Participatory Methods in Community-based Coastal Resource Management
Participatory Methods in Community-based Coastal Resource Management

VOLUME 3
Tools and methods

1998
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and

Small Islands Agricultural Support Services Program

Western Samar Agricultural Resources Development Programme
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International Development Research Centre (IDRC)

International Center for Living Aquatic Resource Management (ICLARM)

Voluntary Service Overseas (VSO)

SEAMEO Regional Center for Graduate Study and Research in Agriculture (SMISLE)

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Alan White, Coastal Resource Management Project (CRMP)
Acknowledgement

Publications such as the "Participatory Methods in Community-based Coastal Resource Management" are products based on knowledge acquired from direct field experience of individuals and institutions operating at the community level. IIRR relied heavily on the experience of partners and peers engaged in the field of community-based natural resource management. These supporters include a large number of people who have contributed in various capacities over time.

First on the scene were Ken Mackay, International Development and Research Centre of Canada (IDRC); Julian Gonsalves, International Institute of Rural Reconstruction (IIRR); and Gary Newkirk, Dalhousie University's Coastal Resources Research Network (IDRC/CoRR). Together they recognized the need for a publication that documents participatory methods used specifically for coastal settings. At that time, it was felt that IIRR's experience with participatory methods for rural development would play an important role in the overall project. Similarly, it was felt that the wealth and depth of experience in community-based coastal resource management in the Philippines warranted its selection as the venue for the participatory workshop.

An organizing committee was initiated including (in addition to those above) Gregory Ira and Joy Rivaca-Caminade (IIRR); Bob Pomeroy, International Center for Living Aquatic Resource Management (ICLARM); Francisco
Fellizar, SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA); Rathin Roy, Bay of Bengal Programme (BoBP); Rebecca Rivera, Tambuyog Development Center (TDC); Annette Junio-Menez, University of the Philippines at Diliman, Marine Sciences Institute (UP-MSI); Elmer Ferrer, University of the Philippines at Diliman, College of Welfare and Social Work and Community Development (UP-CWSWCD), Geoff Brown, Voluntary Service Overseas (VSO); Marie Grace Madamba-Nuñez, Philippine Partnership for the Development of Human Resources in Rural Areas (PhilDHRRA); Alan White, Coastal Resource Management Project (CRMP); Herman Ongkiko, Small Islands Agricultural Support Services Programme (SMISLE); and Minerva Gonzales, Community Extension and Research for Development (CERD).

The documentation of the experiences of these committed individuals and each of the contributing authors into the final sourcebook could not have taken place without the financial support of donors. We are grateful to the following organizations and their representatives for recognizing the value of the sourcebook and having confidence in our capacity to produce it. Initial financial support came from Ken Mackay of IDRC. Additional financial support came from Mr. Paul Huddleston and Zenaida Cuenca-Forbes of the Canadian International Development Agency (Environment Development Fund), Ambassador Eric T.J.T. Kwint of the Royal Netherlands Embassy (Small Embassy Projects Programme), Herman Ongkiko of SMISLE and David J. Moles of the Western Samar Agricultural Development Programme (WESAMAR).
IIRR also remains appreciative of the support it has received (over the years) from the United States Agency for International Development (USAID) and the Ford Foundation (FF). Such institutional support allows IIRR to leverage resources and foster partnerships with other institutions.

The entire list of participants is provided in this sourcebook. Their contributions go well beyond their respective papers. Each participant added value to the work of their colleagues.

There are, however, certain individuals that deserve special mention for the special effort they provided. First, we would like to thank the VSO volunteers who provided editorial support during the workshop: Arlene Brooks, Cathy Rosario, Sarah Jane Curran, Maeve Nightingale, Stuart James Green and John Purvis. Arlene Brooks and Cathy Rosario extended their stay with us to help integrate third round revisions into the papers. Their voluntary support was characteristic of the commitment of VSO to assist local organizations in the pursuit of CBCRM.

Marie Grace Madamba-Nunez provided IIRR staff with critical technical support in the post-workshop editing of the papers. Dr. Gary Newkirk provided extremely valuable comments to the various drafts.

The International Institute of Rural Reconstruction would like to thank these individuals and each of the authors and support staff for contributing their time and experience toward the successful completion of this publication.

Mabuhay!
Introduction

The need for a sourcebook on participatory methods for community-based coastal resource management (CBCRM) arose from the absence of practical field-tested reference materials that merge the participatory nature of CBCRM with the unique conditions of the coastal zone. Field workers from government, non-government, community-based and even research organizations are increasingly applying participatory and community-based approaches (developed primarily in terrestrial settings) to work in the coastal zone.

While the general principles of participatory methods for conservation and development apply equally well to coastal conditions, the specific tools and their applications will differ. Practitioners of CBCRM have been developing and adapting participatory tools to their unique environments for many years now.
There is no one way to do community-based coastal resource management. Its concepts and processes continue to evolve as field practitioners relentlessly explore, innovate and generate new ideas and techniques in managing the coastal environment. This sourcebook is an attempt to document the various tools and methods developed in the course of doing CBCRM as actually and effectively employed by field practitioners in countries like the Philippines, Indonesia, India and other Asian countries.

The sourcebook is heavily biased towards participatory methods because the authors believe that such processes not only intend to empower, but do empower. Participatory approaches also generate relevant information from local and indigenous knowledge that is crucial to community-based coastal resource management.

The sourcebook is designed for use by people working directly with coastal communities to help strengthen their capability to manage, protect and develop their local resources. These include community organizers, community leaders, researchers, other field workers who may come from NGOs, GOs or research and training institutions. The tools are meant to guide users and not to be taken as rigid formulas. The tools can generally be applied or adapted to all types of coastal settings with a little resourcefulness and creativity.
The first booklet

The first section of the sourcebook zooms in on the coastal zone, the principles and components of community-based coastal resource management, community organizing as an underlying and integrating component to CBCRM and an overview of participation. This section differs from the rest of the sourcebook because it is more of a “reader” with basic background information; a foundation for the rest of the sourcebook.

The paper on the coastal zone emphasizes the challenges of the terrestrial and marine interface including the following characteristics: the prevalence of open access conditions; predominance of common pool resources; the mobile nature of many of the resources; the unique influence of temporal (e.g., lunar) cycles; the frequently strong gender differentiation in productive roles; and the dual (i.e., terrestrial and marine) nature of coastal livelihoods.

The paper on community-based natural resource management presents the evolution, principles, stages and strategies of CBCRM. CBCRM is presented as a framework for coastal conservation and development in partnership with community based organizations, local governments, non-governmental organizations and others.

Community organizing (CO) is covered in the introduction because of its central role in integrating CBCRM activities. Participants recognized the diversity in CO approaches and the political and administrative obstacles in some countries. Nevertheless, the depth of experience and central role of CO in the Philippines (a recognized leader in CBCRM) supported its inclusion in the introduction.
Finally, the issue of participation itself is presented. The rationale for participation, the forms of participation, the obstacles to participation and the relationship between participatory approaches and non-participatory approaches are discussed. General guidelines for using participatory methods are also included.

The types of participatory methods presented in the sourcebook and the degree to which they promote participation varied greatly. The methods range from survey type questionnaires (less participatory) to locally designed wealth ranking tools (more participatory). A common sentiment was that the only "correct" level of participation is that which is acceptable to the local community members.

The second booklet

The main section of the sourcebook is the step by step description of various participatory methods field-tested by the authors and their organizations. A simple outline was devised for most of the topics in this section and include the following headings: definition, purpose, materials, suggested approach, outputs, strengths, weaknesses and variations. Examples were commonly used to illustrate key points. In most cases, the examples were based on actual experiences. Cautions highlight areas where potential problems are likely to occur. Icons were also used for these special considerations.
The methods can be categorized in a number of ways: 1) the type of tool employed (e.g., matrix, diagram, timeline); 2) the purpose of the tool (e.g., temporal analysis, spatial analysis, comparison); and 3) the stage in the project cycle when it is applied (e.g., analysis, planning, implementation). Eventually, the final groupings adopted for the sourcebook emphasize the type of tool and its purpose. The judicious use of cross-referencing was used to address any weakness in the categorization of the topics.

The third booklet

While the primary focus of the book is on methods for analysis, planning, monitoring and evaluation, the authors felt strongly that a description of a few critical "implementation interventions" was warranted. Hence, the topics on mangrove reforestation and establishment of marine protected areas. The sourcebook also recognizes the importance of gender and indigenous knowledge as cross cutting themes, thus their inclusion.

In addition, appendices including a list of relevant equipment and a matrix of livelihood options for CBCRM are included.

A distillation of practical field experiences

The sourcebook – like most of IIRR publications – is a distillation of practical field experiences of a committed group of conservation and development practitioners. There
is no cutting edge science or even new knowledge. The strength of the sourcebook is its ability to simplify and communicate ideas clearly to a particular audience.

There is, however, an inherent contradiction in such undertakings. It is often difficult to balance the site-specific nature of field-tested experiences with the need to provide useful information to a wider audience. Authors were encouraged to be specific in describing the tools and methods they used. At the same time, they were reminded to avoid or explain local terms, norms or institutions. In general, the steps or the suggested approaches are written in generic terms and selected examples are used to illustrate the specific experiences from which the method was derived. Ultimately, it is the reader that will determine the local relevance of the methods.

The success of the publication will be measured by the creases on the binding and the amount of salt spray that forms on its cover as practitioners regularly turn to it in the field.

The creativity and ingenuity of the users will determine the life-span of the sourcebook. Improvements and adaptations are welcome and expected. Indeed, we look forward to working again with the original contributors as well as future users of the sourcebook to continually provide relevant and practical materials in support of CBCRM.
This sourcebook is the final output of the workshop conducted at the International Institute of Rural Reconstruction (IIRR) in Silang, Cavite, Philippines on 28 July - 08 August 1997. The workshop, organized by IIRR, brought together about 35 community-based coastal resource management (CBCRM) practitioners in Asia. They worked closely with a production team of editors, artists and desktop publishing staff.

It is during the workshop that these participatory tools in CBCRM were compiled and participatorily edited. This publication is aimed at community workers, researchers, community leaders, extension agents and field teams of various government, non-government and community-based organizations.
Workshop objectives

Process, participation and product were the 3Ps stressed in the workshop which recognized the following objectives:

1. To compile participatory field methodologies, tools and approaches used in coastal communities into a sourcebook for use, testing and adaptation by other practitioners and organizations involved in CBCRM.

2. To produce a sourcebook based on successful practices.

Workshop process

Planning and preparation for the production of the sourcebook started long before the workshop. With the members of the steering committee (representing various organizations in Asia), the focus of the publication was decided on. The steering committee also assisted IIRR in the identification of topics and resource persons for the workshop.

The workshop used a process developed and pioneered by IIRR. This process had been used to produce information kits on a range of topics related to agriculture and natural resources management, including agroforestry technologies in the Philippines, integrated agriculture-aquaculture in Asia, ethnoveterinary medicine in Asia and environmental concepts and actions.
During the workshop, each participant presented his or her draft paper, using overhead transparencies of each page. Copies of each draft were also provided to all other participants who critiqued the draft and suggested revisions.

After the first presentation, an editor-artist team helped the author revise and edit the draft and draw illustrations to accompany the text. The edited draft and artwork were then desktop published to produce a second draft.

Each participant then presented his or her revised draft to the group for the second time, also using transparencies. Again, the audience critiqued it and suggested revisions. After the presentation, the editors, artists and desktop publishing staff again helped the author revise it and develop the third draft. Toward the end of the workshop, the third draft was made available to the participants for final comments and revisions.

The workshop allowed inputs from all participants to be incorporated, taking advantage of the diverse experience and expertise of all present. The concentration of resource persons, editors, artists and desktop publishing staff at one time and place enabled materials to be produced more quickly than is typical for similar publications. And the sharing of experiences among participants allowed the development of networks that would continue to be fruitful long into the future and would lead to concrete follow-up activities.
Assessment and monitoring tools
Planning for assessment and monitoring at the community level

Definition

Assessment is measuring certain aspects of the environmental or socio-economic conditions in a community.

Monitoring is repeated assessments at regular intervals to detect changes over time.

Key to both monitoring and assessment is the selection of success indicators based on the objectives/targets of the project to be monitored and assessed.
Purpose

- To assist the community in coming up with an assessment and monitoring design and system for community level programs or projects.

- The data collected during the actual implementation of the assessment and monitoring plan can be used by the community in making important resource management decisions.

Requirements

Human resources

✓ facilitator

✓ volunteers from the community or community-based organizations

Prerequisite

Training of community members/volunteers

Community members who will carry out data collection have to be trained. Persons whose livelihoods or lives are directly connected to the health of the resource or who are knowledgeable concerning the socio-economic condition being measured should be encouraged to participate as observers. These people are more likely to perform consistently over time. Trainees who will collect data from marine environments should be at ease with snorkeling equipment and familiar with various types of habitats before beginning technical training.
A community workshop in which community members can share their ecological and local knowledge is an important step in the training process. This is an opportunity to discuss issues such as safety at sea. Local fishers can provide warnings about dangerous animals, currents, etc.

During the training, observers should be encouraged to collect information in their local language and classify organisms being monitored using local names. The meaning of local names and classification systems must be clear, documented and validated by the larger community before being used.

Suggested approach

1. Identify program/project or resource to be assessed and monitored.

2. Set or review objectives of program/project or resource to be assessed and monitored.

3. Based on the objectives, identify and select the indicators (should be measurable) to be assessed and monitored. Decide unit of measurement for each indicator selected.
Example

The community council wants to build a marina beside the local reef. Because of concerns over the potential damage to the reef from siltation during construction, the council decides to strike a work group to design a monitoring plan. The group decides to measure reef health by monitoring total fish catches over the reef during the construction period. However, when an elder is consulted, he points out that the method chosen is guaranteed to tell the developers that their activity is enhancing the fishery! This is because the construction period will be during that time when pelagic fish migrate into the bay and total fish catches go up. Measuring total fish catch, therefore, is not appropriate. The community needs a frequent and direct measurement, like a record of water color and clarity and regular checks to see if dirt is settling on the coral. With timely feedback of information from monitoring, construction practices can be adjusted before long-term damage is done.

4. Identify and/or develop the methods for collecting information on the indicators selected. This includes selecting the most appropriate site for collecting information whether for assessment or monitoring.
Choosing a sampling site

- The sampling site is a physical location where you collect information.
- The choice of a biological sampling site is based on judgement and knowledge of the environment.
- If you are monitoring the condition of a resource, ask local resource users (fishers, farmers, forest workers) to help you find the best sampling site. Do not try to sample all possible places where the resource exists. Select one or two sample sites that are easy to reach.
- If you are measuring the impact of a project or activity, choose one sampling site which is where you expect the most impact to occur. Choose another site where you expect no impact at all. These sampling sites should be as similar as possible (i.e., marine sites should be alike in terms of water depth, bottom type, slope and wave exposure).

The number of samples needed will depend on:

- the change you want to measure.
  To detect small changes in the average condition of your indicator, you need a lot of data and a very accurate estimate of average. To detect large changes, you need fewer samples and a rougher estimate of the average.
- the amount of variation you naturally find in your indicator.
  If your indicator has a large range of possible values, take many samples to arrive at a good estimate of “average”. If, however, the indicator being measured hardly varies within your sampling sites, collect fewer samples.

Example

If you are monitoring changes in substrate, you will need more samples in an area with high variation in substrate vs. an area with low variation.
5. Regularly evaluate and test the method that you have chosen.

**Testing**

Testing can be done through repeated use in one place on the same day to see if the result is repeatable. There are always differences even when you count or measure accurately.

If the results change a lot every time, either the method is not good enough or the observers need better training. If the method turns out to be too difficult, time-consuming for community members or provides data that you do not understand or cannot analyze, find a different approach.

6. Develop a workplan for assessment; and subsequently, for monitoring.

**Tips**

- Photography can also be used as a tool to document changes in your indicator. Pictures do not need statistical analysis. They tell a convincing story to people of all ages and education levels. Test and evaluate the method.

- Community people are more likely to apply a method consistently if it is familiar and fits in with their normal daily activities.

- When monitoring, all data must be taken using a consistent method and always from the same sampling site or stakeholder group.
Output

★ Workplan for the conduct of monitoring and assessment.

The actual assessment should be able to generate baseline data using the selected indicators. Actual monitoring, on the other hand, should be able to record the changes in the indicators selected. These changes should be discussed and analyzed.

Limitations

- Some community information needs cannot be met through simple methods performed by non-specialists. In some cases, the community will need to collaborate with a non-government organization (NGO) or academic or government institution to gather and analyze information related to resources.

- The monitoring methods, timing and reporting have to be reviewed regularly to see whether improvements or adjustments are needed.
Mangrove assessment and monitoring (using the transect plot technique)

Definition

The transect plot technique is a modification of the transect technique described in this source book and in English, et al. (1994). It is a systematic and participatory approach in quantitatively describing the condition and structure of the mangrove forest (e.g., species composition and density). Although the method is standard for technical persons, the steps are simple and could very well be carried out by local communities. The transect plot technique is most practical when used to assess and monitor large and naturally occurring mangrove forest.
Purpose

- To generate a quantitative technical description of the mangrove forest (e.g., diversity, density, dominance, regenerative potential). Technical descriptions are useful in establishing or justifying the legal instrument (e.g., ordinance) for the establishment of mangrove reserves.
- To provide baseline information to validate technical information generated by "outsiders" (e.g., Environmental Impact Assessment) and for validating claims for the success or failure of any management initiative.
- To substantiate mangrove-related advocacy work.
- To supplement requirements by some funding agencies that require a detailed technical description of the resource being proposed for management.
- To give an opportunity for the community worker to explain some of the ecological processes occurring in mangrove areas.

Requirements

Human resources

✓ community worker (facilitator, recorder, analyst; helps identify some of the species that are not named by the villagers)

✓ 2-3 selected community members (lay the transect and establish plots; measure circumference of the trees; count the saplings and seedlings; and identify species using local names)

The roles can eventually be assumed by the participants after training.
Materials
✓ measuring tape (with centimeter scale)
✓ transect (rope, approximately 100 meters in length)
✓ map of the general area (topographic map, resource map, aerial maps)
✓ prepared data sheets
✓ pencils
✓ compass
✓ Mangrove Identification Guide (e.g., Calumpong and Meñez, 1996)

Suggested approach

1. Conduct a brief orientation on the method and other related processes (e.g., common identification of species). Discuss purpose of the assessment.

2. Select site for the transect.
   - Discuss and decide where to establish the transect lines using a resource map or other available maps. Sites should be able to represent the different conditions in the forest (e.g., with or without communities, open or protected, near or far from rivers).
   - Verify the transect position on site and make the necessary changes if the sites chosen are not representative of the general area.
3. Gather data needed.

- Location of the sites should be properly recorded based on landmarks and must be reflected on the map.

- Establish transect lines for each site by laying down the rope from the seaward edge of the forest at right angle to the edge of the mangrove forest. For large forests, the compass will come handy in ensuring the laying of a straight transect.

![Diagram](image)

Note: transect lines should not overlap

- For each forest type (species zonation) encountered along the transect, randomly establish three plots. Plots could be established randomly along the transect line, if the zone is wide, or at the sides of the transect line, if the zone is narrow. The size of the plot should not be less than 10 m x 10 m (using ropes or marking only the corners to establish the plot).

- For each species in the plot do the following:
  a. Count and record the total number of mature trees.

Mangrove assessment and monitoring
(using the transect plot technique)
b. Measure and record the circumference of all mature trees (at breast height, approximately 1.3m from the ground.

There will be occasions wherein the growth of mangroves will be irregular. The following are the standard procedure in measuring the circumference at breast height (CBH) and should be followed all throughout the sampling.
c. Count and record number of saplings (use a 5m x 5m subplot if the density is high).

d. Count and record the number of seedlings (use a 1m x 1m subplot if the density is high)

- For each plot take note of the following.
  a. Substrate type (e.g., rocky, sandy, muddy).
  b. Any impact (natural or human) in the area (e.g., shell collecting, cutting of trees for mangroves, storm effects, uprooting) and assess human impact on a scale of 0 to 5 (0 for no impact and 5 for severe impact, e.g., clearing for fishpond).
  c. Other organisms (e.g., birds, invertebrates, fish) encountered should also be recorded or enumerated when possible.

4. Organize data gathered according to diversity, density and basal area based on the following definition and formula.
   a. Diversity - the number of species encountered per transect.
   b. Density
      Stem density - the number of trees per plot

\[
\text{Stand density per hectare} = \frac{\text{No. of stems in plot x 10,000}}{\text{Area of plot}}
\]
c. Density of mature trees - the number of CBH measured for a particular species per plot

Density could be presented as density of mature trees, saplings, seedlings of a particular species, the sum of the density of the different categories of a particular species or the total density of all the species.

d. Basal Area (BA)

\[
BA = \frac{\pi (\text{Diameter at breast height})^2}{4} \quad \text{unit = cm}^2 \\
\pi = 3.1416
\]

Species BA = Sum of all the BA of a particular species per plot

Because the formula calls for Diameter at Breast Height (DBH), there is a need to convert the CBH to DBH.

\[
DBH = \frac{\text{CBH}}{\pi}
\]

Stand BA = \[
\frac{\text{Sum of BA for all species}}{\text{Area of plot}} \quad \text{unit = m}^2 \text{ per hectare}
\]

Stand BA for each species is calculated by the same method but calculating only for trees of the same species.

Because three plots are established, average the values for the three plots.
Example

Mangrove assessment data

Location: Bais Bay, Negros Oriental, Philippines
Team Members: Roy Olsen D. de Leon
              Celia Acedo
              Wendy Regis
              Dalmacio Calumpong

Site: No. 1 (Near Channel)
Date: August 1, 1997

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<th>Sapling (&lt;4 cm diameter height &gt; 1m)</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ra 20</td>
<td>Rm 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rm 21</td>
<td>Rm 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rm 13</td>
<td>Rm 19</td>
<td></td>
</tr>
</tbody>
</table>

Ra = *Rhizophora apiculata* ("bakhauan-lalaki")
Rm = *Rhizophora mucronata* ("bakhauan-babae")

Other observations:
Impact includes "miracle hole" (artificial tidal pool, 1 m depth, 3 m diameter) dug by villagers to trap fish during low tide.
5. Present the results to the community.

Summarize and present the results of the assessment as a mangrove profile. This could be presented along with results from other participatory coastal resource assessment methods.

6. Discuss and analyze observations.

7. Monitor the impact of mangrove management initiative. To monitor, establish permanent plots at well-marked locations. Mark trees in a plot either by nailing to the tree metal plates with information such as transect, plot and tree numbers.
Mark corners of plots using 1.5 m bars driven in the substrate (approximately 1 m should be above ground to make it conspicuous). Use wooden poles for short term and iron bars for long term.

Monitoring should also gather the same information taken during the assessment. Results of the monitoring should be compared with the (baseline) data resulting from the assessment. Monitoring should be done every three months.

