Final Report:
Lessons from the US Coral Triangle Initiative Support Program

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Learning Project Final Report
Lessons Learned from the US Coral Triangle Initiative Support Program

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Submitted on:
January 23, 2014

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Acronyms and Abbreviations

ADB	Asian Development Bank
CCA	Climate Change Adaptation
CI	Conservation International
CT	Coral Triangle
CT6	The six nations in the Coral Triangle: Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor-Leste
CTI-CFF	Coral Triangle Initiative for Coral Reefs, Fisheries and Food Security
CTMPAS	Coral Triangle Marine Protected Area System
CTSP	USAID Coral Triangle Support Partnership project
EAFM	Ecosystem Approach to Fisheries Management
IRS	Interim Regional Secretariat
IUU	Illegal, Unreported, and Unregulated (fishing)
LEAP	Local early action plan
LP	Learning Project
MEAT	Management Effectiveness Assessment Tool
MPA	Marine Protected Areas
NCC	National Coordinating Committee
NGO	Non-government organization
NOAA	National Oceanic and Atmospheric Administration (US)
NPOA	National Plan of Action
PI	Program Integrator – Tetra Tech
PNG	Papua New Guinea
REAP	Regional Early Action Plan
REX	Regional Exchange
ROG	Regional Oceans Governance
SI	Solomon Islands
SNA	Social Network Analysis
TNC	The Nature Conservancy
USAID	United States Agency for International Development
USCTI	US Coral Triangle Initiative
UW	University of Washington
WWF	World Wildlife Fund (for US organization)/Worldwide Fund for Nature (other national organizations)

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Executive Summary

The Learning Project (LP) examined the lessons learned, results and outcomes of the US Coral Triangle Initiative (US CTI) Support Program. USAID, through the USCTI Support Program Implementing Partners, provided funding to the University of Washington to capture lessons learned from the USAID-funded five-year program. The LP emphasized the contributions of each implementing partner from the US CTI, the symmetry and linkages between mechanisms, and the lessons learned from this ambitious initiative supporting regional ocean governance. Working in partnership with representatives from each of the US CTI implementing partners (the Coral Triangle Support Partnership (CTSP), the National Oceanographic and Atmospheric Administration (NOAA), the Program Integrator (PI)) and the US CTI's funding agency (the US Agency for International Development (USAID)), the LP created a manageable and effective research effort that identified general patterns occurring within the US CTI that are conditioned by contextual considerations. Broader linkages and synergies between the activities of the US CTI implementing partners and the six-nation Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) were examined to identify the major lessons learned from the US CTI effort.

The LP had multiple, interrelated goals that resulted in a careful documentation and assessment of the US CTI:

1) Work with USAID and US CTI implementing partners to develop an assessment design and focus that meets the interests of the US CTI partners and USAID, and contributes specific recommendations for how further support should be structured.
2) Use various assessment methods to develop a rigorous understanding of the evolution of the US CTI at local, national and regional levels that contributes to recommendations on future program design.
3) Identify lessons learned from the US CTI to inform the CTI-CFF governments and implementing partners regarding possible follow-on programs.
4) Identify lessons learned from implementation of the US CTI in the six CT countries.
5) Disseminate assessment findings through the inclusion of results in the US CTI reports to USAID, a comprehensive LP report, and peer reviewed publications.
6) Increase the capacity for applied multi-disciplinary assessment in the region.

Three types of social surveys were used: 1) community-level survey in four countries, 2) a social network survey of Regional Exchange (REX) participants, and 3) a survey of US CTI and CTI-CFF leadership in all Coral Triangle (CT) countries. Semi-structured interviews were conducted at the national level in all CT countries and regional level including informants from national ministerial leadership, US CTI leadership, Non-Government Organizations (NGOs), and scientific community.

This report highlights initial findings on the US CTI impacts on:
      1) increased institutional capacity development and leadership formation;
      2) improved governance through vertical and horizontal integration; and
      3) establishing mechanisms to ensure policy implementation post-US CTI.

The CT region has a wide range of social ecological conditions, cultures, histories, and capacities. Findings of this project reveal:

- There are modest indications that social ecological conditions are improving in project sites across the region.
- Management activities intended to improve social ecological conditions are advancing and promising.
- Marine Protected Areas (MPAs), Ecosystem Approach to Fisheries Management (EAFM), Climate Change Adaptation (CCA) planning and implementation are progressing, with the greatest tangible progress on MPAs at the local and regional levels.
- The declaration of the Coral Triangle MPA System (CTMPAS) is a landmark accomplishment.
- MPA awareness, monitoring, and implementation of MPAs are improving in project sites. The declaration of new MPAs in Solomon Islands, Timor-Leste, and Malaysia are tangible steps forward.
- EAFM and CCA concepts are diffusing among policy makers throughout the region. The development of tangible EAFM and CCA actions and policies are in relatively early, but promising, stages.

Other findings from the LP include:

- The development of a broad range of well-designed educational materials and guidebooks is impressive and valued. Adoption of these normative and educational materials is at an early stage and represents an opportunity for the next stages of US government and international NGO support for the CTI-CFF in partnership with CT countries.
- The ambitious integrated approach used by the US CTI is maturing and represents the leading edge of regional marine resource management. The US CTI has resulted in progress in both thematic integration (linking MPAs with EAFM with CCA) and institutional integration. There remain considerable challenges to improving vertical integration in the region—a process that is highly valued and will require ongoing attention. Many challenges and barriers exist, only some of which a program such as the CTI-CFF can address.
- Investing in human and institutional capacity and fostering such linkages with guidelines, networks and practical exercises designed to solve pressing problems emerge as important processes to maintain. One of the most significant achievements

of the US CTI is the creation of learning networks at various levels within the CT region. Social network analysis and key informant interviews clearly document the progress toward and value of the regional and in-country networks that have been fostered by REXs and other means.

- There are also indications that leadership is developing. National policy makers and other REX participants are dedicated and interested in the continuation of national and regional learning networks.
- The role of female leaders in these networks is apparent and is contributing to the ongoing empowerment of women who participate in the CTI-CFF.
- The establishment of a strong and multi-national Regional Secretariat is highly valued. Considerable effort should be focused on ensuring that the Secretariat, once established, is highly skilled and effective.
- A CT regional identity is also emerging. Communication between country leaders, leadership creation, and vertical integration through regional and national CTI-CFF plans has supported this regional identity.
- Finally, the US CTI Support Program Implementing Partners (World Wildlife Fund (WWF), The Nature Conservancy (TNC), Conservation International (CI), NOAA, PI) have dramatically improved their collaboration during the last five years. Also notable is the improved collaborative relationships between the international NGOs and CT national government agencies. Additional analyses will more fully investigate these institutional changes.

This report concludes with recommendations to improve regional ocean governance. Most notably, the continued engagement of US governmental and non-governmental organizations is strongly recommended. Considerable progress in all US CTI thematic areas has been made and will require ongoing support to solidify commitment and ensure maximum return on investment. Continued investment in learning networks, establishment of educational programs organized around novel guidebooks and training materials, and strengthening of a Regional Secretariat are highlighted among other recommendations. The commitment to an integrated approach that balances conservation with food security goals is essential to the progress and institutional commitment to the CTI-CFF.

I. Introduction

Coral Triangle Support Partnership (CTSP) Background

The Coral Triangle (CT) covers nearly 2.3 million square miles of ocean, encompassing all or parts of the waters of Indonesia, Malaysia, Papua New Guinea (PNG), the Philippines, Solomon Islands (SI), and Timor-Leste. The CT supports some of the greatest concentrations of marine biodiversity on Earth, including over 500 species of reef building corals and 3,000 species of fish. Its biological resources sustain the lives of more than 132 million people in the region and benefit millions more worldwide. Yet the marine and coastal natural resources of the Coral Triangle are threatened, and the many goods and services they provide are at immediate risk from a range of factors that adversely impact food security, employment opportunities, and the quality of life of the people who depend on marine resources.

