

Perceptions on Coastal Resources by Coastal Barangays in Mati City, Davao Oriental: Implications for the Coastal Resource Management Program

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Abstract

This study assessed fisherfolk perceptions of coastal resource importance, the perceived condition of resources in Mati's coastal barangays, differences in views across demographic profiles, existing management practices, and implications for the Coastal Resource Management Program (CRMP). A descriptive research design was used, with data collected from November 2003 to January 2004 from 358 respondents across 16 coastal barangays. All respondents were male, predominantly aged 30–39 (28%), married (87%), Catholic (73%), and Visayan (40%). Most had elementary education (59%), low incomes, household sizes of six or more (49%), and were lifelong residents (38%). They typically fished once daily (79%) for 4–6 hours in the morning using hook-and-line or pasol (71%), with farming as a secondary income source (37%). Mangrove ecosystems were rated “poor” (mean=2.39), attributed to conversion to fishponds, overharvesting, and settlement expansion. Seagrass and coral reef conditions were viewed as moderate. Demographic factors-age, sex, status, education, religion, and income-showed no significant link with resource perceptions; however, tribal affiliation did. Mangroves were valued most highly (mean=4.59), followed by coral reefs (4.52) and seagrasses (4.46). While fishing laws were reportedly enforced, violations persisted. For CRMP, findings suggest that sustainable management follows when community needs are prioritized-balanced development requires centering people's livelihoods to achieve effective stewardship.

Keywords: Barangays, Coastal, Implications, Perceptions, Resources

Introduction

The Philippines is endowed with a lush coastal ecosystem, including reefs, mangroves, and seagrasses, which are among the richest in the world in terms of biodiversity (Alifio et al, 2002). These coastal ecosystems have important functions, several uses, and advantages. These marine resources support man and other marine creatures with food and some valuable resources for survival.

However, the coastal ecosystems in the Philippines and over South East Asia are under severe stress from the combined impacts of human exploitation, physical disturbance, pollution, sedimentation, and general neglect. Although this region is in the tropical marine and coastal

biodiversity center of the world, the decline of coral reefs, seagrasses, mangrove, and estuarine quality and productivity is disturbing (White et al, 2002). The Department of Environment and Natural Resources (DENR) implemented more comprehensive programs to respond to the prevailing condition of our coastal and marine environment. Among these programs is the Community-based Coastal Resource Management (CB-CRM), which implies that individuals, groups, and organizations have a major role, responsibility, and share in the resource management and decision-making process. Moreover, people have a significant impact on Coastal resources in their day-to-day activities. They receive many benefits from coastal resources, and they make decisions on how coastal resources will be managed and utilized. If people do not manage the coastal resources in a sustainable way, they lose most of the coastal resources.

Therefore, people's participation in the planning and implementation of coastal resources management efforts is critical. One of the most important components to consider in sustainable development is environmental protection and conservation (Canlas, 1996, as cited by Alzate, 1990). The study generally aimed to determine the perceptions of fisherfolk toward coastal resources in Mati, Davao Oriental, and examine the implications of these perceptions for the Coastal Resource Management Program (CRMP). Specifically, it sought to determine the fisherfolk's perceptions regarding the importance of coastal resources and assess the present status of these resources in the coastal barangays of Mati, Davao Oriental, as perceived by the residents. The study also aimed to determine whether significant differences existed in the respondents' perceptions and participation based on their age, sex, civil status, educational attainment, religion, tribe, and income level. Furthermore, it examined the utilization, protection, and management strategies practiced by the local community toward coastal resources and identified their implications for the implementation and improvement of the Coastal Resource Management Program (CRMP).

The study focused on the perceptions of coastal communities toward coastal resources in selected coastal barangays of Mati, Davao Oriental, and their implications for the Coastal Resource Management Program (CRMP). Specifically, it sought to answer the following questions: What are the perceptions of coastal communities regarding the importance of coastal resources? What is the present status of coastal resources in selected barangays of Mati, Davao Oriental, as perceived by the residents? Are there differences in their perceptions and participation based on age, sex, civil status, educational attainment, religion, tribe, and income level? What utilization, protection, and management strategies are practiced by the people toward coastal resources? Finally, what are the implications of these findings for the Coastal Resource Management Program (CRMP)?