Outputs

★ Information

Following is the type of information that will be generated using the transect plot technique

<table>
<thead>
<tr>
<th>Data</th>
<th>Use</th>
</tr>
</thead>
</table>
| Number of species encountered (Diversity) | • Diversity of mangroves is one of the criteria in selecting sites for mangrove reserve/sanctuary.  
• One of the functions of mangrove reserve/sanctuary is to provide possible sources of seeds/propagules for mangrove enhancement.  
Low Diversity: 1-3 species  
High Diversity: 10+ species |
| Stem density and basal area (mature trees) | • Index on the condition of the forest. Condition of the forest is usually equated with the number of trees found in a given area. Coupled with data on the basal area, the condition of the forest is better described. |

The most diverse single stand mangrove forest reserve in the Philippines is in Pagbilao, Quezon with 29 species.
- Density alone may be deceiving at times. Forest may have a small density but the trees are huge (occupy a greater portion of the area) and therefore should be protected because this indicates an "old" forest.

- The stem density and basal area can also be used to determine the direct impact of development on the mangrove ecosystem. The number of trees that will be lost in favor of development could be calculated given baseline information.

- Basal area can be a good index of dominance. Dominant species are usually the more appropriate species for forest enhancement or reforestation.

In the Talabong Mangrove Forest Reserve, Bais Bay, Negros Occidental, Philippines, the density of matured *Avicennia marina* (mostly > 60 cm DBH) average 900 stems occupying 27 sq m per hectare. In another forest zone in the same area, density of mature *Rhizophora apiculata* (5.1 to 10 cm DBH) average 5705 stems but only occupies 15 sq m per hectare.

- Density is an indicator of the regenerative capacity of the forest.

- If the saplings and seedlings are more than 50% of mature trees, the probability of the forest to sustain its existence is high. If the density is low, it can indicate high impact on the area (e.g., uprooting of seedlings and saplings due to shellfish gathering). This will help the villagers determine the need to enhance or rehabilitate the condition of the forest.

- Density can also help pinpoint the location of possible sources of transplanting materials. Some species (e.g., *Avicennia* and *Sonneratia* spp.) are difficult to grow if planted from seeds and will better survive if transplanted.
### Strengths

- Increases awareness of community about ecological processes.
- Generates detailed information on the mangrove forest.
- Generates quantitative data that could be used in scientific studies.
- Uses minimum equipment.

### Limitations

- Time consuming
- Walking through mangroves can be difficult and uncomfortable.

---

**Data**

<table>
<thead>
<tr>
<th>Substrate type</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seedlings and saplings for <em>Avicennia marina</em> in Lag-it Bais Bay, Negros Oriental, Philippine average 22,187 per hectare. Highly distributed forest density for seedlings and saplings can range from 0 to 100 stems per hectare.</td>
</tr>
<tr>
<td></td>
<td>- Is a necessary input in any reforestation effort. Species survival is more often dependent on the soil substrate. For example, <em>Rhizophora</em> sp. “Bakhau” is more suited in muddy-sandy substrate.</td>
</tr>
</tbody>
</table>


Compiled by Roy Olsen D. de Leon
Monitoring the effectiveness of marine sanctuaries

Definition

Monitoring the effectiveness of marine sanctuaries is a tool using a set of identified indicators to assess the immediate effects and impact of marine sanctuaries on the productivity of coastal fisheries and quality of life of fishing communities.
Value

This method builds on the different monitoring methods/tools such as underwater fish visual census, fish catch monitoring and seasonal calendar. Done in a participatory manner by community members, this will help to develop lasting community support and cooperation for the protection of the marine sanctuary as they experience, understand and appreciate its importance to their livelihood and well being. The data gathered may be used as basis for local policy advocacy.

Requirements

Human resources

✓ marine sanctuary monitoring team (composed of trained volunteers from the community: refer to the topic on establishing and managing marine sanctuaries)

Materials

✓ seasonal calendar
✓ gridded map
✓ colored pens
✓ craft paper
✓ notebook
✓ 5 x 20 m improvised permanent belt transect (see annex)
✓ underwater slates
✓ snorkels and masks
✓ fins (optional)
✓ markers/bouys
✓ boat
Suggested approach

The effectiveness of a marine sanctuary may be determined given a particular function it serves such as: breeding, nursery, feeding, refuge area and as a source of recruits to the fisheries. Indicators are identified to establish the basis for judging a marine sanctuary's effectiveness.

The approach outlined is based on its application on a coral reef sanctuary. Indicators of its effectivity include an increase in biodiversity and increase in fish catch. One indicator of impact on the quality of life would be an increase in the income of the fisher.

The indicators can be slightly modified to apply to mangrove and seagrass sanctuaries.

A general approach in monitoring these various functions may be as follows:

1. Prepare a seasonal calendar that includes, among others, the spawning season of the different species of fish and shellfish, the peak season for the different species of fish and the average size of the commercial species caught. Involve as many members of the community as possible to get more accurate information. The calendar will serve as the baseline information where succeeding calendars will be compared (refer to topic on seasonal calendar).

2. Depending on the area covered by the marine sanctuary, identify five to ten representative points in the sanctuary as sampling stations. The same stations will be used throughout the monitoring program. It is important that these stations are properly marked.
3. Do regular monitoring on a monthly, bi-monthly, quarterly, seasonal or annual basis depending on the parameter being monitored, availability of logistics and availability of the monitoring team. During each sampling activity, record the date, weather condition, phase of the moon, tide, depth, station number and name of recorder. Generate a monitoring report for each monitoring period.

4. Present monitoring report to the community. Discuss and analyze findings or variations from the original calendar and explore possible causes and implications.

5. At the end of each year, prepare a seasonal calendar using data from the monitoring activities. This could be useful in establishing trends.
Monitoring for specific functions

As breeding/nursery area

This could be done on a "general observation" basis, recording few, some or many species for each site but even this needs a trained eye.

The presence of spawn, fish fry, spats and juveniles in large numbers in the marine sanctuary is an indication that the area is being utilized as breeding or nursery ground by various marine organisms. It is also an indication of the "healthy" condition of a particular sanctuary.

1. Swim through the permanent belt transect in each sampling station and count the number of fish fry, spats and juveniles observed. Identify to genera or species level whenever possible. Record the number and species of spawning adults whenever this is observed. Repeat outside the sanctuary.
1. Prepare a table on the underwater slate to facilitate recording of observation.

<table>
<thead>
<tr>
<th>Species</th>
<th>Number</th>
<th>Ave. size</th>
<th>Feeds on</th>
<th>Remarks</th>
</tr>
</thead>
</table>

2. Swim through the permanent belt transect in each sampling station and record observations of feeding fish and other organisms on the slate.
3. Transfer recorded observations to a notebook.

**As source of recruits to fisheries**

1. Identify the same number (5-10) of sampling stations outside the sanctuary (unprotected area). Set the improvised permanent belt transect and mark the sites.

2. Do a fish visual census of the sampling stations inside and outside the marine sanctuary. Record size estimates of commercially-important species (refer to topic on underwater fish visual census).

3. Monitor fish catch of the local fishers (refer to topic on fish catch and effort monitoring).

4. Transfer observations to a notebook.

5. Compare data on species composition, number and size from the sanctuary with the fish catch data from the local fishers.

If composition, number and size of fish caught by the local fishers outside the sanctuary are similar to that of those in the sanctuary, then you can conclude that indeed the sanctuary is effectively becoming a source of recruits for the fisheries of that particular area.

**Output**

* Monitoring report using a particular set of indicators that measure the effectivity of the marine sanctuary.

* Trend analysis of selected indicators
Strengths

- Integrates various tools to measure effects/impact of a particular coastal resources management intervention.
- Generates detailed information on the characteristics of the habitats and fisheries found in the sanctuary.

Limitations

- Availability of the monitoring team to do regular monitoring of the marine sanctuary over a long period of time.
- Broadcasted eggs are not visible.
- Frys are not very visible unless in big quantity.
- Long monitoring period before significant changes/impact can be observed.
- Benefit for the community cannot be felt immediately.
Fish catch monitoring
(for small-scale fisheries)

Definition

A method that can be used by fishers to monitor and assess trends in their local fisheries. This involves the standardized collection of information about their daily fish catch, fishing gear, hours and fishing grounds.

Purpose

- The method is readily adaptable to a variety of organisms (e.g., crabs, shells etc.). Fish catch monitoring can be conducted in areas where there is a strong fisher association.
• The data can be used to support advocacy initiatives of the fisher organization (e.g., stricter enforcement of laws in municipal fishing grounds and livelihood assistance). Data collected and analyzed in a systematic manner and formally presented to government and other sectors can be impressive and influential.

• Fish catch monitoring is a useful method for monitoring both positive (e.g., marine reserve) and negative impacts (e.g., mining) of activities affecting the coastal area.

• The information can be useful for project management and development.

The data or information generated from the fish catch monitoring might not be acceptable as legal evidence, or useful for detailed statistical analysis.

Requirements

Human resources

✓ 4 - 8 volunteers (fishers)
✓ facilitator (especially during the early stages for training and data analysis)

Materials

✓ craft paper and pens
✓ resource map (the original and copies)
✓ fish identification materials (picture book)
✓ data sheets and pencils
✓ logbook
✓ weighing scales (whatever is locally available)
✓ calculator

Optional
✓ ruler/ locally designed fish measurement board
✓ binoculars and boat (depending on distance of fishing grounds from shore)

Suggested approach

Preparation
1. Clarify objectives and the value of fish catch monitoring with the community and make sure that this is the appropriate method to use.

2. Generate lists and reach a consensus about the location of the fishing grounds, different types of fishing gear, fish species and fisher groups. Discuss each item in the list to make sure that everybody is referring to the same things (refer also to the topics on brainstorming, focus group discussions and resource mapping).

3. Group and rank the items in the lists (e.g., fish species according to local importance). This should be recorded in the logbook and used as the standard list for data entry and analysis.
4. Show and explain the sections of the data sheet. Include suggestions for improvements. It is important to be accurate and to record zero values (e.g., if a fisher goes fishing but catches nothing).

Example of a fish catch data sheet for the Philippines (in English and Filipino)

<table>
<thead>
<tr>
<th>Date (Petsa):</th>
<th>Recorded by (Itinala ni):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (Oras):</td>
<td>Weighed by (Tinimbang ni):</td>
</tr>
<tr>
<td>Location (Lugar):</td>
<td></td>
</tr>
<tr>
<td>Comments (Puna):</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Moon phase</th>
<th>New</th>
<th>1st quarter</th>
<th>Full</th>
<th>Last quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>Stormy</td>
<td>Raining</td>
<td>Overcast</td>
<td>Fine</td>
</tr>
<tr>
<td>(Panahon)</td>
<td>(Masama)</td>
<td>(Maulan)</td>
<td>(Maulap)</td>
<td>(Maganda)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sea state</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Walang alon)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Malaki ang alon)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fishing gears (Kaso ng pangangada at pangailang ng mga alon)</th>
<th>Fish species (Kaso ng isda)</th>
<th>Weight (Timbang)</th>
<th>Location (Saon galing)</th>
<th>Number of fishermen (Kung Manggaling)</th>
<th>Hours (Kung oras)</th>
<th>Motorized banca (Meron motor o walang motor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>Laki</td>
<td>Babae</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

34 Participatory Methods in Community-based Coastal Resource Management
Many different fish species / fishing grounds / fishing gears may be referred to by the same local name. Make sure that the local names are distinct for each of the different types.

5. Ask the team to decide on the location (e.g., store, fish buyers' waiting shed) and the time (a set time of day and a set day of the week). Aim to have a frequency of at least once a week (e.g., every Monday morning). Encourage the team to set-up a schedule.

Things to consider when deciding on the fish catch monitoring schedule:

- The morning, afternoon and night fisheries are very different (the time when the fishers return to the land will vary)
- Focus on the dominant fishery or the one where you are expecting to see changes
- Regular daily and weekly schedules of the volunteers

6. Explain fish catch per hour and the data analysis process (refer to the analysis section).

7. Elect a leader for the volunteer team. The team leader will be responsible for keeping the data sheets/logbook, standard lists, labelled map and calculator.
Monitoring proper

1. Ask the volunteers assigned for that day and hour to facilitate the records of fishing details for as many fishers as possible for that day. Later, as more of the fishers in the area appreciate the importance of catch monitoring, the individual fishers may record their own data and simply give it to the volunteers to collate. Other relevant information may be recorded in the logbook.

2. After 1-2 months of data collection, help/assist the volunteer team in analyzing the data.

3. Ask the volunteer team to present their findings regularly (e.g., fisher association meetings) to the community for verification or comments. Discuss with the community possible implications of the data and plan for appropriate action.
4. Display graphs of the results on a billboard at the same place as the monitoring station. This should be updated regularly.

![Graph](image)

5. After the village level monitoring is established, coordinate fish catch monitoring efforts with adjacent villages if villages share common fishing grounds, and/or common issues.

**Analysis**

1. To calculate catch per fisher hour, the number of kilograms of fish caught per unit effort (hours and number of fishers), use the following formula

   \[
   \text{Catch per fisher hour} = \frac{\text{Fish catch (weight)}}{\text{No. of fishers} \times \text{Fishing hours}}
   \]

   *Note: Always specify the gear used as catch per fisher hour times of the day or time of the year.*

   **Example:** Catch/fisher hour of grouper by hook and line

   \[
   \frac{10 \text{ kg}}{2 \text{ fishers} \times 2 \text{ hours}} = 2.5 \text{ kg/fisher hour}
   \]
• This method can be used to calculate catch per fisher hour for different gear, species, fishing grounds, or any combination of these.

**Example**

You are planning to implement a mangrove reforestation project and you hope that this will encourage mangrove-associated species to increase in that area. To do this, conduct a baseline survey and then monitor changes in species caught for that fishing ground over time (months).

2. Compare your results with other communities conducting fish catch monitoring.

3. Plot the relevant data in simple bar, line and pie charts (refer also to topic on presenting numeric data in diagrams or charts).

4. Invite the community to discuss the possible implications of the differences observed keeping in mind variations in weather, habitat and management. Raise issues of what can be done (i.e., use the information to plan future action).

**Outputs**

★ Information on the fishery activity of the village in a standard, comparable and simple way.

★ An objective assessment of the effectiveness of current coastal management projects or activities.
Strengths

- Suitable for regular monitoring; not highly technical.
- Builds capability of the community to work together on their own.
- Builds confidence of the community to advocate for fishery-related issues.
- Encourages the community to see for themselves the state of their fisheries and increases their awareness on fishery issues.
- Provides an opportunity for cooperation between fisher organizations and other agencies (e.g., government, fishery institutions).
- Women, men and the youth sector can be involved.

Limitations

- Fishers may not want to cooperate with the monitoring thus biasing observations.
- Misconceptions about the need for the data can cause problems, e.g., “is this just for those scientists?”
- In some areas, it is difficult to mark fishing grounds on maps due to distance from shore and lack of reference maps.
Variations

Fish length monitoring

When conducting fish catch monitoring in a community marine reserve, it is highly beneficial to gather and analyze data about the average length of different species. This can be added to the fish catch monitoring data collection.

It is not necessary to measure every fish, a sub-sample will do. This may be conducted once a month for all species caught, on a particular day (e.g., the second Tuesday of every month). Randomly select (not just select the big ones, take five fish from different catches) from 10 - 20 fish per species and measure their length. Use the standard drawing of the fish and demonstrate to the volunteers how to measure the fish in a standard way.

Another option is to select some indicator species and have these measured every monitoring day using a sample of 5 - 10 fish per species per day. Add the average length of the different fish species then add to the monitoring board and plot over time.

Standard fish length measurement
Good species to monitor for marine reserves which have coral reefs are groupers (Plectropomus spp., Cephalopholis spp.), parrotfish (Scarus spp.), rabbitfish (Siganus spp.) and snappers (Lutjanus spp.). It is worthwhile to record the actual species not just the genera, as different species have different length ranges.

**Example**

Grouper species are often combined together as one local name but *Plectropomus spp.* has a maximum length of more than 70 cm whereas *Cephalopholis spp.* has a maximum length of approximately 35 cm.

**Effort mapping**

This is useful to determine the levels of fishing in nearshore fishing grounds (e.g., those near a marine reserve). Ask for the number of boats and number of fishers in the village using each fishing gear. Ask also about the (a) typical months, times and fishing grounds where these gear are used; and (b) typical landing grounds for these types of gear, when and why they are used.

Determine the peak fishing hour for the village of interest and have the team set-up a rotation for the mapping of fishing boats to be done twice a month. During the peak hour, let the designated team member (perhaps with the binoculars) observe the village waters (either from shore or from a boat). Mark the fishing gear (one mark for each fisher) on a copy of the coastal map (on bond paper). Submit this map to the team leader. A map of the total fishing effort in the area may be derived from this information.
This method cannot be used to map gear used at night.

Another option is to use a map wherein the area of interest is gridded into some 10 to 25 approximately equal (in size) sub-areas and label each of these sub-areas with a letter or local names.

**Individual fisher self-monitoring**

Ask each fisher to record the days when he or she goes fishing.
Sample: Fish catch monitoring form
Prieto Diaz, Sorsogon, Philippines

<table>
<thead>
<tr>
<th>Name:</th>
<th>Brgy.:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of crew</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gears</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gears specification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S M T W Th F S</td>
</tr>
<tr>
<td>Fishing ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species caught</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Income)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight sold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight unsold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written in native dialect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Record all fishing days</td>
</tr>
</tbody>
</table>

Cross every day you go fishing

Prepared by Karen Vidler, Andre Uychiaoco and Margarita de la Cruz

Fish catch monitoring (for small-scale fisheries) 43
Mangrove reforestation monitoring

Definition
A method to monitor the progress or growth of mangroves after reforestation activities by coastal communities (refer also to topic on mangrove reforestation). The information gathered allows for improvements or adjustments to be made to the mangrove reforestation project which can lead to increased survival rates of the mangroves planted.

Purpose
- To determine the survival rate and growth of mangroves planted.
- The information generated can be useful in deciding where to expand efforts for mangrove rehabilitation, e.g., sites that have better survival and/or growth rates.
Requirements

Human resources

At least three people, preferably community members who were involved in the reforestation activities. Depending on the size of the area you may have more than one team.

✓ 1 data recorder
✓ 2 observers

Materials

✓ measuring stick (for height measurements)
✓ tape measure (dressmaker type)
✓ notebook
✓ pencil
✓ data sheets
✓ resource map
✓ compass (optional)
✓ calculator (optional)
✓ camera (optional)

Prerequisite

Map the mangrove reforestation area directly after planting is complete. On the map, record:

• numbers of each species;
• average space between seedlings;
• area of site;
• substrate;
• tidal range; and
• existing mangroves and other features.

This will be your baseline information.

Record any significant events which occur in the area in the logbook (e.g., typhoon, illegal cutting, repairs to the fence, cleaning of barnacles, rubbish, etc.) as these may significantly affect the reforested area.

**Suggested approach**

1. Conduct monitoring activities six months after planting to enable you to plan for replanting activities; and 6-12 months thereafter, until the mangroves are established and/or three years old.
2. Conduct the survey with the recorder standing in a central place while the two observers walk or wade in a predetermined pattern around the reforestation plot. Let the two observers systematically call out information on every seedling to the recorder:
   - alive, unsure or dead; and
   - name of species of alive or unsure.

3. Fill out the following table for every mangrove present to assess mangrove abundance, composition and survival.

Sample output

Mangrove abundance, composition and survival data sheet

<table>
<thead>
<tr>
<th>Location:</th>
<th>Site:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: / /</td>
<td>Recorder/Observer:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mangrove health status</th>
<th>Count</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alive</td>
<td>N-N-N-N-I</td>
<td>16</td>
</tr>
<tr>
<td>Unsure</td>
<td>N-N</td>
<td>5</td>
</tr>
<tr>
<td>Dead</td>
<td>N-N-N</td>
<td>8</td>
</tr>
<tr>
<td>Species 1</td>
<td>N-N-N</td>
<td>10</td>
</tr>
<tr>
<td>Species 2</td>
<td>N-N-N</td>
<td>10</td>
</tr>
</tbody>
</table>

4. At the same time, conduct a growth survey by using a subsample of 10% of the mangroves (i.e., conduct it for every tenth mangrove plant counted, if that mangrove
propagule is dead or unsure, go to the next one, until you have a live mangrove plant). Then, record the following information:

- seedling height – measured from the lowest point, i.e., the base of the plant or where it enters the substrate to the highest point, i.e., the top of the growing shoot;
- number of leaves: if more than 20, just place >20;
- diameter at base: 5 cm above the substrate, 5 cm above the roots (if present);
- presence of prop roots or other root structures; and
- presence of fauna, e.g., barnacles, crabs, etc.

**Mangrove growth data form**

<table>
<thead>
<tr>
<th>Mangrove growth</th>
<th>Sample size: 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Site:</td>
</tr>
<tr>
<td>Date:</td>
<td>Recorder/Observer:</td>
</tr>
<tr>
<td>Mangrove height (cm)</td>
<td>Number of leaves</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

5. Take several photographs of the area for documentation purposes. Put the date on each photograph.

6. Compile the data sheets and log the information into the logbook. Present these during the next meeting to discuss the progress of the mangrove reforestation.
Analysis

Combine all the data sheets for the site and add up the totals (see mangrove abundance, composition and survival data sheet). To calculate the survival rate, follow the following example.

Example

10,000 mangrove seedlings were planted in a hectare plot (7,000 Rhizophora spp. and 3,000 Bruguiera spp.) Six months later, there were 8,974 alive, 207 unsure and 678 dead (6,403 Rhizophora spp. and 2,918 Bruguiera spp.).

Overall survival rate

\[
\frac{100 \times (\text{alive} + \text{unsure})}{\text{total planted}} = \frac{100 \times 9,181}{10,000} = 91.81\%
\]

Species survival rate

\[
\text{Rhizophora spp.} = \frac{100 \times 6,403}{7,000} = 91.47\%
\]

\[
\text{Bruguiera spp.} = \frac{100 \times 2,918}{3,000} = 97.26\%
\]

Survival rate guide

- Above 80% survival rate — excellent
- Above 60% survival rate — good
- Below 60% survival rate — poor

Recommended action

- Maintain site
- Expand site
- Change site

Some species may have lower survival rates, e.g., Avicennia, Ceriops. This may not mean you should stop planting them, as a more diverse mangrove forest has a higher ecological value.
Calculations may seem daunting... but can be fun when conducted in a group.

The unsure category is useful when comparing information from different sampling times, e.g., at the first monitoring you had 90% survival rate and this decreased to 40% after six months. If the total for the "unsure" was high, this may mean a gradual die off; if the total was low there may have been a major impact to cause such a drastic change (e.g., typhoon, pollution).

**Output**

- A detailed map of the mangrove reforestation area to complement the resource map
- A description of the site and methods used (this may be part of a logbook).
- Recommendations for future mangrove reforestation activities in the area.
Strengths

- Allows the community to monitor their own mangrove reforestation efforts.
- Allows comparison between different sites or with other communities.
- An opportunity to involve the youth to conduct the monitoring as their own.