The six Coral Triangle countries (CT6) formally agreed to pursue the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF or CTI) at the first CTI Senior Officials Meeting (SOM) in Bali, Indonesia in December 2007. The CT6 followed this agreement with a series of National Coordinating Committee (NCC) meetings to establish the scope and priorities for this monumental effort. The Coral Triangle Declaration was officially signed by the CT6 heads of state in May 2009 in Manado, Indonesia. The CTI Regional Plan of Action (RPOA) adopted as part of that agreement, as well as the related National Plans of Action (NPOA) that have been drafted and adopted since that time, present clear goals, targets, and prioritized activities necessary to achieve local, national, and regional outcomes within ten to 15 years. The five CTI conservation goals are:

1. Priority seascapes designated and effectively managed.
2. Ecosystem approach to fisheries management (EAFM) and other marine resources fully applied.
3. Marine protected areas (MPAs) established and effectively managed.
4. Climate change adaptation (CCA) measures achieved.
5. Threatened species status improving.

The US government—through coordinated efforts by the Agency for International Development (USAID), the National Atmospheric and Oceanic Administration (NOAA), Department of State (DOS), and other agencies (collectively known as the USCTI Support Program or USCTI)—has committed over $40 million in technical and financial assistance from 2009-2013 to support the CT6 nations as they work to achieve the CTI goals. The main conduit for this aid was the Coral Triangle Support Partnership (CTSP), a five-year project implemented by a consortium led by World Wildlife Fund (WWF) with The Nature Conservancy (TNC), and Conservation International (CI). The consortium maintains a strong presence in all CT countries as well as internationally, providing the CT6 with opportunities to leverage additional assistance that otherwise would be beyond their reach. Each consortium member has a long history of engagement in the region, and over the years consortium members have invested tens of millions of dollars in the CT with plans to scale up significantly in the next decade.

The implementation of the CTSP proceeded on two parallel and complementary tracks. The first track included national level interventions mostly through projects orchestrated by the three NGOs at national and/or local scales in various project sites across the region. The second track operated at the regional level and primarily focused on providing support to the CTI-CFF IRS and regional Technical Working Groups focused on three of the five goals of the Regional Plan of Action (Fisheries, Marine Protected Areas and Climate Change Adaptation) as well as the working groups for Monitoring and Evaluation and Sustainable Finance. The Learning Project aimed at "learning" how the regional, national, and community-level work was perceived and to what extent it was considered effective.

Learning Project Background

The Learning Project (LP) examined the lessons learned, results and outcomes of the USCTI Support Program. USAID, through the USCTI Support Program Implementing Partners, provided funding to the University of Washington (UW) to capture lessons learned from the USAID-funded five-year program. The LP emphasized the contributions of each implementing partner from the USCTI, the symmetry and linkages between mechanisms, and the lessons learned from this ambitious initiative supporting regional ocean governance. Working in partnership with representatives from each of the USCTI implementing partners CTSP, NOAA, PI and the USCTI's funding agency, USAID, the LP created a manageable and effective research effort that identified general patterns occurring within the USCTI that are conditioned by contextual considerations. Broader linkages and synergies between the activities of the USCTI implementing partners and the six-nation Coral Triangle Initiative on CTI-CFF were examined to identify the major lessons learned from the USCTI effort. This analysis was framed by the growing discourse of large-scale ocean governance, social ecological systems, policy making, and implementation of multi-lateral ocean governance programs (e.g., Berkes 2006; Christie et al. 2009a; Mills et al. 2010; Fidelman et al. 2012; Fidelman and Eckstrom 2012).

The LP created a deeper understanding of the USCTI's evolution, successes and challenges; responses to challenges; and opportunities for supporting regional governance beyond the current USCTI partnership. The LP documented how the USCTI produced results and outcomes that are greater than the sum of individual contributions by implementing partners while also capturing aspects of each implementing partner's lessons learned and outcomes achieved. Rather than limiting the work to the experiences of one site, one country, or even the USCTI alone, a critical aspect of this work was to examine, to the extent possible, the breadth of the six-nation CTI-CFF regional governance mechanism in relation to the USCTI Support Program.

The LP had multiple, interrelated goals that resulted in a careful documentation and assessment of the USCTI:

1) Work with USAID and USCTI implementing partners to develop an assessment design and focus that meets the interests of the USCTI partners and USAID, and contributes specific recommendations for how further support should be structured.

2) Use various assessment methods to develop a rigorous understanding of the evolution of the USCTI at local, national and regional levels that contributes to recommendations on future program design.
3) Identify lessons learned from the USCTI to inform the CTI-CFF governments and implementing partners regarding possible follow-on programs.
4) Identify lessons learned from implementation of the USCTI in the six CT countries.
5) Disseminate assessment findings through the inclusion of results in the USCTI reports to USAID, a comprehensive LP report, and peer reviewed publications.
6) Increase the capacity for applied multi-disciplinary assessment in the region.

The LP focused on the following themes of particular interest to USCTI partners:

- **Innovative organization/institutional structure:** The USCTI is a novel and ambitious trans-boundary, multiple-objective assistance program. The LP captured lessons learned about the role of each USCTI implementing partners, how each implementing partner worked together; how the mechanisms operated; how implementing partners experienced the USCTI; and how the USCTI supported the CTI-CFF to reach regional ocean governance goals.
- **Transition and sustainability**: In the final year of the USCTI, the implementing partners sought to fully transition the capacities, tools, products and services delivered throughout the USCTI to the appropriate CT institutions – e.g., the CTI-CFF IRS and the CT6 National Coordinating Committees (NCCs), among others. The USCTI planned for the program's final year to include a "hand-off" of tools and capacities developed through USCTI activities (one of the final steps in the program's efforts in institutionalization) to the appropriate institutions. As such, the USCTI is concerned with the sustainability of those products and capacities, as well as the institutions absorbing them. The LP examined mechanism used by the USCTI intended to improve transition and sustainability.
- **Innovation and replicability**: CTI-CFF, with support from the USCTI, is perhaps the broadest and deepest endeavor in marine EAFM and regional ocean governance (ROG) anywhere to date. Examining the lessons learned and what has been achieved for various aspects of EAFM and ROG (e.g., outcomes related to conservation, governance, and human dimensions) was a key task for the LP. There is interest in the USCTI's and CTI-CFF's broader impact, replicability, and innovation to the fields of practice of EAFM and ROG, as well as for the evolving efforts of the CTI-CFF itself. The LP documented what has been achieved in conservation and ocean governance (at various scales) and the USCTI's contributions to the broader fields of practice.
- **Design of development partnerships in support of multi-national governance initiatives:** The USCTI's organizational structure represents an approach to development partnership built upon a novel design to development/conservation interventions. Its design mirrors the breadth and scale of regional, national, and local-level institutions implementing the CTI-CFF in practice, which in turn mirrors the scales of the ecosystem CTI-CFF strives to protect. Some key questions the LP asked included:

1. What lessons learned might the design and organizational arrangements of USCTI provide to the field of practice on multi-national ocean governance?
2. What were the audiences' experiences (e.g., CTI-CFF IRS), NCCs of the CT6, etc.) in the endeavor of USCTI?
3. How has the USCTI sufficed to meet local, national, and regional needs in EAFM, MPAs, CCA, and institution-strengthening?

- **Peer-to-peer learning and global partnerships**: The USCTI established formal and informal learning networks at various levels of governance. The goal has been to raise capacity, foster leadership, and improve policies. Key assessment questions included:
    1. To what extent has peer-to-peer learning taken place surrounding the CTI-CFF and USCTI?
    2. Is there evidence of peer-to-peer learning in CTI-CFF and USCTI contributing to tools, lessons, curricula, and other innovations being replicated, transmitted, piloted, elsewhere?

Core Assessment Team Members

The LP was implemented by a multi-disciplinary team with assessment and conservation experience. This team coordinated their activities with USCTI implementing partners.

