greater understanding of coastal livelihoods. He also highlighted specific vulnerabilities and mechanisms that build sustainable coastal resilience for both human and extreme natural events. Drawing from the experience of livelihoods, vulnerability in the coastal zone of Bangladesh the case talked about various livelihoods and specific vulnerabilities. The presentation generated interest among the workshop participants and put emphasis on the need of "self assessment tools" for building resilience specific to livelihoods of the poor coastal communities.



## ***Coastal Zone and Disaster Management in Indonesia***

**Dr. Stacey Tighe** and **Ms. Patra Rina Dewi** from Indonesia gave presentations on Indonesian approaches to building resilient coastal communities. The presentation discussed an emerging system of partners and standards for community-based action to prevent, prepare for, respond to and recover from multiple hazards. The presentation also outlined the agency and institutional activities and their status in post tsunami situation.



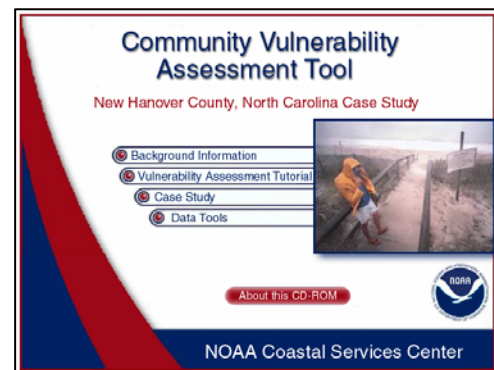
## UNDP Experiences in Disaster Risk Management in Asia-Pacific Region

**Mr. Sanny Jegillos**, Regional Programme Coordinator from UNDP Regional Centre in Bangkok, discussed mechanisms for strengthening local capacities and the critical path to building resilient communities in the region. His presentation highlighted disasters as crisis and opportunity as well. In his presentation he pointed out lessons learned in building capacity for disaster reduction in the affected countries.



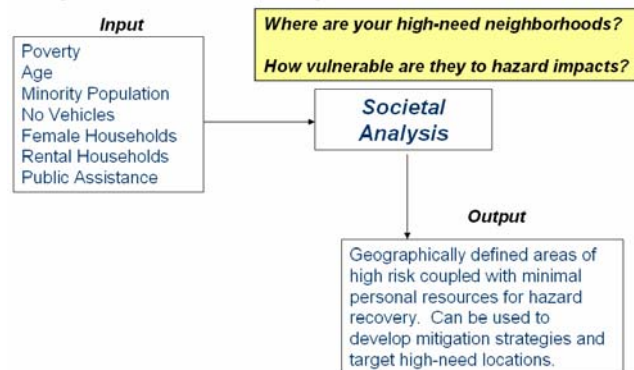
## Community Vulnerability Assessment Tool (CVAT): NOAA Experiences in Vulnerability Assessment

**Mr. Russell Jackson**, the Coastal Hazards Program Coordinator of NOAA Pacific Services Center has presented the NOAA experiences in developing Community Vulnerability Assessment Tool (CVAT). CVAT is a peer reviewed methodology for conducting multi-hazard risk and vulnerability assessments at the community level. Mr. Jackson suggested that the general methodology of CVAT is included as a tutorial that steps the user through a “community level” process of analyzing the vulnerability factors with respect to multiple hazards: physical, social, environmental and economic. In addition to demonstrating the vulnerability assessment methodology, GIS is illustrated as a valuable resource for conducting hazards-related analyses in a case study format.



CVAT follows a seven step process:

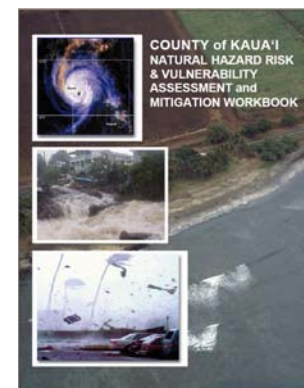
- Hazard identification
- Hazard analysis
- Critical facilities analysis
- Societal analysis
- Economic analysis
- Environmental analysis
- Mitigation opportunities analysis.



These tools have been applied at various NOAA Coastal Services Center funded assessments such as:

- Maui County, Hawaii – County-wide Assessment
- Oregon and Washington – Community Assessment
- focused on Ports and Harbors
- Rhode Island – Statewide Assessment
- Brevard and Volusia Counties, FL–County-wide Assessments
- Tutuila, American Samoa – Island-wide Assessment

And in various independent assessments such as:



- Caribbean – Grenada and Barbuda National Assessments
- New Hampshire – Statewide and County-wide Assessment
- Hawaii – Statewide and County-wide Assessment

### ***ADPC Experiences in Critical Guideline of CBDRM***

**Mr. Zubair Murshed**, Program Manager, CBDRM, ADPC delivered a presentation on their recent work to develop Critical Guidelines of CBDRM and the indicators of resilience This was a follow up work of the project on Partnerships for Disaster Reduction –Southeast Asia 3 (PDRSEA 3). The presentation suggested that resiliency can be achieved by reducing the: (a) probability of failure through risk reduction measures; (b) consequences of failure, in terms of few lives lost, few injuries and reduced direct and indirect damage; (c) time needed for recovery; and the (d) patterns of vulnerability that can develop during the process of reconstruction. Mr. Zubair shared the guideline of CBDRM and outlined the following indicators of resilience in the community:

- A community organization
- A DRR and DP plan
- A community EWS
- Trained manpower (risk assessment, search and rescue, medical first aid, relief distribution, masons for safer house construction, fire fighting)
- Physical connectivity (roads, electricity, telephone, clinics)
- Relational connectivity with local authorities (NGOs etc)
- Knowledge of risks and risk reduction actions
- A community disaster reduction fund to implement risk reduction activities
- Safer house (to withstand with local hazards)
- Safe source of livelihoods.

### **3.3 Discussion Points**

The CCR workshop generated substantive discussion on the meaning of coastal community resilience and process for integrating disaster and coastal management cycles. The following key points were discussed:

- Definitions of the term “resilience” and “risk”
- Elements of resilience
- Audience of the CCR Guidance (community people or the managers/practitioners?)
- National-local coordination and upscaling the issues
- Livelihoods diversification (and emphasis on the diversifying right kind of livelihoods)
- Vulnerability and needs assessment
- Attitudinal and behavioural vulnerabilities
- Existing disaster management programs and integrations
- Business and financial resilience (i.e. safety net, micro credit issues)
- Disaster management funds
- Significance of dissemination and communication of warnings
- The PADANG ‘dilemma’
- Evaluation of level of resilience
- Utilizing existing resources from various other initiatives. Country workshop devising issues
- Future steps (the devising of the trainings), and
- Other miscellaneous issues.