Limitation

- Time consuming

Variation

Depending on the area, sub-divide the mangrove reforestation plot, e.g., if there is variation in the type of substrate or level or amount of tidal inundation within the plot in order to get more accurate results.
Resource enhancement strategies
Conservation and rehabilitation strategies

Definitions

Conservation is the protection of natural ecosystems and resources through sustainable use. This differs from preservation which implies strict protection with no use. Enhancement and rehabilitation are activities whereby people aid or speed up the process of environmental recovery or regeneration. Restoration differs somewhat from rehabilitation in that it promotes regeneration that replicates a previous natural/original condition. These activities are a major component of CBCRM.

These strategies can be introduced early on but can only be implemented when the community calls for them. Supplementary coastal livelihoods which diversify or reduce dependence on coastal resources are frequently complementary strategies.
Purpose

- To prevent destruction or depletion of coastal resources.
- To directly rehabilitate coastal habitats or resources.

Prerequisites

- Community organizing and environmental education (refer to these topics in this sourcebook).
- Participatory assessments of the habitats or resources (e.g., mangroves, fishes, etc.) and resource users (e.g., fishers, women, etc.) that will be affected by these strategies.
- Participatory problem analysis (e.g., problem trees) including prioritization (ranking) to decide if conservation and rehabilitation strategies are necessary and then select the specific method to be used.

Indigenous methods

Be sure to understand the local/traditional methods of protection and enhancement (e.g., spirits in the mangrove trees). Try to strengthen or build on these practices or beliefs if they are useful.

- Consensus-building to ensure that a large portion of the community agrees and supports the conservation and rehabilitation strategies.

Conservation and rehabilitation strategies

The following table is a presentation of conservation and rehabilitation strategies/methods.
## Strategy: Regulation and enforcement

<table>
<thead>
<tr>
<th>Strategy/Method</th>
<th>Action</th>
<th>Purpose when to use</th>
<th>Considerations</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine protected area/zoning (Refer to topic on participatory zoning).</td>
<td>Closing an area to some uses and assigning areas for other uses.</td>
<td>To protect and allow recovery of an area and its resources.</td>
<td>Must be widely accepted.</td>
<td>Promotes consensus and networking. Easier to enforce than most other regulations.</td>
<td>Legislation difficult to get. May highlight conflicts. Benefits may take a few years before becoming evident.</td>
</tr>
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</tr>
<tr>
<td>Seasonal closure.</td>
<td>Not allowing fishing or diving during certain times of the year.</td>
<td>To allow resources or habitats to recover.</td>
<td>May need alternatives for those affected. Information regulation campaign needed.</td>
<td>Allows use of the area at the other times.</td>
<td>Loss of fishing opportunity. Usually difficult to enforce.</td>
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<tr>
<td>Species restriction.</td>
<td>Not allowing the catching of certain species.</td>
<td>To protect endangered species or breeding of overexploited species.</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrolling and enforcement.</td>
<td>Helping the authorities ensure compliance with the law.</td>
<td>Essential to realize the objectives of the above regulatory methods.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy/Method</td>
<td>Action</td>
<td>Purpose when to Use</td>
<td>Considerations</td>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Recycling.</td>
<td>Reusing materials for the same or for another use (e.g., composting)</td>
<td>To reduce waste production and extraction of materials.</td>
<td>External facilities needed to re-use certain materials (e.g., metals).</td>
<td>Also reduces cost and even generates income.</td>
<td>Concentrates impact to one place.</td>
</tr>
<tr>
<td>Waste collection/</td>
<td>Moving scattered garbage from coastal habitats to a landfill.</td>
<td>To contain waste to a place where it will do less damage.</td>
<td>May encourage contests.</td>
<td>Sanitation also improves health.</td>
<td></td>
</tr>
<tr>
<td>clean-ups.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watershed revegetation.</td>
<td>Replanting erosion-prone areas.</td>
<td>To reduce erosion and sedimentation.</td>
<td>Will also depend on farming and upland communities.</td>
<td>Also helps soil fertility.</td>
<td></td>
</tr>
<tr>
<td>Anchor buoys.</td>
<td>Providing a safe place for boats to moor without causing habitat</td>
<td>To reduce anchor damage to corals.</td>
<td>Care needed in putting down buoy’s weight.</td>
<td>Can also be used to delineate marine protection area boundaries.</td>
<td></td>
</tr>
<tr>
<td>Livelihoods.</td>
<td>(Refer to topic on livelihoods).</td>
<td>To reduce dependence on, and extraction of coastal areas; to improve coastal livelihoods by reducing waste or through sustainable intensification.</td>
<td>Should be environment-friendly.</td>
<td>Sustained and increased income.</td>
<td></td>
</tr>
</tbody>
</table>
## Strategy: Transportation and reseeding

<table>
<thead>
<tr>
<th>Strategy/Method</th>
<th>Action</th>
<th>Purpose when to Use</th>
<th>Considerations</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangrove reforestation.</td>
<td>Transferring young mangrove (propagules or saplings).</td>
<td>To start-up mangrove growth and reproduction. To restore abundance of mangrove forest.</td>
<td>Do not introduce foreign species or mangroves where there was none, multi-species forests are more natural. Availability of seedlings.</td>
<td>Stabilizes coast and reduces sedimentation.</td>
<td>May take a long time for benefits to be felt so must ensure control of area for 10-25 years.</td>
</tr>
<tr>
<td>Reseeding</td>
<td>Transferring young or breeding adults of species to a depleted area (e.g., sea cucumber, urchins, giant clams).</td>
<td>To speed up restocking of a depleted area and to allow growth of these species.</td>
<td>Young or breeding adults must be protected. Watch out that other species are not harmed. Requires input of young or breeding adults.</td>
<td>Spawn also reseeds the areas beyond. Usually economically-valuable species are reseeded.</td>
<td>Young may die young.</td>
</tr>
<tr>
<td>Artificial reefs.</td>
<td>Putting in a soft bottom area.</td>
<td>To serve as a shelter for fish to aggregate.</td>
<td>Currently controversial. Carefully consider site and materials.</td>
<td>Might also serve as a substrate for corals to settle and grow.</td>
<td>Would speed-up resource depletion if it is fished.</td>
</tr>
</tbody>
</table>
Outputs

★ Assisted natural regeneration of the habitat or resources.

Restoration
Reforestation using indigenous species and matching abundance
i.e., 3 varieties

Rehabilitation
Reforestation using single fast-growing species
i.e., 1 variety

Limitations

★ Tested organizational capacity and commitment to the management of natural resources.

- Some community members may be opposed to the enhancements to be carried out, thus, dividing the community or organization. Consensus should be ensured here.
• Very few areas can be set aside for conservation without negatively affecting some resource users.
• Usually expensive, time-consuming and physically tiring.

References


Prepared by Andrei J. Uychiaoco, Margarita T. dela Cruz and Severino Salmo
Establishing and managing marine sanctuaries

Definition

A marine sanctuary is a zone in a protected area where fishing activities of any kind and gathering of any marine organisms are strictly prohibited and where historical and cultural features are preserved either by law or by traditional practice. Research and other educational activities are regulated in accordance with existing policies and guidelines formulated by the government or by the community.

A marine reserve may also be established in which case a buffer zone is designated to enclose the sanctuary. Traditional fishing activity like hook and line may be allowed in the buffer zone.

Marine protected area
Purpose

Establishing a marine sanctuary is a coastal resource management strategy aimed at:

- increasing fish yields, food and income;
- biodiversity conservation;
- resource regeneration;
- habitat rehabilitation; and
- historical/cultural value preservation.

Established and accepted by the community, this can serve as a rallying point for community cooperation, heighten their awareness and appreciation of the environment and the different ecosystems.

Requirements

Materials

- secondary data like manta tow survey data (if available)
- resource use map
- manila paper
- pentel pen
- masking tapes
- improvised transect quadrat
- logbook/notebook
- underwater slates
- fins (optional)
- snorkels and masks
- bouys, billboards and markers
- compass
- boat
Suggested approach

A. Marine sanctuary establishment

An officer of a community-based organization (CBO), a non-government organization (NGO) development worker or a government extension worker can facilitate the process.

1. Conduct a multi-sectoral consultation (refer also to topics on focused group discussion, historical transect, problem tree, resource use mapping) to:
   - identify problems and issues affecting the community and the coastal environment;
   - explore possible solutions; and
   - introduce the concept of a marine sanctuary as a possible strategy in addressing some of the problems such as resource depletion.

The process being discussed may apply to any of the following conditions in the community:

- A community-based organization has already formulated a coastal resources management plan which includes, among others, the establishment of a marine sanctuary.
- The local government or a government agency decides that a marine sanctuary should be established in the area.
- An NGO thinks that a marine sanctuary is a good strategy to address low income levels among fishers due to declining catch and make this an entry point to the community.

In any case, the greater majority of the community must associate ownership of the idea to ensure community support for the program when implemented.
2. Ask the participants to validate the resource map, preferably with the assistance of a technical person.

3. Let the participants identify potential sites for the marine sanctuary based on the following criteria:
   - impact on the community (who and how many will be adversely affected)
   - manageability (location, area covered)
   - historical/cultural value
   - critical site (on the brink of irreversible damage)

   - diversity of life forms (high live coral cover)

   - diversity of ecosystems (mangrove, seagrass, coral reefs)

   - functional diversity (spawning, nursery, feeding)

   - critical area for endangered species (dugong, sea turtle, etc.)
4. Ask the participants to present the potential sites in a public consultation and come up with an agreement about which site to declare as a marine sanctuary.

5. Get volunteers from the participants to prepare the needed documents and lobby for local legislation.

6. Delineate boundaries of the marine sanctuary using compass and install bouys and markers in the process.

B. Marine sanctuary management

1. Organize a multi-sectoral marine sanctuary management council. The size and composition of the team will depend on the number of volunteers and the sectors present in the community.

2. Strengthen the team, particularly on coastal resource management planning.

3. Formulate the marine sanctuary management plan taking into consideration local issues/concerns and sustainability (refer to Table 1). Refer also to topic on fish visual census, random quadrat sampling method, fish catch monitoring, monitoring effectiveness of marine sanctuaries).
Table 1. Sample of a marine sanctuary management plan

Camanga (Philippines)  Marine Sanctuary Management Plan  
January - December 1997

<table>
<thead>
<tr>
<th>Issues /Concerns</th>
<th>Objectives</th>
<th>Activity</th>
<th>Time frame</th>
<th>Logistics needed</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Illegal</td>
<td>• maintain</td>
<td>• organize and train enforcement team (paralegal training)</td>
<td>1 month</td>
<td>• volunteers</td>
<td>• coordination with local government. units; police and coast guard and environmental lawyers</td>
</tr>
<tr>
<td>activities,</td>
<td>integrity of the sanctuary</td>
<td></td>
<td></td>
<td>• resource people</td>
<td></td>
</tr>
<tr>
<td>violations</td>
<td></td>
<td>• deputize team as coastal zone wardens</td>
<td>1 month</td>
<td>• patrol boat</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• prepare patrolling plan</td>
<td>1 week</td>
<td>• enforcement officer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• conduct patrolling operations</td>
<td>ongoing</td>
<td>• fuel, oil, logbook legislation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• develop expanded support for the sanctuary</td>
<td>• conduct ecological awareness seminars and information drive</td>
<td></td>
<td>• information materials</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• billboards</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• install billboards in strategic places</td>
<td></td>
<td>• resource people</td>
<td></td>
</tr>
</tbody>
</table>

Establishing and managing marine sanctuaries
<table>
<thead>
<tr>
<th>Issues/Concerns</th>
<th>Objectives</th>
<th>Activity</th>
<th>Time frame</th>
<th>Logistics needed</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. “Health” of the marine sanctuary</td>
<td>• assess state (improvements) of the marine sanctuary</td>
<td>• organize a regular monitoring team</td>
<td>1 month</td>
<td>• volunteers</td>
<td>· link with NGO and academe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• train team on simple monitoring methods</td>
<td>3 months</td>
<td>• resource people</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• do regular monitoring of fish, coral cover, benthos, etc.</td>
<td>quarterly</td>
<td>• snorkels, masks and fins</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• interpret data together with other members of the community</td>
<td>quarterly</td>
<td>• boat</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• transect quadrat</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• underwater slate</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• underwater camera (optional)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>• gasoline</td>
<td></td>
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<td>• notebook</td>
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<tr>
<td>3. Sustainability</td>
<td>• ensure sustained community effort in managing the marine sanctuary</td>
<td>• identify and develop programs that will ensure continuity of marine sanctuary management activities such as support for livelihood projects, cross visits, community incentives, etc.</td>
<td>3 months</td>
<td>• facilitator</td>
<td>· link with NGOs and appropriate government agencies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lobby for support from government such as budget for fuel and oil, equipment, etc.</td>
<td>regular or as needed</td>
<td>• resource use map</td>
<td></td>
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<td></td>
<td></td>
<td>• case studies/success stories</td>
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</table>

Prepared by: Salcedo Coastal Zone Management Council, Salcedo, Eastern Samar
4. Conduct a public consultation to validate the marine sanctuary management plan and to gather volunteers for the activities to be conducted.

5. Finalize the plan.

6. Negotiate for needed support from different agencies.

7. Implement the plan.

8. Regularly monitor the implementation of the plan.

9. Evaluate implementation and, if necessary, revise the plan.

Outputs

★ Increased environmental awareness among members of the community.

★ An area where fish and other marine organisms can breed, feed and grow undisturbed to replenish their numbers.

★ A local zoning legislation delineating the sanctuary area and stipulating rules and regulations governing the site.
Strengths

- Enhances community cooperation and unity.
- Deepens environmental awareness and commitment, especially when positive results are achieved.

Limitations

- Highly dependent on community participation
- If government organization or NGO leads, there may be less support from the community than if it is community-based organization (CBO) -initiated.

Caution

The spirit of volunteerism and community cooperation is alive in coastal communities and should be strengthened. Paying or giving honorarium to a few people who will do the patrolling or regular monitoring of the marine sanctuary may erode this value. Other forms of incentives that will not only boost the morale of the monitoring and enforcement teams but also enhance community participation should be identified and developed, e.g., livelihood support projects, providing basic services, community awards, etc.

Compiled by Margarita dela Cruz
Mangrove reforestation

Definition

Mangrove reforestation is a resource management option used to rehabilitate or restore mangrove forest cover. It involves the planting of seedlings or transplanting of young mangrove species.

Mangroves are a unique life-support system of coastal ecosystems that provide many services to coastal communities.

Purpose

- To improve the mangrove forest in areas previously cleared for other purposes (e.g., fishpond, abandoned development, etc.).
• To enhance habitat of ecologically and socio-economically important marine organisms (e.g., crabs, shrimps, etc.) that are biologically dependent on the mangrove ecosystem.

• To ensure sustainable harvest of mangrove trees.

• In the long term, to provide supplemental income from marine products for coastal communities.

• To ensure tenurial rights, access and management control of the community over the mangrove resource.

**Prerequisite**

Prior to reforestation activities, ensure the following:

• basic working knowledge on mangrove ecosystem dynamics for the members of the community;

• an understanding of local tenure/utilization issues related to mangroves;

• an understanding of different techniques of mangrove reforestation; and

• mangrove management system (e.g., monitoring).

These can be acquired through the conduct of study tours and/or basic ecology seminars.

**Suggested approach**

**Site selection**

1. Identify and assess potential mangrove reforestation site(s) based on the following criteria:
• previously a mangrove area (e.g., abandoned fishpond that is not titled as private property);

• suitable environmental conditions (e.g., substrate, exposure to waves and salinity);

• public or state-owned domain or property; and

• not intended for any other uses in the near future.

2. Gather data on the tenurial status, possible claims or leases of the potential sites. Visit the government agency in-charge and/or conduct an informal investigation of possible claimants of the potential sites.

3. Conduct a public hearing on the proposed project. Consult the community regarding the proposed site. Perhaps, the area is used by the community as a gleaning area or marina for local boats. Make sure that all users attend the hearing.

4. After the public hearing, finalize the site(s).
5. Secure the necessary tenurial instrument or permit from concerned government agencies. This is necessary to ensure legal access to the resource and maintain management control.

Example

In the Philippines, a "mangrove stewardship agreement" (MSA) may be awarded by government agencies to a family, group or community.

Fund sourcing

Source funds for reforestation activities that will involve land surveying, propagules and planting materials, plastic bags for potting, etc.

Site preparation

1. Survey the area to establish boundary and parcels to be assigned to the community members. Use wooden stakes as boundary markers. Establish structures, e.g. nets to suppress high waves and to prevent people from entering the area while the mangroves are still small.

Size of the plots will depend on the total available area for reforestation and the number of cooperators. Usually, in the Philippines, 1/4 ha is given to a family.
2. Select appropriate mangrove species using the following criteria:
   - dominant species in the area;
   - appropriate to the substrate;
   - appropriate to the tidal range; and
   - appropriate to salinity range.

3. Collect propagules and/or seedlings of selected species from identified sources. For species that will require seedlings to be transplanted from the wild (e.g., *Avicennia* spp.) or those requiring potting prior to planting, establish a nursery.

4. Determine the appropriate season for planting.

   The best time to plant is usually during the off-typhoon season. Determine also the season when adult trees produce propagules or natural seeds.
5. When the site and planting materials are ready, schedule the date(s) for actual planting.

During actual planting, determine spacing. Propagules that are planted farther apart (e.g., 0.5 m, 1 m spacing) grow slowly but require less thinning.

Implementation time may vary depending on the availability of propagules, biological nature of chosen species and preparedness of the community.

Maintenance of the reforestation site

1. Clean the site every 2-3 days initially, then every week thereafter (e.g., removal of wastes and garbage materials, plastic, net remnants, barnacles, fouling organisms, etc).

2. Re-plant in areas with low survival.

3. Thin out or trim after 2-3 years or if the plants are growing massively

4. Harvest selectively (resolve utilization agreement among community members).

5. Monitor regularly (refer to topic on mangrove rehabilitation monitoring).
Example

In Banacon Island, Bohol, Philippines, a community reforested an area of over 400 hectares with *Rhizophora* spp. The community members now sustainably harvest from the area. They sustain this livelihood through regular replanting.

Strengths

- Community is directly involved in the planning, implementation, monitoring and management of the project.

Limitations

- Securing tenurial instrument or legal papers or permits may take a long time depending on the government system.
- Benefits not immediately felt by the community members.
- Possible social conflict may arise with other resource-users, e.g., gleaners.
- Replanting dominant species in the area improves the chances of success but does not give a good "natural" mix of mangrove species.
- Monocropping can cause diseases to easily spread.

Prepared by Severino Salmo III and Roy Olsen De Leon
Education and extension
Issue-based environmental education for coastal communities

Definition

Environmental education is a process through which coastal communities understand and appreciate the environment, the earth's resources and the interconnectedness of ecosystems. It introduces various ecological concepts and principles as they relate to environmental issues experienced by the community. It enables them to further explore these issues and take the appropriate action to address them.
Environmental education is a very important component of CBCRM and must be a continuing process throughout the program cycle. To be effective, it must be highly participatory and learning must be enjoyable and experiential.

**Purpose**

- To bring about positive change in the values and behavior of individuals and the community, particularly in their perception and relationship towards the natural environment.
- To move the community to actively participate in conservation/resource management programs.
- To enable the community to assert their right to use and manage their resources and the benefits.

**Requirements**

**Human resources**

- resource persons (with knowledge and experience in environmental work and how to use participatory tools and methods)
- facilitator/documentor
- participants (20-40 participants are manageable)

**Note on the participants**

Encourage the participation of people of various age, economic status, religion, occupation and sex.
Materials

Prerequisites
✓ references/case studies
✓ outputs from previous activities

Supplies
✓ manila paper
✓ pentel pens
✓ crayons
✓ ballpens
✓ notebooks
✓ meta cards
✓ masking tape

Equipment (optional)
✓ cassette player
✓ camera
✓ slide projector
✓ slides
✓ video player and monitor
✓ video tapes (resource assessment of the area)

Possible approach

1. Identify current environmental issues facing the community. These should be clearly recognizable by the majority of the community. You may wish to use a preference or problem ranking matrix to prioritize these issues.
2. Facilitate a discussion on the perceived causes of the issue. Be open to various perceptions. For each perception, ask why that is a cause. In this way, you develop a hierarchy of causes similar to a problem tree (refer to the topic on problem trees and webs).

Spend some time examining the differences and relationships between immediate or direct causes and underlying or root causes.

3. Facilitate a discussion on the consequences or impacts of the issue. Ask what is currently happening as a result of the issue and what will happen if the issue continues without any intervention. For each consequence or impact identified, ask how this might affect other aspects of community life.

Categorize the consequences into two groups: 1) impact on the environment; and 2) subsequent impacts of environmental degradation on people, especially their health. Emphasize the link between environmental health and human health and welfare.

4. Identify key ecological concepts or principles that arise during the discussion. Very often, these will arise when discussing the linkages between impact on the environment and impact on human health and welfare.
For example, the linkage between the pollution of estuarine water and human poisoning resulting from consumption of shellfish would provide an opportunity to discuss the ecological concept and process of "biological magnification of pollutants." Similarly, the linkage of mangrove degradation and declining capture fisheries would provide an opportunity to discuss "habitat" or "nutrient cycling."

5. When people are aware of the problems, their causes, consequences and the underlying relationships, they are in a better position to address them. At this stage, discuss ideas for action. Very often, these action activities can be an integral part of the CBCRM program.

Five steps in an issue-based approach to environmental education

Issue-based environmental education for coastal communities
Individuals can develop and become involved in activities that are most relevant to the maintenance of their own health and welfare.

Example

In Barangay Macabug, Ormoc City, Philippines, fishers noticed the corals were losing their color and silt was accumulating on them. They discussed this with other fishers and they decided to hold a public forum and invited a resource person from a local NGO. Together, they analyzed the situation using PRA tools (e.g., problem tree) and the issues of coastal quarrying/mining surfaced. The NGO representative then explained why this land activity is affecting the corals in the sea.

The community realized their lack of awareness and understanding of the environment. They requested for an informal environmental training program from the NGO. At the same time, they decided to bring the matter to the city government. They prepared posters and fliers and invited the media in their advocacy. This caught the attention of the public and the city government promised to discuss the issue during the next council session.
Outputs

★ Greater appreciation and support for project activities.
★ An analysis of issues and introduction to ecological concepts and principles.
★ People who are aware of issues and with increased knowledge of certain ecological concepts and principles (an indicator of this is their ability to articulate and discuss such issues and concepts with other members of the community).
★ Local policy recommendations/positions based on an informed understanding of an environmental issue.

Strengths

• Gives people a logical basis for action, e.g., motivates them to prevent blast fishing because destroying corals negatively affects supply of fish.
• Allows sharing of information between the community and technical people/resource persons.
• Can lead to immediate action (e.g., clean-up drive, reforestation of mangrove areas, etc.)
• Helps the community organizer identify potential leaders and trainees from the community.

Limitation

• Raising awareness takes time and changing people’s behavior even longer.

Prepared by Margarita dela Cruz, Ingrid Gevers and Stuart Green
Participatory technology development and dissemination

Definition

Participatory technology development and dissemination (PTD&D) is a process which combines the knowledge and research capacities of local communities (i.e., indigenous knowledge) with that of research and development organizations in an interactive learning process. It involves identifying, generating, testing, adapting and promoting improved or new techniques or institutional arrangements to help solve local problems.
The ultimate aim is to improve resource management and strengthen the experimental and technology management capacities of local people and communities, thus fishers and farmers play a key role in the entire process. Many projects currently apply various aspects of PTD&D.