Team lead: Patrick Christie, PhD; University of Washington (UW)
Co-team lead: Richard Pollnac, PhD; University of Rhode Island (URI)
Regional project field coordinator: Todd Stevenson, PhD; UW
Indonesia/Timor-Leste field coordinator: Chris Rotinsulu, URI PhD candidate
Philippines field coordinator and social network analysis lead: Diana Pietri; UW PhD candidate

Four UW School of Marine and Environmental Affairs marine policy graduate students (Kathryn Graziano, Melissa Luna, Saiontoni Sarkar, Samantha Macks) collected and encoded survey data. Two Indonesian University of Rhode Island graduate students (Chris Rotinsulu and Abdul Halik) coordinated survey research in Indonesia and Timor-Leste. Ciony Sia, a Philippine national and contracted by the PI, conducted interviews in the Philippines and Malaysia. Twenty-two field assistants from the Philippines, Indonesia, Timor-Leste and Solomon Islands collected community-level survey data.

II. Methods

Methods Overview
A multiple method approach was used to triangulate findings for this study, which allows for greater internal and external validity. The methods employed include: (1) document analysis, (2) social surveys, and (3) semi-structured interviews. Document analysis informed the development of surveys and interview guides. Informants were sampled using random and purposive sampling, which depended on the type of informant. Informant types included: community marine resource users, community leaders, community conservation leaders, local

level government officials, national level CTI-CFF and CTSP leaders, and regional level US CTI, CTSP and CTI-CFF senior leaders. Quantitative data were analyzed using SYSTAT, SPSS, and UCINET. Semi-structured interviews were transcribed using a naturalized transcription approach (Oilver et al. 2005), but quotes were lightly edited to improve reader comprehension while strictly maintaining the meaning of quotes. Qualitative interview data were analyzed using Atlas.ti. Study sites were determined by the LP leadership team, in consultation with the US CTI and CTSP partners. Further details about the methods used in this study are included in the annex of this report.

Research Sites and Sample

The LP team conducted community-level surveys in four of the six CT countries—Philippines, Indonesia, Timor-Leste and Solomon Islands (Figure 1). The contexts were selected based on the following considerations: time and funding availability, cultural diversity, and depth of community-level policies. Communities influenced by the USCTI and comparable coastal communities outside the program's influence (referred to as 'control' communities) in the Philippines, Indonesia and Timor-Leste were surveyed. Reaching control communities in Solomon Islands was cost prohibitive. National-level surveys of government and NGO leaders were conducted in all six CT countries. Regional surveys and 85 key informant interviews were conducted with individuals from all CT countries and from US-based institutions involved with the USCTI. The online social network analysis survey was sent to all attendants at any USCTI REXs on CCA, EAFM, and MPAs. The sample size for any survey result is presented with the below analysis.
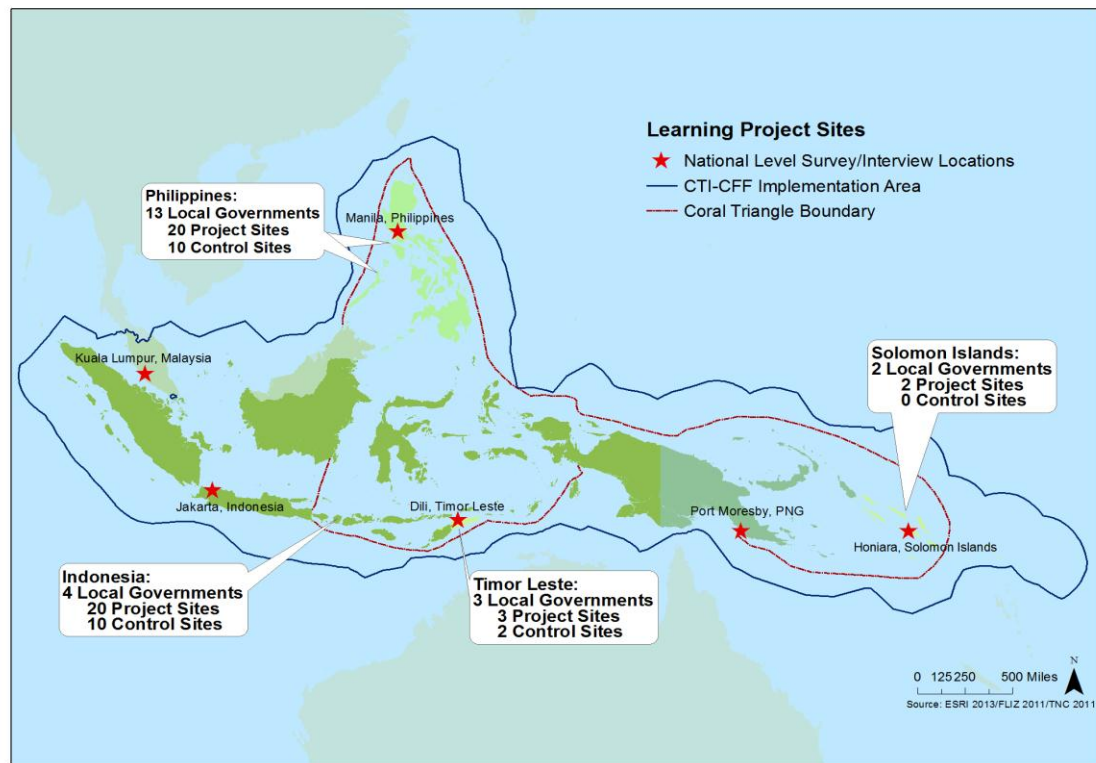
Figure 1. Location of LP surveys and interviews.

III. Structure of Report Findings

Figure 2 provides an outline for this report and analysis. The LP measured perceived social-ecological changes through the surveys administered in the CT region. Management activities implemented by the USCTI that were intended to improve social-ecological conditions included: designing and implementing a system of MPAs, creating and implementing an EAFM framework, CCA planning, various topical trainings, national and regional policy development, guidebook development, and improved enforcement of fisheries and conservation regulations. The LP measured the impacts of these management activities and of the USCTI on the various processes that are the means through which management activities can improve social-ecological conditions. Throughout the report, results and analysis are also related to the USCTI Support Program Consolidated Results Framework (Figure 3). This report highlights initial findings on the USCTI impacts on:

1) increased institutional capacity development and leadership formation;
2) improved governance through vertical and horizontal integration; and
3) establishing mechanisms to ensure policy implementation post-USCTI.

