Interpreting Observations

10

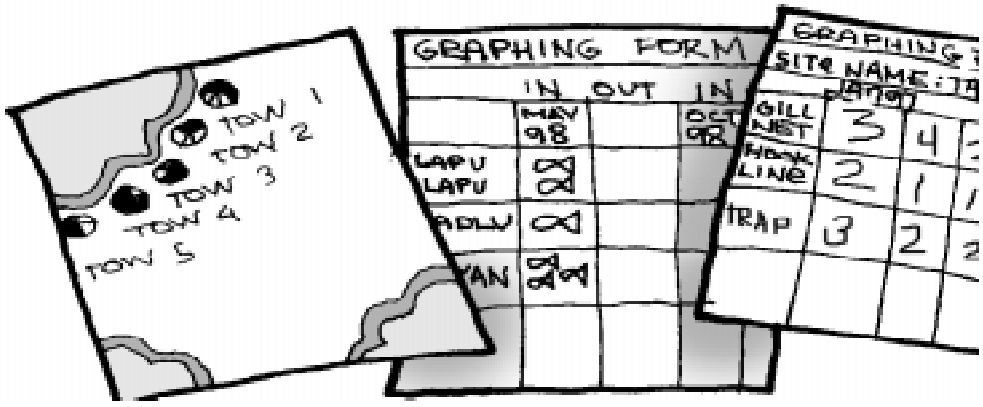
Relating various observations with each other and with ideas/ theories/concepts about how other similar systems operate can help us understand the processes in the observed system.

For accuracy, compile all data before team members separate! Summarize and feedback for validation as soon as possible.

Requirements

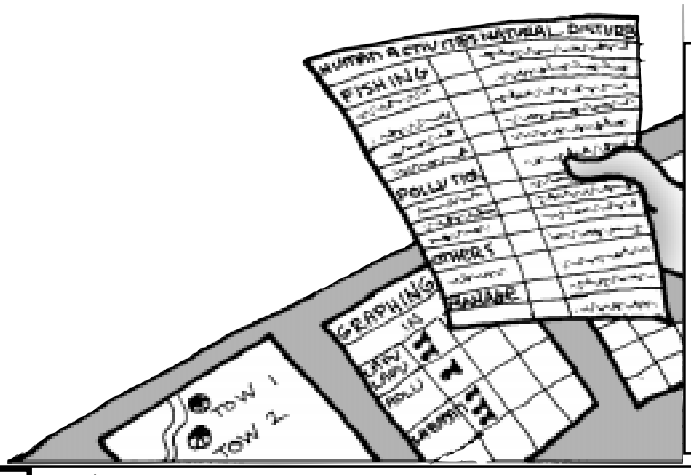
- ❑ Completed summary forms and graphs of the Manta Tow, Benthos Transect, Fish And Invertebrate Visual Censuses, and Fish Catch observations
- ❑ Completed data forms for Human Activities and Natural Disturbances observations
- ❑ Crayons or colored pencils

1 Use the various summary and data forms to fill out the Correlation Table.



Review each result again.

2 Look for and note down possible trends.



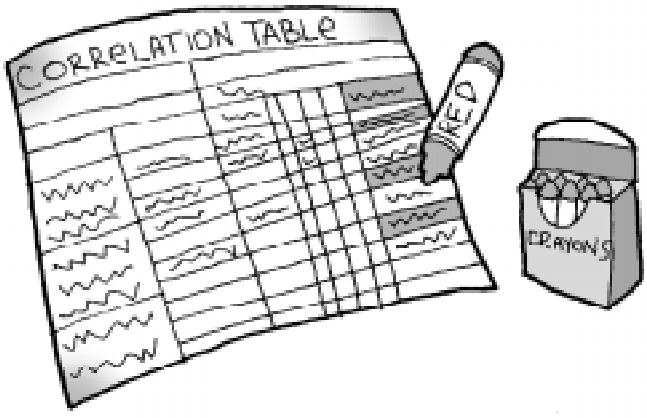
What constitutes a trend?

- consistent increase
- consistent decrease
- increase or decrease at regular intervals (for example, seasonally; look at the pattern of your graph)

3 Look for and note down relationships of variables.

Some things may tend to increase or tend to decrease together. Others may act in opposite ways; that is, one thing increases whenever the other thing decreases.