The diagram below illustrates the main components of PTD&D and lists some of the tools or methods that can be used for each component.

**Components of PTD&D**

The main components of PTD&D are described below:

- Examination of relevant and appropriate local or indigenous knowledge, e.g., information, beliefs, technologies and institutional arrangements found in the community.
- Examination of relevant and appropriate external knowledge, i.e., knowledge that comes from outside the community (e.g., from researchers, non-government organizations, government organizations or other communities).
Joint technology/practice development includes any form of collaboration between insiders and outsiders to improve resource management. The contributions of local and external knowledge will vary.

Testing and adaptation “on-farm research” is the process of fisher or farmer experimentation and modification of jointly developed technologies or practices.

Fisher/farmer-led extension and dissemination, i.e., peer to peer exchange of knowledge through cross-visits, study tours or focused group discussions.

PTD&D begins during the assessment and analysis phase of a project when key problems are identified by the community. It moves into the implementation phase as fishers and farmers and outside facilitators begin to develop improvements based on weaknesses of the current practices. Later in the monitoring and evaluation stage, it is the fishers and farmers who adapt the new technologies and analyze the results. Finally, in the scaling-up phase, fishers and farmers serve as trainers, extensionists or resource persons to help disseminate improved technologies or practices in other areas.
Purpose

- To improve existing technologies or develop new ones. It is useful in situations where outside facilitators and community members are willing and able to work together to improve specific technologies or practices.
- To be used in any situation that can benefit from combination of indigenous and external knowledge.
- May be especially useful in settings where indigenous innovation is not very dynamic.

Requirements

Human resource

Outside facilitators who have developed rapport with community, are familiar with the marine and terrestrial ecosystems and who have the technical skills in the sector under study (e.g., fisheries, agriculture, livestock, aquaculture, etc.)

Possible approach

1. Assess indigenous knowledge related to the key problem area in the sector under study (refer to problem identification and ranking tools and indigenous knowledge).
2. Determine the current weaknesses or limitations of local or external practices or technology (refer to problem tree and ranking tools), e.g., the uncontrolled growth of the vegetation sometimes creates a problem for other species in the pond.
3. Identify modifications or alternative practices or technologies to address the limitation, by blending indigenous knowledge and external knowledge, e.g., aquaculturists and researchers developed a system to stratify the pond using a palm leaf (tal).

4. Develop a training module and train selected community members to implement the technology.

   This may involve a number of training modules conducted over a period of time. Emphasize principles or reasons behind specific technologies. This will help facilitate adaptations by farmers/fishers in the next stage.

5. Conduct on-site research by observing and documenting significant changes, as fisher or farmer leaders apply and adapt the technology or practice over a period of

   Tip
   Take note of the impact of the improved practices or technologies. Pay special attention to adaptations made and why.
time. These changes reflect the unique combination of environmental, economic and social constraints faced by each individual fisher or farmer. This is a critical part of PTD&D that recognizes the importance of adaptation and differentiates it from simple transfer of technology.

Technology developed with farmers gardening in sandy and saline coastal soils

6. Conduct cross-visits or study tours to bring other community members to learn from the experience of the selected community members.

7. Help to improve the capacity of farmers to share their innovations with others. This can include assistance in developing communication skills, documenting lessons learned or improving indigenous extension or sharing methods.

Outputs

* Improved technologies (e.g., techniques for oyster culture) or improved practices (e.g., better coordination through the use of communal labor).
The specific output of PTD&D depends on the unique set of circumstances (environmental, cultural, economic, political and demographic) that a resource user or community faces.

- A secondary output of PTD&D is improved capacity of local resource users to test, adapt and share new ideas more systematically.

**Strengths**

- **Process** is not technically complex. It requires, however, technical specialists or researchers to work directly with community members and recognize their role in change.

- **Builds on** existing technologies of men, women, children and elderly and promotes jointly developed improvements, thereby avoiding the introduction of new technologies that may be inappropriate for men and women of various ages.

- **The testing and adaptation phase** allows resource users to modify improved technologies or institutional arrangements to suit individual needs. To some extent, this can also address the specific conditions of various segments of the community (i.e., men, women, children and the elderly).

- **Places heavy emphasis** on the use of indigenous knowledge (e.g., technologies, beliefs, practices or information) throughout the PTD&D process.
Limitations

- It requires the direct involvement of selected community members over a long period of time (as both research partners and indigenous extensionists).

- Time consuming, often requiring at least one year (or more) for jointly developed improvements and adaptations to be evaluated. The dissemination component can only take place after this period of time and also requires some capacity building. While the duration is long, the level of involvement from the outsider gradually decreases over time.

- It is relatively expensive as a result of the high input of staff time. However, the dissemination component of the approach is supposed to reduce this cost as local community members take on an increasingly larger role in technology development and dissemination.

Prepared by Gregory Ira and Dipankar Saha
Study tours

Definition

A study tour or cross-visit of community-based coastal resource management (CBCRM) sites is an experiential learning process where participants get to see a number of coastal areas where CBCRM principles and technologies are practiced. The study tour highlights the results of such practices visually (e.g., by a tour of reefs and mangrove forests). It also shows the processes involved in achieving these results, through direct interaction with community.

For the communities visited, on the other hand, the tour is an affirmation of the value and effort they invested in CBCRM. The tour is also an opportunity for fishing communities to meet other fishing communities, thus enriching the experiences of both.
Purpose

As an effective tool for deepening the participant’s appreciation of CBCRM, a study tour is normally done at the early stages of a project where participants are already quite familiar with the concept but have not seen its expression in actual practice.

It can also be used to look at specific interventions (e.g., fish sanctuary, mangrove reforestation) sites and experiences.

The general purpose of the study tour can be broken down as follows.

- To understand and experience the values/principles and practices of CBCRM through direct interaction with coastal communities in selected sites.
- To facilitate assessment and redesigning of existing coastal resource management programs through sharing, reflection and planning.
- To promote and advocate CBCRM values, principles and practices to a broader sector of the community especially local policymakers, government agencies, NGOs and other fishing communities.
- To initiate linkages and networking among different fishing communities.
Requirements

✓ tour kit – The tour kit is a compilation of reference and reading materials that are relevant to the theme or topics to be taken up during the tour. It should include copies of the tour objectives and design, schedules and itineraries, profiles of sites to be visited, a directory of participants, facilitators and resource persons.

✓ flashlights
✓ snorkeling gear
✓ swimming gear
✓ life jackets
✓ looking glass (for those who do not know how to swim or snorkel)
✓ seminar/workshop materials

Suggested approach

Planning

1. Review the needs of prospective participants. What knowledge/skills/orientation do you intend the participants to acquire during the tour?

2. Define the theme and objectives of the tour. There can be one or several themes involved in a single tour. A tour can focus on resource enhancement technologies (sanctuary management, marine reserves, mangrove reforestation), community organizing processes and/or coastal livelihood projects using appropriate technologies.
List of possible study tour themes and topics

- community organizing processes
- resource tenure issues and possible interventions
- community participation in environmental protection and law enforcement
- role of women
- coastal livelihood initiatives
- building fisher cooperatives
- marine sanctuary management
- mangrove management
- building local partnerships
- advocacy for local policy reform in the fisheries sector

Site selection

1. Draw up a list of potential sites. Identify your criteria according to the theme and objectives of the tour.

2. Gather information about the sites and write a brief profile for each site.

3. Visit the potential sites. It is important for the tour coordinator to see the sites before the actual tour to be able to determine:

   - the appropriateness of the sites
   - the availability of logistical needs, e.g., a meeting place, ample accommodation, available means of transportation
   - the itinerary for the tour and the time needed to move around the areas to be visited
• to consult and inform the community to be visited about the proposed activity. It is important to get the support of the community to be visited because they will act as host and "tour facilitators" or "guides."

Tour design, itinerary and logistics

1. After visiting all potential sites, finalize the tour design and itinerary.

2. Incorporate mini-lectures on related topics in the tour design. For example, an overview of the history and concepts in CBCRM can be given at the beginning of the tour as part of the orientation.

Basic ingredients to a tour

Give the participants:
• time for study
• reflection and interaction
• rest and recreation
• evaluation and planning
3. Aside from the community members in the sites to be visited, invite also resource speakers from non-government organizations (NGOs), government and the academe based in the area to give inputs related to the theme (if necessary).

4. Finalize logistical needs. Key to the success of any study tour is that logistics are handled efficiently. Since participants will be mobile most of the time, time must be managed very strictly. Delay in one area can affect the whole tour. Accommodations should be comfortable enough and provide basic facilities, e.g., toilet, water, etc.

Selection and invitation of participants

1. Always choose the participants carefully. Determine criteria based on the objectives of the activity.

Example

If it is to build the capability of the fisher leaders and members, then majority of the participants should come from this group. If the tour is also intended to convince local officials for policy reform, then representatives of target agencies or officials should be invited to participate.
2. Prepare a letter of invitation. Stipulate what the participants should expect in terms of accommodation and travel arrangements.

3. Include a checklist of things to bring. Relay information about the place, the weather, clothes to wear, etc. (e.g., if there will be a lot of island hopping, advise participants to wear shorts and slippers).

The ideal touring group should not be more than twenty people, including tour staff. The number of participants will be determined by available resources and manageability.

4. Consider gender/ethnicity and age when selecting participants.

5. Provide an overview of cultural dos and don’ts for the participants if they are from a different cultural background.

**Tour proper**

1. Staff complement

   A study tour, “crew” or staff complement should be able to take on the following roles. The crew could be composed of two or three people:

   • a tour coordinator who also serves as over-all facilitator/"tour guide";
   
   • a logistics person in charge of transportation, food, accommodations and budget; and
   
   • a documentor who will document in written form photos and, if possible, video the whole activity.

   Additional staff (facilitators and guides) should come from the local organizations in the sites to be visited.
2. Cost and budget

The basic items in the budget include:

- transportation
- board and lodging
- communication
- materials for the tour kit
- honoraria for facilitators and documentors
- rent for function/meeting rooms and presentation equipment
- documentation materials (e.g., film, video camera rental, tapes)
- first aid and contingency fund
- if resources allow, a short-term accident insurance

Post-study tour activities

Conduct any of the following as possible post study tour activities:

- echo seminars – hold a seminar and get participants to share their experiences to community members who were not part of the tour.
- on-site training activities – train the community in a skill learned on the cross visit
- proposal-making and fund sourcing for possible projects/technologies seen on the visit
- cross-visit of the “visited” community to the sites of the participants

The extent to which the tour coordinator(s)/sponsor(s) will become involved in the post-study tour activities depends on its relationship with the tour participants.
Three stages of the study tour

1. Orientation sessions
   - Introductions
   - Expectations
   - Overview of tour design
   - General overview of CBCRM

2. Tour proper
   - Site briefings
   - Tour
   - Interaction/sharing
   - Processing of experience or inputs or formal study sessions with resource persons to be done for every site visited.

3. Evaluation and planning
   - Planning for individual or participating organization
   - Overall evaluation of the tour

Tool box

In presenting their experiences, the community visited can make use of their historical lines, resource maps, seasonal calendars or fish catch monitoring charts. The visitors, on the other hand, can use semi-structured interviews, walk a transect line of the area and note down observations. The facilitator can also convene a focus group where key informants from the visited community can be invited.
Output

★ A compilation of enriched/revised CBCRM plans drafted by participating organizations.
★ Written documentation of proceedings.
★ Photo and video documentation.
★ Network of CBCRM practitioners.

Note
These are, of course, the tangible outputs. The most important output is the experience the tour can give both to the participants and host communities.

Strengths

• Coming into contact with fellow fishers who are reaping the gains of their efforts is usually an inspiring and motivating experience.
• Travelling and seeing other places broaden the perspective of participants.
• The interaction between communities provides a venue for contact-building and networking.

Limitations

• The tour takes the people away from their livelihood for a considerable period of time. Arrangements can be made with families who will be affected by this activity.
• Although the tour usually raises the expectations and enthusiasm of the participants, the technologies seen in the tour sites may not necessarily be applicable in their respective areas. The participants should be able to critically assess the sites and the technologies applied.
• A study tour is costly and resources are always limited.
Hints and tips

- **Documentation.** Document the tour through write-ups, photos and video. Documentation serves as reference material for sharing the learnings and experiences and for replicating the activity in the future.

- **Duration.** A study tour can go for as long as 10 days, depending on how extensive or intensive the topics are intended to be. The length of time community members are willing to be away from work should be considered.

- **Sensitivity to culture.** Participants should also be reminded to be sensitive to the culture of the communities to be visited. Information about this should be relayed as part of the orientation of the participants. If there are problems in the language spoken, make arrangements for an interpreter.

- **Timing.** Scheduling the tour is also an important aspect of planning. The best time to conduct a tour would be:
  - during summer (weather is fine, people have less work in communities in the Philippines); and
  - before the community participants enter the CBCRM planning stage.

- **Flexibility.** Anything can happen in a mobile tour; not all factors can be controlled. Participants must be prepared to be flexible and open to unexpected situations.

Compiled by Marie Grace Madamba-Nuñez

106 Participatory Methods in Community-based Coastal Resource Management
Advocacy
Legal analysis

Definition
Due to the imperfection of the law there is a need for legal analysis. Legal analysis is a process whereby fishers can address legal issues affecting their community and marine resources. It can be used at any stage of the CBCRM process, but will be more effective if preceded by community organizing, participatory rural appraisal (PRA) and environmental awareness seminars.

Purpose
- To gain critical understanding of the law and the legal system, especially appreciating the legal framework governing the management of marine resources and coastal zones.
To gain knowledge of the remedies available and legal procedures related to the implementation of laws and policies affecting marine resources.

To develop a good grasp of the legal issues affecting these resources and the community's role in shaping local policies for protecting and managing the same.

To identify legal needs and at same time plan out concrete actions.

Requirements

Human resources

✓ lawyer – must have experience in community work and be familiar with environment law

✓ paralegal/facilitator – A paralegal is a person who has knowledge of the law and legal procedures. This is normally through informal training/workshops and actual experience, but he/she has no license to practice law. He/she assists the lawyer in gathering evidence, facilitation of paralegal training, legal consultations and documentation. This person may be a fisher, community organizer or any volunteer.

✓ documentor

Key participants

✓ community/village leaders and members (consider gender, ethnicity, age)

✓ local officials, either in the village or town level
Community is confronted by a legal issue (e.g., dynamite fishing close to the village). Discuss and analyze issues using any of the following tools: focus group discussion, semi-structured interview, problem trees, brainstorming.

Community seeks the assistance of an institution (e.g., non-government organization), lawyer or local official. But if the community does not actively seek assistance, paralegals, lawyers and local officials may come across community issues through community visitations and the media.

The community conducts preliminary research on the issue or event by gathering relevant information and/or compiling pertinent legal documents such as copies of local ordinances allegedly violated.
4. The community schedules a meeting/consultation with the NGO/government official/lawyer/paralegal.

Example

In January 1996, fishers of Sitio Honda Bay, Barangay Sta. Lourdes Palawan, Philippines, participated in a consultation on CBCRM. During this forum, they presented a problem concerning the entry into the Puerto Princesa bay area of "hulbot-hulbot" (conical shaped, fine-meshed net with scaring device), a destructive type of commercial fishing operation. They claimed that since the "hulbot-hulbot" fishing operations started, their fish catch had significantly dropped. They needed help to stop the commercial fishing operation but were not aware of pertinent laws on the matter as well as remedies available to them. After a long campaign, they were able to stop the operation of the "hulbot-hulbot".

Legal analysis proper

Community attends assembly, meeting or consultation to discuss and analyze the issue and develop an action plan. In this consultation, the lawyer discusses the legal strategies or other remedies that the community can use.

Actions

The community may decide to adopt one, some or all the following actions depending on the nature of the legal issue.
Immediate actions

★ Send a letter-petition to local officials and government agencies bringing the issue to their attention and requesting for immediate action/resolution.

★ Request a village assembly to discuss the issue and propose possible remedies.

★ Request the appropriate government agency to institute the needed legal action (judicial or administrative).

Example: request the enforcing agency to arrest illegal fishers.
Considerations

If problems persist

- Bring the matter to the media to generate public interest and support to the community's cause (refer also to topic on media advocacy).
- Institute the legal action with the assistance of a lawyer.
- Hold a rally or dialogue (whichever is deemed appropriate by the community) with concerned government officials to press for immediate action.

Long-term actions

- Join committees or "watchdog groups" to ensure the enforcement of the law and apprehension of violators.
• Propose local legislation to address the issue.
• Train community members as paralegals.

Example

In one case in Honda Bay, Palawan, Philippines, fishers of Barangay Lucbuan requested more in-depth knowledge on the law, legal system and expressed interest in having some members become paralegals. Thus, a seminar or paralegal training was conducted. Potential community paralegals were identified during the training. Twenty people attended the training and five of these volunteered as paralegals. These paralegals have been involved in monitoring the existing community issues, new issues and action plans. They have assisted lawyers in documenting illegal fishing, gathering evidence and following up legal actions.

• Request technical/scientific investigation when necessary to enhance factual basis in any proposed measure or local legislation.

Tips
• Photocopy all documents submitted. Letter-petitions should be stamped "RECEIVED" as proof of formal submission.
• Provide community members with copies of relevant laws, regulations or ordinances.
• If laws are in foreign language, translate these into local language or prepare a primer.
• Involve the community in the whole process from initiation through evaluation.
Remember these tips when analyzing the law

- The law is real. Management of marine resources is enabled through legal systems that define rights and remedies, and create supervisory and regulatory agencies.
- Laws are generally made by those who are in power, and thus tend to reflect the interest and bias of the maker. An analysis should be made as to who makes the law as well as their guiding interest.
- Laws change.
- The substance of the law and its implementation are two different issues.
- Fishers must be empowered to take an active role in the legal process. Relying on the present legal system is not enough.

Strengths

- Empowers local communities to participate in shaping and implementing laws and policies related to the marine resources.
- Indigenous communities are given the opportunity to assert customary laws and practices over ancestral waters (e.g., Tagbanua community in Coron Island, Palawan are seeking the recognition and delineation of their ancestral waters).
- Facilitates coordination and networking between lawyers, paralegals and fishers.
- Generates active participation of women (e.g., women of Sitio Honda Bay, Philippines were found to take the lead in the campaign to stop commercial fishing in the bay area).
Limitations

- Presence of lawyer or paralegal is generally required.
- Community may rely solely on the lawyer to identify remedies/options.
- Funding may be required for the travel of lawyers for community consultation.
- Indigenous communities may have different legal systems. Example, in the Philippines, there are indigenous people who have a separate law system, e.g., Mangyan people in Mindoro.
- Depends on local politics and the local judicial systems.

Philippine experience: Local government ordinance on the use of municipal waters

With the advent of the Local Government Code, local government units (LGUs) are responsible for the enforcement of laws and regulating fishery activities within municipal waters. The extent of municipal waters was expanded from seven to fifteen kilometers from the shoreline under the new law. The LGUs, therefore, have the power to issue ordinances to govern municipal waters.

In 1996, when the city of Puerto Princesa prepared a draft ordinance on establishing its municipal waters and regulating fishery activities within its city waters. The fishers of Honda Bay participated in the public hearings and submitted proposals for changes. They succeeded in asserting the following:

- strict prohibition/ban on commercial fishing within municipal waters
- banning of baby trawl
- substantial reduction in permit fees
- formation of resource management councils
- explicit grant of preferential fishery privileges to marginalized fishers in the locality.

Prepared by Grizelda Mayo-Anda
Institutional analysis

Definition

Institutional analysis is the identification of various resource users, stakeholders and organizations involved in community-based coastal resource management (CBCRM). It also involves an examination of the institutional arrangements, the set of rights and rules for CBCRM in a community.

An institutional analysis is usually conducted early in the CBCRM process during the planning phase. The level of detail can range from a simple description of the existing coastal resource management system to a very detailed analysis of the management system in terms of equity, efficiency and sustainability.
Purpose

- To identify existing legislation, policies and regulations for coastal resource management at different levels of government (village, municipal, district, province, regional, national, international) and community (customary, traditional).

- To identify existing property rights and tenure arrangements in order to determine who defines rights to exploit the resources, who has access to the resources, and whether any of these rights are transferable, and the identification of the rules that must be followed.

- To evaluate the existing level of involvement of resource user groups in managing resources in order to determine the ways in which user groups can participate in CBCRM.

A CBCRM program may attempt to alter existing power structures to allow wider participation in management of resources. This is a delicate process where it is essential to be aware of the existing structures and what likely effects proposed changes will have.

- To assess the mandate and structure of existing CBCRM organizations.

Requirements

Human resources

✓ government officials

✓ facilitator with expertise in political science, sociology, resource management or economics
The facilitator trains the community leaders and government officials on the purpose and methods for institutional analysis and provides guide questions for them to use in collecting information from both primary and secondary sources.

Materials

- notebooks and pens
- brown paper and colored markers

Suggested approach

1. Collect data from documents, reports and publications about coastal resource management laws, policies, regulations and organizations. Sources for these may be non-government organizations (NGOs) and research and academic institutions. Use the guide questions as a framework.
Guide questions

Stakeholders

- Who are the resource users and stakeholders?

Organizations at the local level

- What village-level organizations exist in the area?
- Which are engaged in CBCRM?
- Which are formal (legally recognized) groups, and which are informal?
- For formal groups, to which category do they belong (1) LGUs; (2) NGOs; (3) community-based organizations; (4) private interest groups and (5) others?
- What are the organization’s mandates or objectives and administrative structure?
- How long has the organization been in existence, and what is its historical development?
- Is the membership increasing or decreasing?
- What are the organization’s technical, personnel and financial resources?
- How is the organization affiliated with other organizations vertically and horizontally?
- What are the characteristics of the leadership/power structure of the group?
- How are group decisions made (consensus/majority/autocratic)?
- What is the level of representation and participation of resource users and stakeholders in decision-making?

Institutional arrangements at the local level

- What are the property rights in terms of access, management, exclusion and transfer?
- What are the formal and informal (traditional and customary) rules?
Guide questions... continued

- What are the operational rules that pertain to boundary, allocation, authority and equity?
- What are the regulatory mechanisms (e.g., quota, closed season, etc.) and incentives (e.g., taxation, licensing, etc.)?
- What are the management rules, such as adjudication and enforcement?
- How is the rulemaking body formed in terms of leadership, membership and representation?
- What are boundaries (i.e., political, gear type, traditional/customary, organizational, physical), their size/clarity, ownership, geographical coverage and changes over time?
- How are rules enforced and what sanctions are used?
- How legitimate and relevant are the rules to resource users?

