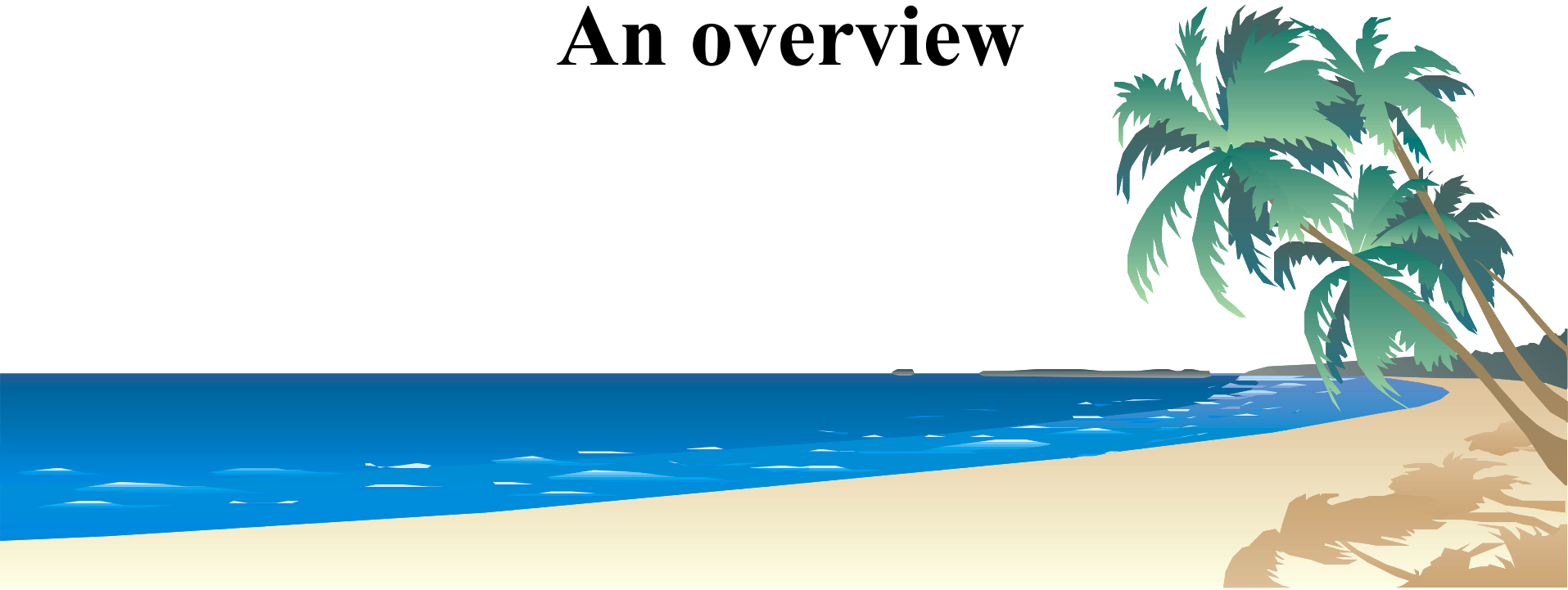
Lecture/Discussion #1:

The coastal and marine ecosystems: An overview



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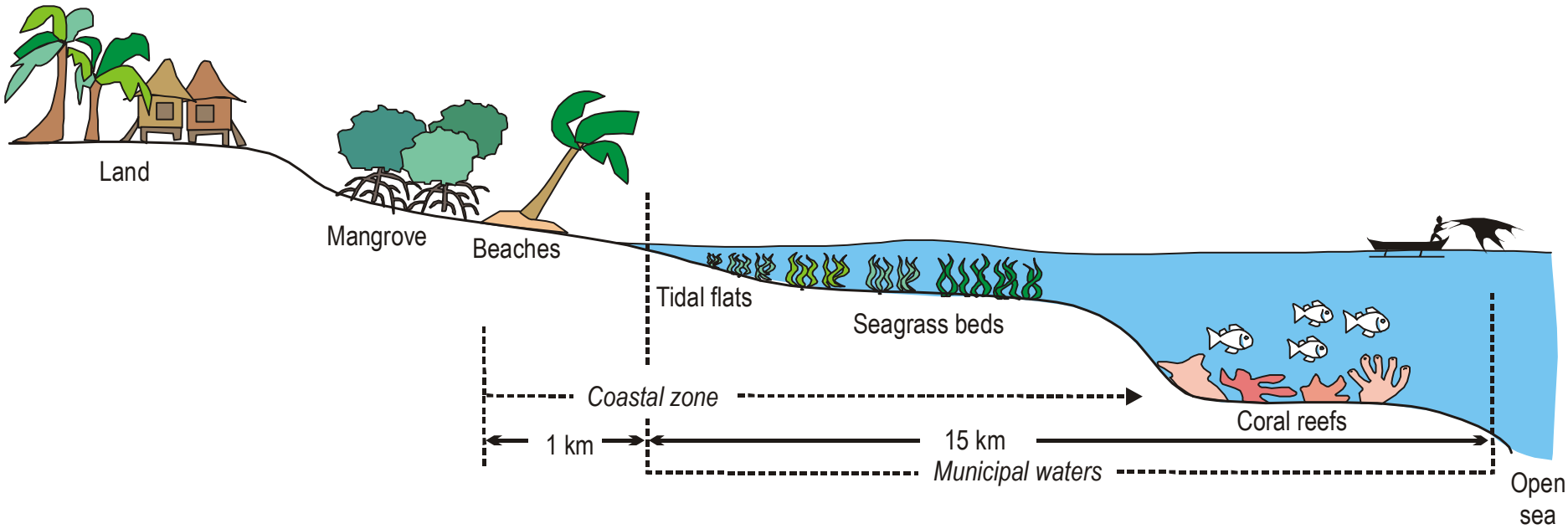
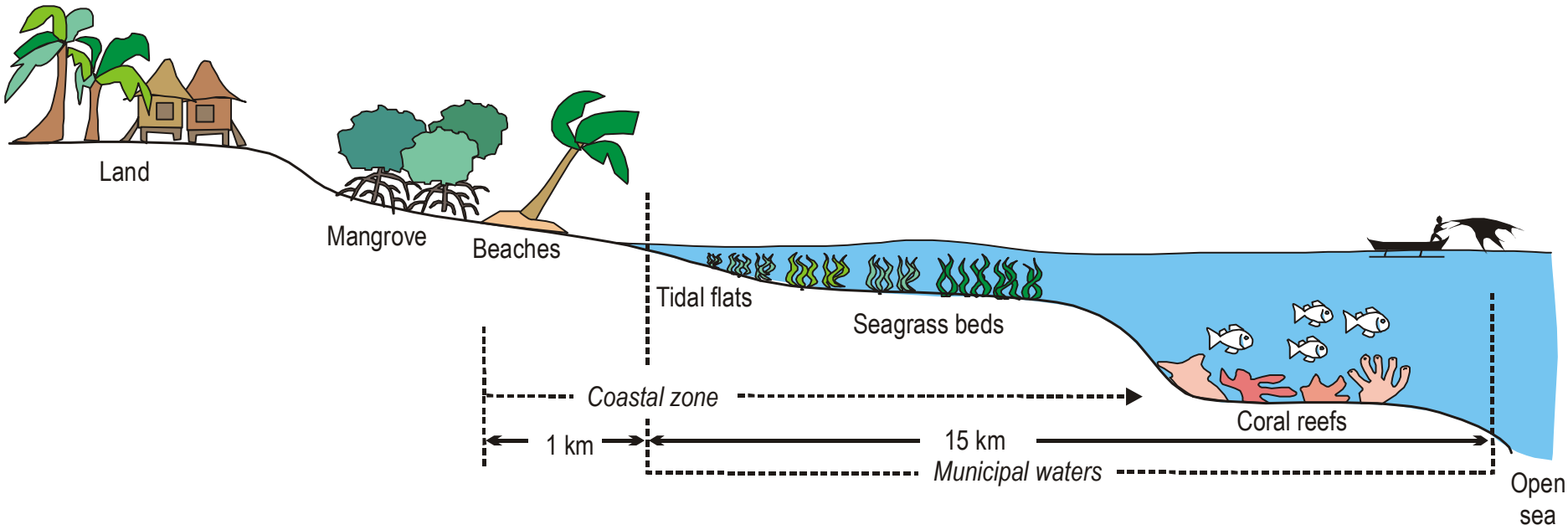
The coastal zone



Coastal Zone is the interface where the land meets the ocean. It includes the shoreline environment and the adjacent coastal waters.

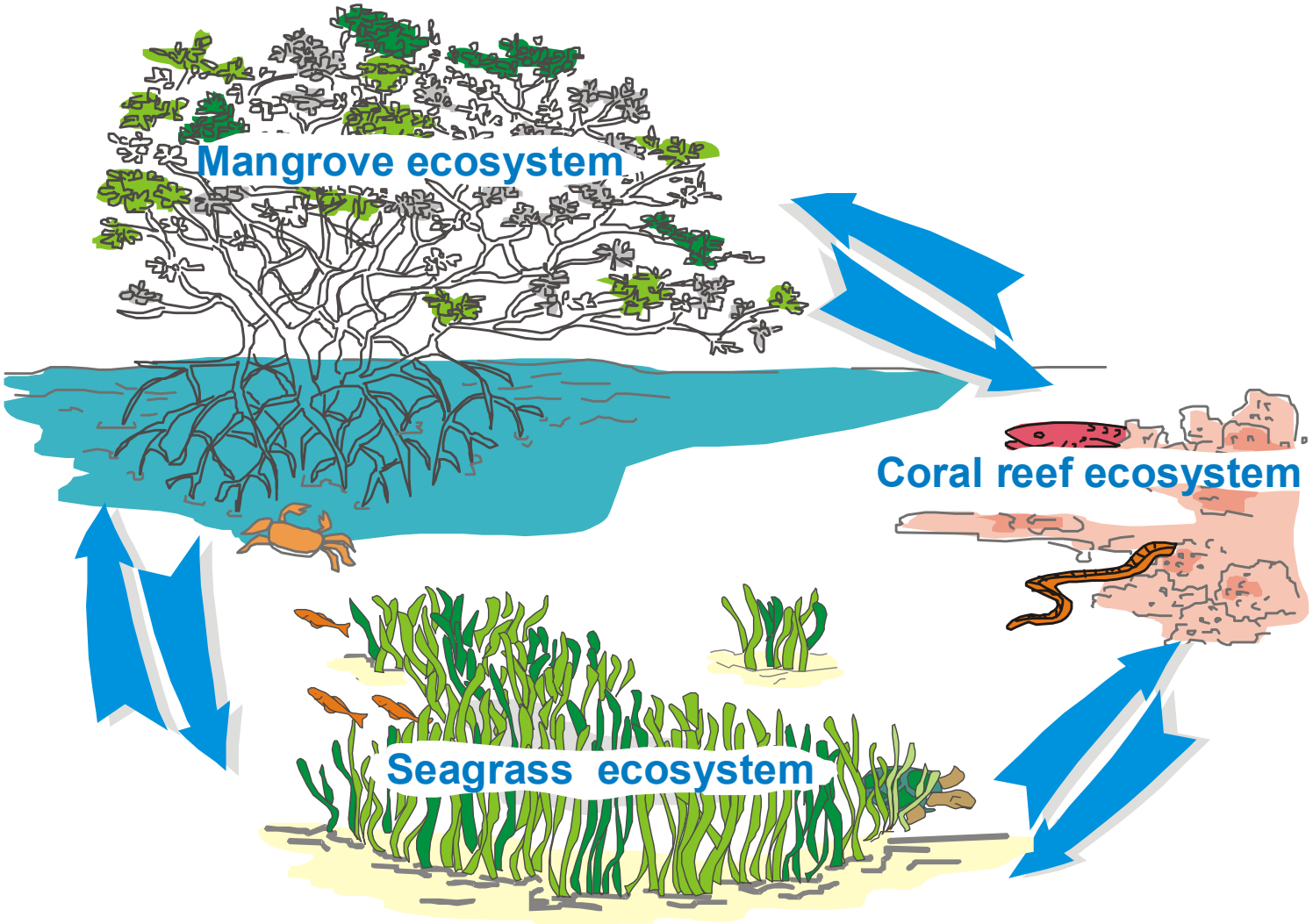
The coastal zone



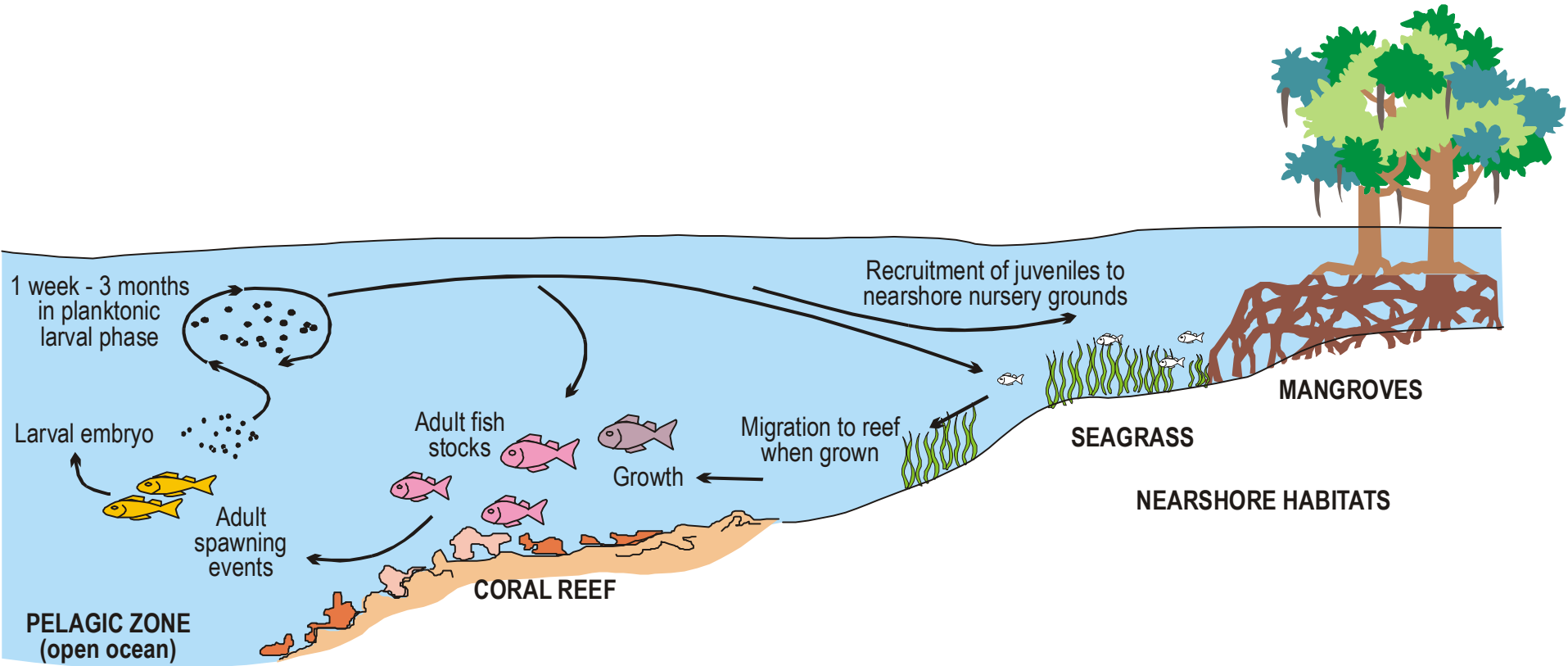
A Philippine Coastal Zone has the following major ecosystems along its shallow coastlines

- coral reefs
- seagrass beds
- coastal wetlands including mangroves
- estuaries and lagoons

Mutual contributions of tropical coastal habitats



Typical life cycle of coral reef fish species and interconnectivity of habitats



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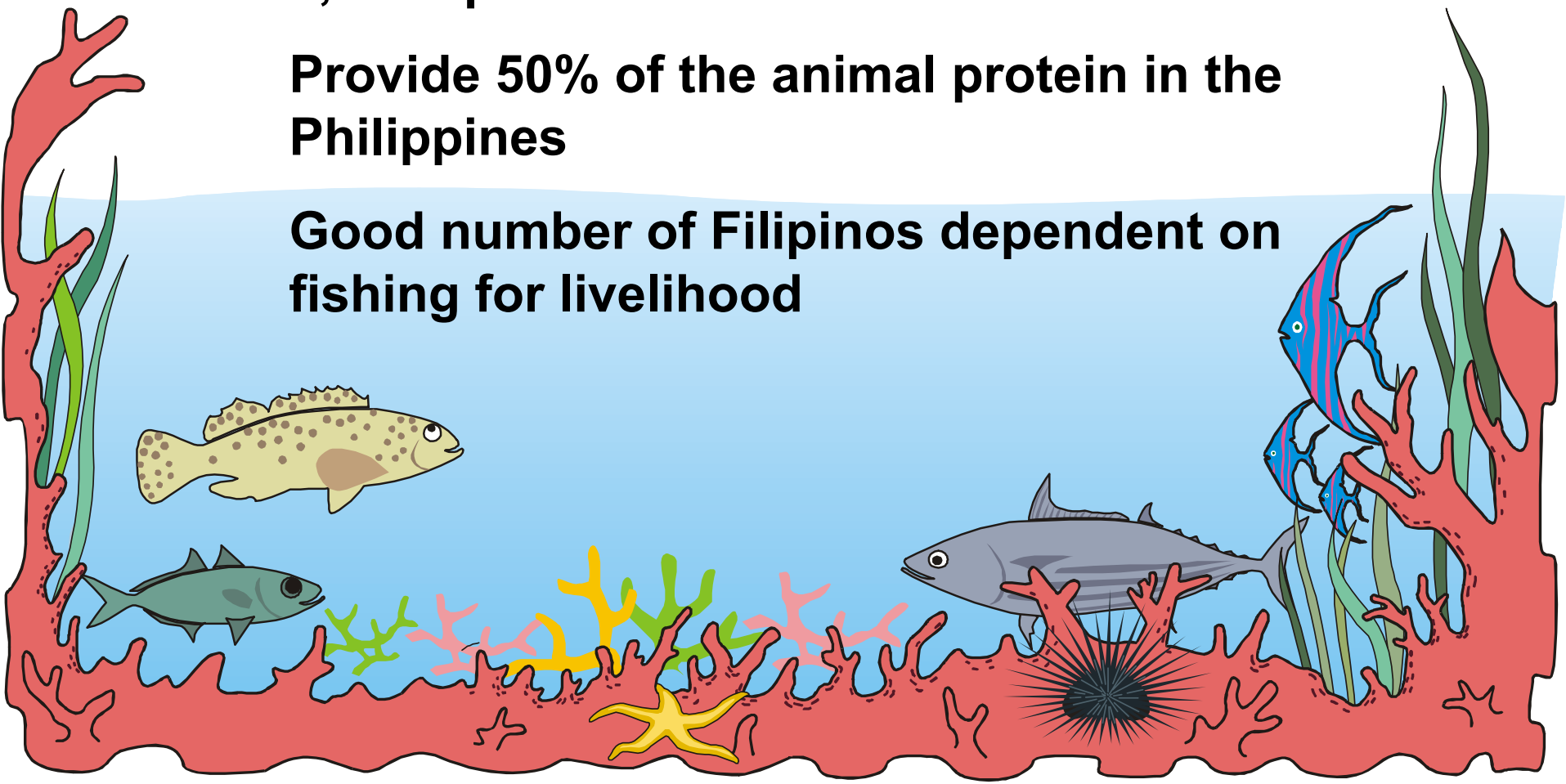
Rich marine biodiversity with 400 species of corals; 900 species of seaweeds; and 1,400 species of fish and crustaceans

Provide 50% of the animal protein in the Philippines

Good number of Filipinos dependent on fishing for livelihood



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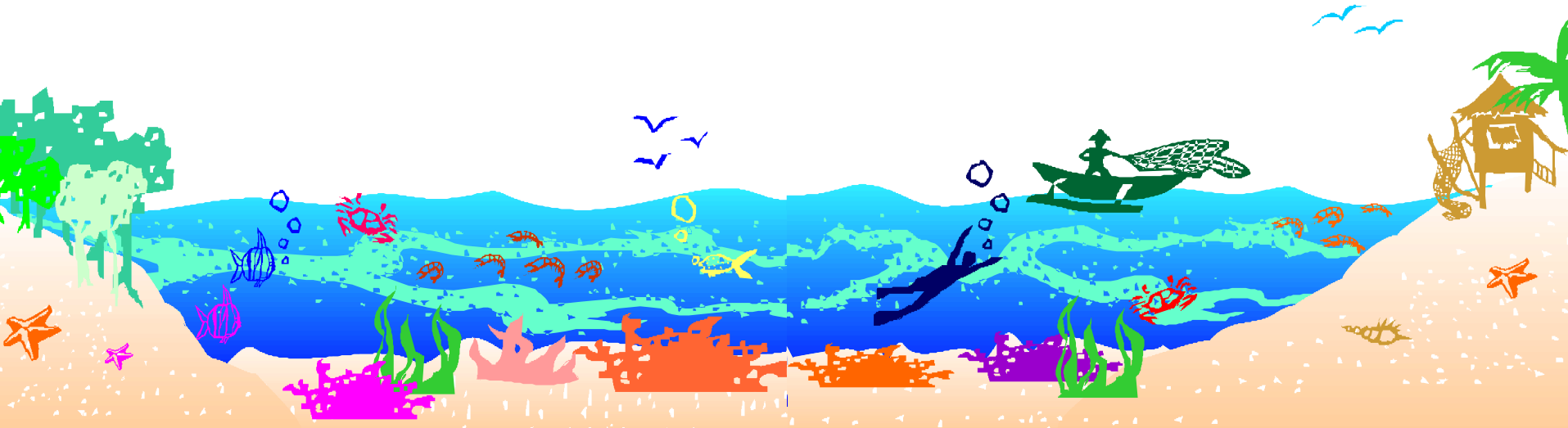
Habitats of the Philippine coastal zone



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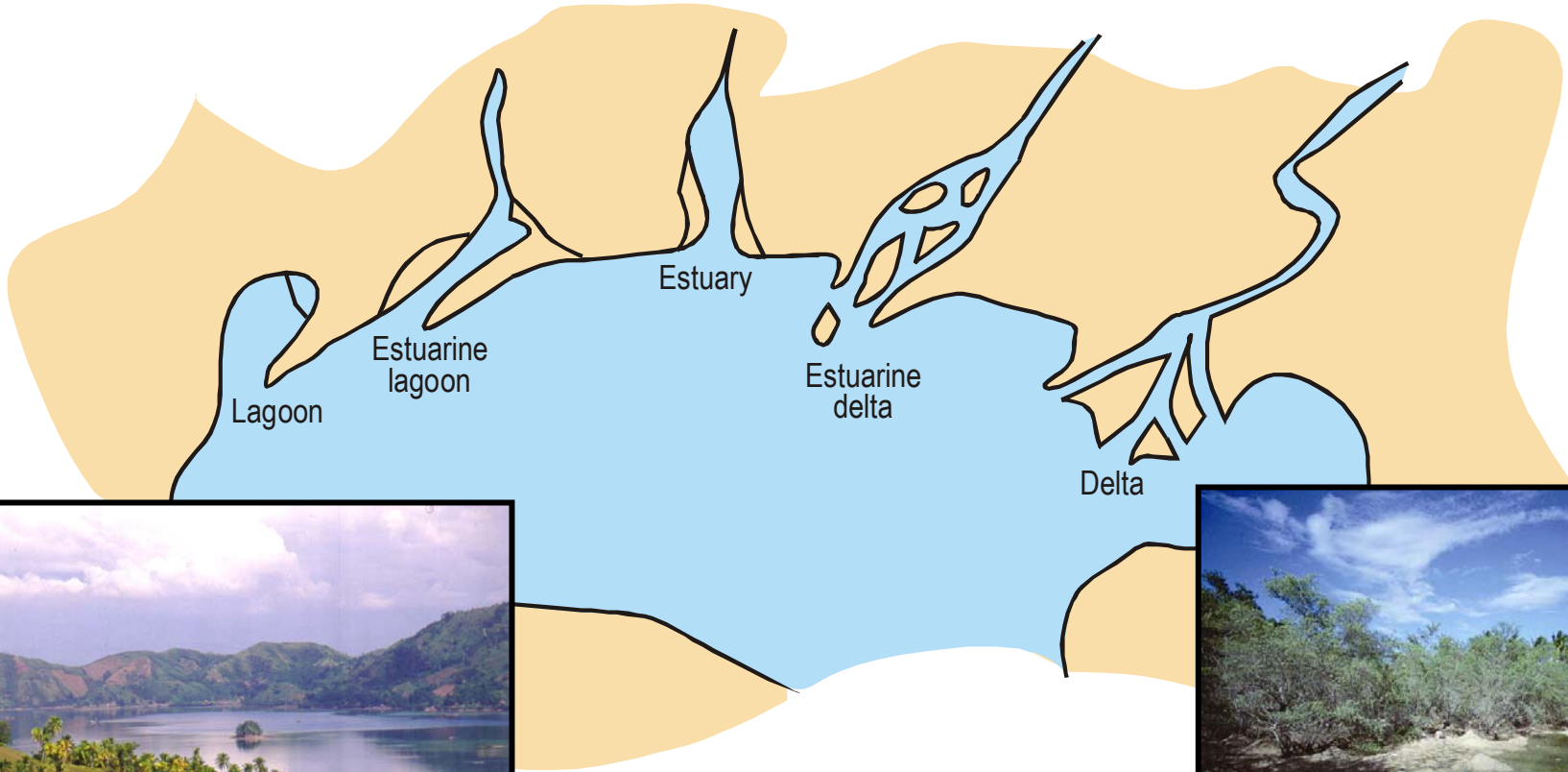
Examples of inlet types from lagoons to deltas



Estuary in Malalag Bay, Davao del Sur

Estuaries, lagoons and bays

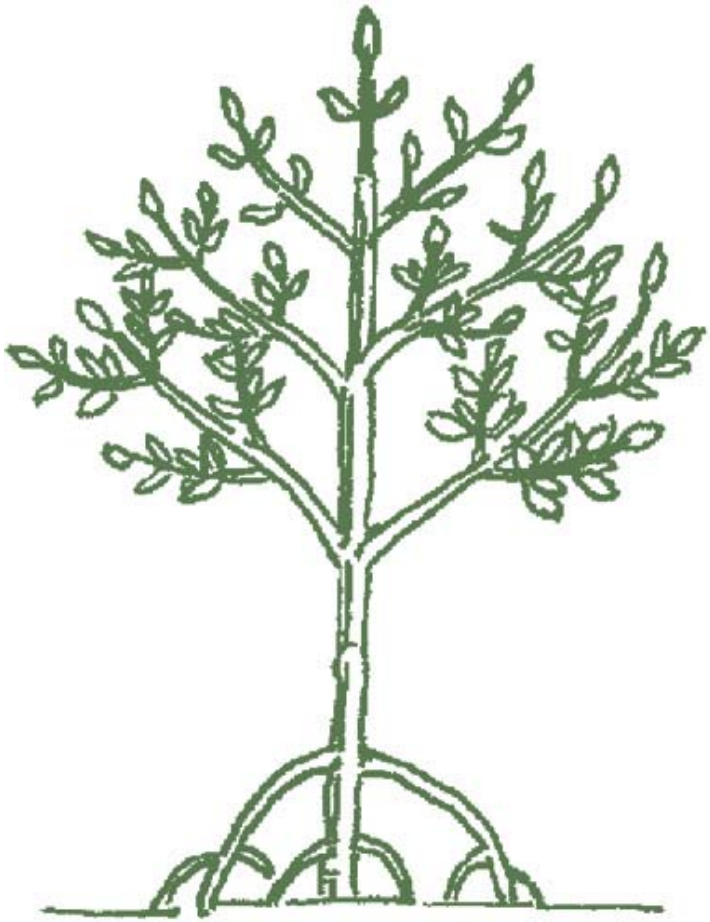
Coastal wetland in Masbate

Coastal wetlands, including mangroves

Wetlands play as home and nursery feeding grounds to a great variety of plants and animals.

Mangroves are woody, seed bearing plants adapted for life in brackish water. Serve as feeding and nursery grounds and refuges to many fish species, migratory birds and other marine organisms.

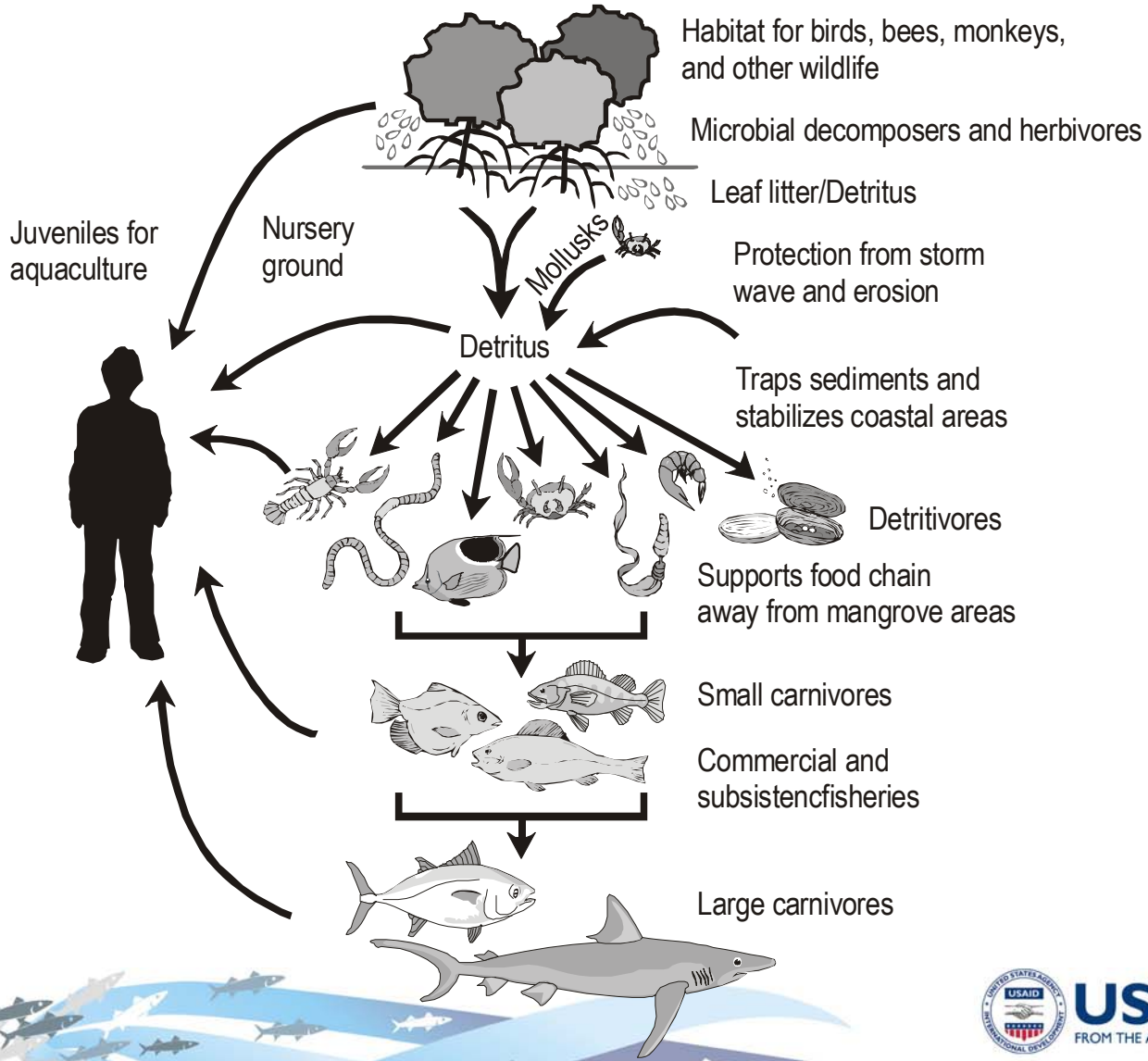
Examples of two major mangrove genera



Rhizophora

Avicennia

Mangroves and their ecological and economic benefits



Benefits to humans:

- Clean water
- Fish, shells, mollusks, etc.
- Medicines
- Tannins
- Wood (fuel and construction)
- Honey
- Alcohol
- Shore protection
- Research data
- Education
- Recreation/tourism
- Biodiversity

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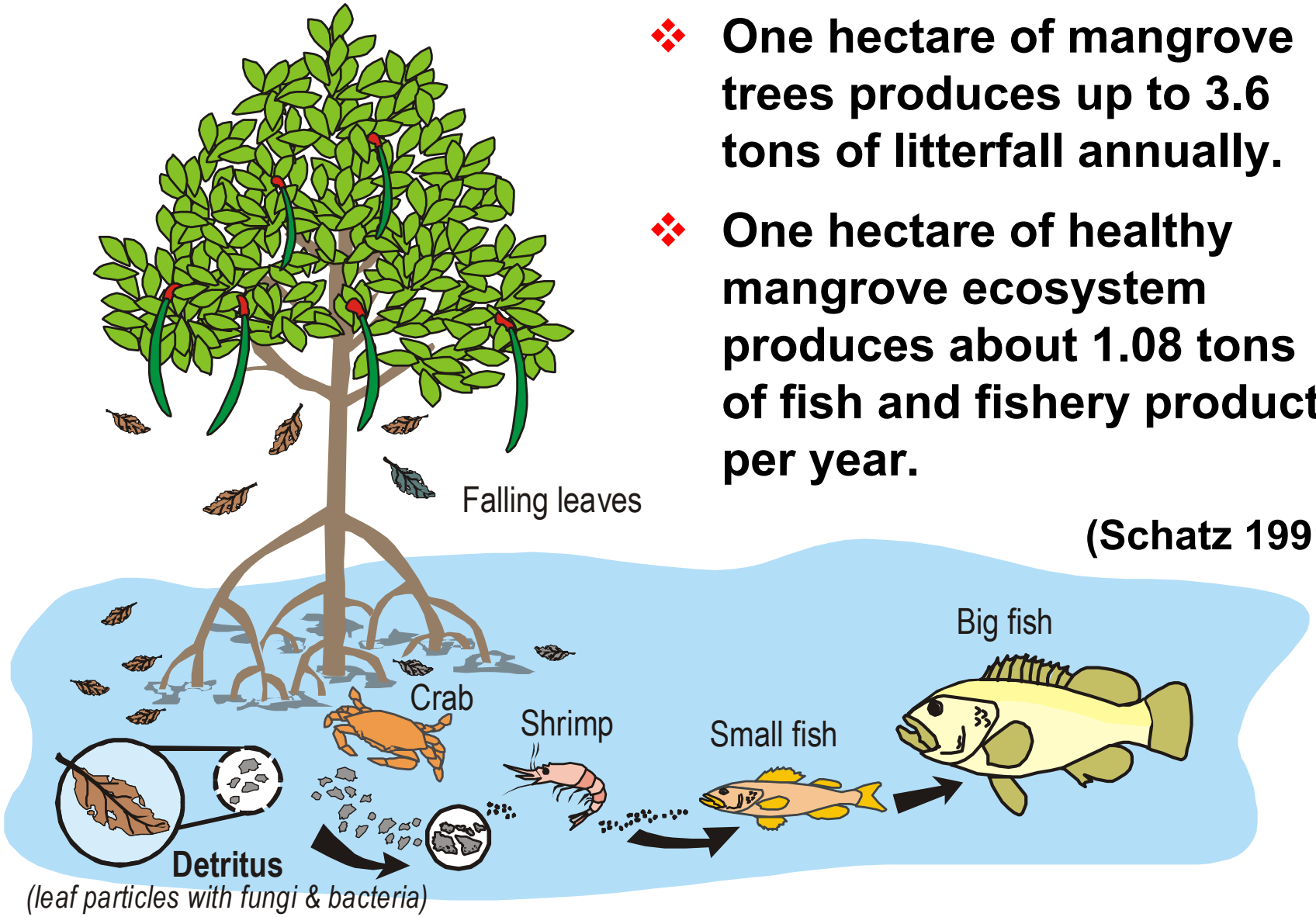
- **One hectare of mangrove trees produces up to 3.6 tons of litterfall annually.**
- **One hectare of healthy mangrove ecosystem produces about 1.08 tons of fish and fishery products per year.**

(Schatz 1991)



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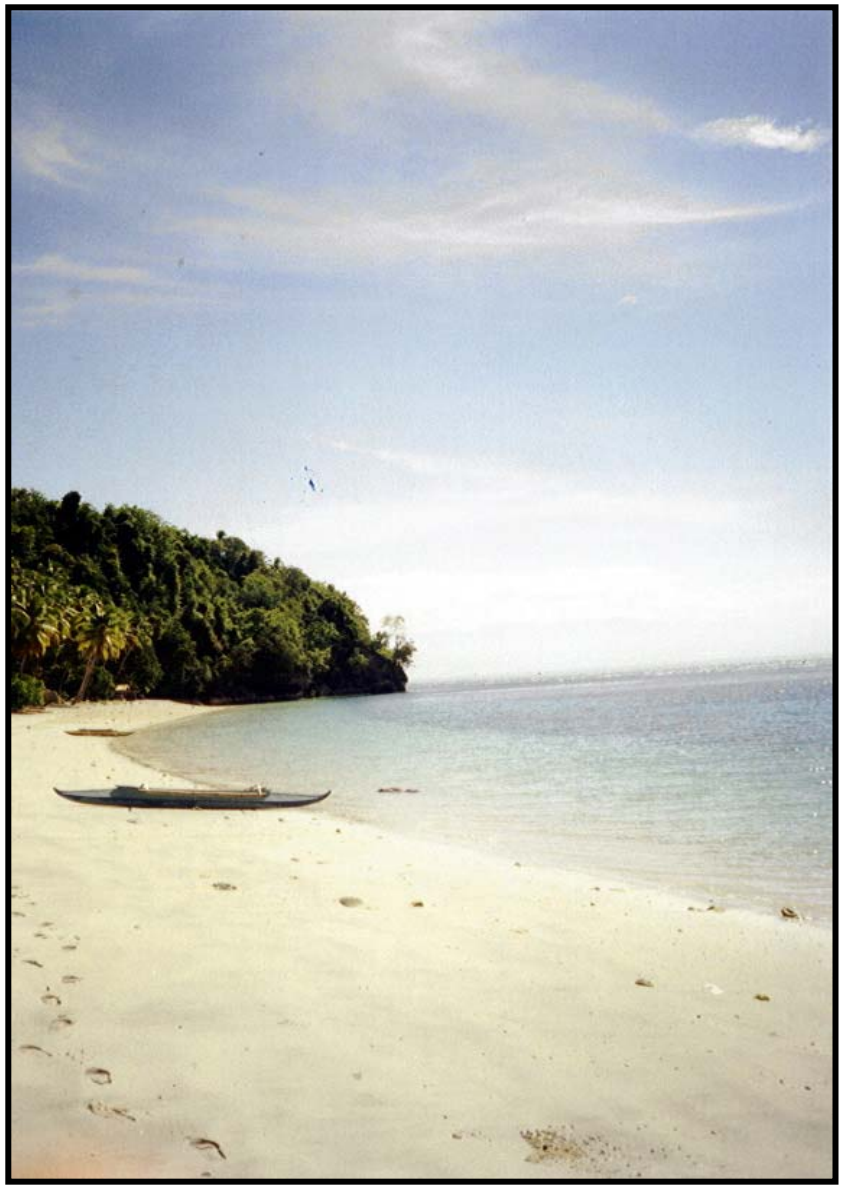
Beaches are dynamic landforms which features are constantly being shaped through forces of wind and water.



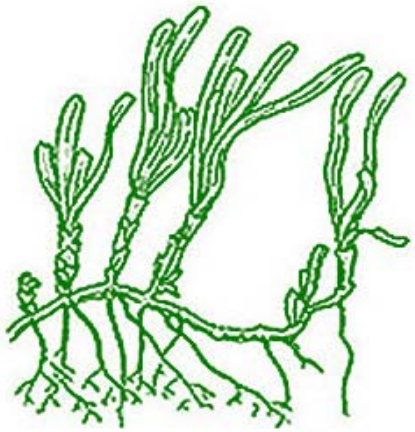
Undisturbed beaches also serve as nesting places for turtles. They also are the focal point of coastal tourism since many tourist activities depend on clean beaches.

Seagrass beds are seed-producing marine plants that occur in shallow, nearshore waters, and are often found between coral reefs and mangrove areas, colonizing the soft, shallow and sandy-muddy bottom.

