



INTEGRATED COASTAL ZONE MANAGEMENT

Integrated Coastal Zone Management Training Course

Curriculum, course outline and unit plans

March 2013

**A project managed by The Nature Conservancy on behalf of AusAid
and implemented by the Australian Tropical Marine Alliance and the Coral Triangle Center**



INTEGRATED COASTAL ZONE MANAGEMENT

Acknowledgements

Thanks to our Curriculum Development Working Groups many of whom assisted well beyond simply providing constructive input to the curriculum development. In PNG this included: Barbara Masike, Augustine Mungkaje, Senita Wauwia, Leah Aisi, Margaret Ame, Aisi Anas, Maxine Anjiga Arua, Leban Gisawa, John Kakas, John Kasu, Jeff Kinch, Paul Lokani, Demi Markus, Russell Purai, Vagi Rei, Bernard Suriman, Steven Tandale, Jane Wia. In the Solomon Islands this included: Seno Mauli, Delvine Boso, Patrick Daudau, Peter Kenilorea, Duta Kauhiona, Alex Makini, Rosalie Masu, Ben Salepo, Shannon Seeto, John Usuamo, Agnetha Vavekaramui and Jennifer Wate.

We acknowledge Julian Clifton for the bulk of the development and delivery of the ICZM training materials and Sabine Carter for design work on those materials. Leanne Fernandes for coordination of all of the above.

This curriculum and supporting teaching materials was developed as part of an Australian Government-funded project called "Strengthening in-country tropical marine resources management training capacity in PNG and the SI". It focuses on training and education priorities for the Solomon Islands and Papua New Guinea relating to tropical marine resource management. The project has been managed by The Nature Conservancy (special thanks to Laura Whitford) as part of the Australian Government's support to the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security and is being implemented by the Coral Triangle Center (with special thanks to Rili Djohani) and by the Australian Tropical Marine Alliance (James Cook University, University of Western Australia, University of Queensland, Charles Darwin University and the Australian Institute of Marine Science). Thanks to the Coral Triangle Support Partnership for some extra funding to support workshop logistics.



INTEGRATED COASTAL ZONE MANAGEMENT

CONTENTS

TRAIN THE TRAINERS	1
Background	1
Tailoring the curriculum to PNG and Solomon Islands	1
Development of training materials	1
Training-of-trainers methods.....	2
CURRICULUM	2
Overview of course units	5
Learning outcomes.....	5
Pedagogy.....	5
Overview of assessment	6
Flexible training framework.....	7
Teaching resources	7
UNIT PLANS	8
Unit 1 Governing Coastal Ecosystems.....	8
Unit 2 Coastal Vulnerability	10
Unit 3 Understanding ICZM	12
Unit 4 Stakeholder Analysis	14
Unit 5 Problem Analysis	16
Unit 6 Objective Analysis	18
Unit 7 Integrated Coastal Planning	20
INTEGRATED COASTAL ZONE MANAGEMENT PLAN TEMPLATE.....	22
GLOSSARY OF TERMS	24



INTEGRATED COASTAL ZONE MANAGEMENT

TRAIN THE TRAINERS

Background

Developing local capacity in tropical marine resource management in support of the Coral Triangle Initiative (CTI) strategies has been among the highest priorities identified by Papua New Guinea and the Solomon Islands.

Government to government liaison identified that there is inadequate marine resource management education curricula and training in government and academic institutions in these countries. As indicated in the regional CTI Plan of Action, Solomon Islands National CTI Plan of Action and PNG's Marine Plan, marine resource management practitioners often lack access to key/important training, resources or guidance.

Based upon in-country consultations with the Australian Government, a project was developed to address these gaps in PNG and the Solomon Islands. The team comprises: the Australian Tropical Marine Alliance, the Coral Triangle Center and the Nature Conservancy, with support from the Australian Government.

There are three components to the project. Firstly, the curricula intended to build the skills and capacity of marine resource managers will be developed. These curricula are designed to be delivered as short courses (1 week in duration) which will ensure that people currently working as marine resource managers are not precluded from participating due to a busy work schedule. Secondly, existing trainers working in local institutions (local universities for example) will be provided with training in the delivery of the curricula. Thirdly, these trainers will be supervised and mentored as they deliver the training in situ, to a student audience comprising marine resource managers.

This package constitutes part of this agreement through delivering a training course in integrated coastal zone management.

Tailoring the curriculum to PNG and Solomon Islands

The curriculum has been tailored through: use of local examples, use of locally relevant source materials and prescribed reading for students, ensuring that the teacher and students apply local language and concepts where relevant and possible throughout the curriculum, and application of ideas and advice from in-country expert collaborators garnered both during the scoping study and continued communications.

Development of training materials

This training material has been developed by working with in-country curriculum development working groups which include members from both countries' Departments of Environment, Fisheries and Education as well as various local and international NGOs.

Communications about this curriculum occurred per email, telephone/skype calls and per face-to-face meetings with experts in PNG and Solomon Islands, as well as experts from Australian Institutions including the School of Marine and Tropical Science, the Australian Research Council Centre of Excellence for Coral Reef Studies and the Centre for Sustainable Tropical Fisheries and Aquaculture both at James Cook University.



INTEGRATED COASTAL ZONE MANAGEMENT

Training-of-trainers methods

Training of trainers in PNG and Solomon Islands will occur in-country, with both in-country and international experts working in collaboration.