4 Use a colored pencil or crayon to mark things with opposite trends with different colors on the Correlation Table.

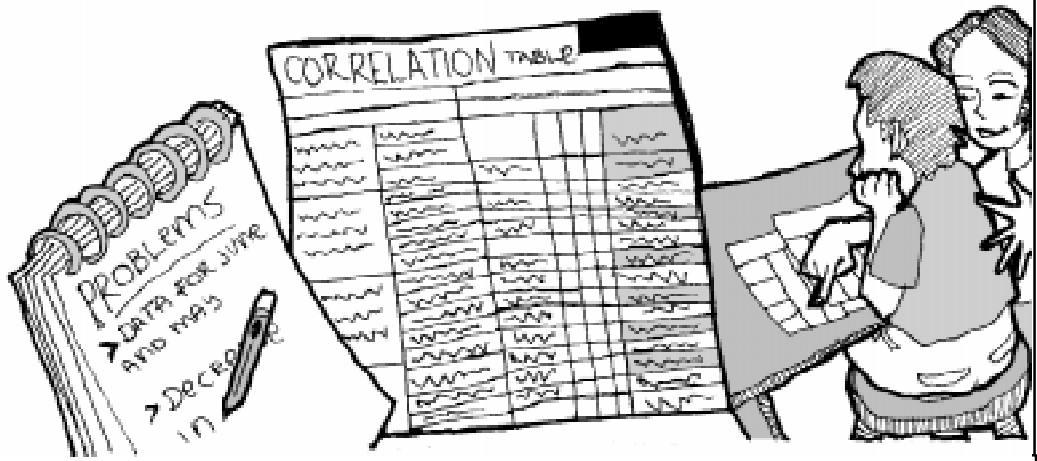


For example,

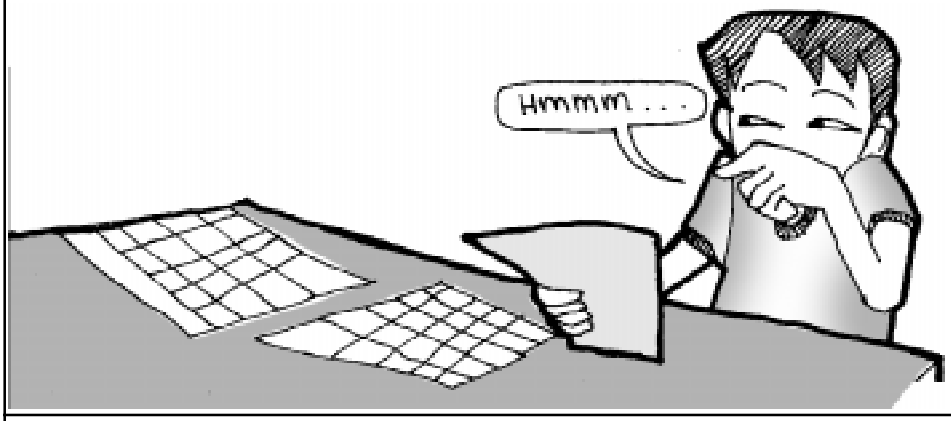
- things which are increasing may be marked with warm colors—reds and oranges;
- things which are decreasing might be marked with cool colors—blues and greens.

5 See to it that things which seem to increase and/or decrease together are marked with the same or similar colors on the Correlation Table.

6 Look for potential problems or issues in the Correlation Table and note these down for later discussion (see Evaluation & Action).

