ECONOMIC BENEFITS AND INTEGRATED COASTAL MANAGEMENT SUSTAINABILITY

Robert S. Pomeroy, Enrique G. Oracion,
Demberge A. Caballes, and Richard B. Pollnac

ABSTRACT

This paper will examine the factors influencing the sustainability of integrated coastal management (ICM) projects in the Philippines, specifically in two locations, Bais Bay area of Negros Oriental Province and Mabini-Tingloy (known as Anilao) area of Batangas Province, where a number of ICM projects have been implemented since the mid-1980s. Indicators for ICM project impacts are developed and analyzed to determine their relationships with ICM project sustainability. Years of residency in the community, participation in ICM projects with resource management and enterprise/alternative livelihood activities, and the total number of projects participated in were the strongest predictors of perception of ICM project sustainability at the two sites in the Philippines. Participation of community members in the ICM project design and implementation and real or perceived economic benefits from the project influence participants to sustain project activities after project completion

Introduction

Integrated coastal management (ICM) is an accepted management framework to address coastal and marine environmental problems and conflicts and to achieve sustainable use of coastal resources in developing countries (Christie and White 2000; Cicin and Knecht 1998; Chua 1996a, 1996b; IWCO 1998; Kay and Alder 1999). However, due, in part, to internal financial constraints, most ICM projects in developing countries are supported by external donors and lenders. The dependence on external financial and technical assistance creates both the potential for and the reality of unsustainability of ICM institutions and policies as projects are terminated and support staff and funding are withdrawn. For example, Carlos and Pomeroy (1996) found that

that the majority of community-based coastal resource management projects in the Philippines were not maintained after the project funding and external technical assistance had been terminated.

A broad body of literature has been developed that documents and analyzes the collective experience and lessons learned worldwide with ICM (Burbridge 1997, Olsen et al. 1997, PAP 1997, Hershman 1999, World Bank 1999). Although these studies have provided important information to support ICM, a literature search revealed a missing element in these studies (Simonetti and Christie 2001). There were no comparative, empirical studies focusing on the sustainability of ICM initiatives in developing countries. The literature review found that there are numerous studies outside of the field of ICM that are concerned with a broad spectrum of issues related to sustainability. For example, Ostrom (1992) and other researchers concerned with common property regimes have considered the factors that influence the sustainability of community-level common property institutions. While useful, these efforts alone cannot capture and reflect the breadth and complexity of the practice of ICM – which encompasses multiple ecological, institutional, and social levels – and the intrinsic demands of ensuring that ICM efforts are sustained beyond a project's termination. If ICM is to be fully accepted and integrated by governments in developing countries into their natural resource management efforts, then the issue of sustainability of ICM must be addressed. An understanding of the factors that influence ICM sustainability will contribute to improving the design of ICM for more sustainable efforts.

To address the issue of ICM sustainability, a multidisciplinary group of researchers, led by the University of Washington, undertook a two year project in integrated coastal management sustainability. The objective of the project was to focus on the question of sustainability of ICM in the Philippines and Indonesia through empirical research, assisting ongoing ICM efforts in these countries, and improving human and institutional capacity. The project analyzed different aspects of what influences sustainability

of ICM through several "cells" of research (legal, socio-cultural, institutional, economic, biophysical). Different research team members focused on individual cells and these findings were later integrated and compared across cells. The first year of the project focused on the Philippines. The initial findings from the Philippines research were tested in Indonesia in the second year of the project.

Sustainability of ICM projects by local residents depends on a number of factors including acceptance of project activities, level of participation in project design and implementation, compliance with regulations, level of economic benefits received, and how equitably the economic benefits are distributed in the community. Clearly, if local residents believe that the ICM project does not address local concerns or has no positive impact on their well-being, they will be unlikely to support or become involved in project activities. They will be even less likely to sustain project activities into the future after ICM project funding ceases. This paper will examine the factors influencing the sustainability of ICM projects in the Philippines, specifically, in two locations, Bais Bay area of Negros Oriental Province and Mabini-Tingloy (known as Anilao) area of Batangas Province, where a number of ICM projects have been implemented since the mid-1980s. Indicators for ICM project impacts are developed and analyzed to determine their relationships with ICM project sustainability.