The trainers will be trained by:

1. Reviewing the entire substance of the curriculum and upskilling trainers' knowledge base as necessary
2. Role-modelling of proposed class activities to both ensure trainers understand how to implement the activity and to ensure feasibility of activity
3. Reviewing of all teacher and student resource materials to ensure full understanding of their function in student learning and/or extension
4. Unit-per-unit in-training evaluation of trainers comprehension of key learning outcomes which students will need to achieve

Trainers being trained will be asked to keep a "teacher journal" and to enable them to make notes about the training-of-trainers as they are given the material to use and to provide feedback to each other.

CURRICULUM

Title: Integrated Coastal Zone Management (ICZM)

Semester: 4 day intensive short course OR semester-long course

Coordinator: One for each training institution where course to be implemented

Course Rationale

Coastal resources are of fundamental importance in economic, cultural and environmental terms in both PNG and the Solomon Islands. Managing the coastal impacts of human activities including onshore development, forestry, mining, agriculture and the longer term consequences of climate change are essential for development to be sustainable. Integrated coastal zone management (ICZM) is internationally recognised as the optimal means to resolve conflicts associated with coastal environments, to ensure that a wide range of stakeholders can continue to use coastal resources and to facilitate resilience to the impacts of climate change on both coastal communities and environments.

Course Description

This course will teach students about the need for ICZM and how to implement this ICZM. This will involve training in and application of skills in reconciling conflicting demands arising from different stakeholder groups and their needs and demands in the coastal zone.



INTEGRATED COASTAL ZONE MANAGEMENT

Curriculum Objectives

Students will gain an understanding of:

- The unique management demands of the coastal zone as the interface between land and sea
- The vulnerability of the coastal zone to human activities
- Principles and techniques used to identify conflicting needs associated with the coast
- The complex linkages between cause and effect when dealing with coastal problems
- Methods to identify priority action areas to address coastal problems

Course Content

1. Understanding the coastal setting: coastal ecosystems and services provided by coastal environments.
2. Coastal planning – government institutions responsible for coastal issues. Understanding the reasons for overlapping and multiple areas of responsibility.
3. Recognising the vulnerability of coastal environments. Identifying direct and indirect threats associated with human activity.
4. Linking threats to services – identifying user groups at most risk in coastal environments.
5. Overview of integration – understanding the importance of horizontal and vertical integration in coastal management.
6. Demonstrating the importance of integration: using examples (mining, oil palm plantations) to show the links between observed coastal problems and underlying driving issues.
7. Understanding the importance of public participation in ICZM – realising the benefits for management.
8. The need to recognise the variety of stakeholder groups and the importance of understanding different priorities amongst stakeholder groups. Examples to be used from mining and oil palm.
9. Using measures of importance and influence to organise stakeholders and facilitate their participation in ICZM.
10. Using problem trees to facilitate understanding of cause-effect pathways and the extent to which they may differ according to individual stakeholder groups. Examples relating catchment activities to coastal environments.
11. Understanding how problem trees can be used to produce objective trees for use by managers. The importance of incorporating stakeholder analysis into implementation plans.
12. Comparing objectives to demonstrate differing stakeholder priorities and values. Understanding the importance of attempting to reach a consensus regarding objectives to form the basis of ICZM.
13. Recognising how to deal with conflicting priorities in designing ICZM plans based on stakeholder analysis, problem trees and integrated objective trees.



INTEGRATED COASTAL ZONE MANAGEMENT

14. Drawing up a prioritised list of actions. Recognising the need to monitor ICZM activities and follow adaptive management strategies.

Monitoring student learning

Student learning will be monitored throughout the teaching and learning process to determine student progress and learning needs. During each unit plan opportunities have been embedded to gather feedback about how students are progressing and what they need to learn next. Specific monitoring opportunities may include:

- Student Consultation
- Student Reflection including via use of the glossary and class activities
- Journal Responses

In addition, formal assessment will be conducted via:

- Class practicals/activities (may include assignments and other assessment pieces)
- Class tutorial (may include questionnaires and other assessment pieces)
- Final assessment: - a draft plan for integrated coastal zone management

Pre-requisites

Knowledge of local coastal environments and the human activities in them.

General reading

European Commission (2001). EU Focus on Coastal Zones. European Commission, Brussels. 36p. Suitable background reading for trainers.

European Commission (2011). OurCoast: Guidance based on selected ICZM cases. European Commission, Brussels. 55p. Suitable background reading for trainers.

South Pacific Regional Environmental Programme (1999). Coastal Management Profiles. SPREP Samoa 213p. Suitable background reading for trainers.

Post RC, Lundin CG eds. (1996). Guidelines for Integrated Coastal Zone Management. Environmentally Sustainable Development Studies and Monographs Series No. 9. The World Bank, Washington DC. 28p. Suitable background reading for students.

Le Tissier M, Roth D, Bavinck M, Visser L. (2011). Integrated Coastal Management: from post-graduate to professional coastal manager. Eburon, Delft. 205p. ISBN 978-90-5972-327-6. Suitable background reading for trainers.

Worldwide Fund for Nature (2006). Bismarck Solomon Seas Ecoregion: Solomon Islands fisheries, marine and coastal legislation and policy gap analysis. Worldwide Fund for Nature 68p. Suitable background reading for trainers.



INTEGRATED COASTAL ZONE MANAGEMENT

Overview of course units

The course begins with an introduction to be led by the trainer, which may include a local field visit if possible. This is followed by seven course units which are detailed in this booklet.