This study focused on the perception of coastal resources by coastal barangays in Mati, Davao Oriental, specifically focusing on the fisherfolk's status with respect to the existing coastal resource management. This work took three (3) consecutive months, and sampling was done every weekend from October 2003 to January 2004.

The data was evaluated based on interviews of fisherfolk with the use of a questionnaire. The respondents of this study were chosen randomly. The perceptions of the fisherfolk play a vital role in determining valuable information needed in this study. The study area covered the sixteen (16) coastal barangays of Mati, Davao Oriental. These areas included barangays Tagabakid, Mayo, Don Enrique Lopez, Dahican, Lawigan, Tamisan, 4 Bobon, Matiao, Central, Badas, Mamali, Dawan, Macambol, Cabuaya, Luban, and Lanca. Results derived from this study are only applicable and true to these areas.

Perceptions of the coastal communities play a vital role in determining valuable information needed to have sound and effective protection, utilization, and management strategies towards coastal resources. This study will help people know and understand their role

in their environment, and it will help them realize the importance of the coastal resources, as well as all natural resources. This can be a good basis for further modification and formulation of plans to ensure successful implementation.

METHODOLOGY

Study area

This study was conducted in the sixteen (16) coastal barangays of Mati, Davao Oriental. Namely, Tagabakid, Mayo, Don Enrique Lopez, Dahican, Lawigan, Tamisan, Bobon, Matiao, Central, Badas, Mamali, Dawan, Macambol, Cabuaya, Luban, and Langka).

Respondents of the study

The respondents of this study were the fisherfolk of the coastal barangays of Mati, Davao Oriental. They were chosen randomly to respond to the instruments used by the study. The number of respondents was determined using Slovenes Formula at 5% level of error.

$$\text{Where: } n = \frac{N}{1 + Ne}$$

N = size of the sample

N = the size of the population

E = error of the tolerance (5%)

1 = constant

Sampling Procedure

Letters were given first to the barangay captains before the study was conducted the study in the area. Sampling was conducted every Saturday and Sunday of the week from October 2003 to January of 2004. Interview schedules were first with the Brgy Captain. A team of ten enumerators did the interview.

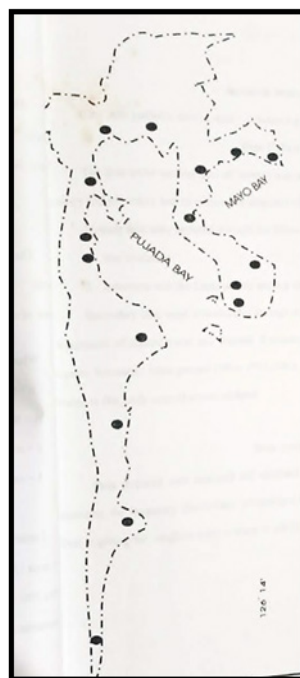


Figure 2. Map of Mati City as study area.

Research instrument

Data were gathered using a semi-structured questionnaire.

Data collection

The descriptive method of research was used in this study. The data utilized were both primary and secondary data to achieve the objective of the study.

Primary data were gathered through the following:

1. Site visitation
2. Interview with the local people and key informants in the area.

Secondary data were consolidated through visiting the concerned government offices, like the Department of Environment and Natural Resources (DENR) and the Provincial Fisheries and Aquatic Resources Management Office (PFARMO). Previous studies from books and magazines related to this study were also consolidated.

Data analysis

The data gathered were analyzed and tabulated using descriptive statistics such as summary measures, the frequency distribution, percentages, and correlation. A Likert analysis/scale was used to get the weighted mean to determine the correlation.

Results and Discussion**Perceptions on the importance of coastal habitats****Perceived importance of mangroves**

Table 1 shows the responses of the respondents as to the perceived importance of the mangroves in the coastal barangays of Mati. Seventy- nine percent (79%) strongly agreed that mangroves is one of the most important coastal habitats in the ecosystem, which serves as a buffer zone and habitat for marine animals. The presence of mangroves in the bay contributed to an increase in their income (58%). A healthy mangrove can breed more fish, which increases their catch, being their primary source of income. Mangroves have many uses and benefits to the people (61%), and they also protect other coastal ecosystems from excessive siltation (72%). The general mean score (4. 59) of the respondents as to their perceived importance of mangrove in the area was high, an indication that they understand and recognize the role of mangroves in the bay.