Methods

Study Sites. A review of ICM projects in the Philippines identified over 100 projects implemented from the early 1980s to the present (Project Document, 2001). It was not possible with the resources available in this project to study all of these ICM projects in the country. The research team decided (using site selection criteria such as number and types of ICM projects in the area and length of time since project completion) to focus on two areas in the Philippines: Bais Bay area of Negros Oriental Province (see Figures 1 and 2, page 28, this issue) and Mabini-Tingloy

(known as Anilao) area of Batangas Province (see Figures 1 and 2, page 17 , this issue).

The Bais Bay area has a diversity of coastal habitats and is used for a variety of purposes including residential, aquaculture, fishing, recreation, and mangrove harvest. Bais Bay is surrounded by three municipalities – Manjuyod, Tanjay and Bais City. There have been several ICM projects in Bais Bay dating back to 1984. This research focused on three of the four ICM projects which have been implemented in the area (Table 1). These projects are: Central Visayas Regional Project (CVRP), Environmental and Resource Management Project (ERMP), and Coastal Resources Management Project (CRMP). All three of these projects emphasized resource management and enterprise/alternative livelihood activities.

Table 1. ICM projects studied in Bais Bay area

Year	Project	Lead Agency	Funding Source	Major Activities
1984-1992	Central Visayas Regional Project-I (CVRP)	Central Visayas Regional Project Office	World Bank	marine reserve, mangrove reforestation, artificial reefs, fish aggregating devices
1990-1992	Environmental and Resource Management Project (ERMP)	Silliman University	Canadian International Development Agency	marine and watershed management
1996-2002	Coastal Resources Management Project (CRMP)	Department of Environment and Natural Resources	US Agency for International Development	mangrove rehabilitation, enterprise development, technical assistance

The Anilao area, located on Balayan Bay, is utilized for residential, transportation, and recreational purposes. Mabini and Tingloy are two municipalities bordering the Bay. The Anilao area has a history of tourism activities, dating back to the 1960s. This is mainly due to its geographical closeness to Manila. There have been several ICM projects in the Anilao area dating back to 1990. This research focused on three of the five ICM projects which have been implemented in the area (Table 2). These projects are:

Community-based Coastal Resource Management Project of the Haribon Foundation, Balayan Bay Integrated Coastal Management Project of WWF/KKP, and the Community-based Coastal Resources Management Project of the Sulu Fund. These three projects emphasized community organizing and resource management activities.

Table 2. ICM projects studied in the Anilao area.

Year	Project	Lead Agency	Funding Source	Major Activities
1990-1995	Community-based Coastal Resource Management Project (CBCRM-H)	Haribon Foundation	US Agency for International Development; Government of the Philipppines	community organizing; organized cooperative; marine protected areas; organized resort owners association
1997-1999	Balayan Bay Integrated Coastal Management Project (BBICM)	WWF/KKP	WWF-US	community organizing; coastal area development council; coastal clean-up; surveillance equipment; organized local NGO
1999	Community-based Coastal Resources Management Project (CBCRM-S)	Sulu Fund		marine conservation

Structured interviews were conducted with a random sample of project participants and non-participants in the Bais Bay area and in the Anilao area. A sample of 60 people were interviewed (40 project participants and 20 non-participants) in each area. Interviews were conducted in two municipalities and four barangays around Bais Bay. Project participants were involved in one or more of the following projects – Central Visayas Regional Project (CVRP), Environmental and Resource Management Project (ERMP), and Coastal Resources Management Project (CRMP). Interviews were conducted in two municipalities and three barangays in the Anilao area. Project participants were involved in one or more of the following projects – Community-based Coastal Resource Management Project of the Haribon Foundation, Balayan Bay Integrated Coastal Management Project

of WWF/KKP, and the Community-based Coastal Resources Management Project of the Sulu Fund.

