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Integrated Coastal Resources Management (ICRM): A Catalyst for Social Participation among fishing households

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***Abstract*: Employing quota sampling technique, 240 households were interviewed in six (6) sites along Mayo Bay (Dahican), Pujada Bay (Tamisan, Lawigan), and Balete Bay (Dawan, Mamali, Macambol) that have established and or yet to be delineated Marine Protected Areas (MPAs). Poverty incidence among fishing households in all sites was high since their income falls below PhP7,000.00 per month. More males were engaged in enterprises than women and these enterprises are agricultural. Households have low participations in organizations that were engaged in coastal resources management. Respondents participated in decision-making processes relevant to coastal resource management but have only fair influence. Social facilities and services availed include preschool, elementary and high schools but few availed collegiate education; health centers are almost present in all sites; safe sources of water were also availed in the form of communal faucets and public deep wells and few availed productive loans and financial assistance. The distance of the houses of the respondents from ICRMP interventions and enforcement landmarks is not significantly related to household income. Only household income and distance of fishing from MPA are significantly related.**

***Keywords:* Fishing household, Enterprises, ICRMP, Marine Protected Areas.**

I. INTRODUCTION

The Integrated Coastal Resources Management Project (ICRMP) is a management system designed to regulate human activities for preserving ecosystem functions and services so as to achieve environmental and economic sustainability and other social goals of sustainable development (Alcala 2011, cited in Chua 2006).

Management of coastal resources in the country through the establishment of marine reserves (MR) can be traced back in the 70's due to the clear rapid depletion of these resources (Alcala and Calumpong 2008). As a strategy of MR is the establishment of Marine Protected Areas (MPAs) reaching to more than 1,000 in the country at present.

MPAs are now considered not simply a conservation tool, but a development tool, and an equity tool that designed to contribute to the long term livelihoods of island people, their culture and their economies (Lutchman, 2005).

There were various reports on the positive ecological benefits of MPAs however; there is less knowledge about their socio-economic effects. It is not clear that a well-managed, well-designed and enforced reserve will increase the size and numbers of fish inside their boarders that will lead to the increase of catches of fishermen living near these MPAs.

The gap of these literatures remain that it is not clear whether the improvements of coastal resources have trickledown impacts to socio-economic well-beings of the communities. Despite this, Vicente and Cerezo (2010) reported that through MPAs, there is a moderate participation of fisher folks to fisher folks organizations in Lingayen Gulf. Further, MPAs enhanced the linking/networking skills of the residents and with their social aspects like education and health as well as political aspect.

Monitoring and evaluation of socioeconomic changes in a community as results of the interventions like the Integrated Coastal Resources Management Project (ICRMP) are equally important with the biophysical changes that are being monitored and evaluated by natural scientists. Like other impact evaluation studies which are cautious to see "whether the changes in well-being are indeed due to the program intervention and not to other factors" (Khandker, Koolwal & Samad, 2010). The connectivity of data can be seen how the improvement in the quality of marine and coastal ecosystems had likewise impacted the quality of life or well-being of coastal communities covered by ICRMP.

As stated in the Design and Monitoring Framework (DMF) of ICRMP, the specific socioeconomic indicators to be monitored and evaluated include income, engagement with or employment in enterprises outside of actual fishing as supplemental livelihoods, participation in policy decision-making related to coastal resource management, and access to social services of fishing households.

Conceptually, if ICRMP interventions are successful, these will lead to greater economic opportunities to fishing households in immediate communities as compared to those located farther from the interventions.

The economic advantage of some fishing households relative to the improvement of their income offers them greater opportunity to participate or influence decisions and policy making processes regarding coastal resources. This also offers (women) more benefits or productive engagement (to women) due to their greater economic involvement within and outside the household as results of the increasing livelihood opportunities.

Objectives:

This baseline study was conducted to:

1. Establish the current income of fishing households that are disaggregated according to sex and sources;
2. Identified the engagement of households to enterprises and types of enterprises where they are engaged;
3. Determined the proportion of female household members working or involved with these enterprises;
4. Established the involvement of households in organizations engaged in coastal resources management;
5. Measured the participation of these households and the extent of their influence in coastal resource management decision making processes;
6. Proved their availment of social facilities available in the communities where they live; and
7. Analyzed the relationships between the distance of the MPAs and income of the respondents.