Organizations above the local level

- Which organizations exist in the area above the village level?
- Which organizations are engaged in CBCRM?
- For the relevant organizations, what are the formal policies, programs, regulations, laws and legislation related to CBCRM?
Guide questions... continued

- Which are formal (legally recognized) groups, and which are informal?
- For formal groups, to which category do they belong (1) local government or other state-level bodies; (2) NGOs; (3) POs; (4) private interest groups; (5) national government agencies and other regional agencies; (6) bilateral/regional bodies; (7) international agencies and (8) others?
- What are the organization's mandates or objectives and administrative structure?
- At what level does the organization operate: (1) international; (2) regional; (3) national/central; (4) regional; (5) province/state; or (6) district/municipal/town?
- How long has the organization been in existence, and what is its historical development?
- What are the organization's technical, personnel and financial resources?
- How is the organization affiliated with other organizations vertically and horizontally?
- What is the organization's awareness of the conditions of the fisheries/marine resources?

Institutional arrangements above the local level

- How do national policies, programs, regulations, laws and legislation affect CBCRM at the local level?
- How do the other national policies, programs, regulations, laws and legislation on economic development and general public administration affect CBCRM?


2. Complement and validate the secondary data collection by collecting primary data. A variety of participatory techniques and tools can be used. These include
structured and semi-structured interviews, focus group discussion, resource mapping, historical timelines, flow patterns, case studies and venn diagrams. Again, the guide questions should serve as a framework.

3. Collect and sort the data, focus on the relationships between and among the various institutional arrangements and organizations involved in CBCRM.

4. Identify complementarities, conflicts, overlaps and gaps in the institutional arrangements and organizations which support or hinder effective CBCRM at various levels of government and within the community.

5. Identify what is needed to support CBCRM, such as new regulations, new organizations and enforcement mechanisms.

6. Recommend strategies for implementing patterns of relationships in space, time, flow and decision using various tools such as transects, maps, timelines, venn diagrams and matrix.
Note
Institutional and organizational arrangements can change and should be analyzed over time.

Example

Matrix of nested organizations for coastal resource management in Binunsalan Bay, Philippines

<table>
<thead>
<tr>
<th>Administrative level</th>
<th>Government agency</th>
<th>Local government unit</th>
<th>Non-government organization</th>
<th>People's organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>Department of Environment and Natural Resources</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Provincial</td>
<td>Provincial Environment and Natural Resources Office</td>
<td>Provincial Government (Palawan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal</td>
<td>Community Environment and Natural Resources Office</td>
<td>Municipal Government (Puerto Princesa City)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village</td>
<td>Village Council (MangroveSda)</td>
<td>- Ligaya ng Buhay - Binunsalan Bay Foundation, Inc.</td>
<td>- Christian Multi-purpose Cooperative - Charity Women's Association - Fisherman's Ministerial Fellowship</td>
<td></td>
</tr>
</tbody>
</table>

7. Analyze rules.

There are three levels of rules which are very closely linked and need to be clearly identified during the analysis.

- **Operational rules** govern and regulate the day-to-day decisions and operations of the resource user concerning when, where and how to harvest the resource.
Management rules are used by resource users and government to formulate and change operational rules, deal with conflicts, enforce decisions, and detect and sanction against rule violation.

Legal and policy rules establish the process for resource management. Legal and policy rules include, for example, the national fisheries policy and legislation which establishes a national fisheries agency. National laws and policies are translated into management rules, which in turn are further translated into operational guidelines. In other words, the rules affecting operation are made within a set of management rules that are themselves made within a set of legal and policy rules.

8. Validate.

It is important for the community members and government officials to participate in validation of the institutional analysis to ensure accuracy and to fill in any data gaps. This can be done through meetings with key leaders, focus group discussions, and/or with the community as a whole.
9. Produce the final report. Following is the suggested outline.

- Background/Rationale for Institutional Analysis
- Objectives of Institutional Analysis
- External Institutional and Organizational Arrangements (national, provincial, district, municipal)
  - policy, legislation, regulation, programs
  - government administrative agencies (mandate, functions, structure, objectives)
  - non-government organizations (mandate, functions, structure, objectives)
  - services
  - nested relationships
- Community Institutional and Organizational Arrangements
  - stakeholders
  - community organizations (mandate, functions, membership, structure, resources)
  - boundaries (political, physical/natural, gear, customary, fishing spot)
  - property rights/tenure arrangements
  - rules: formal/informal; operational, collective choice, constitutional
  - decision making and conflict resolution
  - monitoring and enforcement
  - nested relationships
- Analysis and Diagnosis
  - Institutional analysis of the coastal resource
  - Management systems
  - Pattern analysis (Space, time, flow, decision)
- Summary and Recommendations
Output

★ A report containing descriptions, maps and figures that analyzes the formal and informal coastal resource management systems that operate in the community. The outputs are of use to resource users, stakeholders and government for dialogue and debate about coastal resource management and CBCRM.

Venn diagram showing nested arrangements for different levels of fishing rules in the Philippines

![Venn Diagram](image-url)
Strengths

- Depending upon the level of detail generated, the institutional analysis provides information which may not otherwise be available or commonly understood by the community and government.
- Can be conducted in a relatively short time period (one or two weeks) and at a low cost.
- Provides an opportunity for resource users to share their knowledge and understanding about resource management and use.
- Allows for the synthesis of bio-physical, socio-economic and institutional information about coastal resource use and management.

Limitations

- Institutional analysis can be relatively complex. Due to this complexity, it requires a trained facilitator to undertake the analysis.
- The analysis requires an understanding of informal rights and rules at the community level. The team members must be able to probe deeply to get this type of information in an accurate manner.
Example

In San Miguel Bay, Philippines, an institutional analysis identified coastal resource use patterns and both formal and informal management systems. Weaknesses were identified in the formal management system of the government because the various municipalities surrounding the Bay were implementing fisheries management regulations in different ways and there was no coordination of management. This resulted in use conflicts and overexploitation of the fishery. Recommendations were made to develop a Bay-wide management council to coordinate management systems and improve overall enforcement. The San Miguel Bay Management Council was established. Fisher organizations were directly involved in the management council providing for a participatory and "bottom-up" management system.

References


Building partnerships in CBCRM

Definition

Building partnerships in community-based coastal resource management (CBCRM) is a process that seeks to mobilize the resources and energies of various players towards achieving the strategic goal of CBCRM, i.e., to empower coastal communities in managing and developing their resources. The process is integrative because it seeks to bring together various groups with diverse roles to work for a common goal.
A partnership can be forged between two or more parties which could include people's organizations, government organizations and non-government organizations. Depending on the partnership's basis of unity, it could extend membership to other interest groups.

**Purpose**

- To create a development environment that is supportive of the principles and processes of CBCRM. The partnership can be a venue to scale-up programs and push for local policy reform.
- To foster dialogue and understanding among various sectors of the community and bring them to a consensus on certain principles, issues and resolutions relating to a particular resource or the coastal environment in general.
- To build on the unique strengths of various organizations toward the achievement of a common goal.

**Possible approach**

Partnerships can be built around a single activity or issue or around strategic concerns like managing and developing a whole coastal zone. It could be short-term, or it could be developed and nurtured for a long period of time, for as long as the principles and/or programs that unite the partners hold true. The nature of the partnership can also evolve and change through time.

In the Philippines, partnership building is usually initiated by a non-government organization or a community-based organization.

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The approaches to building partnerships in CBCRM can be as diverse as the characteristics of the development environment are in a particular area. It can also be very flexible depending on the creativity and sensitivity of the people initiating the partnership.

Following are the basic steps in initiating the partnership. However, the life that the partnership will take on after the initial steps will largely depend on the partners themselves.

1. Identify key development players or stakeholders in the community.

These are persons or institutions whose interests and actions significantly affect a particular resource. These development players could include members of the fishing community, the local government unit, the local government agencies, the business community, the academe, religious organizations and other non-government institutions present in the area.
2. Gather background information on identified potential partners.

Identify their interests/agenda, strategies, key persons, strengths and weaknesses, and their relationship to other players. Identify ways to relate with these persons or groups. This can be done by using the venn diagram, stakeholder analysis or institutional analysis methods. A cultural analysis can also be conducted to get an insight into the dynamics and relationships of these groups.

3. Conduct a dialogue with each of the potential partners.

Explain the vision, goals strategies and processes of the organization you are involved with. Discuss with potential partners the prospect of getting together with other institutions and involving them in the program. This will give an idea on how receptive these potential partners are to the proposed program.

4. Convene key development players for an initial consultation-workshop.
The initial meeting could be an introduction of each of the organizations and their programs and projects in the community. Develop a matrix of programs and efforts to show who does what in the area. This can help partners identify common programs or projects. Solicit feedback from the participants about their interest in joining the partnership.

5. Conduct a strategic planning workshop.

The strategic planning could start with an environmental scanning or local situation of the coastal environment. Let the participants identify issues and problems and analyze them. It is important that participants agree on a common framework or set of principles with which to analyze common issues and then eventually agree on the solutions. Strategies could be identified to address these issues. Ask them to formulate a detailed plan of action afterwards. Each partner should identify their roles and possible contributions to the plan.
6. Set up a coordination mechanism.

A coordination or partnership mechanism could then be set up. The partners should agree on how they should organize themselves.

One possible set-up is to form a council where representatives from each partner organization is represented. The council serves as the policy and decision-making body of the partnership. The council should elect a convener and could be rotated among the partners. The partners should also formulate and agree on a set of operational systems or policies like regular meetings, funds management, process of decision-making (e.g., by consensus), supervision of the secretariat, roles of partners, etc. These could be stipulated in a formal document or memorandum of agreement (MOA) which will be signed by all partners. The MOA can also contain the partners' basis of unity, strategies and plan of action.

A secretariat that will help in convening and monitoring the operations of the partnership can also be formed.

7. Conduct a ritual of commitment sharing.

The consultation workshop could close with a ritual of commitment sharing and signing of memorandum of agreement or terms of reference defining the partnership's basis of unity, roles and commitment of each partner.
The ritual could be done in the context of a celebration or launching of a program highlighted by the signing; or in a gathering of all the partners and their constituents in a simple ceremony.

**Strengths**

- Serves as a venue to scale-up programs and push for local policy reform.
- Fosters dialogue and understanding among various stakeholders in the community.
- Mobilizes the resources and energies of various stakeholders towards achieving a strategic goal.

**Limitations**

- Sometimes, in an effort to involve all sectors, the composition of the partnership becomes too big to manage.
- Because partners are considered on equal footing, decision-making takes longer.
Because partners come from diverse orientations and have their own interests and agenda, facilitation and management of the group can be difficult.

**Tips**

- A partnership must always be anchored on agreed principles, if not a common vision.

- A principled partnership is built on mutual respect and trust. This has to be very clear at the onset of establishing the partnership.

- The community-based organization (CBO) as the initiator of the partnership must achieve a certain degree of organization and readiness when getting into a partnership with government and other institutions. One of the purposes of entering into partnership is to influence the local policy environment so that the interests and the CBCRM agenda of fishing communities are promoted and their gains protected.

The CBO leaders must have a CBCRM/development agenda and must possess skills in communication and negotiation. They must also be ready to assume responsibilities.

- Key in keeping the partnership operational is the secretariat. It is important that the NGO/CBO representatives in the partnership take part in secretariat work, if not lead it.

- The partnership must sustain itself. Partners, however, may be asked to contribute or help raise resources at the start for meetings and common activities.

- The PO and NGO partners must always involve the government partners in their activities to facilitate regular information exchange, orientation and education and community building among the partners.

- It is preferred that decisions are made by consensus to ensure the support of every partner.

Compiled by Marie Grace Madamba-Nuñez

Participatory Methods in Community-based Coastal Resource Management
Media advocacy for coastal communities

Definition

Media advocacy is a way of raising environmental issues and concerns affecting coastal communities using the trimedia: print, television and broadcast.

Purpose

- To get the attention and support of government, non-government organizations (NGOs) and other concerned and interested agencies, e.g., for fisheries policy reform.
• To obtain financial support (for rehabilitation or conservation).
• To raise public awareness.

The media

At present, there are three popular sources of public information: the print media (local, national and international newspapers; newsletters; pamphlets; leaflets), broadcast media (both local and national radio stations), and television (both national and international networks).

Requirements

<table>
<thead>
<tr>
<th>Human resources</th>
<th>Materials needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ community leaders</td>
<td>✓ manila paper and pentel pen</td>
</tr>
<tr>
<td>✓ development worker</td>
<td>✓ camera</td>
</tr>
<tr>
<td>✓ writer/artist</td>
<td>✓ typewriter or computer</td>
</tr>
<tr>
<td>✓ photographer</td>
<td>✓ ballpen and notebook</td>
</tr>
<tr>
<td>✓ media contacts</td>
<td>✓ tape or video recorder, if available</td>
</tr>
</tbody>
</table>

Suggested approach

1. Identify issues that need mass media projection. These issues usually need immediate and/or strategic action (e.g., poaching of foreign vessels, occurrence of events
such as fish kill and advocacy for a new fisheries code). Refer to topic on problem ranking.

2. Agree on the media campaign objectives and level-off expectations. Identify desired tangible outputs and the desired impact or effect.

3. Identify the target audience for the campaign or advocacy.

Mang Jose saw the degradation of the marine ecosystem due to blast fishing and wanted the government to enact local legislation strengthening the local enforcement agency and increasing the penalty for such illegal acts.
4. Identify the best media form to use: print, broadcast or television or combination of the various forms. The choice should depend on the target audience for advocacy and the popularity (with higher audience reach) in the community.

5. After selection of the appropriate media, the following strategies can be done.

<table>
<thead>
<tr>
<th>Print</th>
<th>Broadcast</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔ press releases</td>
<td>✔ submit taped interviews</td>
<td>✔ prepare/submit video documentary</td>
</tr>
<tr>
<td>✔ exposé</td>
<td>✔ conduct radio hopping with a trained spokesperson</td>
<td>✔ guest in talk shows</td>
</tr>
<tr>
<td>✔ news stories</td>
<td></td>
<td>✔ air views in public affairs shows</td>
</tr>
<tr>
<td>✔ feature articles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✔ letters to editors</td>
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</tr>
</tbody>
</table>

Strategies applicable to all media forms

✔ press conferences
✔ networking with media personalities or media groups
✔ preparation and distribution of press kits (data gathering, writing, photo/video documentation)
✔ media liaison work

6. Discuss the campaign strategy with the community.

7. Gather data to substantiate the campaign or media advocacy. To validate information, consult with other agencies such as government bureaus and non-government organizations. Obtain facts and figures from

Caution

There must be a consensus from the community on what information it wants to release to the media. Also, be cautious about naming names.
them. Get some ideas and examples from reading materials: literature, books, newspapers. Gather as much information as possible and compile them properly. Be discreet in handling confidential information.

8. Prepare campaign materials to be sent out to the media offices. Whoever should write the story for press release must be skilled on how to do it. If there are some issues and concerns which need more scientific explanation, contact an expert on the subject matter.

The community decided to expose their plight by writing press releases. Some were assigned to write while others did the lay-outing and packaging of materials into popular forms (e.g., comics).
9. Submit campaign materials to the media offices. Submit the story to newspapers (local or national) which can advance the community's concern.

Furnish copies to radio stations. For a national publication, include two or more pictures and a letter explaining the content of the press release. Be sure to select the people who should receive the report.

Write to an international publication or ask a television crew to visit the place and ask them to make a special report on the community's plight. Submit articles during special events like Earth Day celebration, Environment Month, Clean-up the World Day, etc.
10. Follow up articles and campaign materials. Be sure to keep the issue "burning". Should the issues and concerns be solved, make another write-up and share it to media again. In this way, people who are following the story will know the result of the advocacy.

![Image](image_url)
The problem of the community was given prominence when the issue hit the headlines of a national daily.

11. Continuously monitor the issue and the campaign. Make sure people who are following the story know the result of the advocacy. Let them know if the objectives were met and what the gains of the campaign were.

![Image](image_url)
The government responded by sending an official to see the problem. The community shared the problem to the visiting official and together they tried to solve the problem.
12. Inform the people of the follow-up action or strategy

Caution

In countries where media is restricted, the community must be aware of the implications of their statements and must be ready for possible consequences of their actions.

Other options

Call for a press conference.

If the community has friends from the media (newspaper, radio, and/or television), ask them to attend a media briefing you will conduct with the community.

Write to the editors.

Send an original copy of the letter. Photocopies or carbon copies are almost always rejected by the editors. In addition, write to the municipal and provincial officials, congressmen, and other lawmakers about the community's plight.

Make your own newsletter.

This will serve as historical record and it can be mailed to people who have the same concerns as yours. A leaflet may also be prepared.

Conduct radio visits or call radio stations to air news reports.
Tips in media advocacy

- Provide answers to the what (event, issues, concerns), where (place), when (date), why (the importance), whom (people) and how (procedure).
- Organize a pool of writers and campaign strategists.
- Conduct training/crash course in media work (newswriting, feature writing, photography).
- Organize volunteer writers from the community.

Strengths

- Popularizes an issue, which adds pressure on local decision makers.
- Empowers community members by teaching them to expose issues and defend them publicly.

Limitations

- Needs skills in advocacy/media work.
- Requires a wide network.
- Some forms of media such as video, may be expensive or too technical to be conducted without external assistance.

Prepared by Henrylito D. Tacio
Logbooks

Definition

A logbook is a way of recording information in an informal manner. It involves recording entries by date into a notebook. The information may be general or very specific, depending on the need of the coastal community. These needs may be identified using other methods such as a seasonal calendar.

Purpose

- To provide a way in which the community can keep their own records according to their own criteria of importance. There should be a specific reason for starting the logbook, e.g., a visitors book for marine reserve. Once started, the logbook can then be expanded to cover other issues.
To provide chronological records that may be useful for establishing trends or documenting events such as violations of local ordinances. It is ideal for recording irregular/unpredictable events like disasters.

Logbooks can also be used to substantiate advocacy campaigns.

Requirements

Human resources

Whoever is interested from the coastal community should have access to the logbook. A caretaker may be identified to care for and maintain the logbook. To ensure that everyone is able to have access to the logbook, the caretaker role may be rotated among different people. The logbook may be kept at the house of a local fish vendor or the caretaker.

Materials

✓ logbook (a bound book with lines, preferably with at least 100 pages) with pencil attached
✓ simple format for recording entries

Use pencil so that if the book gets wet the text will not blot. A plastic cover can also help.
Possible approach

1. Hold a group discussion to introduce the concept of a logbook. Discuss where the community sees a need to collect information or to monitor different activities.

Examples of information that can be recorded: floods, health, typhoons, siltation from rivers, enforcement schedules and notes, unusually high fish catches, introduction of new fishing gears, mangrove rehabilitation.

2. Discuss how these different events/activities can be best recorded in the logbook. Give guidelines. Record the following information:
   - date and time;
   - type of activity;
   - details of the activity;
   - who made the observation and/or recording (optional).

3. Emphasize that some activities are best recorded using a standard format, e.g., for sightings of endangered species.

<table>
<thead>
<tr>
<th>Date: 19/3/96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: Mid morning</td>
</tr>
<tr>
<td>Location: Natanco Island</td>
</tr>
<tr>
<td>Name of animal: Dolphin</td>
</tr>
<tr>
<td>Description: big fin, 1 1/2 m. long, gray with white belly</td>
</tr>
<tr>
<td>Number of animals: 2 adults (adults/young)</td>
</tr>
<tr>
<td>Activity: Feeding</td>
</tr>
<tr>
<td>Recorder: Teddy Lacerna</td>
</tr>
</tbody>
</table>
4. Give examples of information that can be recorded like fish catch, illegal activities, unusual sightings, natural calamities and introduction of new fishing gear.

5. Give an idea on how the book can be divided into sections, for example: bird observations; general comments; visitors’ comments; fish catch monitoring notes and schedules; and mangrove monitoring notes.

<table>
<thead>
<tr>
<th>Illegal fishing activity monitoring data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barangay: Recorder/Observer:</td>
</tr>
<tr>
<td>Municipality: Province:</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>Petsa</td>
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</tr>
</tbody>
</table>

6. Encourage the community to regularly review and discuss the information recorded in the logbook. This can be done at monthly meetings and will help maintain the interest in recordkeeping.

Remember
If groups outside the community need information from the logbook, photocopy it, do not remove the logbook from the community – it is theirs. If you need to borrow the logbook, return it within the day.
Output

★ Chronological record of events and selected information.

Example

A community in Marinduque, Philippines, identified encroachment of commercial fishing vessels as a major problem. They were already conducting municipal fish catch monitoring using a logbook and they expanded the use of this logbook to record illegal fishing activities. The information was used for advocacy initiatives to gain support from the local authorities in stopping illegal activities. The outside project management also used the information to gain additional support for enforcement, e.g., funding for a patrol boat.

Strengths

• It is not highly structured, technical or costly.
• It provides written record for future reference.
• It is ongoing.

Limitations

• Does not record highly detailed or technical data.
• Difficult to sustain continuous recordkeeping.

Compiled by Karen Vidler
Making and using case studies

Definition

A case study is a story line approach to document projects, processes and events.

Purpose

Through making a case study, people are able to analyze their programs and also learn techniques for communicating this to outsiders. Communities with experience in community-based coastal resource management (CBCRM) possess valuable knowledge that should be shared using popular methods where applicable.

Case studies can be used:

- To ensure similar fishing communities who are planning to use CBCRM are aware of the issues they may encounter and those already involved can share experiences with each other.
• To provide insights to trainee fieldworkers about community dynamics and how this affects the success of projects.

• To confront sectors that use the same coastal waters, e.g., commercial fishers, shipping operators and tourist resort owners with the perspective of small-scale fishers. This can be the start of a dialogue on how coastal resources can be shared and protected.

• To raise awareness of development issues with a variety of sectors, e.g., school children.

• As a means of fund-raising or finding other support.

Case study 1. In Sandingan, Loon, Bohol, Philippines, a high school student wrote a play script about a case of illegal fishing where the fishers were caught using dynamite and ended up in prison. With very limited funding from a local organization, the drama was presented to over 300 people at the local fiesta (community celebration). Local leaders, fishers and many other people attended the drama and so became aware of the dilemmas involved. Particularly effective was a scene that showed how distressed a fishers family was when he was arrested and imprisoned. The drama was video documented and is now used as a training tool with fishers in the whole of Bohol.
Making a case study

Requirements

Human resources
✓ facilitator
✓ a group of willing participants with a story to tell
✓ if relevant, a resource person who can advise on video film making or recording, comic strip production, scriptwriting for short plays.

Materials
✓ notebook
✓ pen
✓ materials gathered from previous CBCRM methods, e.g., maps, transects
✓ camera/video camera/tape recorder (optional)

Suggested approach

This takes from a few hours to several days.

1. Select an appropriate area or project site. A case study is best done when the project you want to focus on is nearing completion or completed, or after the event you want to document has just happened.

2. Invite the whole community to be involved in the process to get the widest range of views. If any key informants cannot be present, try to interview them separately.
3. Decide as a group the focus of the case study. Ask the following important questions:

Important questions to ask are:
- Are we going to cover our whole program or just part of it?
- What do we want to use the case study for?
- Who will use it? What information will they need?
- What are the main points we want to draw out from our experiences?

4. Put together all the information needed. This can be an occasion to look again at previous research and consider how the program has evolved. Decide if any new research is needed for a more complete picture.