Perceived importance of seagrasses

Table 2 shows the responses of the respondents as to their perceived importance of the seagrasses in the 16 coastal barangays of Mati. A number (34%) of the respondents agreed that the seagrass ecosystem is one of the most important coastal habitats in the marine ecosystem because it is a nursery ground for marine habitats, a food source, fertilizers, a breeding area trap for sediments, and a source of medicine. With a healthy seagrass, it increases the volume of their catch to sustain their family. A healthy seagrass provides livelihood to the fisherfolk and the community because it can increase their catch and increase their income.

Table 1. Perceived importance of mangroves.

Statement of the respondents on the importance of mangroves in the area	Responses										Mean	DR
	1		2		3		4		5			
	F	%	F	%	F	%	F	%	F	%		
1. Mangrove areas are important coastal habitats in the marine ecosystem	0	0	0	0	9	3	76	21	273	79	4.73	SA
2. The presence of mangroves in the Bay contributed to an increase in my income.	4	1	10	3	36	10	100	28	208	58	4.39	A
3. Mangroves are beneficial to people.	0	0	2	1	15	4	121	34	220	61	4.56	SA
4. Mangroves protect other coastal ecosystems from 0 excessive siltation.	0	0	0	0	17	5	82	23	259	72	4.67	SA
Mean											4.59	SA

Legend:

DR - Descriptive Rating

1 - strongly disagree (SA)

2 - disagree (D)

3 - neutral

4 - agree (A)

5 - strongly agree (SA)

F - frequency (F)

Table 2. Perceived importance of seagrasses.

Statement of the respondents on the importance of Seagrasses in the area	Responses										Mean	DR
	1		2		3		4		5			
	F	%	F	%	F	%	F	%	F	%		
1. Seagrasses are important coastal habitats in the marine ecosystem	0	0	0	0	17	5	82	23	259	72	4.67	SA
2. Healthy seagrasses increase the volume of fish catch/day.	0	0	6	2	24	7	101	28	227	63	4.39	A
3. Mangroves are beneficial to people.	0	0	2	1	15	4	121	34	220	61	4.56	SA
4. Seagrasses provide a livelihood to the community	0	0	0	0	17	5	82	23	259	72	4.67	SA

Perceived importance of coral reefs

Table 3 shows the responses of the respondents as to the perceived importance of coral

reefs. According to the respondents, coral reefs are one of the important coastal habitats in the marine ecosystem (57.54%) because it serves as breeding grounds, building materials, shoreline protection, source of medicine, and food source to all marine animals and also a wave breaker. It provides an avenue for excellent diving activities, increases the volume of fish catch for every fishermen and it also provides a diverse habitat for a large number of fishes and other marine animals. Generally, the computed mean score based on the respondents' perceived importance of coral reefs was high (with a computed mean of 4.46), indicating that the majority were aware of the benefits that can be generated from the coral reefs' ecosystem.

Table 3. Perceived importance of coral reefs.

Statement of the respondents on the importance of coral reefs in the area	Responses										Mean	DR
	1		2		3		4		5			
	F	%	F	%	F	%	F	%	F	%		
1. Coral reefs are one of the important coastal habitats in the marine ecosystem	0	0	2	0.56	21	5.87	129	36	206	57.54	4.50	SA
2. Healthy coral reefs provide an avenue for excellent scuba diving activities	1	0.28	6	1.68	40	11.17	137	38.27	174	48.50	4.33	A
3. Presence of coral reefs increases the volume of fish catch/fishermen	0	0	0	0	4	1.12	88	24.58	266	74.30	4.73	SA
4. Coral reefs provide diverse habitat for a large number of fishes and other animals.	0	0.28	1	0.28	18	5.03	127	35.47	211	58.94	4.52	SA
Mean											4.46	A

Legend:

DR - Descriptive Rating

1 - strongly disagree (SA)

2 - disagree (D)

3 - neutral

4 - agree (A)

5 - strongly agree (SA)

F - frequency (F)