## 4. INVENTORY OF BREAKOUT GROUP WORK FINDINGS

### 4.1 Brainstorming on elements of “vulnerability” and “resilience”

Socio-economic domain	
Hazard	Vulnerabilities
<p><b>Episodic</b></p> <ul style="list-style-type: none"> <li>▪ Tsunami,</li> <li>▪ Earthquakes,</li> <li>▪ Storm and storm surges,</li> <li>▪ Forest fire, Urban fires</li> <li>▪ Drought/flooding</li> <li>▪ Heat/cold spell</li> <li>▪ Pest infestation</li> <li>▪ Terrorism</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Urban community</b> <ul style="list-style-type: none"> <li>◇ Livelihoods, Poor infrastructure design, nature of coastal economics</li> <li>◇ Poor urban planning</li> <li>◇ Lack of social capital/ fractured community</li> <li>◇ Encroachment along water bodies</li> <li>◇ Ports</li> <li>◇ Poorly planned settlement</li> <li>◇ Employment density</li> <li>◇ Financial Scale Big vs. Small business</li> <li>◇ Critical Infrastructure</li> <li>◇ Secondary impact</li> </ul> </li> <li>▪ <b>Rural village community</b> <ul style="list-style-type: none"> <li>◇ Lack of diversified livelihoods</li> <li>◇ Low education levels</li> <li>◇ limited resources</li> <li>◇ Minimal awareness</li> <li>◇ Poor infrastructure</li> <li>◇ No access to warning</li> <li>◇ In-migration/Out-Migration</li> <li>◇ Limited access to financial institutions- MFI VS</li> <li>◇ Informal money lenders</li> <li>◇ Insurance</li> <li>◇ Alcohol/ drug use</li> <li>◇ Depletion/overexploitation of resources</li> </ul> </li> <li>▪ <b>Tourism community</b> <ul style="list-style-type: none"> <li>◇ Lack of awareness for visitors</li> <li>◇ Incentive to resorts to be in proximity to shore</li> <li>◇ Public /Land-use planning</li> <li>◇ Language barriers/ communication problems</li> <li>◇ Lack of enterprises</li> </ul> </li> </ul>
<p><b>Chronic</b></p> <ul style="list-style-type: none"> <li>▪ Shoreline</li> <li>▪ Erosion,</li> <li>▪ Sea level rise,</li> <li>▪ Climate variability</li> <li>▪ Coastal resource degradation</li> <li>▪ Pollution (e.g., agricultural runoff)</li> <li>▪ Epidemics</li> <li>▪ Food “insecurity”</li> <li>▪ Invasive species</li> <li>▪ Conflict</li> </ul>	<ul style="list-style-type: none"> <li>◇ Unregulated population growth</li> <li>◇ Settlement</li> <li>◇ Faulty Planning</li> <li>◇ Resource constraints</li> <li>◇ Poor Sanitation</li> <li>◇ Poor road communication</li> <li>◇ Pollution</li> <li>◇ Inappropriate Infrastructure</li> <li>◇ Lack of diversified livelihoods</li> <li>◇ Lack of enterprises</li> <li>◇ Lack of willingness to take economic opportunity</li> <li>◇ Short sighted economic outlook</li> </ul>



Governance domain	
Hazard	Vulnerabilities
<p><b>Episodic priorities:</b></p> <ul style="list-style-type: none"> <li>▪ Storms/Storm Surges</li> <li>▪ Tsunami</li> <li>▪ Flood</li> </ul> <p><b>Chronic priorities:</b></p> <ul style="list-style-type: none"> <li>▪ sea level rise</li> <li>▪ coastal resource degradation</li> </ul>	<ul style="list-style-type: none"> <li>◇ Storms and Storm Surges, Tsunamis, and Floods</li> <li>◇ Lack of zoning</li> <li>◇ Lack of zoning enforcement</li> <li>◇ Lack of capacity</li> <li>◇ Lack of clarity regarding policy and guidelines</li> <li>◇ Decision makers have lack of knowledge</li> <li>◇ Decision makers have lack of information</li> <li>◇ Corruption</li> <li>◇ No mechanisms for rapid community input during recovery</li> <li>◇ Mechanisms for sustained monitoring and evaluation</li> <li>◇ Mechanism for incorporating new information into planning</li> <li>◇ Lack of building codes</li> <li>◇ Lack of code enforcement</li> <li>◇ Political will</li> <li>◇ Lack of local level warning systems</li> <li>◇ Lack of regional coordination</li> <li>◇ Lack of legislation/mandates/SOPs</li> </ul>

Environmental domain	
Hazard	Vulnerabilities
<p><b>Primary (Episodic):</b></p> <ul style="list-style-type: none"> <li>▪ Tsunami</li> <li>▪ severe storms/storm surge</li> <li>▪ Spills</li> </ul> <p><b>Primary (Chronic):</b></p> <ul style="list-style-type: none"> <li>▪ Coastal erosion</li> <li>▪ Sea level rise</li> </ul> <p><b>Secondary (Episodic):</b></p> <ul style="list-style-type: none"> <li>▪ Forest fire</li> <li>▪ Pest infestation</li> <li>▪ Drought</li> <li>▪ Landslides</li> </ul> <p><b>Secondary (Chronic):</b></p> <ul style="list-style-type: none"> <li>▪ Pollution</li> <li>▪ Epidemics</li> <li>▪ Food insecurity</li> <li>▪ Invasive species</li> <li>▪ Conflicts</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Coastal resource degradation</b> <ul style="list-style-type: none"> <li>◇ mangrove, sand dunes, other natural protective features/physical buffers</li> <li>◇ loss of wetlands, flood mitigation</li> <li>◇ loss of wetlands buffer against pollution/sedimentation</li> <li>◇ coral mining and sand mining</li> </ul> </li> <li>▪ <b>New unsustainable extraction/overuse of resources</b> <ul style="list-style-type: none"> <li>◇ assistance disaster following natural disaster</li> <li>◇ unintended consequences of new technology</li> </ul> </li> <li>▪ <b>Tourism development</b> <ul style="list-style-type: none"> <li>◇ inappropriate infrastructure development</li> <li>◇ disregard for regulations/policies</li> <li>◇ inappropriate for local ecosystem</li> </ul> </li> <li>▪ <b>Land Use Practices (including setbacks)</b> <ul style="list-style-type: none"> <li>◇ well intentioned land use policies create new vulnerabilities</li> </ul> </li> <li>▪ <b>Lack of stakeholder involvement in environmental protection</b></li> <li>▪ <b>Lack of “green” development guidelines/enforcement</b></li> <li>▪ <b>Lack of fisheries/coastal resource management scheme</b> to address capacity/effort (so can absorb assistance after disaster)</li> <li>▪ <b>Lack of information</b> about ecosystem/environment/baseline and relationship to hazard mitigation <ul style="list-style-type: none"> <li>◇ invasive exotics (when “building back better”)</li> <li>◇ more likely to degrade</li> <li>◇ unsustainable uses of resources for rebuilding</li> <li>◇ unsustainable uses of resources (inland) (deforestation)</li> </ul> </li> <li>▪ <b>Post Disaster</b> <ul style="list-style-type: none"> <li>◇ dismantling temporary structures</li> <li>◇ debris removal (rotting vegetation=nutrient loading)</li> <li>◇ groundwater contamination/saltwater intrusion</li> </ul> </li> </ul>

## 4.2 Elements of Coastal Community Resilience

The coastal community resilience factors that are identified from these three groups are then presented in a combined format that can be regarded as the elements of resilience. These are as follows:

1. Holistic framework for integrating institutions at all levels to address both DM and ICM
  - ◇ Community Focused
  - ◇ Mandates and Legislation
  - ◇ Clear Standard Operating Procedures
  - ◇ Roles and Responsibilities Defined
  - ◇ Cross linkages to other sectors relevant to coastal resource management and environmental protection
2. Participatory management
  - ◇ Participatory engagement and democratic process in planning
  - ◇ Mechanisms to promote community volunteerism - participatory engagement, community volunteerism - identify and give them specific roles for disaster response and recovery. Can reach some sectors of society that otherwise would not be reached (different language). Link with national network as well. Need some reward (salary, knowledge, skills) for longer term to make it sustainable.
  - ◇ Training for volunteers is essential. Empowerment helps create future leaders. Incorporate redundancy - identify roles for groups as opposed to individuals
  - ◇ All relevant stakeholders (traditional and non-traditional) involved maximizing support for management policies that reduce threats to natural protective features, sustainable uses. Different forums for different types of outcomes during a process.
  - ◇ Gender empowerment
  - ◇ Enhanced capacity building to participate effectively
3. Long term sustainable funding with flexibility designed in to address episodic events
  - ◇ Response funding connected with long term goals
  - ◇ Priorities don't change with political winds
4. Warning systems
  - ◇ Communication early warning
  - ◇ Community volunteerism
  - ◇ Redundancy in communication
5. Risks and vulnerability assessment
  - ◇ Participatory engagement
  - ◇ Access to historical info about disasters
6. Establish emergency operations plans
  - ◇ Disaster management plan (incorporates social/economic factors)
  - ◇ Incorporate participatory engagement, Community Volunteerism
  - ◇ Coordination of response/relief
  - ◇ Emergency procedures, roles and responsibilities clearly defined
  - ◇ Practice, Practice, Practice
  - ◇ Institutional memory for past disasters in coordination of relief

7. Business
  - ◇ Develop of business disaster plans
  - ◇ Making insurance/financial institutions attractive
  - ◇ Understand what their risks of where they are located
  - ◇ Minimize risk in business Ratio of loss
  
8. Baseline environmental information
  - ◇ Baseline environmental information about resources, carrying capacity, and relationship to hazard mitigation available in a form easily understood at the community level.
  