The report concludes with initial recommendations for the next stages of the CTI-CFF and potential US government and NGO support. It is important to note that the LP measured *perceptions* of changes in the above outcomes. The LP did not conduct ecological, fisheries stock, or economic assessments. Rather, the LP documented various social groups who participated in the USCTI, the status of relevant policy development, and perceived changes in institutions, policy implementation, and social-ecological conditions. Individual and institutional opinion and action is informed and shaped by perceptions. The impact of the USCTI is measured by comparing differences between project and control communities (at the community level) and changes over time at community, national, and regional levels. Plausible explanations for differences or changes are provided by an analysis of survey and key informant interview data and LP team experience with related programs. This triangulation of methods, drawing conclusions from multiple data sources, improves the reliability and validity of findings (NSF 2002).
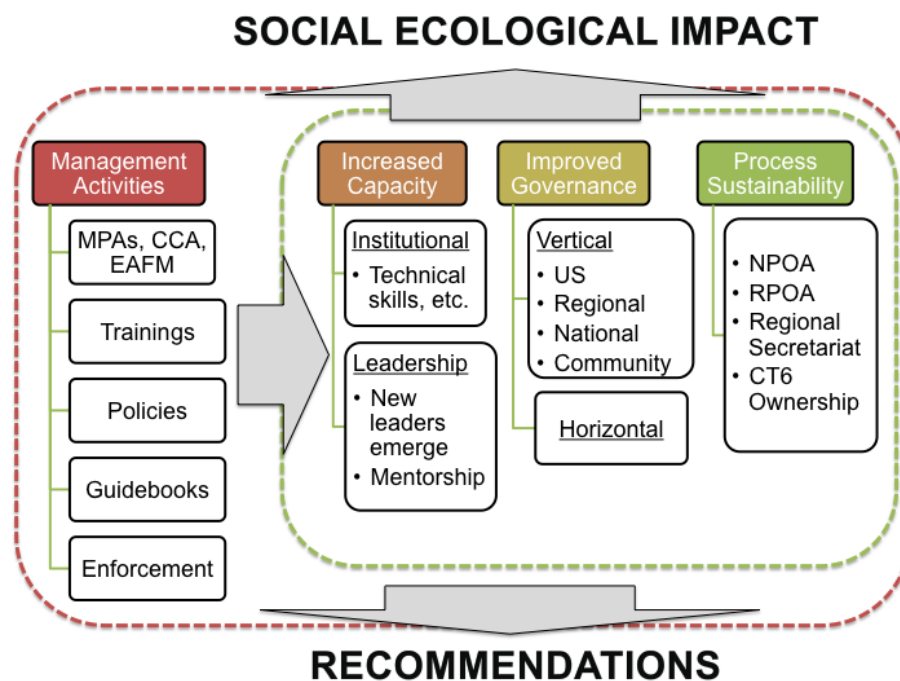
Figure 2. Processes and impacts measured by the LP.
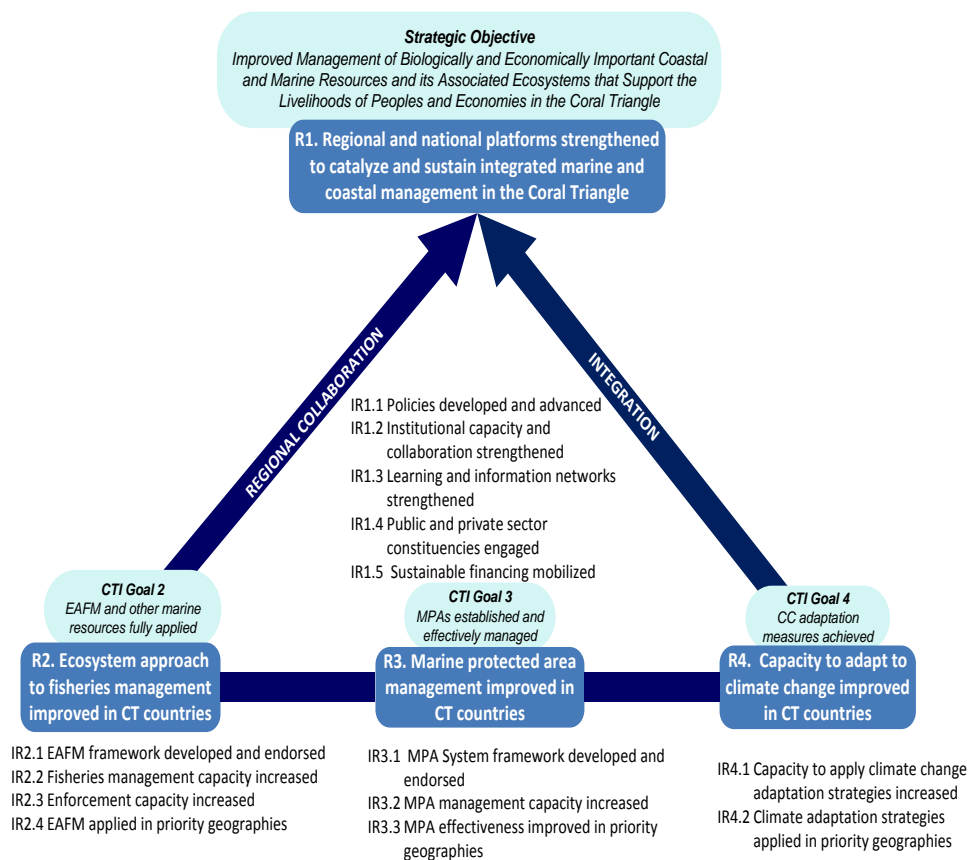
Figure 3. USCTI Support Program Consolidated Results Framework.

IV. Report Findings and Analysis

Social – Ecological Impacts

This section addresses the current social-ecological conditions in the CT region, as well as any changes that have occurred in these conditions since the start of the USCTI program. The social-ecological conditions in the CT relate to the USCTI's overarching Strategic Objective from the Results Framework (Figure 3): "Improved management of biologically and economically important coastal and marine resources and its associated ecosystems that support the livelihoods of peoples and economies in the Coral Triangle."

The social – ecological conditions in the CT region are varied, but frequently quite difficult.

"There are very urgent day to day issues like food security and it's hard to make the transition towards... thinking long term. Being able to act and respond on a day-to-day basis when you know food in the belly is the primary objective of the day is really, really hard... I think in actuality we're still dealing with the realities of day to day life in the

developing world. And that ability to plan long term where you don't see results for years down the road is very, very hard..." – US government official.[1]

The overarching goal of the CTI-CFF is to improve the conditions of coral reefs and food security of people living in the CT region (CTI-CFF 2009). Respondents were asked whether they agreed or disagreed with the following statement:

"There are no longer enough fish in the sea to provide for our food and income."

Only approximately 50 percent of project and control site informants report that fish is sufficient to meet their food and income needs (Figure 4). The difference between project (n=1,297) and control (n=658) communities is not statistically significant (p>0.050, Fisher exact test and chi sq., n=1,955). Foale et al. (2012) suggest that there is a need for CTI-CFF to develop more specific goals and targets related to food security; however, achieving sufficient levels of fish for food and income is a complicated and time intensive process and may improve within project communities over time.
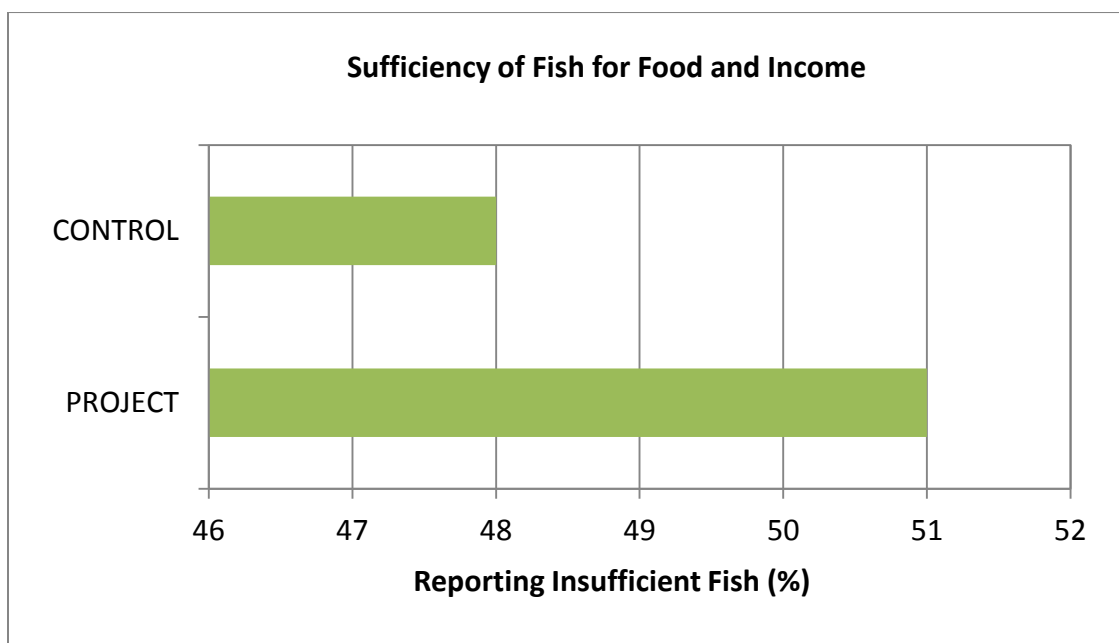
Figure 4. Perceived sufficiency of fish to meet food and income needs (n=1,955 Resource Users).