Perceived status of coastal habitats

Mangroves

Table 4 shows respondents' perceptions of the status of coastal habitats. Mangroves are relevant in the marine environment because they provide shelter and habitat for a diverse array of marine life (Goler et al., 1996). Moreover, mangroves are one of the most productive ecosystems responsible for a very high fishery production in coastal areas. Based on the perception of the respondents, the status of mangroves in the study areas was poor (with a computed mean of 2.39) due to cutting and conversion to fishponds and resettlement areas. Others claimed that the wave action hinders the growth and survival of the mangroves that were

planted, especially in barangays Lanca, Cabuaya, Tagabakid, Mayo, Don Enrique Lopez, and even some parts of Bobon and Dahican. However, from the Participatory Coastal Resource Assessment (PCRA) conducted in May 2003, the mangrove resources on the southern portion of the area were only observed in barangay Luban. No mangrove stands were found in the coastal areas facing Mayo Bay, though associate species were found. Mangrove resources in the municipality consist of a mature cover of (22.27%), saplings (9.36%), and seedlings (31.05%), corresponding to poor and fair condition, respectively, of the different stages of growth.

Seagrasses

Seagrasses serve as nursery grounds for species that spend their adult lives outside the community (Calumpang and Meñez, 1997). Seagrasses in the study areas were perceived by the respondents to be in neither poor nor rich condition (with a computed mean of 3.41). Compared to the PCRA 2003 results, showed that only Barangay Luban showed an excellent condition of seagrass cover.

Coral reefs

Coral reefs are one of the richest and most unique marine environments (Intercoast, Spring 2000). In addition, coral reef ecosystems are important to Philippine human society as a source of food and livelihood, tourist attractions, sources of diverse genetic resources, and wave buffers (Aliño, 2002). However, based on the perceptions of the respondents, they claimed that the status of coral reefs was neither poor nor rich (with a computed mean of 3.48); others (91%) claimed that it was due mainly to the use of dynamite or illegal fishing methods. However, PCRA results showed that coral reefs were in poor condition. The results vary from the results of the perceived status of coral reefs.

Table 4. Perceived status of coastal habitats.

Based on your observation, what is the status of the major ecosystems in your area.

Status	Mangroves		Seagrasses		Coral reefs	
	F	%	F	%	F	%
1	159	44.41	50	13.97	50	13.97
2	64	17.88	24	6.70	28	7.82
3	36	10.06	86	24.02	80	22.35
4	31	8.66	98	27.37	103	28.77
5	68	18.99	100	27.93	97	27.09
Total	358	100	358	100	358	100
Mean	2.39		3.48		3.47	
DR	Poor		Neither poor nor rich		Neither poor nor rich	

Legend:

DR - Description of rating

1 - very poor

4 - rich

2 - poor

5 - very rich

3 - neither poor nor rich

Perceived Causes for the decline of coastal habitats

Mangroves

Table 5 shows the decline of the coastal habitats of mangroves, which are important ecologically, but they are under intense pressure from human activities. In many parts of the

world, mangrove forests are being destroyed or degraded at an alarming rate (AAS 1995 as cited by Requitillo). As perceived by the respondents, the direct loss of mangroves is due to cutting of timber, fuel wood (73%), conversion to fishpond (53%), sedimentation (24%), pollution (20%), building a house (18%), and other forms of destruction (3%). All of these activities resulted in the loss of the area occupied by mangroves.

Seagrasses

As perceived by the respondents, the major causes for the decline in the population of seagrasses were pollution (68%), use of beach seine (66%), tourism (17%), use of fish net (6%), and other activities also caused the decline of seagrasses population (3%). As perceived by the respondents, the most destructive fishing gear was cyanide (89%), and the least destructive was gill net (15%).

Coral reefs

Natural threats to coral reefs include cyclones and hurricane, periodic population explosion of echinoderm such as crown of thorn starfish, periodic ocean warming events (El Niño), and the action of earthquakes and volcanoes (Goliner, 1996). However, respondents revealed that the causes for the decline of coral reefs were dynamite (91%), pollution (41%), use of “sud sud” (37), and other activities (1%).

Table 5. Perceived causes of the decline of the coastal habitats.

Mangroves	F	%	Rank
Cutting	261	73	1
Conversion to fishpond	191	53	2
Sedimentation	85	24	3
Pollution	71	20	4
Building a house	66	18	5
Other	10	3	6
Coral reefs			
Dynamite	321	91	1
Pollution	145	41	2
Use of “sud-sud”	132	27	3
Others	5	1	4
Seagrass			
Pollution	243	68	1
Use of beach seine	236	66	2
Tourism	61	17	3
Use Fish net	20	6	4
Others	9	3	5
Destructive fishing gears			
Cyanide	320	89	1
Compressor	272	76	2
Fine mesh	147	41	3
Beach seine	112	31	4
Dynamite	53	23	5
Gill net	52	15	6

(*) Respondents gave multiple answers

Differences in the respondents' perceptions towards the importance of the coastal habitats.