Measurement of Variables. Perceptions of ICM project impacts involved assessments of changes over time in 16 factors viewed as essential components to any ICM project (Pomeroy et al., 1997; Pollnac and Crawford 2000). The factors evaluated here are the following:

1. Participation in community affairs in general
2. Participation in coastal resource and fisheries management
3. Influence over community affairs in general
4. Influence over coastal resource and fisheries management
5. Access to resources
6. Control over coastal resource and fisheries
7. Fair allocation of access rights to coastal and fishery resources
8. Overall quality of life of the household
9. Household income
10. Income from coastal resources
11. Employment
12. Overall quality of fisheries resources
13. Compliance with coastal resource and fishery rules
14. Ease of collective decision-making on barangay problems
15. Quickness of resolving community conflicts on coastal resource and fishery-related issues
16. Knowledge of coastal resource and fishery management

The method used to measure the indicators takes advantage of the human ability to make graded ordinal judgments concerning both subjective and objective phenomena. Human behavior is based on graded ordinal judgments, not simply a dichotomous judgment of present or absent. This level of measurement allows one to make more refined judgments concerning ICM sustainability project impacts, as well as permits the use of more powerful statistical techniques to determine the relationships between perceived impacts and potential predictor variables. The technique

chosen for use in this study is a visual, self-anchoring, ladder-like scale which allows for making finer ordinal judgments, places less demand on informant memory, and can be administered more rapidly (Pomeroy et al., 1997; Pollnac and Crawford 2000). Using this technique, the respondent is shown a ladder-like diagram with 10 steps. The respondent is told that the first step represents the worst possible situation. For example, with respect to coastal resources, the respondent might be informed that the first step indicates an area with no fish, or other resources, that the water is so foul nothing could live in it. The highest step could be described as rich, clean water, filled with fish and other resources. The respondent would then be asked where the situation was before the ICM project and where it is today. The perceived change is the difference between today and the time before the ICM project.

Analysis of the data on ICM sustainability indicators involved first calculating mean values for the differences between each indicator for today (t2) and the pre-project time period (t1). A paired comparison t-test was calculated to determine whether the mean differences between the two time periods are statistically significant. As the next step in the analysis, the 16 indicators for both areas were combined and were submitted to a principal component (with varimax rotation) analysis to determine whether relationships between the indicators were such that they could be reduced to fewer, composite indicators for further analysis. Number of components were selected based on the scree-test. Component scores representing the position of each respondent on each component were created for each respondent. We refer to these scores as Project Impact Indicator Component Scores (PIICS). They are standardized scores with a mean of zero and a standard deviation of one. The relationship of the PIICS were intercorrelated with a set of independent variables. A stepwise regression analysis was conducted to determine the relative importance of the predictor variables in terms of their individual and combined ability to account for variance in the PIICS.

Results

The average age, education, years living in the community, and household size for all respondents in the two areas are presented in Table 3.

Table 3. Demographic Characteristics of Bais Bay and Anilao Area Respondents

	Bais Bay	Anilao
Age	48 (12.64)	43 (10.55)
Education	6 (2.53)	8.3 (3.25)
Years living in community	37 (16.50)	35.8 (11.3)
Household size	5.2 (2.24)	6 (2.8)
	n=60	n=60

Standard deviation in parentheses

The mean value and paired comparison t-test are presented first for Bais Bay and Anilao areas individually. The results of this analysis are combined for the principal component, correlation, and stepwise regression analyses.

Bais Bay Results. For the combined sample of participants and non-participants in the Bais Bay area, there was a statistically significant increase in perceived levels of 10 of the 16 indicators ($p<0.01$). There were large positive changes perceived in participation in community affairs in general, participation in coastal resource and fish management, influence over community affairs in general, influence over coastal resource and fish management, control over coastal resource and fisheries, compliance with coastal resource and fishery rules, ease of collective decision-making on barangay problems, quickness of resolving community conflicts on coastal resource and fishery-related issues, and knowledge of

coastal resource and fishery management. There was a large negative change perceived in overall quality of fishery resources. All other indicators showed no statistically significant changes in perceived level of indicators (Table 4).