While there is a high incidence of perceived food insecurity in surveyed coastal communities, the USCTI project sites with MPAs report significant improvements in fish abundance, coral health, and mangrove health in the past five years (Figure 5). Respondents were asked how coral reef health, fish abundance and mangroves have changed over the last five years using a five-point scaled question, where responses ranged from (1) very poor, (2) poor, (3) average, (4) good, and (5) very good. Past (project n=1,264, control n=695) versus present (project n=1,265,

[1] All quotes were lightly edited to improve reader comprehension while strictly maintaining the meaning of quotes.

control n=643) change in total fish, coral, and mangroves are statistically significantly different for resource users with MPAs in their community (p<0.01, t-test). These results support the conclusion that MPAs in the USCTI project communities are having a positive impact on improving environmental conditions that are an essential prerequisite for food security.
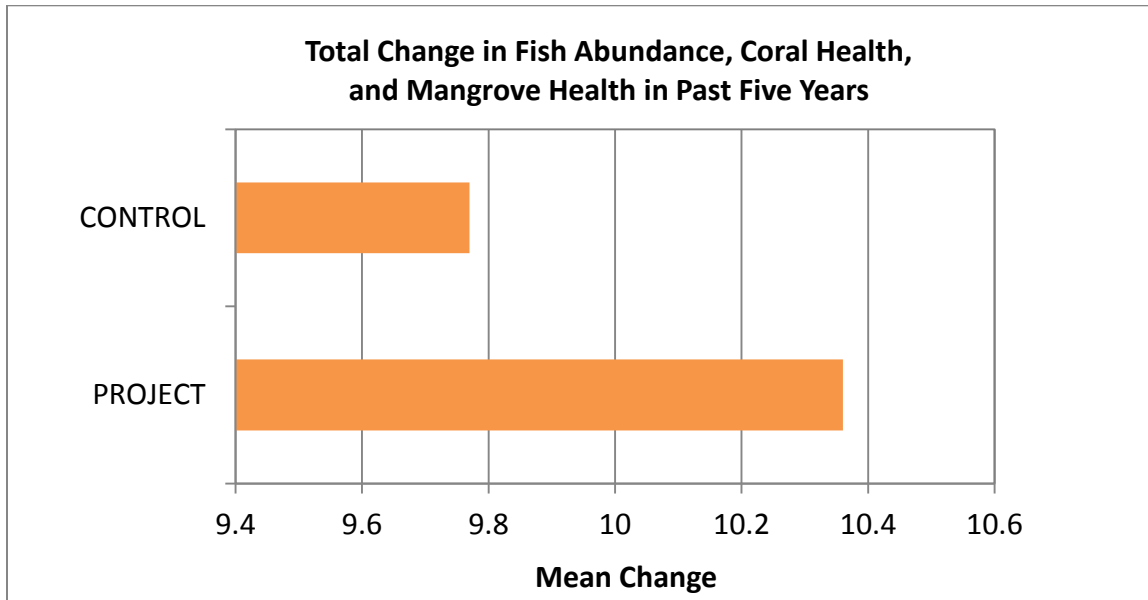
Figure 5. Perceived changes in environmental conditions (n=1,959 Resource Users).

The CTI-CFF appears to be having positive impacts on food security, sustainable fisheries, and coral reef health (Figure 6). National and regional respondents were asked how well the CTI-CFF helped their respective country achieve food security, sustainable fisheries, and coral reef conservation goals using a ten-point scale, where responses scaled from no achievement to high achievement. National respondents report greater improvements than regional informants. National (n=146) and regional (n=20) respondents held significantly different perceptions about food security (U=813.0, p=0.001), sustainable fisheries (U=853.0, p=0.003), and coral reef health (U=997.5, p=0.019). Differences between countries were also significant for sustainable fisheries (H(5)= 13.522, p=0.019) and food security (H(5)= 11.318, p=0.045) variables.
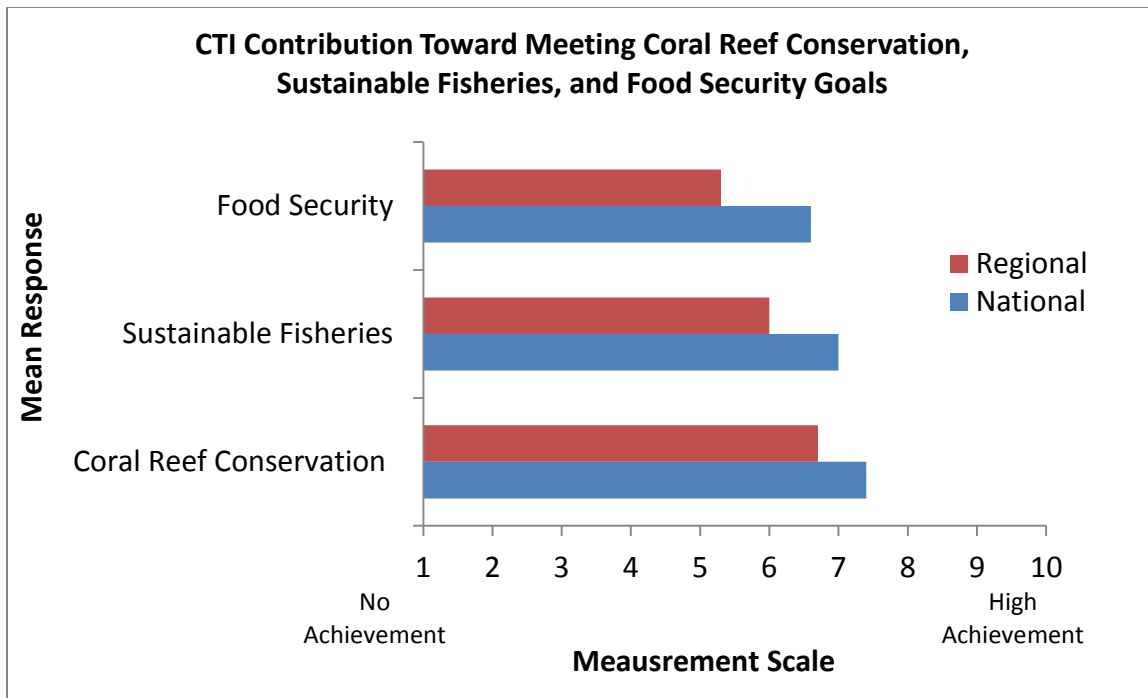
Figure 6. Impacts of CTI-CFF according to national and regional informants (n=166 Regional and National).

In a similar vein, selected national and regional respondents were queried about how the CTI-CFF would influence coral reef health, fisheries and food security over the next 20 years. Respondents were asked to express their belief about how the CTI-CFF would influence food security, fisheries, and coral reef health over the next 20 years, assuming that the CTI-CFF would continue, and responses scaled accordingly: (1) negative impact, (2) modest improvement, (3) maintain current levels, (4) modest improvements, and (5) large improvements. National and regional respondents held similar perceptions about the long term CTI-CFF influence on fisheries, but were statistically different with regard to their perceptions about coral health and food security (p<0.050, U test, n=56, Figure 7). With all three variables, national respondents perceived the CTI-CFF would result in greater improvements over the next 20 years than regional informants.