Materials and Methods:

The communities surveyed in Mati City covered those marine protected areas (MPAs) already established or yet to be delineated and enforcement to be enhanced. Specifically, these sites are located in communities along Mayo Bay (Dahican), Pujada Bay (Tamisan, Lawigan), and Balete Bay (Dawan, Mamali, Macambol).

Qualified households were only those engaged in fishing and related activities. Employing a quota sampling technique, a sample of 40 households per site was randomly identified or a total of 240 households were interviewed in six sites. In identifying the household to be interviewed, on-site sampling technique was used by identifying first the shoreline center of the MPA; then the sampling direction or where the survey will proceed was randomly determined. A random start from the center was also randomly determined from numbers 1 to 5 in order to identify the first household to be interviewed. The subsequent households were identified by using the interval of two or every second household from the previous household. It was either the husband or the wife served as the respondents. Replacement by the next household was immediately done when the originally sampled households were not qualified or the probable respondents were not present during the survey. A structured questionnaire was used in gathering data by locally hired interviewers through the Regional ICRM Center (RIC) XI located at the Davao Oriental State College of Science and Technology (DOSCST). The survey was conducted from December 16 to 20, 2011.

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II. RESULTS & DISCUSSION

Description of the Study Sites:

Mati is the capital city of Davao Oriental and part of Region XI. It faces the Pacific Ocean and is composed of 26 barangays with total land area of 682 km². Six of its coastal barangays were included in the baseline survey. Dahican, located in the eastern part of Mati City, is one of its urban barangays composed of 2,131 households and a total population of 11,149 (City Planning and Development Office, 2009). It has portions that face Mayo Bay and Pujada Bay and occupies an area of 14.53 km². Also located in the eastern part of Mati City is Tamisan. It only measures 7.87 km² with 698 households and 3,456 individuals. Next to Tamisan is Lawigan, a mountainous coastal barangay which is 37 kilometers from Mati City. It has a land area of 25.07 km² settled by 494 households and a population of 2,932. The barangays of Tamisan and Lawigan are directly Pujada Bay (City Planning and Development Office, 2009).

In the southern part of Mati City fronting Balete Bay that also connects with Pujada Bay are Dawan, Mamali, and Macambol. Dawan is 19 kilometers from the city and the farthest is Macambol, which is 24 kilometers away. Mamali, which is generally hilly with high elevation, is situated between Dawan and Macambol. The biggest of the three is Macambol, which occupies an area of 186.35 km² while the smallest is Mamali, which measures only 13.26 km². Dawan measures 30.04 km² but more populated, composed of 989 households and 4,210 individuals (Barangay Affairs Office, 2011). Closer to the population size of Dawan is Macambol with 3,876 individuals and 881 households. Mamali is not only the smallest, geographically, but also in population with 532 households and 2,590 individuals (Barangay Affairs Office, 2011).