There is no difference in the perceived importance of the coastal habitats according to age, civil status, religion, education, and income level. No matter what the respondent's age, civil status, religion, education, and income level, these will not affect their perception of the importance of the coastal resources. It depends on how the respondents take good care of and conserve the resources. The general perception of the respondents towards their coastal ecosystem is to conserve and manage the mangroves, seagrasses, and coral reefs.

Table 6. Test for differences in perception on the importance of coastal resources.

Age level	Means
Less than 19	4.48 ^a
20 – 29	4.34 ^a
30 – 39	4.43 ^a
40 – 49	4.39 ^a
50 – 59	4.41 ^a
60 above	4.38 ^a
F-value	0.445
P-value	0.817
Civil Status	
Single	0.45 ^a
Married	4.39 ^a
Widower	4.25 ^a
F-value	0.519
P-value	0.595
Religion	
Roman Catholic	0.39 ^a
Islam	4.41 ^a
Baptist	4.56 ^a
Others	4.36 ^a
F-value	0.471
P-value	0.702
Education	
No Education	4.26 ^a
Elementary level	4.43 ^a
Elementary	4.28 ^a
High School level	4.38 ^a
High School Graduate	4.40 ^a
College level	4.38 ^a
College graduate	4.22 ^a
F-value	0.690
P-value	0.658
Income	
50 – 100	4.39 ^a
100 – 150	4.41 ^a
200 – above	4.43 ^a
F-value	0.229
P-value	0.796

Note: Means with the same letter are not significantly different from each other at the 0.05 level of significance.

Tribe

There is a significant relationship between tribe and their perception of the importance of the coastal resources. Waray tribe perceived the least importance of the coastal resources (with a mean of 3.87), and some Leyteño also perceived least towards the importance of the coastal resources (with a mean of 4.30). The ethnic group with the highest perception of the importance of coastal resources (with a mean of 4.56th) was the Cebuano tribe.

Table 7. Test for differences in perception of the importance of coastal resources according to tribe.

Tribe	Means
Bisaya	4.36 ^a
Kalagan	4.41 ^a
Dabaweño	4.52 ^a
Cebuano	4.56 ^a
Boholano	4.37 ^a
Mandaya	4.35 ^a
Manobo	4.13 ^a
Leyteño	4.30 ^{ab}
Waray	3.87 ^b
Surigaonon	4.13 ^a
F-value	2.214
P-value	0.012

Note: Means with the same letter are not significantly different from each other at the 0.05 level of significance.

Utilization, Protection, and Management strategies towards coastal habitat utilization

Fishing practices

The number of years of fishing by the fisherfolk of Mati is shown in Table 8. It is revealed that most (52%) of them had been engaged in fishing for 16 years and above, and only very few (6%) engaged in fishing for 13 to 15 years. Most of the fishermen usually went out to fish in the morning (78%), and only a few (7%) went out in the evening.

Table 8. Fishing practices.

Number of years fishing	Frequency	%
1 – 3 years	40	11
4 – 6	35	10
7 – 9	34	9
10 – 12	42	12
13 – 15	22	6
16 and above	185	52
How often do you fish		
Once a day	283	79
Twice a day	38	11

Twice a day	38	11
Twice a week	32	9
Once a month	3	1
Depend the weather	2	0
Number of hours spent fishing		
1 – 3 hrs	50	14
4 – 6 hrs	117	33
7 – 9 hrs	6	18
10 – 12 hrs	96	27
13 – 15 hrs	17	5
16 hrs and above	151	42
Fishing time		
Morning	279	78
Afternoon	27	8
Evening	24	7
Anytime	76	21

Fishing methods

A variety of fishing methods were used by the fisherfolk of the 16 coastal barangays of Mati. Hook and line (pasol) were the main fishing gear used (71%) since it could not be easily destroyed and was not harmful to marine organisms and marine habitats. Other fishing gears consist of fish net (pukot), spear fishing (pana), bamboo rafts (payaw), fish corral (bunsod), bubo, beach seine (baling), and other (2%) fishing gears. Many (66%) owned a banca, and only few (3 %) have no banca; they rent because they cannot afford to buy a banca or pump boat. This explains why most of them could not extend the area of operation as well as increase the volume of their catch.