Seagrass

- Seagrass beds harbor a rich assemblage of marine organisms that all contribute to the important role of seagrasses in the marine ecosystem
- Seagrass beds support at least:
  - 172 species of fish
  - 46 species of invertebrate
  - 51 species of seaweeds
  - 45 species of algal epiphytes
  - 1 species of sea turtle
  - 1 species of Dugong

Types of seagrasses commonly found in the Philippines



Cymodocea

Halodule

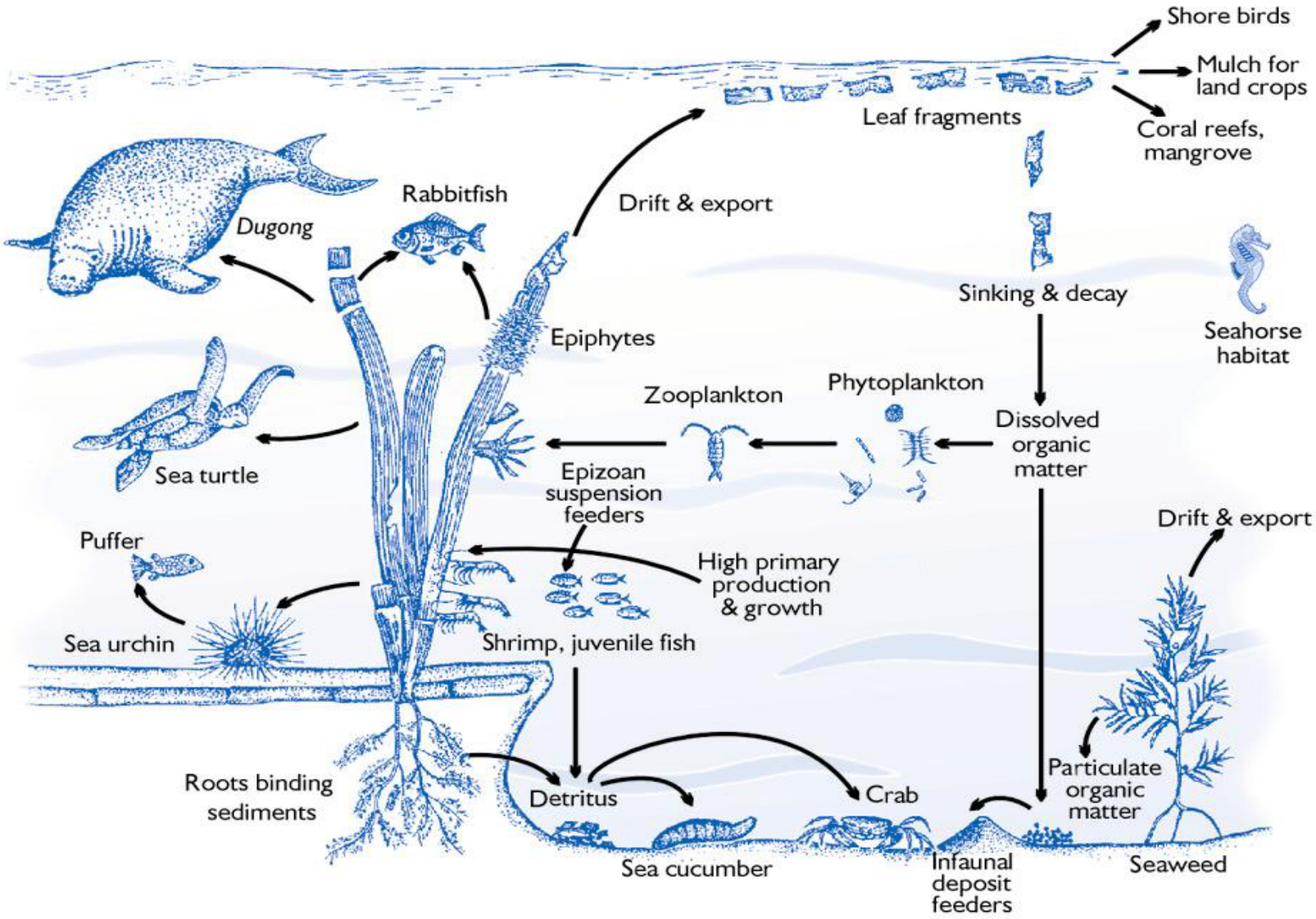
Syringodium

Halophila

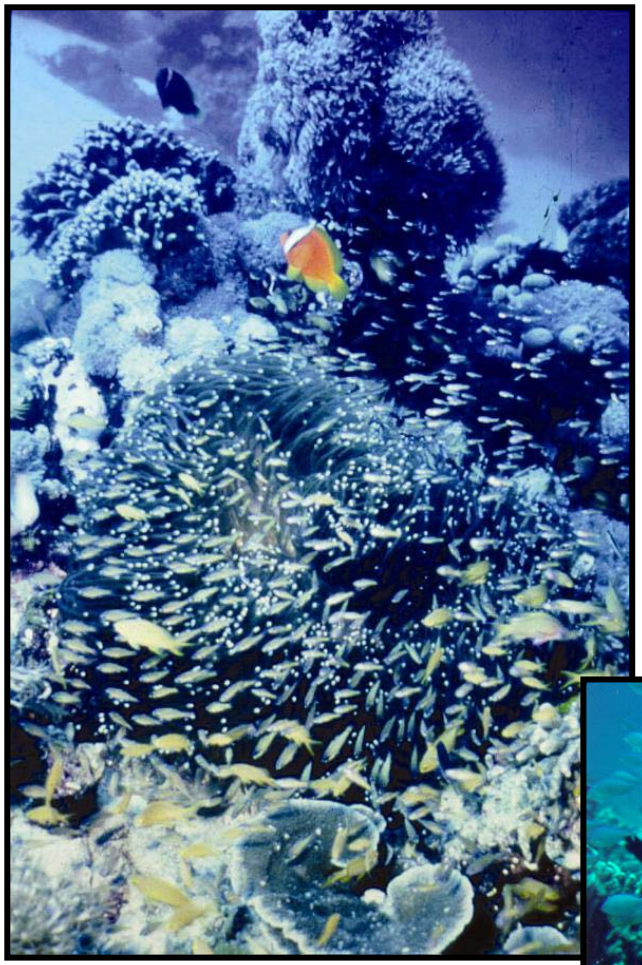
Thalassia

Enhalus

Food chain in Philippine seagrass ecosystems

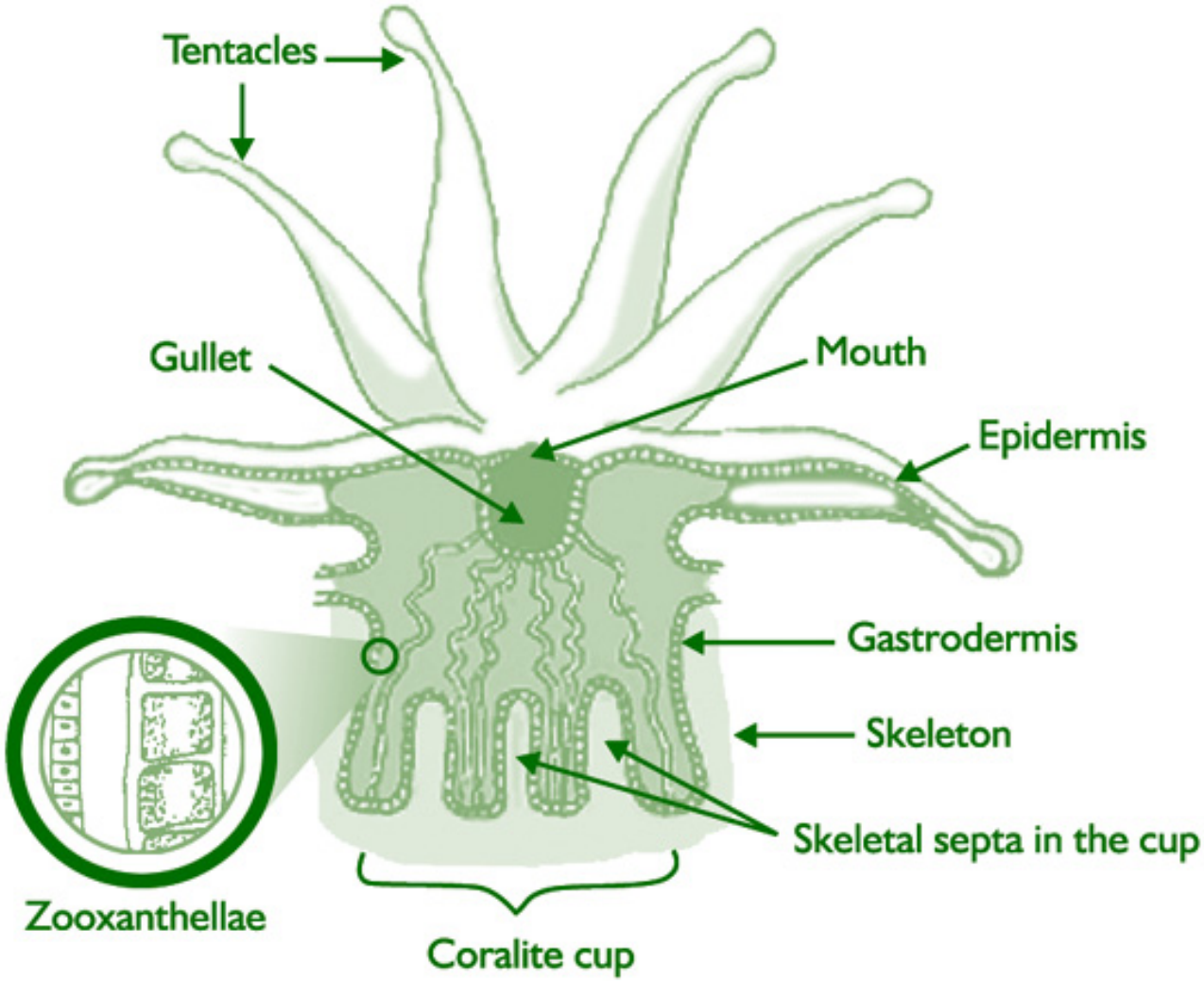


Corals are actually tiny animals called polyps that live in colonies underwater, either in patches or extensive reefs.

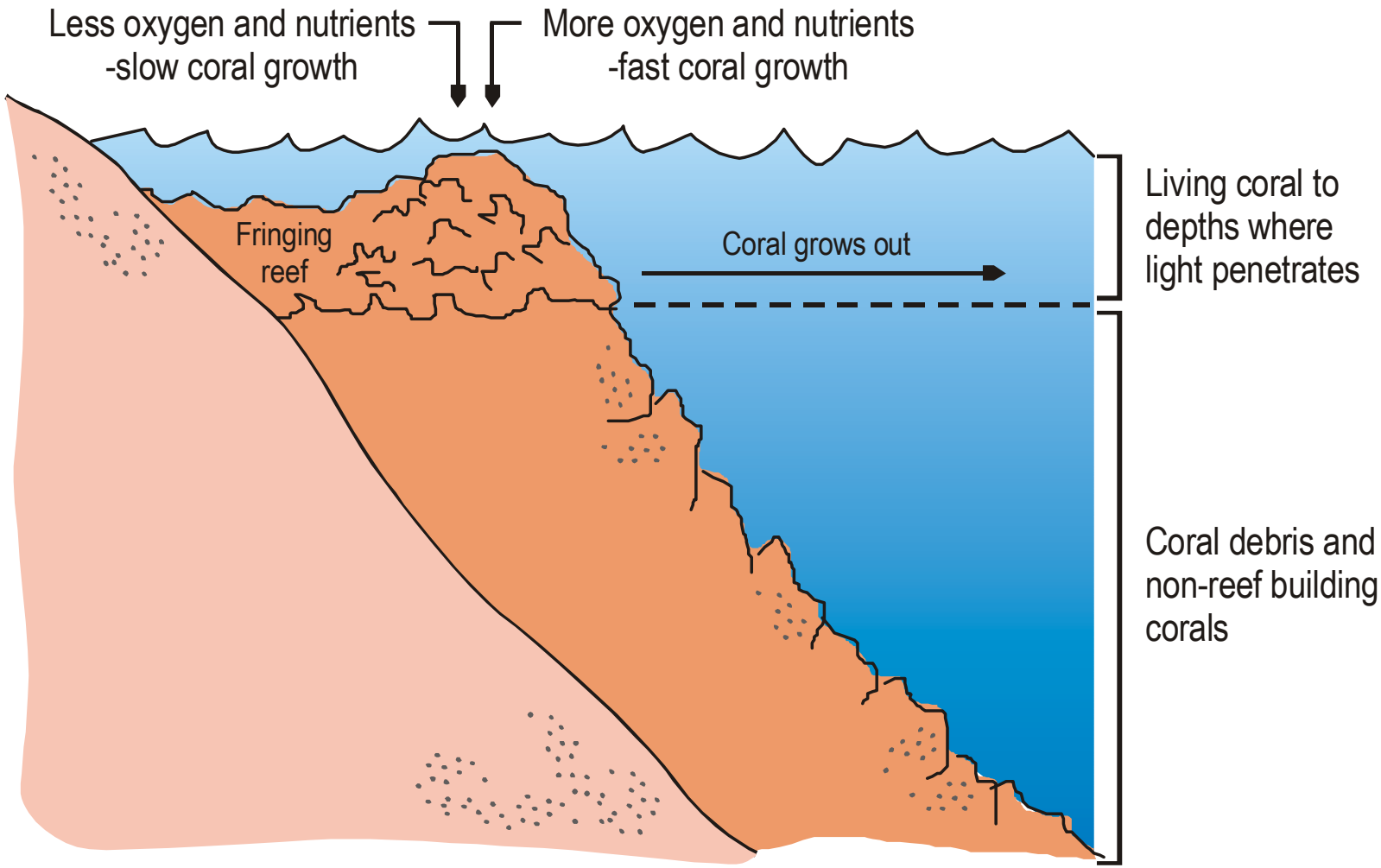


Each colony is composed of thousands of tiny polyps. Polyps secrete salivary calcium carbonate material that hardens to form the rigid structural mass of the reefs.

Parts of a coral polyp

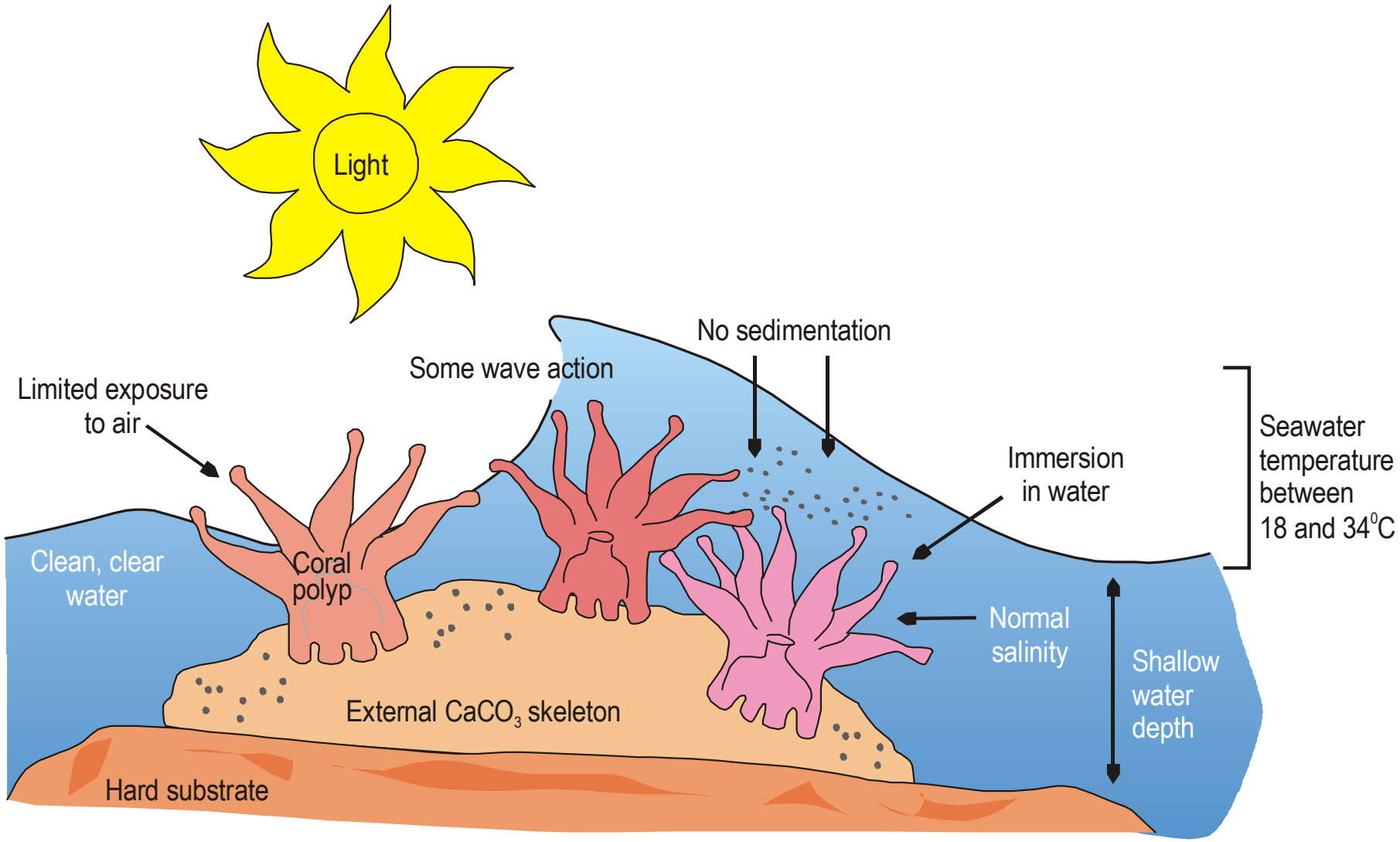


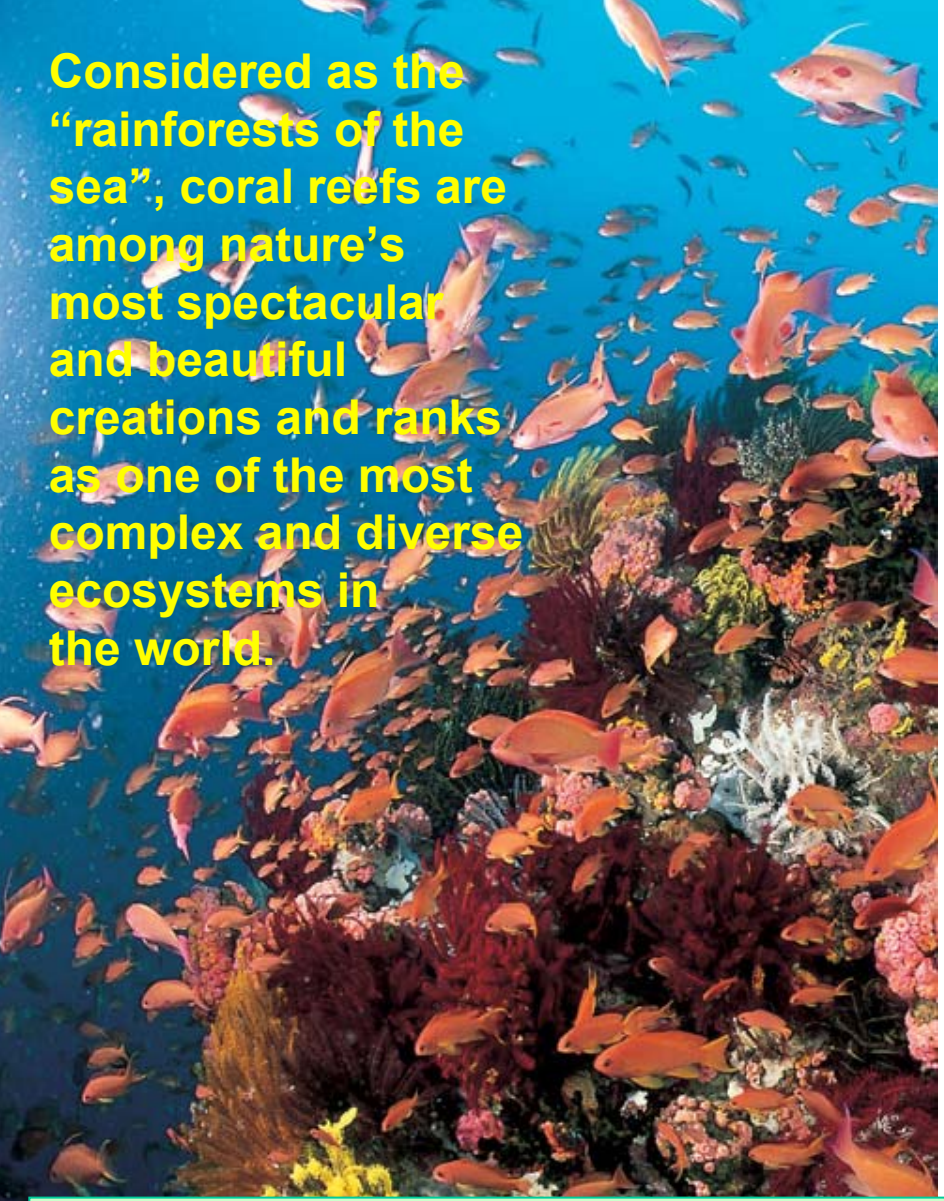
Formation of a typical fringing coral reef



The coral colony grows as one polyp buds off another polyp. The polyps build a united skeleton which gives the colony the strength to withstand waves and storms.

Requirements for healthy coral reef growth





Considered as the "rainforests of the sea", coral reefs are among nature's most spectacular and beautiful creations and ranks as one of the most complex and diverse ecosystems in the world.

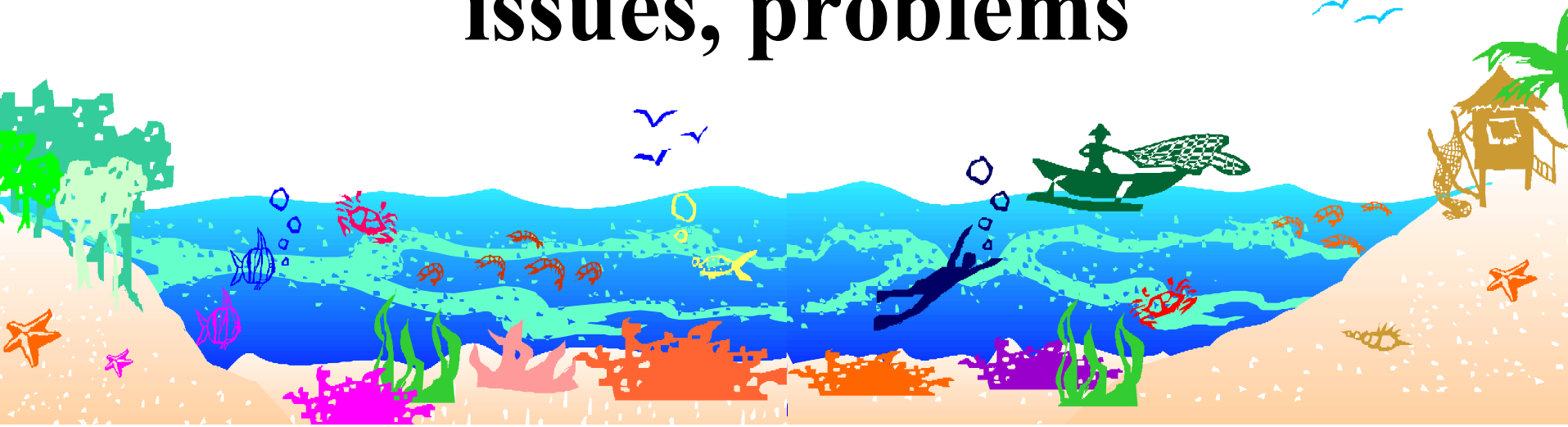
Philippine coral reefs host:

- more than 2,000 species of fish
- 5,000 species of clams, snails and other mollusks
- 488 species of corals
- 981 species of bottom-living algae
- thousands of other marine organisms

It is estimated that one square kilometer of healthy coral reefs can produce up to 20 tons of fish per year. Destroyed reefs on the other hand only produce less than 4 tons of fish per square kilometer per year.

Lecture/Discussion #2:

The Philippine coastal zone: An endangered environment, issues, problems



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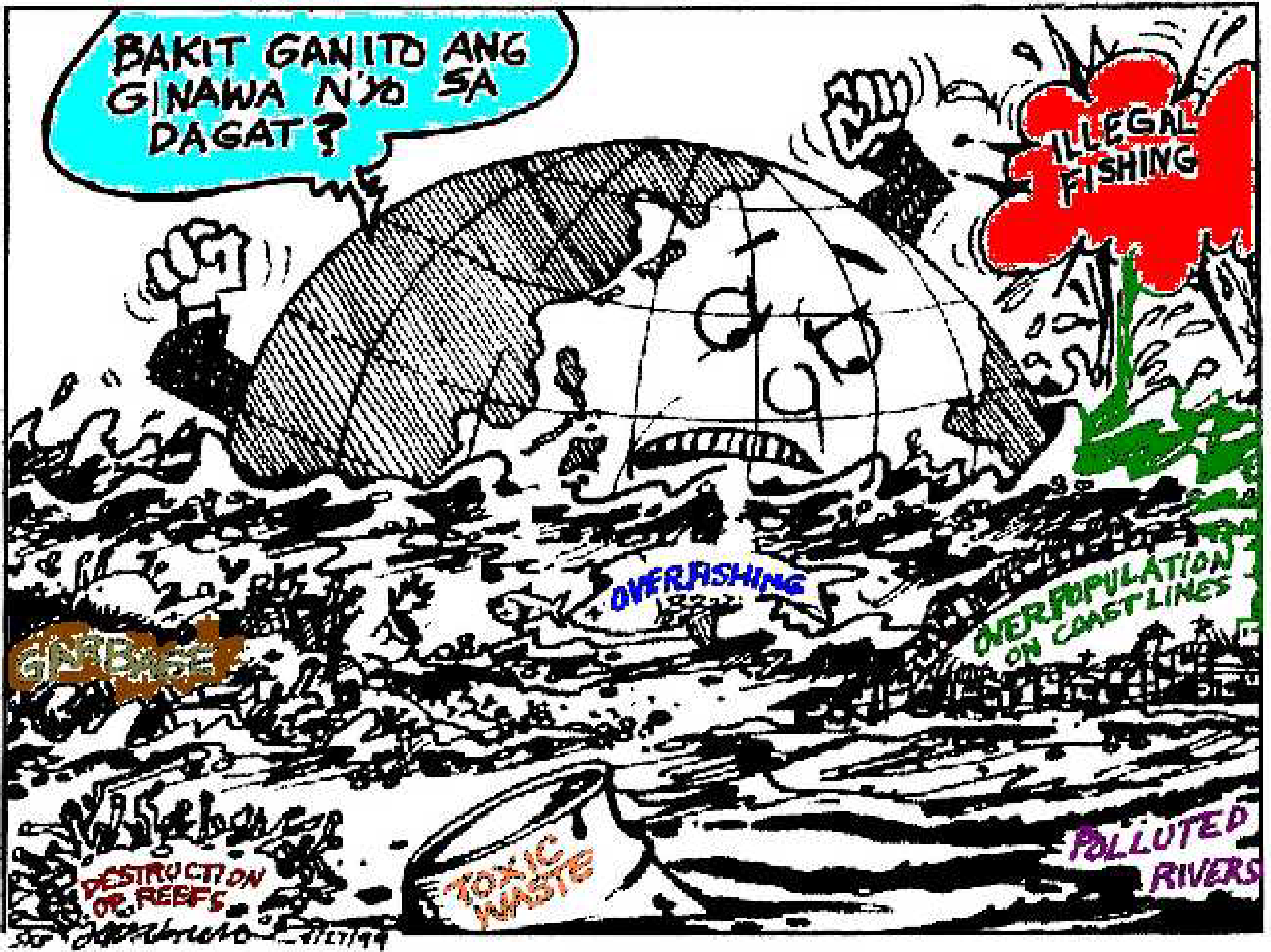
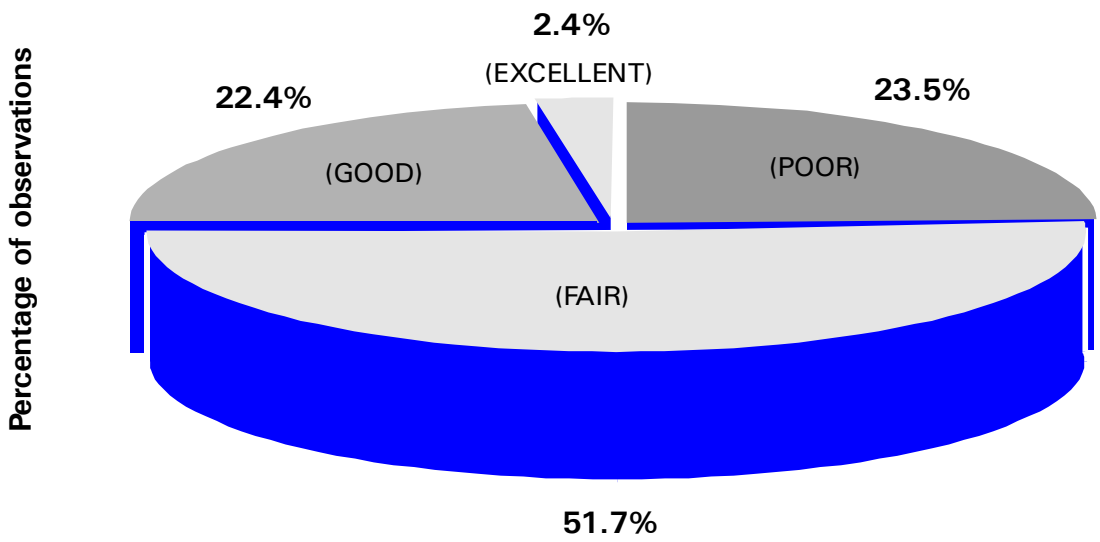

BAKIT GANITO ANG GINAWA N'YO SA DAGAT?
ILLEGAL FISHING
OVERFISHING
OVERPOPULATION ON COASTLINES
DESTRUCTION OF REEFS
TOXIC WASTE
POLLUTED RIVERS


TRAWLING
OVERFISHING
DETERIORATING ECOLOGY
POLLUTION
SILTATION
SEDIMENTATION
DOMESTIC WASTE

Coral reef degradation

Status of Philippine coral reefs at 14 localities

(85 reefs samples)



Coral reef condition as percentage of hard coral cover

0-24.9% Poor 25-49.9% Fair 50-74.9% Good 75-100% Excellent

(85 reefs sampled)

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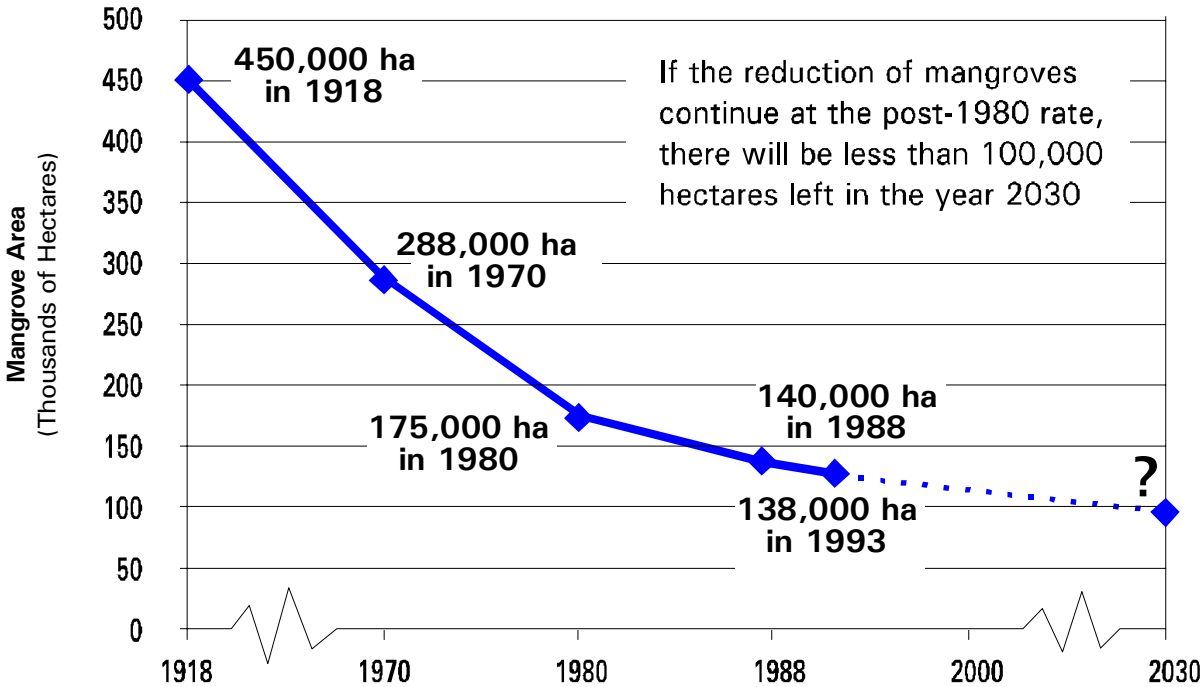
Mangroves in trouble

Decline of mangrove resource in the Philippines



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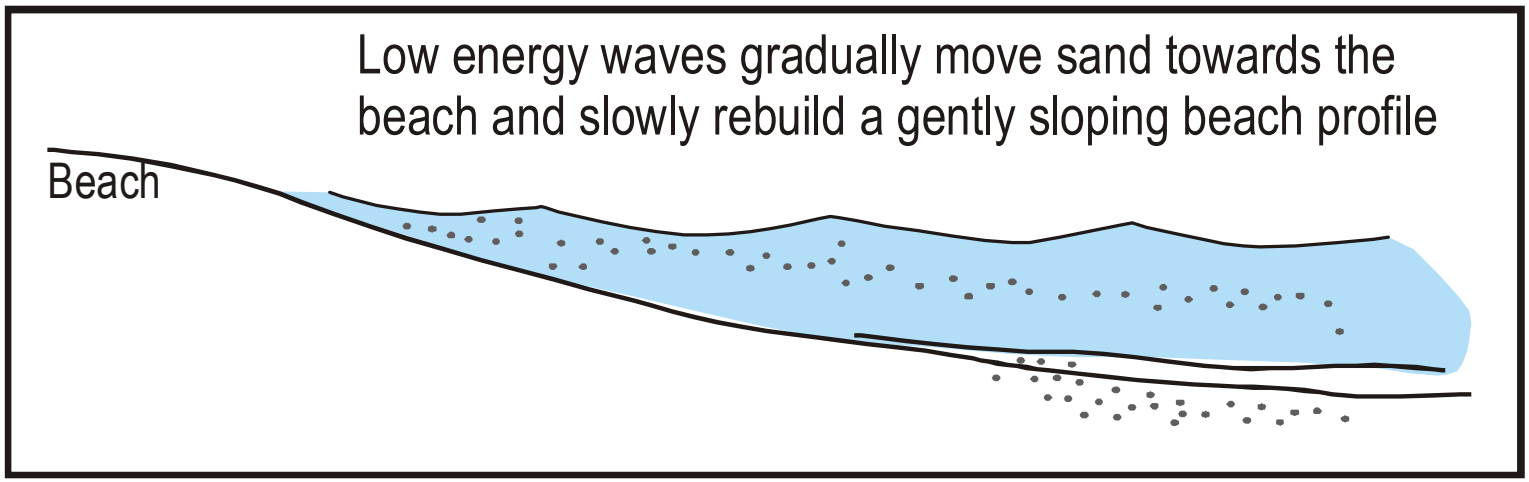
Loss of seagrass beds

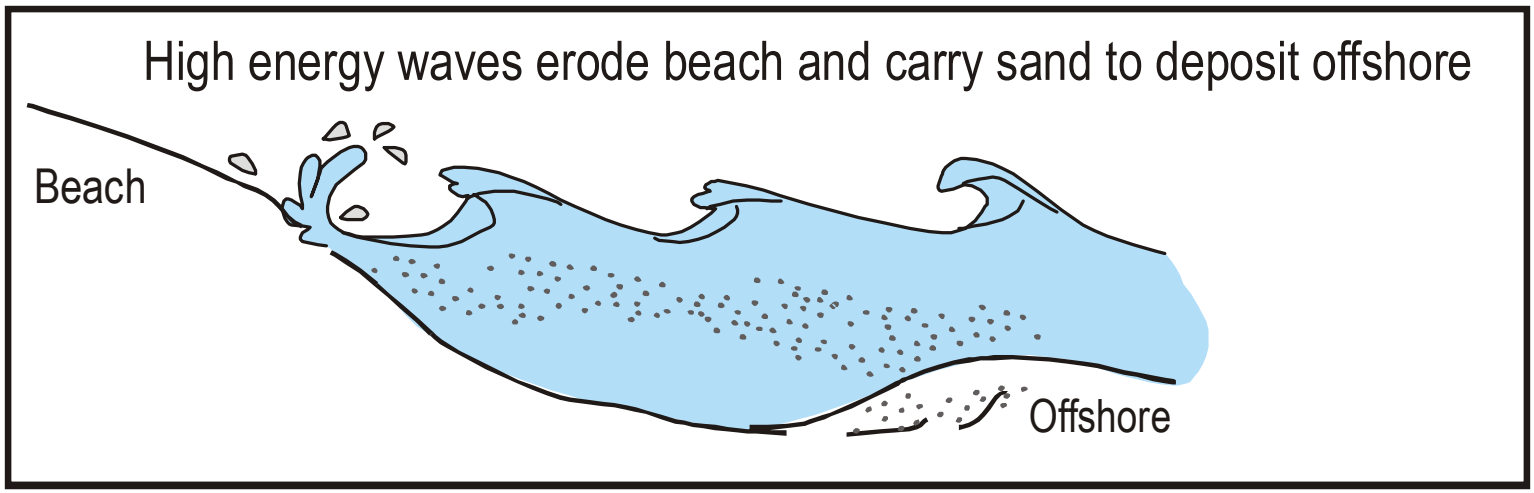
Loss of seagrass beds are attributed to the following:

- Land use activities such as encroachment in the habitat through reclamation and improper shoreline development including the construction of structures that impede natural water movement
- Use of destructive fishing gears that scour and scrape the seagrass beds
- Sedimentation and siltation from upland areas
- Introduction of water borne pollutants from domestic and industrial wastes

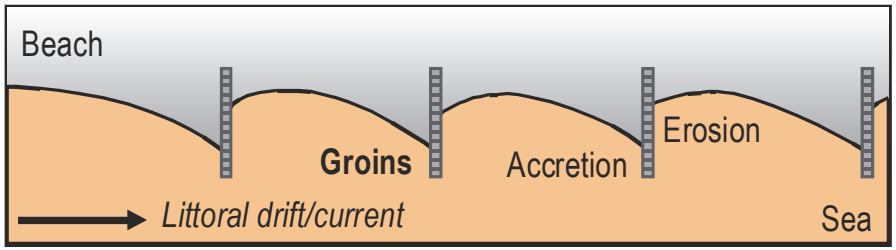
Loss of marine sand through mining/quarrying and inappropriate coastal development

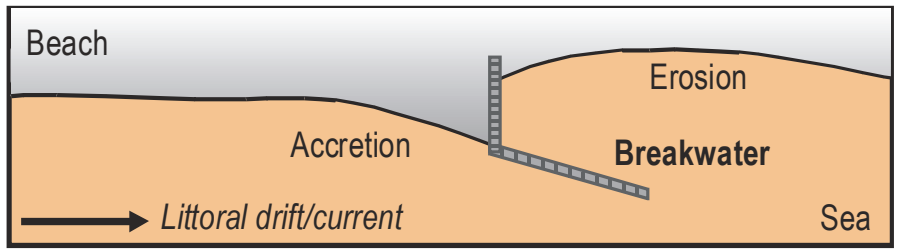
Seasonal variations in beach erosion and accretion

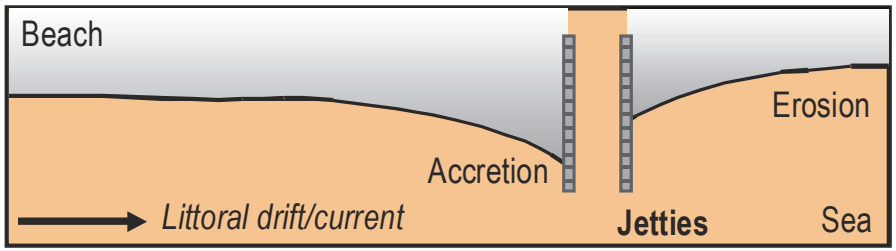


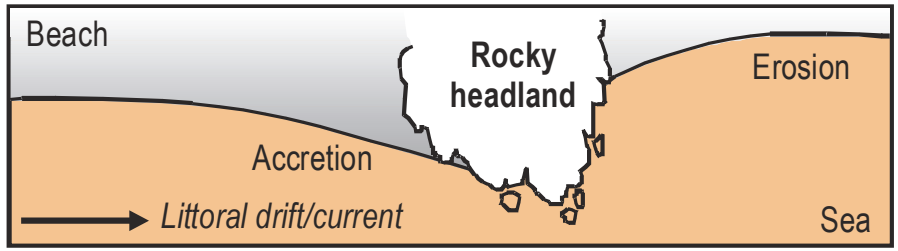


Examples of down-drift erosion resulting from hard engineering solutions and headlands as seen from aerial view