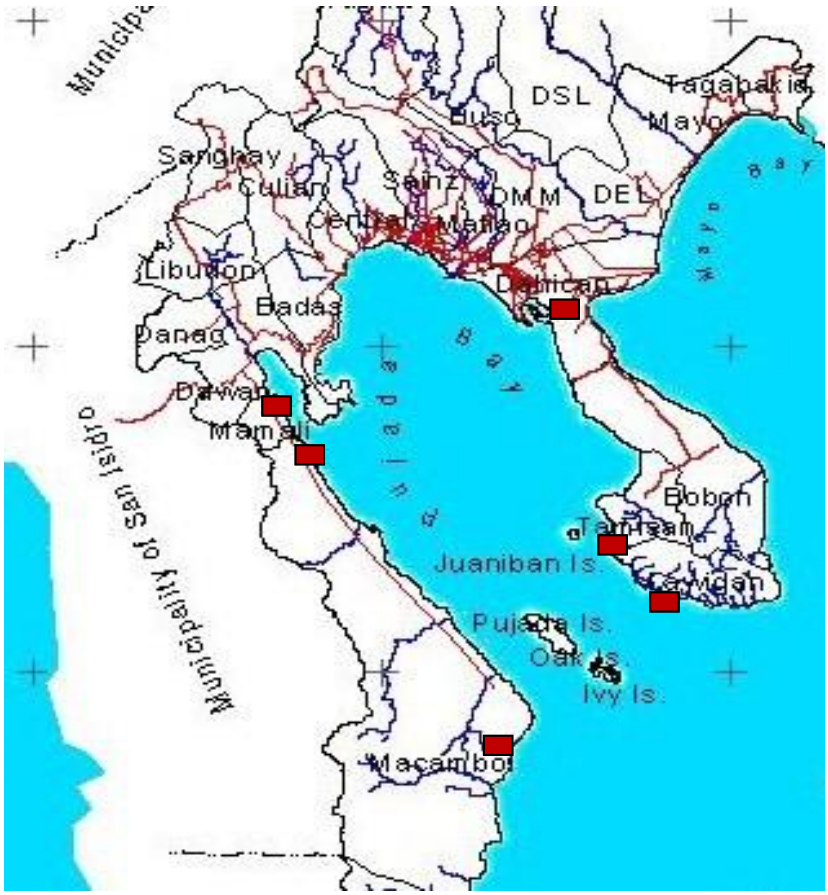

Figure1. Map of the Study Sites in Mati City, Davao Oriental

Impact Indicators:

Fishing household income:

Majority (77.5) of the fishing households have an income below 7,000.00 per month which falls below the poverty threshold of PhP 7,017 (Virola, 2012).

The male household members across all sites have higher mean monthly income (26,572.34) compared to their counterparts (5,269.85). This shows that only few women are earning income and contributed only minimal (16.55%) of the total mean household income.

As a whole, 58.62% derived their income from fishing where Mamali has the highest (65.85%) income from this source while Lawigan has the lowest (45.61%) (Table2). This signifies that there is heavy dependence of Mamali households in fishing compared to the households in Lawigan which is directly adjacent to Tamisan where ICRMP interventions had been introduced.

Table.1: Estimated Mean Monthly Income from All Sources of Fishing Households Disaggregated by Sex and Sources

Income Cohorts	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (%)
< 7,000	29 (72.50)	35 (87.50)	31 (77.50)	25 (62.50)	34 (85.00)	32 (80.00)	186(77.5)
7,001- 14,000	7(17.50)	4 (10.00)	5 (12.50)	11 (27.50)	5 (12.50)	5 (12.50)	37(15.41)
14,001 +	4 (10.00)	1 (2.50)	4 (10.00)	4 (10.00)	1(2.50)	3 (7.50)	17(7.08)
Total	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	240(100.0)
Sex							
Male	4,747.64 (80.39)	3,212.50 (79.64)	4,702.45 (81.39)	5,131.00 (75.39)	3,990.00 (91.30)	4,788.75 (96.76)	26,572.34 (83.45)
Female	1,158.10 (19.61)	821.25 (20.36)	1,075.00 (18.61)	1,675.00 (24.61)	380.00 (8.70)	160.50 (3.24)	5,269.85 (16.55)
Total	5,905.74 (100.00)	4,033.75 (100.00)	5,777.45 (100.00)	6,806.00 (100.00)	4,370.00 (100.00)	4,949.25 (100.00)	31,842.19 (100.0)
Sources							
Fishing	3,246.15 (54.97)	2,531.25 (62.75)	2,634.95 (45.61)	4,178.75 (61.40)	2,877.50 (65.85)	3,197.50 (64.61)	18,666.1 (58.62)
Non-fishing	2,659.59 (45.03)	1,502.50 (37.25)	3,142.50 (54.39)	2,627.25 (38.60)	1,492.50 (34.15)	1,751.75 (35.39)	13,176.09 (41.38)
Total	5,905.74 (100.00)	4,033.75 (100.00)	5,777.45 (100.00)	6,806.00 (100.00)	4,370.00 (100.00)	4,949.25 (100.00)	31,842.19 (100.0)

E***ngagement in enterprises and types of enterprises:***

Enterprise refers to any economic activities that involved the processing, packaging or marketing of natural products such as those harvested and cultured from the seas, ponds or farms. Servicing other people for fees, particularly tourists, is also considered a form of enterprise presumably resulting from the effective management of coastal and marine resources. Thus, direct catching of fish is not considered as enterprise but the drying of fish, making of salted fish, processing of crab meat and so on are examples of these.