Group introductions	Day 1 morning	1 hour
Governing coastal ecosystems	Day 1 morning	2.5 hours
Coastal vulnerability	Day 1 afternoon	2 hours
Understanding ICZM	Day 2 morning	3 hours
Stakeholder analysis	Day 2 afternoon	3 hours
Problem analysis	Day 3 morning	3 hours
Objective analysis	Day 3 afternoon	3 hours
Integrated coastal planning	Day 4	6 hours
Conclusions and feedback	Day 4 afternoon	0.5 hours
	TOTAL	24 hours

Learning outcomes

Upon completion of the unit, students will be able to

- Encourage institutions and individuals to work in an integrated manner
- Identify and prioritise threats to coastal resources associated with human activities
- Develop a sustainable strategy to address coastal issues which reflects stakeholders' views
- Communicate and facilitate the need to work in a co-ordinated and integrated manner to address coastal issues

Pedagogy

There are four main elements that make up pedagogical approaches and practices: the teacher, the teaching, the place and the curriculum. The specific pedagogical approaches and practices used in developing each of these elements of the teaching materials being prepared are discussed below.

Teacher: This curriculum is designed to be tailored and used by a trainer, lecturer or teacher who has experience delivering learning to mainly adult students. It can also be used to inform and guide workplace mentoring and supervision in ecosystem approaches to fisheries management.

The curriculum developed allows the teacher to bring their own knowledge and experience into the learning environment and to improvise by tailoring the training to the students and situation.

Teaching: The teaching is designed to be student-centred with each unit beginning with an activity which both engages the students and allows the teacher/lecturer to assess the level of knowledge of students in the unit being taught. The teacher can then build on the existing levels of knowledge in the classroom, skip lesson material which is already known and focus on the new learning outcomes of the unit. The teacher can also partner more knowledgeable students with less experienced



INTEGRATED COASTAL ZONE MANAGEMENT

students in the many teaching activities throughout each unit. Teachers are also encouraged to engage students to help them tailor the course to their individual needs.

The teaching is designed to empower the learner, for example, the presumption that each student can and will deliver an ecosystem-based fisheries management plan by the end of the course.

Place: The training is designed to be and will be delivered in-country and engages with local knowledge and local management practices and uses local case studies all to ensure learning is relevant to the students. The presumption throughout the training is of a partnership with local resource users and community members (although the explicit training for community-based resource management is addressed in another curriculum being developed by this project). The training also addresses the place-specific governance context within which an ecosystem approach to fisheries management must work.

Curriculum: In addition, the curriculum is at least 50% activity based to support learning-by-doing; the curriculum fosters and experiential learning process. This helps to connect the learning to the students work and/or life to make it relevant and interesting. This also supports the development of generic workplace skills, for example, teamwork, critical analysis, presentation skills, planning, communication, problem solving, professional writing skills, interpersonal skills and time management.

Whilst high quality hard copies of all the teaching material will be made available, the curriculum developers are aware that, over time, these may be used up, damaged by wear and tear or lost. We have assumed that, in some cases, teachers will only have access to a computer and a black and white printer and the teaching resources have been designed to be usable without access to more than the CD upon which all the teaching materials will be placed. Once the hardcopies are printed, the teacher can take them to places without electricity, without white or blackboards and they shall still be able to deliver the learning outcomes.

The curriculum has been developed with a view to opening pathways so that parts or all of the curriculum is accredited within the formal education systems of PNG and the Solomon Islands.

Overview of assessment

The main assessment artefact is a draft plan for integrated coastal zone management. This is designed to be prepared by groups of 4-5 trainees in order to achieve the learning outcomes, as well as stimulate knowledge exchange. If this assessment is formalised, the plan could amount to 50% of total assessment.

Each student will maintain an assessable journal (“diary”) of thoughts, learnings, ideas, etc. which should be used to demonstrate the level and type of engagement each student is having with the coursework and to also help the teacher revise the level and focus of the training to best accommodate student needs. This assessment should comprise 20% of the total.

Each student will maintain a personal glossary of new terms (with local language equivalents) in the back of their diary. This is assessable and worth 10% of the total. Reference can be made to the glossary of terms included in this booklet.

The remaining 20% of the assessment can take the form of class practicals/activities or class tutorials. There are very many of these throughout the unit plans as well as suggested review questions. We recommend that each teacher chooses which activities and/or tutorials to use for assessment depending upon the class composition.



INTEGRATED COASTAL ZONE MANAGEMENT

Flexible training framework

The course has been designed to be delivered in a flexible manner in order to facilitate delivery to trainees of differing backgrounds and skill sets.

University lecturers may choose to deliver the entire course as outlined. This is suitable for final year undergraduate students or those enrolled at postgraduate level.

College educators may choose to deliver a majority of the material to support related courses in coastal management.

Community educators and outreach officers may choose to focus upon the group work components to develop experience and skills amongst resource users with respect to certain issues within coastal zone management.

High School teachers and other responsible for teaching resource management may choose to supplement or enhance current curriculum with examples and ideas drawn from this curriculum.

Teaching resources

The teaching resources provided by this project will be provided both in hard copy and on a CD from which additional hardcopies can be printed.