9. Infrastructure and critical facilities
  - ◇ Disaster resistant houses better enforcement of building regulations
  - ◇ Proactively improve infrastructure for disaster response (roads, shelters). Establish policies for minimum requirements for needed infrastructure
  - ◇ Identify and implement appropriate infrastructure to minimize damage or resist hazards.
  
10. Fisheries management policies
  - ◇ Appropriate to carrying capacity of the area that address (and document) level of effort (e.g. number, type of boats used for fishing) to set stage for assistance following disaster. (Links to livelihoods, governance)
  
11. Recovery/redevelopment plans established before disaster
  - ◇ Preplanning
  - ◇ Mechanisms in place for Governments to coordinate donors/NGO for post disaster response and recovery. Donors understand/support local and government priorities/programs/policies. Collaborate on standards with national and sub-national agencies.
  - ◇ "Temporary" coastal management plans established and used during disaster recovery that address these and other relevant issues unique to recovery.
  - ◇ "Green" reconstruction/recovery guidelines in place before disaster that address these issues and others.
  - ◇ Integrated approach to setbacks and other mitigation policies that include reference to livelihoods and community development best practices (including stakeholder participation)
  
12. Improved user-friendly knowledge management
  - ◇ Educated decision makers
  - ◇ Access to reliable, timely, and understandable information
  - ◇ Analytical skills
  - ◇ Create user friendly technological tools
  
13. Utilize traditional and cultural knowledge/practices
  - ◇ Social capital and networks
  - ◇ Traditional culture practices- natural warning indicators
  - ◇ Identify historical info about disasters
  - ◇ Loss of traditional knowledge can be devastating
  - ◇ Integrate traditional knowledge in public awareness
  
14. Institute legal tools of engagement that incorporate DM and ICM
  - ◇ Appropriate "Building Codes" that incorporate resilience/resistance of buildings
  - ◇ Integrated (DM/ICM) Land Use Planning, dynamic zoning and enhanced Environmental Impact Assessment (EIA)
  - ◇ Includes mechanisms for arbitration to resolve conflict
  - ◇ Mechanism for effective enforcement



15. Implementation of integrated programs that support the institutional framework, mandate, legal tools

- ◇ Capacity for implementation
- ◇ Competent Decision Makers
- ◇ Systems that support accountability and transparency

16. Develop appropriate coastal resource management policies

- ◇ Protect natural protective features that are in place, enforced, and embraced by the community.
- ◇ A community level (bottom up) push for resource protection to meet and rationalize top-down management
- ◇ Are flexible enough to address new threats and implications of new technology/increased effort
- ◇ Involving community with risk mitigation activities- buy-in
- ◇ Encourage hazard mitigation measures
- ◇ Incorporates natural resource mgmt and disaster resilience

17. Land use planning

- ◇ Incorporate DM/CRM aspects into land use planning
- ◇ Community planning - sensitive to local people
- ◇ Address zoning conflicts and tools to resolve conflicts

18. Site planning

- ◇ Understand risks when developing plans
- ◇ Integrate development with risk management programs
- ◇ Living documents for community planning
- ◇ Involving community with risk mitigation activities- buy-in
- ◇ Participatory, democratic engagement
- ◇ Create user friendly technological tools

19. Design and implement tourism development guidelines

- ◇ Promotes sustainability and is linked to carrying capacity of the region and other resource management programs.
- ◇ Incorporate mechanisms that allow community participation in planning and in benefits of tourism (jobs, environmental education)

20. Diversification of livelihoods

- ◇ Target programs that reduce dependence (and potential impact from disaster) on any one economic sector (i.e. tourism, fisheries).
- ◇ Diversified livelihoods can reduce the over-influence of one type of sector in decisions
- ◇ Diversify livelihoods that are not as susceptible to hazards
- ◇ Understand risks in developing livelihoods
- ◇ Self sustainable livelihoods
- ◇ Gender empowerment.

### 4.3 Brainstorming on “conceptual models” of building resilience

The brainstorming session on conceptual models of building resilience has been a fruitful exercise in the CCR workshop. A set of five alternative models have been emerged from the participants. However, among these following two models of building resilience received wider acceptance both with their own rights.

**Model 1.** The “Recycle cycle model”\* – a simple one and builds on the existing cycle of disaster management

**Model 2.** The “pie” or “pizza model” – that depicts the elements of resilience has also been widely accepted by the participants as well.



Figure 11. One participant from India describing the conceptual model that emerged from his group work.

The following models are documented in a raw state (i.e. handwritten) as developed in the workgroup discussions and in brainstorming sessions. After the workshop, the refinement and fine tuning of these models are underway but these are kept for documentation. These models gives a reflection of thoughts that are gradually been put together in the process and for gradually identifying a more accepted model by the various group of participants.

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\* The conceptual model names -- as used by the participants -- have not been altered intentionally. Such as the term “recycle cycle model” or “pie model” or “pizza model” kept untouched at this phase.

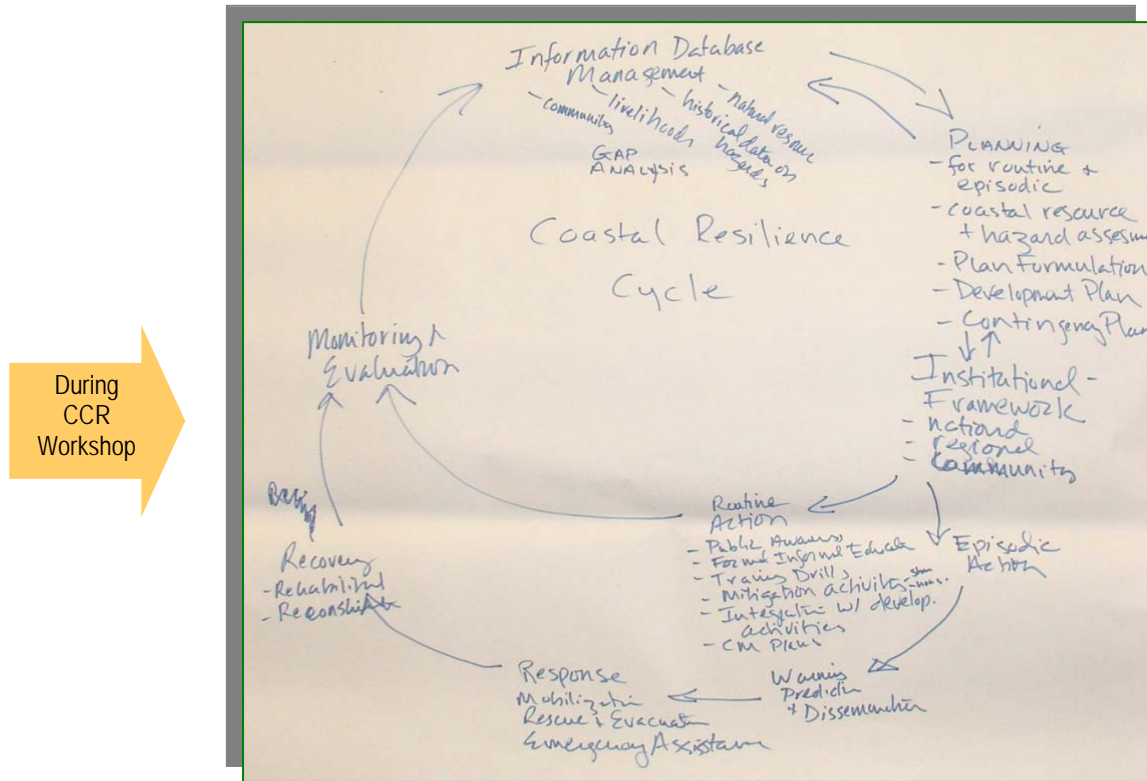


Figure 12. The "recycle cycle model" emerged from the group work remained as a precursor of evolving conceptual models of process of resilience.