Table 9. Kinds of fishing gear used by the respondents.

Fishing gears	Frequency	%
Pasol (Hook and Line)	253	73
Pukot (another trawl)	154	43
Pana (Spear fishing)	93	71
Payaw (bamboo raft)	21	6
Bubo	16	4
Bunsod (Fish corral)	16	4
Baling (beach seine)	6	2
Sudsud (Push net)	4	1
Other	8	2
Fishing boat		
Banca	235	66
Motorized or pump boat	112	31
None	11	3
Total	358	100

Fishery resources

Most of the fisherfolk (72%) had an average catch of 5 kgs. and below per day, and a few (5%) caught about 20 kgs. and above (Table 10). The data shows that the low volume of fish catch

is insufficient to support the daily needs of the family, considering the household size of 6 members and above. Although they are assured of the availability of fish for their consumption, other basic needs could not be satisfied. Table 11 shows that the most common fish caught by the fisherfolk was the katambak (55%). Fish were not the only marine products they got from the sea. Squid shells and crabs were also gathered. Their products were either sold house to house by the family members or sold to the wholesaler. As compared to the PCRA (2003) results, the data show that the most common fishes caught in the study areas were matambaka, and tulingan, danggit, burot, and mulmol, timbungan, and bariles in that order. Pujada Bay, the most common fishes caught include danggit, matambaka, 34 tulingan, burot, timbungan, mulmol, and katambak. In Mayo Bay, the most common fishes caught include tulingan, malasugi, burot, matambaka, barilis, pirit, and timbungan. While in those areas facing the Pacific Ocean are talakitok/mamsa, nalasugi, katambak, bangsi, balo, timbungan, mulmol, guno, and daligmana.

Table 10. Number of fish caught per day.

Kilograms	Frequency	%
5 – and below	257	72
5 – 10	57	16
10 – 15	24	7
20 – and above	20	5
Total	358	100

Table 11. Fishes commonly caught in the area.

Kilograms	Frequency	%
Katambak	197 ^a	55
Timbungan	185	52
Matambaka	177	49
Danggit	142	40
Caraballas	100	28
Balo	98	27
Bariles	27	8
Pandawan	14	4
Tulingan	14	4
Molmol	10	3
Talakitok	10	3
Others	134	37

Note: Respondent gave multiple answers.

Protection

This portion of the study made use of the data of Florisa Mangubat in her study *Perceptions Towards Coastal Resource, Conservation, and Management Among Coastal Barangays in Mati, Davao Oriental* 2003 (unpublished) (99.44%) who do not cut mangroves and few 0.28% cut mangroves. Majority of the respondents (83.52%) plant mangroves in the area which has been depleted due to overharvesting like barangay Badas, Dawan, and Dahican particularly in Maitum and Guang-guang while has been declared as a protected area (1994). There were respondents (86.31%) who claimed that they do not throw garbage waste on the mangrove areas. Respondents gave their reason that some of their neighbors likely throw garbage in areas

where mangroves grow (12.01%), but not all the time, and some wastes come from upland areas and is carried by floodwaters. Many (88.83%) do not favor the conversion of a mangrove area into a fishpond. However, R.A. 7586, an act providing for the establishment and management of Protected National Integrated Areas System (NIPAS), was enacted by Congress in 1992 to respond to the profound impact of human activities on all components of the national environment, particularly the effects of increasing population, resource exploitation, and maintaining the natural biological and physical diversities of the environment. There were respondents who claimed they did not engage in illegal fishing (98.60%). Illegal fishing today has been banned in order to protect, rehabilitate, and conserve the resource.

Management strategies

Fishing policies

When asked who implemented the fishing policies, all of the respondents perceived that these include barangay officials, DENR, BFAR & IMPEDE in the parts of Dawan, Mamali, and Macambol. According to the respondents, these fishing policies were followed by the fisherfolk. Among the policies were the banning of fine-meshed nets, banning of the use of compressors, dynamite fishing, poisoning, electrifying, and collection of small-sized fish. However, these policies are not strictly monitored and implemented. While these policies are being implemented, compliance is still weak since there are those who still violate these policies.