The teaching resources include:

- Curriculum
- Unit plans (including learning outcome, detailed topics to be covered with suggested timings, classroom activities to reinforce learnings, reflection and review tools)
- Unit plans as above including notes for teachers
- Glossary of terms
- Powerpoint presentation of lessons
- References of relevance to students and trainers sorted by unit
- General references pertaining to ICZM in both PNG and the Solomon Islands



INTEGRATED COASTAL ZONE MANAGEMENT

UNIT PLANS

Unit 1 Governing Coastal Ecosystems

Topic: How is the coastal zone governed?

Learning Outcome: Students will be able understand the functions and services provided by coastal resource and how these are governed

Unit plan		
Step		Duration
1.	Ask class what they understand by the term 'coastal ecosystems'.	10 min
2.	Work through each of these three, discussing the functions of each ecosystem.	20 min
3.	Describe goods provided by coastal ecosystems and describe the difference between renewable and non-renewable goods.	20 min
4.	Ask class to categorise these goods into renewable and non-renewable categories	10 min
<i>SHORT BREAK</i>		5 min
5.	Define coastal services and list those arising from reefs, mangroves and seagrass meadows.	20 min
6.	Ask class who they think has overall responsibility for coastal government. List government departments mentioned.	10 min
7.	Use information from step 6 to underline how differing interest groups are involved in coastal government. Taking example of two government departments (for example, forestry and conservation), demonstrate the likelihood of conflicting priorities within government.	20 min
8.	Show how the coast is under jurisdiction of different levels of government.	15 min
9.	Ask class to discuss how involvement of different levels of government is likely to affect conflict. Is conflict more likely or not? Explore reasons why and list these.	15 min
10.	Conclusion.	10 min
Total duration = 2hr 30 mins		

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Homework: Students to use one of the notebooks/exercise books to record a list of goods and services derived from coastal environments.



INTEGRATED COASTAL ZONE MANAGEMENT

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) Identify which government departments are involved in coastal management
 - b) Give three reasons why the involvement of many government departments leads to problems in coastal management

Reading material

Govan H (2011). Good coastal management practices in the Pacific: experiences from the field. SPREP, Samoa 42p. Contains a brief summary of coastal management challenges and a case study from Solomon Islands. Recommended for both teachers and trainees.

Lane MB (2006). Towards integrated coastal management in Solomon Islands: identifying strategic issues for governance reform. *Ocean and Coastal Management* 49: 421-441. This paper considers the situation applying to coastal management in the period 1998-2003 and is quite advanced in its analysis of governance issues. It is suitable background reading for trainers.

Sulu RJ, Boso DN, Vave-Karamui A, Mauli S, Wini-Simeon L (2012). State of the Coral Reefs of Solomon Islands. *The Nature Conservancy* 60p. Chapter 3 outlines policies and legislation of relevance to coastal management. Chapter 4 summarises systems of traditional marine resource management. Essential reading for both teachers and trainees.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 2 Coastal Vulnerability

Topic: What is coastal vulnerability?

Learning Outcome: Students will be able to identify pressures on the coast and how these relate to vulnerability of coastal resources and ecosystems

Unit plan		
Step		Duration
1	Assess prior knowledge through class brainstorm, asking students to identify what human activities take place near the coast	15 min
2	Using display materials, tabulate these activities with reference to their environmental impact. Use criteria including short term impacts, long term impacts, localised impacts, large scale impacts. Discuss this with class.	20 min
3	Ask class to identify which activity they consider to have most environmental impact. Discuss differences in opinion and place in wider international context: to what extent are these reflected in other countries?	15 min
4	Discuss difference between direct impacts and indirect impacts.	15 min
5	Summarise steps 1-4: students should be aware that coastal ecosystems are subject to a variety of interacting pressures, reflecting activities both near and far from the coast itself	10 min
	<i>SHORT BREAK</i>	5 min
6.	Ask class to list words they associate with 'vulnerability'	5 min
7.	Use feedback and powerpoint material to define and discuss coastal vulnerability.	10 min
8.	Explore concept of 'sensitivity' with reference to components of coastal ecosystems discussed in Unit 1.	15 min
9.	Ask class to write down what actions can be taken to reduce vulnerability of a coral reef to human impacts in the coastal zone	10 min
10.	Use these actions to highlight that class has just outlined strategies for coastal management. Undertake brief analysis, focusing on those which address localised threats to coral reefs	15 min
11.	Conclusion.	10 min
Total duration = 2 hr 15 mins		

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Homework: Students to use one of the notebooks/exercise books to record a list of human activities and their impacts on coastal ecosystems.



INTEGRATED COASTAL ZONE MANAGEMENT

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) What human activity has the most significant impact on coastal ecosystems? Justify this through identifying the scale and magnitude of these impacts.
 - b) Identify the reasons why coral reefs, mangroves and seagrass meadows are vulnerable to human impacts.

Reading material

Adger WN (2006). Vulnerability. *Global Environmental Change* 16, 268-281. This is a detailed analysis of the concept of vulnerability. It is suitable background reading for trainers.

Badjeck M-C, Allison EH, Halls AS, Dulvy NK (2010). Impacts of climate variability and change on fishery-based livelihoods. *Marine Policy* 34, 375-383. This provides a good overview of marine resource users' vulnerability to climate change. It is suitable background reading for trainers.

European Environment Agency (2010). *The European Environment: state and outlook*. European Environment Agency 58p. This report includes a recent and comprehensive summary of threats facing the coastal environment in Europe, which will be of use in helping to understand some aspects of coastal vulnerability in the Solomon Islands. It is suitable background reading for trainers.