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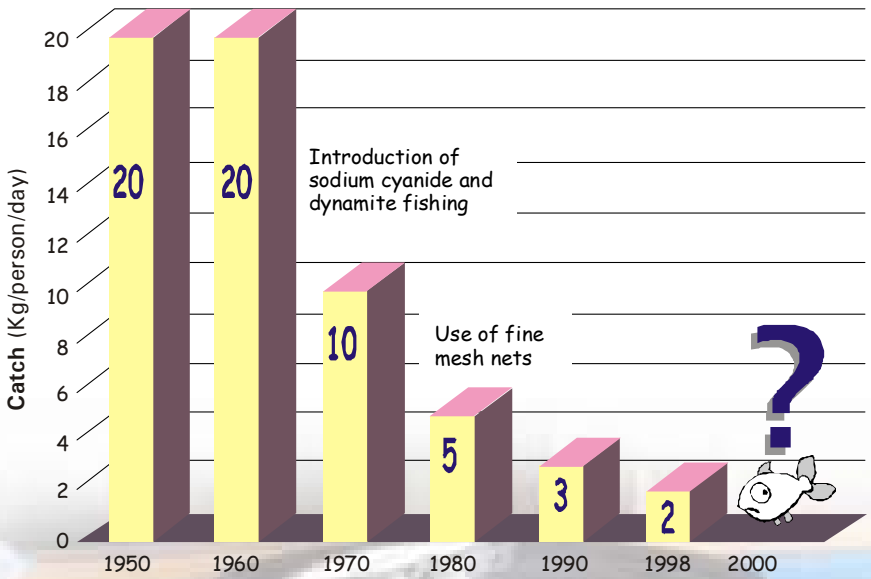
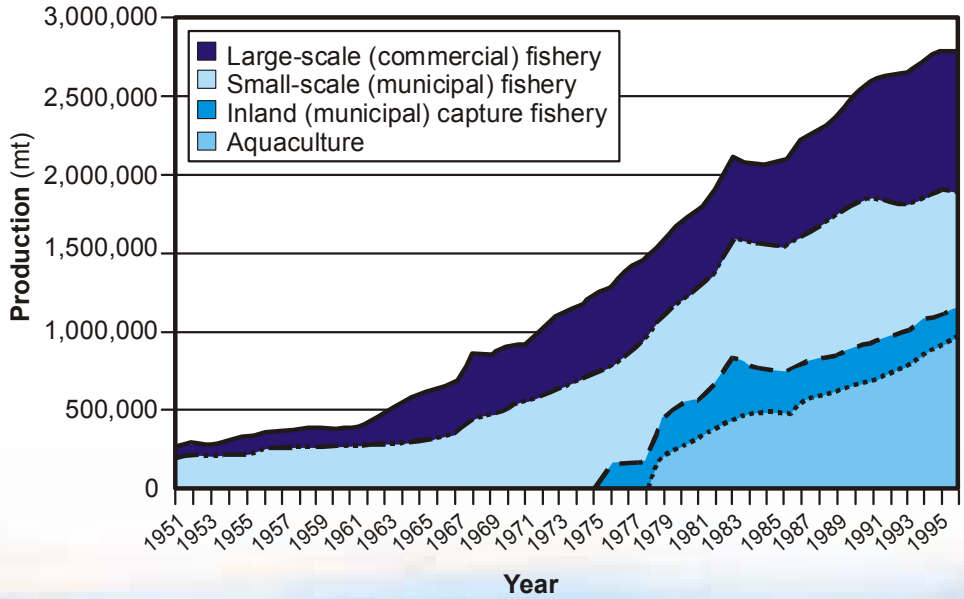
Declining fish catch

Trend in estimated daily fish catch per municipal fisher for Olango Island, Cebu



Fisheries-related food production for 1951-1996



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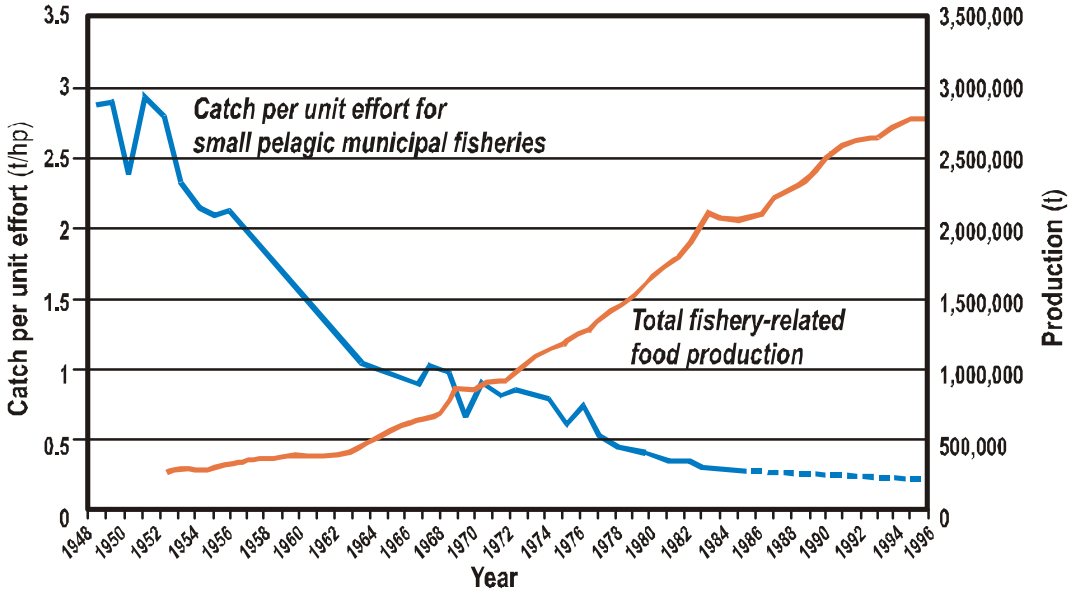
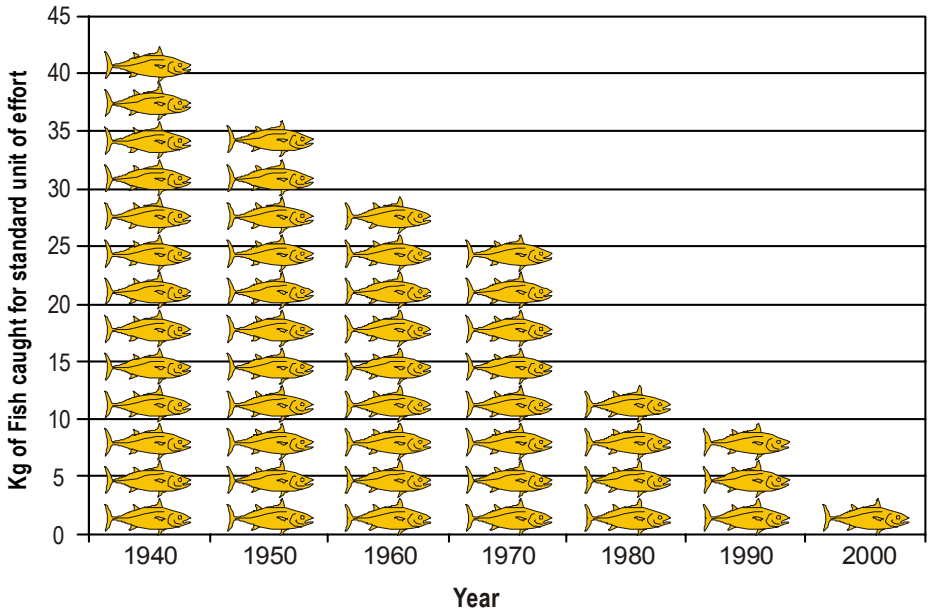


Trend in catch per unit effort for municipal small pelagic fisheries since 1948 and total fisheries production

Average catch of fish per unit effort since 1940s for fishers using hook-and-line from six provinces around the Philippines



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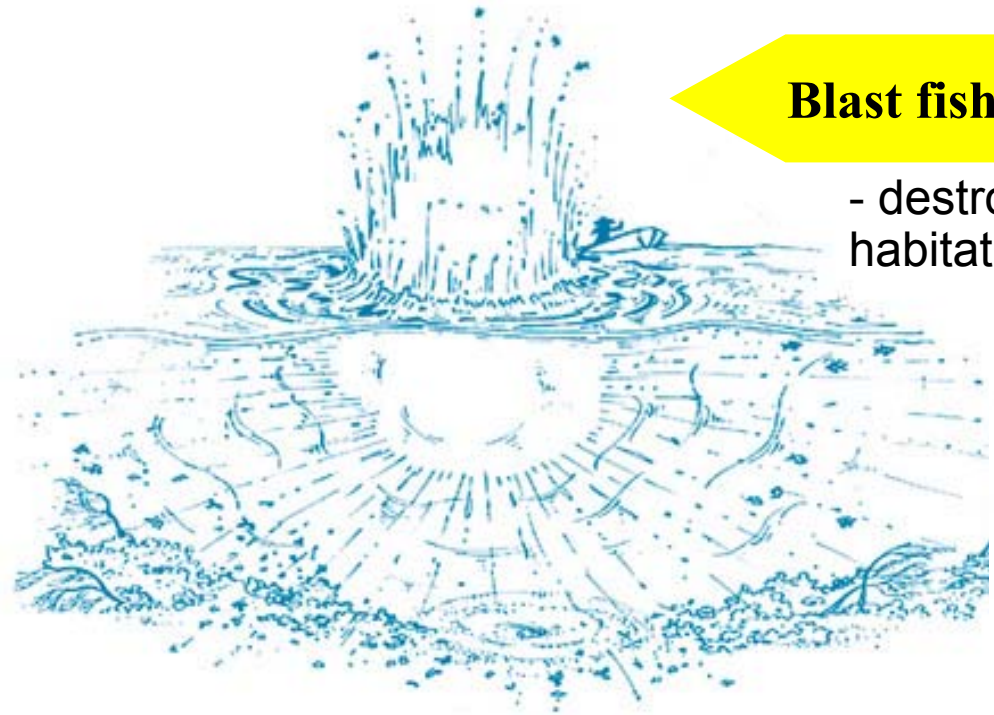
Illegal destructive activities

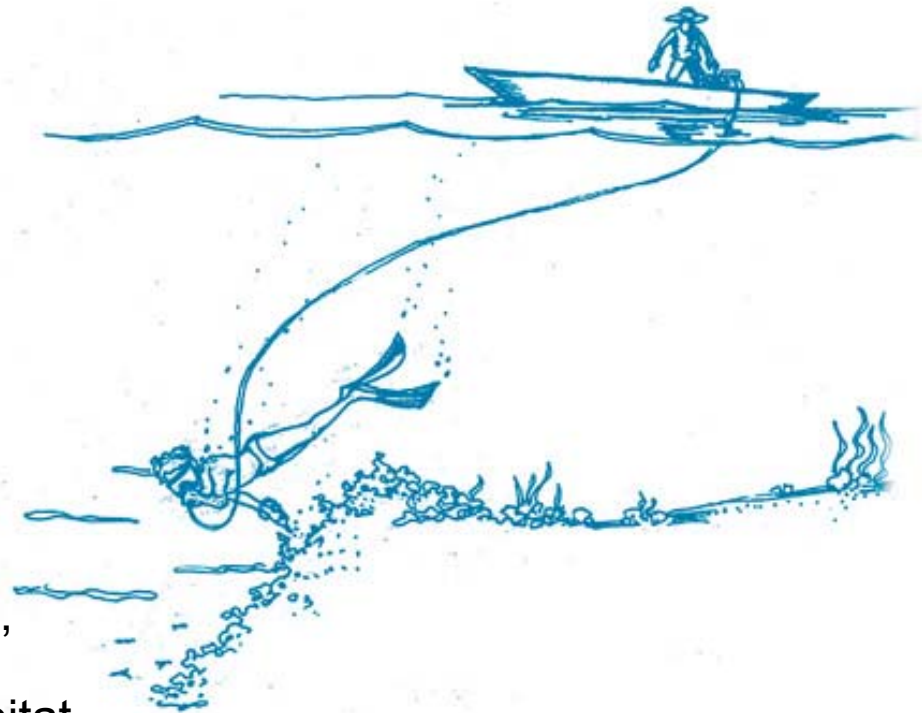
- Blast fishing, use of poisons, superlights, muro-ami, fine mesh nets, in fishing
- Conversion of mangroves and seagrass habitats to land or other uses resulting in decline of nearshore catch
- Mine sand and beach mining/quarrying
- Harvesting of banned species including corals, whale sharks, manta rays, giant clams and endangered marine species
- Non-observance of shoreline setback regulations resulting in damaging construction activities and development in the coastal zone
- Inappropriate tourism activities/ development
- Pollution
- Loss of marine biodiversity

Common fishing gear (nationally or locally) in the Philippines and the potential damage caused by the gear



Blast fishing

- destroys the reef and fish habitat along with the fish



Compressor fishing

- allows the fisher to use poison, collect almost anything, and to seriously disturb the bottom habitat

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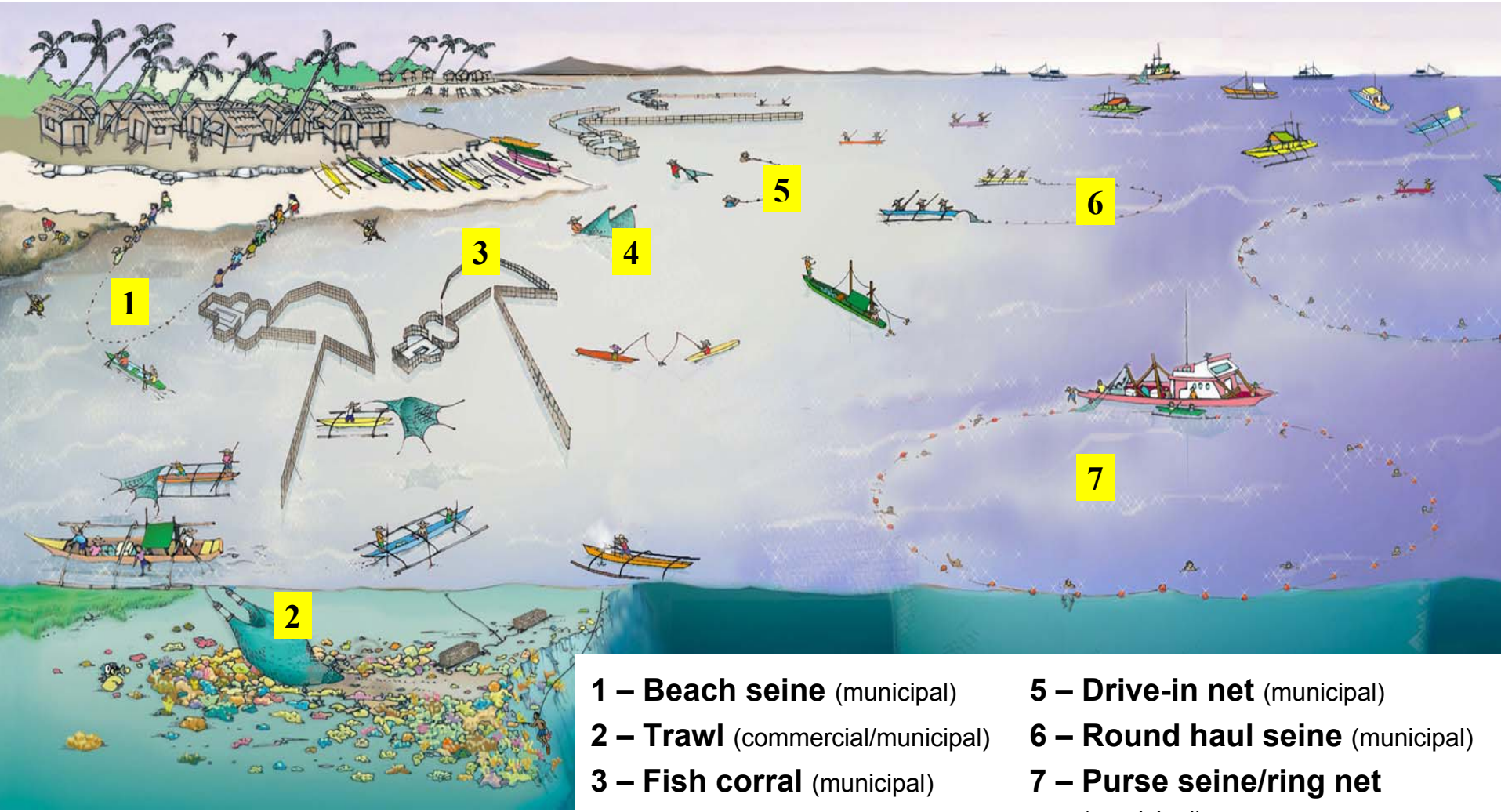
Too much fishing is killing the fishing.

Overfishing occurs when the quantity of fish harvested causes a net reduction of the fish population, thereby limiting production from fish stock for the future.

For so long now, fish are caught much faster than their ability to naturally replenish.

The lack of management measures and open access fishing result in overfishing and overexploitation of fish stocks



1 – Beach seine (municipal)
2 – Trawl (commercial/municipal)
3 – Fish corral (municipal)
4 – Scissor net (municipal)
5 – Drive-in net (municipal)
6 – Round haul seine (municipal)
7 – Purse seine/ring net (municipal)

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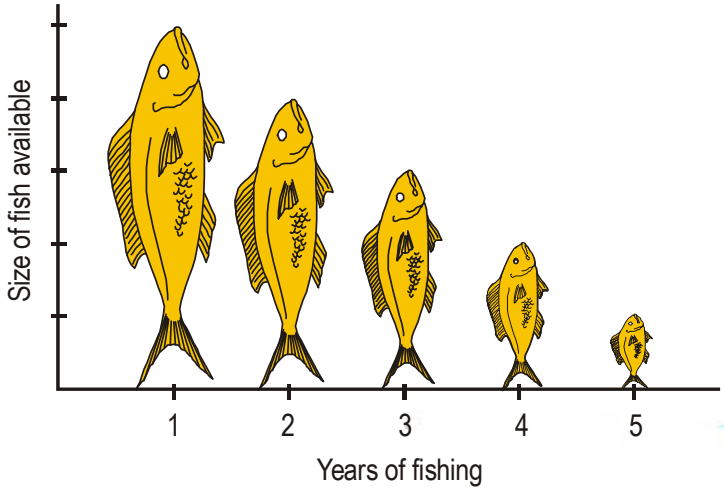
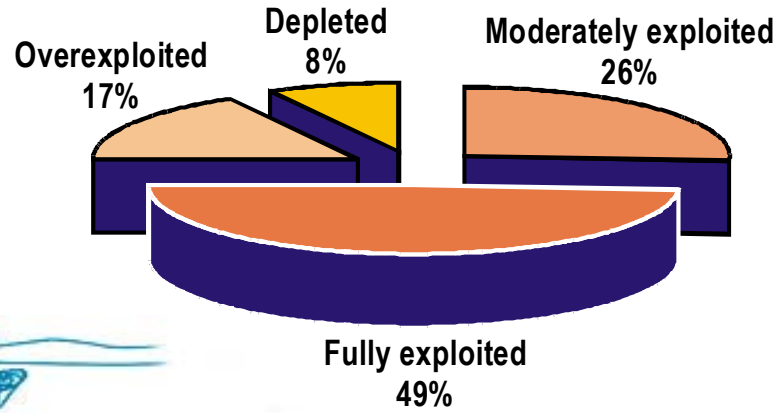
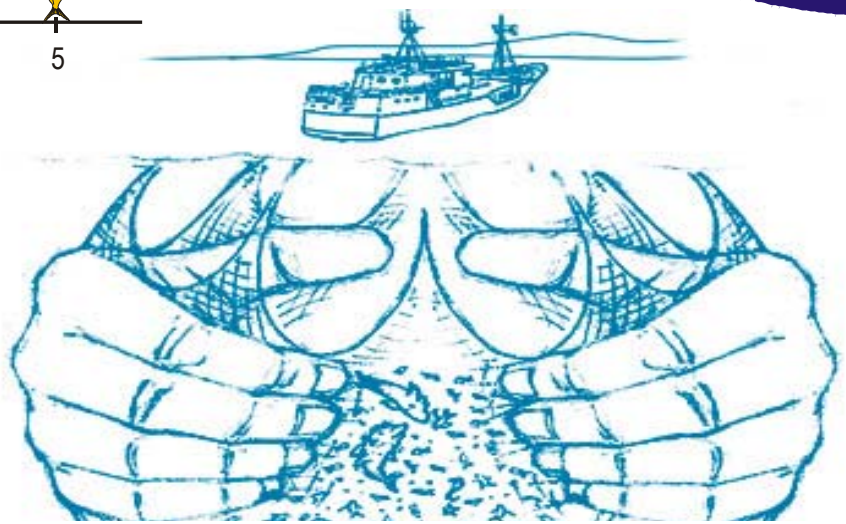
Overfishing

Growth overfishing



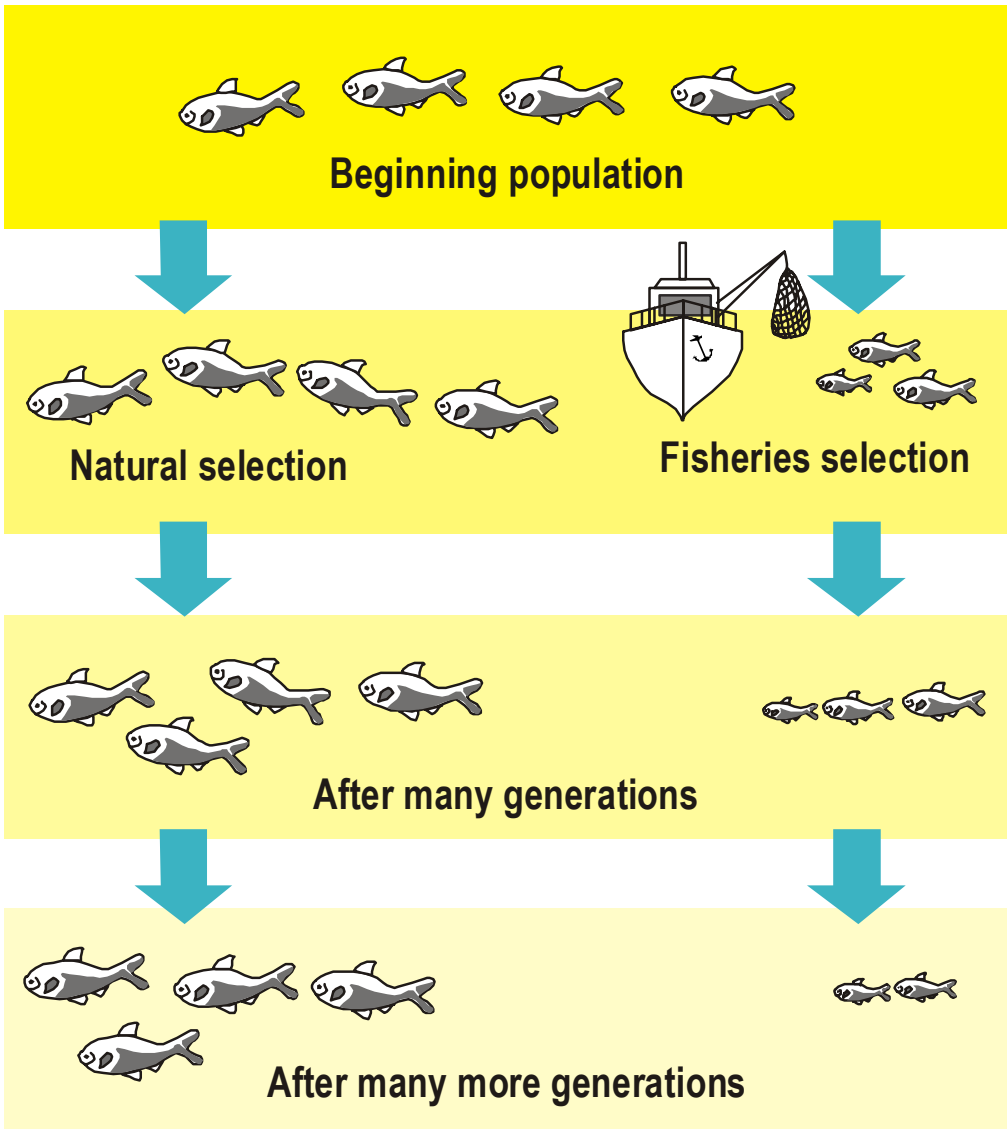
Level of exploitation of world's major fisheries





Current technologies give us the ability to catch everything in the sea

Long-term impacts of overfishing



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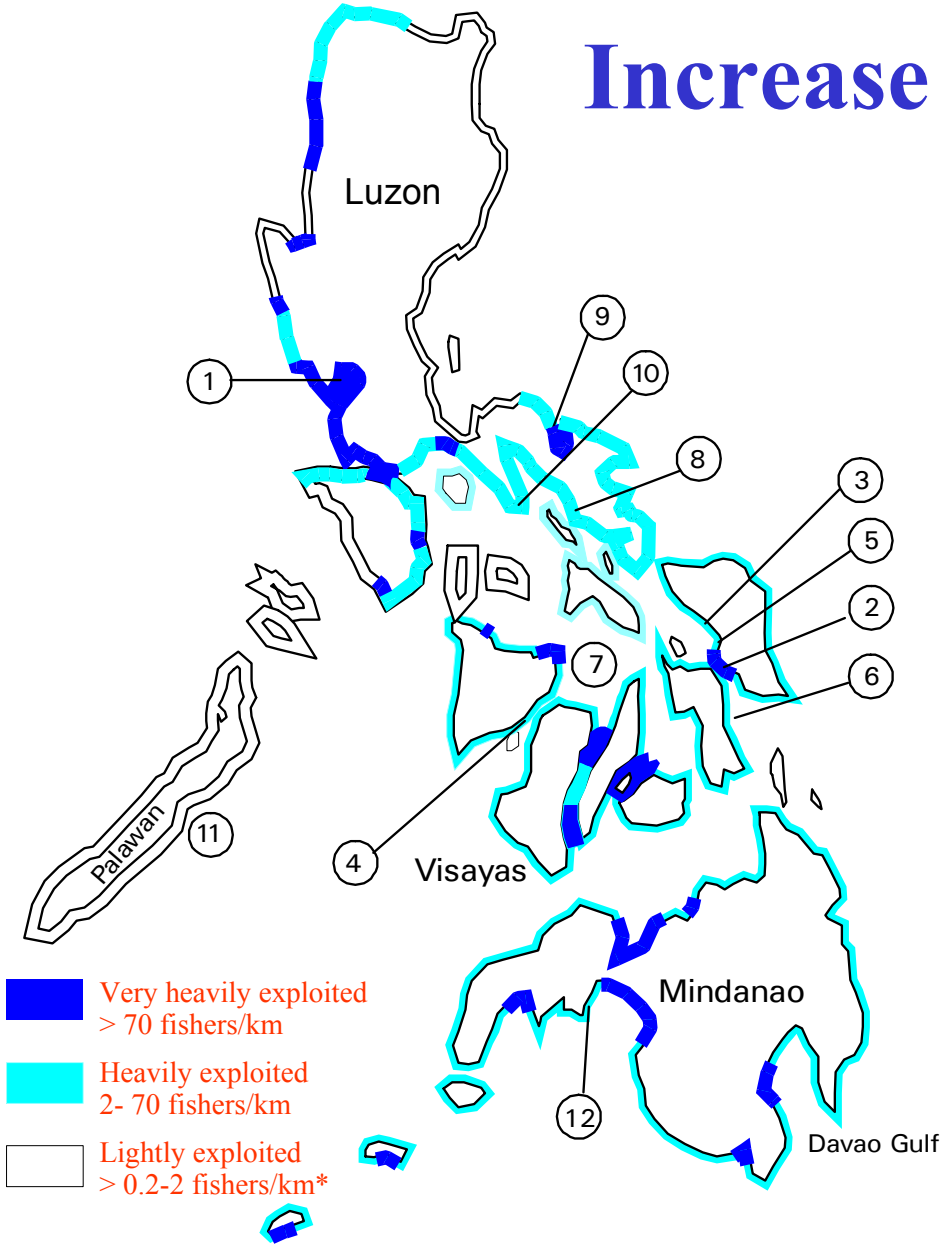
Increase in density of fishers



*The only coastal areas which may not be overfished occur here.

All major bays in the Philippines are heavily exploited

Important fishing bays:

1. Manila Bay
2. Carigara Bay
3. Samar
4. Guimaras Strait
5. Maqueda Bay
6. Leyte Gulf
7. Visayan Sea
8. Burias Pass
9. San Miguel Bay
10. Ragay Gulf
11. Honda Bay
12. Illana Bay

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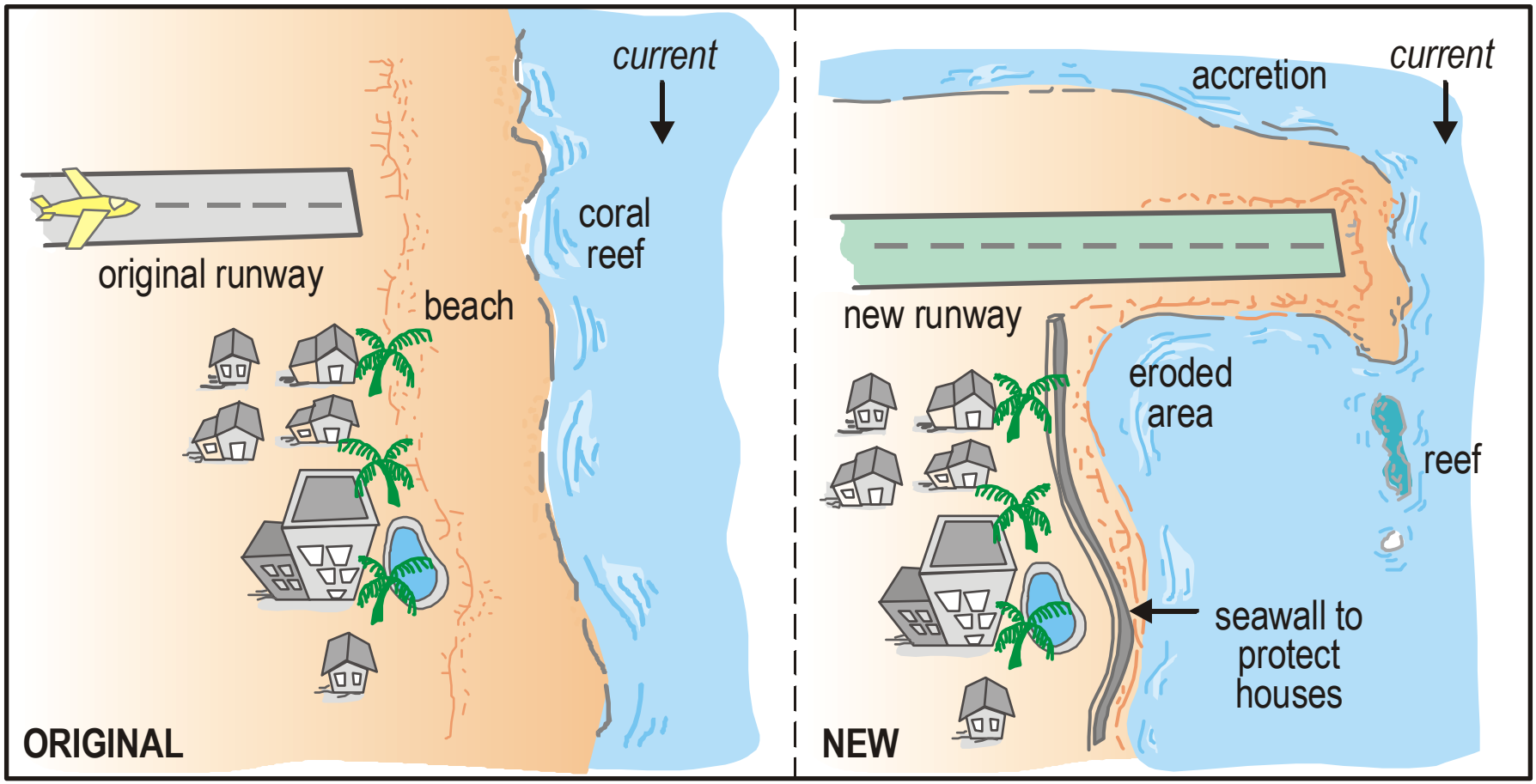
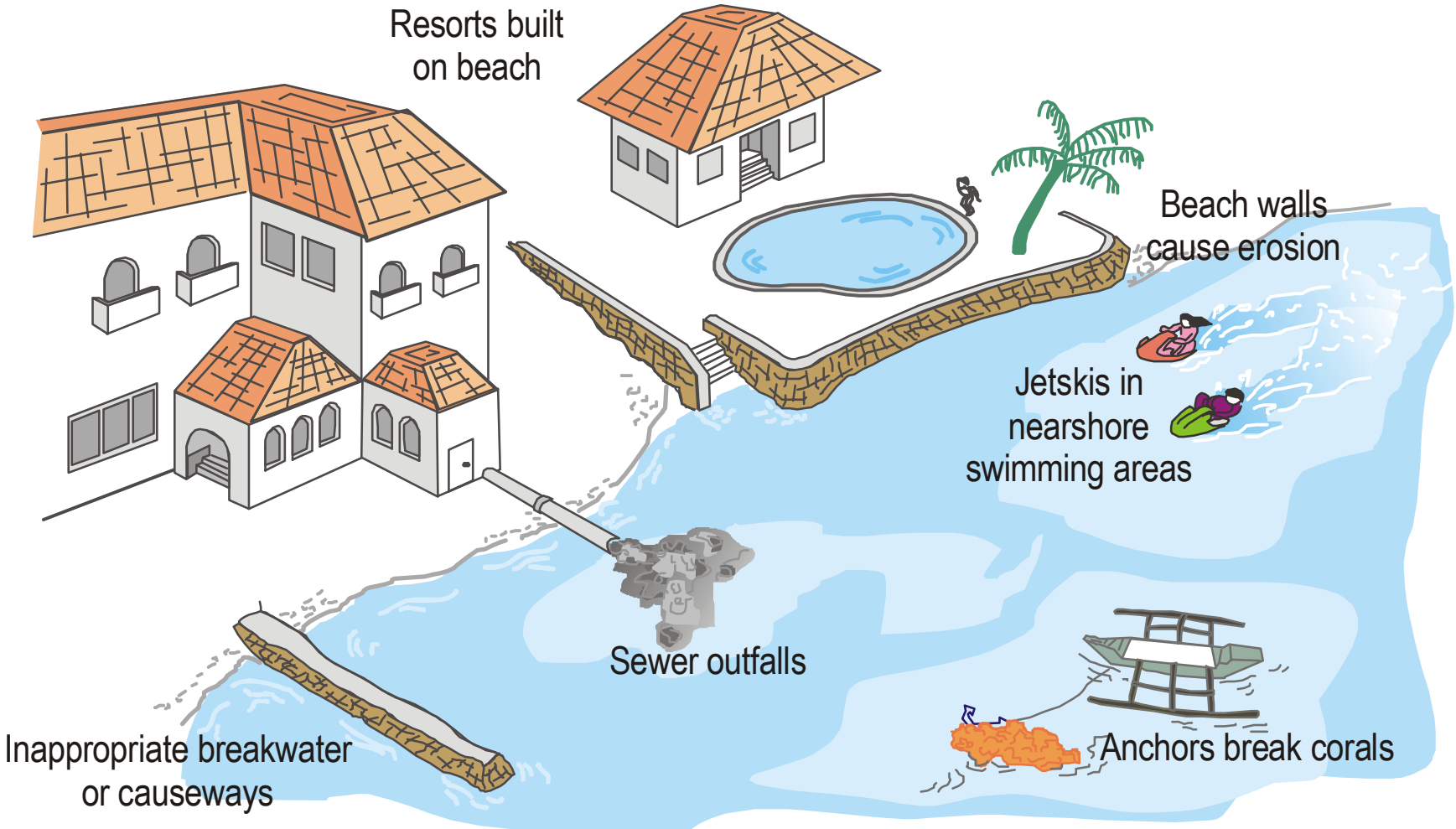
Source: Edralin *et al*. 1987

Inappropriate coastal development



Extension of airport runway interferes with sand movement, Dumaguete City

Frequent environmental impacts of tourism development and activities on the coastal zone



Resource use conflicts

- Coastal areas all over the Philippines are being developed rapidly because people like to live and do business near the sea.
- The consequence is that beaches, foreshore land areas and nearshore coastal habitats are in demand and are being utilized for a wide variety of conflicting human uses including industry, construction, dumping, boat landings, tourism and human settlements.

Nearshore fisheries support many thousands of coastal dwellers through livelihood and food

Commercial size fishing vessels often compete with small-scale fishers in municipal waters

Pollution and loss of water quality

Improper waste disposal is becoming a major problem

- About 50% of the coastal and marine pollution in the Philippines comes from runoff and land-based discharges.

Erosion, sedimentation, accretion

- Illegal logging and improper site development have resulted in erosion of lands and subsequent sedimentation of wetlands and foreshore areas.

Shoreline erosion causes a real loss of land

Growing population and deepening poverty

The average Filipino family has more than 5 members

- The coastal areas are under increasing pressure from rapid population growth of 2.4% per year and the consequent concentration of development activities in the coastal strip.
- More than 60% of the Philippine population live within what are considered coastal areas.
- The increasing population and poverty have put additional pressure on resources, subsequently resulting in increasing environmental damage, overfishing and alarming degradation of habitats.

Lecture/Discussion #3:

Introduction to coastal resource management (CRM) and the CRM planning process

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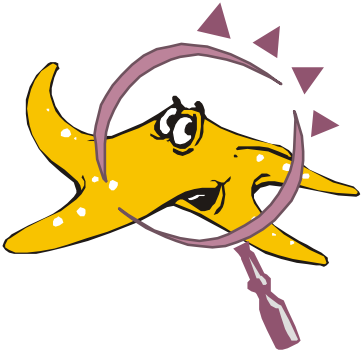

Key content points:

- Coastal resource management (CRM) is first and foremost about addressing varied, wide-ranging and often interconnected issues that directly or indirectly impact coastal areas.
- CRM provides the tools for slowing down, if not reversing the negative impacts of uncontrolled use of these resources.
- CRM is best accomplished by a participatory process of planning, implementing and monitoring sustainable uses of coastal resources through collective action and sound decision-making
- By involving resource users and focusing on local level responsibility, the communities have more ownership of the resources, issues and problems and their corresponding solutions.

CRM is above all else, managing people and human activities so that their negative impacts on the coastal environment are minimized.

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It is a consultative, multi-sectoral and multi-disciplinary process that encourages the participation and cooperation among individuals and communities to achieve the conservation and sustainable use of the coastal zone and its resources.

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Key issues addressed by CRM

- Degradation of coastal habitats
- Open access to fishery resources
- Increased fishing pressure to unsustainable levels
- Destructive/illegal fishing practices
- Coastal law enforcement
- Loss of marine biodiversity
- Inappropriate tourism and coastal/shoreline development practices
- Resource use conflicts

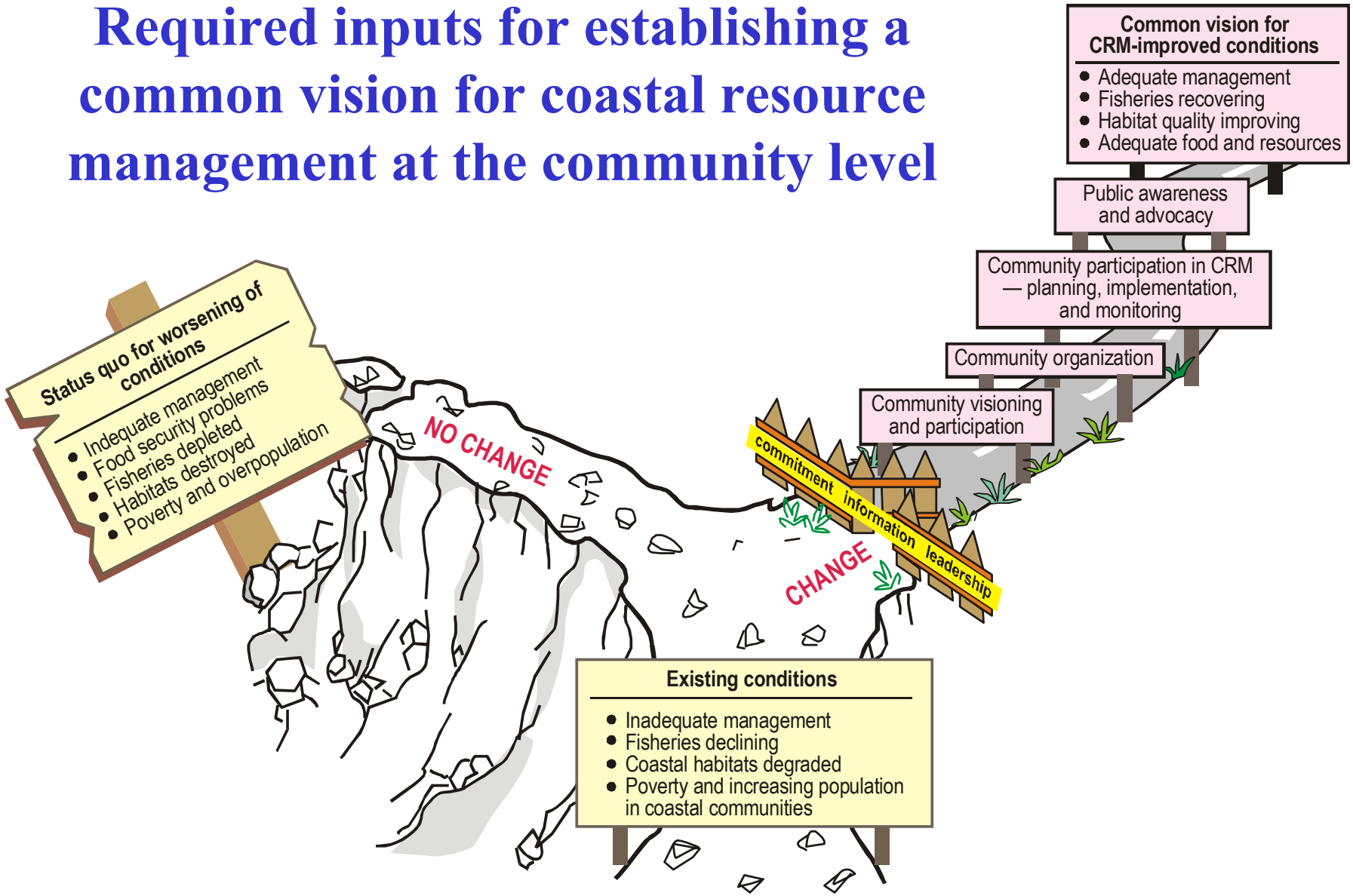
Involving communities in CRM

It is important to recognize that local fishers and community members are the real day-to-day managers of coastal resources and nearshore fisheries.