Conservation measures and practices on the coastal resources.

This portion of the study made use of the data of Mae Dinah Marundan in her study “Coastal Resource Practices of Coastal Barangays in Mati, Davao Oriental. Its Implication to the Sustainability of Coastal Resources” (2003, unpublished). The respondents agree that everyone must practice family planning because the number of family members is one reason why fishing activities increased. Furthermore, an increase in population could lead to overfishing that can cause the destruction of coastal resources; help in the rehabilitation of mangroves, seagrasses, and coral reefs; and participate in the different activities about conservation. Respondents also agree that participating in different activities, attending seminars and training, and campaigning to save and protect the mangroves are ways to conserve coastal resources. They also agreed that laws and ordinances can be a guide for the community in conserving its coastal and marine resources.

Perceived changes in fishery resources

As perceived, fish size was better years ago (89.38%), and some (19%) claimed that it is better now or has not changed at all (19%). According to many respondents (86.31%) fish abundance was better during the past years because few fishermen depend on fishing and only few (19%) claimed there were no change because until now they experienced abundance of catch. The volume of fish catch was also better during the previous years (89.11%) because of the few fishermen that compete with the resources unlike nowadays, and only a few (475%) claimed that their volume of fish catch was better now.

Table 12. Perceived changes in the status of the fishery resources.

Change in	F	%
Fish size		
Better now	19	5.31
No Change	19	5.31

Better years ago	320	89.38
Fish abundance		
Better now	30	8.38
No change	19	5.31
Better years ago	309	86.31
Volume of fish catch		
Better now	17	4.75
No Change	22	6.14
Better years ago	319	89.11

Implications for the coastal resource management program

Habitat management

The perceived status of the coastal habitats was in poor condition for the mangroves and neither poor nor rich for the seagrasses and coral reefs. Implication of these to coastal resource management program should be set up to support information, education, and communication (IEC) strategies at the provincial level through the fisherfolks. However, poverty and low high school completion rates combine to limit formal education for most respondents. Consequently, literacy levels are low, thus increasing the need for direct communication. This explains why it is necessary, because many people in the community are less inclined to read. Therefore, relying on printed material to raise awareness of environmental issues is not enough to reach all members of the community. Low literacy levels deem it necessary for community organizers to interact with as many people in the community as possible, launching consciousness-raising efforts. However, there are management interventions in habitat management, such as the establishment of marine protected areas (mangroves, seagrasses, and coral reefs), management of mangroves and rehabilitation programs, protection of seagrass beds by regulating fishing activities destructive to the habitat, enforcement of environmental and fishery laws, conduct of information, education, and communication (IEC) campaigns, and community organizing and formation of fisher organizations for protection and conservation. There were respondents of the study attended the Participatory Coastal Resource Assessment (PCRA) conducted by the Davao Oriental State College of Science and Technology (DOSCT) Research Extension Office. Awareness of the environment's problems and issues in a coastal zone must precede the planning of a resource management strategy. CRMP has developed the PCRA process. Gathering information during PCRA is the first and perhaps one of the most important steps toward community empowerment that promotes sustainable local development through responsible sharing of common environmental treasures. An interviewee commented that knowledge gained from the PCRA process "gives people a sense of identity, a sense of ownership of their resources." He further stated that the sense of ownership needs faster stewardship for community empowerment in coastal resource management. Although the CRA training was a definite point of enlightenment for some participants, some respondents' reaction to the PCRA was that it is useless, and for some said it is a waste of time.

Fishery management

Since most of the respondents were full-time fishermen, the power of money has implications for alternative development. The needs of the greater communities mean NGO's and aid agencies need to explore other sources of income. Schools have a responsibility to provide an education that will encourage young people and give them confidence to seek careers outside of the fishing industry. Environmental education can be a part of a solution to