Caution
If the case study touches on controversial issues, be aware that you may be placing individuals or whole communities in difficult or even dangerous positions. Make sure the participants understand the implications of putting their views 'on record'. Also, be careful of libel; if you are going to make an accusation in a case study, make sure you can back it up with evidence.
5. Work with the participants in producing an outline of what has happened. This usually leads to heated debate as people usually have very different interpretations of the same events.

Try to draw out the views of all the participants (refer to topic on brainstorming). Reaching a consensus can be a lengthy but enlightening process. You might want to highlight the differences of opinion in your case study but be careful that the main point is not lost.

Caution

Making a case study can open 'a can of worms' since it may lead to the community identifying new problems.

6. Once you have a basic story line, discuss what medium it should be presented in, e.g., written, video, drama, comic strip, photo essay or story (a series of photos with captions and speech bubbles). You might be able to draw on familiar legends and use dance, theatre or mime.
7. Make the case study. Try to ensure it 'flows' and that it has a strong start (refer to topic on using media for advocacy). A possible presentation for the case study is considering the following flow:

- Introduction (remember your likely audience - how much background information will they need?)
- How the project was implemented
- Results
- Conclusions

Bear this in mind:

- Do not gloss over what went wrong in the project as this can often provide the most useful insights for those using the case study. Include accounts of problems encountered and how these were overcome.
- A bit of humor will go a long way in making it popular, so try to incorporate amusing anecdotes - and visual humor if making a video or play.

The case study will probably have to go through various drafts so that people can give their comments on it.

8. Leave copies of the case study in the community, credit their involvement and keep them informed of how the case study is being used and what the feedback has been.
Case study 2. An NGO in Baguio City, Philippines, works with community-based organizations on the coast and in the surrounding Cordillera mountains, and wanted to produce case studies that would help their organizations understand how all their livelihoods were interlinked. For example, tailings from mines in the mountains were polluting the coastal fishing areas, forcing fishers to migrate to the mountains in search of work in vegetable gardens.

The first case study was done with a fishing cooperative in La Union. At a community meeting, the history of the coop was discussed, leading to much debate. That night, one of the field workers produced a rough comic strip of the story for feedback from the others. The final comic strip was made by an artist in Baguio, drawing caricatures of the members of the people’s organizations based on photographs. Copies were printed for all the organizations. The fishers were pleased to see their story put into such a professional format. However, on appraisal, it was realized that it would have been better for the artist to have gone to La Union and worked with the community to produce the final comic strip, so that they would have learnt these skills.
Using case studies

Requirements

Materials

✓ papers
✓ pens
✓ if appropriate, props for drama, a video player, materials for CBCRM tools

Suggested approach

Before the session:

1. Choose a case study that is appropriate to your audience and will prompt the kind of discussion you plan to have. You may want to adapt a case study to make it culturally-relevant. Do not be tempted to change too much otherwise all the details that make it real will be lost.

2. Familiarize yourself with the case study. Write discussion questions and try answering them yourself.

Caution

Some case studies can trigger strong emotions. Be aware of how participants might be likely to react to the case study you have chosen.
3. Make sure that any equipment required is working and you know how to use it.

During the session:

1. Present the case study. If it is a written one, it may be best to hand out copies to all the participants but also ask someone to read it out loud.

2. Ask the participants to divide up into small groups of three to six and spend about 30 minutes discussing the case study, using a list of questions as a guide. People will be more confident about speaking in these small groups. Ask them to write all their comments down on a large piece of paper.
Possible questions

- What is the case study about?
- How were the main difficulties in the project resolved? Would you have resolved them differently?
- How did the personalities of the people involved and their relationships to each other effect the success of the project?
- Were the views of any groups of people left out from the case study?
- What did the case study not tell you, i.e., where were the gaps?
- What do you think will happen next in the program? (you could give participants just part of the case study, ask this question, and then later show them the rest to see how their answers compare to what actually happened.)
- How does the case study relate to experiences in your own work or life?

3. Ask the small groups to report back to the rest of the group. Take one idea from each group at a time for the others to discuss.

4. Ask the participants to further explore the case studies through activities. For example:
   - Rewrite the case study from the perspective of one of the people featured.
   - Have a 'live debate' where participants take on the role of different characters in the case study and discuss the program from their perspective.
   - Perform a drama to explore a particular issue raised, e.g., the role of women in fish marketing.
• Produce a 'people sculpture', where participants use their bodies to produce a sculpture that symbolizes the main message of the case study, e.g., the need to work together. This is a useful way of summing-up.

A people sculpture to show cooperation

• If the case study has sufficient detail, it could be used in a training session for the fieldworkers to practise using CBCRM tools - e.g., producing a timeline - before going into the communities.

If you are holding a work-related training session over several days, it can be useful for participants to bring their own mini-case studies to the training and present them. They can then share and get advice on their own on-going projects. Make sure they are sent advice on how to make the case study and how long it should be.
Case study 3. In Bien Unido, Bohol, Philippines, a three-year coastal resource management project was just about to phase out. The CBCRM team went to the area for five days to make a case study of the whole process and analyze where to go next. They asked the fishers cooperative to decide how they should document the project. The case study was done as a video, which was shot over three days with the different groups in the cooperative involved in the whole process. Every night, the day’s shooting was played back to the community with over 100 people attending. The resulting video is now used as a potent tool with other communities in the area. The project team was also able to analyze the key strengths and weaknesses of the project and to use these lessons in program management and development. It is now used by the local community as an introduction for other visiting groups.

Strengths

- Case studies provide a permanent record of a project.
- The story format is a popular means which people can empathize with more easily compared to program reports.
- They present issues and problems in a social context and so are suitable for exploring those dynamics between people that are important in determining whether a project will succeed or fail.
• They can be a useful tool for learning new skills, such as documenting, writing, video-making, drama and comic strip techniques.

• They can be the impetus for forming networks between communities. The next stage could be a site visit or study tour (refer to topic on study tours).

• They can be used to provide some distance in discussing sensitive issues, e.g., illegal fishing or wife battering. This way the issue can be raised without having to discuss specific cases and people in the community.

**Limitations**

• Case studies only give a small snap shot of reality. They highlight certain issues and ignore others that might have had a strong influence on the project but were ‘invisible’ to the case study makers, e.g., that they live in a municipality where the local government is supportive of environmental projects.

  The presence of an ‘outside’ facilitator can help give a wider perspective, but there is the risk that they will impose their perspective too much on the narrative.

• They are about a specific program and specific site and so the study may not be so relevant to other areas or different projects.

• The format does not lend itself to incorporating quantitative data. One solution to this is providing supporting documents containing the ‘hard facts’.

*Prepared by Stuart Greene and Cathy Rosario*
Process documentation research

Definition

Process documentation research (PDR or process documentation) is a learning tool designed to capture project dynamics and experiences that cannot be collected by standard monitoring and evaluation. It focuses on the means or processes used by organizations rather than the outputs or ends (measured against objectives or targets as in typical evaluation) alone. It also attempts to identify the role of external factors that affect project results.
Process documentation relies primarily on direct observation, semi-structured interviews, focus group discussions and community and project validation of written reports. A third party — who is external to the facilitating organization and the local community - conducts the process documentation. The results are validated by the project and community and fed-back into the project to improve it.

PDR, therefore, asks not "what" the project achieved but examines "how" the achievements were reached.

**Purpose**

- To help organizations understand "why" certain approaches (e.g., CBCRM or tripartite partnership) are useful.
- To help organizations systematically examine how certain approaches can be improved.
- To document the effectiveness of “participatory” and “people-centered” processes. Especially, if the processes are likely to be replicated elsewhere.

For example, many organizations in the Philippines are promoting a tripartite partnership (a partnership among community-based organizations, local government units and non-government organizations) approach to CBCRM.

- To examine the value of certain processes (e.g., participatory approaches) independent of overall project success or failure.
Requirements

Human resources

✓ project staff of CBCRM initiative (i.e., implementing organizations)

✓ project partners/beneficiaries

✓ process documentation field staff

Materials

✓ agreements with implementing organizations and project beneficiaries

✓ mutually agreed upon process documentation framework (see Table 1)

✓ notebook

Suggested approach

1. Select the project and the particular process or approach to be analyzed. This may be identified in advance or requested by a donor or an organization with the financial resources and interest to conduct process documentation.

2. Identify a project team and develop a PDR framework. The PDR team can be single, individual or a small group. Each site requires a minimum of one field researcher. The PDR framework should help focus the attention of the PDR field staff and provide a systematic way of identifying, documenting and analyzing the process under study.
Sample PDR framework

The PDR framework is a guide for the PDR staff and for the implementing organization. It provides general instructions on how the PDR staff will operate and what he or she will focus on. It helps to ensure consistency in the process of direct observations made by the PDR staff.

Below is a sample PDR framework.

1. Describe the planned activity.
2. Describe the expected outputs.
3. Describe the actual activity and how it differed from the plans.
4. Describe the processes used in implementing the activity.
5. Describe the immediate outputs of the activity.
6. When possible (usually at a later date), describe the impacts of the activity.
7. Describe the factors that influence the immediate outputs.
8. Answer the following questions:
   a. How did the tripartite relationship and community organizing process contribute to the immediate outputs?
   b. What was the source of information?
   c. How was the information collected?
3. Conduct an orientation with the implementing organization and project beneficiaries. This orientation is crucial to establish a friendly working relationship with the implementing organization and local community. It should be emphasized that the PDR is not a project evaluation but a process designed to help improve the project for the benefit of both the implementing organization and the community.

4. Integrate the PDR field staff into the activities of the project to allow observation and documentation of project activities. This will include the use of direct observation, focus group discussions and semi-structured interviews.

5. Ask the PDR field staff to analyze the observed activities by considering how the process or approach used benefited or hindered the activity.
This is the most important and difficult step of process documentation research. The PDR field staff must be experienced enough to recognize the differences between the process or approach under study and other common approaches. He or she must be able to distinguish between the effect of the active application of the process under study and the effect of external factors. Finally, the PDR field staff must be able to clearly document and defend his/her observations during subsequent validation meetings.

6. Conduct regular (e.g., monthly) validation meetings with the implementing organization. Even the most meticulous and consistent observers will miss or misinterpret some aspects of project implementation. Regular validation meetings will promote goodwill between the field researcher and the staff of the implementing organization.

7. Conduct quarterly validation meetings with the implementing organization and project beneficiaries. The meetings will highlight the lessons learned over the period and be presented to help improve the project.
Allow the implementing organizations and community representatives to assess the observations and lessons of the PDR field staff. It is preferable to let the implementing organization and community arrive at possible options to improve the project based on their interpretation of the PDR observations. The PDR field staff should help facilitate this process.

PDR process

Identification of project and "process" to be studied

Identification of PDR team and development of the PDR framework

Orientation and levelling of expectations with implementing organizations and selected project beneficiaries

Implementation of PDR activities

Improvement in project processes

participant observation, informal interviews, (within both individuals and groups), review of project-related documents

Project modifications

Recommendations

Validation meetings

Reports
Outcomes

★ Written quarterly reports which include insights for consideration by the implementing organizations while the project is still ongoing.

Sample output of quarterly reports submitted to implementing organizations

The following passage from a quarterly report done by the PDR research assistant examines "stakeholders" external to the tripartite relationship under study:

1. A third factor that may make or brake the PO-LGU-NGO partnership is the pressure coming from the players outside the tripartite partnership. These players include the commercial fishing vessel operators, non-PO members and the media.

Example:

"The case of the barangay captain (village leader) owning a commercial fishing vessel is seen as a "conflict of interest." But, would the same barangay captain still a threat to the tripartite partnership if he was to abide by the existing laws and agreements reached in the tripartite (relationship) related to the CBCRM agenda?"

2. The non-PO members are not so much a threat to the tripartite relations but (more of a threat) to the efforts (in the field) of the tripartite (members) in CBCRM (activities).

Example:

"There was one incident of that a (non-PO member) was apprehended by the members. The case filed against him was entry to the area designated as fish sanctuary."

3. The "Bantay Radyo" program is a positive contribution of the media in strengthening partnership relations relative to the CBCRM agenda. But there are also cases where the media may, unconsciously, be a threat "to the partnership".

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Example

"The research assistant shared with the group (local people's organization) a new clipping. He read in the local newspaper an article that said the shoreline from Brgy. Cabacungan to Brgy. Candugay in the Philippines is declared a fish sanctuary."

The article led to a discussion among the PO about the accuracy of the article's content and the need to have better linkages with the local media to ensure accuracy in such articles.

Based on the observations and analysis above, the PDR research assistant posed the question to the implementing organization: How should the tripartite partnership address these other stakeholders? Should they become a formal part of the relationship or should special arrangements or channels be made to improve communication and coordination?

★ A final summary report that provides more general insights into the process under study (see examples below)

Sample output of a PDR report examining the "Tripartite Approach" to CBCRM in the Philippines

As stakeholder groups, the government organizations (GOs) continue to be perceived as bureaucratic and politically-motivated; the non-government organization (NGOs) as imposing; and the people's organizations (POs) as passive. As such, projects are often directly between POs and NGOs or POs and GOs and seldom between GOs and NGOs. Project communities, therefore, tend to see GOs and NGOs as largely fund sources or conduits. The GO-NGO cooperation is often indirect, resulting from the implementation of PO-GO or PO-NGO project initiatives or because of protocol, or it being perceived as the ideal thing to do. Nevertheless, the project experiences also show that many of the negative institutional biases may be turned around by finding key individuals to sponsor good initiatives. And before this is misconstrued as the extension of personal favor, some thinking needs to be done to see how a partnership works that is completely built around roles and structures and never personified through individuals in those roles and structures.
Strengths

- Provides an outside view of how processes or approaches influence or affect a particular project.
- Helps identify areas for project adjustments in midstream e.g., during the process of project implementation.
- Goes beyond monitoring and evaluation of project ends (results) and examines the role of project means (processes) as well as external forces.
Limitations

• An additional cost to the project.

• If the PDR orientation or implementation is not done carefully, it can lead to animosity between the field researcher and the implementing organization.

Variation

• Another approach is to let the community conduct PDR, or ask a nearby community to do PDR, after proper training on PDR has been conducted.

Prepared by Gregory Ira and Ric Armonia
Cross-cutting themes
Building on indigenous knowledge

Definition

Indigenous knowledge (IK) refers to information, practices, beliefs, tools, skills and institutions that local people have developed over time and continue to develop. It is usually based on experience, tested over long periods of time, adapted to local conditions and continuously evolving.

Indigenous knowledge is not limited to information. It is not confined to tribal or indigenous groups or even rural areas. Other names for indigenous knowledge as described above include “local knowledge,” “indigenous technical knowledge” and “traditional ecological knowledge.”
One way of increasing people's participation in CBCRM is by starting with what they know and building on what they have. This is the basis for recognizing and using indigenous knowledge in development work and natural resource management.

New or alternative livelihood or conservation projects are attractive and often conveniently pre-packaged, but are commonly not appropriate for local conditions nor are they sustained after the life of the project. It is more realistic to assess existing practices and promote those that are found to be effective and, when possible, improve them by introducing external knowledge (refer to topic on participatory technology development and dissemination).

**Forms of indigenous knowledge**

Indigenous knowledge can take many forms. Recognizing and giving value to these forms of indigenous knowledge will increase your understanding of local practices and can increase the participation of local people in development activities. Common forms of indigenous knowledge are described below.

The forms of indigenous knowledge are separated and categorized here to help the reader understand them better. In most cases, however, indigenous knowledge systems are holistic and these distinctions would not necessarily be recognized.
Information

Common indigenous information can range from knowing the habitat, niche and life cycle of various aquatic organisms to understanding the meaning of the underwater sound around the reefs. Indigenous indicators are an example of information that can be put to use in CBCRM activities.

Beliefs

Indigenous beliefs can be described as knowledge that may not be rationally or scientifically explained. In some cases, there are scientific explanations but the indigenous rationale for the belief is different. This includes beliefs associated with religion, world views or other apparently non-rational associations. Beliefs related to coastal resource management range widely from the worship of crocodiles to fear of aquatic omens. Beliefs may play an important role in shaping the behavior of people and should be recognized if CBCRM programs are to be accepted locally.

Tools

Tools in coastal areas can include the various forms of gear and equipment used. Indigenous tools are often made from local resources. Understanding the trends in cost and availability of the resources for local gear and tools are important considerations in CBCRM.
Materials

Indigenous materials include all the resources locally available that are put to use by local people. These may or may not be unique to the area. The use of seaweeds is an example of an indigenous material in coastal areas. In some areas, certain types of seaweeds are eaten, used for feeding fish in ponds or as a component in compost for gardens.

Skills

Indigenous skills include marine navigation, production of tools and equipment, proper preparation of fish and many others. These skills are often learned through years of experience and apprenticeship. In many cases, these skills are undocumented and lost when new technologies replace them.

Communication

Indigenous communication methods include locally recognized symbols and signs. Some communication methods are highly specialized such as communication between boatmen and divers. Communication centers or venues (such as stores, shelters, fish landings, markets, etc.) are often good locations for sharing or gathering new information.
Institutions

Indigenous institutions are social arrangements and norms that include rules and regulations. Examples include arrangements for communal work for pulling in large nets and recognizing individual or group fishing territories.

Practices and technologies

Coastal production systems display a variety of indigenous practices and technologies. These are often complex combinations of information, tools, skills, materials, and institutions. Understanding the strengths and weaknesses of these practices and technologies should be the starting point of development and natural resource management activities.

Relevant indigenous knowledge

There is indigenous knowledge related to every aspect of coastal village life. Problem identification will help focus the assessment of relevant IK. For example, if the problem is the loss of mangrove forest, then relevant knowledge may include information on appropriate species, timing and areas for reforestation.
**Purpose**

Indigenous knowledge plays a vital role in CBCRM. IK is more valuable when it is used for development or conservation rather than when it is simply documented. The recognition and use of indigenous knowledge can help improve project relevance, acceptability, sustainability and even technical and economic feasibility. The table below shows how IK can help in the four stages of the CBCRM cycle.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Role of IK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>Situational assessment requires input and analysis from local community members. Their own knowledge (e.g., information on local taxonomies) of the local economic, social and environmental setting is crucial to a clear understanding of local opportunities and challenges.</td>
</tr>
<tr>
<td>Planning</td>
<td>Planning involves timing of activities. This must take into consideration the local seasonal calendar that looks at labor availability, special events and the role of indigenous institutions.</td>
</tr>
<tr>
<td>Implementation</td>
<td>Implementation requires the active participation of community members through field testing and adaptation of improved practices. Their indigenous methods for experimentation will affect how plans get implemented.</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>Indigenous indicators of impact are often overlooked. Frequently, these involve indirect indicators. While these may be less precise than other indicators, they are often more frequently monitored as part of regular activities of local people.</td>
</tr>
</tbody>
</table>
Who knows what?

The first step in building on IK is to determine who knows what. Many projects have suffered because information regarding key activities has been gathered from the wrong people. Local knowledge can be grouped into three main categories:

- Common knowledge is held by most people in a community; e.g., almost everyone knows how to cook rice or how to swim.

- Shared knowledge is held by sub-groups within the community but not by all; e.g., women in the community may know the best methods of collecting certain shellfish at low tide or young men may be most adept at compressor diving.
Specialized knowledge is held by a few people who might have had special training or an apprenticeship; e.g., only a few villagers may know how to make boats or other specialized equipment.

There are many factors that affect who knows what in a community, including age, sex, education, occupation, length of residence and others. For more information on selecting or identifying resource persons from the community, refer to topic on key informants.

Caution

- Even local people may consider IK as “backward” and may not be forthcoming with information.
- IK changes over time; talk to young as well as older people.
- Migrant populations will have a mixture of IK. Some of the IK they possess may be based on conditions elsewhere, or adaptations.
Determining when to use IK

The decision tree below summarizes the major decisions for evaluating IK.

Step 1
Identify problem

Does IK relating to problem exist?

Step 2
Is IK effective and sustainable?

Yes → Promote IK

No → Test appropriate outside knowledge

Step 3
Can IK be improved?

Yes → Apply and promote improved IK

No → Test appropriate outside knowledge

Ownership of IK

Ownership of indigenous knowledge at the community level is usually different from legal forms of ownership like intellectual property rights. Outsiders should respect the
ownership of indigenous knowledge and consider the following points when using IK:

- Seek permission before documenting and sharing IK.
- Include local people as authors or credit them when recording their practices. Always include names, dates and places in your records and in any document describing IK of specific person or community.
- Help local people document their information, to become authors themselves.
- Record and use IK in the context of applied development projects.
- Leave copies of the outputs of fieldwork (e.g., maps, seasonal calendars) with the community.
- Make the outcome of your study available to the community (e.g., translate reports, make copies of videos, establish village-based databases, etc.)
- Help community members (or communities) copyright documents and patent technologies which are unique and promising.
- Help communities organize to determine for themselves how they wish to respond to inquiries from researchers and commercial companies. They might be able to bargain with such outsiders to ensure that they receive some benefits from sharing their knowledge.
- Know and comply with the local laws on export of artifacts and germplasm.

Prepared by Gregory C. Ira and Dipankar Saha

Participatory Methods in Community-based Coastal Resource Management
Participatory gender analysis and responsive planning

Definition

Gender analysis is a process of understanding the relationship of women and men within a coastal environment. The analysis focuses on the reproductive and productive roles of women and men and how these affect their access to and participation in the management of coastal resources. The results of the analysis can be used for developing coastal resource management plans that would be sensitive to the conditions and needs of men and women in a coastal community.
Purpose

- To facilitate the process of evoking participation of some identified men and women to identify issues and concerns that affect their participation in the use and management of coastal resources.
- To analyze gender roles and relationships in the context of their bio-physical and socio-cultural environment.
- To develop a gender responsive coastal resource management plan.

Requirements

Materials
✓ brown paper
✓ pentel pen
✓ craft paper or manila paper

Prerequisite

The facilitator must:
- have a sound grounding in community organizing and a working knowledge of coastal resource management; and
- be gender-sensitive and have a grasp of the principles/concepts of gender and development.
Suggested approach

Stage 1: Understanding how men and women perceive their environment

1. Group the men and women separately.

2. For each group, discuss the problems and issues about their bio-physical and socio-cultural environment (refer to topics on problem ranking and focus group discussions). Discuss perceived solutions.

3. Write down the results in a matrix.

4. Ask each group to share results. Note commonalities and differences in men and women in the perception of problems and solutions.

5. Synthesize major outputs.
Example

The men's group identified one problem as being the depletion of the mangroves. This was leading to them catching less fish since mangroves are an important habitat for fry. Their solution was to replant mangroves.

The women's group identified the same problem. For them, the main concerns were that without a barrier of mangroves, the beach was getting steadily eroded, so that during typhoons, houses were being badly damaged. Also, it was increasingly hard to find firewood for their daily fuel needs. Their solution was also to replant mangroves.

However, when the two groups joined together, the women were not happy about the large area the men had chosen for reforestation. In the men's view this land was not being used, but as the women pointed out, this was an important gleaning area for them, where they were able to collect shellfish for the family's meals. The women suggested instead a narrower strip of land in a place least rich in shellfish.