Major activities that involve communities in the CRM process:

- Identification of stakeholders and formation of partnerships
- Community organization and mobilization
- Community participation in the planning process
- Information, education and communication (IEC)

Required inputs for establishing a common vision for coastal resource management at the community level



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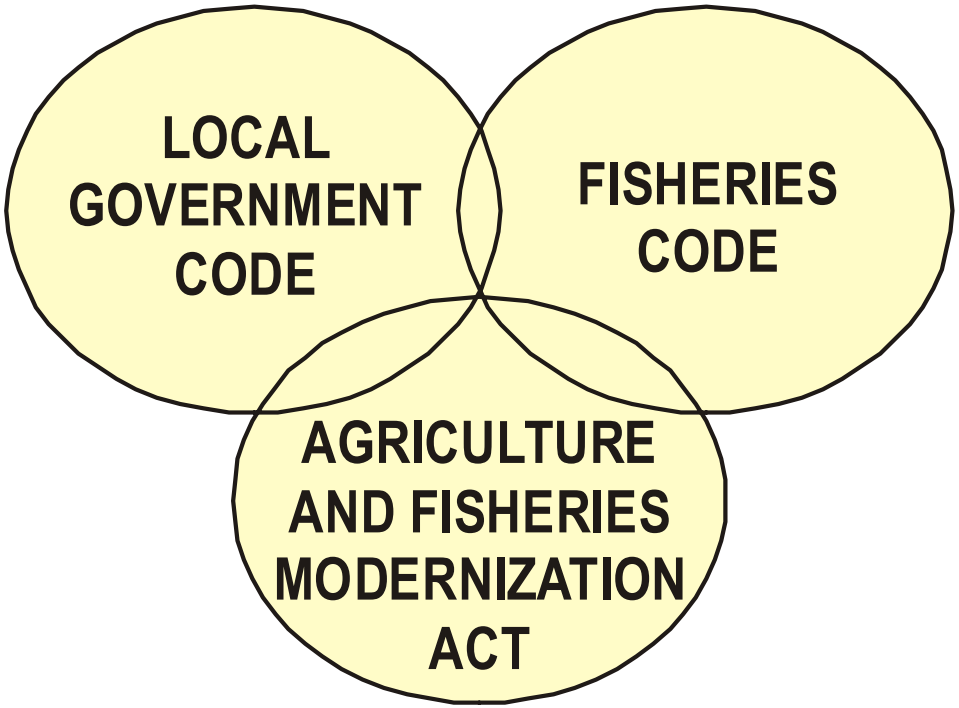
Role of the local government units

Local government plays a pivotal role as the last safety net for the recovery of coastal and marine resources in the Philippines.

The primary mandate for managing municipal/coastal waters out to a distance of 15 km from the shoreline has been devolved to the local government unit (LGU) under the 1991 Local Government Code (RA 7160) and more recently defined in the 1998 Fisheries Code (RA 8550).

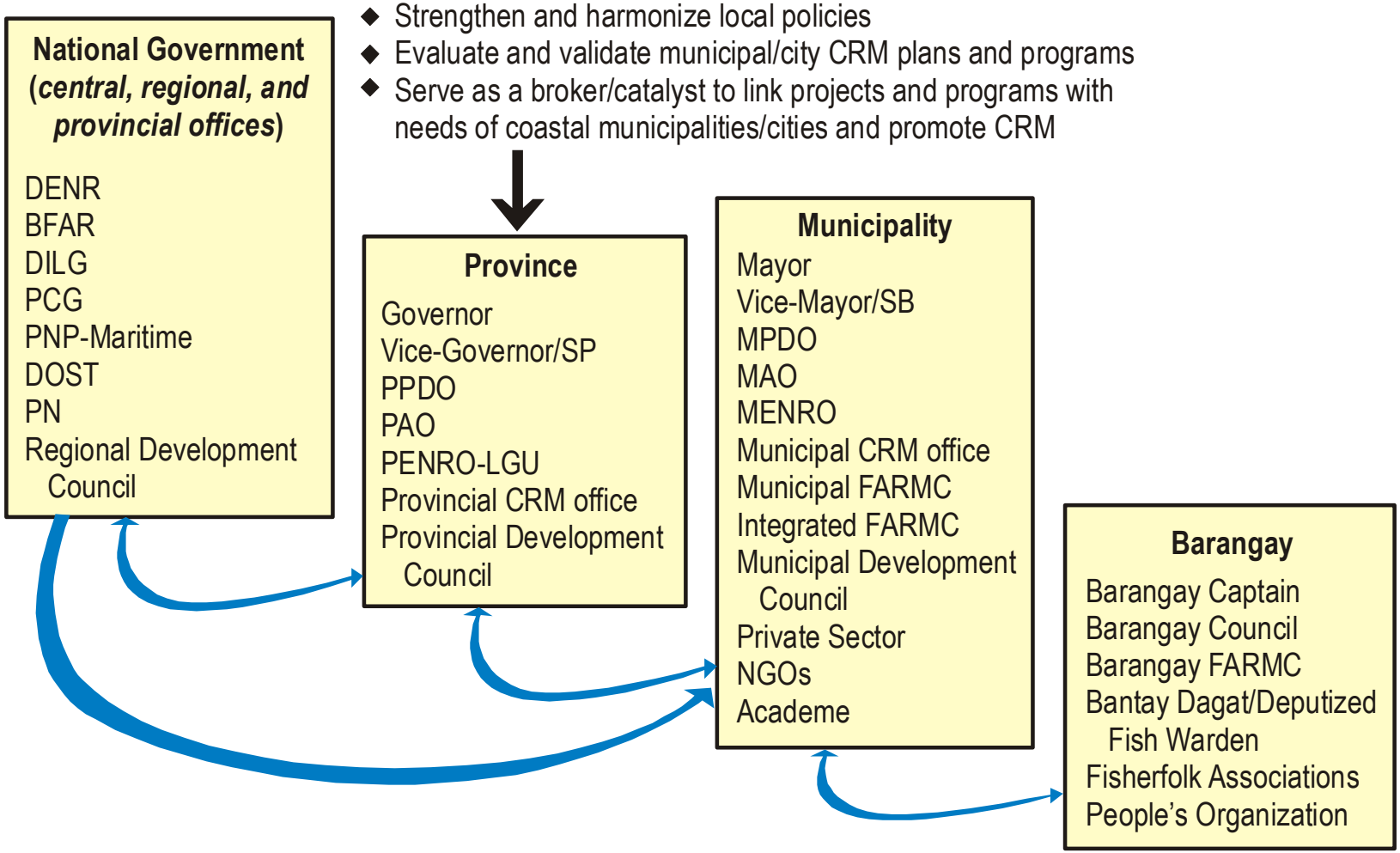
LGU Mandate for CRM



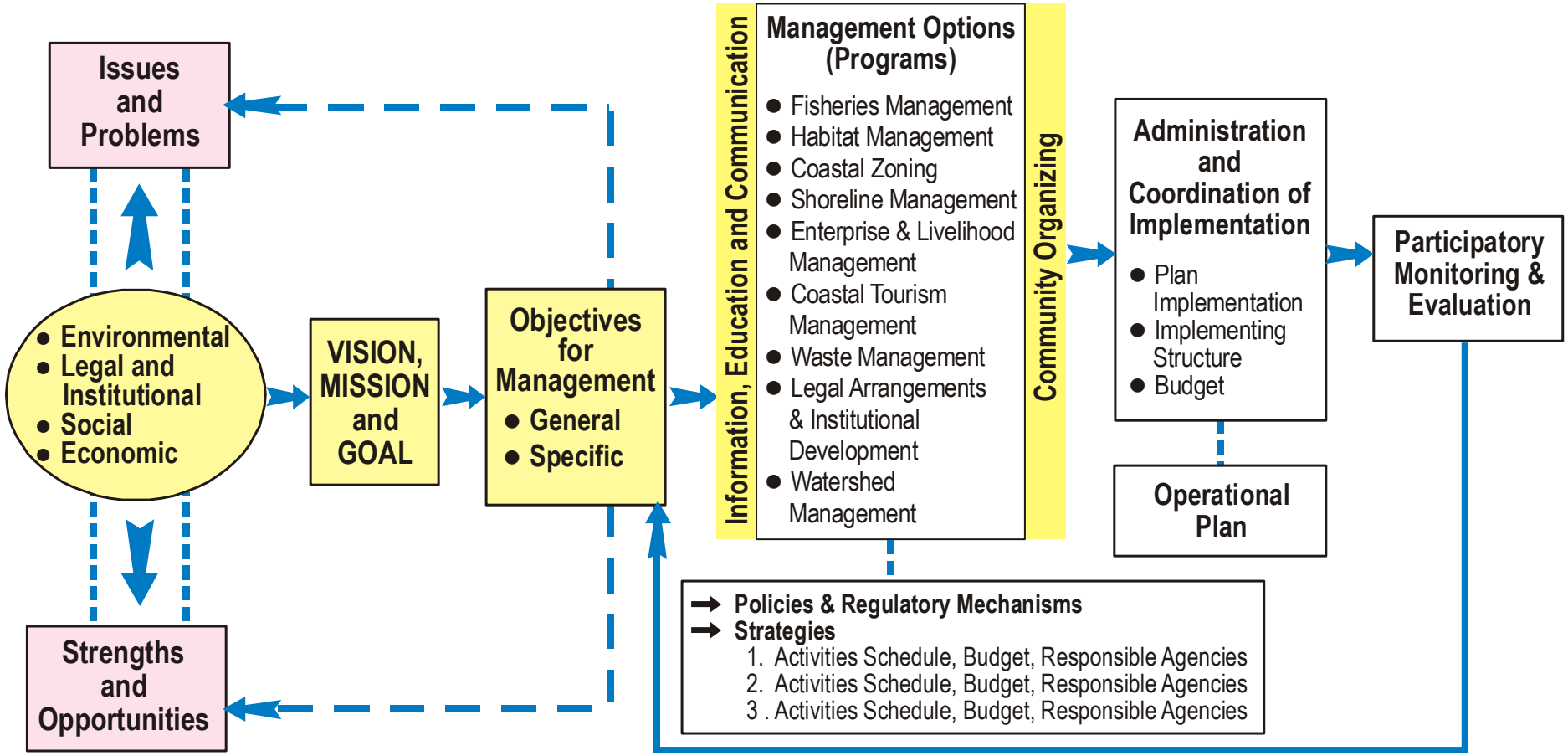
Planning
Protection
Regulatory
Enforcement
Legislation
Intergovernmental relations
Relations with POs and NGOs
Extension and Technical Assistance

Agencies responsible for managing coastal resources

- Provide CRM as a basic service to municipalities/cities through technical assistance, training, and information management
- Strengthen and harmonize local policies
- Evaluate and validate municipal/city CRM plans and programs
- Serve as a broker/catalyst to link projects and programs with needs of coastal municipalities/cities and promote CRM



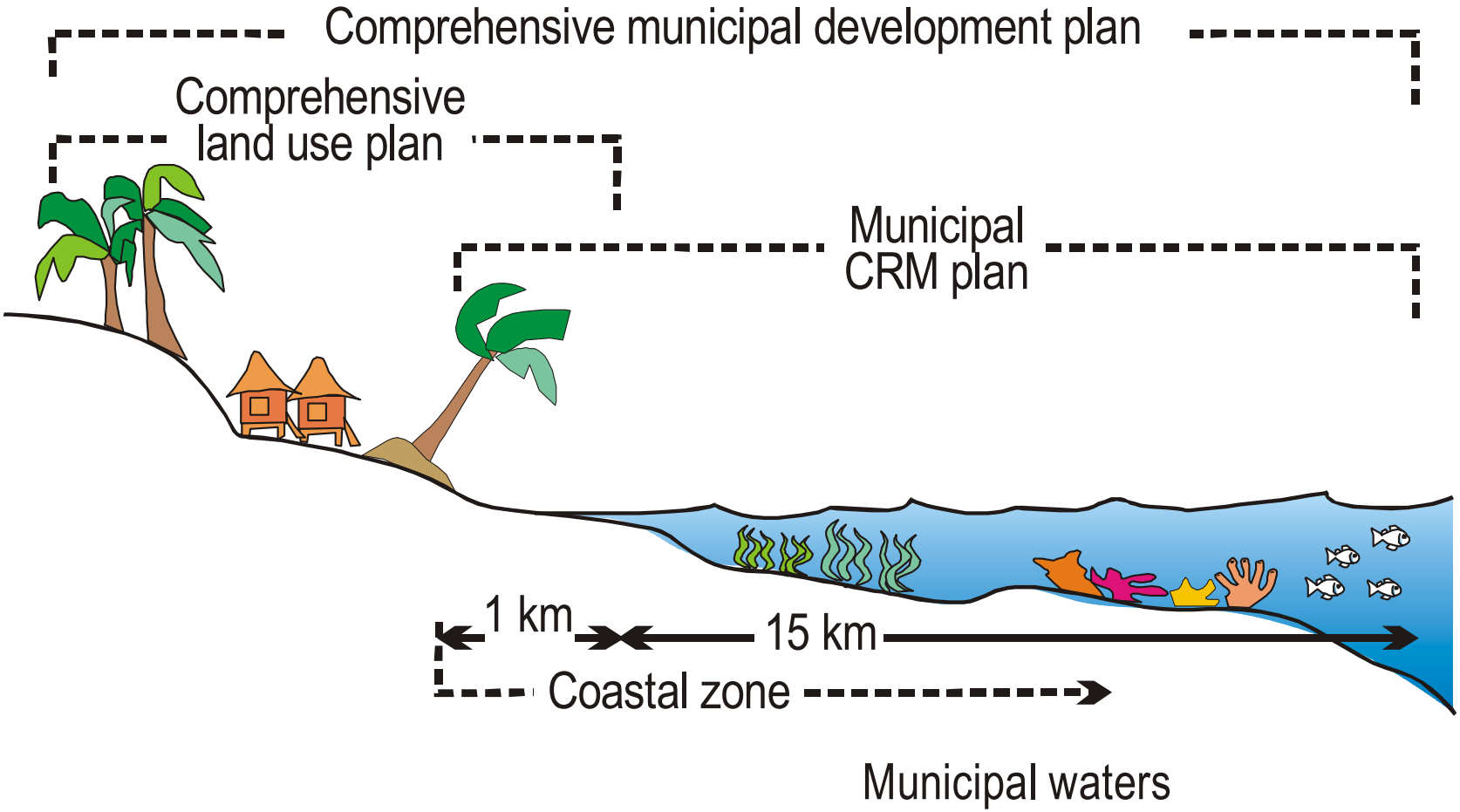
Strategic planning on CRM for LGUs



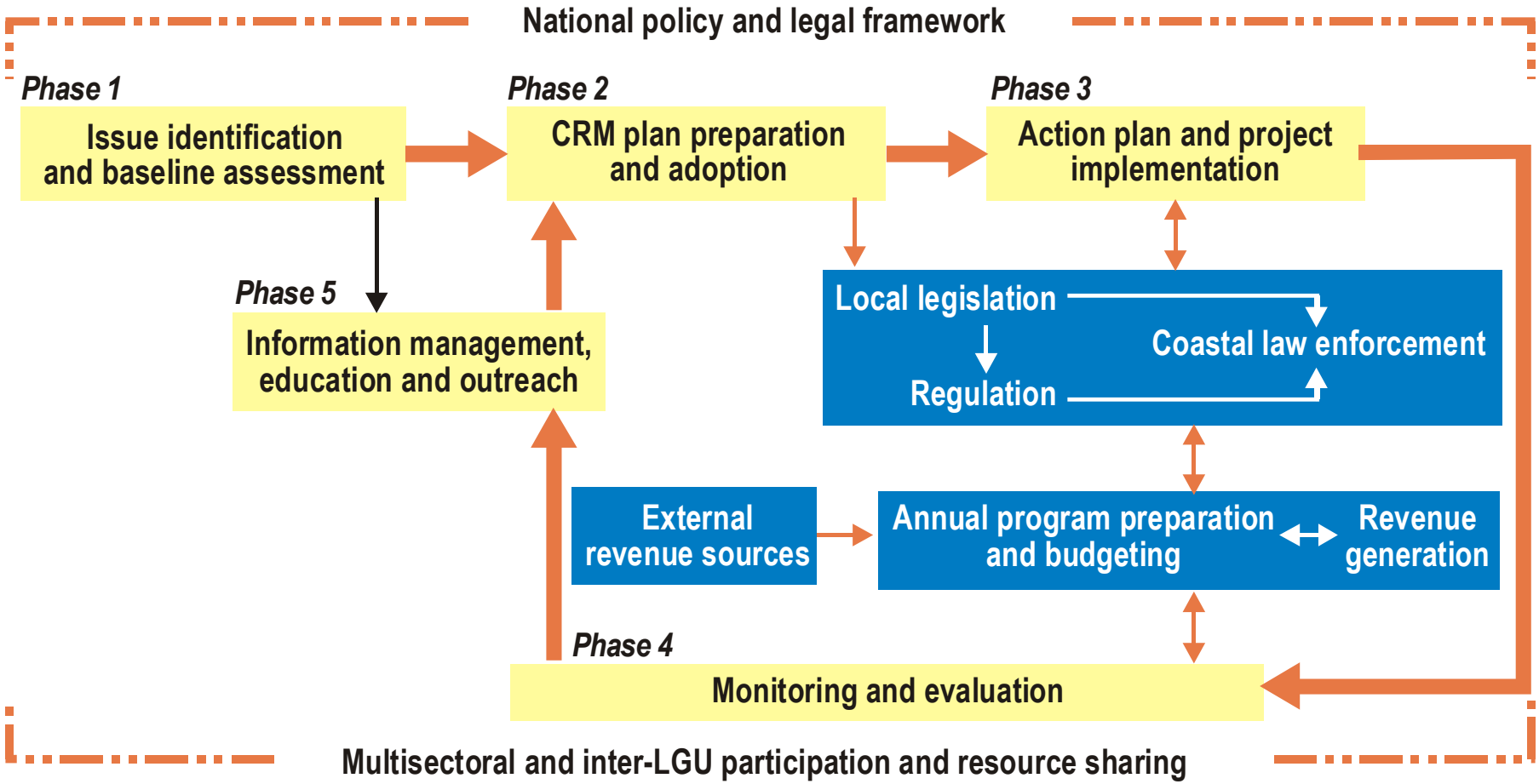
Benefits of CRM planning to LGUs

- Guides local chief executives on priority issues to be addressed
- Establishes local legislative agenda for municipal, city and provincial councils
- Provides direction to technical staff on actions to be taken to address priority issues
- Provides a framework for making informed decisions about coastal and marine resource use
- Provides continuity during changes in political administration
- Contributes to long-term sustainability of economic development activities

Spatial coverage of a municipal CRM implementation



The coastal management planning process being adapted for Philippine local government



CRM Key Result Areas (Benchmarks)

1. Multi-Year CRM Plan
2. Coastal Resource Assessment
3. CRM-Related Organizations
4. Annual CRM Programming and Budgeting
5. Shoreline/Foreshore Management
6. Best CRM practices being implemented:
   a. Local Legislation
   b. Municipal Water Delineation
   c. Coastal Zoning
   d. Fisheries Management
   e. Coastal Law Enforcement
   f. Marine Protected Area
   g. Mangrove Management
   h. Solid Waste Management
   I. Upland/Watershed Management
   j. Coastal Environment-Friendly Enterprise Development
   k. Revenue Generation
   l. Multi-Institutional Collaboration for CRM

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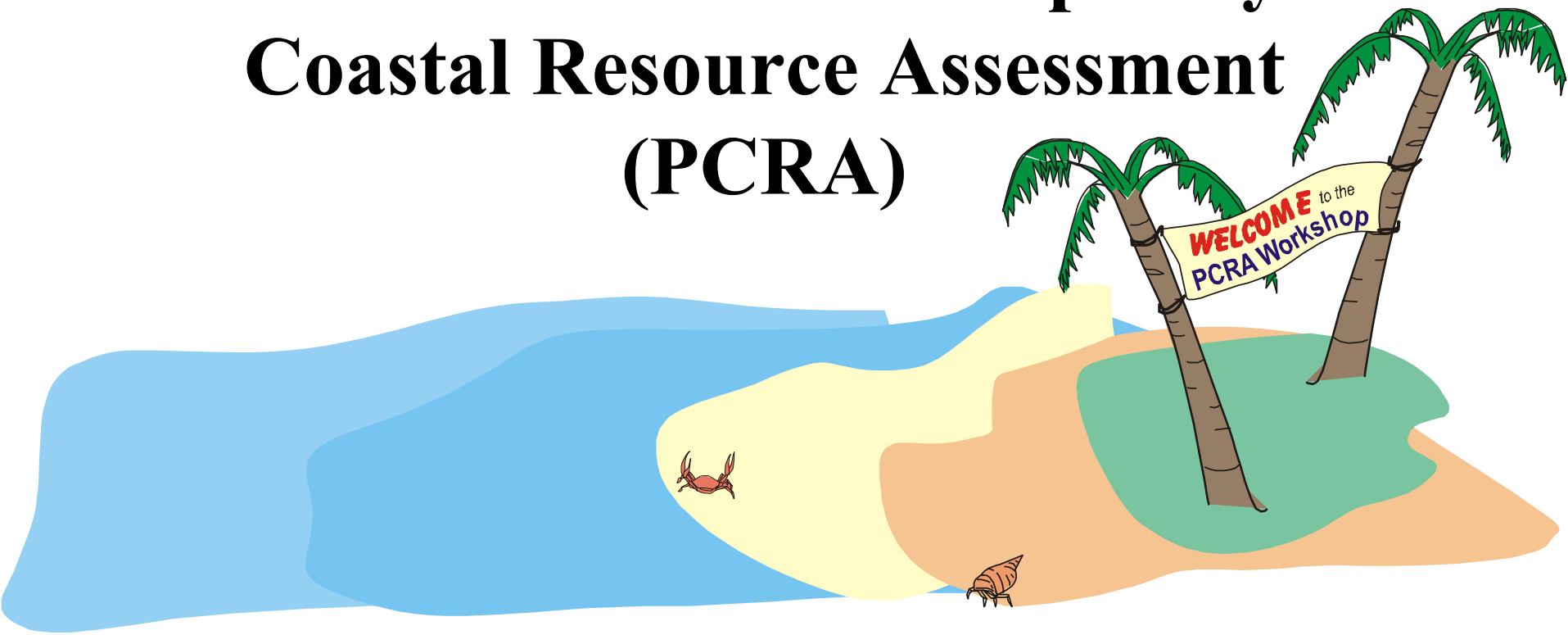
Lecture/Discussion #4:

Introduction to Participatory Coastal Resource Assessment (PCRA)



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Five-phase CRM Process Adapted for Philippine Local Government

National policy and legal framework

Phase 1

Issue identification and baseline assessment

Phase 2

CRM plan preparation and adoption

Phase 3

Action plan and project implementation

Phase 5

Information management, education and outreach

Local legislation

Regulation

Coastal law enforcement

External revenue sources

Annual program preparation and budgeting

Revenue generation

Phase 4

Monitoring and evaluation

Multisectoral and inter-LGU participation and resource sharing

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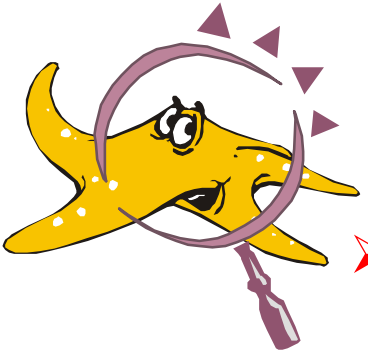


Key content points:

- An essential element of successful CRM is active participation by the entire community including day-to-day resource users (fisherfolk), local government, national government, NGOs, academe, private sector and other stakeholders.
- PCRA is an effective process of gathering information from local residents that involves the community in data collection.
- PCRA serves not only as a research tool for the coastal stakeholders, but also as a hands-on educational experience about the coastal environment they will help manage.
- PCRA results are important inputs to CRM planning.
- It is strongly encouraged to conduct PCRA at regular intervals to monitor habitat and fisheries conditions as well as current resource uses and practices.

CRM planning and PCRA

- CRM planning must be based on sound information on the condition and use of coastal and nearshore fisheries resources. Coastal environment and nearshore fisheries profiles and subsequent management plans are based on assessment, compilation and analysis of information about coastal and fisheries resources, resource use activities and characteristics of resource users.

- PCRA is an effective process for gathering information from local residents that involves the community in data collection.

- The “local knowledge” provided is a critical component of the background information for planning. Data gathered from PCRA activities make up the “coastal environment profile” of an area.
- Done well, a coastal environment profile greatly facilitates – and is essential to – formulating and implementing a CRM plan.

One of the important outcomes of PCRA process:
Coastal Environment Profile

A coastal environment profile is a document that presents secondary information and primary data gathered from resource assessment activities in an organized and integrated form.

It is essential for good planning and implementation.

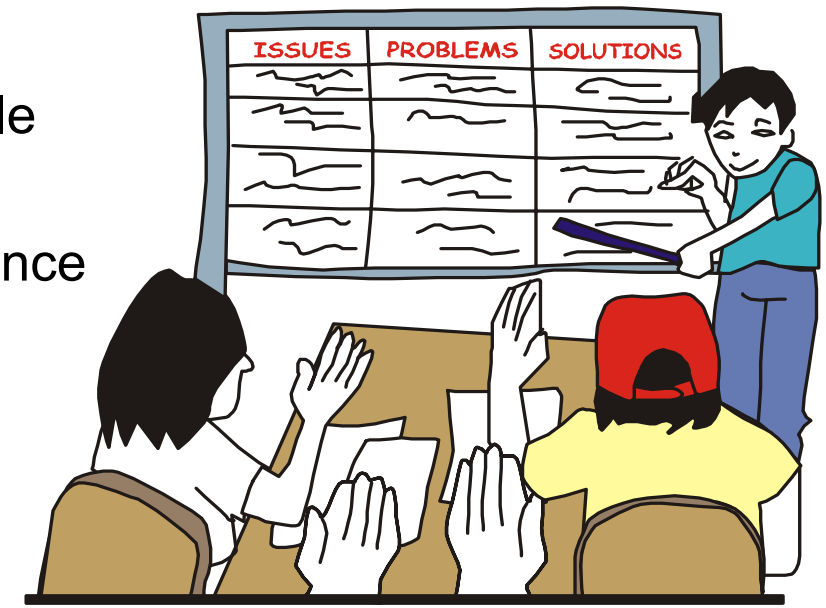
INTRODUCTION
- Background
- Special Area Management
- Past Management Efforts
- The Coastal Environment Profile

GEOGRAPHY
- Climate
- Land Characteristics
- Coastal Waters

PCRA framework and benefits

PCRA — resource assessment from the perspective of local users, integrating local wisdom and knowledge with technical expertise

- Generates information for CRM planning purposes
- Resource management made more participatory
- Community empowerment
- Ensures vital inputs from multiple stakeholders
- Useful in CRM project performance monitoring and evaluation
- Tool to achieve objectives of CRM



Important components of the PCRA process

- Gathering documented information
- Observation and participation
- Gathering local knowledge
- Obtaining local feedback on gathered and observed information

Analyzing and integrating all information to produce coastal environment profile

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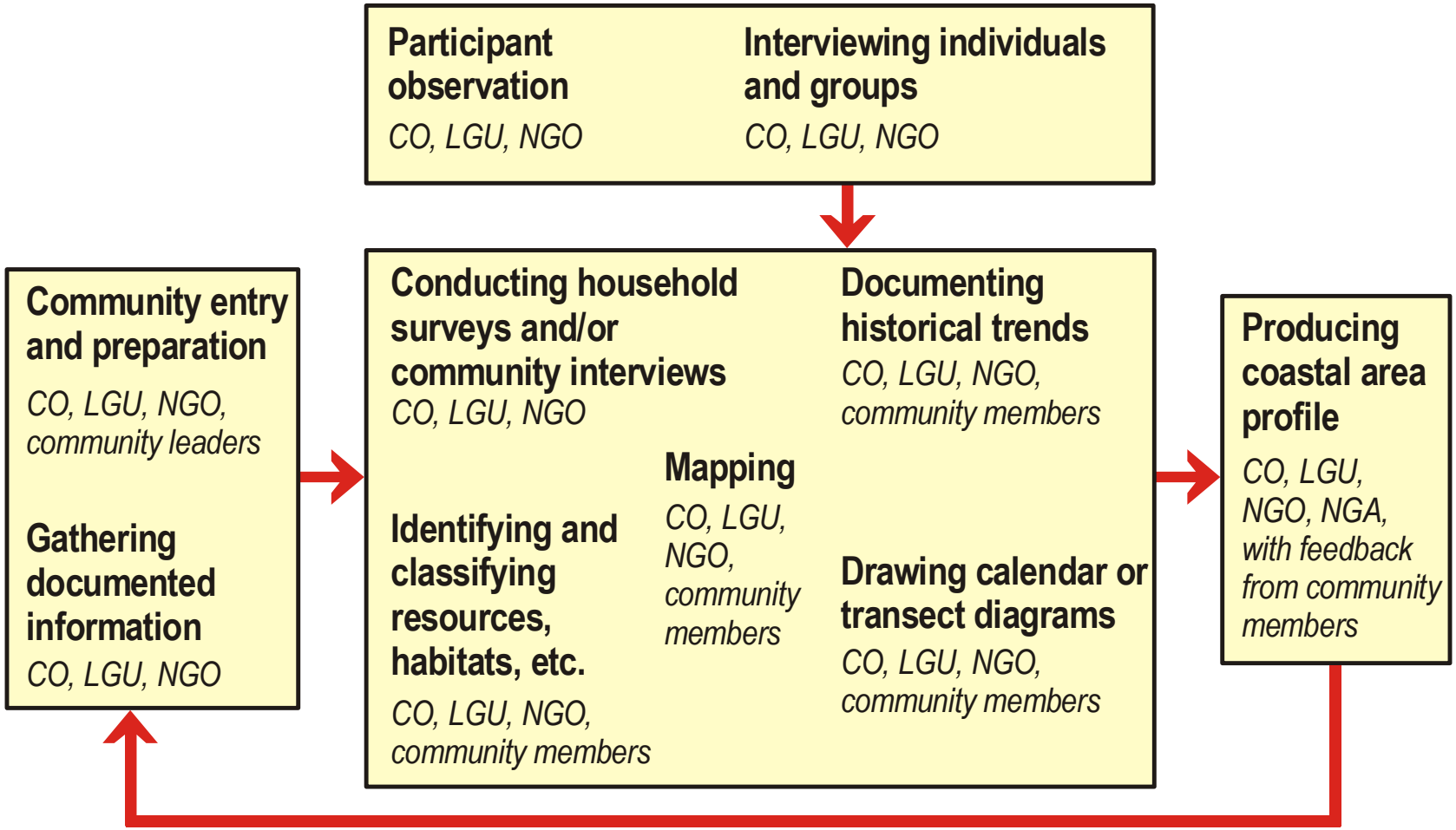
PCRA offers the following beneficial outcomes:

- Resource users become aware of the status of their resources, issues, and problems associated with the decline of these resources.
- Their participation allows them to participate actively in subsequent phases of the CRM process and contribute to decisions that will be supported by the community.
- PCRA is not only a research tool, it also serves as an educational tool that takes participants through the analytical and critical thinking stages regarding their coastal resources, resulting in informed decision-making and action.
- PCRA helps mobilize the community's sense of collective ownership and responsibility for the problems and issues of their coastal environment as well as the appropriate solutions to address these.

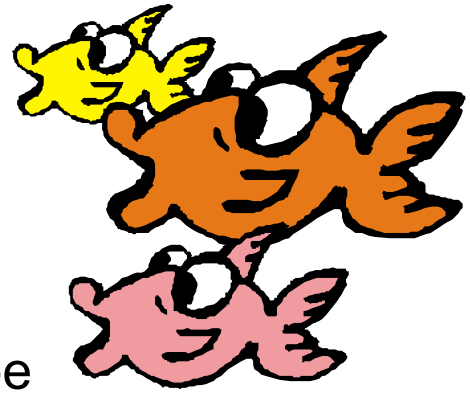
Interrelated methods of PCRA and the important players



PCRA Methods

PCRA Method	PCRA Tool	Expected Output
INTERVIEW	• Interview Guide • Calendar Diagram Form • Trend Diagram Form	• Socio-demographic Profile • Calendar Diagram • Trend Diagram
COMMUNITY RESOURCE MAPPING	• Map	• PCRA Maps
TRANSECT WALK	• Transect Diagram Form	• Transect Diagram
HABITAT ASSESSMENT		
• Coral Assessment	• Use of Quadrat • Manta Tow	• Coral cover • Other information
• Seagrass Assessment	• Quadrats • Transect Line	• Seagrass cover • Dominant species • Other Information
• Mangrove Assessment	• Quadrat • Transect Line	• Density • Dominant species • Condition

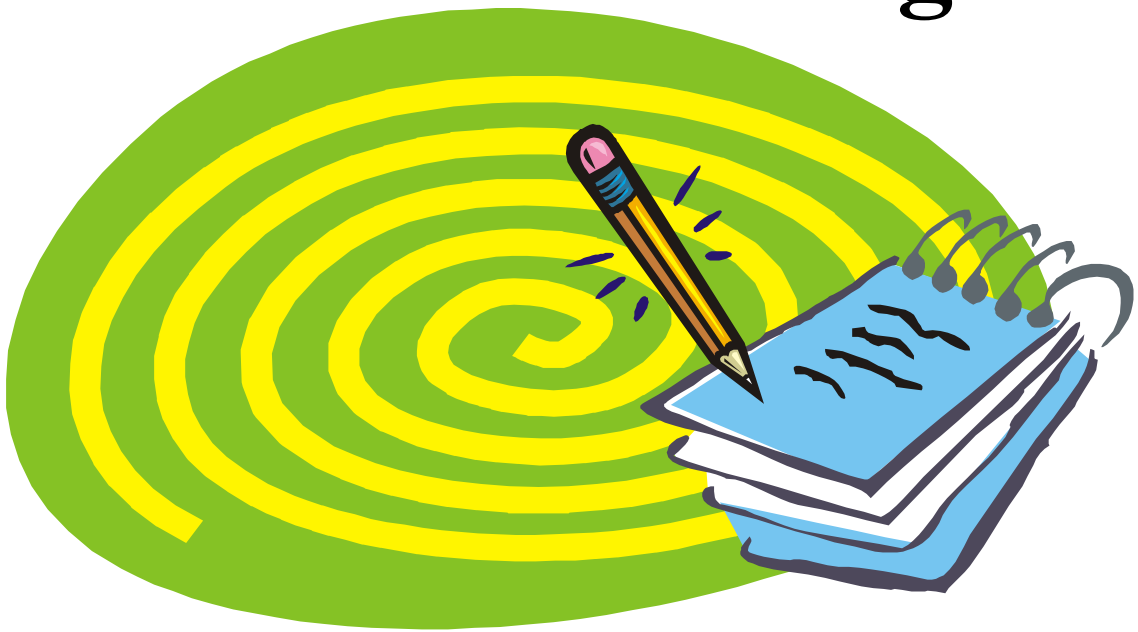
Limitations of PCRA



1. If a more specific inquiry (e.g. coral taxonomy, fish stock assessment, water quality and hydrological analysis, etc.) is a primary concern, PCRA needs to be triangulated and complemented with more in-depth resource assessment activities.
2. There are well-known dangers of the less vocal members of the community and the "non-influentials" being overlooked as sources of information. Thus, it is important for PCRA participants conducting the interviews to be sensitive to such indications.
3. Not all PCRA participants drawn from the local community may be immediately conversant in conducting interviews and focus group discussions. Facilitators need to exert some effort to validate information generated and to complement such PCRA data gathering with follow-up interviews and focus group discussions.

Lecture/Discussion #5:

Gathering secondary information and interviewing



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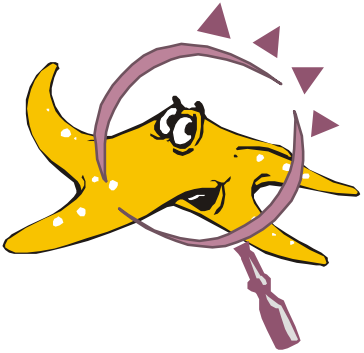


Key content points:

- Secondary data are information that have already been gathered or published for some other purpose. Generally, it is faster to collect and less expensive than primary data.
- It is always useful to begin any research or study by gathering relevant secondary data.
- The time involved in searching secondary data is ordinarily much less than that needed to complete primary data collection.
- Secondary data can play a substantial role in the exploratory phase of research.
- In PCRA, secondary sources can be extremely useful in defining both the population and the locality being assessed.

Why gather existing information?

- To serve as an initial introduction to the locality and the community
- Provide baseline information which could serve as basis for assessing early CRM actions/interventions in the area
- Lessen data duplication
- Help identify data gaps

Sources of secondary information

- National and local government agencies (*development plans, land use plans, cadastral maps, census data, fisheries data*)
- Nongovernment organizations (*documentation of past and current development projects in the area, national and local situationers, case studies, etc.*)
- Academic and research institutions (*researches, theses, habitat assessment, resource and ecological surveys, water quality assessment, socio-economic profile*)

Secondary data may be collected using different means like:

- Letter writing
- Making telephone calls
- Visiting offices and libraries
- Interviewing officials, teachers, scientists and researchers
- Checking data available in the village/barangay/municipality
- Gathering general information from the national agencies, donor-funded projects or non-government organizations

While the benefits of using secondary information are numerous, it has its shortcomings. Among these are:

- Reliability and accuracy of data provided
- Relevance of old information (except as baseline for comparison)
- Existence of possible data bias
- Dependability of research methodologies employed

Gathering information through interviews

Interviewing is a method of gathering data/information by asking questions.

The 2 parties involved in this process:

1) Interviewer(s) – the person(s) asking the questions
2) Respondent(s) – the person(s) who provide the information/data

The aims of a PCRA interview are:

- Gather reliable information for resource assessment
- Facilitate improved communication for community development and institutional strengthening
- Understand the perspective of others in the community
- Find out what is important to the community

The following data/information may be obtained from interviews

- Socio-economic data
  - occupation/livelihood
  - household composition
  - housing condition
  - others
  - income
  - health
  - education
- Knowledge, attitudes, perceptions about the coastal environment
- Existing coastal habitats and fisheries resources
- Perceived status of these resources
- Community activities and existing organizations in the community
- Existing livelihood/resource management projects in the community
- Assessment of trends in fish catch
- Perceived changes in fisheries resources
- Existing infrastructure projects/coastal development activities
- Perceived problems, concerns, issues
- Proposed solutions to these problems

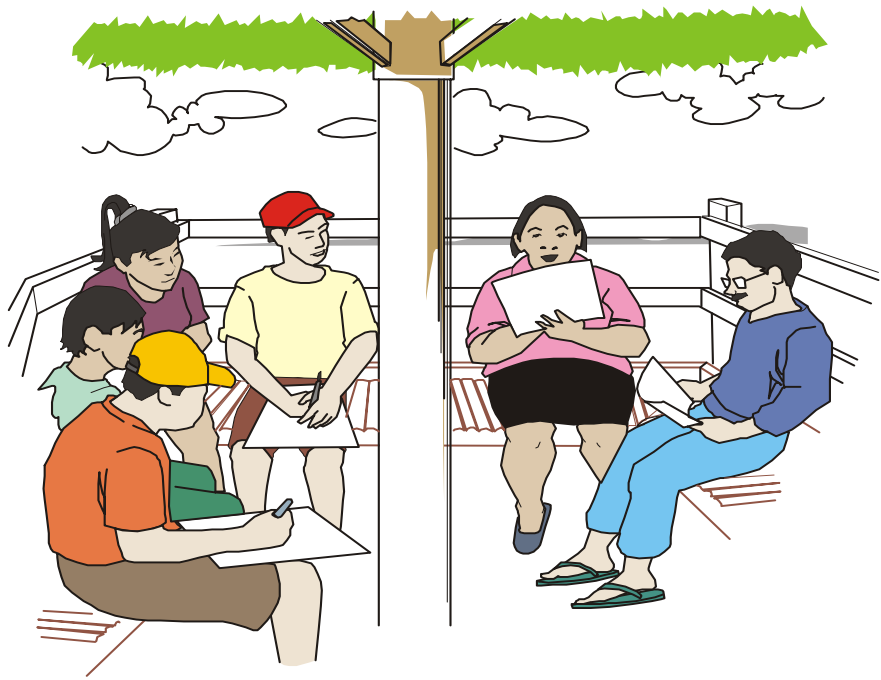
Types of interviews

Structured interviews: Composed of specific set of questions outlined in a specific sequence, often with closed-ended or multiple choice options for responses.

Semi-structured interviews: Generally composed of a combination of closed-ended and open-ended questions, with a lot of follow-up or probe questions.

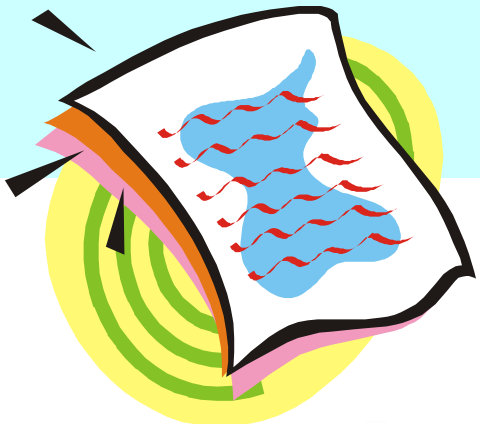
A semi-structured interview usually involves a set of guide questions or discussion points.

Design of the interview schedule must be prepared beforehand and with care.