CTI Influence on Coral Reef Health, Fisheries Status, and Food Security in the Next 20 Years
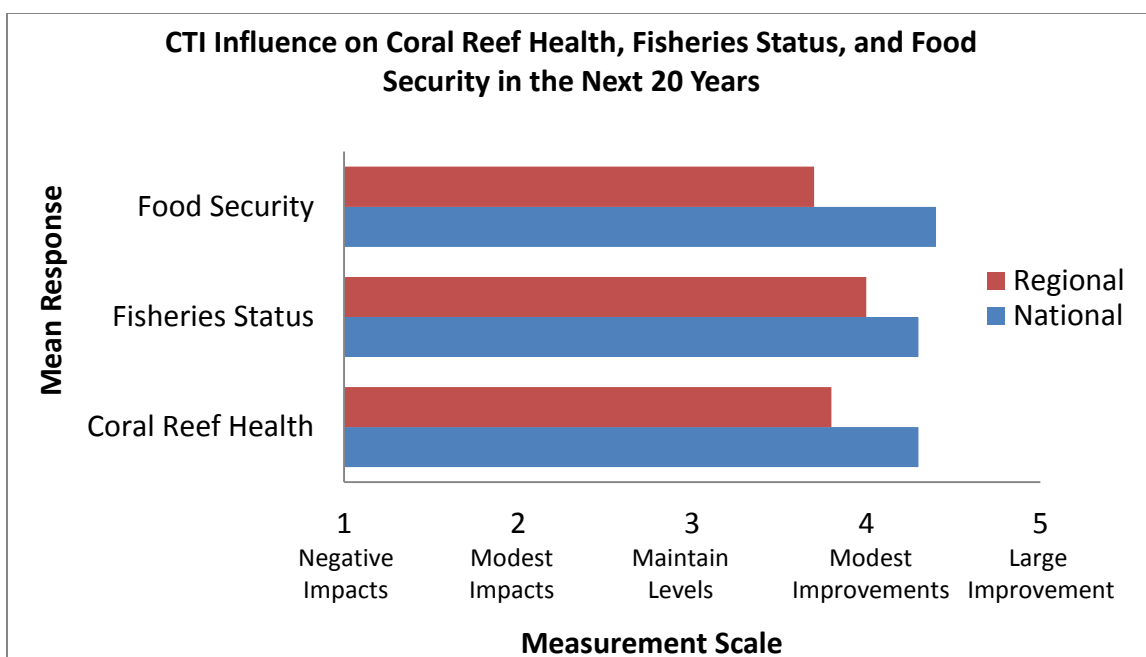
Figure 7. Perceived long term CTI-CFF influence on food security, fisheries and coral reef health held by national and regional respondents (n=56).

Management Activities

This section discusses the effects of specific management activities implemented by the USCTI, such as the establishment of MPAs and the application of technical toolkits developed under by the USCTI. These activities relate to the following results in the Results Framework: R2 (EAFM improved in CT countries); R3 (MPA management improved in CT countries); and R4 (CCA improved in CT countries).

The launch of the USCTI was complex and initial management activities were not always successful or well coordinated. Some of this difficulty is predictable given the context and wide variety of institutions and individuals involved. These challenges are covered by the mid-term and end-of-project program evaluations (The World Fish Center, 2010; Social Impact, 2013). The LP interviews captured some of these early-year difficulties that are presented here to demonstrate that while the beginning of the program may have been fraught with challenges, it markedly improved over time.

> "(W)e overstretched ourselves and we did not leave room for set-up. I think that's common among the countries. Because if you look at the work plan for Year 1, Year 2—it's as if you just hit the ground implementing. But the set-up of this kind of project should have been a year. I think the first year should be dedicated to discussion, developing these protocols, and things like that, and then we implement." – NGO employee from CT6 country

"But the devil (is) always in the details. As we've realized, and I see this in many other areas—gender, public partnerships… The *hows* of the making things work were inefficiently articulated and needed to be really worked through … But … somebody really needed to have thought a little bit more comprehensively on what each partner would bring to the table, how they would work together, what the anticipated outcomes would be." – NGO employee from non CT6 country

Specific management activities are the means by which programs like the USCTI potentially affect social-ecological change. MPAs have historically been a favored management tool in the region (e.g., TNC et al. 2008; Green et al. 2011). The USCTI led the establishment of a region-wide MPA system, CTMPAS (CTI-CFF 2013). A high percentage of sampled project sites have MPAs that were established prior and through the USCTI program (Figure 8). Respondents were asked whether there was an MPA in their community. More resource users from project communities (n=222) report the presence of local MPAs than control communities (n=179, p<0.050, chi-sq).
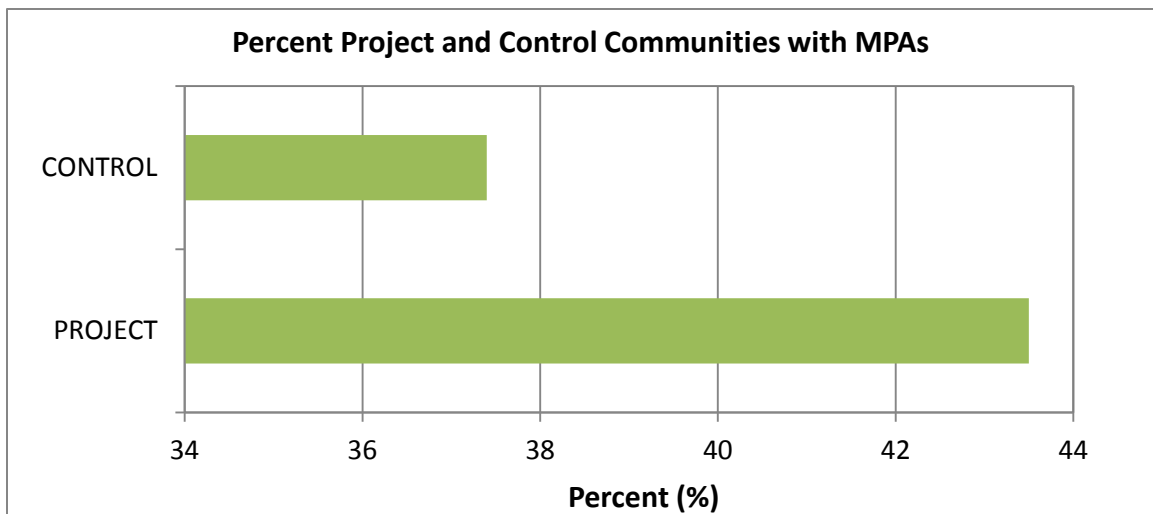
Figure 8. Frequency of MPAs in communities (n=401 Resource Users).

MPAs are common but not generally well enforced in the region according to national informants (Figure 9). National informants were asked to describe the level of MPA enforcement in their country using a five-point scaled question, such as (1) never happens, (2) almost never happens, (3) sometimes happens, (4) usually happens, and (5) always happens. There are significant differences between countries (H(5)=19.597, p=0.001, n=145). Philippine responses were significantly higher (indicating higher occurrence of enforcement) than those from Indonesia (U=357.0, p=0.036), Solomon Islands (U=280.0, p<0.001), Timor-Leste (U=296.0, p=0.044), and Papua New Guinea (U=180.0, p=0.001). Malaysia responses were also significantly higher than those from Solomon Islands (U=123.5, p=0.009) and Papua New Guinea (U=78.5, p=0.016).

Occurrence of Marine Protected Area Enforcement

Never
4%

Almost Never
5%

Always
14%

Almost Always
32%

Sometimes
45%
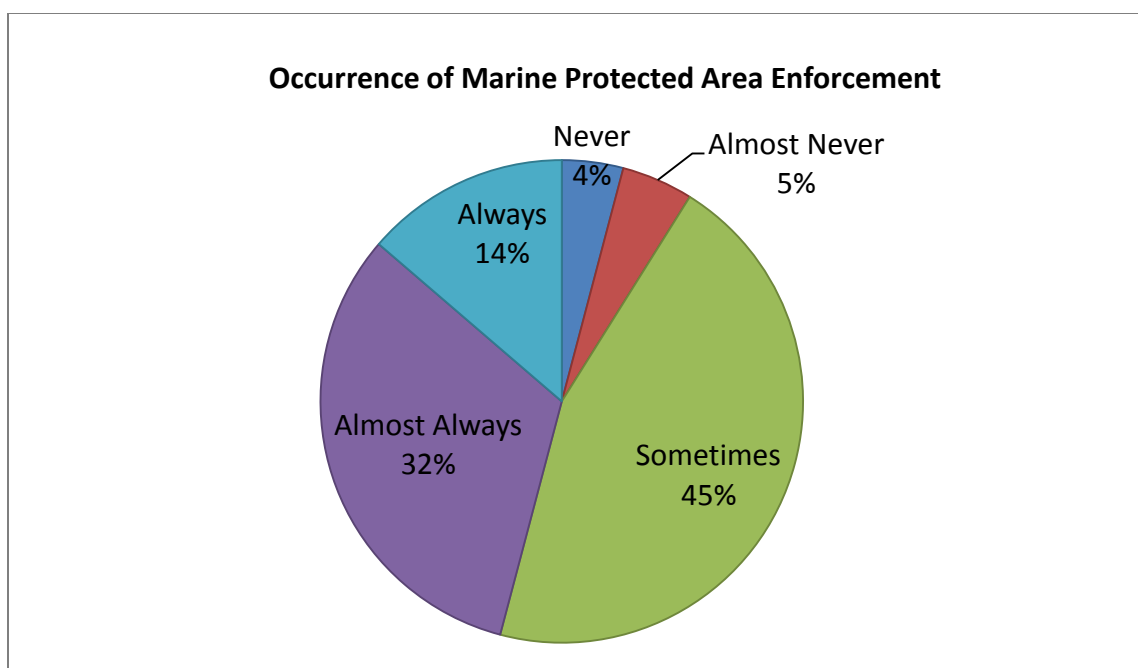
Figure 9. MPA enforcement effectiveness (n=145 National informants).