Table 4. Perceived pre-project and post-project changes in indicators for all respondents

Indicator	T1	T2	T2-T1	P
Participation in community affairs-general	3.7	5.7	2	<0.01
Participation in resource and fish mgt	3.45	6.7	3.25	<0.01
Influence over community affairs-general	3.15	5.6	2.45	<0.01
Influence over resource mgt	3.32	6.3	2.98	<0.01
Access to resources	8.88	8.15	-0.73	
Control over resources	3.75	7.42	3.67	<0.01
Fair allocation of access rights	8.12	8.22	0.1	
Overall quality of life of HH	5.6	5.1	-0.5	
HH income	5.8	4.7	-1.1	
Income from coastal resources	5.96	4.98	-0.98	
Employment	2.4	2.98	0.58	
Overall quality of fish resources	6.7	4.47	-2.23	<0.01
Compliance with rules	3.63	7.28	3.65	<0.01
Ease of collective decision-making on barangay problems	5.02	6.68	1.66	<0.01
Quickness of resolving community conflicts on resource	5.12	7.17	2.05	<0.01
Knowledge of coastal resource and fish mgt.	4.03	7.48	3.45	<0.01

A similar analysis was conducted separating the participants and the non-participants (Table 5). The results reflect statistically significant changes similar to those found in Table 4. There does appear to be some differences between participants and non-participants for ease of collective decision-making on barangay problems and quickness of resolving community conflicts on resources with non-participants having no statistically significant change for these two indicators.

Table 5. Perceived Pre-project and Post-project Changes in Indicators for Participants and Non-participants

	Participants				Non-Participants			
Indicator	**T1**	**T2**	**T2-T1**	**P**	**T1**	**T2**	**T2-T1**	**P**
Participation in community affairs	3.6	6.13	2.53	<0.01	3.9	4.95	1.05	<0.01
Participation in resource and fish mgt	3.05	7	3.95	<0.01	4.25	6.1	1.85	<0.01
Influence over community affairs-general	2.93	6.48	3.55	<0.01	3.6	3.85	0.25	<0.01
Influence over resource mgt	2.9	6.83	3.93	<0.01	4.15	5.25	1.1	<0.01
Access to resources	8.7	8.25	-0.45		9.25	7.95	-1.3	
Control over resources	3.35	7.93	4.58	<0.01	4.55	6.4	1.85	<0.01
Fair allocation of access rights	8.15	8.28	0.13		8.05	8.1	0.05	
Overall quality of life of Household	5.5	5.2	-0.3		5.8	4.9	-0.9	
Household income	5.73	4.93	-0.8		5.95	4.35	-1.6	
Income from coastal resources	6.15	5.2	-0.95		5.6	4.55	-1.05	
Employment	1.85	2.55	0.7		3.5	3.85	0.35	
Overall quality of fish resources	6.73	4.9	-1.83	<0.01	6.65	3.6	-3.05	<0.01
Compliance with rules	3.15	7.65	4.5	<0.01	4.6	6.55	1.95	<0.01
Ease of collective decision-making on barangay problems	4.43	6.78	2.35	<0.01	6.2	6.5	0.3	
Quickness of resolving community conflicts on resources	4.55	7.38	2.83	<0.01	6.25	6.75	0.5	
Knowledge of coastal resource and fish mgt	3.58	7.58	4	<0.01	4.95	7.3	2.35	<0.01

The results of this analysis indicate that respondents are participating more and having more influence over community affairs and resource management. Enforcement of rules has improved, as has collective decision-making. Overall, the quality of fishery resources has declined. Household income, income from coastal resources, and overall quality of life have declined or not improved since the project and access to the resource has been restricted as a result of marine sanctuaries (although the results are not statistically significant)

Anilao Area Results. For the overall sample, there was a statistically significant increase in perceived levels of 14 of 16 indicators ($p<0.01$). There were large positive increases in participation in resource and fish management, influence over resource management, control over resources, employment, compliance with rules, and knowledge of coastal resource and fish management. There was a large negative change perceived in access to resources and income from coastal resources (Table 6).