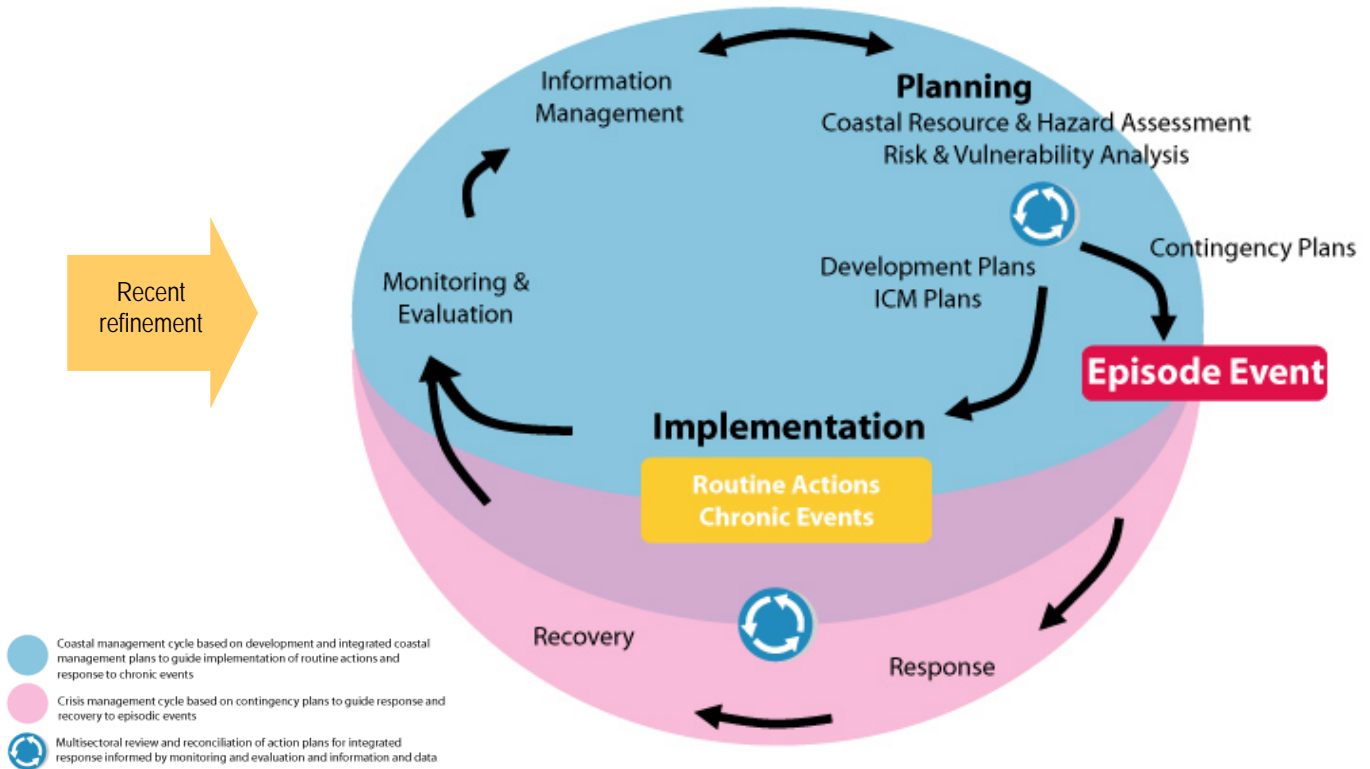
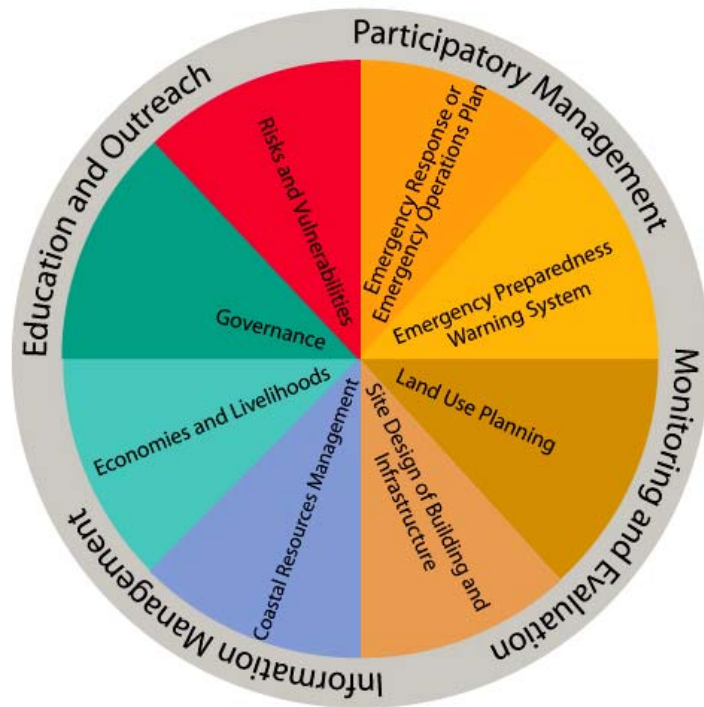


Figure 13. The recently refined version of the CCR workshop model now named as "Coastal Community Resilience Cycle". Integrating Planning and Response to Address Chronic and Episodic Coastal hazards.



During CCR Workshop

Figure 14. Another model emerged from the group where the elements of resilience components are portrayed in a pizza like model metaphorically identified as the pizza model.



After refinement

Figure 15. The recent refined version of the circular model portraying the “elements of costal community resilience” looks like this.

Few other alternative models:

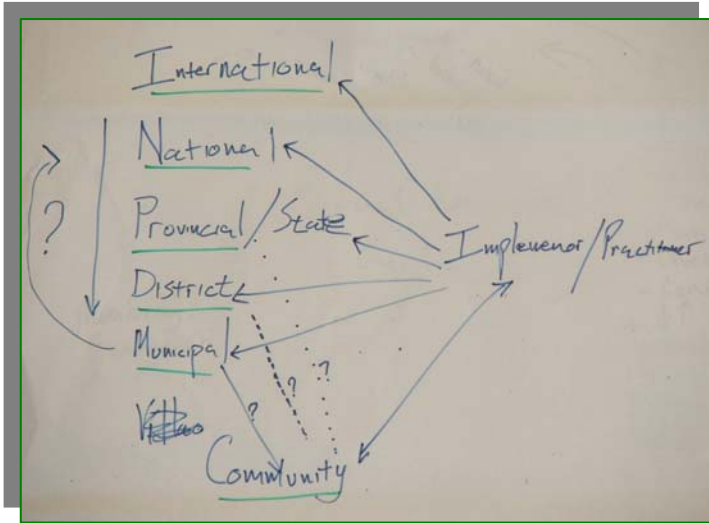


Figure 16. This model outlined the various tiers and hierarchical institutional setups that need to be taken under consideration for building coastal community resilience.

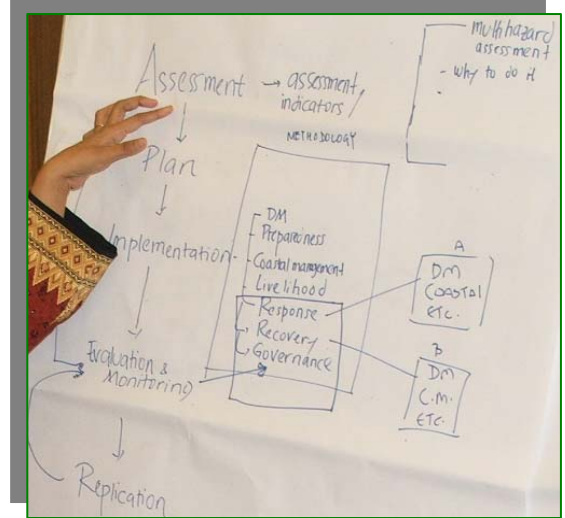


Figure 18. Another alternative model on process of resilience.