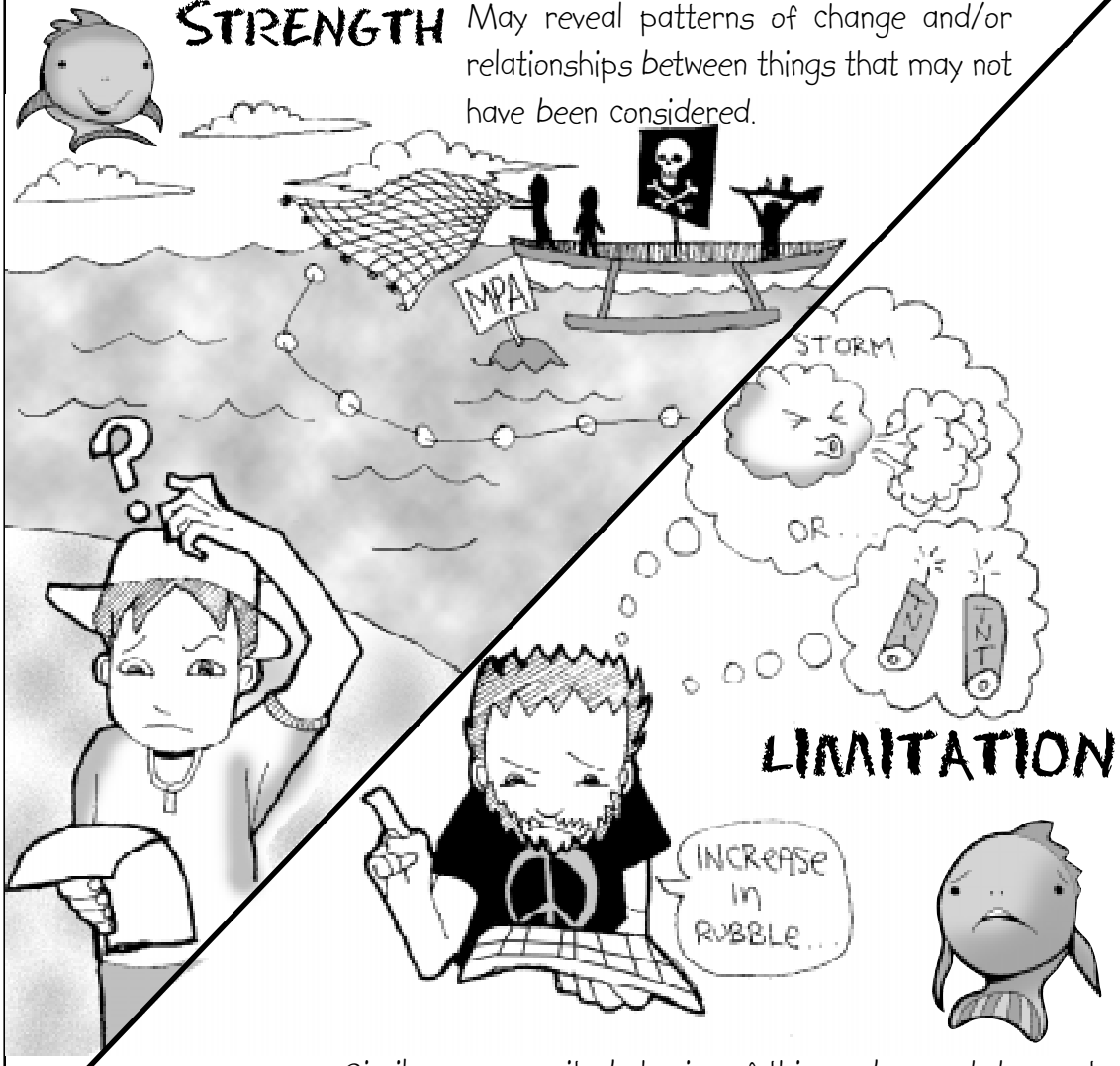


6 Look for improving trends in the Correlation Table and try to see whether they are related to improvements in management.



STRENGTH

May reveal patterns of change and/or relationships between things that may not have been considered.



LIMITATION

Similar or opposite behavior of things observed does not necessarily mean that one causes the change in the other.

Trainer's Tips for Chapter 10

Correlation is the relationship between things which tend to change together in a way not on the basis of chance alone. Positive correlation is when things increase and/or decrease together. Negative correlation is when one thing increases whenever one thing decreases.

Objects that increase or decrease in the same manner might have a cause-effect relationship or may just both be reacting to still another object (e.g. environment) in the same manner.

Data are represented into pictographs, pie charts, line graphs, and the like to make them easy to understand and remember.