The output for the discussion can be used in Stage 3: Gender planning to produce a mangrove reforestation plan that is sensitive to the needs of the whole community.

Stage 2: Gender analysis

In this stage, the community members look into the gender roles played by men and women in the management of their homes (reproductive activities), their sources of income (productive activities), their participation in community activities, and their positions in terms of access and control over their resources.

1. Group the men and women separately.
2. Facilitate the participants' discussion of the various reproductive and productive activities and their respective roles.

3. Write down in matrix form (see sample output) the reproductive activities and productive activities (major activities related to fishing/farming or other sources of livelihood). Subdivide the productive activities into:
   - home-based;
   - coastal based; and
   - community management work.

4. Ask the participants to produce a chart showing how men and women spend their time in a typical day (refer to the topic on daily activity charts).

5. Ask the participants to write down their roles in accessing and controlling resources and how benefits are distributed among men and women.

6. Ask the two groups to come together to compare their matrices.

**Sample outputs**

**A. Reproductive activities and gender division of labor**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food preparation</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Child rearing</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>House cleaning</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Washing of clothes</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Repair of house</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Gathering of firewood</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The matrix shows that reproductive activities are dominantly done by women with the men sharing in firewood gathering.
Productive activities and gender division of labor

1. Home-based activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish drying</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Care of livestock</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Mending fishnet</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The matrix shows that women are more active in home-based productive activities than men.

2. Coastal-based activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Selling of fish</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Mangrove production</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Collection of shells</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The matrix shows that both men and women are involved in coastal-based activities.
3. Community management work – maintenance of the community through participation in community organizations and activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance in meeting</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Community clean-up</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Membership in community organization</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The matrix shows that both men and women are active in community management work. But discussion indicated that, often, only men join or are considered members of community organizations.

Daily activity chart

<table>
<thead>
<tr>
<th>Time</th>
<th>Men/Activity</th>
<th>Women/Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 a.m.</td>
<td>fishing</td>
<td>wake-up and prepare food for fisher-husband</td>
</tr>
<tr>
<td>5 a.m.</td>
<td>clean house and feed livestock, wash clothes and fetch water</td>
<td></td>
</tr>
<tr>
<td>7 a.m.</td>
<td>sleep</td>
<td>meet fisher husband on the shores; sort fish for vending and sell fish in the market</td>
</tr>
<tr>
<td>11 a.m.</td>
<td>prepare lunch and/or prepare leftover fish for drying</td>
<td></td>
</tr>
<tr>
<td>1 p.m.</td>
<td>mend nets</td>
<td>help mend nets</td>
</tr>
<tr>
<td>3 p.m.</td>
<td></td>
<td>tend to livestock and mangrove farm</td>
</tr>
<tr>
<td>5 p.m.</td>
<td>prepare equipment for fishing</td>
<td>clean house/surrounding, fetch water, prepare dinner and pack food for fisher husband</td>
</tr>
<tr>
<td>9 p.m.</td>
<td>fishing</td>
<td>retire to bed</td>
</tr>
</tbody>
</table>

The composite profile of time allocation of men and women in the community reveals the multiple roles women have in the maintenance and sustenance of their home combined with home-based and coastal-based productive activities.

5. Access and control over resources and benefits – productive resources such as land, house, fishing gear and equipment, tools, etc.

Access and control over resources and benefits

<table>
<thead>
<tr>
<th>Resources</th>
<th>Access</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>House</td>
<td>Men &amp; Women</td>
<td>Men &amp; Women</td>
</tr>
<tr>
<td>Fishing equipment</td>
<td>Men</td>
<td>Men</td>
</tr>
<tr>
<td>Mangrove farms</td>
<td>Women</td>
<td>Women</td>
</tr>
<tr>
<td>Income</td>
<td>Men &amp; Women</td>
<td>Men</td>
</tr>
<tr>
<td>Formal loans</td>
<td>Men &amp; Women</td>
<td>Men</td>
</tr>
</tbody>
</table>

Men and women seemingly have equal access to resources but men have more control over the resources.
Stage 3: Gender responsive planning

Based on the assumption that the participants have critically diagnosed the capacity of their resources and have analyzed gender roles, proceed now to gender-responsive planning.

1. Group the men and women separately.

2. Ask the groups to use the data they have gathered in stages 1 and 2 to identify changes they want to happen in their productive and reproductive activities.

3. Ask each group to formulate a gender-responsive plan of action (i.e., considering division of labor, multiple roles of women, equitable access and control of both men and women.

4. Ask the two groups to come together and reach a consensus on what projects/activities to prioritize (refer to the topic on preference ranking).

5. Identify government and non-government agencies that can possibly assist them in the implementation of the plans (refer also to topics on institutional analysis and stakeholder analysis).
Output

★ Sample plan of action addressing the need of both men and women

Strengths

• Highlights the unique contribution of men and women in the use and management of coastal resources.
• Highlights the often neglected contribution of women in production work.
• Increases awareness of both men and women regarding their perceived roles and relationships in the productive and reproductive spheres.

Limitation

• Discussions can be strongly influenced by cultural (e.g., religion, tradition) biases and might end up in heated discussions or debates.

Compiled by Felixberto Roquia, Jr.
Annex
Sampling equipment for quantitative methods

Tips for construction or selection, maintenance and use

Snorkeling gear

Mask
Better than home-made goggles as it is much easier to see what you are trying to measure.

Snorkel
Essential so that observers can keep their faces in the water and their eyes on the sampling area.

Fins
Allow a swimmer to propel her/his self out of danger quickly. Also encourage swimmers to keep their feet up away from corals which could be damaged during sampling.
Mask, fins and snorkel must be washed in fresh water after use, allowed to dry and stored in a dry place away from direct sunlight. To preserve rubber parts, sprinkle talcum powder for long-term storage.

Data recording

Underwater data slate

Made of white plastic or plastic-laminated wood, the slate is roughly the size of a sheet of A4 paper. It has a sharpened, soft lead pencil attached by a string. Carving a groove near the top of the pencil helps the string stay in place. Two more holes may be drilled at the bottom corners of the slate to attach a second string, so that the slate can be hung around the neck of a swimmer.

After use, pencil marks can be rubbed off the slate using toothpaste or an acidic, unripe fruit (mango, nutmeg flesh).

Manta board

The manta board can be cut out of any available wood or plywood. Data slates can be attached using screws or clips. The manta board rope is 17 m long polyethylene rope connecting the board to the boat. Attach colored markers to the rope at 6 m intervals to allow the snorkeler to record the visibility.
Finding your direction

Compass
A compass keeps a walker or swimmer moving in a consistent direction and helps you lay out a transect rope in straight line. Pick a compass that is entirely made of plastic and suitable for use underwater.

Measuring weight

Spring balance
Cheap, small, easy to carry spring balances for weighing fish are readily available but rarely very durable. Handle with care and keep as free of salt as possible. Select a balance that is in keeping with the type of fish you want to measure (i.e. a 1 kg or 5 kg balance for small fish, 10 or 25 kg balance for large fish) and also with the degree of accuracy you need. Different balances have different scales of measurement i.e., may be accurate to 100 g, 250 g, 500 g etc.

Weighing scales
Top loading weigh scales are more accurate than spring balances but are heavy and bulky and need to be kept in one place. As with all metal objects, thoroughly clean off salt after each use.
Measuring distance, depth, length and circumference

Fish measuring board

A conveniently sized (e.g., 50 cm), straight wooden board or plastic sheet with a centimeter scale either embedded or drawn with a permanent pen. A short vertical headboard allows fish length to be measured from snout to fork of tail.

Measuring stick

Wooden ruler or straight stick 2 m tall and marked at 1 cm intervals, for measuring water depth or tree height.

Tailor’s measuring tape

The measuring tape is usually 2 m in length. A tape made of plastic material is recommended for working in wet conditions. This can be used to measure the girth (circumference) of trees, depth of shallow water, length of fish or shellfish, etc.
Transect rope as a distance measurement tool

A transect rope, usually 50 or 100 m long (but can be any length that suits the purpose) is used to measure distance during a walking transect. It should be a durable but light rope, made of material that does not get tangled easily. Keep the transect rope wound onto a reel when not in use, to prevent tangling.

Selecting sampling points

Transect rope as a sampling point selection tool

When a transect rope is used to select sampling points, mark it at 1, 5 or 10 m intervals (depending on purpose), using brightly colored tape. Use a different color for each distance marker (red for 1 m, blue every 5 m, etc.). Use a permanent ink pen to write total distance on the 10 m markers (i.e., 10 m, 20 m, 30 m).

If the transect rope is to be used underwater, pick a type of rope that does not float. Otherwise you will have to attach small weights to it at frequent intervals.

Fiberglass tape measure

For some types of work (e.g., line intercept transects requiring data gathering at 1 to 10 cm intervals; detailed mapping) a 50 m fiberglass tape measure makes the best transect rope. These fiberglass tape measures come with a handy reel, are very durable and do not float.
Remember to wash your tape measure in fresh water and allow it to dry before putting it away.

**Aids for selecting random sampling points**

**Sampling rock, stick or rope**

When using a random quadrat sampling method, the idea is to select random sampling points so that all parts of the sampling site have an equal chance of being measured.

However, observer bias is hard to avoid. Some may want to measure only “nice” coral, or decide to put the quadrat over sand so that sampling can be finished more quickly. A colored rock or stick can be tossed over the shoulder to randomly select a sampling point. If the tool is likely to get lost or cause damage, a sampling rope can be used.

A sampling rope is a 25 m long piece of light rope with 3 - 5 brightly coloured markers tied or taped on. The rope is laid over the habitat to be sampled and the markers are used as sampling points.

If being used for underwater sampling, the rope should not float. If it does float, you need to attach enough small weights to it (sinkers, shells, stones) to keep it on the bottom. In this case, the weights can be used as sampling point markers.

A sampling rope is different from a transect rope. Sampling markers on the rope are not at regular intervals. The rope is
placed on the sample site haphazardly and does not have to be in a straight line. The only constraint is that sampling points should be far enough apart that there is no chance for two sampling points (quadrats) to overlap. The rope is laid down repeatedly until the desired number of samples have been collected.

**Defining the size of a sampling point**

**Quadrat**

The quadrat is a tool that consistently defines the size of the sampling point. This makes it possible to collect quantitative information of consistent quality. Data collected is in the form of number of individuals or percentage cover per quadrat.

The quadrat is a rigid square which can be made of thin iron rods, or plastic pipes drilled with holes to let water in. It is important that quadrats to be used underwater do not float, but they should also not be too heavy.

People usually find it easier to estimate percentage cover if the quadrat is divided into four, sixteen or twenty five smaller squares using stiff wire or thin metal rods. For instance, when using a 16 square quadrat, observers may wish to record the number of squares covered by each category, and then calculate the percentage cover after returning to land. For instance, if living corals occupy 10 of the 16 squares, this is the same as $\frac{10}{16} \times 100\% = 62.5\%$ cover.
Quadrats do not have to be 1 m square. The size can be adjusted to suit the size and frequency of the object being measured, e.g., quadrats measuring 0.5 m square and subdivided into 25 squares are often used for seagrass and dense shellfish populations.

If there are problems with entanglement of the quadrat with corals etc., try a two-sided quadrat or even an imaginary quadrat.

If you use several different sizes and styles of quadrat, you must be consistent about which one you use in each type of habitat.

Training tips for quadrats

When training with quadrats, practise estimating percentage cover on land (% cover of grass). Use only one category at first (i.e., % cover of living grass) then work up to being able to estimate 2, 3 and more categories inside one quadrat (i.e., living grass, dead grass, bare dirt and rocks). Work in groups to reach a common perception about percentage cover.

Observers should be encouraged to take their time and consult one another when trying to estimate cover on patchy bottom. Try to visualize picking up each separate clump of the coral, seaweed or whatever, and moving it next to a larger clump, repeating the process until, in your mind's eye, a whole section of the quadrat is filled and the percentage cover is obvious.

Permanent belt transects

An improvised permanent belt transect can be made using polyethylene rope, GI wire, a combination of both or other locally available material (e.g., vine). The rope or wire is permanently attached to the bottom, defining a rectangular
sampling site that is repeatedly monitored over time. The specific length and width of the sampling area may vary according to the need. Distance along each side of the rectangle should be marked to facilitate data gathering. If it is a 5 m x 20 m area, mark every 5 m along the long side.

Permanent belt transects or permanent quadrats (like a belt transect but square) can be set up in a variety of habitats. On solid rock bottom, the rope or wire can be secured using iron rods or large spikes hammered into the bottom. The rope can also be attached to large rocks or corals. It is important that the rope be kept straight and that it is secured at frequent intervals. Then if it breaks loose at one point, it will not whip around and get tangled in corals, etc., possibly causing damage.

Markers for permanent sampling sites

Markers attached to the bottom

Establishing permanent markers in the sea is a challenge because storm waves are very powerful and can remove many types of markers.

Permanent markers in the intertidal area should be brightly colored (orange works well), small and flat and firmly secured by a spike or by underwater cement.
Markers can also be attached to branching coral. In this case, they should be plastic, durable, light, brightly colored and loosely attached to a lower branch.

If placing a buoy to mark a sampling site, keep the following in mind:

- Local fishers must know why it is there so that they do not remove it. Try attaching a flag with a message in the local language.
- If possible, use a small float that remains submerged as opposed to a surface buoy.
- Use a floating rope to attach your buoy and keep it as short as possible. This limits the chances of entanglement of the rope with corals.
- An anchor must be big and strong enough to resist the force of waves but not so big as to be aesthetically offensive. You may have to use underwater cement to keep the anchor in place and/or hammer an attachment into the bottom.

Soft bottom plot markers

Stakes 1.5 m in length for marking survey plots in soft-bottom habitats like mangroves can be made of wood, iron bar or PVC pipes. Wood may be readily available but will not last as long. Iron is cheap and durable. PVC pipes are the most durable but relatively expensive.

Drive the stake 0.5 m into the substrate and leave 1 m sticking up above ground.
Tree markers

Metal plates can be hammered onto trees to mark permanent sampling plots. Information is written on the plate, such as the transect and plot number and tree number.

Collecting physical data

Thermometer

Thermometers for use by community data collectors should be sturdy, preferably plastic with alcohol inside as opposed to glass with mercury inside. If possible, select a model that allows a string to be attached, and keep it inside a case to keep it safe. If the thermometer is attached to a string, it can be dangled more easily over the side of a boat, raft or wharf.

Secchi disc

A secchi disk measures transparency, i.e., the distance light penetrates into the sea. The cleaner the water is, the greater the transparency.

The secchi disk can be made of plywood, wood with a surface plastic lamination, or a paint tin lid. Cut the wood into a circle or select a lid 8 inches in diameter. The circle must be painted with shiny black and white paint in a pie-wedge pattern. Drill a hole through the centre of the disk. Pass a rope through the hole and attach a lead or other weight (about 3 kg) to the lower end of the rope. Above the disk, the rope should be 25 m long and
marked at 1 m intervals with tape or by tying brightly colored string through the strands of the rope.

The disk is used by lowering it through the water over the chosen sampling site. Keep your back to the sun so that the glare on the water does not interfere with your eyesight. Watch the disk as it drops through the water, counting off each meter of rope as it enters the water. When the disk disappears, stop counting and record the number of meters depth. Slowly pull the rope in, counting backwards until the disk becomes visible. Record this depth too. The transparency (depth at which the secchi disk can be seen) is recorded as the average of the two measurements.

Data analysis

Calculator

Pick one that is cheap, durable and simple. Look for a dual energy source model (battery and solar).

Prepared by Irene Novaczek
Livelihoods

People in coastal communities undertake a mixture of occupations, means of food production and other activities in order to provide food, shelter, health, education and spiritual enhancement. For some purposes, natural resources available locally are used through fishing, farming, and forestry. In other cases, products or services must be sold to purchase necessary material goods and services.

The options for productive activities for coastal communities are limited, particularly for poor communities that do not have the means to go far to sea or to access nearby productive farm land. If options were available, inventive people would have pursued these already. Nevertheless, there is a need to explore new opportunities provided by successful community-based coastal resource management (CBCRM) within the context of establishing greater access and control over coastal resources. When this is achieved, it is assumed that this would bring about greater food security and increase in income.
There are two generally recognized categories of interventions that could help raise productivity in coastal communities: one, to improve the natural environment; and two, to develop enterprises.

The former is often considered as conservation, enhancement and rehabilitation while the latter is often referred to as livelihood. However, these activities are closely interlinked: one is either dependent or greatly affected by the other.

For example, an improved mangrove forest through restriction of cutting or through reforestation will lead directly to improved fish catch, resulting in increased income and food security. On the other hand, income and food from an aquaculture enterprise reduces the need for fish from the sea and can lead to environmental rehabilitation.
The word "livelihood" is used often and in many ways: alternative livelihoods, supplemental livelihoods and sustainable livelihoods. In many uses, the term livelihood has primarily an economic focus. It should however look beyond economic activities and include quality of life measures, means of providing sustenance, shelter, health and satisfaction. If the development workers' role is to facilitate the improvement in quality of life, they should always maintain this broader perspective.

<table>
<thead>
<tr>
<th>Some recognized definitions of livelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Livelihoods can include a level of wealth and of stocks and flows of food and cash which provide for physical and social well-being. This includes security against sickness, against early death and against becoming poorer (Chambers, 1993)</td>
</tr>
<tr>
<td>Livelihoods: are the means, activities and entitlements by which people make a living (N. Singh)</td>
</tr>
<tr>
<td>• Sustainable livelihoods is a balance between economic efficiency, ecological integrity and human well-being, including equity considerations. Sustainable livelihoods are derived from people's capacity to access options and resources and use them to make a living in such a way as not to foreclose options for others to make a living, either now or in the future. (N. Singh).</td>
</tr>
<tr>
<td>• A sustainable livelihood includes reserves which can be used to meet contingencies of sickness, accidents, losses, sudden or major social needs, and so on. (Chambers, 1993).</td>
</tr>
</tbody>
</table>

Rehabilitation and conservation projects affect resource users (e.g., gleaners in intertidal area, fishers) in such way that often these users must withdraw from using a particular resource they depend upon for livelihood, in order to conserve that resource or allow time for regeneration and ultimately greater and more sustainable yields.
Decisions on which conservation or livelihood activities to pursue can be made using some of the tools in this sourcebook. Other information will be needed in some cases, such as market data, and will have to be obtained with other methods.

Remember

This book is not intended to provide details of the technical or procedural aspects of such interventions. Advantages and disadvantages of various livelihood projects are discussed. Other information (e.g., site suitability, markets, infrastructure and required skills) to be considered during planning and implementation of livelihood projects are also outlined. This information could be useful when initially reviewing options for a specific area.

Following is a table of livelihood projects that can be considered in exploring options for the development of enterprises for coastal communities.
# Livelihood projects

<table>
<thead>
<tr>
<th>Livelihood</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aquaculture</strong></td>
<td>• Income may be expected within 6 months</td>
<td>• Juvenile collection may cause stock depletion</td>
<td>• Appropriate conditions (protected cove) in site selection</td>
</tr>
<tr>
<td><strong>Fish cage culture</strong></td>
<td>• Capital investment may be low</td>
<td>• Must have calm waters</td>
<td>• Brackish water for some species</td>
</tr>
<tr>
<td></td>
<td>• Technology simple and ecologically-sound</td>
<td>• Labor-intensive</td>
<td>• Tenure/access rights to area</td>
</tr>
<tr>
<td></td>
<td>• Potential for live market</td>
<td>• Risk of losing fish to theft or storms</td>
<td>• Availability of feed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Knowledge and skills in managing project</td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Grouper grow-out in cages</td>
<td>• One of the most commercially-important species</td>
<td>• Gathering stock from natural habitat might cause depletion</td>
<td>• Seawater</td>
</tr>
<tr>
<td></td>
<td>• High market price especially for live market</td>
<td>• Often calm water conditions are not available</td>
<td>• Sheltered area (protected against waves)</td>
</tr>
<tr>
<td></td>
<td>• Capital investment is not large</td>
<td>• High labor input to clean cages</td>
<td>• Regular cyanide testing (if possible) to discourage use of poisons</td>
</tr>
<tr>
<td></td>
<td>• Technology is simple and ecologically-sound</td>
<td>• Risk of losing fish to theft</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Risk of losing fish to a typhoon/storm and large waves</td>
<td></td>
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<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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</tr>
<tr>
<td>Oyster/mussels culture</td>
<td>• Low investment</td>
<td>• Possibly moderate/low demand</td>
<td>• Site sheltered from waves</td>
</tr>
<tr>
<td></td>
<td>• Low labor input needed</td>
<td>• Perishable</td>
<td>• Site without pollution</td>
</tr>
<tr>
<td></td>
<td>• Simple technology</td>
<td>• Vulnerable to theft</td>
<td>• Local seed source</td>
</tr>
<tr>
<td></td>
<td>• Uses local and cheap materials</td>
<td>• Red tide</td>
<td>• Good water flow</td>
</tr>
<tr>
<td>Seaweed culture</td>
<td>• Short growth cycle</td>
<td>• Grazing by fish may be high</td>
<td>• Good water flow</td>
</tr>
<tr>
<td></td>
<td>• Seed for next cycle can be gathered from harvest</td>
<td>• Market may demand high quality</td>
<td>• Brackish to full seawater</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Some buyers only take large lots</td>
<td>• No history of disease in site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fluctuating price of some species</td>
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<tr>
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</tr>
<tr>
<td>Mud crab fattening</td>
<td>• High market price</td>
<td>• Collecting stock may deplete supply</td>
<td>• Brackish water site</td>
</tr>
<tr>
<td></td>
<td>• Short cycle</td>
<td>• Availability of feed</td>
<td>• Muddy bottom or cages</td>
</tr>
<tr>
<td>Sea urchin culture</td>
<td>• Low cost</td>
<td>• Possible shortage of seed</td>
<td>• Hard bottom, marine site</td>
</tr>
<tr>
<td></td>
<td>• High market price</td>
<td>• Vulnerable to theft</td>
<td>• Seaweed as reed</td>
</tr>
<tr>
<td></td>
<td>• Little or no negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>environmental impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea cucumber</td>
<td>• Low cost</td>
<td>• Growth may be seasonal</td>
<td>• Soft bottom site</td>
</tr>
<tr>
<td></td>
<td>• No feed added</td>
<td>• Seed may not always be available</td>
<td>• Sheltered site</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Good water flow</td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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<tr>
<td>Sea ranching</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Abalone</td>
<td>• Slow moving</td>
<td>• Few successful demonstrations</td>
<td>• Hard bottom marine site</td>
</tr>
<tr>
<td></td>
<td>• High market value</td>
<td>• Seed supply may not always be available</td>
<td>• Availability of feed</td>
</tr>
<tr>
<td>Giant clam</td>
<td>• Low maintenance</td>
<td>• Seed supply may not always be available</td>
<td>• Reef area</td>
</tr>
<tr>
<td></td>
<td>• No feeding</td>
<td>• Vulnerable to theft</td>
<td>• Tenure and security</td>
</tr>
<tr>
<td></td>
<td>• Promotes conservation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquaculture sales and service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collection of fish seed to stock ponds (e.g., milkfish and <em>Chanos spp.</em> )</td>
<td>• Part-time</td>
<td>• Demand limited or seasonal</td>
<td>• Near the shore or brackish water area</td>
</tr>
<tr>
<td></td>
<td>• Whole family can participate</td>
<td>• May lead to depletion of stocks</td>
<td>• Appropriate transportation facilities</td>
</tr>
<tr>
<td></td>
<td>• Low investment</td>
<td></td>
<td>• Permit might be needed</td>
</tr>
<tr>
<td></td>
<td>• High profit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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<td>-----------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Livelihood</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Food processing</strong></td>
<td>• Adds value to local resources</td>
<td>• Requires training and ongoing management and quality control</td>
<td>• Resources in excess of local food demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Caution: Do not turn a women's family food resource into a men's cash crop)</td>
</tr>
<tr>
<td><strong>Drying/salting</strong> of fish</td>
<td>• Reduces perishability</td>
<td>• May promote an unsustainable fishery</td>
<td>• Knowledge/skills in drying/salting</td>
</tr>
<tr>
<td></td>
<td>• Good fish processing alternative during peak season of fish catch</td>
<td></td>
<td>• Constant supply of fish</td>
</tr>
<tr>
<td></td>
<td>• Also good for home consumption</td>
<td></td>
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</tbody>
</table>