Majority (57.5%) of the households in all the sites do not have members who were employed or engaged in enterprises as described earlier. Most (77.63%) of the enterprises which involved members of fishing households are agricultural and only 29% came from fishery and least (18.01%) from tourism services. MPA establishment will draw some issues like no or poor availability of alternative or supplementary livelihood opportunities due to loss of customary access to traditional fishing grounds among others (Pomeroy, 2010). Thus, EMPAFISH (2006) asserts that part of the compensatory measures of MPA establishment is the development of livelihoods as alternative to fishing activities.

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Table.2: Engagement in Enterprises and type of enterprises

If Employed or Engaged	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (mean %)
Yes	16 (40.00)	18 (45.00)	16 (40.00)	26 (65.00)	12 (30.00)	14 (35.00)	102 (42.5)
No	24 (60.00)	22 (55.00)	24 (60.00)	14 (35.00)	28 (70.00)	26 (65.00)	138 (57.5)
Total	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	240 (100.00)
Type							
Agricultural	15 (60.00)	19 (70.37)	14 (87.50)	39 (88.64)	16 (100.00)	22 (66.67)	125 (77.63)
Fishery	8 (32.00)	8 (29.63)	2 (12.50)	5 (11.36)	-	6 (18.18)	29 (18.01)
Tourism services	2 (8.00)	-	-	-	-	5 (15.15)	7 (4.35)
Total	25 (100.00)	27 (100.00)	16 (100.00)	44 (100.00)	16 (100.00)	33 (100.00)	161(100.0)

Involvement of female household members in enterprises:

There was low mean percentage (36.06%) of women engagement in various types of enterprises (Table 5). Marine protected areas empower women financially in the form of cash transfer provided by the project thus not directly from enterprises that may be established by MPAs. Hence, MPAs sustainability with other factors necessitates financial support from outside sources (Aswani and Weint, 2004).

Table.3: Involvement of Women in Enterprises Compared to Men

Sex of House-hold Members	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (mean%)
Male	35 (54.69)	26 (59.09)	17 (73.91)	47 (82.67)	21 (70.00)	26 (78.79)	172 (63.94)
Female	29 (45.31)	18 (40.91)	6 (26.09)	28 (37.33)	9 (30.00)	7 (21.21)	97 (36.06)
Total	64 (100.00)	44 (100.00)	23 (100.00)	75 (100.00)	30 (100.00)	33 (100.00)	269 (100.00)

Involvement of households in organizations engaged in coastal resources management:

The participation of the surveyed households in organizations that were engaged in activities related to the conservation and protection of marine and fishery resources as well as community development projects is not significant. Only 15.42% of the households across the sites admitted to have members who were affiliated with these types of organizations (Table 6). This finding contradict the reports of Lutchman, (2006) and EMPAFISH (2006) that in all cases, meaningful participation of MPA stakeholders will be critical to success.

Table.4: Involvement of Households in Environmental Organizations

Information	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (mean%)
Involvement							
Member	3 (7.50)	13 (32.50)	3 (7.50)	6 (15.00)	11 (27.50)	1 (2.50)	37(15.42)
Not a member	37 (92.50)	27 (67.50)	37 (92.50)	34 (85.00)	29 (72.50)	39 (87.50)	203(84.58)
Total	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)	240 (100.00)
Organizations							
Fishers' associations		1 (7.69		5 (83.33)	3 (27.27)		9 (24.32)
NGO-sponsored organizations		1 (7.69)			7 (63.64)		8 (21.62)
BFARMC	2 (67.67)	6 (46.35)	2 (67.67)	1 (16.67)		1 (100.00)	12 (32.43)
Bantay dagat	1 (33.33)	5 (38.46)	1 (33.33)		1 (9.09)		8 (21.62)
Total	3 (100.00)	13 (99.99)*	3 (100.00)	6 (100.00)	11 (100.00)	1 (100.00)	37 (99.99)*

*Round-off error

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Participation and Influence in Decision Making Processes:

Majority (66.67%) of the fishing households participated in decision making process (Table5). But despite their participation to issues concerning coastal resource management, they have less influence especially in policy making (59.96%). This data signifies that people's organizations are not yet empowered which can be traced from the unstable statuses of MPAs where most of these are not yet fully legitimized. MPA contributes to the political aspect that will include participation in decision-making (Vicente, 2010). However, the finding that fishing households have less influence contradicts the very core concept of effective MPA i.e. peoples' participation in decision making matter most to ensure its success (Pomeroy, 2010).