CORRELATION TABLE

Form 7

Site Name: Brgy. Flores fish reserve

Municipality & Province: Baybay, Catanduanes

Period covered (mo/day/yr): May 1997 to May 1999

Zone/Sector: outside MPA

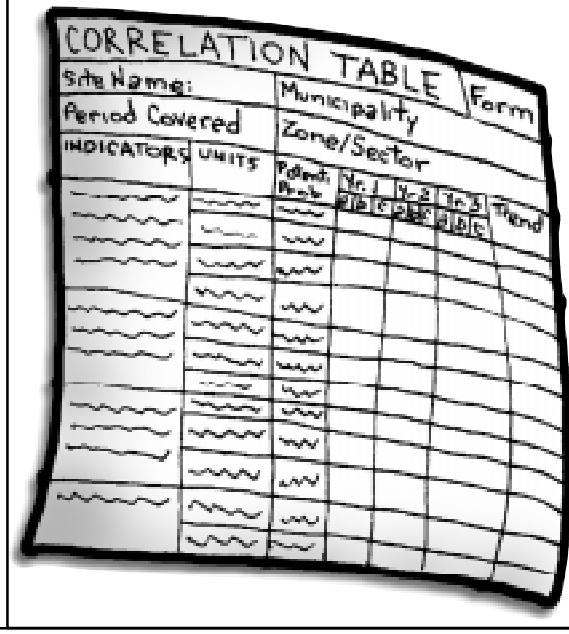
INDICATORS	units	potential problem if...	Year I			Year II			Year III			Trend observed
			a	b	c	a	b	c	a	b	c	
FISH (Carangidae+Caesionidae)	average count	decrease	5	0	0	35	30	20	11	6	4	
FISH (Lutj+Leth+SEpin+Haem)	average count	decrease	6	5	4	9	8	7	10	9	8	inc.
LOBSTER	average count	decrease		0			0			0		
GIANT CLAMS	average count	decrease		0			1			0		
TRITON	average count	decrease		0			0			0		
CROWN-OF-THORNS	average count	increase		0			7			1		
OVERHARVESTING/OVERFISHING	no. of fishers obs.	increase		12			10			15		
CORALS (Hard & Soft)	average % cover	decrease		26			22			19		dec.
FISH (Chaetodontidae)	average count	decrease	18	15	13	13	10	8	6	4	3	dec.
DEAD CORAL (w/ or w/o ALGAE)	average % cover	increase		2			4			10		inc.
RUBBLE	average % cover	increase		8			5			6		
DESTRUCTIVE FISHING	evidence of blasts	increase		3			1			0		dec.
ANCHOR DAMAGE	overturned corals	present		×			×			✓		
STORMS	no. of strong ones	high		0			0			0		
TOURISM	no. of resorts	>med or inc.		0			0			0		
ALGAE (turf+macroalgae)	average % cover	increase		12			18			23		inc.
FISH (Balistidae+Tetradontidae)	average count	decrease	0	0	0	0	0	2	0	0	0	
FISH (Scar+Acan+Kyph)	average count	decrease	35	30	25	15	11	10	12	10	8	dec.
URCHINS	average count	large change		20			4			3		dec.
ALGAL OVERGROWTH	occurrence	common		6			8			9		
AGRICULTURAL/FARMED AREA	% of coastline	> low or inc.		30			40			45		inc.
POPULATION		high		16,000			18,000			20,000		inc.
TRASH/GARBAGE (total)	no. observed	present		6			30			42		inc.
MARICULTURE	% area	high		0			0			0		
SAND/SILT	average % cover	increase		17			13			15		
RIVER	distance	near		3km			3km			3km		
VISIBILITY (horizontal & vertical)	in meters	decrease		15			12			8		dec.
FORESTED AREA	% of coastline	decrease		10			2			0		
COASTAL STRUCTURES BUILT-UP	% of coastline	> low or inc.		5			5			8		inc.
SHIPPING	no. of large ships	> 3-5		0			0			1		
MINING POLLUTION	no. observed	present		0			0			0		
INDUSTRIAL POLLUTION	no. of factories	> low or inc.		0			0			0		
MASS BLEACHING	% cover	> 20%		0			10			0		
DISEASED CORALS	% cover	> 20%		0			0			0		
FISH KILLS & other mass deaths		present		×			×			×		
Crown-of-thorns, algae, urchins,...	average count	rapid inc.										algae inc.
OTHER REMARKS:												