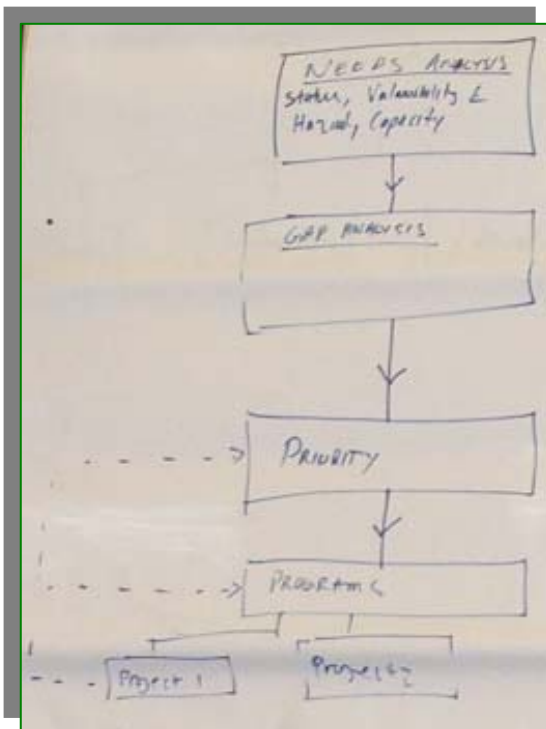


Figure 17. This model focuses on various elements of a system that is resilient.

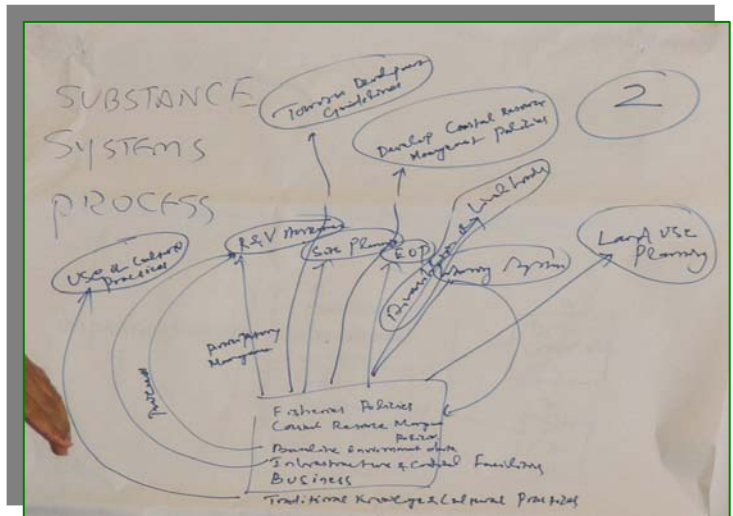


Figure 19. Some models such as the above one have tried to portray the complexity of issues.



#### 4.4 Tools and strategy identification

The tools and strategies are identified through a participatory exercise and through the intensive use of “Delphi method”. Each participant contributed in identification of the tool and strategies by major CCR elements that they have identified in the earlier stage (first day). Each participant from their experiences specified issues associated with the resilience building elements.

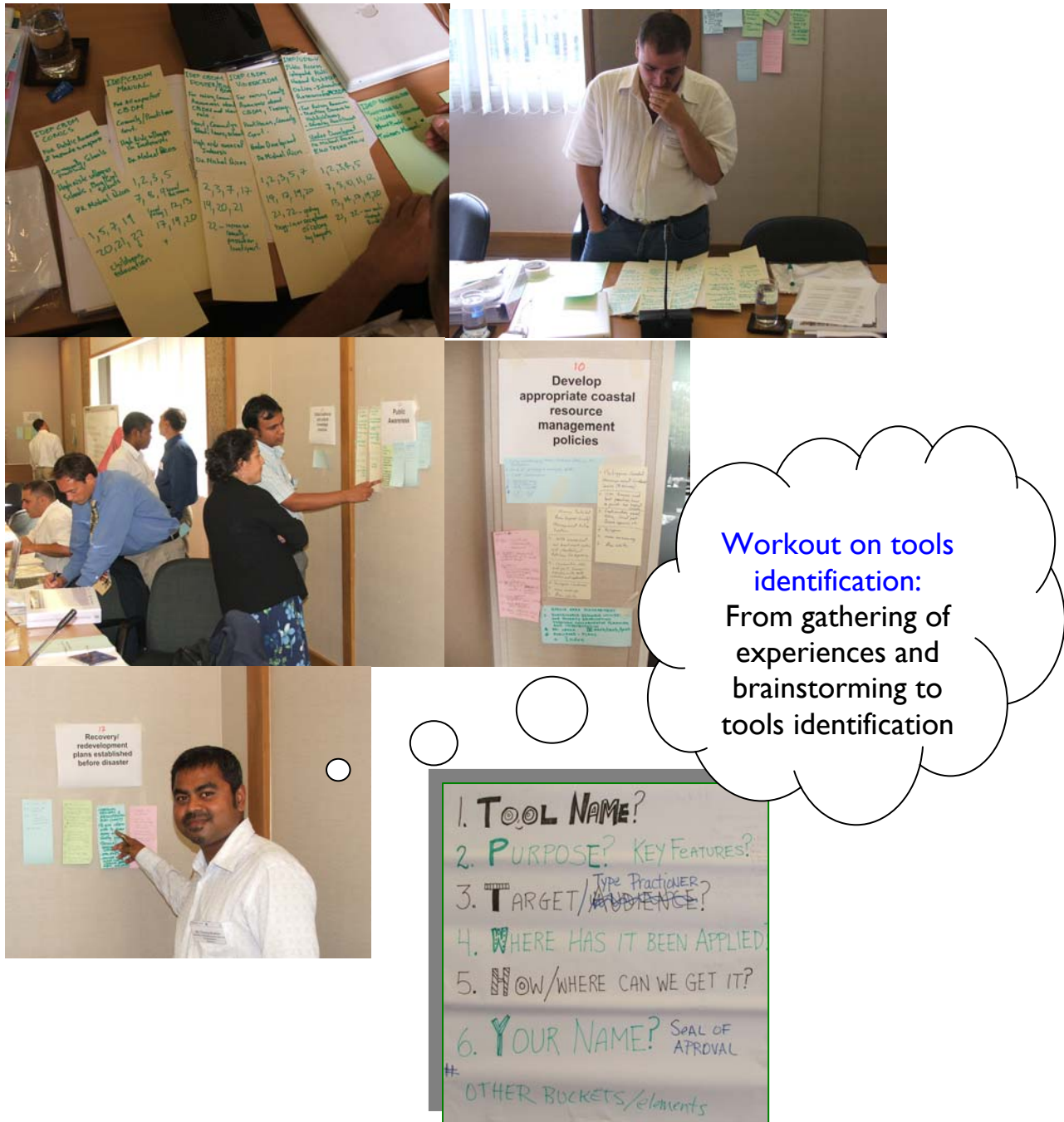


Figure 20. The schematic above shows various activities that were performed to identify tools for building resilience.

The issues participants identified are as follows:

- Tool name
- Purpose of the tool and/or key elements
- Target audiences or type of practitioners
- Locations where the tool has been applied
- Where to get that particular tool
- Identification of the contributor, and
- Additional references (if there any).