Table.5: Participation and Influence in Decision Making Processes

Parameters	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (%)
Participation							
Yes	29 (72.50)	29 (72.50)	19 (47.50)	34 (85.00)	28 (70.00)	21 (52.50)	160 (66.67)
No	11 (27.50)	11(27.50)	21(52.50)	6 (15.00)	12 (30.00)	19 (47.50)	80 (33.33)
Policy making							
Strong influence	17 (58.62)	4 (13.79)	7 (36.84)	7 (20.59)	6 (21.43)	4 (19.05)	45(28.39)
Fair influence	10 (34.48)	6 (20.69)	8 (42.11)	13 (38.23)	16 (57.14)	12 (57.14)	65(41.63)
Less influence	2 (6.90)	19 (65.52)	4 (21.05)	14 (41.18)	6 (21.43)	5 (23.81)	50 (59.96)
Resource allocation							
Strong influence	13 (44.83)	3 (10.34)	8 (42.10)	5 (14.70)	8 (28.57)	7 (33.33)	44 (28.98)
Fair influence	13 (44.83)	8 (27.59)	6 (31.58)	15 (44.12)	15 (53.57)	10 (47.62)	67 (41.55)
Less influence	3 (10.34)	18 (62.67)	5 (26.32)	14 (41.18)	5 (17.86)	4 (19.05)	49 (29.57)
Budget allocation							
Strong influence	12 (41.38)	4 (13.79)	6 (31.58)	6 (17.65)	7 (25.00)	7 (33.33)	42 (27.12)
Fair influence	8 (27.59)	8 (27.59)	8 (42.10)	16 (47.06)	16 (57.14)	7 (33.33)	63 (39.13)
Less influence	6 (20.60)	17 (58.62)	5 (26.32)	12 (35.29)	5 (17.86)	7 (33.33)	52 (32.00)
No response	3 (10.34)	-	-	-	-	-	3 (1.72)

Availment of (accsess to) social facilities (services):

In general, majority of the households availed elementary school (75%) and early childhood school (56.67%); very few availed collegiate school (10.42%), and for those that had enjoyed it, the distribution is biased to Dahican (25%). Dahican is proximately located near the Davao Oriental State College of Scuence and Technology (DOSCST).

Access to the primary health centers, is overwhelming thru primary health centers (92.92%) and public hospital (64.42%). One-half (50%) of the respondents have communal faucet and some with public deep well (46.67%) as source of safe drinking water while others owned piped water. Ninety-three percent of the households also availed productive loans. MPA contributes high on social aspects (Vicente, 2010) which is consistent to this finding.

Table.6: Household Availment of Social Facilities

Social Facilities	Dahican (%)	Tamisan (%)	Lawigan (%)	Dawan (%)	Mamali (%)	Macambol (%)	Total (mean %)
Educational Facilities							
Early childhood school	19 (47.50)	27 (67.50)	33 (82.50)	17 (42.50)	23 (57.50)	17 (42.50)	136 (56.67)
Elementary school	30 (75.00)	30 (75.00)	37 (92.50)	28 (70.00)	29 (72.50)	28 (70.00)	182 (75.83)
High school	24 (60.00)	15 (37.50)	27 (67.50)	19 (47.50)	11 (27.50)	9 (22.50)	105 (43.75)
Collegiate school	10 (25.00)	5 (12.50)	-	3 (7.50)	2 (5.00)	5 (12.50)	25 (10.42)
Health Facilities							
Primary health center	36 (90.00)	38 (95.00)	37 (92.50)	38 (95.00)	38 (95.00)	36 (90.00)	223(92.92)
Rural health unit	16 (40.00)	16 (40.00)	10 (25.00)	26 (65.00)	12 (30.00)	4 (10.00)	84(35)
Public hospital	28 (70.00)	23 (57.50)	23 (57.50)	29 (72.50)	31 (77.50)	23 (57.50)	157(65.42)