Sulu RJ, Boso DN, Vave-Karamui A, Mauli S, Wini-Simeon L (2012). *State of the Coral Reefs of Solomon Islands*. The Nature Conservancy 60p. Chapter 5 summarises threats to the Solomon Islands coastal resources and their vulnerability. Essential reading for both teachers and trainees.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 3 Understanding ICZM

Topic: Understanding integrated coastal zone management

Learning Outcome: Students will be able to recognise the need for ICZM and characterise coastal issues, problems and impacts

Unit plan		
Step	Description	Duration
1	Assess prior knowledge through class brainstorm, asking students to define what 'integration' means in the context of coastal zone management. Write down selected definitions on display board.	10 min
2	Use outcomes from step 1 to emphasise that integration involves the creation of new ways of management, not replicating existing ones. Discuss the various aspects of an integrated approach, particularly referring to horizontal and vertical integration.	20 min
3	Define vertical integration with reference to local government administration, using display board. Ask class to say why they think vertical integration is important.	15 min
4	Talk through other elements of integration: scientific and spatial.	15 min
5	Summarise steps 1-4.	15 min
	<i>SHORT BREAK</i>	5 min
6	Ask class to write down threats facing the coast.	15 min
7.	Group 'threats' under one of the following headings: a) biodiversity loss; b) pollution; c) coastal erosion; d) climate change.	20 min
8.	Work through each category, listing the problems which are associated with it.	25 min
9.	Review last two steps: class has identified principal threats facing coastal managers and the problems associated with these issues.	5 min
	<i>SHORT BREAK</i>	5 min
10.	Narrow focus down to specific problem – use onshore mining as an example. Ask class to consider the impacts of mining under the categories of marine, coastal and land-based.	15 min
11.	Work through the impacts cited and list them on the display board.	25 min
12.	Conclusion. Emphasise progress in understanding ICZM and importance of linking issues with impacts. Encourage discussion and interaction following unit so that all are prepared to focus upon coastal activities in subsequent units.	5 min
Total duration = 3 hr 15 mins		

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc



INTEGRATED COASTAL ZONE MANAGEMENT

Homework: Students to use one of the notebooks/exercise books to define vertical integration and horizontal integration in their own words.

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) Why is vertical integration important? What benefits does it bring to coastal management?
 - b) List the threats to coastal resources associated with palm oil plantations.

Reading material

Bennett G (2012). Customary marine tenure and contemporary resource management in Solomon Islands. Proceedings of the 12th International Coral Reef Symposium, Cairns 5p. This article highlights the need for coastal management to reflect local histories of resource ownership. Recommended reading for both teachers and trainees.

Govan H, Schwarz A-M, Boso D (2011). Towards integrated island management: lessons from Lau, Malaita, for the implementation of a national approach to resource management in Solomon Islands. World Fish Center 69p. Chapter 2 focuses on national approaches to coastal management. Essential reading for both teachers and trainees.

Wilkinson C, Brodie J (2011). Catchment management and coral reef conservation: a practical guide for coastal resource managers to reduce damage from catchment areas based on best practice case studies. Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre 120p. Chapters 1 and 2 underline the importance of ICZM through highlighting the links between catchment activities and coastal environments. Recommended reading for both teachers and trainees.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 4 Stakeholder Analysis

Topic: Understanding stakeholder analysis

Learning Outcome: Students will recognise the importance of effective stakeholder participation in ICZM and appreciate the means by which this can be organised

Unit plan		
Step		Duration
1.	Open session with interactive discussion. Write 'participation' on the display board and ask class for words they think are associated with this term.	25 min
2.	Summarise participation as a process which helps ICZM achieve its broader outcomes. Move on to 'stakeholder'. Ask class to say what they think makes a person, group or organisation a 'stakeholder'. List the responses.	15 min
3.	Through class contributions, construct a list of all those people, groups and organisations who may be defined as stakeholders in coastal planning and management. Ensure that this includes those not necessarily in the coastal zone (eg farmers) and not directly involved in using coastal resources (eg planners).	10 mins
4.	Add two columns to list headed 'Importance' and 'Influence'. Explain that importance refers to the need for the coastal activity to satisfy the interests of a stakeholder. Influence refers to the power of a stakeholder to help or impede a coastal activity. Take the example of a subsistence fisher – this group often has high importance but sometimes low influence and explain why this is the case. Go through the stakeholders using a 1 to 5 scale (1=very little importance/influence; 5=very high importance/influence). Assign scores of importance and influence to each stakeholder with class input. Explain why at each stage.	30 mins
	<i>SHORT BREAK</i>	5 min
5.	Recap what has been done. Highlight the need to obtain consensus (as far as is possible) on ranking importance and influence.	10 min
6.	Go back to importance/influence table. Highlight that stakeholders can have combinations of low importance/low influence; high importance/low influence etc – leading to four possible combinations. Assign each of the stakeholder groups to one of these categories.	30min
7.	Summarise step 6 as showing that different types of participation are necessary. Discuss what form of participation is suitable for each category.	20 min
8.	Conclusion. Emphasise importance of collecting high quality information about stakeholders.	10 min
Total duration = 2 hr 30 mins		



INTEGRATED COASTAL ZONE MANAGEMENT

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Homework: Students to use one of the notebooks/exercise books to define stakeholders in their own words.

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) Why are different forms of participation needed for stakeholder groups? Provide three reasons.
 - b) Define the difference between 'importance' and 'influence' in defining stakeholder groups.