The elements of resilience on which participants attached tools are:

1. Holistic framework for integrating institutions at all levels to address both dm and ICM
2. Participatory management
3. Long term sustainable funding with flexibility designed in to address episodic events
4. Warning systems
5. Risks and vulnerability assessment
6. Establish emergency operations plans
7. Business
8. Infrastructure and critical facilities
9. Baseline environmental information
10. Fisheries management policies
11. Recovery/redevelopment plans established before disaster
12. Improved user-friendly knowledge management
13. Utilize traditional and cultural knowledge/practices
14. Institute legal tools of engagement that incorporate dm and ICM
15. Implementation of integrated programs that support the institutional framework, mandate, legal tools
16. Develop appropriate coastal resource management policies
17. Land use planning
18. Site planning
19. Design and implement tourism development guidelines
20. Diversification of livelihoods, and
21. Others (an open one).





## 5. CCR GUIDEBOOK OUTLINE AND AND PLANS

The workshop successfully developed the tentative outcomes and outlines for the CCR Guidebook development. In the final day of the CCR Workshop, building on the participants' views, thoughts and the work group results, the compiled CCR workshop outcomes and the draft outline of the CCR Guidebook have been presented by Dr. Catherine Courtney, Coordinator of the CCR task, US IOTWS Program.

The participants agreed on the outline, future plans and collaboration in developing the CCR initiative in future. Participants have also provided their forward looking proactive feedbacks on that as well.

### 5.1 Draft Outline of CCR Guidebook

Tentative outline of the Coastal Community Resilience Guidebook remains as follows:

- Introduction
- Coastal hazards and vulnerabilities
- Conditions that make coastal communities resilient
- A framework for coastal community resilience
- Assessing coastal community resilience
- Building coastal community resilience (tool matrix by CCR element)
- Sustaining Investment in coastal community resilience

### 5.2 Next steps

Tentative schedule of guidebook CCR development activities are follows:

- Working draft CCR guide : August 30, 2006.
- Partner section inputs : July – August, 2006.
- Country inputs : September – October, 2006.
- CCR guide revision : October – November, 2006.
- CCR guide printing and launch : December, 2006.

### 5.3 Achievements

The major achievements resulted from the CCR workshop are as follows:

- Greater understanding of the resilience and related **concept(s)**. A common understanding was developed in terms of academic definitions, agency definitions, practicing definitions and so forth.
- Identification of the major **elements of coastal community resilience** specific to IO region.
- Identification of **sector specific** vulnerability factors and elements of resilience (socio-economic, environmental and governance related).
- Knowledge of various **agency activities and country activities** related to building resilience. Also, successfully brought together two major groups of professionals: coastal management professionals and disaster management practitioner.

- **Technical consolidation** to develop a comprehensive guideline for building community resilience in the coastal areas.
- Draft outline of possible and alternative **conceptual frameworks** (also schematic diagrams) for building resilience
- The draft **outline of the CCR Guidebook** (a guide to planning and action to address tsunami and other coastal hazards)
- Setting up a tentative **work-plan and schedule** of upcoming activities, and
- Initiation of the **country plans** for organizing national workshops.
- **Commitment of participating agencies** for future contribution in CCR Guidebook development.

## 5.4 Finding out workshop materials

The soft version of the workshop documents, presentations and most of the other related working copies documents are posted at the US IOTWS workshop page.

The webpage link (URL) is as follows:

[http://www.us-iotws.gov/ev\\_en.php?ID=2142\\_201&ID2=DO\\_TOPIC](http://www.us-iotws.gov/ev_en.php?ID=2142_201&ID2=DO_TOPIC)

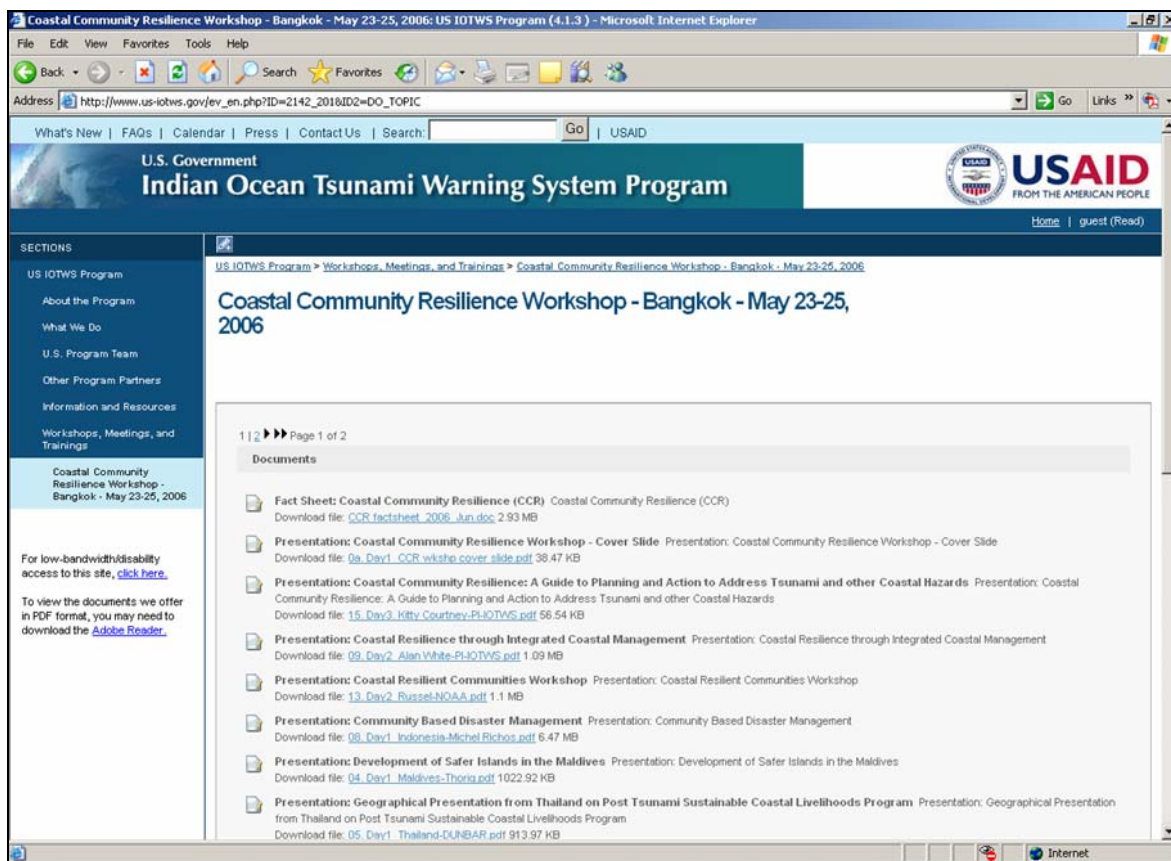


Figure 21. The section on Coastal Community Resilience Workshop on the US IOTWS website.

In addition to this, the detailed "CCR workshop folder" and other relevant resources are available at US IOTWS Program library located at Program Integrator's office in Bangkok.

## ANNEXES

### ANNEX A: Workshop Participants



**Mr. Atiq Kainan Ahmed**  
Social Scientist, US IOTWS Program  
Chartered Square Building  
18<sup>th</sup> Floor, Unit 1802  
152 North Sathorn Road  
Bangrak, Bangkok 10500 Thailand

Tel: +66 2 637 8517-9 Ext: 15  
Fax: + 66 2 637 8520  
Mobile: + 66 4 666 5062  
Email: [atiq@iotws.org](mailto:atiq@iotws.org), [atiqka@adpc.net](mailto:atiqka@adpc.net)



**Mr. Akshatvishal Chaturvedi**  
UN ISDR/Bangkok  
c/o UNESCAP, UN Conference Center  
Building,  
Rajdamnern Avenue,  
Bangkok 10200

Thailand  
Mobile: +66 (0) 9 204 2746  
Email: [chaturvedi1@un.org](mailto:chaturvedi1@un.org)



**Mr. Orestes Anastasia**  
Thailand Program Manager  
USAID Regional Development  
Mission/Asia  
Diethelm Tower A, 10th floor  
93/1 Wireless Rd. Bangkok 10330

Thailand  
Tel: + 66 2 263 7468, + 66 2 263 7499  
Fax: + 66 2 263 7499  
Email: [oanastasia@usaid.gov](mailto: oanastasia@usaid.gov)



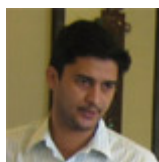
**Catherine A. Courtney, Ph.D.**  
Marine Environmental Scientist  
Tetra Tech EM Inc.  
707 Richards St., Suite 300  
Honolulu, HI 96813  
U.S.A.