Private hospital	6 (15.00)	9 (22.50)	11 (27.50)	11 (27.50)	10 (25.00)	10 (25.00)	57 (23.75)
Water Facilities							
Public deep well	19 (47.50)	4 (10.00)	34 (85.00)	37 (92.50)	17 (42.50)	1 (2.50)	112 (46.67)
Communal faucet	7 (17.50)	37 (92.50)	5 (12.50)	8 (20.00)	33 (82.50)	30 (75.00)	120 (50)
Own piped water	4 (10.00)	7 (17.50)	1 (2.50)	3 (7.50)	4 (10.00)	15 (37.50)	34 (14.17)
Financing Facilities							
Productive loans	12 (30.00)	21 (52.50)	17 (42.50)	15 (37.50)	9 (22.50)	19 (47.50)	93 (38.75)
Financial assistance	7 (17.50)	14 (35.00)	2 (5.00)	21 (52.50)	11 (27.50)	6 (15.00)	61(25.42)

Results of chi-square computation in determining if significant relationships exist between estimated monthly household income and distance of fishing activities and houses of the respondents with the various ICRMP interventions and enforcement land marks in the communities surveyed show that the distance of the houses of the respondents from ICRMP interventions and enforcement landmarks is not significantly related to household income. But it is only household income and distance of fishing from MPA that are significantly related. Therefore, those that fished near or within the impact areas of the MPAs are benefiting from spillover effects (i.e., mature fish get outside the MPA and caught by fishers).

Meanwhile, the absence of significant relationships between the location of houses of the respondents from ICRMP interventions and enforcement landmarks suggest that it is the direct utilization of fishery and marine resources that matter most in measuring impact rather than simply the domicile.

Table.7: Relationship between Estimated Monthly Household Income and Distance from ICRMP Interventions

Variables	Chi-square		Remarks
	Computed	Tabular	
a. Income cohort and mean distance of fishing from marine protected area	23.149	9.488	Significant
b. Income cohort and mean distance of house from marine protected area	4.438	9.488	Not significant
c. Income cohort and mean distance of house from marine mangrove reforestation	6.394	9.488	Not significant
d. Income cohort and mean distance of house from *bantay dagat* guard house	6.141	9.488	Not significant
e. Income cohort and mean distance of house from barangay hall	3.204	9.488	Not significant

Degrees of freedom= 4

III. CONCLUSIONS AND RECOMMENDATIONS

The fishing households have an income below 7,000.00 per month which falls below the poverty threshold of PhP 7,017. The male household members across all sites have higher monthly income (26,572.34) compared to their counterparts (5,269.85). As a whole, 58.62% derived their income from fishing.

Women engagement in various types of enterprises was low (36.06%) and only 15.42% were affiliated with organizations related coastal resource management. Majority (66.67%) of the fishing households participated in decision making process but have less influence especially in policy making (59.96%). Majority availed elementary school (75%) and early childhood school (56.67%) but very few availed collegiate school (10.42%). Access to the primary health centers, is overwhelming thru primary health centers (92.92%) and public hospital (64.42%). One-half (50%) of the respondents have communal faucet and some with public deep well (46.67%) as source of safe drinking water while others owned piped water and 93 % had availed of productive loans while only 25.42% were provided with financial assistance.

The distance of the houses of the respondents from ICRMP interventions and enforcement landmarks is not significantly related to household income. But it is only household income and distance of fishing from MPA that are significantly related.

Since most MPA sites are not fully legitimized and functional, it is recommended that LGUs, NGOs, DENR, BFAR and other stakeholders should pool their resources like legislations, funding and other logistics to make these operational. If MPA sites are well established and managed it is hoped to trigger the establishment of enterprises as alternative sources of income of fishing households especially women.

Equally important in managing MPAs is an empowered people's organizations. Hence, it is recommended that concerned agencies including the academe should assist in organizational development of POs to enhance their participation and influence in decision-making relative to coastal resource management.

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