Evaluation & Action 11

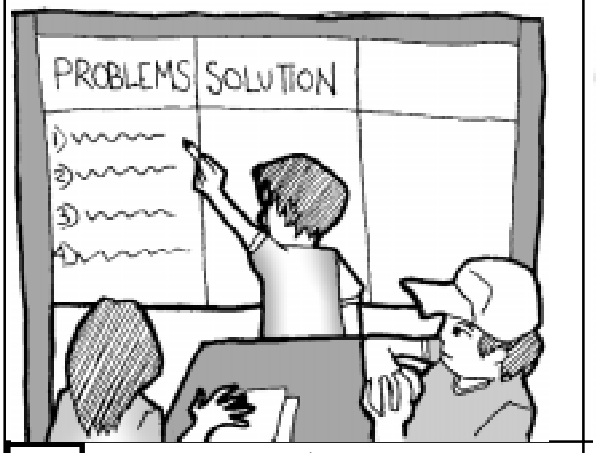
Studying the trends and the factors that might have led to the current situation may lead us to act upon certain factors which are within our control. Actions include (1) preventing destruction/ depletion or (2) directly restoring coastal habitats/ resources. Without evaluation and action all the effort put into planning, observing, summarizing, and interpreting will not lead to improvement.

Requirements

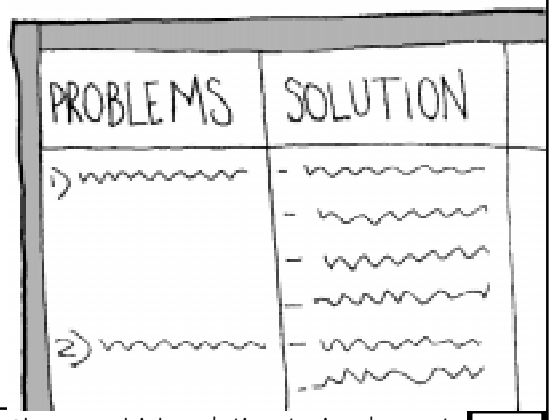
- ❑ Filled-out Correlation Table



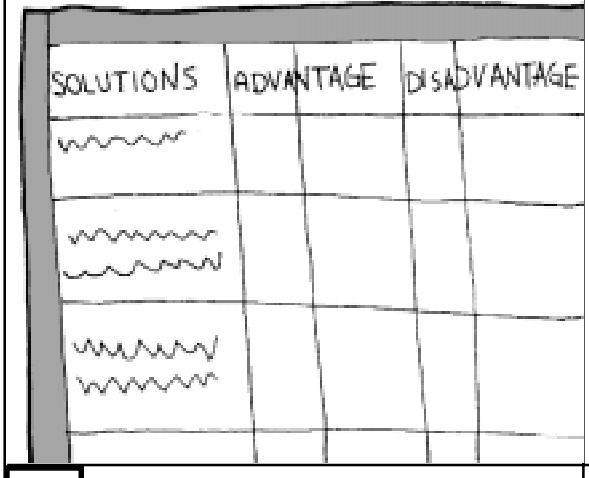
1 List potential problems/issues identified in the Correlation Diagram.



2 Generate as many as possible solutions for each problem/issue.



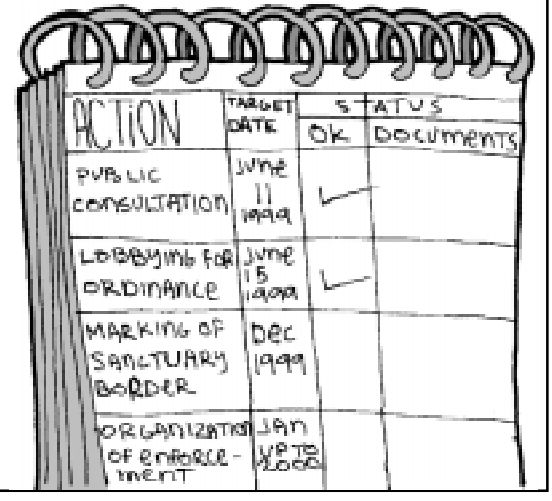
3 Get the top 5 solutions & write down their advantages & disadvantages.