The interview process

- Beginning
  - Introduction
  - Ask permission
  - State purpose
  - Set time frame
- Interview proper
  - Actual asking of questions
- Closing



Tools or instruments used to guide the interview

- Interview questionnaire
- Interview guide
- Focused group discussion guide
- Use of diagrams, graphs

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Types of questions to ask

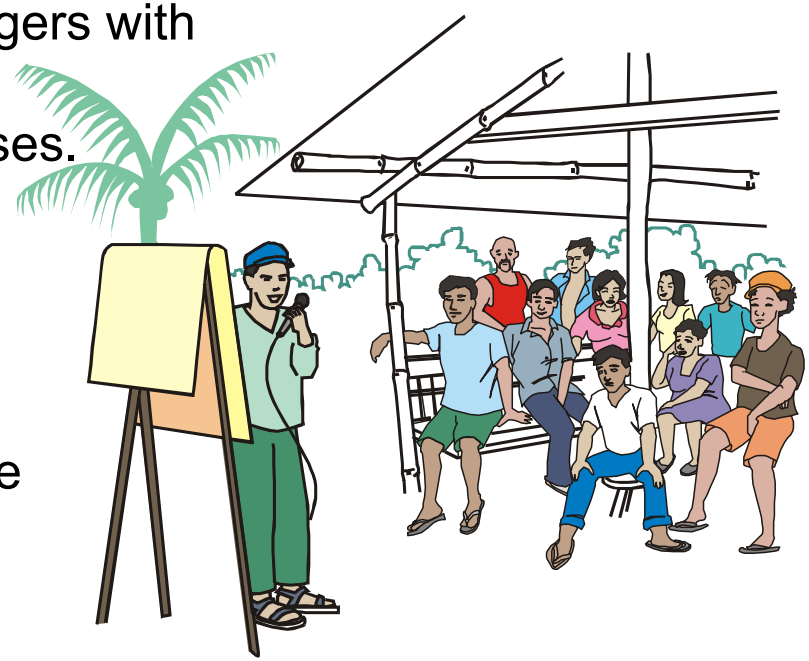
- **Descriptive questions** - require the informants to describe activities or issues (*Describe how your fishing methods and fish catch have changed over the years*);
- **Structural questions** - elicit a response that indicates how well the informant understands the complexity of the situation (*What effect has the degraded condition of the reef had on your livelihood?*);
- **Contrast questions** - provide an opportunity for the informant to compare and contrast situations in their world. (*How would you compare the quality of life in the village now with 10 years ago?*); and
- **Probing questions** - give the informant an opportunity to analyze situations and look for underlying causes (*Why do you think the fish catch has declined?*)

Key respondents in interviews

- **Individuals/Key informants and opinion leader.**
  Selected community members who are able to provide information on particular subjects based on their knowledge, skills or experience are specially sought to provide information.

- **Groups or specific sectors in the community.**
  Significant information like fishing practices & gears, health data, community issues and concerns are better generated through group interviews given the familiarity of the villagers with one another, thereby making it easier for them to confirm or challenge their responses.

- **Participants in Focus Group Discussions (FGDs).**
  FGDs are conducted to discuss specific topics or issues in detail. A small group of people (4 to 10) who are knowledgeable or interested in the topic are invited to participate in the discussions.



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Interviewing Guidelines

DO's

Before the interview

- Inform concerned local leaders about the PCRA activity and the need to conduct interviews. Set a date, time and place most convenient to the respondents.
- Obtain a broad overview of the area and the community so that you are able to select a representative sample of interviewees.
- Prepare for the interview.
- Identify persons to be interviewed beforehand and schedule appointments. State the purpose of the interview.
- Be sensitive to cultural practices.
- Arrange for a translator if you do not speak the local language/dialect of your respondent.
- Be aware of the daily schedule of community members. Schedule interviews so they do not interfere with respondent's important activities.
- Assess length of time needed to complete the interview.
- Ensure all the materials needed for the interview are in order.

Before the interview (*continued*)

DONT's

- Arrive at a community without previous agreed-upon arrangements with local leaders.
- Conduct interviews in an "ambush" manner.
- Call attention to your arrival through the use of fancy vehicles, non-conformist attire, and loud behavior.
- Be unprepared with your interview materials (e.g. you have to send out someone to make copies of your interview guide or to buy pencils or notebooks because you forgot to bring these.

Skills needed to interview

- **Questioning**
- **Observing**
- **Listening**
- **Focusing and guiding**
- **Recording**
- **Establishing rapport**

DO's

During the interview

- Conduct interviews in the language of the respondent(s)
- Begin with the traditional greeting and properly introduce yourself/members of your team and the purpose of the interview.
- Advise respondents as to the length of time expected to complete the interview.
- Express to respondents that you are there to learn from their insights and experiences.
- Conduct interview informally and mix questions with discussions.
- Be open-minded and objective.
- Be respectful and sensitive to non-verbal language.
- Be gender-sensitive.
- Establish rapport and build trust with your respondents by showing interest
- Ask easy questions before the more difficult ones.
- Use indirect questions for sensitive aspects such as income, education, ownership, etc.
- Ask open-ended questions so that they require explanations.
- Make questions short and easy to understand and ask these clearly and one at a time.
- Show interest and encouragement when asking for additional information.
- Record only what is being said.
- Finish the interview politely and thank the respondent(s) sincerely.

During the interview (*continued*)

- Go direct into the interview proper without greeting respondent(s)
- Assume that respondents have all the time in the world for the interview.
- Use tape/video recorders without the permission of the respondents.
- Unnecessarily interrupt discussions between respondents and other members of your team.
- Use leading questions and volunteering your own opinions.
- Make conclusions and finish the sentences of respondents, even if they have difficulty expressing themselves.
- Encourage a few to monopolize discussions.
- Ask vague questions.
- Lecture to respondents.
- Argue with respondents.
- Indicate any signs of disbelief to responses given.
- Allow interview(s) to go too long.
- Ask insensitive questions.
- Abuse the respondent(s) hospitality.
- Discourage alternative views and opinions.
- Be gender-insensitive.
- Do any inappropriate behavior.

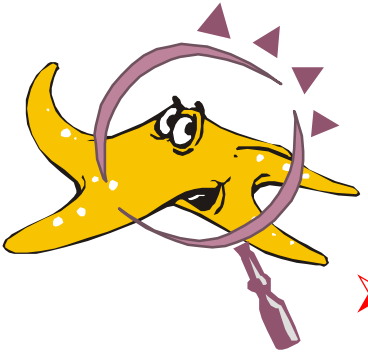
DO's

After the interview

- "Clean-up" your notes on the interview the soonest possible time as you may quickly forget the information provided.
- Test your understanding of the issues/problems by validating these in subsequent interviews with other respondents.
- Note down your observations and add any general information you may have gathered in the course of the interviews.
- Record only what is being said and what you see.
- Note down "quotable quotes" from respondents that you can use in your reports.
- If you don't speak the local language, use an interpreter's services to ensure you have correctly noted the responses.
- Ensure completed notes/responses/questionnaire guides are properly identified for easy retrieval in report writing.

Lecture/Discussion #6:

Diagramming



Key content points:

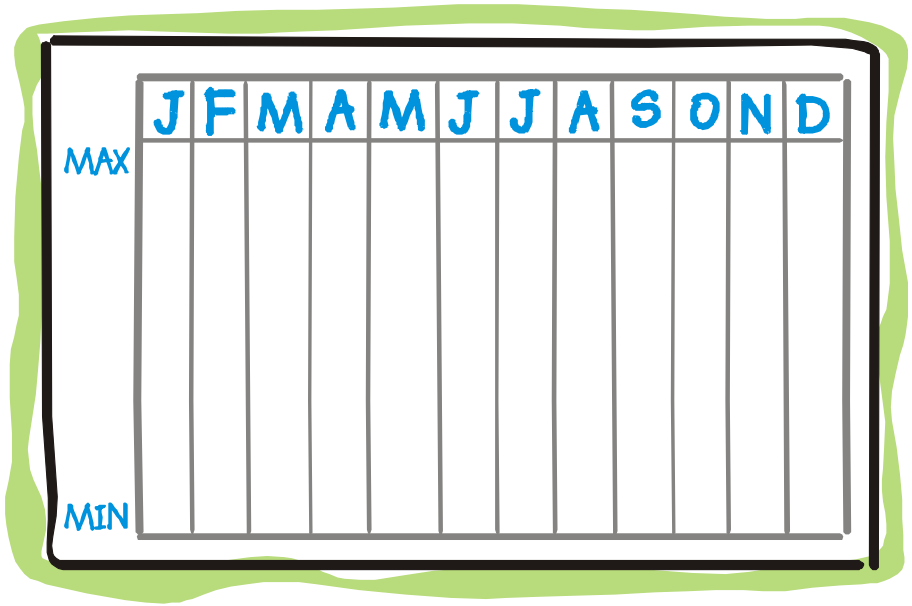
- Diagramming is a means of presenting information visually to illustrate spatial and time-based information.
- It provides a good way of presenting and analyzing information without having to go into complicated detail.
- Diagrams work best in context specific situations and for presenting localized information.
- Visual construction of information provided by diagramming helps to simplify data organization and analysis.
- Need to be complemented with other information-generating techniques
- The more common diagramming techniques in PCRA include calendar/seasonal diagrams and trend diagrams or time lines.

Calendar diagram

Calendar diagrams are very useful means of generating information about seasonal trends within the community and identifying or documenting cyclical patterns or changes in any one of more variables in an annual or cyclical periods.

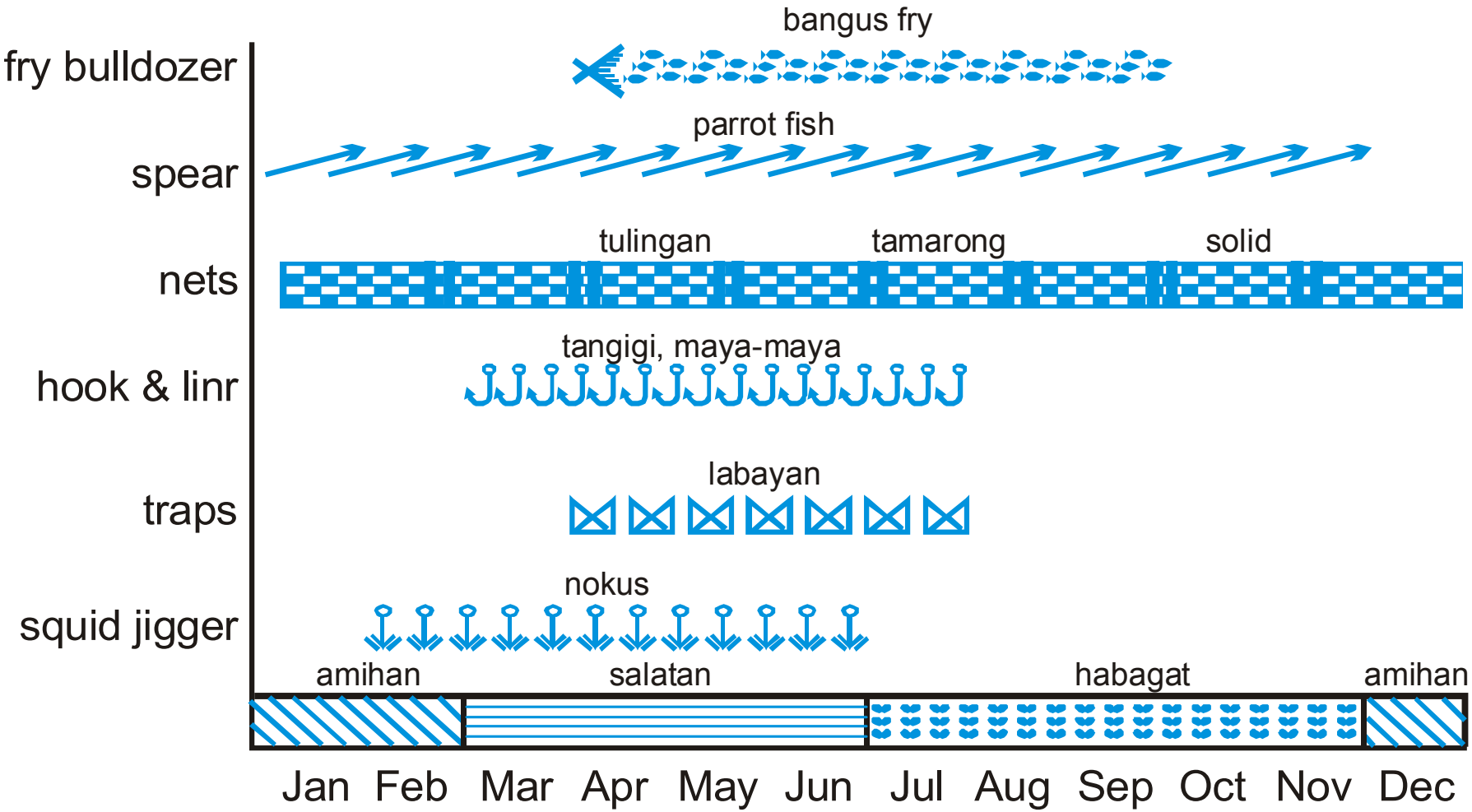
These variables may include:

- Temperature
- Wind intensity and direction
- Rainfall levels
- Seasonal production
- Fish-catch
- Fishing gears used
- Labor requirements
- Expenditures, etc.



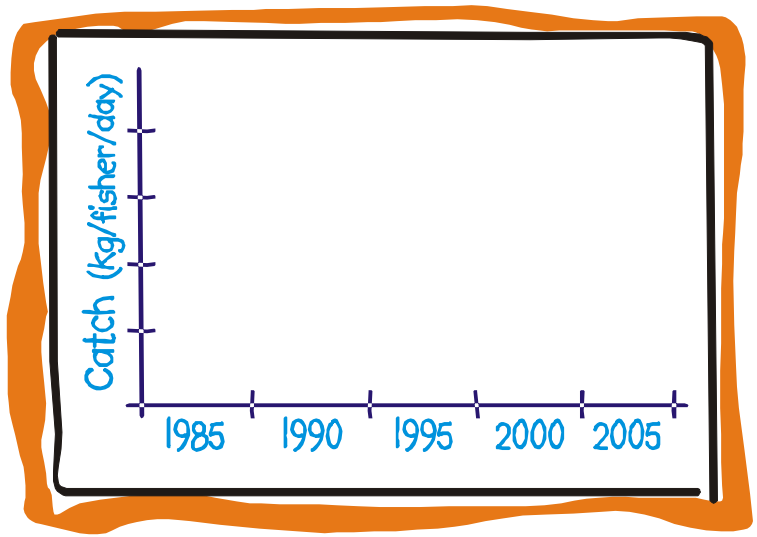
The calendar emphasizes qualitative information focusing more on periods (usually lasting a few days or more) than events (that usually last a day or less). The periods are based on experiences from previous years.

Sample calendar diagram on seasonality, fishing gear, and fish catch



Trend diagram

A trend diagram illustrates in graphical manner the community's perception of how the condition of their coastal area or community has changed over time. By looking at certain variables that are considered important to the community and helping them to plot these on the vertical axis against time in years along the horizontal axis, the community is able to see the "trend" of the assessed variable(s) through time.

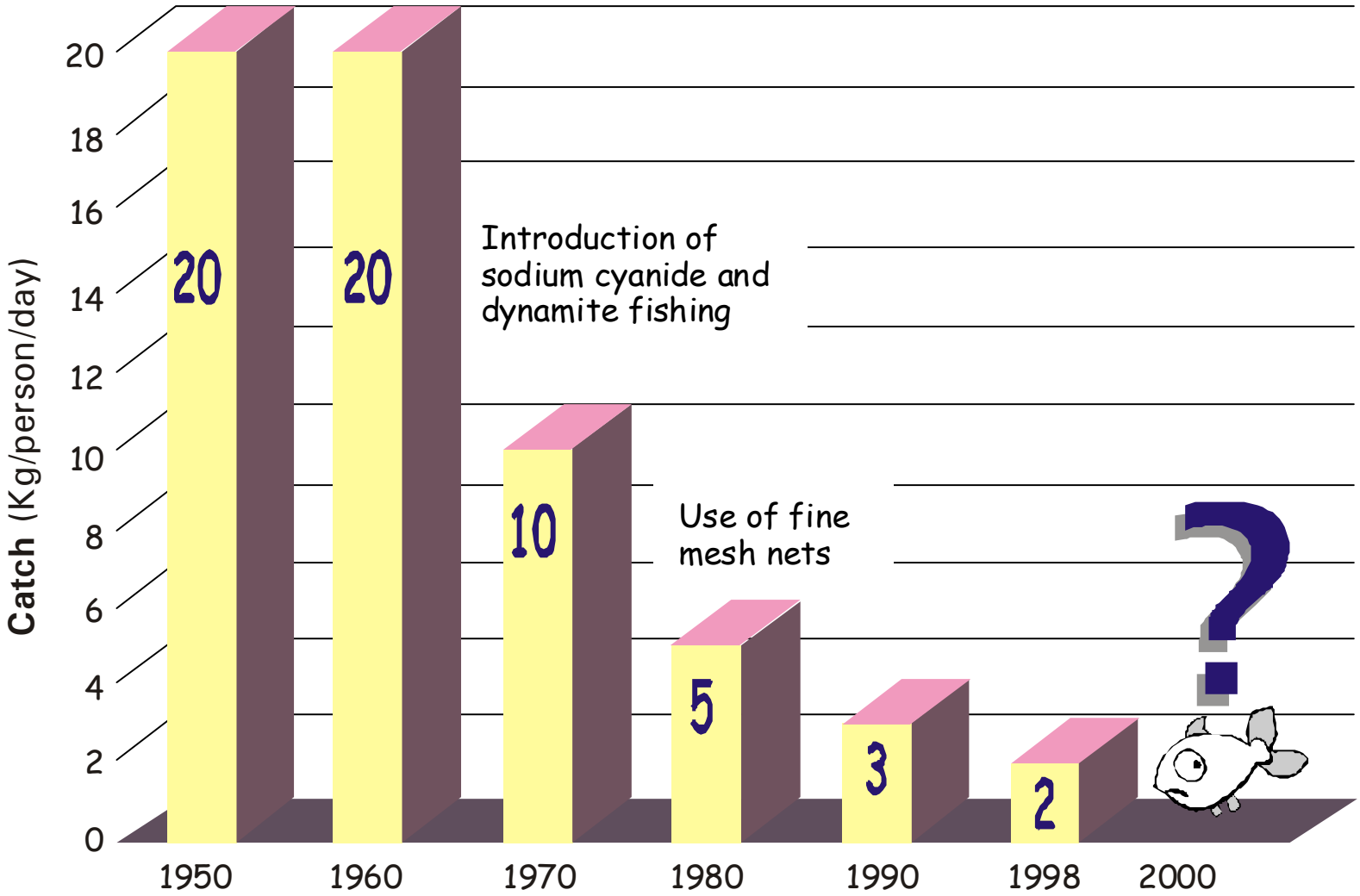


These variables may include:

- Population
- CPUE by gears
- Mangrove condition
- Fishing practices, etc.

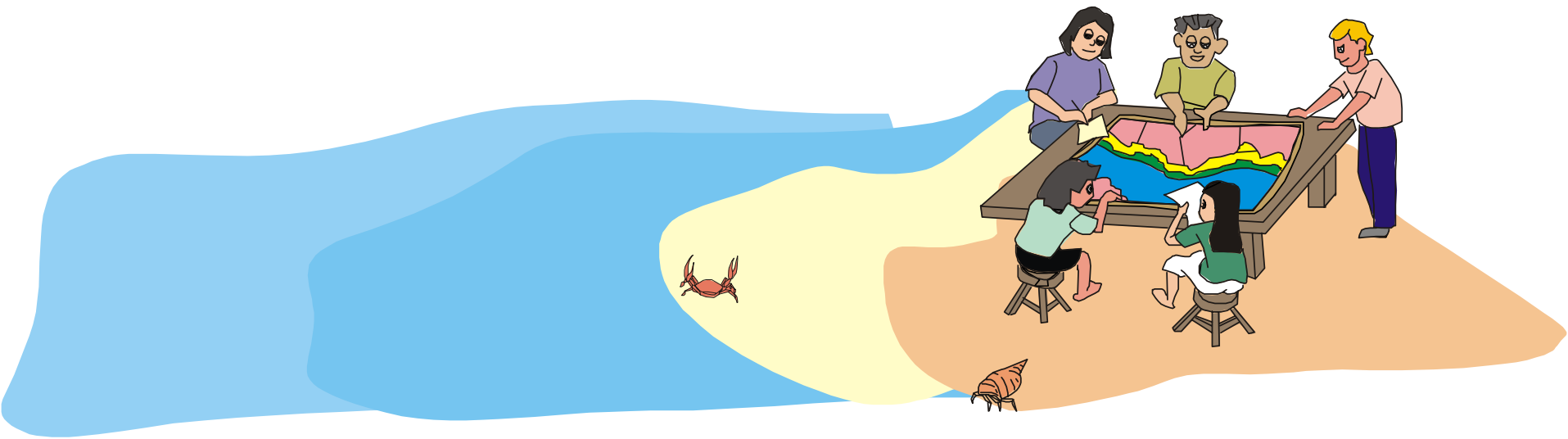
The advantage of a trend diagram is that it provides clear and visual presentation of the changes through time. Its limitation lies in the fact that data provided by the community are largely based from individual experiences, or personal recall, and hence may be subjective.

Sample trend diagram of fish catch



Lecture/Discussion #7:

Community Mapping



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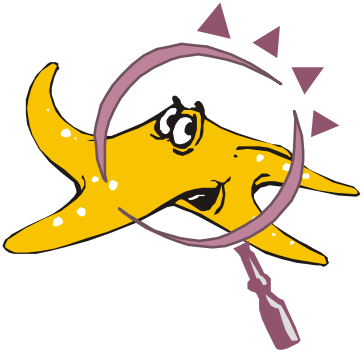


Key content points:

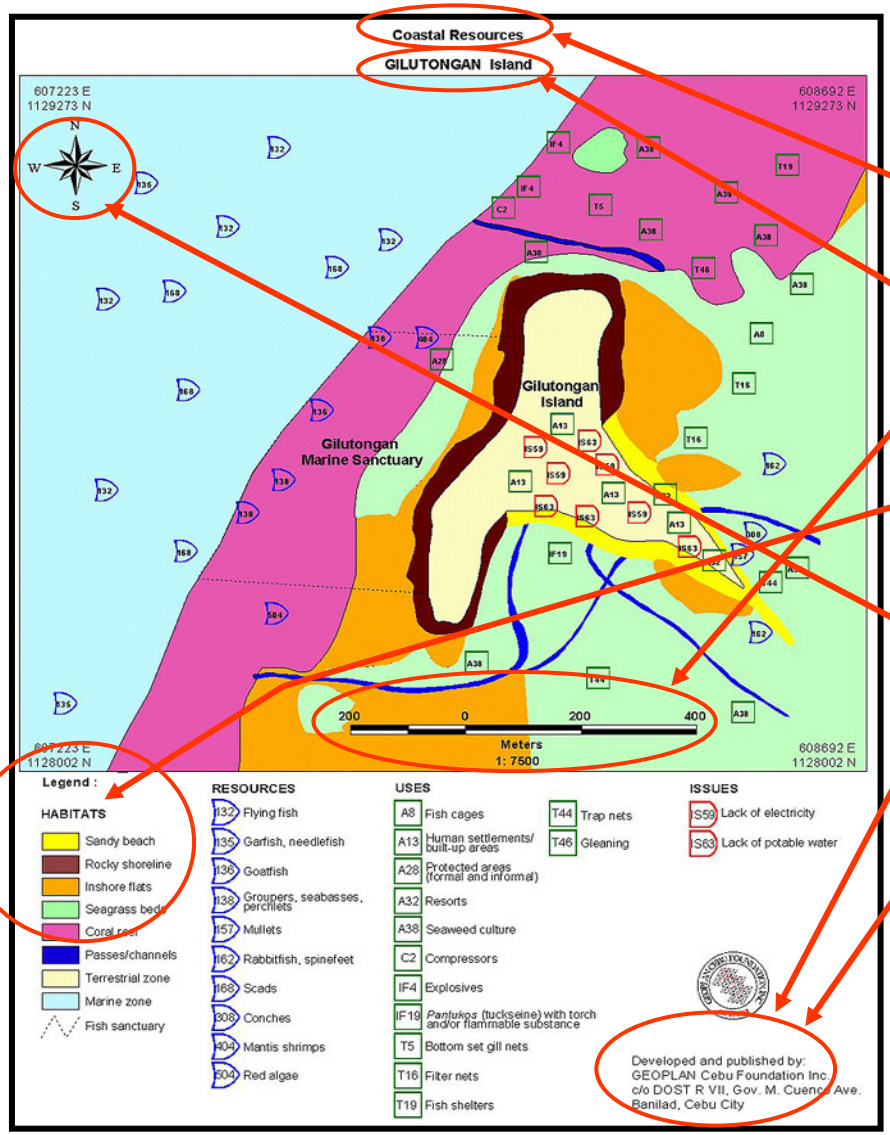
- Mapping is a visual technique of presenting information on the coastal and marine resources in the area that can be easily understood by community members. Maps can also reveal much about the socio-economic conditions and how participants perceive their community.
- Such maps generally serve to reflect the locations/boundaries of villages, coastal and fisheries resources, forests, agricultural and urbanized lands, water resources as well as their present uses and key activities including corresponding issues and problems.
- The use of a barangay base map is important to closely approximate the spatial patterns and other characteristics being revealed in the map.

Maps are some of the most important tools in planning and implementing CRM projects. By laying the various zones, resources, infrastructures, development activities, opportunities, threats and issues on the map, the community is able to situate the condition of their coastal area in a visual and tangible manner.

Various information that can be mapped:

- Boundaries
- Roads
- Settlements
- Other infrastructures
- Natural resources
- Land use
- Zonation
- Other special interests

Standard features of a map



1. Title
2. Location
3. Scale
4. Legend
5. North Orientation
6. Author(s)/Publisher(s)
7. Year of Publication

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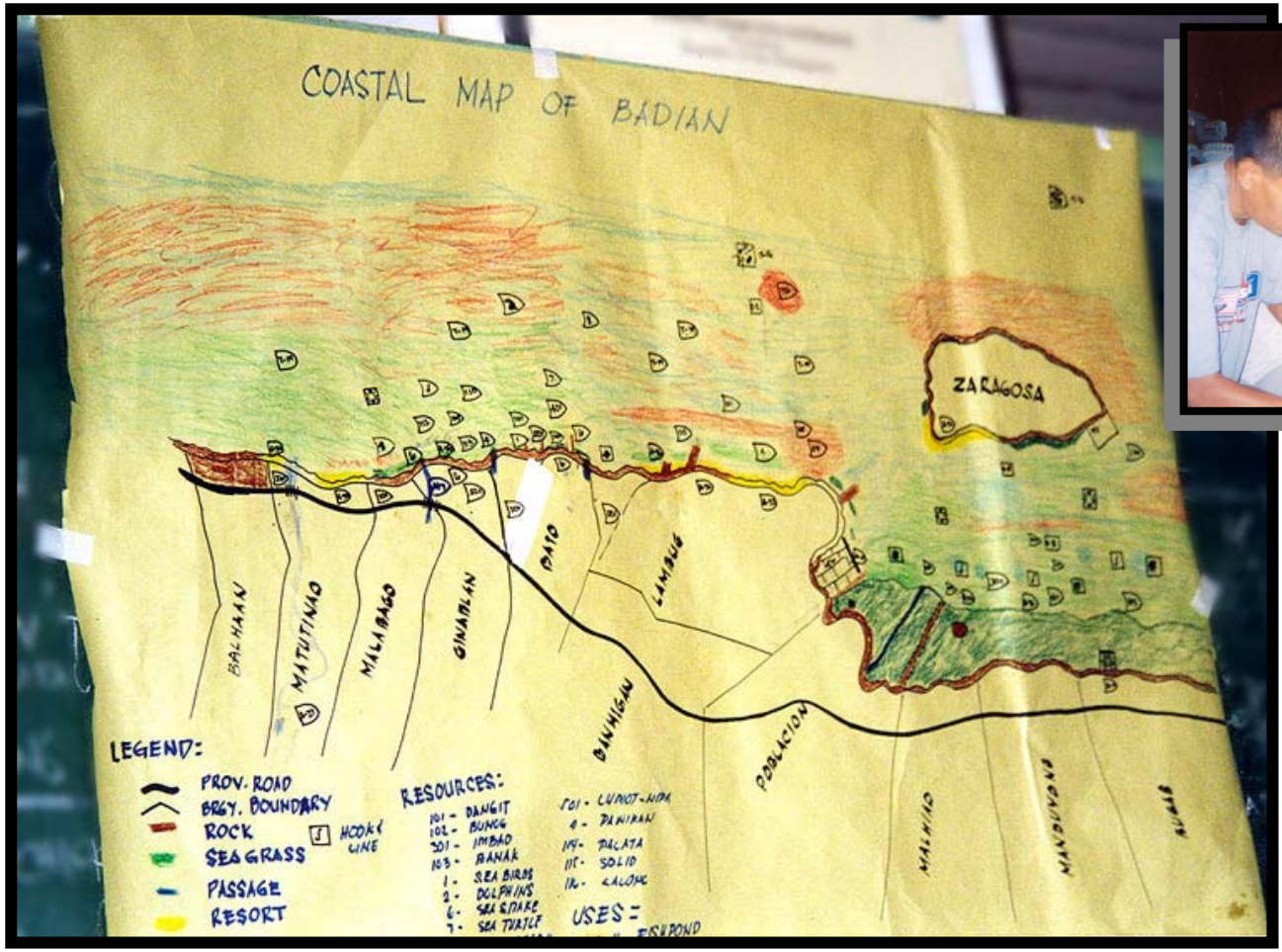
Sample of a community-drawn coastal resource map of Badian, Cebu



Community-mapping participants

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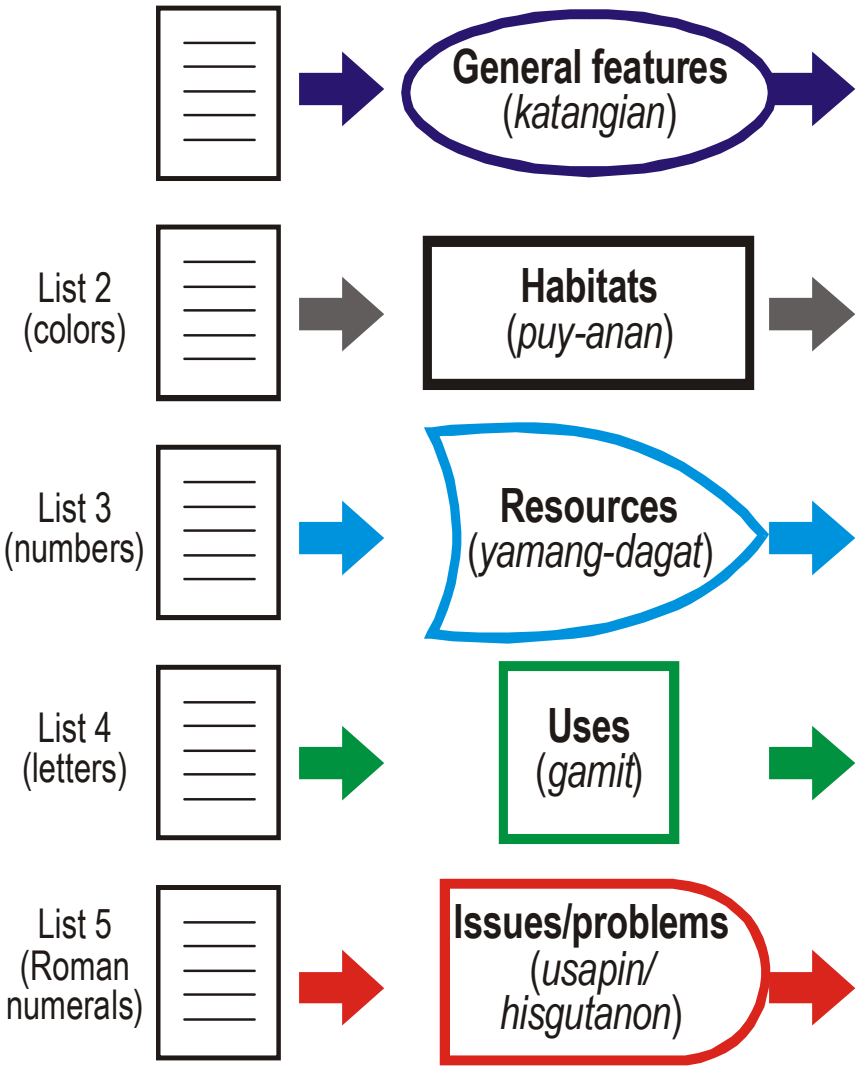
Things to map



— may include landmarks in the community, road network, social infrastructure, boundaries, etc.

— may be mapped using crayons or color pencils following a color code which is already prepared ahead of time.

— may be mapped after the habitats. Resources are elements that provide food and other materials derived form the coastal ecosystem of tangible value to local communities.

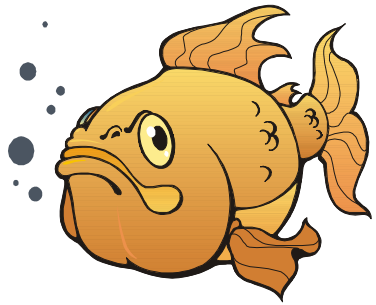
— include sites/locations where activities are conducted or where opportunities/functions provide existing or potential benefits to the community.

— last to be mapped because these require the earlier elements to be mapped before some problems or issues could be identified

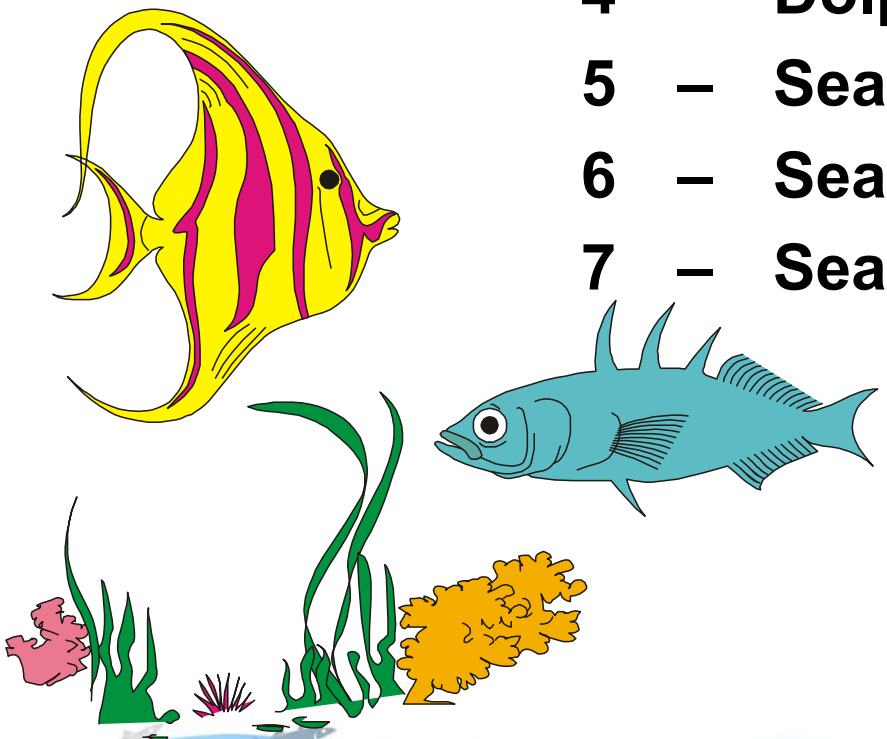
Habitat color codes

- Mangrove (dark green)
- Seagrass (light green)
- Beach/offshore sandbar (yellow)
- Rocky Shoreline (brown)
- Mudflats (black)
- Inshore flats (orange)
- Coral reef (red)
- Estuary (violet)
- Marine waters (light blue)
- Passes/channels/ deep ocean (dark blue)
- Terrestrial Area (light yellow)

Sample code for resources



1 – Anchovies
2 – Tuna
3 – Shells (clams)
4 – Dolphins
5 – Sea turtles
6 – Sea cucumbers
7 – Sea birds



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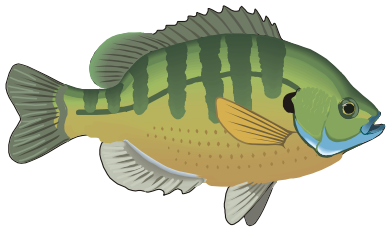
Sample code for uses, livelihood, opportunities



A – traditional gleaning

B – hook and line area

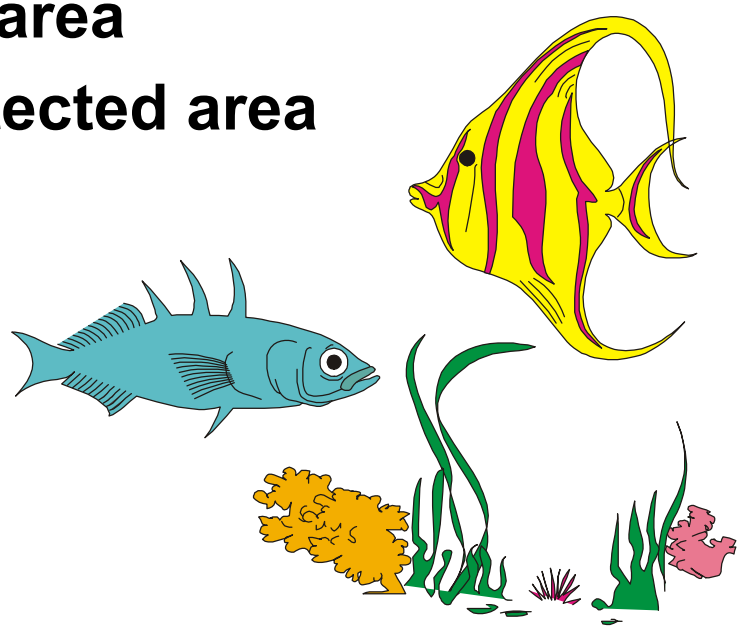
C – seaweed farm

D – fish drying area

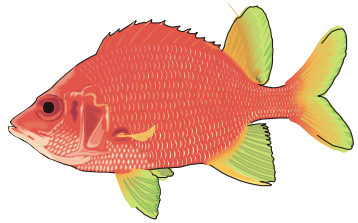
E – marine protected area

F – lighthouse

G – fish port



Sample code for problems, issues, conflicts



I – Blast fishing

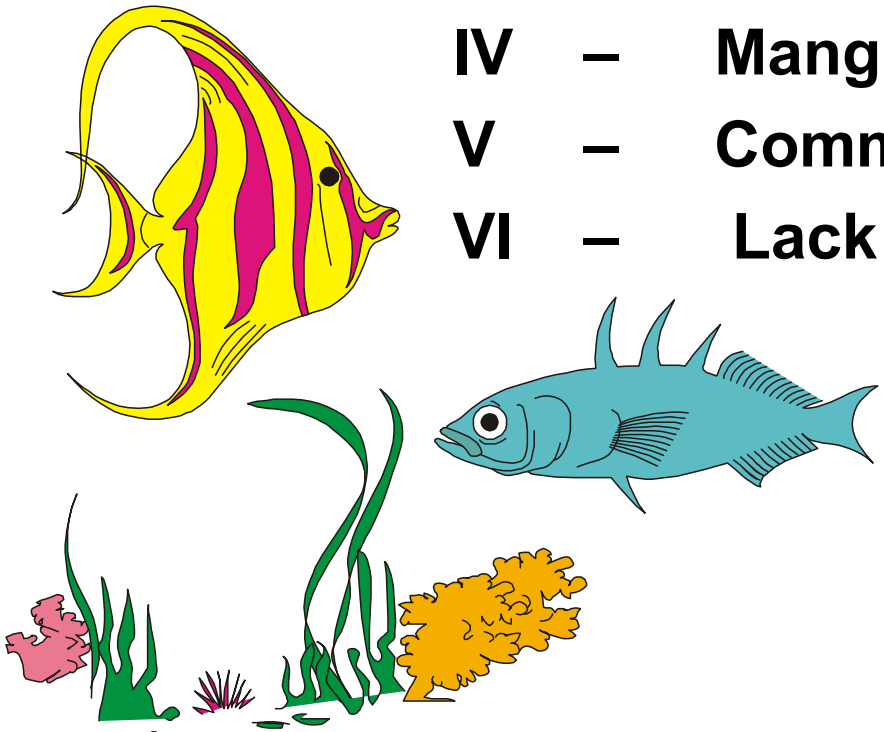
II – Lack of land tenure

III – Beach erosion

IV – Mangrove cutting

V – Commercial fishing intrusion

VI – Lack of alternative livelihood



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Barangay Bintuan
Batuan Is.
Malipandon Is.
Lison Is.
Pitas Is.


Barangay Bintuan
Luasong Is.
Tangat Is.
Mayanpayan Is.
Batuan Is.
Malipandon Is.
Pitas Is.
Lison Is.
Marily Is.
Lakit Is.
Nagbayan Is.
Tandong Is.

Lecture/Discussion #8:

Transect Walks

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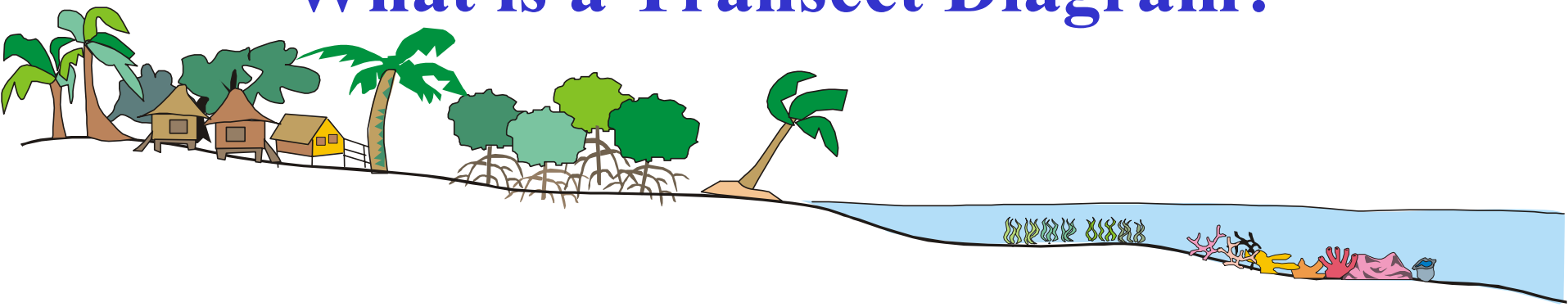
What are Transect Walks?