Table 6. Perceived pre-project and post-project changes in indicators for all respondents

Indicator	T1	T2	T2-T1	P
Participation in community affairs-general	4.65	5.92	1.27	<0.01
Participation in resource and fish mgt	3.26	6.55	3.29	<0.01
Influence over community affairs-general	2.85	4	1.15	<0.01
Influence over resource mgt	2.63	4.92	2.29	<0.01
Access to resources	9.75	8.13	-1.62	<0.01
Control over resources	3.03	8.26	5.23	<0.01
Fair allocation of access rights	9.71	9.55	-0.16	
Overall quality of life of HH	5.15	6.28	1.13	<0.01
HH income	5.03	6.08	1.05	<0.01

Table 6. cont'd

Indicator	T1	T2	T2-T1	P
Income from coastal resources	4.53	3.46	-1.07	<0.01
Employment	3	5.4	2.14	<0.01
Overall quality of fish resources	6.51	6.36	-0.15	
Compliance with rules	3.76	8.48	4.72	<0.01
Ease of collective decision-making on barangay problems	6.85	7.9	1.05	<0.01
Quickness of resolving community conflicts on resource	6.28	8.08	1.8	<0.01
Knowledge of coastal resource and fish mgt.	3.5	7.96	4.46	<0.01

Table 7 reflects statistically significant changes similar to those found in Table 6. There does appear to be some differences between participants and non-participants in participation in community affairs, overall quality of life of the household, income from coastal resources, and ease of collective decision-making on barangay problems with non-participants having no statistically significant changes for these four indicators.

Table 7. Perceived Pre-project and Post-project Changes in Indicators for Participants and Non-participants

	Participants				Non-Participants			
Indicator	**T1**	**T2**	**T2-T1**	**P**	**T1**	**T2**	**T2-T1**	**P**
Participation in community affairs	4.67	6.35	1.68	<0.01	4.6	5.15	0.55	
Participation in resource and fish mgt	3	7.3	4.3	<0.01	3.8	5.05	1.25	<0.01
Influence over community affairs-general	3	4.45	1.45	<0.01	2.55	3.1	0.55	<0.01
Influence over resource mgt	2.7	5.6	2.9	<0.01	2.5	3.55	1.05	<0.01
Access to resources	9.9	7.93	-1.97	<0.01	9.45	8.55	-0.9	<0.01
Control over resources	2.5	8.1	5.6	<0.01	4.1	8.6	4.5	<0.01
Fair allocation of access rights	9.72	9.52	-0.2		9.7	9.6	-0.1	
Overall quality of life of Household	4.8	6.07	1.27	<0.01	5.85	6.7	0.85	

Household income	5.12	6.05	0.93	<0.01	4.85	6.15	1.3	<0.01
Income from coastal resources	5.27	3.77	-1.5	<0.01	3.05	2.85	-0.2	
Employment	2.67	4.85	2.18	<0.01	3.65	6.5	2.85	<0.01
Overall quality of fish resources	6.42	5.97	-0.45		6.7	7.15	0.45	
Compliance with rules	3.3	8.35	5.05	<0.01	4.7	8.75	4.05	<0.01
Ease of collective decision-making on barangay problems	6.52	7.7	1.18	<0.01	7.5	8.3	0.8	
Quickness of resolving community conflicts on resources	6.12	8	1.88	<0.01	6.6	8.25	1.65	<0.01
Knowledge of coastal resource and fish mgt	2.92	7.9	4.98	<0.01	4.65	8.1	3.45	<0.01

The results of the analysis indicate that the respondents have improved participation in and have influence over coastal resource and fish management. Access to the resource has been limited. The findings above indicate that household income has improved although not necessarily from coastal resources.