4 Choose which solution to implement.

5 Implement the possible solution.

6 Monitor and evaluate the progress.



SOME STRATEGIES

On this page are some suggested strategies to address problems identified on the Correlation Table.

PROBLEM	STRATEGY/METHOD
Overfishing	Harvest Regulations (Marine Protected Area/Zoning, Seasonal closure, Gear restriction, Species restriction), Patrolling & Enforcement, Reseeding (e.g. Sea-Ranching)
Destructive fishing	Education, Patrolling & Enforcement, Harvest Regulations (Marine Protected Area/Zoning, Seasonal closure, Gear restriction, Species restriction)
Pollution (garbage & sewage)	Waste collection (& proper disposal system), Recycling
Pollution (agricultural & sediments)	Mangrove reforestation, Watershed revegetation, Organic farming, Crop rotation, Education
Pollution (mining & industrial)	Lobbying for waste reduction, detoxification, and redirection
Reef damage from tourism activities	Education, Mooring buoys, Patrolling & Enforcement, Marine Protected Area/Zoning
Coastal construction	Lobbying for impact reduction measures and relocation
Storms, global warming, mass bleaching, & other natural disturbances	Reduce man-made stresses (other problems above) to enable the environment to recover more easily

On the following pages the above strategies are further described...

STRATEGY/METHOD	STRATEGY/METHOD	PURPOSE/WHEN TO USE
CONSERVATION: Regulation & Enforcement		
Marine Protected Area/Zoning	Closing an area to some uses; Assigning areas for other uses	To protect and allow recovery of an area and its resources; To reduce resource-use conflicts
Seasonal closure	Not allowing fishing or diving during certain times of the year	To allow resources or habitats to recover
Gear restriction	Not allowing the use of certain gear	To prevent destruction of habitat; To promote equitability or to limit exploitation level
Species restriction	Not allowing the catching of certain species	To protect endangered species or breeding of overexploited species
Patrolling & Enforcement	Helping the authorities impose compliance with the law	Essential to realize the objectives of the above regulatory methods
CONSERVATION: Impact Reduction		
Recycling	Reusing materials for the same or for another use (e.g. composting)	To reduce waste production and extraction of materials
Waste collection/clean-ups	Moving scattered garbage from coastal habitats to a landfill	To contain waste to a place where it will do less damage
Watershed revegetation	Replanting erosion prone areas	To reduce the sediments going to the coastal area
Anchor buoys	Providing a safe place for boats to moor without causing habitat damage	To reduce anchor damage to corals
Supplementary livelihoods	Providing additional sources of income	To reduce dependence on and extraction of coastal resources
Lobbying	Using the force of a large number of people to influence...	To influence groups not concerned with the coast to be concerned
ENHANCEMENT & REHABILITATION: Transplantation & Reseeding		
Mangrove reforestation	Transfering mangrove young (propagules, seedlings or saplings)	To start up mangrove growth & reproduction and restore abundance of mangrove forest
Reseeding	Transfering young or breeding adults of species to a depleted area (e.g. sea cucumber, urchins, giant clams)	To speed up restocking of a depleted area and allow growth of these species there
Artificial reefs	Putting hard structures in a soft bottom area	To serve as a shelter for fish to aggregate

CONSIDERATIONS	ADVANTAGES	DISADVANTAGES
CONSERVATION: Regulation & Enforcement		
Must be widely accepted; Boundaries must be marked	Promotes consensus and networking; Easier to enforce than most other regulations	Legislation difficult to get; May highlight conflicts; Benefits may take a few years before becoming evident
May need alternatives for those affected; Info campaign needed	Allows use of the area at other times	Loss of fishing opportunity
May need alternatives for those affected; Info campaign needed		Usually difficult to enforce; Loss of fishing opportunity
May need alternatives for those affected; Info campaign needed		Difficult to enforce; Loss of fishing opportunity
Volunteers need para-legal training and have to be deputized; Better to prevent than apprehend violators; Boat, fuel, & radios needed		Sometimes dangerous for the deputized wardens; Cases may get stuck in court
CONSERVATION: Impact Reduction		
External facilities needed to re-use certain materials (e.g. metals)	Also reduces cost and even generates income	
May encourage with awards	Sanitation also improves health	
May also depend on farming and upland communities; Don't introduce foreign species	Also reduces air pollution	
Care needed in putting down buoy's weight	Can also be used to delineate MPA boundaries	Concentrates impact to one place
Should be environment-friendly	Sustained increased income	Activities could multiply too much and harm the environment
Prevent rather than wait for trouble	Can serve as a rallying point for unity	Potential conflicts among resource users
ENHANCEMENT & REHABILITATION: Transplantation & Reseeding		
Don't introduce foreign species or mangroves where there was none; Multi-species forests are more natural; Availability of seedlings	Stabilizes coast and reduces sedimentation	May take a long time so must ensure control of area for 10-25 years after for benefits to be felt
Young or breeding adults must be protected; Don't introduce foreign species; Watch out that other species are not harmed; Requires input of young or breeding adults	Spawn also reseeds the areas beyond; Usually economically-valuable species are reseeded	Young may die before they mature
Currently controversial; Carefully consider site, materials, & regulations	Might also serve as a substrate for corals to settle and grow	May speed up resource depletion if it is fished