- Transect walks are walks taken by PCRA participants across the community in order to observe the people, village surroundings, land and coastal resources, resource uses and practices as well as issues and problems.
- They provide an overall view of the community.
- Observations and information resulting from these walks are then noted in a transect diagram.

How are Transect Walks done?

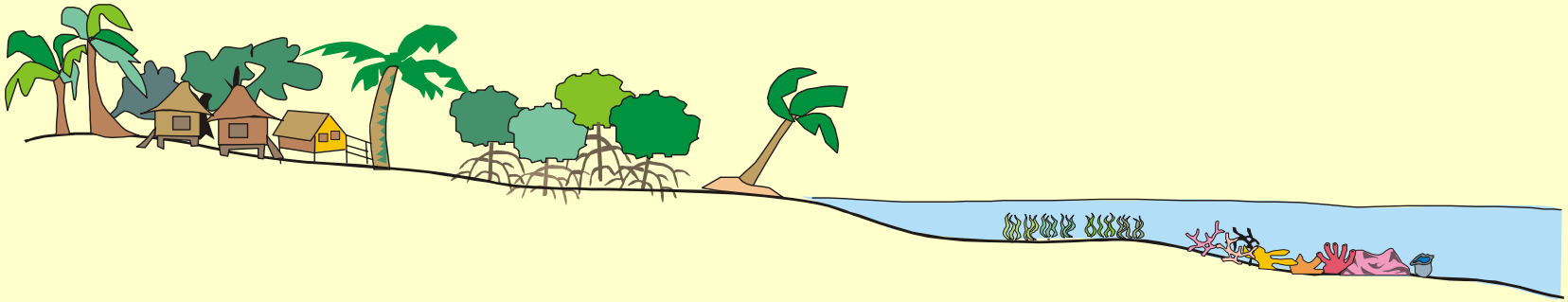
- They are planned by drawing a “transect line” through a map of the community to reflect the various elements or components of the coastal zone. The line goes through or “transects” all elements of the coastal zone providing a geographic representation or “cross-section” view of the community.
- PCRA participants follow the line on the map during their walk in order to observe the various habitats, characteristics, uses, problems/ issues and opportunities.
- It is strongly recommended that villagers join the participants in the transect walks and that participants maximize the time spent with community members to generate information about the locality’s coastal zone and fishery resources.

What is a Transect Diagram?



- Observations resulting from the transect walks provide the information recorded in the transect diagrams.
- This diagram gives the user the advantage of studying several parameters along two dimensions:
  - Resources, their uses, related problems and/or issues and related opportunities are arranged in succeeding rows; and
  - Geographic divisions (e.g. terrestrial, beach, mangrove, seagrass, reef, deep sea) are found in the vertical axis.

TRANSECT WALK DIAGRAM

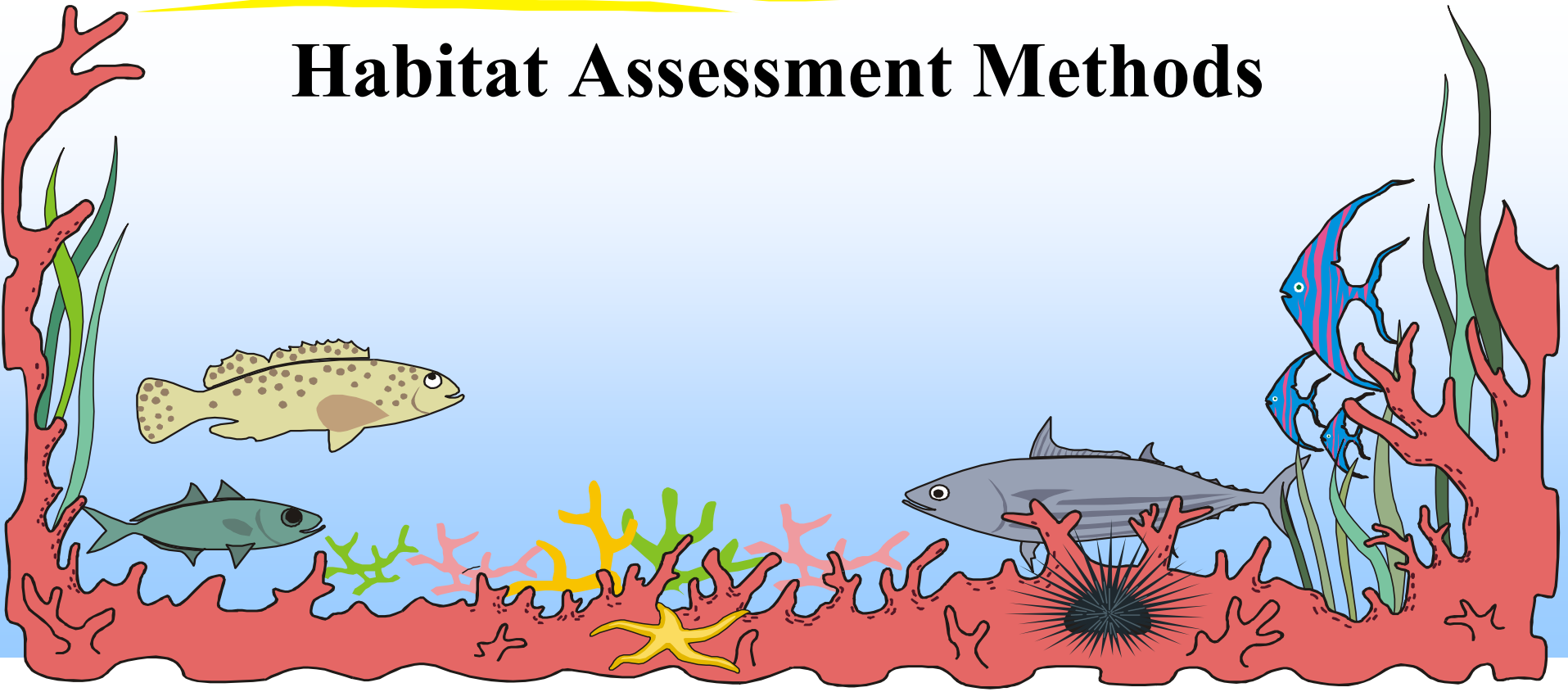


Habitat Management Parameter	**Lowland/ Settlement area**	**Bakawan** (mangrove)	**Aplaya** (beach)	**Hunasan** (tidal flat)	**Damuhan** (seagrass bed)	**Bahura** (reef/ shoal)	**Ilalim** (deep water)
Mga likas na kayamanan (natural resources)							
Mga uri ng hanapbuhay, mga pagkakataon (types of livelihood, opportunities)							
Mga suliranin (problems/issues)							

Sample transect walk diagram

Lecture/Discussion #9:

Habitat Assessment Methods



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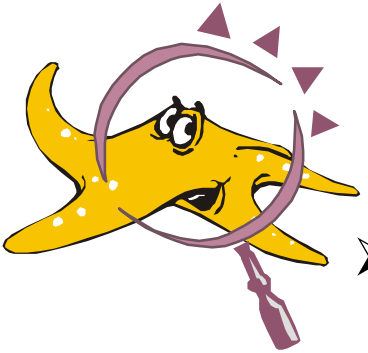
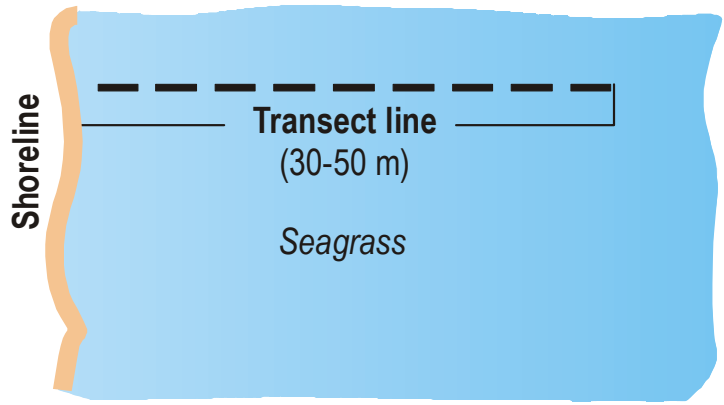


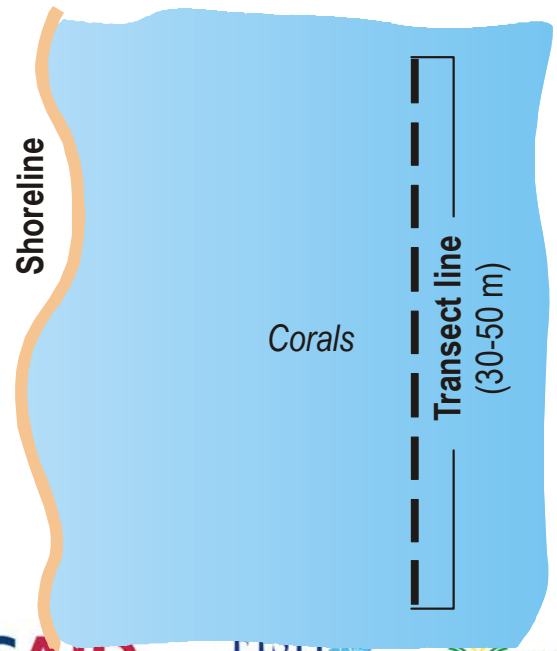
Key content points:

- Habitat assessment is a process designed to evaluate the condition and structure of environmental habitats, such as coral reefs, mangrove forests and seagrass beds.
- The PCRA looks into the current conditions and relative abundance of these coastal resources/ecosystems using a simplified scientific method that involves the use of transect lines and/or quadrats in the assessment process.
- In all 3 habitats, a transect will be utilized.
- Quadrats are effective tools to determine abundance/ condition of the assessed habitat in terms of percentage cover observed.
- Percentage cover of the assessed habitat is determined through actual observations using the habitat rating criteria.

Use of transect lines

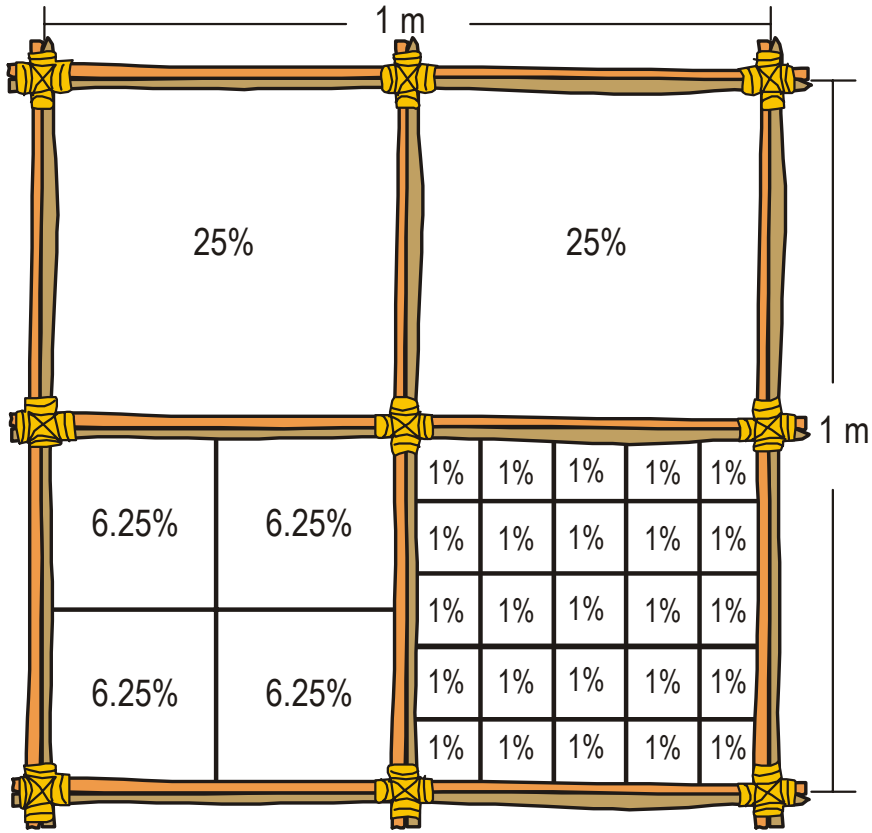
- The line may be an abaca rope, a nylon string or a fancy transect made of fiberglass. If it's not the commercial kind, calibrate the lines beforehand with one meter intervals.
- If the habitat starts beyond the shoreline, take note of the distance between the shoreline and where the habitat begins and start laying the transect line **perpendicular to the shoreline in the case of seagrasses**, and **parallel to the shoreline in case of corals**.
- To ensure that the transect will be straight, utilize landmarks as a guide or use the triangulation methods, a compass or even a GPS.





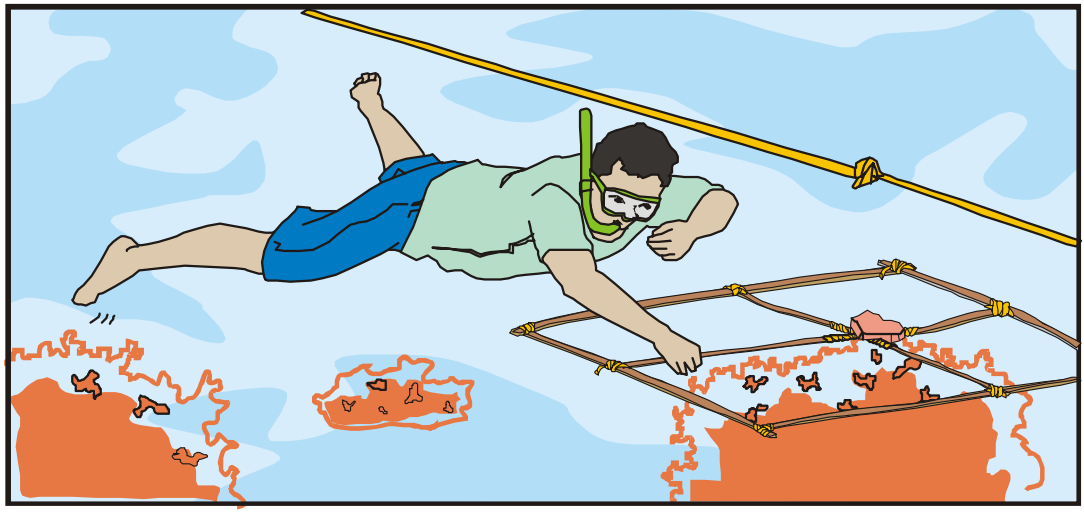
Use of quadrats

- A quadrat generally measures 1 m x 1 m. It may be made of aluminum or PVC pipes with smaller grids inside or simply of small tree branches or bamboo poles tied together.
- Placement of the quadrat follows the transect line and is laid down in pre-determined specific intervals.
- Quadrats are established every 10 meters along the transect line to serve as the representative samples of the assessed habitat.
- A 1 m x 1 m quadrat is divided into 4 subsquares for easy percentage cover estimation of the assessed coral or seagrass habitat.
- It is recommended that a suitable number of transect lines and quadrats be used to serve as samples of the assessed habitats.



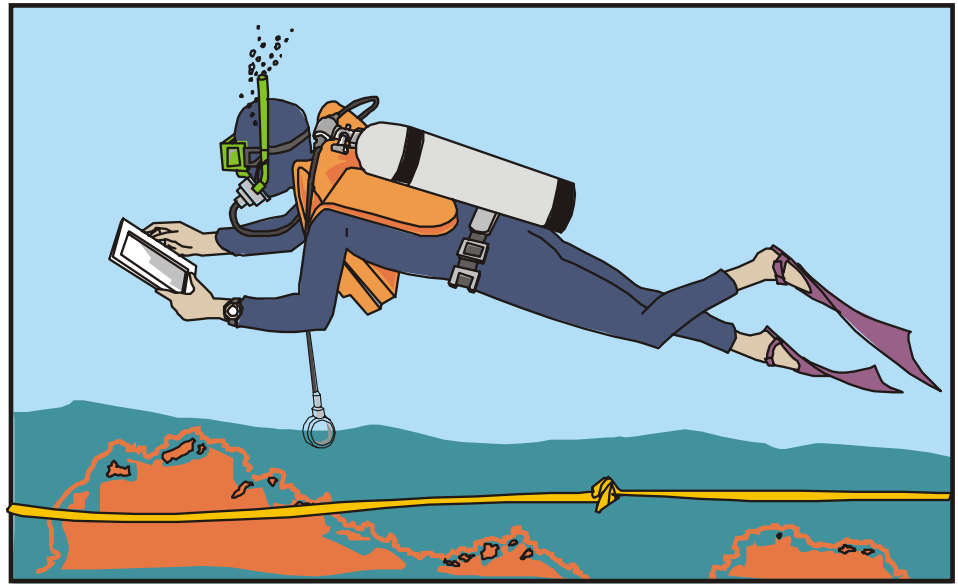
Assessment methods

1. Snorkel survey



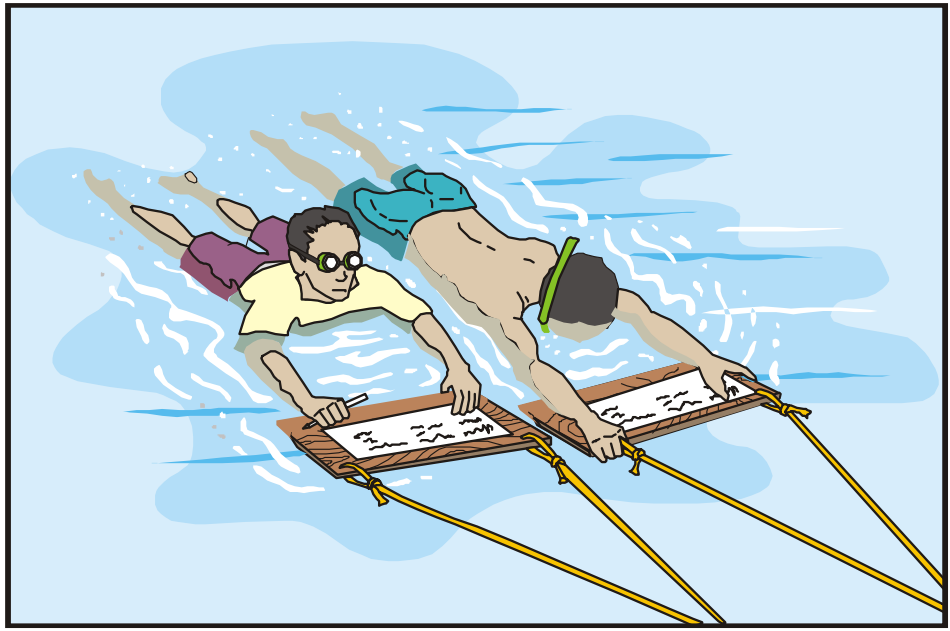
- Using snorkeling equipment or goggles, PCRA participants lay a transect line on the bottom part of the assessed area and record its depth.
- The snorkeler swims over the transect and estimates the percentage cover of the assessed habitat within 1 m on either side of the transect.
- May employ the use of quadrats which are laid down on the sea floor at specific intervals, following the transect line.

2. Point Intercept Method



- Used by more experienced researchers to precisely estimate and record the relative abundance of living and non-living things on the reef bottom observed within a defined area.
- A 50 m transect line is laid parallel to the shoreline and should be kept at the same depth.
- When using scuba, a 6-7 m depth is standard. Readings are taken every 25 cm along the line and entered into data sheets. Observations and recordings are taken from one end of the line to the other.

3. Manta Tow Method

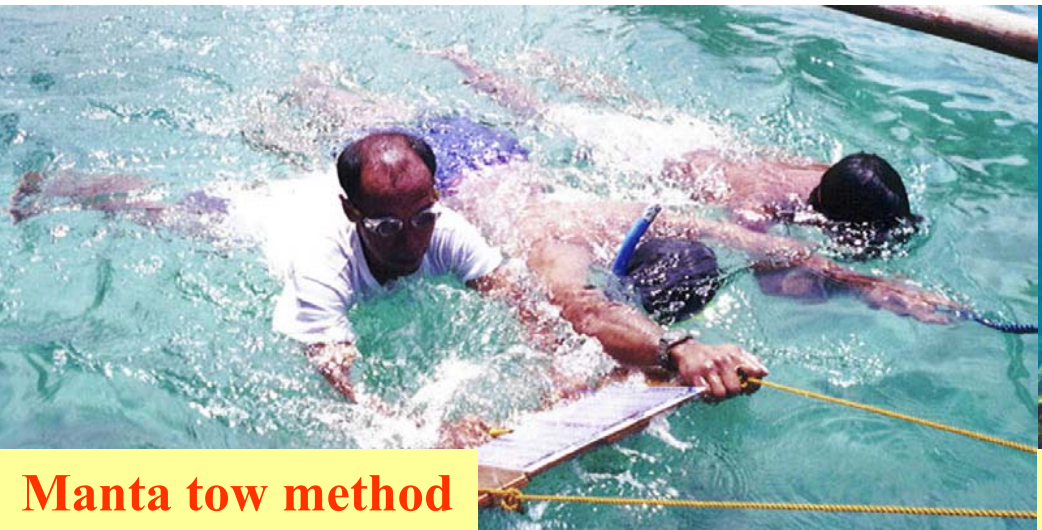


- A manta tow survey is the observation of an underwater area of good visibility by a snorkeler who is being pulled by a small boat.
- Manta tow participants note their observations on the condition/abundance of the assessed habitat at specific intervals.
- Useful in generating a “big picture” of the area as the use of a boat allows the snorkeler to cover longer distances.


Coral habitat assessment

- The goal of the assessment is to measure coral cover percentages within the assessed area through observation and rational estimations of each habitat component.
- Percentage cover will not only refer to the living corals (hard and soft corals) but also the substrate (dead standing corals, coral rubble, hard rocky surface, sand).
- All data are then entered into a transect data form.

Point intercept method



Manta tow method

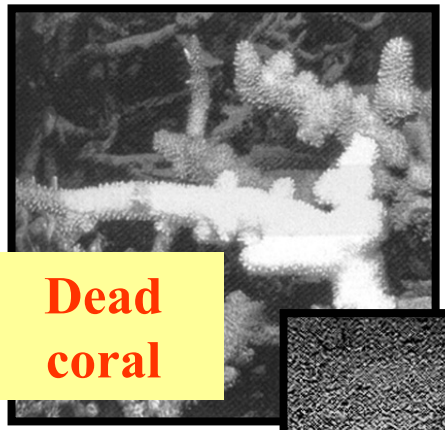
Snorkel survey

Coral reef habitat components/substrates

- **Live Hard Coral (LHC)** – coverage of stony or hard corals on the bottom or part of the bottom
- **Live Soft Coral (LSC)** – coverage of soft corals attached to the bottom
- **Dead Standing Coral (DSC)** – recently killed coral still attached and recognizable at the bottom in original upright position
- **Coral Rubble (CR)** – coverage of loose broken fragments of stony corals or coralline algae on the bottom, with a diameter greater than 1 cm
- **Hard Rocky Surface (HRS)** – consolidated hard bottom or large blocks of hard reef material not attached to bottom or easily moved around
- **Sand/Silt (S)**

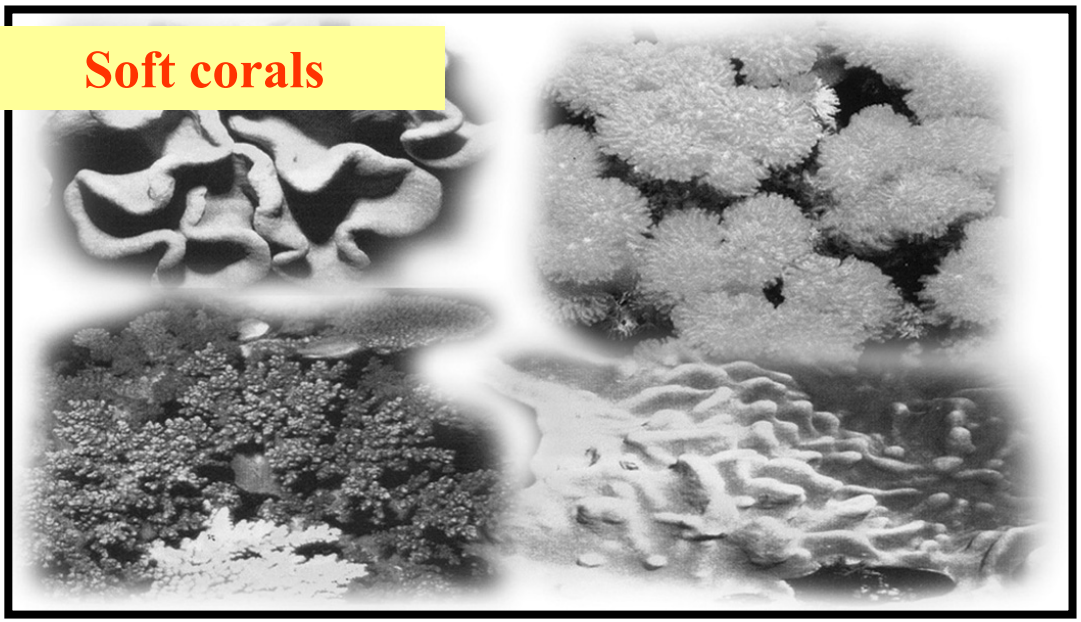
Hard corals

Dead coral

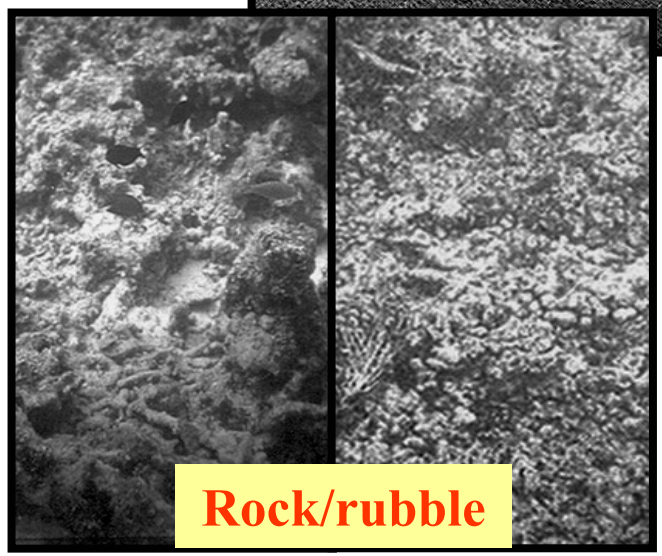


Sand/ silt

Soft corals



Rock/rubble



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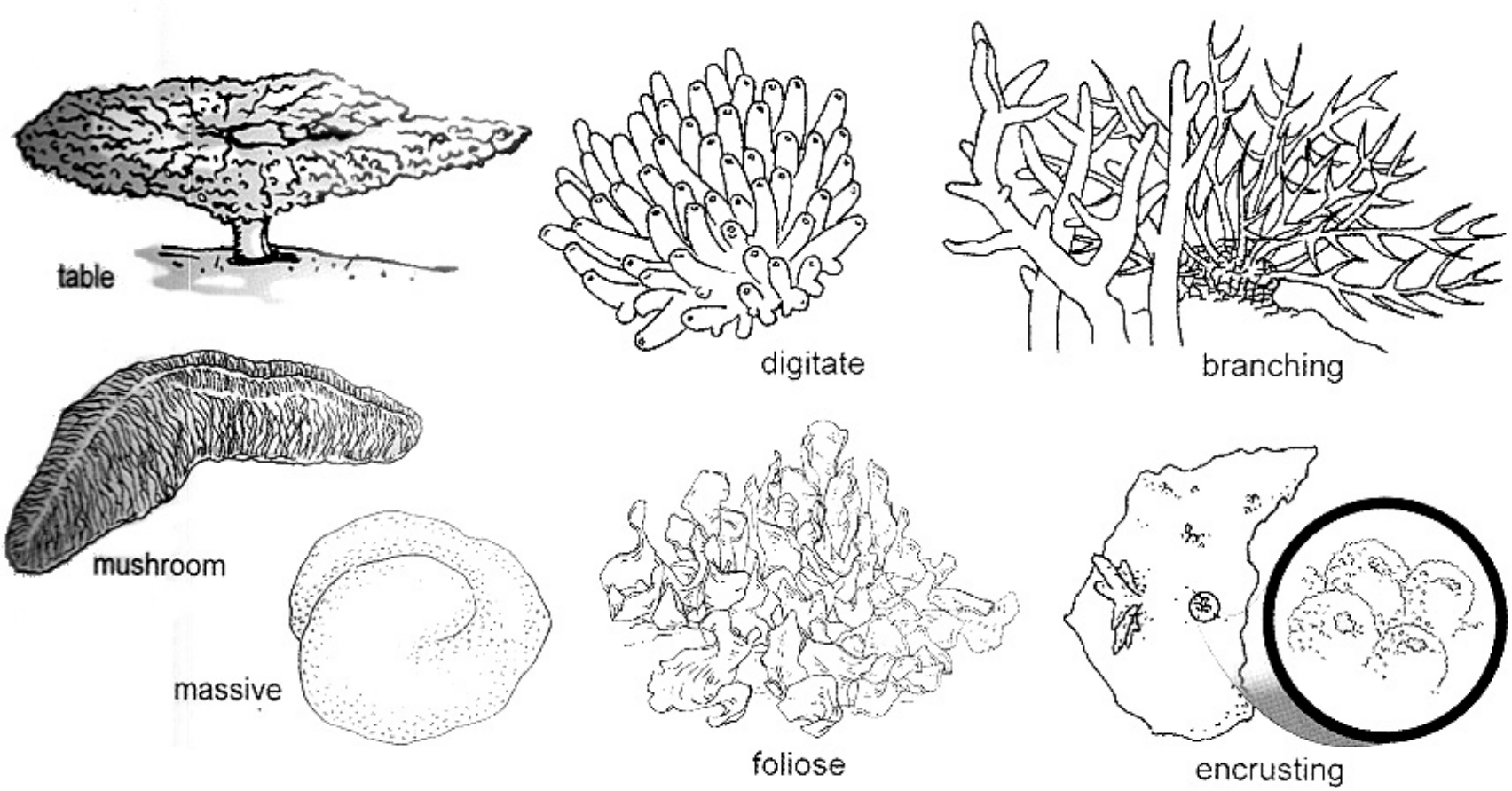
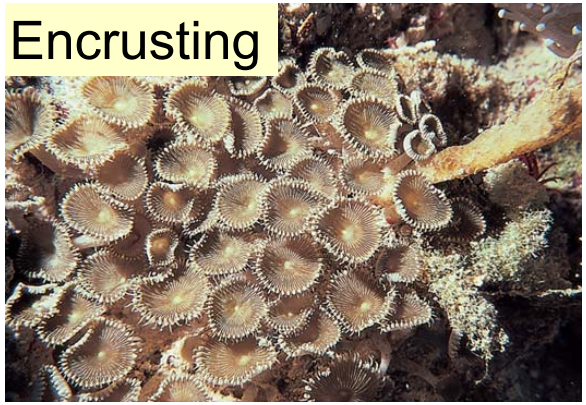
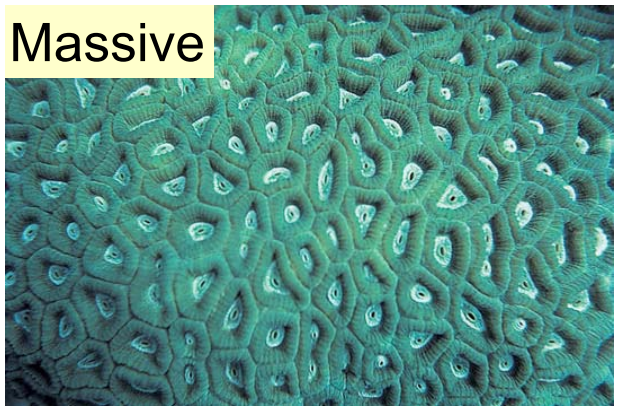
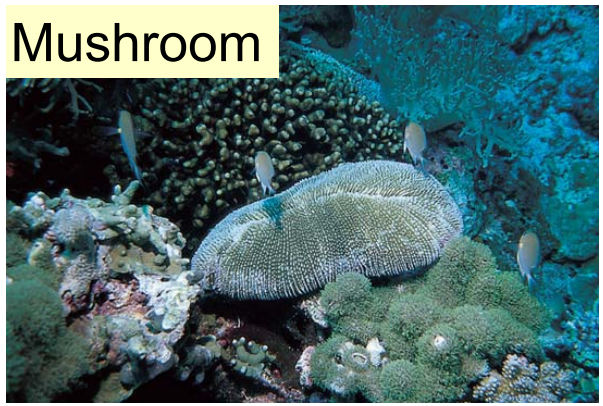
Coral life forms



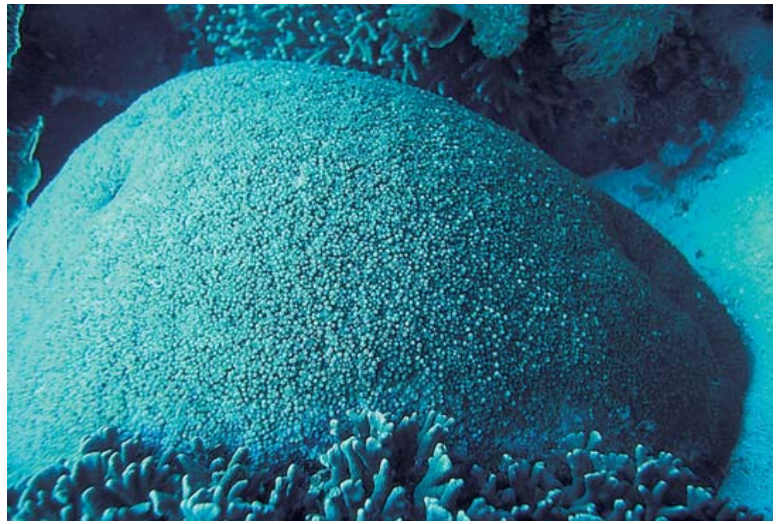






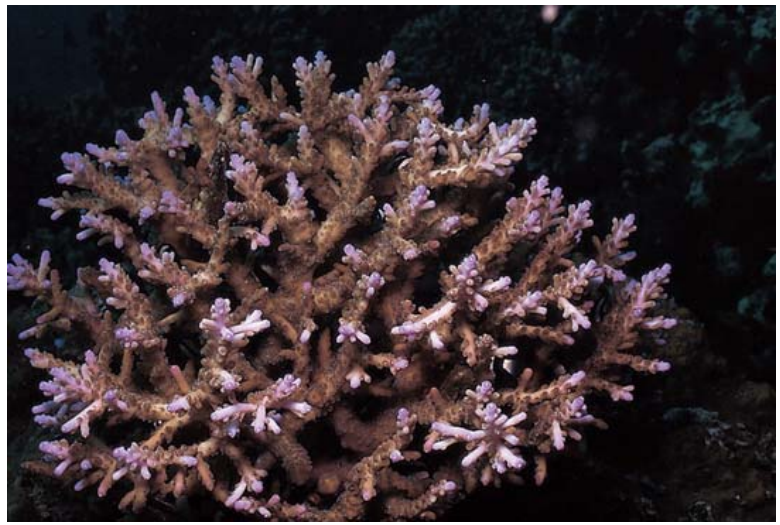
- **Branching** – at least two degrees branch
- **Encrusting** – major portion attached to substratum as a laminar plate
- **Foliose** – coral attached at one or more points, leaf-like or plate-like appearance
- **Massive** – solid boulder or mound
- **Sub-massive** – tends to form small columns, knobs or wedgesplate
- **Mushroom** – solitary, unattached or free-living corals

Acropora palifera Columnar branching coral



***Astreopora* sp.** Starflower coral

***Acropora* sp.** Table coral



***Acropora* sp.** Tubular branching coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

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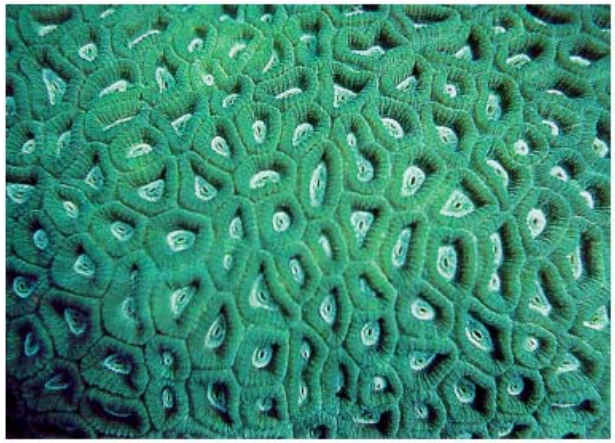
Oulophyllia crispa Intermediar valley coral



***Favia* sp.** Knob coral

Cycloseris patelliformis Hermit coral

Platygyra lamellina Lesser valley coral

***Leptoria* sp.** Least valley coral

***Fungia* sp.** Mushroom coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

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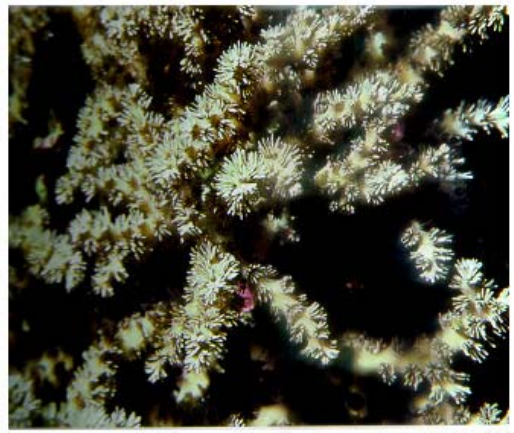
Heliofungia actiniformis Anemone mushroom coral

Galaxea fascicularis Octopus coral

***Symphillia* sp.** Sinuous cup coral

Lobophillia costata Lobed cup coral

Mycedium elephantotus Chinese lettuce coral



Archelia horrescens Octopus coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

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Coral reef habitat assessment forms

CORAL REEF HABITAT ASSESSMENT
TRANSECT DATA

Date:_____ Location:_____

Transect No.	Quadrat No.	LHC	LSC	DSC	CR	HRS	S	Total	Other Observations

MANTA TOW DATA FORM

Site name:_____ Date:_____

Tow No.	Location	Hard Coral	Soft Coral	Dead Standing Coral	Coral Rubble	Hard Rock Surface	Sand	Total

POINT INTERCEPT METHOD DATA FORM

Site Name: _____ Municipality/Province: _____ Date: _____
Observer: _____ Transect No. _____ Depth: _____

Benthic lifeforms/Coral reef components	Number of sampling points found	Estimated percentage cover
Live Hard Coral		
Live Soft Coral		
White Dead Coral		
Dead Coral with Algae		
Turf Algae		
Fleshy microalgae		
Coralline algae		
Sponges		
Other animals		
Seagrass		
Rubble		
Rock		
Sand/silt		

Seagrass habitat assessment

- Seagrass habitat assessment is highly similar to coral reef assessment and the quadrat size used is 1 x 1 m. The transects and quadrats are laid where the seagrass habitat begins, and end where the observed habitat ends. Intervals between transects and between quadrats are determined by the size and expanse of the habitat.
- PCRA for seagrass generally employs the snorkel method.
- Participants must be familiar with the various seagrass species as species identification is an important component of the PCRA.
- The Philippine has 16 known species of seagrass, the second highest in the world to Australia's 23.