Analysis of ICM Sustainability Indicators

While it is interesting to examine each of the indicators, one at a time, it is possible that there are relationships between the indicators which can be used to understand changes in more general factors in the project communities. As a means of discovering these more general factors, principal component analysis with varimax rotation was used to elucidate patterns of relationships between the degree of change in the 16 indicators. The data for both project communities were combined for this analysis. The scree test was used to determine the number of components, resulting in 3 components, which account for a total of 52 percent of the variance in the data set. The results of this analysis are in Table 8. Items loading highest on the first component are clearly related to governance; thus, the component is named "Governance". On the second component items related to income and household wellbeing load highly, resulting in identifying the component as indicating "livelihood." Finally, items loading highest on the third component are related to access to the resource or

access to community affairs; hence, the component is named "Access."

Table 8. Principal component analysis of indicators

INDICATOR	GOVERNANCE	LIVELIHOOD	ACCESS
Knowledge of management	0.759	0.047	-0.160
Compliance with rules	0.711	0.087	-0.094
Influence on management	0.648	0.102	0.526
Control over resources	0.638	0.106	-0.049
Participation in management	0.616	-0.026	0.388
Conflict resolution	0.566	0.080	0.129
Collective decision making	0.557	-0.040	0.230
Household income	0.124	0.924	-0.035
Household well being	0.070	0.866	-0.002
Coastal income	-0.037	0.839	0.109
Employment opportunities	0.363	0.405	-0.220
Quality of fish resource	0.069	0.576	0.149
Influence community affairs	0.406	0.066	0.760
Participate in community	0.262	0.052	0.617
Access to resources	-0.188	-0.072	0.458
Fair allocation of access	-0.138	0.270	0.423
Percent total variance	21.037	18.314	12.278

Component scores representing the position of each respondent on each component were created for each respondent. The component scores are the sum of the component coefficients times the sample standardized variables. These coefficients are proportional to the component loadings. Hence, items with high positive loadings contribute more strongly to a positive component score than those with low or negative loadings. Nevertheless, all items contribute (or subtract) from the score; hence, items with moderately high loadings on more than one component (e.g., influence on community affairs in the analysis presented here) will contribute at a moderate level, although differently, to the component scores associated with the governance and access components. This type of component score provides the best representation of the data. In this paper, for this data we will refer to these scores as Project Impact Indicator Component Scores (PIICS). They are standardized scores with a mean of zero and a standard deviation of one.

The three components clearly reflect the goals of ICM—improvements in governance, livelihood, and empowerment in

terms access to resources and community decision making. Empowerment is also reflected in the governance component (e.g., influence and participation in management, control over resources, and collective decision making). It is important to determine if degree of change in these important indicators is related to project activities or some other variables. As a first step in investigating these relationships, the Project Impact Indicator Component Scores are intercorrelated with a set of independent variables (Table 9). Correlations in Table 9 indicate that respondents with more years of residence in the community and a higher level of project participation, as well as those participating in the CVRP and Haribon projects tend to score higher on the Governance Component. Those from Bais City and older respondents, as well as those with lower levels of formal education tend to score lower on the Livelihood Component. Finally, those from Bais City, those who lived longest in the community and participated in the greatest number of projects as well as participated in the ERMP and CRMP projects tend to have the highest scores on the Access Component.

Table 9. Correlations between independent variables and project impact indicator component scores.