While enforcement is inconsistent, national informants report dramatic improvements in the last five years—a likely indication that the CTI-CFF and the USCTI is having a positive impact (Figure 10). Differences between countries were significant ($\chi2=14.636$, df=5, p=0.012, N=135). A binary (yes/no) question was used to determine whether respondents believed MPA enforcement improved. These MPA results indicate progress toward the USCTI Intermediate Results under R3 (MPA management improved in CT countries) in the Results Framework (Figure 3). Improved MPA enforcement relates to both IR3.2 (MPA management capacity increased) and IR3.3 (MPA effectiveness improved in priority geographies).

Improvements to Marine Protected Area Enforcement Over the Past Five Years

No
15%

Yes
85%
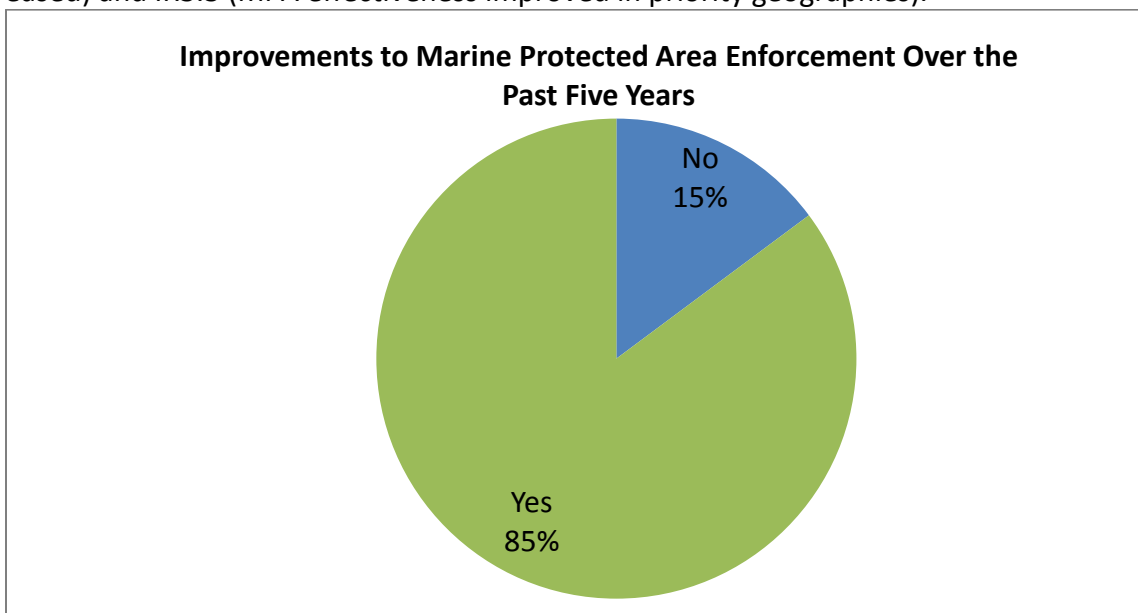
Figure 10. MPA enforcement improvement (n=135 national informants).

A primary goal of the USCTI was to raise awareness about EAFM policies (R2 in the Results Framework – EAFM improved in CT countries). National and regional respondents were asked whether the CTI-CFF increased their understanding of ecosystem approaches to fisheries using a binary yes/no question. The USCTI mid-term evaluation found that this goal had not yet been met (USCTI 2010); however, LP results demonstrate that the USCTI has made significant progress toward this goal with national and regional informants (Figure 11). Differences between countries were not significant ($\chi2=2.382$, df=5, p>0.05).

CTI Influence on Increasing the Understanding of Ecosystem Approach to Fisheries Management

No
6%

Yes
94%
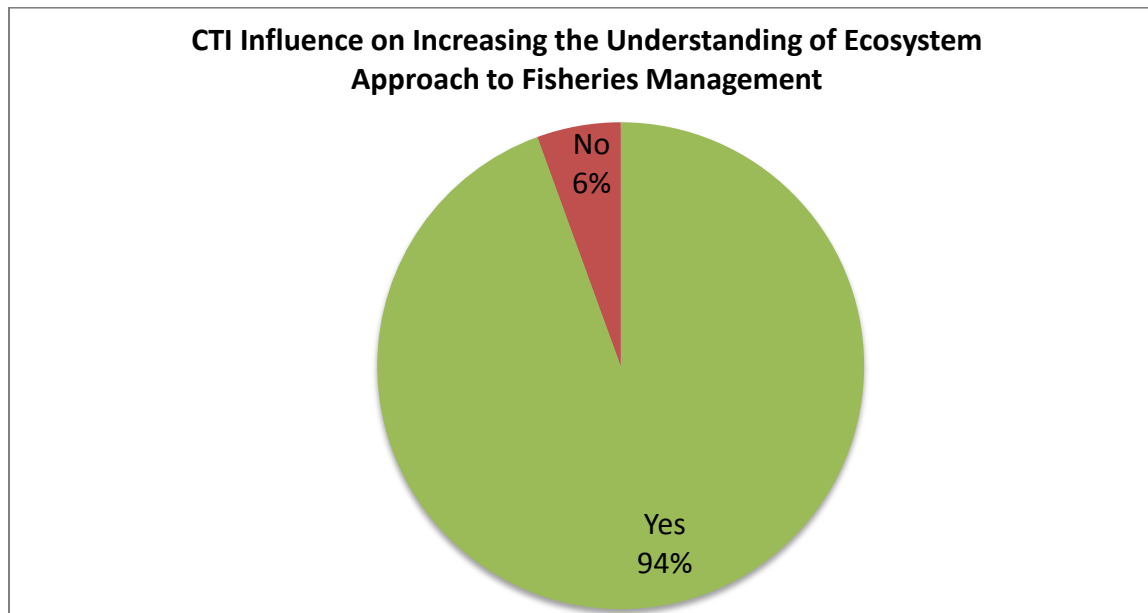
Figure 11. Understanding of EAFM (n=36 Regional and National Informants).