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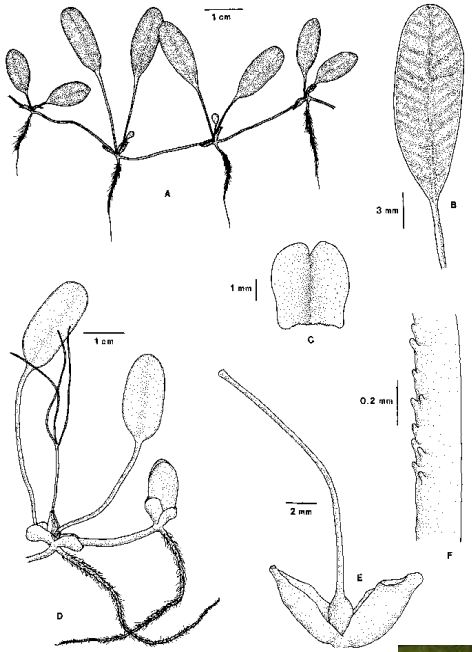
Seagrass habitat assessment form

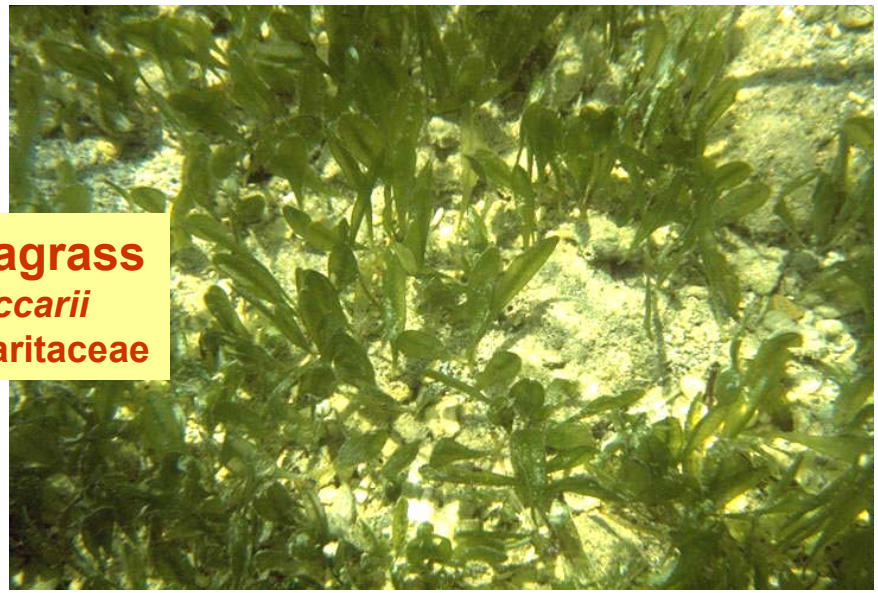
SEAGRASS HABITAT ASSESSMENT
TRANSECT DATA

Date: _____ Location/Area covered: _____

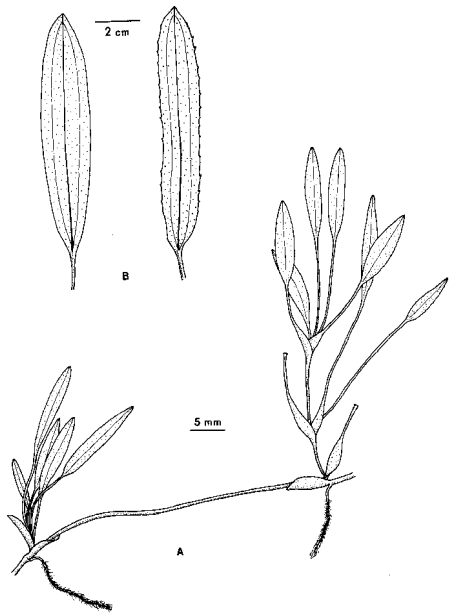
Transect No.	Quadrat No.	Species	% cover	Substrate	Other Observations



Spoon seagrass
Halophila ovalis
Family Hydrocharitaceae



Beccari's seagrass
Halophila beccarii
Family Hydrocharitaceae



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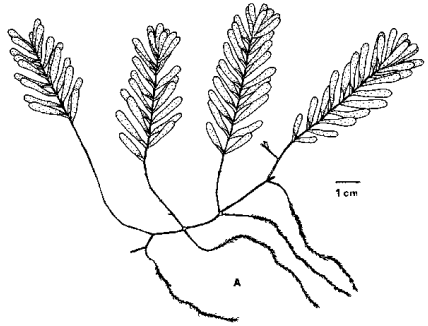
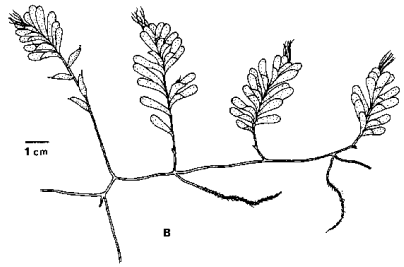
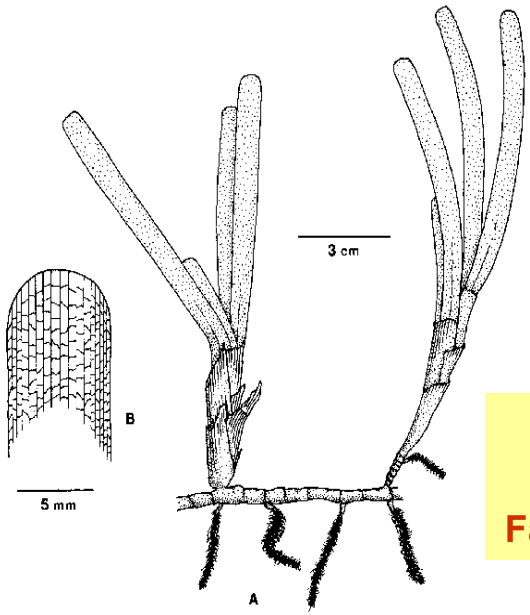




Fern seagrass
Halophila spinulosa
Family Hydrocharitaceae



Sickle seagrass
Thalassia hemprichii
Family Hydrocharitaceae

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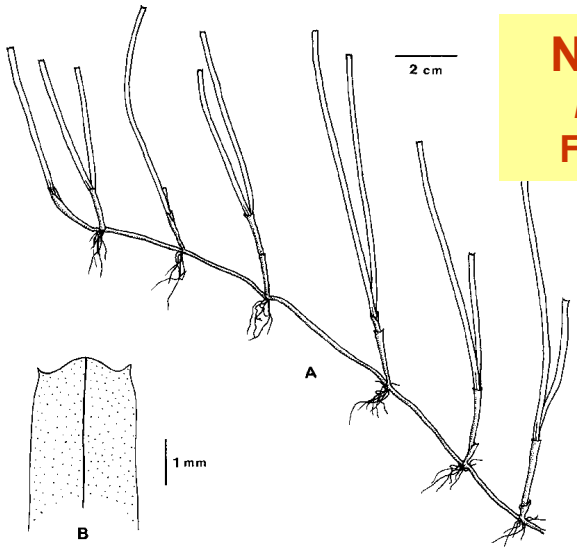
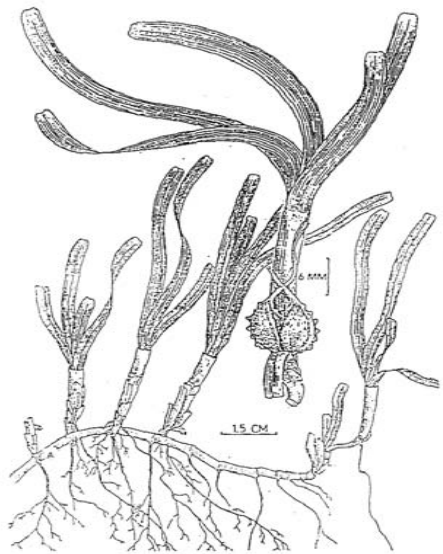


Needle seagrass
Halodule uninervis
Family Cymodoceae

Ribbon seagrass
Cymodocea rotundata
Family Cymodoceacea



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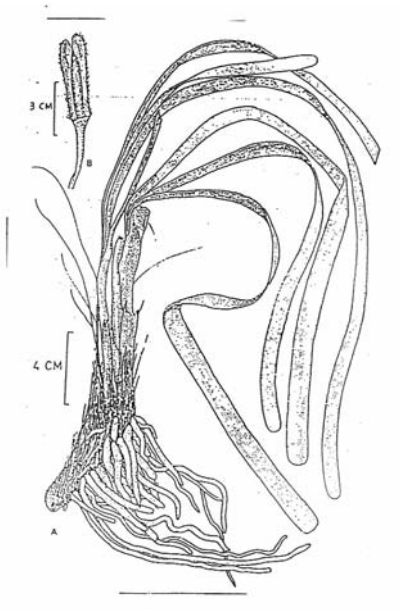
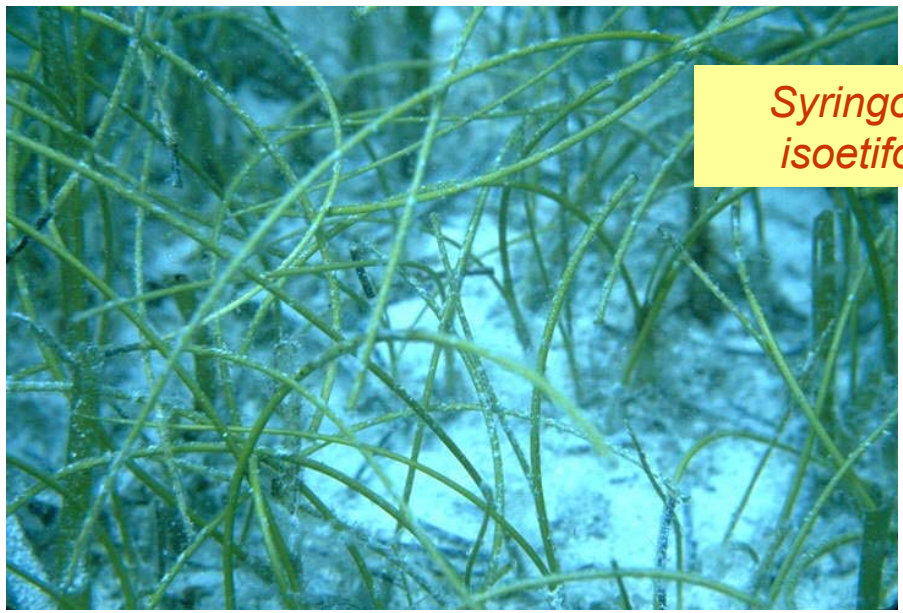
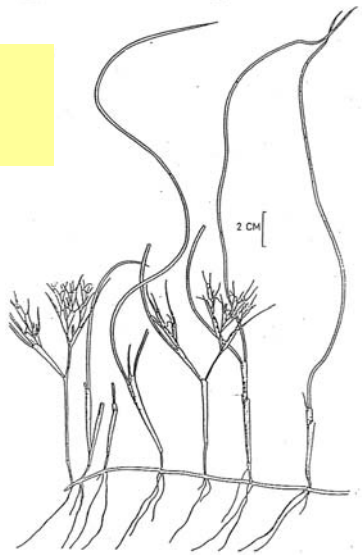


Eel seagrass
Enhalus acoroides



Syringodium isoetifolium



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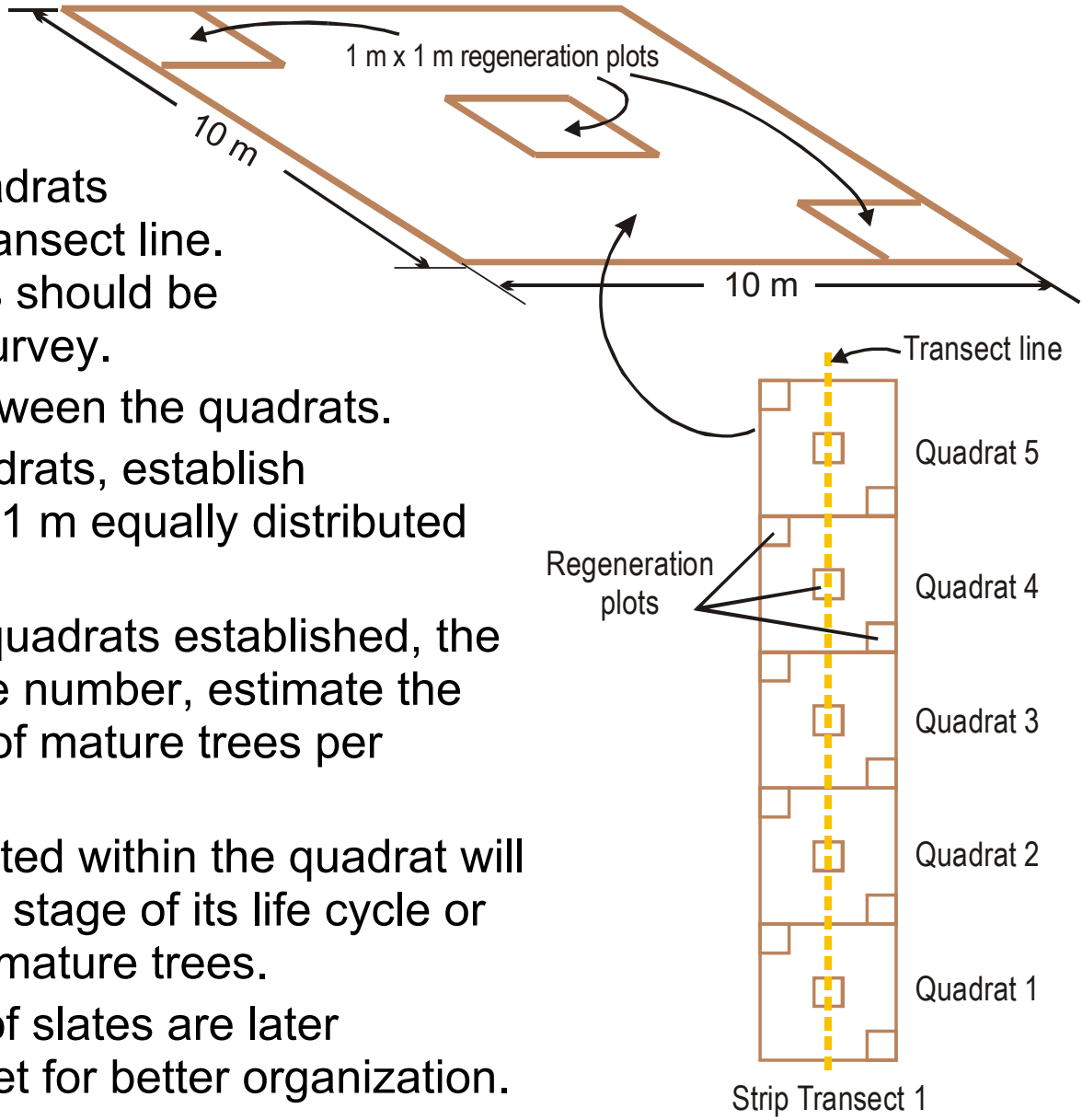
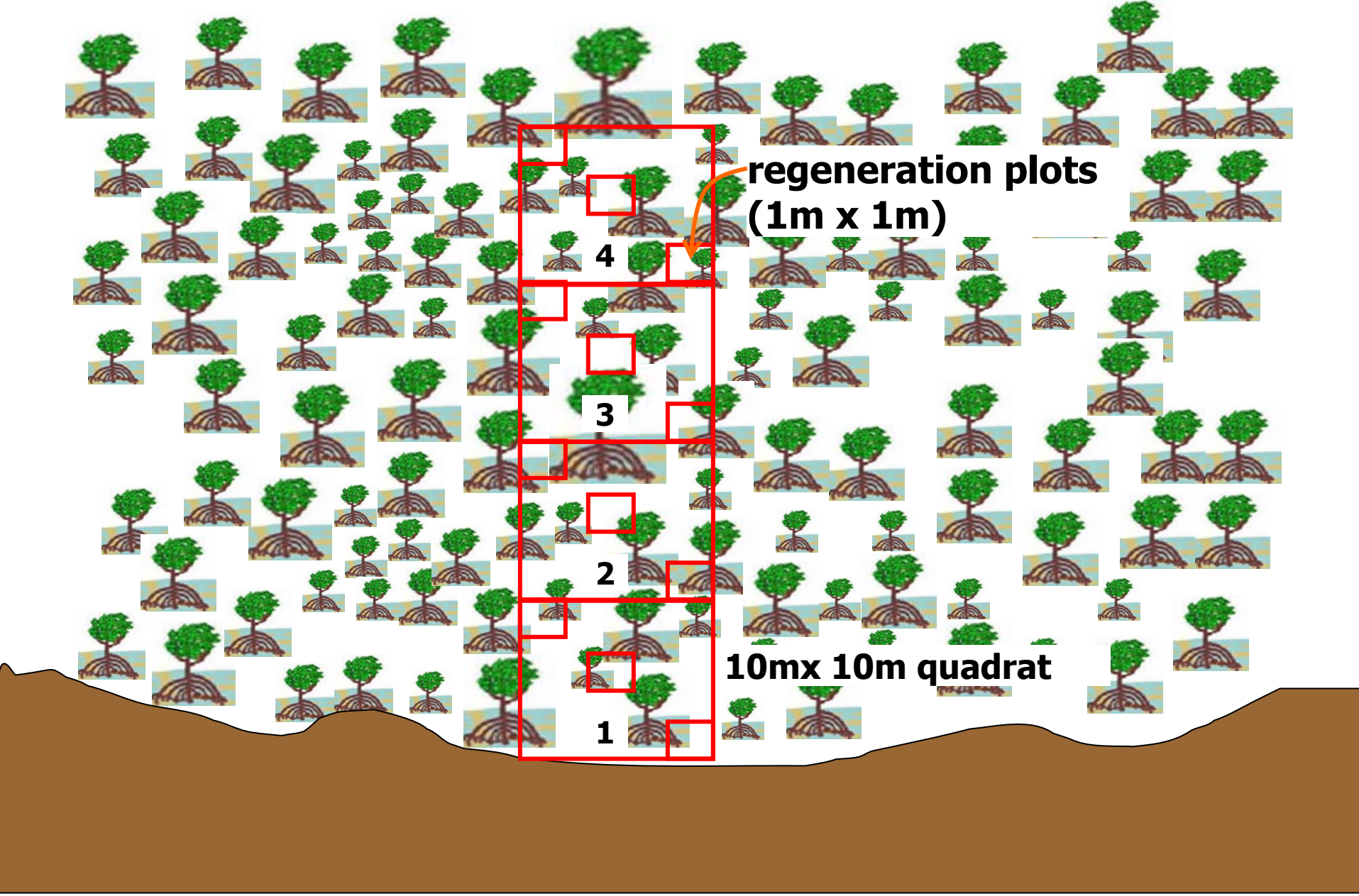
Mangrove habitat assessment

- In mangroves, the area of investigation is 10% of the total mangrove forest. Transect lines and quadrats will be used.
- In mangrove assessment, the percent crown cover, number of regeneration per square meter, average height of trees and number of species observed are calculated/estimated.
- Longer transects and larger quadrats are called for. Transect lines may run from 20-100 m, depending on the size or expanse of the mangrove habitat. Quadrats measuring 10 x 10 meters are also called for.
- Each transect should extend seaward or perpendicular to the shoreline and should start where the mangrove habitat starts, and ends, where the habitat ends.



- A series of 10 m x 10 m quadrats are established along the transect line. The position of the quadrats should be consistent throughout the survey.
- There will be no interval between the quadrats.
- Within the 10 m x 10 m quadrats, establish 3 smaller quadrats of 1 m x 1 m equally distributed as regeneration plots.
- With the strip transect and quadrats established, the PCRA participants count the number, estimate the height and crown diameter of mature trees per species in each quadrat.
- Each kind of mangrove located within the quadrat will be counted according to the stage of its life cycle or age: seedling, sapling, and mature trees.
- Data recorded on waterproof slates are later transcribed onto a data sheet for better organization.



Seedling – up to 1m height and a trunk size less than 4cm in diameter

Sapling – greater than 1m height and a trunk size of 4cm in diameter

Mature tree – greater than 1m height and a trunk size greater than 4cm in diameter

Seedling

Sapling

Mature tree

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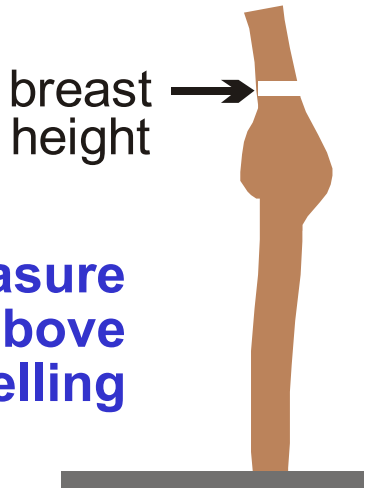
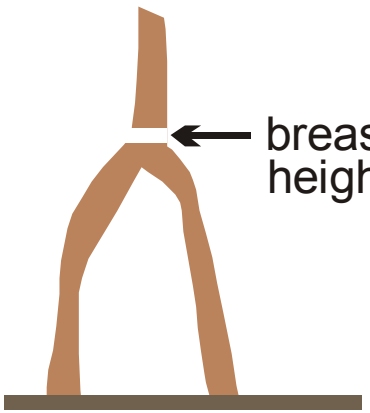
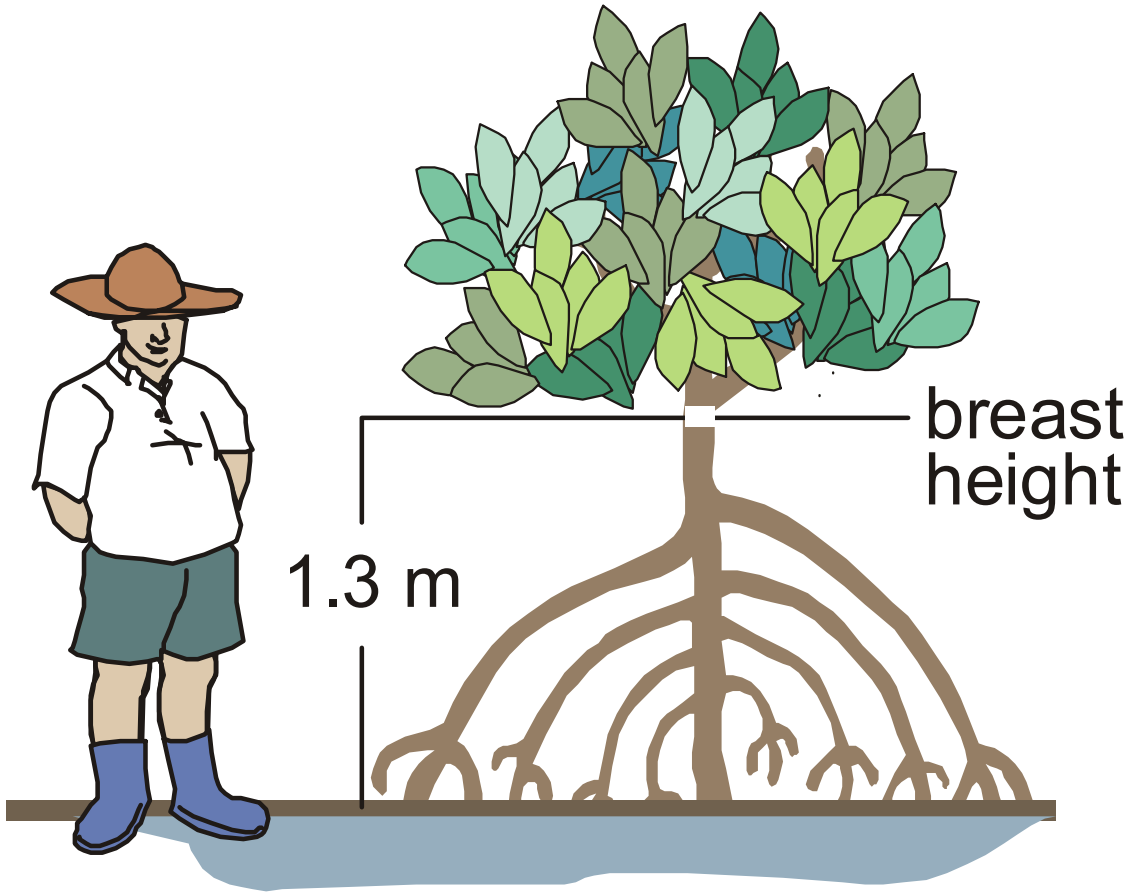
If the growth of mangroves is irregular, determine breast height by any of the following:



Measure just above swelling



Measure above irregular growth



Mangrove habitat assessment and regeneration data sheets

DATA SHEET FOR MANGROVE ASSESSMENT

Transect No. _____
Recorder: _____
Date _____

Location _____
Site Barangay
_____
Municipality Province

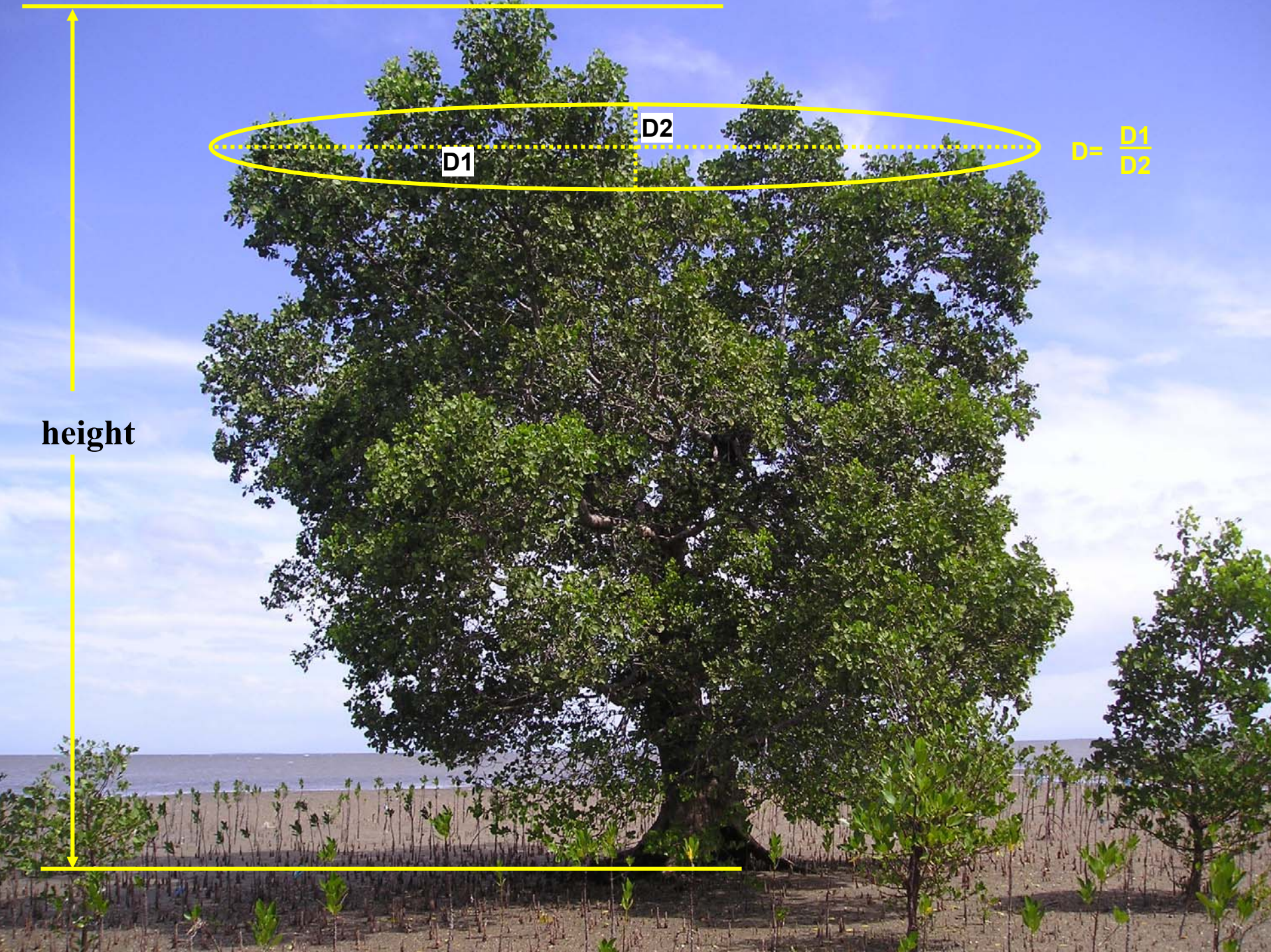
Quadrat No.	Tree No.	Substrate	SPECIES	Total Ht. (m)	Crown diameter (2 readings)	OBSERVATIONS (disturbance, threats, uses, cuttings, garbage, fauna)

DATA SHEET FOR MANGROVE REGENERATION

Transect No. _____
Recorder: _____
Date _____

Location _____
Site Barangay
_____
Municipality Province

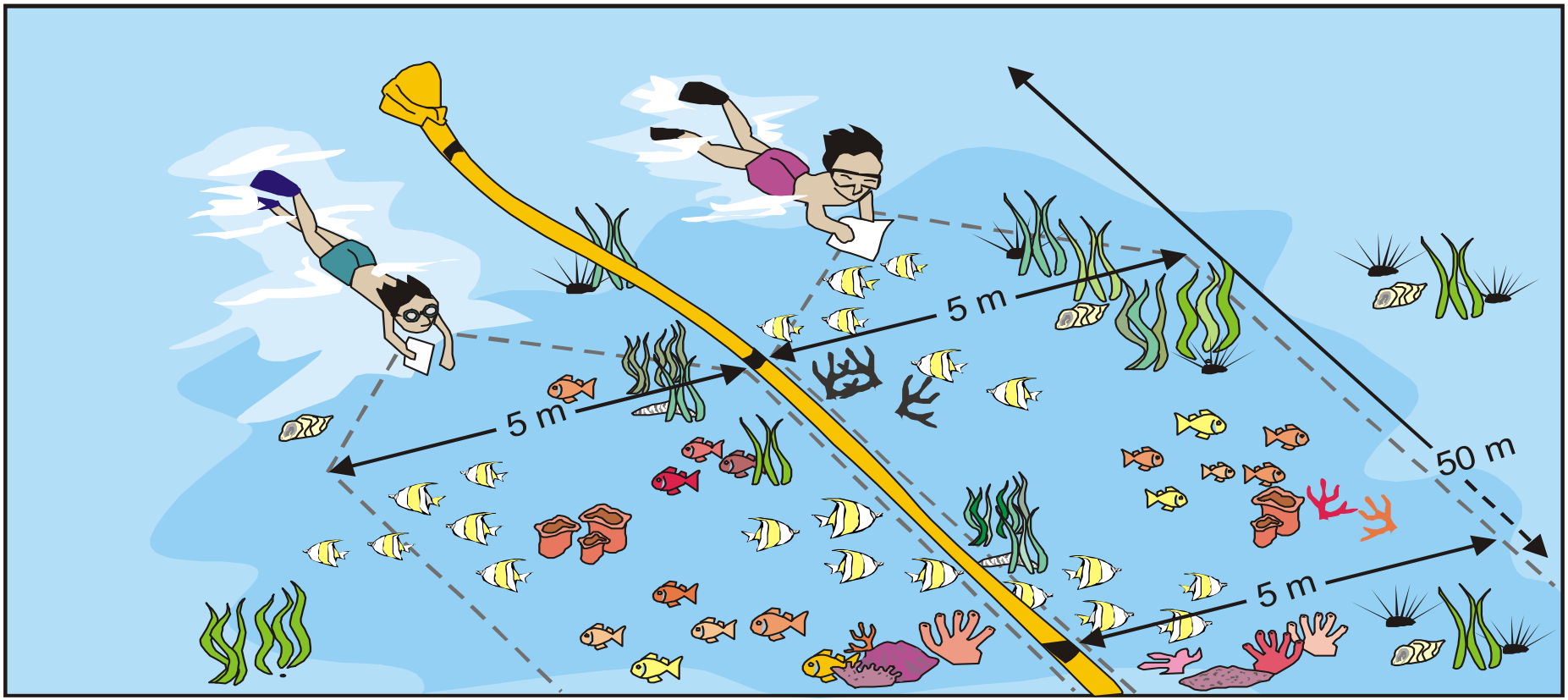
Quadrat No.	Plot No.	SPECIES	Count	REMARKS (ave. height, status, etc.)
1	1 2 3			
2	1 2 3			

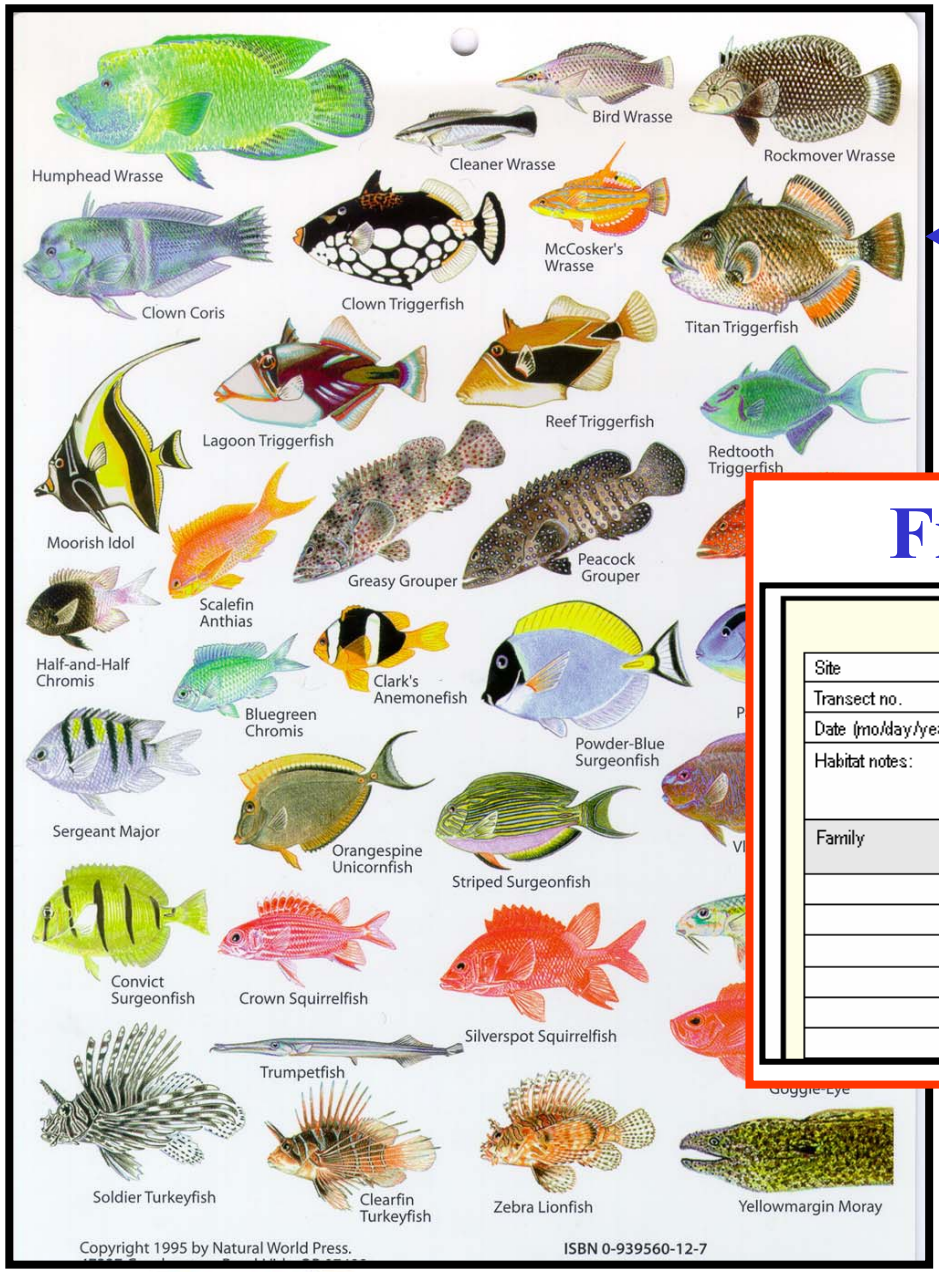

D2
D1
D= D1/D2
height

Fish visual census

- Fish visual census is the identification and counting of fishes observed within a defined area.
- It is used to estimate the variety, numbers and even sizes of common, easily-seen, easily-identified fishes in areas of good visibility. This information may reflect the health of the fish stocks within the surveyed area.
- Participants must be familiar with the various reef fishes. Where possible, a laminated fish identification guide should be prepared for participants' reference during the conduct of the fish visual census.
- Faster moving fishes are counted before the slower moving fishes. Each transect covers an area of 500 m^2.

- Starting at one end of the line, each observer floats on each side of the transect line while observing 5 m to his/her side of the transect and forward to the next 5-m mark. Both observers swim to and stop every 5 m along the line to record the counts of fish per size class until the transect is completed.
- Total counts are then transcribed onto the data form.





Laminated fish identification guide sample

Fish abundance data form

FISH ABUNDANCE DATA FORM

Site		Municipality and Province			
Transect no.	Depth (m):	Coordinates:			
Date (mo/day/year):	Time:	Left observer:		Right observer:	
Habitat notes:		Horizontal visibility:	Angle of slope:	Transect orientation (NE\W/S):	

Family	Species	Record number of fishes per size class			
		1-10 cm	11-20 cm	21-30 cm	Specify sizes for >30 cm

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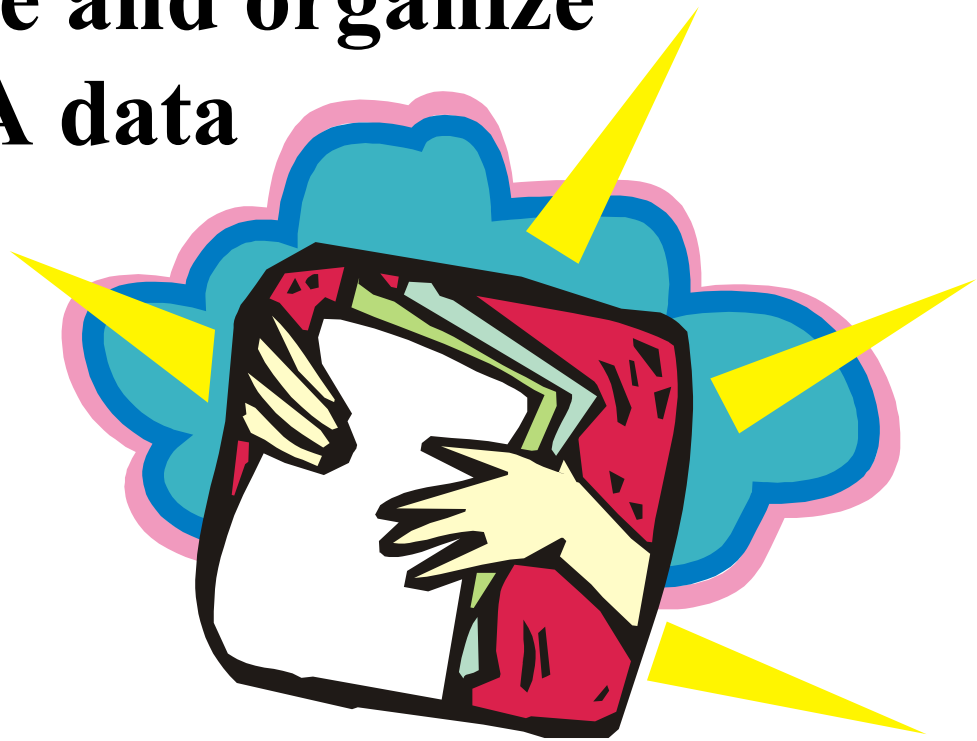
Lecture/Discussion #10:

How to analyze and organize PCRA data



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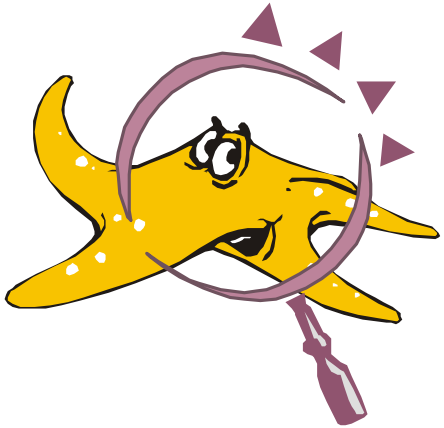


Key content points:

- With the volume of raw data gathered, there is a need to organize and process these data so that these could be presented in a summarized, orderly, and visual manner.
- Analyzed data from PCRA and secondary sources will serve as inputs to the development of the Coastal Environmental Profile which will then serve as basis for CRM Planning.

Guides in processing and analyzing data from different PCRA methods

1. Results of transect walk

- The group should consolidate their data gathered into one matrix making sure that each observation is validated by the group.

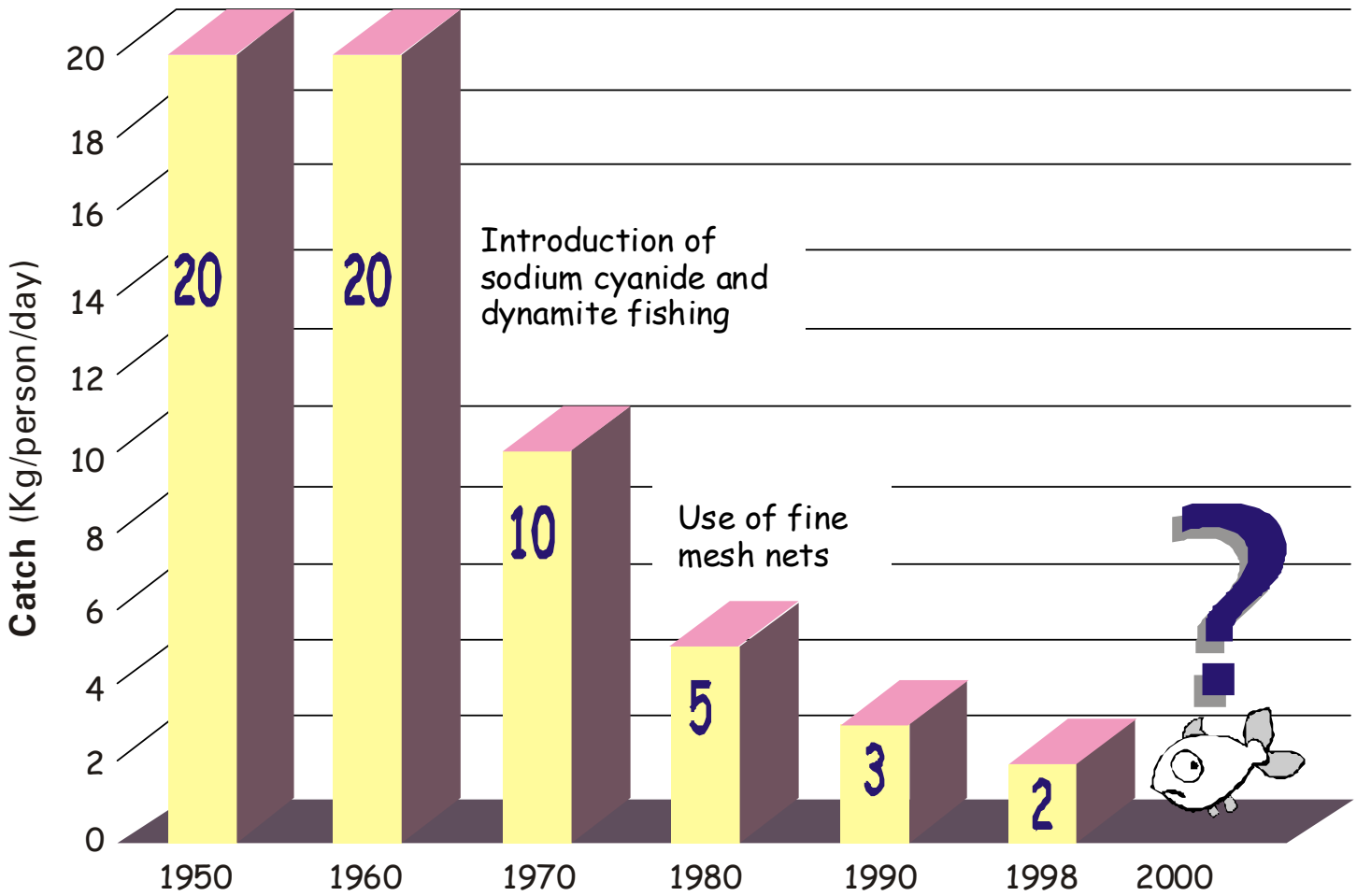
Habitat Management Parameter	Bakawan (mangrove)	Aplaya (beach)	Hunasan (tidalflat)	Damuhan (seagrassbed)	Bahura (reef/shoal)	Ilalim (deepwater)
Mga likas na kayamanan (natural resources)	Alimango, tamilok, shells, manla	Resort, shells, alimango (mangrove crab), pandan, niyog (coconut), nipa (nipa fruiticans)	Hermit crab, tayong (sea urchin), babtan (sea cucumbers), shells, alimango (crabs)	Seaweeds, fish - danggit, gono, banak, pusit, banyaw-banyaw, bantol	Isda (finfish), pugita (octopus), shells, banagan (lobsters), babtan (sea cucumbers)	Isda (finfish)
Mga uri ng hanapbuhay, mga pagkakataon (types of livelihood, opportunities)	Pangisdaan (fishery), bahayan (place for houses), pantalan (pier location), gatong (firewood)	Harvest and sell above, gawan ng banig, etc. (making mats, etc), coco products, pawid (roof shingles, wine)	Sell babatan (sea cucumbers, dried)	Harvest and sell above resources	Harvest and sell above resources	Harvest and sell above, fish deep reefs with compressor (not recommended)
Mga suliranin (problems/issues)	Bawal magputol (cutting is illegal), nik-nik (biting flies/midges)	Pagputol ng niyog (cutting of coconut trees)	Gleaning activities damage newly grown corals	More human disturbances of panti (gill net), bantol (stonefish)	Sodium cyanide fishing, blast fishing, tubi (poisonous root used to catch fish), lagtang (poisonous plant)	Trawlers, blast fishing, sodium cyanide fishing, tubi (poisonous root used to catch fish), lagtang (poisonous plant)

- Refer to other groups, e.g. the habitat assessment group for additional information of other coastal zonation like observations of the seagrass group on the condition of the area so that these could be incorporated in the matrix.