Reading material

Fletcher S (2007). Influences on stakeholder representation in participatory coastal management programmes. *Ocean and Coastal Management* 50, 314-328. This article provides an insight into factors affecting how stakeholders can be represented in coastal management. Recommended reading for teachers.

Larsen RK, Acebes JM, Belen A (2011). Examining the assumptions of integrated coastal management: stakeholder agendas and elite cooption in Babuyan Islands, Philippines. *Ocean and Coastal Management* 54, 10-18. This article highlights how participatory processes can be captured by elite groups and the consequences for ICZM. Recommended reading for teachers and trainees.

Pomeroy R, Douvère F (2008). The engagement of stakeholders in the marine spatial planning process. *Marine Policy* 32, 816-822. This article summarises the stages of participation in coastal management and identifies means to engage stakeholders in these processes. Recommended reading for teachers.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 5 Problem Analysis

Topic: Understanding problem analysis

Learning Outcome: Students will be able to use problem trees to analyse cause-effect linkages for coastal issues from the perspectives of different stakeholder groups

Unit plan		
Step		Duration
1.	Recap previous units. Remind class that coastal zone provides services to different groups of people and that the primary threats are associated with human activity. Coast therefore needs 'protection' from people if people are to use its resources. This forms the basis for ICZM: how to manage the threats through linking cause and effect and managing these causes with stakeholder involvement	10 min
2.	Ask class to identify threats to the coast in home country and to consider the reasons for these being considered as threats: what impacts do they have?	15 min
3.	Explain to class that they have just provided ONE perception of coastal problems – ie their own. Stakeholders' views on coastal problems will reflect individual priorities, needs and perceptions. As an example, ask class to imagine they are working for a company seeking to establish an oil palm plantation near the coast. What would they perceive the main problems restricting that company's activity to be?	15 min
4.	Explain that we need to understand coastal problems from different stakeholders' perspectives in order to manage these. Break class into groups of 4 to 5. Assign each group roles of tourism operators, urban developers and conservation NGOs. Ask each group to agree on two or three main coastal problems of concern to each of these groups. Allow 15 minutes and list responses on the display board.	30 min
<i>SHORT BREAK</i>		5 min
5.	Recap what has been done. Highlight that each group will have its own, equally valid, perceptions of coastal problems and that managers have to understand these.	5 min
6.	Introduce the term 'problem tree'.	15 min
7.	The next stages involve working through an example problem tree. Start with the problem being a decline in fish abundance from the viewpoint of local fishers. Ask the class to identify the effects of declining fish abundance. List responses on the display board.	25 min
8.	Ask the class to consider what they think local fishers would say are the causes of the problem of declining fish abundance (the roots of the tree). List responses on the display board.	25 min
<i>SHORT BREAK</i>		5 min
9.	This step compares the fishers' problem tree with another stakeholder group's problem tree. Ask class to work in groups, all assuming that they represent stakeholders from an offshore oil and gas development company. The problem is here defined as <i>a lack of information regarding oil and gas deposits</i> . Each group should identify possible causes and effects	30 min



INTEGRATED COASTAL ZONE MANAGEMENT

	to construct a problem tree.	
10.	Conclusion. Make the point clear that there are many possible problem trees – depends on how many problems and how many stakeholders. The task of the coastal manager is to combine these and turn them into management priorities.	10 min
Total duration = 3 hr		

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Homework: Students to use one of the notebooks/exercise books to list threats to coastal resources in Solomon Islands.

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) Define what is meant by the branches, trunk and roots of a problem tree.
 - b) Give three examples of effects of declining fish abundance from the viewpoint of local fishers.

Reading material

Brewer TD (2013). Dominant discourses, among fishers and middlemen, of the factors affecting coral reef fish distributions in Solomon Islands. *Marine Policy*, in press. This article identifies how and why local resource users perceive resource abundance and decline. Recommended reading for teachers.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 6 Objective Analysis

Topic: Understanding objective analysis

Learning Outcome: Students will be able to understand how to identify objectives to address coastal problems and the complexities associated with differing stakeholder groups' views

Unit plan		
Step		Duration
1.	Recap previous unit. Main point from previous unit was that problem trees vary according to individual views. Combining these in a way which represents as far as possible all views is the task for the coastal manager. This will be carried out in the final day of training.	10 min
2.	Use ranked list of threats facing own country from last unit. Show how this can be turned into an objective through expressing in positive terms.	10 min
3.	Break the class into small groups of no more than 4 people. Using the list of coastal problems from unit 5, assign a problem to each group. Ask them to derive an objective from the problem and list these on the display board.	15 min
4.	Discuss the objectives.	15 min
	<i>SHORT BREAK</i>	5 min
5.	Discuss how objectives help to set goals to structure management plans.	10 min
6.	Introduce objective trees. Explain their relationship to problem trees.	10 min
7.	Work through the objective tree. Ask the class to identify means by which fish abundance can be increased and list these on display board. Repeat this with respect to outcomes and list these.	25 min
8.	Ask class to prioritise the single most important outcome and the single most effective means. Explore any difference in opinions.	15 min
	<i>SHORT BREAK</i>	5 min
9.	Summarise previous activities as identifying most effective strategies to achieve most important outcomes. Introduce this final section as focusing upon achieving consensus in objectives. This is designed along similar lines as Unit 5.	5 min
10.	Form the class into groups of 4-5 people and assign them the following stakeholder groups: <ul style="list-style-type: none"> - Tourism - Oil palm plantation owner - Marine resource conservation - Urban developers Ask each group to identify their priority objective and construct an objective tree based upon this, identifying all possible means and outcomes associated with that objective.	35 min
11.	Discuss the objective trees presented.	15 min
12.	Conclusion.	5 min
Total duration = 3 hr		



INTEGRATED COASTAL ZONE MANAGEMENT

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Homework: Students to use one of the notebooks/exercise books to identify three objectives for coastal zone management in Solomon Islands.