(Caution: Do not turn a women's family food resource into a men's cash crop.)
<table>
<thead>
<tr>
<th>Livelihood</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoked fish production</td>
<td>• Increases value of product&lt;br&gt;• Reduces perishability&lt;br&gt;• Also good for home consumption</td>
<td>• Gathering firewood for fuel to smoke fish can damage the environment</td>
<td>• Firewood</td>
</tr>
<tr>
<td>Pickle making</td>
<td>• High market price of product&lt;br&gt;• Reduces perishability&lt;br&gt;• Home consumption&lt;br&gt;• Absorbs excess from fresh market</td>
<td>• Not all species are suitable for pickle-making</td>
<td>• Quality and sanitary control&lt;br&gt;• Supply of fish, clams, mussels, etc.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Marketing chain business development</td>
<td>Livelihood</td>
</tr>
<tr>
<td>------------</td>
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<td>--------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Fermented fish processing</td>
<td>Market seasonality</td>
<td>Avoids market intermediary</td>
<td>Fermented fish processing</td>
</tr>
<tr>
<td>Increases shelf life</td>
<td>Makes use of local materials</td>
<td>Fish reaches market faster, in better condition</td>
<td></td>
</tr>
<tr>
<td>Makes use of local materials</td>
<td>Value added product</td>
<td>High investment</td>
<td></td>
</tr>
<tr>
<td>Value added product</td>
<td>Good for home consumption</td>
<td>Moderate risk of loss</td>
<td></td>
</tr>
<tr>
<td>Good for home consumption</td>
<td>Requires skilled labor</td>
<td>Ice-box</td>
<td></td>
</tr>
<tr>
<td>Requires skilled labor</td>
<td>Requires hygienic environment</td>
<td>Skilled labor needed</td>
<td></td>
</tr>
</tbody>
</table>

**Livelihood**

- Fermented fish processing

**Marketing chain business development**

- Avoids trader/middle person

**Disadvantages**

- Market seasonality

**Requirements**

- Quality control
- Processing plant or kitchen
- Storage facility
- Skilled labor
- Requires hygienic environment

**Advantages**

- Increases shelf life
- Makes use of local materials
- Value added product
- Good for home consumption

**Transportation of fresh fish**

- Fish reaches market faster, in better condition

**Livelihood**

- Fermented fish processing
<table>
<thead>
<tr>
<th>Livelihood</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basket making</td>
<td>• Home made&lt;br&gt;• Local demand/use</td>
<td>• Labor intensive&lt;br&gt;• Limited demand</td>
<td>• Supply of materials&lt;br&gt;• Skills</td>
</tr>
<tr>
<td>Live fish capture and sale</td>
<td>• High priced product (aquarium fish, restaurant trade)&lt;br&gt;• Can promote conservation</td>
<td>• High technical skills needed&lt;br&gt;• High risk for fishers&lt;br&gt;• Potential use of destructive methods&lt;br&gt;• Potential depletion of stock</td>
<td>• Storage and shipping&lt;br&gt;• Infrastructure&lt;br&gt;• Quality control&lt;br&gt;• Market&lt;br&gt;• Skills in proper methods</td>
</tr>
</tbody>
</table>

**Fishery supply and service**

<p>| Selling of fuel for outboard engines | • Local fuel depot makes supply system more efficient | • High investment&lt;br&gt;• Potential environmental hazard | • Storage space&lt;br&gt;• Business skills |</p>
<table>
<thead>
<tr>
<th>Livelihood</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat making</td>
<td>• Uses local resources and labor</td>
<td>• Materials used might be gathered illegally</td>
<td>• Special construction skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Might need permit from local government (e.g., gathering wood)</td>
</tr>
<tr>
<td>Net making/net mending</td>
<td>• Uses traditional skills</td>
<td>• Limited demand for handmade nets</td>
<td>• Net making/mending skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Investment needed</td>
<td></td>
</tr>
<tr>
<td>Salt making</td>
<td>• Used for fish processing</td>
<td>• Highly perishable</td>
<td>• Appropriate storage facilities</td>
</tr>
<tr>
<td></td>
<td>• Maximizes use of local skills</td>
<td>• Needs wide space/land for salt drying</td>
<td>• Market/users of iodized salt</td>
</tr>
<tr>
<td></td>
<td>• Low investment</td>
<td></td>
<td>• Land area</td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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</tr>
</tbody>
</table>
| Selling refreshments to fishers at landing sites | • High demand  
• High profit | • Seasonal activity depending on seasonality of fish catch | • Basic infrastructure (e.g., movable kiosk)  
• Initial investment of income |
| Community cooperatives              |                                   | **Management skills critical**                      |                                        |
| Small shop/kiosk                   | • Profits go into revolving funds for small business development | • Have to train managers  
• Need starting capital | • Site  
• Small building  
• Supply of goods for sale |
| Fish marketing cooperative          | • Cuts out the middle trader  
• Increased profits to producers | • Needs long time to develop | • Storehouse/ice plant  
• Good location/strategies |
<table>
<thead>
<tr>
<th>Livelihood</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community-based ecotourism</td>
<td>• Local control spreads the wealth from tourism&lt;br&gt;• Communities become active participants, instead of tourism objects</td>
<td>• Tourists bring garbage&lt;br&gt;• Tourists may not be culturally sensitive or have a negative cultural impact</td>
<td>• Site&lt;br&gt;– Natural attraction (reef, forest, wildlife)&lt;br&gt;– Good transportation and accomodation facilities&lt;br&gt;– Clean, modern sanitary facilities&lt;br&gt;– Clean drinking water</td>
</tr>
<tr>
<td>Rental of tourist cottage</td>
<td>• Cottage can be built from traditional materials (sago, bamboo, wood)</td>
<td>• Needs starting capital&lt;br&gt;• Needs secure place to store passports, valuables</td>
<td>• Has to be near an attraction&lt;br&gt;• Clean, safe, attractive</td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Tourist homestay/bed and breakfast</td>
<td>• Home renovation benefits family as well as guests</td>
<td>• Capital investment can be high or low</td>
<td>• Clean, safe, comfortable, friendly accommodation</td>
</tr>
<tr>
<td></td>
<td>• Visitors experience local family life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation park</td>
<td>• Can be used by locals as well as visitors</td>
<td>• Requires consistent management and care</td>
<td>• Clean, safe, attractive environment</td>
</tr>
<tr>
<td></td>
<td>• Source of municipal pride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guided tours (walking, snorkeling)</td>
<td>• Draws on traditional knowledge</td>
<td>• Need to be able to speak tourist's language, e.g., English</td>
<td>• Well planned trails/routes</td>
</tr>
<tr>
<td></td>
<td>• Promotes interest in local history, culture and ecology</td>
<td></td>
<td>• Well marked trails and routes</td>
</tr>
<tr>
<td>Livelihood</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td>Requirements</td>
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<td>------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Fishing trips</td>
<td>- Uses local skills and knowledge and existing infrastructure</td>
<td>- Language skills</td>
<td>- Safe, well maintained boat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Investment in equipment</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Fishing boat hulls can be refurbished for ecotourism, reducing investment cost</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Uses local skills, knowledge</td>
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<tr>
<td></td>
<td></td>
<td>- Need to be able to speak tourist’s language</td>
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<tr>
<td>Boat tours, canoe rides, glass bottom boat rides</td>
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</tr>
<tr>
<td></td>
<td>- Low investment cost</td>
<td>- Needs good marketing and coordination</td>
<td>- Safe, well planned, convenient place</td>
</tr>
<tr>
<td></td>
<td>- Features local fresh fish, shellfish</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Can be very simple</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Can incorporate local songs, story-telling, theatre skills</td>
<td></td>
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<tr>
<td>Organized fish/lobster feasts on beach</td>
<td></td>
<td></td>
<td>- Clean, attractive beach with cooking area, picnic tables, etc.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Livelihood</td>
<td>Requirements</td>
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<tr>
<td></td>
<td>Food stall/restaurant</td>
<td>• Attractive location close to tourist attraction or accommodations</td>
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<td></td>
<td></td>
<td>• Clean place and amenities</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Friendly staff</td>
<td></td>
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<tr>
<td></td>
<td>Handicraft production</td>
<td>• Skills for making a craft</td>
<td></td>
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<td></td>
<td></td>
<td>• Needs training, skills</td>
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<td></td>
<td></td>
<td>• Needs dedication</td>
<td></td>
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<td></td>
<td></td>
<td>• Needs capital to buy materials</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Needs market training</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Can overexploit certain resources (e.g., wood)</td>
<td></td>
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<tr>
<td></td>
<td>Non-marine based crafts/souvenirs</td>
<td>• Can raise awareness of marine conservation/advocacy for conservation, protection, sustainable development</td>
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<tr>
<td></td>
<td></td>
<td>• Can be long lasting</td>
<td></td>
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<td></td>
<td></td>
<td>• Lucrative and rewarding</td>
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<td></td>
<td></td>
<td>• to pride of workmanship</td>
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<td></td>
<td></td>
<td>• Needs market</td>
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<td></td>
<td></td>
<td>• Can raise awareness of marine conservation/advocacy for conservation, protection, sustainable development</td>
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<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>Livelihood</th>
<th>Requirements</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>• Need to be able to communicate with visitors</td>
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<tr>
<td></td>
<td></td>
<td>• Needs local skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Opportunities for women</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Can be very simple</td>
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<tr>
<td></td>
<td></td>
<td>• Need to communicate with visitors</td>
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<td></td>
<td></td>
<td>• Need quality control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Needs training skills</td>
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<tr>
<td></td>
<td></td>
<td>• Needs market</td>
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<tr>
<td></td>
<td></td>
<td>• Can overexploit certain resources (e.g., wood)</td>
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<td></td>
<td></td>
<td>• Attractive location</td>
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<tr>
<td></td>
<td></td>
<td>• Can be close to tourist attraction or accommodations</td>
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<td></td>
<td></td>
<td>• Clean place</td>
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<td></td>
<td></td>
<td>• Friendly staff</td>
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<td></td>
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<td>• to pride of workmanship</td>
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<td>• Needs market</td>
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<td></td>
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<td>• Can raise awareness of marine conservation/advocacy for conservation, protection, sustainable development</td>
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Livelihood projects
<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture/land-based</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable production</td>
<td>• Can be grown in small areas</td>
<td>• May demand scarce fresh water</td>
<td>• Garden around the house</td>
</tr>
<tr>
<td></td>
<td>• Increases variety of diet</td>
<td></td>
<td>• Access to planting materials</td>
</tr>
<tr>
<td></td>
<td>• Continuous supply of food</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simple technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bio-intensive backyard gardening</strong></td>
<td>• Simple technology</td>
<td>• Requires land area</td>
<td>• Should be done around the house</td>
</tr>
<tr>
<td></td>
<td>• Increases food security</td>
<td>• Labor intensive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hygienic waste disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Whole family can be involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Increases variety of diet</td>
<td></td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Small livestock (pigs, chicken, ducks and goats)</td>
<td>- Varied diets</td>
<td>- Requires feeding</td>
<td>- Kept around house</td>
</tr>
<tr>
<td></td>
<td>- Can be integrated with crops</td>
<td>- Veterinary needs</td>
<td>- Technology/skills needed (control of diseases, housing, feeding, management)</td>
</tr>
<tr>
<td></td>
<td>- Local breeds easily adapt to the area and conditions</td>
<td>- Some animals are very sensitive to climate, disease, etc.</td>
<td></td>
</tr>
</tbody>
</table>
Glossary

This glossary is designed to provide both general definition of terms used in the sourcebook as well as special forms of usage that have been adopted for this particular publication.

A

ancestral waters marine areas claimed by indigenous peoples as having been part of their territory since time immemorial

approach a systematic strategy or methodology for addressing a development or conservation concern

For example, community based coastal resource management is an approach to addressing integrated conservation and development in coastal areas.

artesinal fisheries usually small-scale, local, subsistence fisheries conducted by individuals or small groups

assessment a review or informal evaluation of a selected condition

associated species living things (e.g., plants, animals) that are commonly found or interact with a given organism, habitat or ecosystem

B

baseline information usually the first measurement of an indicator taken at the beginning of a project and used to compare with subsequent measures taken after some intervention has been implemented
biases a prejudiced outlook of an individual or group of individuals based on a perspective or pre-conceived notion that does not fairly represent the larger population.

biodiversity  the variety of living things found in a given area

This includes the variety of genes (i.e., genetic diversity), the variety of species (species diversity) or the variety of ecosystems (ecosystem diversity). In addition, the variety of functions (e.g., producers, consumers and decomposers) and the variety of cultures or cultural diversity (e.g., distinct ethnolinguistic groups) are also considered part of biodiversity.

buffer strips lengths of land or water that serve to provide protection to an area in need of protection from some external threat

For example, a five-meter wide strip of land running alongside a river may serve as a buffer strip to prevent surface erosion from entering the river.

buffer zone an area of land or water that serves to provide protection to a conservation area (usually surrounding it) designated for protection from some external threat

For example, an area one hundred meters wide surrounding a marine sanctuary that may have some regulations regarding productive activities.
case study  a short description of a particular project, situation or condition that serves to communicate key messages to the reader

Case studies are commonly used to document experiences and share them more widely through training or workshops.

community  an association of people living in a given area or sharing some general commonality in addition to geographic proximity

An ecological community refers to an association of plants and animals living in a given ecosystem.

comparative information  data that relies on other data as a point of reference (i.e., relative measures) and that cannot provide a precise measure of accuracy in and of itself

For example, trend analysis may indicate that fish yields are decreasing every year, but will not necessarily provide the absolute figures for yield for each year. Similarly, local preferences may rank choices by comparison and not necessarily by some independent quantitative measure. This information may be all that is necessary to initiate some action, in other cases, more absolute information may be required.

consensus  agreement by a large majority of a population or group

It is considered ideal when the entire population or group is in agreement.

conservation  the maintenance of careful regulation of a resource or area through sustainable use
The term conservation has been commonly and mistakenly been used as a synonym for preservation which refers to strict protection of a resource or area.

**coping mechanisms** ways in which individuals, households or groups adjust to or deal with difficult or changing conditions

For example, during periods of peak labor requirement, children may be taken out of school to provide additional labor. For projects, coping mechanisms may refer to ways in which project staff address problems that may impede the implementation of planned activities.

**customary laws** rights, regulations and norms that have been established over time and are generally accepted by a group as a framework for governing social behavior

Contrast with State law, which refers to an official legal system of a nation.

**cross-check** a way of ensuring accuracy of data collection by comparing information on a given subject from one source or method with information on the same subject from another source or method

**cyclical periods** specific lengths of time that are established by naturally occurring cycles or rhythms

For example, the length of time required for the earth to make one complete revolution (orbit) around the sun is referred to as an annual or solar cycle. Depending on latitude and regional climate, this will result in regular seasonal patterns. Similarly, the length of time required for the moon to revolve (orbit) the earth is referred to as a lunar cycle. This cycle influences tides and associated phenomena.
emphasize the ability to understand the feelings of another person or group by trying to put oneself in the position of the other person and feel the emotions from this perspective

enhancement the improvement of some condition based on a human perspective of what constitutes improvement

fish fry recently-hatched fishes

gender "the socially constructed roles and responsibilities of women and men, in a given culture or location" (CEDPA/Gender and Development Training Manual, 1996)

gender analysis "an organized approach for considering gender issues in the entire process of program development" (CEDPA/Gender and Development Training Manual, 1996)

gender and development an approach which seeks to empower women and transform unequal relations between women and men" (CEDPA/Gender and Development Training Manual, 1996)

genera plural form of genus which is a category or level used to classify living things according to biological and structural similarities and differences

gleaners individuals or groups that collect or harvest resources from the wild without cultivation or propagation
indicative data  data that implies, demonstrates or suggests a certain condition
For example, the existence of coral rubble in a circular pattern is indicative data suggesting the occurrence of dynamite fishing.

indicator species  a specific organism that implies, demonstrates or suggests a certain condition
For example, the occurrence of large numbers of crown of thorns starfish.

indigenous knowledge  information, practices, technologies, beliefs, tools, materials, experimentation, skills, pedagogy, communication systems and other social systems or institutions that people in a given group, community or area have tested, adapted and continue to adapt over time

indigenous taxonomies  systems and categories of organizing or associating living and non living resources
For example, local groups will classify or categorize soil, fish and other resources into locally-recognized groupings.

informal community organizations  organizations that are not officially registered or recognized by national or local governments

informant  a person who provides information

intertidal zone  the area between above the lowest low tide mark up to the point where tidal influence continues (commonly the highest high tide mark) or slightly beyond
J

juveniles  fish or aquatic organisms usually characterized by the incomplete development of reproductive organs

L

legend  a description of symbols or abbreviations used on a map

letter-petition  a formal and organized request for change or action by preparing a letter of request and having it signed by a large number of people who support the specific contents of the letter

local ecological knowledge  refer to indigenous knowledge

logbook  a notebook used to record in chronological order the events considered important based on local needs and preferences

M

manta tow  a shallow water survey method that employs towing a swimmer behind a boat by a length of rope with a wooden board at the swimmers' end that is used for stability, maneuverability and recording observations

marine reserve  an area of ocean protected from specified or all uses for any number of reasons including unique biodiversity, its support as habitat for local fisheries, educational purposes, rehabilitation and resoration

marketing  the entire process of identifying, creating addressing and supplying the demand for any given product

This may involve market research, product development, pricing, advertising and determining methods of sales.
media any or all of three forms of information dissemination: 1. print (e.g., newspapers), 2. audio (e.g., radio) and audio-visual (e.g., television)

media campaign a systematic effort to use the media to gain support for a particular position or objective

medium a channel of communication or information dissemination (refer to media)

methodology a general approach or framework that employs a related collection or body of methods consistent with the overall approach

For example, CBCRM can be seen as a methodology.

methods a systematic procedure employed to achieve a certain objective

For example, participatory methods are procedures that follow certain guidelines to maximize participation, minimize bias, ensure validity and balance precision with time and effort. The methods described in this sourcebook make use of more specific tools such as matrices or diagrams and are part of a larger methodology.

monitoring the process of measuring changes in specific indicators at regular intervals over time

morphology relating to the shape (i.e., form or structure) of an organism

numeric data information presented in quantitative form or using numbers
organization a group or association of people bound by a common interest

paralegal a person with training in the law but not licensed to practice the law officially

permanent belt a permanent transect distinguished by two parallel lines

point of first sale the site at which a product (e.g., marine resource) is first transferred from the person who caught or produced the product to a person who pays for the product

preservation the strict protection (i.e., no use) of all resources (living and non-living) in a defined area

process a predetermined and systematic series of steps, actions or operations used by an individual or group to achieve specific objectives and move toward a general goal

productive roles the activities, responsibilities and expectations of an man or woman related to providing the basic economic needs of a household (e.g., food production, wage employment, etc.)

property rights the official or legal interest of an individual or group to access or control a certain area of land or water or resource

protected area the generic term used to describe an area of land or sea that is governed by some form of protection from use or degradation

This may be in the form of conservation or strict preservation.
Q

quadrats  a rectangular plot or frame used to assist in the measurement and study of ecological conditions

R

rehabilitation  the process of improving the conditions of an area of land or sea so that they are more favorable to conditions suitable to humans

reproductive roles  the activities, responsibilities and expectations of a man or woman related to the care and maintenance of the household (reproduction, child care, education, health, home maintenance, security, etc.)

respondent  a person who provides information to another person often through completing a survey questionnaires but also through participating in group discussions or participatory methods of analysis

restoration  the process of returning a given area of land or sea as closely as possible to the specific conditions (i.e., specific species, relative abundance; etc.) that existed in an earlier time

S

sanctuary  an area of land or sea that is often governed by strict protection (i.e., no activities or resource use allowed) often placed within a larger marine reserve

spatial  related to geographic area

For example, spatial tools look at where things occur in a given area or in relation to each other. Compare with temporal tools which means having to do with or related to time.
spawn  the production or deposition of eggs or young of aquatic organisms

species  a category of formal scientific biological classification that describes organisms that are biologically and morphologically similar and capable of interbreeding

stakeholder  usually groups of individuals – within a larger population (e.g., community) - that share a common interest, perspective, worldview or background

temporal  related to time

For example, a time line is a temporal tool that looks at the significant events in the history of community.

tenure  the right to access or control over a resource or area of land or sea

terrestrial  related to land as opposed to sea

tools  specific analytical techniques (matricies, diagrams, transects) that assist in the collection and analysis of data

For example, a matrix is a tool that can be used for participatory livelihood analysis which is a participatory method and is part of an overall methodology that is community-based coastal resource management.

triangulation (validation)  the process of confirming, validating, or improving the precision of data by seeking separate and independent confirmation of the data

Triangulation can be done by using different methods to collect the same data or seeking different respondents or both.
**triangulation (geographic)** the process of determining or locating a specific point on a plane using landmarks to determine the intersection of two lines

**transect** a length of land or sea – usually a straight line – that is used as the basis for sampling plants, animals or other indicators of interest using various sampling techniques

\( V \)

**village assembly** a meeting open to all residents of a village for the purpose of sharing views and disseminating public information

\( W \)

**watchdog groups** informal groups or formal organizations that serve to monitor activities related to a particular issue

For example, a small group of residents may form a group to monitor the occurrence of illegal fishing operations in sanctuary.

**watershed** an area of land that shares a common point where water drains – usually to the ocean

Watersheds are commonly divided into functional (although arbitrary) sections such as upland, lowland and coastal ecosystems. Another functional grouping looks at catchment areas, service areas and drainage areas.
zoning  the process of determining and assigning specific purposes, uses or regulations to specific portions of land or sea in order to optimize land-use

For example, a zoning plan for a bay may be developed to ensure the optimal and equitable allocation of space for often competing uses such as aquaculture, recreation, transportation, conservation or preservation, etc.
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