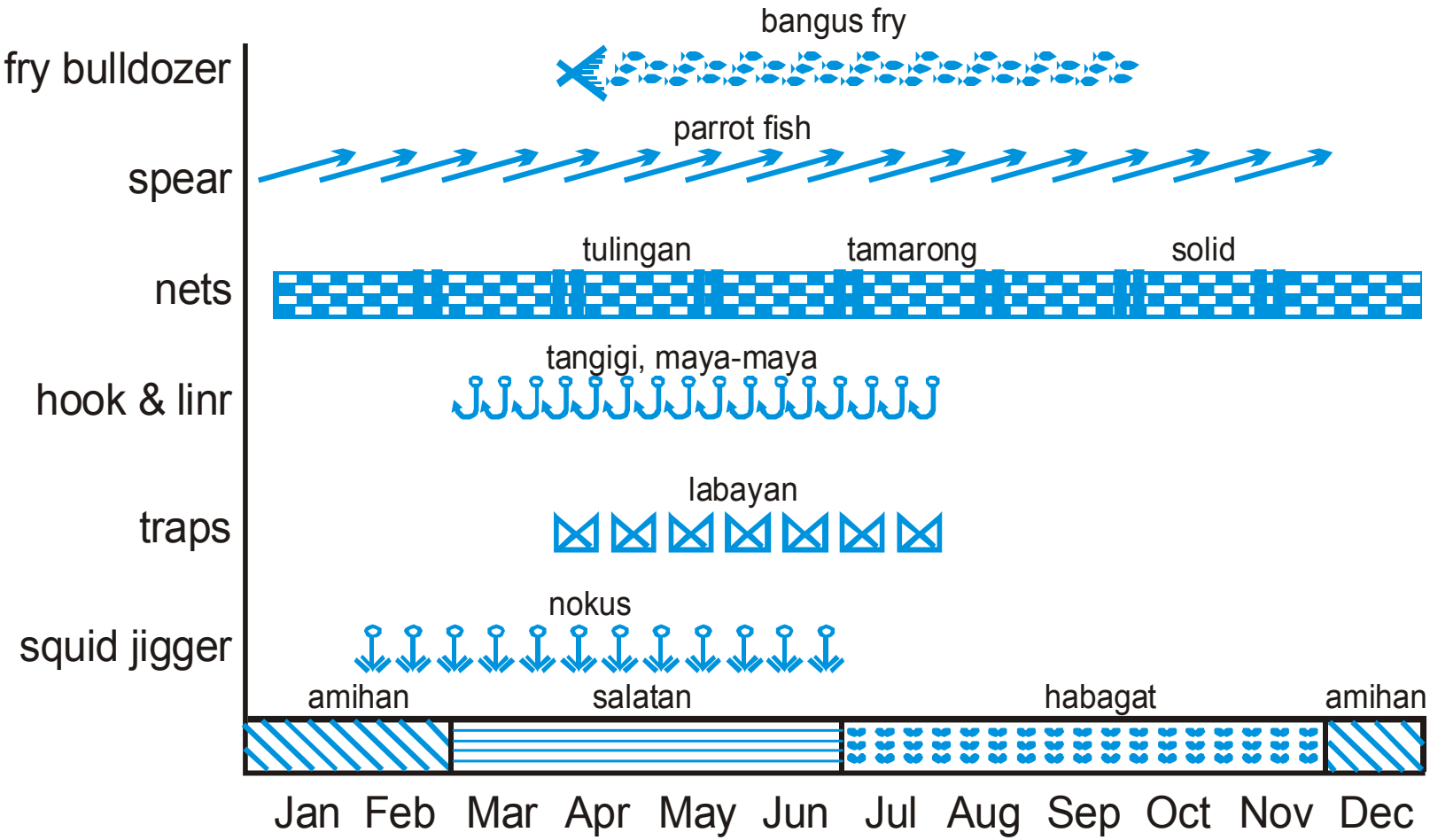
2. Results of field interviews, trend and calendar diagrams

- Data analysis will be more qualitative in nature.
- The use of percentages, frequencies, and averages could be presented if secondary data is available.
- If these type of data are gathered from estimates of the group and duly validated by the participants during the interview, it is important to note how these quantitative data were gathered.
- Community perceptions, like how resources have declined or increased over time are presented as **trend diagram**, and some seasonal activities and events are presented as **calendar diagram**.

Trend diagram of fish catch



Calendar diagram on seasonality, fishing gear, and fish catch

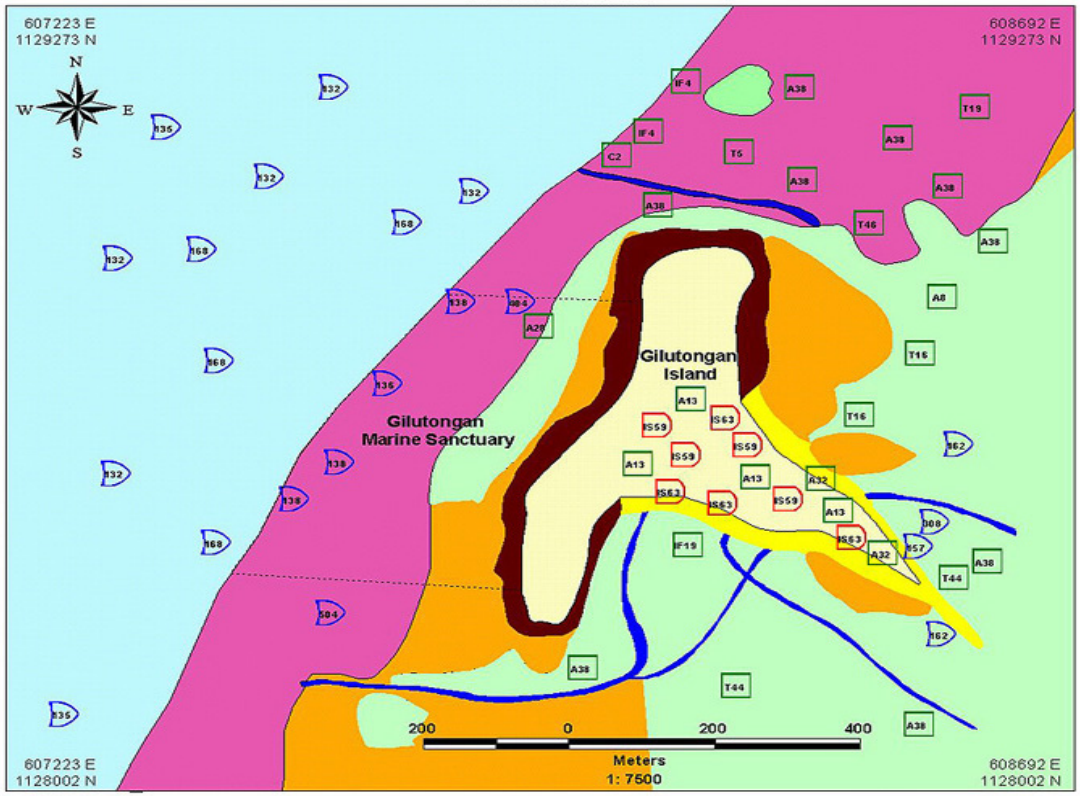


3. Results of community mapping

- The resource map is a consolidation of the information gathered from different PCRA methods.
- The output of the mapping activity will then be finalized by incorporating data that were gathered from the transect walk, coral, mangrove and seagrass assessment groups.
- By doing so, data discrepancies may be filled in and a more comprehensive data may be reflected in the map.
- Make sure that the legend is complete.
- Some efforts should be extended by the assisting organizations to provide some glossary of common English names equivalent to local names which most often vary from one place to another.

Coastal Resources

GILUTONGAN Island



Legend :

HABITATS

- Sandy beach
- Rocky shoreline
- Inshore flats
- Seagrass beds
- Coral reef
- Passes/channels
- Terrestrial zone
- Marine zone
- Fish sanctuary

RESOURCES

- 132 Flying fish
- 135 Garfish, needlefish
- 136 Goatfish
- 138 Groupers, seabasses, perchlets
- 157 Mullets
- 162 Rabbitfish, spinefeet
- 168 Scads
- 308 Conches
- 404 Mantis shrimps
- 504 Red algae

USES

- A8 Fish cages
- A13 Human settlements/ built-up areas
- A28 Protected areas (formal and informal)
- A32 Resorts
- A38 Seaweed culture
- C2 Compressors
- IF4 Explosives
- IF19 *Pamukos* (tuckseine) with torch and/or flammable substance
- T5 Bottom set gill nets
- T16 Filter nets
- T19 Fish shelters
- T44 Trap nets
- T46 Gleaning

ISSUES

- IS59 Lack of electricity
- IS63 Lack of potable water

Developed and published by:
GEOPLAN Cebu Foundation Inc.
c/o DOST R VII, Gov. M. Cuenco Ave.
Banilad, Cebu City

4. Results of coral reef habitat assessment

Snorkel survey method

CORAL REEF HABITAT ASSESSMENT
TRANSECT DATA PROCESSING

Getting the average % cover:

T no.	Q no.	LHC	LSC	DSC	CR	HRS	S	Total	Observations
1	1	20	20	0	10	30	20	100	Algae, reef fish
	2	20	20	0	10	30	20	100	Parrotfish, sea urchins
	3	5	20	0	25	10	40	100	Rubbles
2	1	20	20	0	10	20	30	100	Damaged corals due to anchor
	2	20	5	15	20	30	10	100	Seaweed farm
	3	20	20	10	30	20	0	100	-do-
3	1	15	5	20	20	30	100	100	-do-
	2	20	25	0	25	5	25	100	Sea urchins
	3	20	30	0	0	10	40	100	Seagrass

STEP 1: Take the averages of each component, per transect

T no.	Q no.	LHC	LSC	DSC	CR	HRS	S	Total	Observations
1	1	20	20	0	10	30	20	100	
	2	20	20	0	10	30	20	100	
	3	5	20	0	25	10	40	100	
		15.0	**20.0**	**0.0**	**15.0**	**23.3**	**26.7**	**100.00**	
2	1	20	20	0	10	20	30	100	
	2	20	5	15	20	30	10	100	
		20.0	**12.5**	**7.5**	**15.0**	**25.0**	**20.0**	**100**	
3	1	15	5	20	20	30	100	100	
	2	20	25	0	25	5	25	100	
	3	20	30	0	0	10	40	100	
		18.3	**20.0**	**6.7**	**15.0**	**15.0**	**25.0**	**100.00**	

STEP 2: Add the averages by component from each transect

	LHC	LSC	DSC	CR	HRS	S
	15	20	0	15	23.3	26.7
	20	12.5	7.5	15	25	20
	18.3	20	6.7	15	15	25
Total:	**53.3**	**52.5**	**14.2**	**45**	**63.3**	**71.7**

STEP 3: Divide the totals of the averages of each component by the number of transects in the survey

Total # of transects: 3

LHC	LSC	DSC	CR	HRS	S
53.3/3	52.5/3	14.2/3	45/3	63.3/3	71.7/3

Average % cover:

LHC	LSC	DSC	CR	HRS	S	Total
17.8	17.5	4.7	15	21.1	23.9	100

Adapted from: Municipality of Moalboal 2002.

Habitat criteria rating chart for coral reefs

CONDITION	CRITERIA
Excellent	76-100% coverage live coral cover
Good	51-75% coverage live coral cover
Fair	26-50% coverage live coral cover
Poor	0-25% coverage live coral cover

Manta tow method

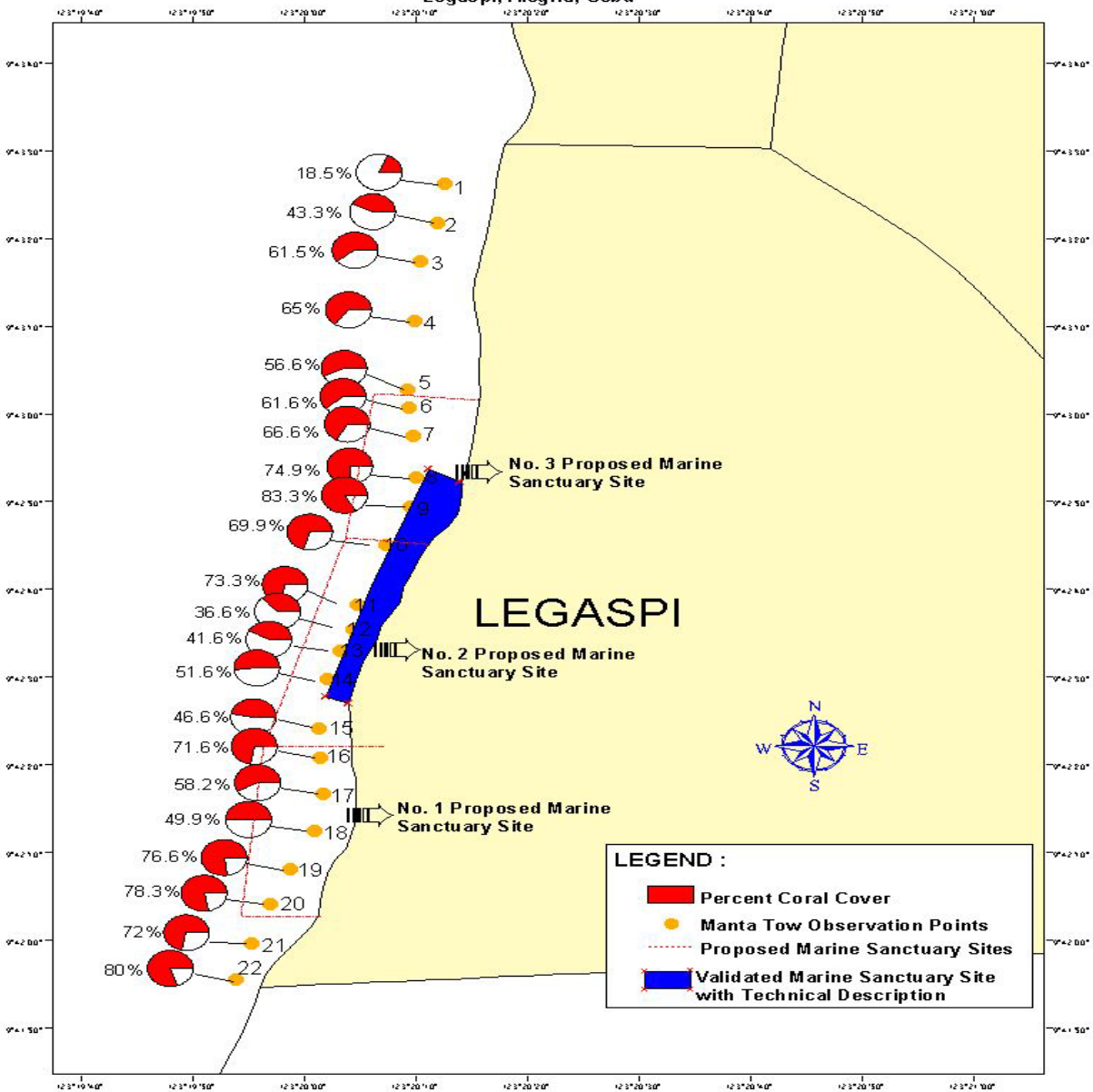
Manta Tow Data Form

Site name: _____ Date: _____

Tow no.	Location	LHC	LSC	DSC	CR	HRS	S	Total
1	From church to house of Pepe	15	10	25	25	15	10	100
2	From Pepe's house to *balete* tree	10	10	30	15	30	5	100
3	From *balete* tree to Vina's Resort	20	15	10	10	10	35	100
4	From Vina's Resort to marine sanctuary guardhouse	30	20	10	10	20	10	100
5	From marine sanctuary guardhouse to school	35	20	10	15	10	10	100
6	From school to Mayor's house	20	15	15	10	15	25	100
7	From Mayor's house to Pablina's Resort	40	25	10	10	5	10	100
8	From Pablina's Resort to the "Cliff"	50	30	10	5	5	0	100
9	From the "Cliff" to "Tubod"	30	15	10	15	10	20	100
10	From "Tubod" to barangay wharf	15	5	30	25	10	15	100

Note: All figures in percent.

MANTA TOW RESULT
Legaspi, Alegria, Cebu



Score	% Cover	Symbol
1	0-10%	
2	11-30%	
3	31-50%	
4	51-75%	
5	76-100%	

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Point intercept method

POINT INTERCEPT METHOD DATA FORM

Site name: _____ Municipality/province: _____ Date: _____

Observer: _____ Transect no. 10 Depth: _____

Benthic lifeforms/coral reef components	Number of sampling points found	Estimated percentage cover
Live hard coral	卌 卌 卌 卌 卌 卌 卌 卌 II	21
Live soft coral	卌 卌 卌 I	8
White dead coral	--	0
Dead coral with algae	卌 卌 卌 卌 卌 I	13
Turf algae	--	0
Fleshy microalgae	卌 卌	6
Coralline algae	卌 I	3
Sponges	--	0
Other animals	卌 卌 卌 II	8.5
Seagrass	卌 卌	5
Rubble	卌 卌 卌 卌 卌	12.5
Rock	卌 卌 卌 卌 卌 III	14
Sand/silt	卌 卌 卌 III	9

To get the estimated percentage cover = $\frac{\text{42 live hard coral observed}}{\text{200 observation points}}$ = 21%

(50-m transect line with observation every 25 cm)

POINT INTERCEPT METHOD DATA SUMMARY FORM

Site name: Gilutongan Marine Sanctuary								Municipality & province: CORDOVA, CEBU						
Zone/sector:	Outside							Inside						
Month and year:	November 1999							November 1999						
Transect no:	1	2	3	9	10			4	5	6	7	8		
Types/groups	Sub-total					Total	Avg.	Sub-total					Total	Avg.
Live hard coral	44.0%	28.0%	56.5%	41.0%	15.3%	184.8	37%	65.0%	58.5%	24.1%	42.5%	38.5%	228.6	45.7%
Soft coral	0.0%	0.0%	0.0%	0.0%	0.5%	0.5	0%	0.5%	0.0%	0.0%	0.5%	0.0%	1.0	0.2%
White dead coral	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0%	0.0%	0.0%	4.0%	6.5%	1.0%	11.5	2.3%
Dead coral with algae	4.0%	5.0%	9.0%	7.0%	2.6%	27.6	6%	9.0%	12.0%	13.6%	18.0%	12.0%	64.6	12.9%
Sponges	0.0%	0.0%	0.0%	0.5%	0.5%	1.0	0%	2.0%	1.0%	1.5%	2.0%	1.0%	7.5	1.5%
Other animals	0.0%	0.0%	0.0%	0.0%	0.5%	0.5	0%	1.0%	0.0%	1.5%	0.0%	0.5%	3.0	0.6%
Turf algae	0.0%	0.0%	7.5%	0.0%	0.0%	7.5	2%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5	0.1%
Fleshy macroalgae	11.5%	27.5%	0.0%	0.0%	0.5%	39.5	8%	0.0%	0.0%	0.0%	0.5%	0.0%	0.5	0.1%
Coralline algae	0.5%	0.0%	0.0%	0.0%	0.5%	1.0	0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.5	0.1%
Seagrass	0.0%	0.0%	0.0%	0.0%	2.6%	2.6	1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0%
Rubble	6.0%	9.5%	6.5%	5.0%	0.5%	27.5	6%	9.5%	9.5%	17.1%	9.5%	14.0%	59.6	11.9%
Rock	14.5%	15.0%	9.5%	4.0%	6.6%	49.6	10%	8.0%	7.0%	5.5%	3.0%	2.0%	25.5	5.1%
Sand/silt	19.5%	15%	11.0%	42.5%	69.9%	157.9	32%	5.0%	12.0	32.2%	17.5%	30.5%	97.2	19.4%
Invertebrates														
Diadema	7	21	2	5	3	38	7.6	?	92	6	6	?	104	35
Sea cucumber	1	0	1	2	2	6	1.2	?	0	2	1	?	3	1

Source: Uychiaoco *et al.* 2001.

5. Results of seagrass habitat assessment

SEAGRASS HABITAT ASSESSMENT
TRANSECT DATA PROCESSING

Getting the average % cover:

Transect no.	Quadrat no.	Species	% cover	Substrate	Other observations
1	1		0	Sandy	Shell, *bakay-bakay*
	2		0	Rocky	*Bakay-bakay*
	3	*Halophila*	25	Rocky, muddy	
	4		0	Sandy, muddy	
	5		0	Rocky	*Panas*
2	1		0	Sandy, rocky	
3	1		0	Sandy, rocky	Murky
	2	*Halodule*	12	Sandy, rocky	
	3	*Halodule*	55	Sandy, rocky	
	4	*Halodule*	40	Sandy, rocky	
	5	*Halodule*	25	Sandy, rocky	
		Thalassia	5		

STEP 1: Take the average % cover of each transect by dividing the total per transect by number of quadrats

Transect no.	Quadrat no.	Species	% cover	Substrate	Other observations
1	1		0	Sandy	Shell, *bakay-bakay*
	2		0	Rocky	*Bakay-bakay*
	3	*Halophila*	25	Rocky, muddy	
	4		0	Sandy, muddy	
	5		0	Rocky	*Panas*
			25/5 = 5%		
2	1		0	Sandy, rocky	
			0/1 = 0%		
3	1		0	Sandy, rocky	Murky
	2	*Halodule*	12	Sandy, rocky	
	3	*Halodule*	55	Sandy, rocky	
	4	*Halodule*	40	Sandy, rocky	
	5	*Halodule*	25	Sandy, rocky	
		Thalassia	5		
			137/5 = 27.4%		

STEP 2: Add the averages from each transect.

	% cover
	5
	0
	27.4
Total:	32.4

STEP 3: Divide the totals of the averages of each component by the number of transects in the survey.

Total # of transects: 3

% cover
32.4/3

Average % cover:

% cover
10.8

Status/ Classification	Criteria for Evaluation	Management Priority
Pristine seagrass beds	High or low species diversity bordering land masses or islands far removed from human habitations, disturbed only be the normal intensity of natural elements; often form thick assemblages in shallow waters	High priority for protection and management
Disturbed seagrass beds	High or low diversity beds occupying bays and coves, near human habitations; these beds receive constant impacts of human activities such as slight to moderate physical disturbance and various kinds of pollution that are not severe enough to eliminate or kill the seagrasses	High priority for minimizing the existing human impacts in the area
Altered seagrass beds	Low species diversity permanently and completely changed or converted in to other coastal uses like fish ponds, land fill or heavily impacted by sedimentation and physical damage	Low priority for management unless rehabilitation is still possible in area
Emergent seagrass beds	Low species diversity, largely controlled by extreme physico-chemico conditions such as low levels of salinity or variations thereof within the natural environment	Medium priority for management and conservation depending on controlling conditions

6. Results of mangrove habitat assessment

$$\text{Percent crown cover} = \frac{\text{Total crown cover of all trees}}{\text{Total area sampled}}$$

$$\text{Regeneration per m}^2 = \frac{\text{Total regeneration count}}{\text{Total no. of regeneration plots}}$$

$$\text{Average height} = \frac{\text{Total height of all trees recorded}}{\text{Total number of trees recorded}}$$

Condition	Criteria
Excellent	76% and above in % crown cover 1 regeneration per m^2 Above 5 m in average tree height Undisturbed to negligible disturbance
Good	51-75% crown cover <1 - 0.76% regeneration per m^2 <5m - 3m average height of trees Slight disturbance and few cuttings
Fair	26-50% crown cover 0.50 - 0.75 regeneration per m^2 <3m - 2m average height of trees Moderate disturbance and noticeable cuttings
Poor	0-25% crown cover <0.50 regeneration per m^2 <2m average height of trees Heavy disturbance/cuttings/pollution, rampant coversion to other uses, nearly destroyed

DATA SHEET FOR MANGROVE ASSESSMENT

Transect no. 1

Recorder: Renclar de los Reyes

Date April 11, 2003

Location Mahayahay (Site) Duhaylungsod (Barangay) Talibon (Municipality) Bohol (Province)

Quadrat no.	Tree no.	Substrate	Species	Height (m)	Crown diameter (average of 2 readings*)	Observations (disturbance, threats, uses, cuttings, garbage, fauna)
1	1	Muddy	*Bakauan babae* (*Rhizopora mucronata*)	6	2	Crabs, birds, seasnake, undisturbed
	2	Muddy	*Bakauan lalaki* (*Rhizopora apiculata*)	5	1.5	
	3	Muddy	*Pagatpat* (*Sonneratia alba*)	6	2	
	4	Muddy	*Bakauan babae* (*Rhizopora mucronata*)	5	2	
	5	Muddy	*Bakauan lalaki* (*Rhizopora apiculata*)	4	1.5	
2	1	Muddy	*Pagatpat* (*Sonneratia alba*)	5	1.5	Shells, undisturbed
	2	Muddy	*Bakauan lalaki* (*Rhizopora apiculata*)	4	1	
	3	Sandy	*Bungalon* (*Avicennia marina*)	6	1.5	
	4	Sandy	*Piapi* (*Avicennia lanata*)	5	1.5	
			TOTAL	**46**	**14.5**	

- Crown diameter (2 measures) - the average of the crown width at the widest point and a second width measurement made 90^{o} to the diameter at the widest point.

- Crown cover is calculated using the formula $\pi/4d^2$ or $0.7854d^2$ (d as the total crown diameter)

- To get the crown cover for each tree = 0.7854 x (crown diameter)^2

- To get the total crown diameter = $0.7854(2)^2 + 0.7854\ (1.5)^2 + 0.7854(2)^2 + 0.7854(2)^2 + 0.7854(1.5)^2 + 0.7854(1.5)^2 + 0.7854(1)^2 + 0.7854(1.5)^2 + 0.7854(1.5)^2$ = **19.04 m^2**

- To get percent crown cover :

$$\frac{\text{Total crown cover of all trees}}{\text{Total area sampled}} = \frac{19.04}{\text{2 quadrats x 100m}^2} = \frac{19.04}{200} = 9.53\%$$

- To get the average height = $\frac{\text{Total height of all trees recorded}}{\text{Total number of trees recorded}} = \frac{46}{9} =$ **5.11 m**

DATA SHEET FOR MANGROVE REGENERATION

Transect no. 1

Recorder: Renclar de los Reyes

Date April 11, 2003

Location

Site	Barangay
Mahayahay	Duhaylungsod
Municipality	**Province**
Talibon	Bohol

Quadrat no.	Plot	Species	Count	Remarks (average height, status, etc.)
1	1	*Bakauan lalaki* (*Rhizopora apiculata*)	2	Other seedlings were not seen due to high tide
		Pagatpat (*Sonneratia alba*)	1.5	
	2	*Bungalon* (*Avicennia marina*)	2	
		Pagatpat (*Sonneratia alba*)	2	
	3	*Piapi* (*Avicennia lanata*)	1	
2	1	*Pagatpat* (*Sonneratia alba*)	1	
	2	*Piapi* (*Avicennia lanata*)	2	
	3	*Bungalon* (*Avicennia marina*)	1.5	

Regeneration per m² = $\frac{\text{Total regeneration count}}{\text{Total no. of regeneration plots}} = \frac{2+2+2+1+1+2+1+1}{6} = \frac{12}{6} = 2$

RESULTS SUMMARY:

1. % crown cover = 9.53%
2. Average height = 5.11 m
3. Regeneration per m^2 = 2

Therefore, the mangrove area with the data used in the example above is in poor condition.

7. Results of the fish visual census

FISH ABUNDANCE DATA FORM

Site: Tuka I (buffer zone)		Municipality and province: Kiamba, Sarangani			
Transect no.: 10	Depth (m):	Coordinates: 5°59.10' N, 124°36.71'E			
Date (month/day/year): 3/20/99	Time:	Left observer: Ben Banquil	Right observer: Andre Uychiaoco		
Habitat notes:		Horizontal visibility (m): 3.5	Angle of slope: 15–20°	Transect orientation (NEWS): East	
Family	Species	Record number of fishes per size class			
		1-10 cm	11-20 cm	21-30 cm	Specify sizes for >30 cm
<EPINEPHELINAE> groupers, *lapu-lapu*		2			
Barramundi cod; *senorita*					
<LUTJANIDAE> snappers; *maya-maya*		12			
<HAEMULIDAE> sweetlips; grunts; *lipti*					
<LETHRINIDAE> emperors; *katambak*		1			
CARANGIDAE jacks; trevallies; *talakitok*					
CAESIONIDAE fusiliers; *dalagang bukid; solid*					
NEMIPTERIDAE coral breams; *silay*		4			
MULLIDAE goatfishes; *timbangan*		7	2		
BALISTIDAE triggerfishes; *pakol*		11			
CHAETODONTIDAE butterflyfishes; *alibangbang*		24			
POMACANTHIDAE angelfishes; *adlo*					
LABRIDAE wrasses; *labayan*		26			
Humphead wrasse; *mameng*					
[SCARIDAE] parrotfishes; *molmol*		4			
Bumphead parrotfish; *taungan*					
[ACANTHURIDAE] surgeonfish; *indangan*		33			
[SIGANIDAE] rabbitfishes; *kitong; danggit*			1		
[KYPHOSIDAE]* rudderfishes; *ilak*			1		
POMACENTRIDAE damselfishes; *paleta*		670			
ANTHIINAE fairy basslets; *bilong-bilong*		12			
Zanclus cornutus					
Moorish idol; *sanggowanding*					
sharks					
rays					
sea turtles					
others	cardinalfish filefish soldierfish flutemouth	6 3 3	1		

Legend: <fishes> = major reef carnivores; [fishes] = major reef herbivores; **fishes** = fishes which are indicators of hard corals

Source: Uychiaoco *et al.* 2001.

DATA SUMMARY FORM

Site name: Tuka Reef (Barangay Poblacion)									Municipality and province: Kiamba, Sarangani								
Zone/sector:	Outside								Inside								
Month and year:	March 1999								March 1999								
Transect no.:	1	2	3	9	10				4	5	6	7	8				
Types/groups	Subtotal						Total	Ave.	Subtotal						Total	Ave.	
Groupers	5	0	2	3	2		12	2.4	5	2	3	2	6		18	3.6	
Snappers	5	0	1	2	13		22	4.4	3	7	4	1	1		16	3.2	
Sweetlips	1	0	0	1	0		2	0.4	0	0	0	0	0		0	0	
Emperors	0	0	2	0	1		3	0.6	16	0	5	1	1		23	4.6	
Jacks	0	0	1	2	0		3	0.6	0	0	1	10	1		12	2.4	
Fusiliers	13	0	0	35	0		48	9.6	0	0	1	0	0		1	0.2	
Spinecheeks	1	0	2	14	4		21	4.2	12	0	14	3	2		31	6.2	
Goatfishes	22	18	21	36	9		106	21.2	7	23	16	5	0		51	10.2	
Triggerfishes	33	20	41	36	11		141	28.2	9	15	21	34	27		106	21.2	
Butterflyfishes	82	43	54	49	24		252	50.4	21	55	50	24	58		208	41.6	
Angelfishes	26	16	21	15	0		78	15.6	9	45	20	12	4		90	18	
Wrasses	69	65	83	272	26		515	103	30	619	239	64	128		1080	216	
Parrotfishes	11	8	0	2	4		25	5	2	12	13	2	51		80	16	
Surgeonfishes	122	74	44	118	43		401	80.2	61	215	227	33	264		800	160	
Rabbitfishes	5	0	1	0	0		6	1.2	1	10	9	2	2		24	4.8	
Damselfishes	1032	1157	1420	617	670		4896	979.2	868	972	686	662	439		3627	725.4	
Fairy basslets	13	18	3	45	12		91	18.2	4	1	12	9	1		27	5.4	
Moorish idol	3	2	2	6	0		13	2.6	1	12	11	0	3		27	5.4	
Cardinalfishes	76	0	0	0	6		82	16.4	3	0	2	2	1		8	1.6	
Filefishes	3	0	7	0	3		13	2.6	0	0	0	7	2		9	1.8	
Soldierfishes	38	1	9	0	3		51	10.2	9	0	10	0	10		29	5.8	
Hawkfishes	3	2	0	0	1		6	1.2	0	0	5	0	0		5	1	

Source: Uychiaoco *et al.* 2001.

FISH ABUNDANCE GRAPH

Fish type	October 1998		March 1999		November 1999		March 2000		March 2001	
Waray-an English	Inside sanctuary	Outside sanctuary	Inside sanctuary	Outside sanctuary	Inside sanctuary	Outside sanctuary	Inside sanctuary	Outside sanctuary	Inside sanctuary	Outside sanctuary
Lapu-lapu Grouper										
Labuyan Wrasse										
Lipti Sweetlip										
Kalambak Emperor										
Solid Fusilier										
Timbungan Goatfish										
Silay Bream										
Alibangbang Butterflyfish										
Indangan Surgeonfish										
Kilong Rabbitfish										
Bawŏalo Needlefish										
Mamot Parrotfish										
Samak Mojarras										

Legend (fish observed per 500 m² survey area):

- 1 - 5 fish
- 6 - 25 fish
- 26 - 125 fish
- 126 - 625 fish
- More than 626 fish

Sources: Coastal Resource Management Project (CRMP) / University of the Philippines - Marine Science Institute (UP-MSI). Community-based monitoring team includes representatives of the Municipality of Cordova, Barangay Gilutongan, DENR Region VII, BFAR Region VII, the University of San Carlos - Marine Biology Section (USC-MBS), and International Marinelife Alliance - Philippines.

Lecture/Discussion #11:

Writing up the Coastal Environment Profile for CRM Planning

USAID FROM THE AMERICAN PEOPLE

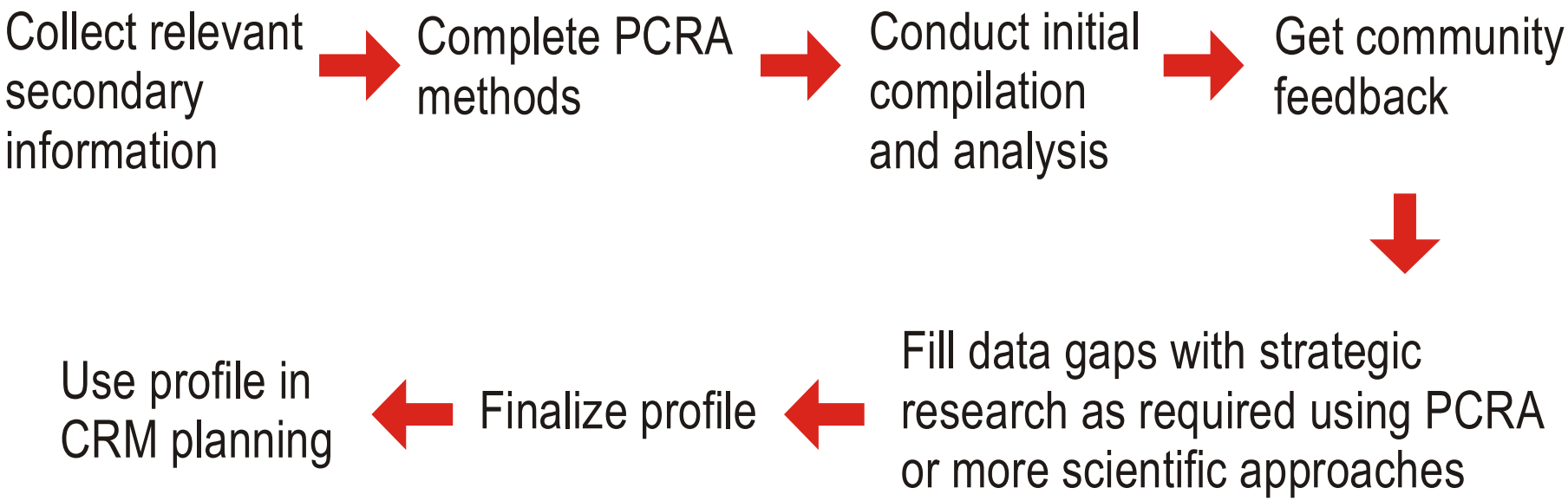
FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

Data gathered from PCRA serve various purposes.

- First, these are the primary bases for the development of the coastal environment profile which are essential for CRM planning.
- They are also used to measure performance indicators for project monitoring and evaluation.
- Other important functions also include: consciousness-raising tool for the community, and point of entry for organizing the community for CRM.

The coastal environment profile is a document which presents the results of PCRA field methods in ways that will assist CRM planning decisions.

Process in producing the coastal environment profile



Outline for the comprehensive coastal environment profile

List of Tables
List of Figures
List of Acronyms and Abbreviations
Acknowledgments

I. Introduction

A. location
B. physiognomy or any short description of the area/geography
C. historical background
D. summary of issues
E. objectives
F. scope
G. general definitions, if any

II. **Physical Features** (*include data by municipality, use maps or tables or any visual where appropriate*)
   A. land area
   B. topography
   C. hydrology
   D. soil
   E. land uses
   F. climate

III. **Natural Resources** (*should have visuals; include species, area, condition*)
   A. mineral resources
   B. forest resources
   C. coastal resources
      1. mangrove
      2. seagrass
      3. coral
      4. seaweed (*if present; may also be included in fisheries*)
      5. fisheries
      6. others (*beaches, endangered species, etc.*)

IV. Socio-Political Setting (*include tables, charts, graphs, etc.*)

A. political/administrative boundaries
B. demographics (*per municipality*)
    1. population size, density, distribution and growth rate
    2. household (*number, members/nuclear or extended*)
    3. age and gender composition
    4. urban and rural distribution
    5. education
    6. labor and/or employment, income
    7. religion and/or ethnic groups
    8. dialects
C. health, sanitation and medical care
D. settlements (*type and ownership*)
E. roads, transportation and communication, other related infrastructure or support systems (e.g. *cooperatives, fishing ports*)

V. **Economic Sector** (per municipality, per barangay when appropriated) — use maps, tables, charts, figures

A. fisheries
   1. capture fisheries
      a. capture methods (*fishing gear, types of boats and no., ownership*)
      b. no. of fishers
      c. catch per unit effort
      d. catch per species (*weight*) per gear
      e. historical trends in catch levels and composition (*species caught, market value and composition.*
   2. aquaculture
      a. cadastral maps to depict fishpond areas by municipality/*barangay*
      b. areas legible for reversion
      c. mariculture types and production levels by municipality/barangay
      d. historical trends in production

B. tourism
   1. classification and location of existing and potential tourist areas
   2. no. of employees per activity
   3. revenues generated
   4. description of environmental, social, cultural impacts

D. others (e.g. agriculture, forestry)
   similar parameters above

VI. Institutional and Legal Framework

A. introduction
B. current state of the Philippine Coastal Zone Law (includes related policies/laws)
C. local government (provincial, municipal, barangay, other GO's)
    1. types, structures
    2. development plans/activities or projects
    3. budget allocated for ICM
D. non-governmental organizations involved in ICM
    1. names
    2. types of activities
    3. funding levels
    4. future plans
E. community organizations
    1. names
    2. types of activities
    3. funding levels
    4. future plans

VII. Management Issues and Opportunities (include stakeholders and appropriate analyses)

A. environmental
B. economic
C. political/institutional