Assessment:

- Student journal/diary
- Student glossary
- Teacher to select from the suggestions below:
 - a) Give three reasons why an objective tree is useful for planning coastal zone management.
 - b) Explain why different stakeholder groups may hold contrasting objectives in coastal zone management.

Reading material

Cohen P (2011). Social networks to support learning for improved governance of coastal ecosystems in Solomon Islands. Coral Reef Initiatives for the Pacific 37p. Contains material illustrating how and why stakeholders hold varying perceptions and knowledge of coastal resources. Recommended reading for teachers.



INTEGRATED COASTAL ZONE MANAGEMENT

Unit 7 Integrated Coastal Planning

Topic: Integrated coastal planning

Learning Outcome: Students will be able to combine theory and practice in order to analyse coastal issues, prioritise strategies and minimise conflict in the pursuit of coastal management

Unit plan		
Step		Duration
1.	Recap previous units.	5 min
2.	Outline the content of this unit. Divide the class into groups of 4-5 people. Each group should select a case study coastal region for the unit exercise. Record each group's case study region on the display board.	20 min
3.	Each group should identify the human activity which presents the most significant problem in the case study coastal region. Record each group's decision on the display board.	20 min
4.	Each group should summarise the aspects of the coastal study region that make it vulnerable or resilient to the problem identified. Record each group's findings on the display board.	15 min
SHORT BREAK		5 min
5.	Each group should identify stakeholders of relevance to the coastal problem and case study region. These should be classified according to importance and influence and then placed in the appropriate category on a stakeholder matrix. A suitable participation strategy should be identified for each category. Each group should then summarise its findings.	45 min
SHORT BREAK		5 min
6.	Each group shall identify the key stakeholder groups from the previous step. Each group then constructs a problem tree focusing on the principal problem identified in step 3 from the perspective of each key stakeholder group. This will generate perhaps three or four problem trees.	40 min
7.	Each class group should combine its problem trees, integrating the causes and effects into one problem tree. Each group should present its final problem tree on the display board.	25 min
LUNCH BREAK		60 min
8.	Each class group should construct an objective tree based on the problem tree constructed in step 3.	25 min
9.	Each class group should combine its objective trees, integrating the means and outcomes into one objective tree. Each group should present its final objective tree on the display board.	40 min
SHORT BREAK		5 min
10.	Problem tree discussion. Each group should consider which individuals or organisations should be responsible for addressing the causes on its final problem tree.	15 min
11.	Objective tree discussion. Consider the means (policies) highlighted. Who should be responsible for these?	15 min
12.	Conclusion.	10 min
Total duration = 6 hr		



INTEGRATED COASTAL ZONE MANAGEMENT

Teaching materials

For teacher: Integrated coastal zone management curriculum CD; computer with printer to print off lesson materials; Blackboard, whiteboard and/or butcher paper and chalk/pens to use with them.

For student: 2 notebooks/exercise books (one to use in classroom for notes; one for journal); pens/pencils etc

Assessment:

- Student journal/diary
- Student glossary

Students can alternatively be assessed on their performance in this unit. If this is required, a report can be submitted which details the individual student's actions and decisions in producing the management plan. A possible template for this plan is detailed overleaf. Assessment criteria can include

- i) Does the report justify the coastal problem identified and the vulnerability of the case study region? Does the student demonstrate an awareness of factors influencing vulnerability and/or resilience?
- ii) Is the stakeholder matrix representative and are participatory processes justified?
- iii) Are the processes of combining problem trees clearly outlined?
- iv) Are the processes of combining objective trees clearly outlined?
- v) Does the report include a reasonable and justifiable analysis of the organisational responsibilities arising from the problem tree and objective tree?

Reading material

Post RC and Lundin CG eds. (1996). Guidelines for Integrated Coastal Zone Management. Environmentally Sustainable Development Studies and Monographs Series No. 9. The World Bank, Washington DC. 28p. Contains relevant material applying to formulating a coastal management plan. Suitable reading for teachers and trainees.



INTEGRATED COASTAL ZONE MANAGEMENT

INTEGRATED COASTAL ZONE MANAGEMENT PLAN TEMPLATE

This section identifies a template that students can follow when writing up the outcomes of the coastal zone management exercise in Unit 7 of the training course. It can be adapted by trainers as required.

1) Define the study area

This section should briefly outline the coastal region to be used for the management plan exercise in Unit 7. The region should be named and its broad geographical extent defined. The principal characteristics of the region should be summarised. This may include reference to the level of urbanisation, the presence of drainage systems and the type of onshore activities (eg mining, oil palm, agriculture) and offshore activities (eg commercial fishing, tourism, mariculture etc) adjacent to the region.

Suggested word length: 250 words maximum

2) Identify the principal coastal problem

This section should identify the human activities which, in your group's opinion, represent the most significant threat to the study area. Briefly state how the decision was made (eg was it based upon personal prior knowledge, group consensus, pairwise ranking exercise etc).