Tel: (808) 441-6612  
Cellular: (808) 382-6927  
Email: [kitty.courtney@ttemi.com](mailto:kitty.courtney@ttemi.com)



**Amrit Bart Ph.D.**  
Associate Professor & Chief of Party  
Coastal Livelihoods Program  
Asian Institute of Technology/URI  
P.O. Box 4 Klong Luang  
Pathumthani 12120 Thailand

Tel: 66 (0) 25245473  
Fax: 66(0)25246200  
Email: [bart@ait.ac.th](mailto:bart@ait.ac.th)



**Mr. Biswanath Dash**  
Consultant (EWS&MHP)  
United Nations Development Programme  
Apex Towers, 4th Floor  
54, 2nd Main Road, R.A. Puram  
Chennai 600 028

India  
Tel: +91 44 42303551  
Fax: +91 44 42303556  
Email: [biswanath.dash@undp.org](mailto:biswanath.dash@undp.org)



**Mr. Rob Barton**  
USAID Regional Development  
Mission/Asia  
Diethelm Tower A, 10th floor  
93/1 Wireless Rd. Bangkok 10330  
Thailand

Tel: + 66 2 263 7468, + 66 2 263 7499  
Fax: + 66 2 263 7499



**Ms. Patra Rina Dewi**  
KOGAMI, Master Trainer  
Jl. S. Parman No. 250  
Ulak Karang-Padang  
Sumatera Barat 25134, Indonesia  
Tel: + 62 751 7860280

Mobile: + 62 815 35 34 30 37  
Email: [farahlagi@yahoo.com](mailto:farahlagi@yahoo.com)



**Ms. Chandrima Biswas**  
Program Associate  
(Disaster Management)  
United Nations Development  
Programme  
Apex Towers, 4th Floor

54 2nd Main Road, R A Puram,  
Chennai 600028  
India.  
Tel: (91 44) 42303551  
Fax: (91 44) 42303556  
Email: [chandrima.biswas@undp.org](mailto:chandrima.biswas@undp.org)



**Mr. Christopher Dunbar**  
Ranong Field Supervisor  
CRC-URI-AIT  
Tsunami Sustainable Livelihood Program  
Kampuan TAO Office, Suksamran,  
Ranong 85120 Thailand

Tel: + 66 77 844 286  
Fax: + 66 77 844 287  
Cellphone: + 66 7 886 0273  
Email: [cjdunbar@gmail.com](mailto:cjdunbar@gmail.com)



**Mr. Len R. Garces**  
 Research Fellow (Coastal Fisheries)  
 Natural Resources Management  
 The WorldFish Center  
 P.O. Box 500, GPO 10670  
 Penang, Malaysia

Telephone: (+604) 620-2173  
 Fax: (+604) 626-5530  
 Email: [l.garces@cgiar.org](mailto:l.garces@cgiar.org)



**Ms. Charlie MacPherson**  
 Program Integrator/IRG-Tetra Tech Tetra  
 Tech, Inc.  
 10306 Eaton Place, Suite 340  
 Fairfax, VA 22030 U.S.A.  
 Tel: 1-(703) 385-6000

Fax: 1-(703) 385-6007  
 Email: [charlie.macpherson@tetrattech-ffx.com](mailto:charlie.macpherson@tetrattech-ffx.com)



**Mr. Thoriq Ibrahim**  
 Director, Regional Development  
 Ministry of Planning and National  
 Development  
 Maldives  
 Ghazee Building

Ameeru Ahmed Magu  
 Male', 20125 Republic of Maldives  
 Tel: +(960) 3323336  
 Fax: +(960) 3327351  
 Mobile: +(960) 7792441  
 Email: [thoriq@planning.gov.mv](mailto:thoriq@planning.gov.mv)



**Mr. David Mckinnie**  
 The US IOTWS Project Coordinator  
 c/o Pacific Marine Environmental  
 Laboratory  
 National Oceanic and Atmospheric  
 Administration  
 7600 Sand Point Way NE

Seattle, Washington 98115 U.S.A.  
 Tel: 1-(206)526-6950  
 Fax: 1-(206)526-4576  
 Email: [david.mckinnie@noaa.gov](mailto:david.mckinnie@noaa.gov)



**Mr. Russell Jackson**  
 Coastal Hazards Program  
 Coordinator  
 NOAA Pacific Services Center  
 737 Bishop Street  
 Mauka Tower, Suite 2250

Honolulu, HI 96813-3212 USA  
 Tel: 808-522-2299  
 Cell: 808-294-4730  
 Fax: 808-532-3224  
 Email: [russell.jackson@noaa.gov](mailto:russell.jackson@noaa.gov)



**Mr. Zubair Murshed**  
 Program Manager, CBDRM,ADPC  
 Asian Disaster Preparedness Center  
 (ADPC)  
 P.O. Box 4, Klong Luang  
 Pathumthani 12120

Thailand  
 Tel: 66 (0) 2516 5900-10  
 Fax: 66 (0) 2524 5350  
 Email: [mzubair@adpc.net](mailto:mzubair@adpc.net)



**Janaka A.de Silva, Ph.D.**  
 Coordinator Projects,  
 Thailand Program  
 IUCN The World Conservation  
 Union  
 Asia Regional Office

63 Sukhumvit Soi 39, Sukhumvit Rd. Watana,  
 Bangkok, 10110  
 Thailand  
 Tel: +( 66 2) 662 4061 Ext. 151  
 Fax: +(66 2) 662 4387  
 Mobile: +(66 4) 769 7381  
 Email: [janaka@iucn.org](mailto:janaka@iucn.org)



**Mr. Indra Ranasinghe**  
 IOTWS Program, ADPC  
 65/67, Housing Scheme,  
 Crow Island, Mattakkuliya,  
 Colombo 15  
 Sri Lanka

Tel: 0773-178820  
 Email: [iranapiu@yahoo.com](mailto:iranapiu@yahoo.com)



**Mr. Sanny Jegillos**  
 Regional Programme Coordinator  
 UNDP Regional Centre in Bangkok  
 4th Floor, UN Service Building  
 Rajdamnern Nok Avenue  
 Bangkok, Thailand

Tel: (+66) (0) 51452246  
 (+662) 2882536  
 Email: [sanny.jegillos@undp.org](mailto:sanny.jegillos@undp.org)



**Mr. Joseph Ravikumar**  
 Project Management Specialist  
 (Tsunami Recovery Program)  
 USAID  
 American Consulate General 220 Anna  
 Salai Chennai,

India  
 Tel: + 91 44 2811 2039  
 Fax: + 91 44 2811 2042  
 Email: [ravikumarJ@state.gov](mailto:ravikumarJ@state.gov)



**Michael Ricos, Ph.D.**  
 Director, Disaster Management  
 Department  
 Yayasan IDEP Foundation  
 PO BOX 160 Ubud, 80571  
 Bali, Indonesia

Tel/Fax : +62 361 981 504  
 Mobile: +62-81-5580-33662  
 Email: [DrMichael@IDEPfoundation.org](mailto:DrMichael@IDEPfoundation.org)





**Ms. Pam Rubinoff**  
Coastal Management Specialist  
Coastal Resources Center  
University of Rhode Island  
South Ferry Road, Narragansett, RI  
02882

USA  
Tel: 401 874 6135  
Fax: 401 789 4670  
Email: [rubi@gso.uri.edu](mailto:rubi@gso.uri.edu)