CHALLENGE

Well-coordinated and time-consuming involvement by dedicated groups of people is usually critical to the success of solutions.

References

Hughes, T.P. 1994. Catastrophes, phase shifts, and large-scale degradation of a Caribbean coral reef. Science 265: 1547-1551.

Earlier versions of the methods described herein can be found in:

Dela Cruz, M.T. and M.C.G. Militante. 1998. Marine reserve monitoring manual for communities. Guiuan Development Foundation, Inc., Guiuan, Eastern Samar, Philippines.

IIRR (International Institute for Rural Reconstruction). 1998. Participatory methods in community-based coastal resource management. International Institute for Rural Reconstruction, Silang, Cavite, Philippines.

Most of the methods in Chapters 5 to 9 were adapted from methods developed by others and described in:

English, S., C. Wilkinson and V. Baker. 1997. Survey manual for tropical marine resources, 2nd ed. Australian Institute of Marine Science, Townsville, Australia.

Hodgson, G. 1999. Reef Check. URL http://www.ReefCheck.org

McManus, J.W., M.C.A. Ablan, S.G.Vergara, B.M. Vallejo, L.A.B. Meñez, K.P.K. Reyes, M.L.G. Gorospe and L. Halmarick. 1997. ReefBase Aquanaut Survey Manual. ICLARM Educ. Ser. 18, 61 p.

White, A.T., C.A. Courtney, M.C. Meyer, A. Alvarado, E. White, J. Apurado and P. Christie. 2000. Summary field report: Coral reef monitoring expedition to Tubbataha Reef National Marine Park, Sulu Sea, Philippines, May 21-30, 2000. Coastal Resource Management Project and the Sulu Fund for Marine Conservation Foundation, Inc., Cebu City, 79 p.

Some useful references for identifying reef organisms in the Indo-Pacific are:

Allen, G.R. 1996. Marine life of Southeast Asia and the Pacific. Periplus Editions, Ltd., Singapore.

Allen, G.R. 1997. Marine fishes of Tropical Australia and South-East Asia. Western Australian Museum, Australia.

Allen, G.R. and R. Steene. 1996. Indo-Pacific coral reef field guide. Tropical Reef Research, Singapore.

Allen, G., R. Steene and M. Allen. 1998. A guide to angelfishes and butterflyfishes. Odyssey/Tropical Reef Research, Western Australia.

Calumpong, H.P. and E.G. Meñez. 1997. Field guide to the common mangroves, seagrass and algae of the Philippines. Bookmark, Inc., Makati City, Philippines.