	GOVERNANCE	LIVELIHOOD	ACCESS
Bias City	-0.147	-0.282**	0.382***
Gender female	-0.076	0.140	-0.021
Age	0.114	-0.315***	0.116
Education	0.070	0.235*	-0.106
Years Resid.	0.198*	0.046	0.259**
Household size	-0.003	0.043	-0.036
Total projects	0.381***	-0.034	0.331***
CVRP	0.304**	-0.127	0.136
ERMP	-0.071	0.015	0.349***
CRMP	-0.013	-0.144	0.474***
HARIBON	0.222*	0.139	-0.198*
KKP	0.052	0.095	-0.005
SULU FUND	0.128	0.001	-0.056

N = 120 *** = $p < 0.001$ ** = $p < 0.01$ * = $p < 0.05$

The next question concerns the relative importance of the predictor variables in terms of their individual and combined ability to account for variance in the Project Impact Indicator Component Scores. This can be accomplished with regression analyses, and most efficiently with stepwise regression analysis. In the application used here, all independent variables (the predictor variables in Table 9) manifesting statistically significant zero order correlations with a specific Project Impact Indicator Component Score are intercorrelated with the dependent variable (the specific Project Impact Indicator Component Score). The one with the highest correlation (the one that explains the most variance in the Project Impact Indicator Component Score) is entered first into the multiple regression equation. Then the effects of the entered variable are controlled, and the variable with the highest partial correlation with the Project Impact Indicator Component Score is entered into the equation. The R^2 (squared multiple correlation coefficient, which is equal to the amount of variance explained in the resource beliefs component score) for the two independent variables and the dependent is then calculated. The next step enters the independent variable that has the highest partial correlation with the Project Impact Indicator Component Score controlling for variables already entered. This stepwise procedure is continued until some pre-set criterion is reached. In this case the criterion was that the variable to be entered has a $p < 0.05$. Partial correlations were carefully examined at each step to insure that multi-collinearity did not have an effect on the analysis. The results of these analyses for the three Project Impact Indicator Component Scores can be found in Table 10.

Table 10. Stepwise Regression Analyses

Dependent Variable: Governance Component Score

Independent Variable	Standardized Beta Coeff.	Prob.
Total number of projects	0.32	<0.05
CVRP	0.20	<0.05

R=0.43 R2=0.18 Adj. R2=0.17 F=12.95 p <0.001

Dependent Variable: Livelihood Component Score

Independent Variable	Standardized Beta Coeff.	Prob.
Bias City	-0.20	<0.05
Age	-0.25	<0.05

R=0.37 R2=0.14 Adj. R2=0.12 F=9.22 p <0.001

Dependent Variable: Access Component Score

Independent Variable	Standardized Beta Coeff.	Prob.
Year resident	0.19	<0.05
ERMP	0.18	<0.05
CRMP	0.42	<0.05

R=0.56 R2=0.31 Adj. R2=0.30 F=17.54 p <0.001

The results in Table 10 indicate that total number of projects participated in and participation in the CVRP project together account for 17 percent of the variance in the Governance Component Score ($p<0.001$). Likewise, not coming from Bais City and being of a younger age account for 12 percent of the variance in the Livelihood Component Score ($p<0.001$). Finally, the combined effects of years as resident in the community, and participating in the ERMP and CRMP projects account for almost one-third (30 percent) of the variance in the Access Component Score ($p<0.001$), with participation in CRMP accounting for most of the variance.

Discussion

Year of residency in the community, participation in ICM projects with resource management and enterprise/alternative livelihood activities, and the total number of projects participated in were the strongest predictors of perception of ICM project

sustainability at the two sites in the Philippines. The longer a person lives in the community the more he/she will feel a sense of ownership over the resource and want to sustain the ICM activities. Projects, such as the CVRP, ERMP, and CRMP in the Bais Bay area, which combined resource management activities with alternative livelihood activities that provided economic benefits (improved income), are important for ICM sustainability. For example, marine reserves in Bais Bay established under the CVRP increased fish catch, subsequently raised income, and were sustainable. Another example is seaweed farming in Bais Bay. Started by the CVRP, it has provided income to households and been taken up by non-participants. Participation in project design and implementation provides community members with a sense of 'ownership' over the project. Since the community members helped to create the ICM project, it provides a greater probability that aspects of the project fit the needs of community members.

In summary, participation of community members in the ICM project design and implementation and real or perceived economic benefits from the project influence participants to sustain project activities after project completion. A sense of ownership over the ICM project is important for sustainability, either from years of residency in the community or participation and involvement in the project.

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