Suggested word length: 150 words maximum

3) Evaluate coastal vulnerability

Describe why your case study region is vulnerable to the problem identified above. This may include reference to the natural environment (delicate or fragile ecosystems, endangered species etc) or it may focus upon the nature of the problem. Consider whether the problem may result in large scale impacts, whether these impacts are long-lived or whether they are for some reason inevitable. This section may be presented in the form of a list if that is easier.

Suggested word length: 250 words maximum

4) Draw a stakeholder matrix for your coastal study region

Ensure that the matrix includes all stakeholders identified by your group. Include a recommended strategy for participation involving each stakeholder group (eg consultation, informing etc). Identify clearly who the key stakeholders are.

Suggested word length: not applicable. This section should consist of a diagram with brief explanatory text identifying the key stakeholders.

5) Show the problem tree for your coastal study region

This will take the form of a diagram. The diagram will need to identify the principal coastal problem referred to in stage 2. The causes and effects of the problem will be shown. These will represent the combined causes and effects derived from problem trees constructed for



INTEGRATED COASTAL ZONE MANAGEMENT

each stakeholder group during the class exercise. You are not required to show each individual problem tree – this section should illustrate the combined tree.

Suggested word length: not applicable. This section should consist of the problem tree diagram.

6) Show the objective tree for your coastal study region

This will take the form of a diagram. The diagram will need to identify the principal objective defined using the coastal problem identified in step 2. The means and outcomes relating to the objective will be shown. These will represent the combined means and outcomes derived from objective trees constructed for each stakeholder group during the class exercise. You are not required to show each individual objective tree – this section should illustrate the combined tree.

Suggested word length: not applicable. This section should consist of the objective tree diagram.

7) Comment on the problem tree

This section will take the form of a discussion focusing upon the problem tree from step 5. Include the following points in your discussion:

- Which organisations should be responsible for addressing the causes of the problem? Are these national level, provincial level or local level organisations? Explain your opinion.
- Who experiences the effects of the problem? Are these groups the same as the key stakeholders you identified in step 4? What are the implications of this?

Suggested word length: 500 words

8) Comment on the objective tree

This section will take the form of a discussion focusing upon the objective tree from step 6. Include the following points in your discussion:

- Which organisations should be responsible for implementing the means to achieve the objective? What does this tell you about the need for vertically and horizontally integrated management?
- Can you suggest some means by which the outcomes can be monitored?

Suggested word length: 500 words

9) Conclusion

This section should consist of a brief personal statement. In your own opinion, what is the most important thing you have learned from this exercise?

Suggested word length: 100 words



INTEGRATED COASTAL ZONE MANAGEMENT

GLOSSARY OF TERMS

There follows a list of some commonly used technical terms in this training course. Teachers and trainees are encouraged to use this to further their understanding of the materials covered and also as a means to identify similar terms in local dialect(s).

Ecosystem goods

The benefits people can obtain from natural resources. Examples include food, water or construction materials.

Ecosystem services

The processes which result in the improvement of resources which are important for human society. Examples include natural filtration resulting in clean water or the bacterial degradation of organic waste.

Exclusive Economic Zone (EEZ)

The area of sea over which a state has special rights, including access to marine and seabed resources and including energy generation by wind or waves. The EEZ normally extends up to 200 nautical miles (370km) from the shoreline. Where this conflicts with another state's EEZ, such as in semi-enclosed seas, the boundary is negotiated by the states concerned.

Horizontal integration

A process within integrated coastal zone management which describes how common goals and policies may be agreed amongst various sectors of human activity (eg shipping, tourism, mineral exploitation, fisheries etc).

Institution

An organisation or set of principles which influence the behaviour of individuals within a society. Institutions may be tangible (for example, government departments or similar organisations) or they may be more intangible (for example, standards of behaviour, morals or codes of conduct).

Integrated coastal zone management (ICZM)

A process by which coastal management is pursued through considering the coast as a whole, thereby achieving policies which apply across administrative and other political boundaries. Similarly, physical differences between a coast, estuary, mangrove or other geographical feature are not used to formulate specific policies. This process recognises the inter-dependencies between coastal ecosystems and adjacent river basins, enabling policies which reflect ecological linkages to be formulated.



INTEGRATED COASTAL ZONE MANAGEMENT

Objective tree

A visual image to convey the relationship between an objective (the trunk of the tree), the means by which the objective can be attained (the roots of the tree) and the outcomes or benefits of achieving the objective (the branches of the tree).

Participation

A process through which an individual or group of individuals can express opinions and possibly influence a decision-making process. Participation can take many forms, reflecting the differing extent to which individuals may determine the outcomes of a decision-making process.

Problem tree

A visual image to convey the relationship between a problem (the trunk of the tree), the causes of the problem (the roots of the tree) and the effects of the problem (the branches of the tree).

Scientific integration

A process within integrated coastal zone management which describes how knowledge is drawn from across the natural and social sciences, together with traditional and local expertise and knowledge, in the production of coastal management and policy.

Spatial integration

A process within integrated coastal zone management which describes how goals and policies may be applied to the coast and its adjacent waters and land mass.

Stakeholder

An individual or organisation with an interest in a resource. Stakeholders are commonly grouped according to their level of livelihood dependency on a resource, resulting in categories such as primary and secondary stakeholders. Key stakeholders may be defined as those of most influence over decision-making with respect to a resource.

Vertical integration

A process within integrated coastal zone management which describes how common goals and policies may be agreed amongst various levels of government (local, district, provincial, state, national).