these problems through raising awareness of issues and encouraging behavioral change. Everything comes from the sea, and everything returns to the sea. The implication is that since the oceans have limited resources, there is a need to minimize the impact that the growing size and number of coastal communities have on the marine environment. A growing population not only puts a greater strain on already depleting resources, but also is responsible for the degradation of marine habitats for those resources. The need to think about development planning in coastal areas is undeniable. Steps towards sustainable development of coastal communities should involve researchers, educators, and planners from a coordinated network of international aid agencies, non-government organization (NGO's), national policymakers, and local communities. Environmental problems due to the human impact of a growing population in coastal areas necessitate an integrated approach to coastal resource management as a move toward sustainable development. Among the practices that contributed to unsustainable development were logging in mangroves forests that converted into fishpond, dredging, and use of destructive fishing methods. Additional damage to coastal resources comes from land-based activities such as siltation from logging, fertilizers, and pesticide runoff from agriculture. Some of the implications of unsustainable development. All too often, the coasts bear most heavily on the brunt of poor Management regimes to control land-based sources of pollution, overfishing, and other threats to the stability of marine and coastal ecosystems one often poorly developed or do not exist. Access to many ocean resources is unregulated, and where such regulation does exist, it is often ineffective. Since the fishery resources of Mati are declining, there are proposed. These interventions consist of establishment and management of marine protected areas (fish sanctuaries) that will identify the potential site for marine protected areas establishment, conduct of IEC on marine protected area and enforcement of the ordinance and implementation of management plan, establish, protect, conserve and rehabilitate watershed among of these activities are the establishment and maintenance of municipal and barangay nurseries, production, distribution, and planting of fruit and forest trees. Monitoring and evaluation of trees planted, implementation of laws and ordinances prohibiting tree cutting, conduct information, education, and communication on prohibition of tree cutting and monitoring, control, and surveillance.

CONCLUSION

Based on the gathered data from the interview conducted with the fisherfolks, the conclusions were derived. Perceived importance of mangroves: many (79%) claimed that the mangrove areas are important coastal habitats in the marine ecosystem; the presence of mangroves in the bay contributed to an increase in income (58%); mangroves are beneficial to people 61%); and mangroves protect other coastal ecosystems from excessive siltation. Seagrasses are important coastal habitats in the marine ecosystem (72%); healthy seagrasses increase the volume of fish catch/day (63%), and seagrasses provide livelihood to the community.

(34%) Coral reefs perceived are one for the important for coastal habitats in the marine ecosystem (57 54%); healthy coral reefs provide an avenue for excellent scuba diving activities (48.60%); the presence of coral reefs increases the volume of fish catch/fishermen (74.30%), and it provides diverse habitats for a large number of fishes and other marine animals (58.94%). The perceived status of mangroves was poor, with a computed mean of 2.39; seagrasses were neither poor nor rich (with a computed mean of 5.47). As perceived, causes for the decline of mangroves are due to cutting of timber, fuelwood (73%), conversion to fishponds (53%), and sedimentation (3%). As perceived, the major causes for the decline of seagrasses were siltation. 68%) use of beach seine (66%), tourism (17%), use of fish net (6%), and other activities also cause the decline of seagrasses

pollution (3%). However, respondents revealed that the causes for the decline of coral reefs were dynamite (91%), pollution (41%), use of “sudsud” (37%), and other activities (1%). Differences in the respondents’ perceptions of the importance of coastal habitats were not different on the perceived importance of the coastal habitats according to age, civil status, religion, education, and income level no matter what the respondents’ age, civil status, religion, education, and income level will not affect their perceptions on the importance of the coastal resources. There is a significant relationship between tribe and their perceptions of the importance of the coastal resources. A variety of fishing methods were used by the fisherfolk of the 16 coastal barangays of Mati. Hook and line were the main fishing gear used (71%) since they could not be easily destroyed and were not harmful to marine organisms and marine habitats. It was revealed that most of them (52%) had been engaged in fishing for 16 years. Many (66%) owned a banca, and only a few (3%) had no banca. However, most of the fisherfolks (72%) had an average catch of 5 kgs and below per day, and few (5%) caught about 20 kgs and above. All of the respondents perceived that the barangay officials, DENR, BFAR, and IMPEDE in the parts of Dawan, Mamali, and Macambol were followed by the fisherfolks. While these policies were being implemented, compliance was still weak since there were those who still violated these policies. On implications for the Coastal Resource Management Program (CRMP), people come first and sustainable management will follow- the government believes that the needs of the people (improve their well-being and train them in sustainable management) should be met first to solve the country’s management problems. Coastal management is necessary to provide a balanced perspective of sustainable development. International governing institutions, aid agencies, and local communities differ not only in their perspective, but also in their strengths and weaknesses. Therefore, integration should focus on the strengths of each, while seeking ways to compensate for the weaknesses of others.

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