**Stacey Tighe, Ph.D.**  
Consultant  
Marine Science and Policy  
350 Ward Ave #106-380  
Honolulu, HI 96814-4004  
Tel (Hawaii): 1-808-554-3657

Indonesia Tel: (62-21) 720-4231  
Indonesia Fax: (62-21) 23-5219  
Indonesia Mobile: 0811-909-376  
Email: [stighe@cbn.net.id](mailto:stighe@cbn.net.id)



**Mr. Ranganathan Santhanam**  
State Relief Commissioner  
Department of Revenue  
Administration, Disaster  
Management and Mitigation  
"Ezhilagam", Chepauk

Chennai-600 005 India  
Email: [rsanathanam@tn.nic.in](mailto:rsanathanam@tn.nic.in),  
[rsanathanam13@hotmail.com](mailto:rsanathanam13@hotmail.com)



**Mr. Songpol Tippayawong**  
Coordinator GMS Initiative  
WWF International  
Thailand Programme  
104 Outreach Building  
AIT, Paholyothin Road,  
Klong Nung, Klong Luang

Pathumthani 12120,  
Thailand  
Tel: +662 524 6128-9  
+66 2 524 6168-9  
Fax: + 66 7 124 0852  
Email: [Songpolt@wwfgreatermekong.org](mailto:Songpolt@wwfgreatermekong.org)



**Mr. Asae Sayaka**  
Wetlands International-Thailand  
Office  
P.O. Box 95, Kor Hong Post Office,  
Hat Yai 90112, Thailand  
Tel/Fax: +66-74-429307

Mobile: +66-1-5411290  
Email: [asae-s@psu.ac.th](mailto:asae-s@psu.ac.th)



**Mr. Richard Whelden**  
Deputy Director  
USAID Regional Development  
Mission/Asia  
Diethelm Tower A, 10th floor  
93/1 Wireless Rd. Bangkok 10330,

Thailand  
Tel: + 66 2 263 7468, + 66 2 263 7499  
Fax: + 66 2 263 7499



**Mr. Adam Stein**  
Spacial Technology Specialist  
Perot Systems Government  
Services  
NOAA Pacific Services Center  
737 Bishop St. Suite 2250

Honolulu, HI 96813, U.S.A.  
Tel: (808) 532-3962  
FAX: (808) 532-3224  
Email: [Adam.Stein@noaa.gov](mailto:Adam.Stein@noaa.gov)



**Alan White, Ph.D.**  
Chief of Party  
Program Integrator  
The US Indian Ocean Tsunami Warning  
System (IOTWS) Program

Chartered Square Building  
18<sup>th</sup> Floor, Unit 1802  
152 North Sathorn Road  
Bangrak, Bangkok 10500 Thailand  
Tel: +66 2 637 8517-9 Ext: 20  
Fax: + 66 2 637 8520  
Email: [Alan.White@ttemi.com](mailto:Alan.White@ttemi.com)



**Mr. A.R. Subbiah**  
Director, Climate Risk Management  
Asian Disaster Preparedness Center  
P.O.Box 4 Klong Luang,  
Pathumthani 12120, THAILAND  
Tel: +66 (0) 2 516 5900-10 Ext: 405

Fax: +66 (0) 2 524 5360, +66 (0) 2 524 5382  
Mobile: + 66 (0) 1755 5471  
Email: [subbiah@adpc.net](mailto:subbiah@adpc.net)



**Ms. Angie Woo**  
Partnership Coordinator  
WWF Greater Mekong  
Thailand Country Programme  
104 Outreach Building  
AIT, Paholyothin Road,  
Klong Nung, Klong Luang

Pathumthani 12120 Thailand  
Tel: +662 524 6128-9  
+66 2 524 6168-9  
Fax: + 66 7 124 0852  
Email: [angie.woo@wwfgreatermekong.org](mailto:angie.woo@wwfgreatermekong.org)



**Ms. Ratirose Supaporn**  
Program Integrator  
The US Indian Ocean Tsunami  
Warning System (IOTWS) Program  
Chartered Square Building  
18<sup>th</sup> Floor, Unit 1802

152 North Sathorn Road  
Bangrak, Bangkok 10500, Thailand  
Tel: +66 2 637 8517-9 Ext: 17  
Fax: + 66 2 637 8520  
Email: [ratirose@iotws.org](mailto:ratirose@iotws.org)

## ANNEX B: Workshop Agenda (as progressed)

### Day 1: Tuesday, May 23, 2006

9:00-9:30	Opening Ceremony (Facilitated by Charlie MacPherson) Welcome address by Richard Whelden (Deputy Mission Director, US Agency for International Development/ASIA)
9:30-9:40	Overview of the US IOTWS Program - <i>Orestes Anastasia, US IOTWS Program Manager, USAID/ASIA</i>
9:40-10:00	Introduction to CCR workshop and workshop mechanics
10:00-10:15	Break
10:15-10:45	Overview presentation on the CCR concepts, self assessment framework, and guidebook components – <i>Pam Rubinoff, Coastal Resources Center, University of Rhode Island, US IOTWS Program</i>
10:45-11:15	Overview presentation of World Wildlife Fund experience on coastal resiliency and Green Coast Program – <i>Angie Woo, Coordinator GMS Initiative, World Wildlife Fund</i>
11:15-12:00	Discussion and feedback on presentations
12:00-1:00	Lunch
1:00-2:30	Presentations of geographic case studies by country: Maldives, Thailand, Sri Lanka, India and Indonesia.
2:30-2:45	Break
2:45-3:45	Discussion to define elements of coastal community resilience
3:45-5:00	Work in groups to refine guidebook outline

### Day 2: Wednesday, May 24, 2006

9:00 – 9:15	Recap of Day 1 Break out group activities
9:15 – 10:30	Presentations on Coastal Zone Issues and Studies (Alan White, Atiq Kainan Ahmed, Stacey Tighe, Patra Rani Dewi)
10:30 – 11:00	Break
11:00 – 12:00	Review of Breakout Sessions: Resilience Elements
11:30 – 12:00	US IOTWS Program Schedule/Country Inputs
12:15 – 1:00	Lunch
1:00 – 2:30	Presentations (UNDP, NOAA, ADPC)
2:30 – 2:45	Break
2:45 – 3:15	Organization of Elements
3:15 – 4:00	Workout on Tools and Strategies
4:00 – 5:00	Review of Tools, Strategies and Other issues.

**Day 3. Thursday, May 25, 2006**

9:00 – 9:15	Charge to Group
9:15 – 10:30	Develop Conceptual Model of CCR
10:30 – 10:45	Break
10:45 – 11:30	Review of Models. Award Ceremony
11:30 – 12:00	US IOTWS Program Schedule/Country Inputs
12:00 – 1:00	Lunch
1:00 – 1:30	Country Meetings
1:30 – 2:00	Review Draft Guide Outline
2:00 – 2:15	Wrap-up, Farewells.

End of CCR Workshop.

## **ANNEX C: Contents of the workshop folder for participants.**

### **Section – One: CCR workshop agenda and objectives:**

- Brief agenda
- Detailed agenda
- Brief of CCR Workshop objectives

### **Section – Two: Case studies and presentations:**

- List of case studies/presentations from the participants

### **Section – Three: Reference documents:**

#### *IOTWS Program working documents*

- Draft outline of CCR Guide
- Draft concept for a scorecard on CCR
- Example CCR tool
- Draft resilience concept document

#### *Literature*

- Resilience concept
- Mangroves/Vegetations
- Social/livelihoods
- Integrated Coastal Management (ICM)
- Disaster preparedness

### **Section – Four: IOTWS fact sheets**

### **Section – Five:**

- Participant list
- IOTWS professionals contacts
- Address and location map of IOTWS office
- Outline for technical case studies
- Outline for geographical case studies



## ANNEX D: Reflections of participants in CCR Workshop



CCR workshop participants. Photographed by Atiq Kainan Ahmed.



Workshop banner



CCR Core Team