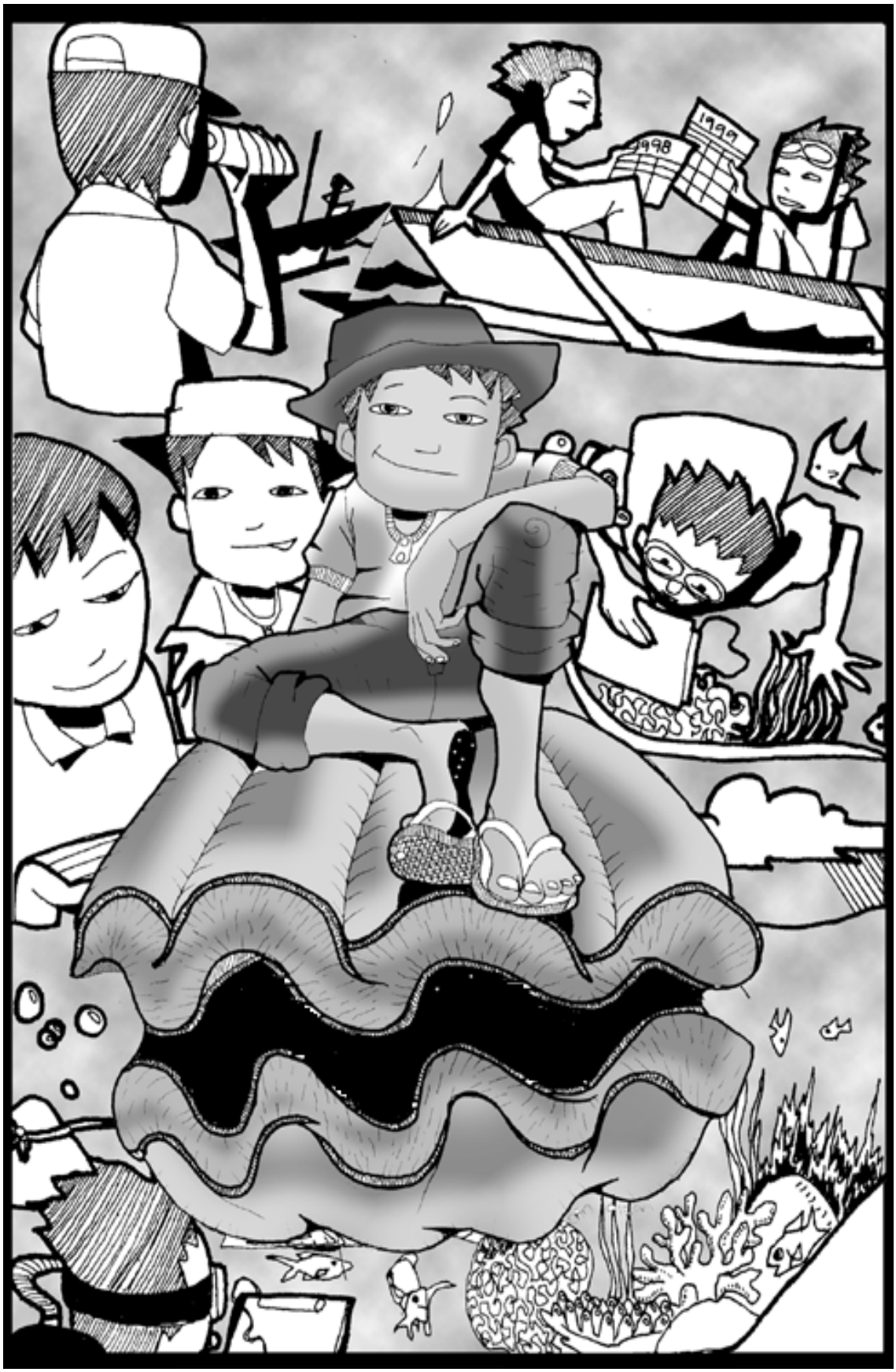
Collin, P.L. and C. Arneson. 1995. Tropical Pacific invertebrates: A field guide to the marine invertebrates occuring on tropical Pacific coral reefs, seagrass beds and mangroves. Coral Reef Press, California.

Lieske, E. and R. Myers. 1996. Collins pocket guide, coral reef fishes: Indo-Pacific and Carribean. Harper Collins Publishers, London.

Myers, R.F. 1989. Micronesian reef fishes: A practical guide to the identification of the coral reef fishes of the tropical Central and Western Pacific. Coral Graphics, Guam.

Randall, J.E., G.R. Allen and R. Steene. 1998. Fishes of the Great Barrier Reef and Coral Sea, 2nd ed. University of Hawai'i Press, Hawai'i, USA.

White, A.T. 2001. Philippine coral reefs: A natural history guide. Bookmark Inc., and Sulu Fund for Marine Conservation Foundation, Inc. 259 p.


1998
1999