In addition to increased EAFM awareness by policy makers, resource users in project sites reported a significant decline in illegal and destructive fishing methods over the last five years (Figure 11). Respondents were asked, using a yes/no question to indicate whether violations associated with blast, cyanide, commercial trawl, small mesh net and hookah fishing occurred in their area today versus five years ago. An overall mean value for all fishing types was calculated for "today" and "five years ago." The difference between means was then calculated by subtracting the "today" mean from the "five years ago" mean value. Project resource users (n=1,346) perceived a statistically significant decrease in total violations in contrast to control resource users (n=647) (p<0.050, t test). The negative response in Figure 12 indicates a decline in violations associated with the above mentioned high impact fishing practices over the past five years. Violations were based on summing the dichotomous variables for presence of illegal and destructive fishing methods. The range of violations was from "0" to "5" for each time period. The index was calculated by subtracting the past mean value from the current mean value.
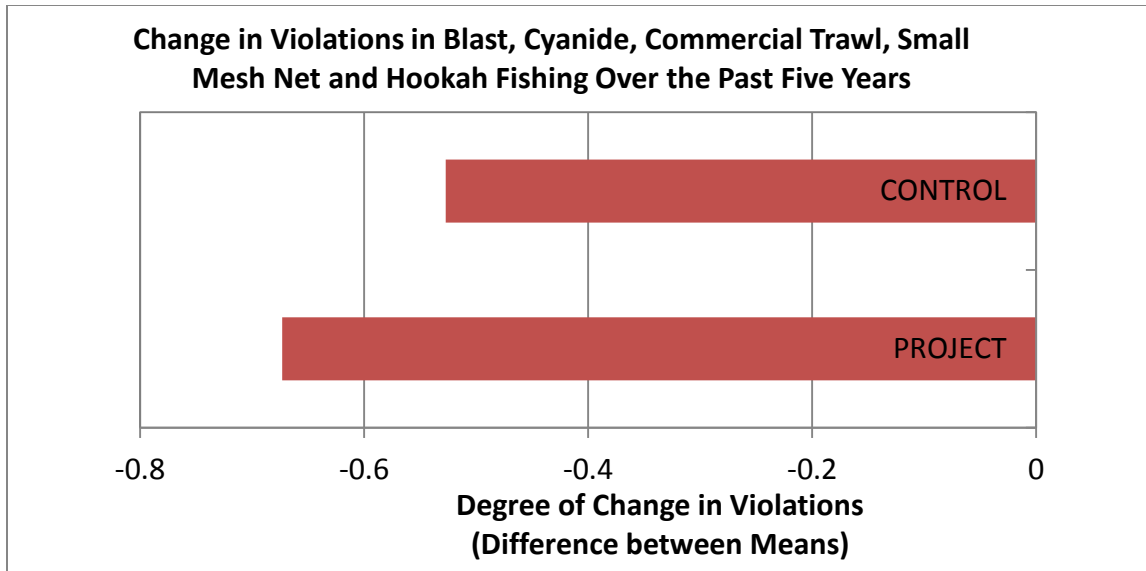
Figure 12. Index of illegal and destructive fishing methods.

The USCTI hosted a variety of training events in project sites, particularly related to MPAs, EAFM and CCA. Respondents were asked whether they received training related to MPAs, EAFM, and climate change using a yes/no question. Training participation rates of community leaders in project (n=234) and control (n=45) sites were not significantly different from one another when analyzed by training type (p>0.050, chi sq. test) (Figure 13).
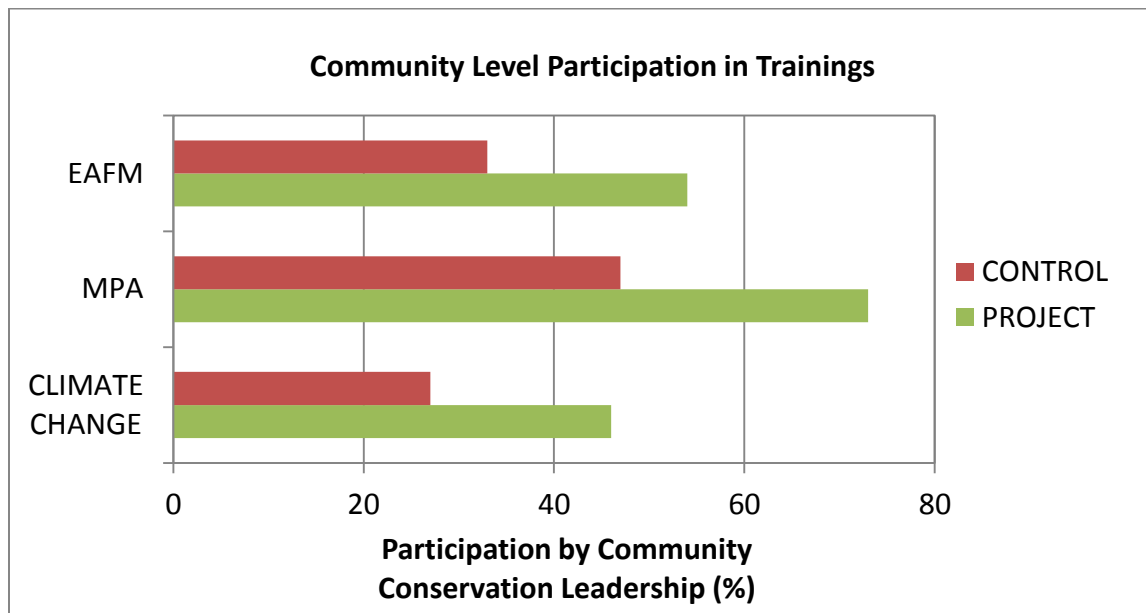
Figure 13. Community leader participation in trainings by subject (n=93. Community Leaders).

When responses were pooled across training types, community leaders (n=78) in the project sites participated in a statistically greater number of trainings (total number of MPA, CCA, and EAFM trainings) than community leaders in control sites (n=15) (p<0.050, t-test) (Figure 14).
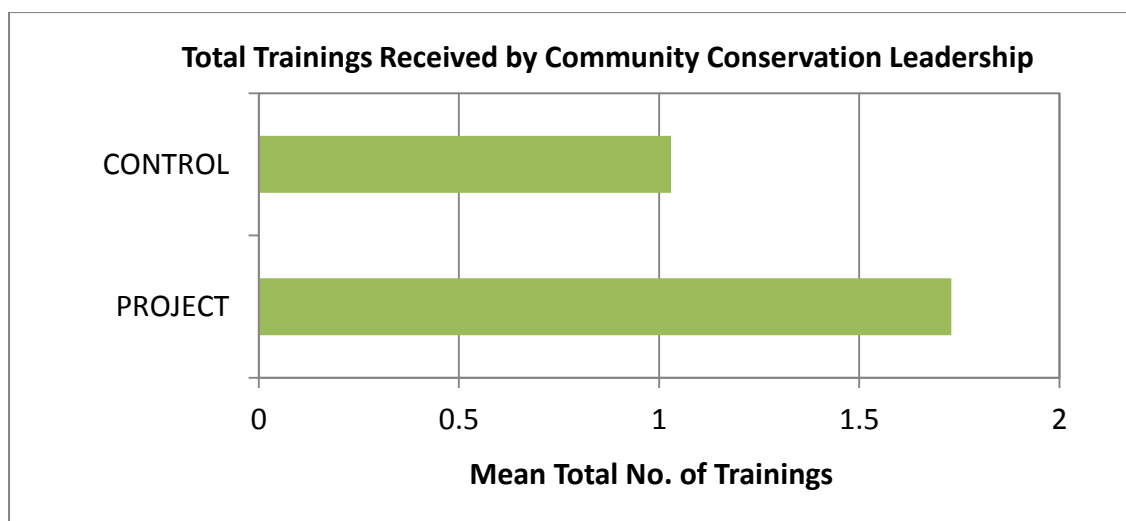
Figure 14. Community leader participation in trainings (n=93 community leaders).

The development of guidebooks and policy documents (e.g., the Regional Early Action Plan and Local Early Action plan guidebooks for CCA, the MPA Monitoring and Evaluation Tool; the EAFM guidebook) was a major USCTI undertaking. According to national informants (n = 144), the application of these materials is at an early stage (Figure 15). This was evaluated by asking respondents how often they used the technical toolkits developed by the USCTI using a five-point scale, where (1) never used, (2) rarely used, (3) sometimes used, (4) regularly used, and (5) frequently used. Significant difference between respondents were detected at the country level (H(5)=14.566, p=0.012). Respondents from the Philippines perceived the toolkits had significantly greater application than respondents from Solomon Islands (p=0.004, U=324.0), Timor-Leste (p=0.023, U=240.5), and Malaysia (p=0.008, U=187.0).
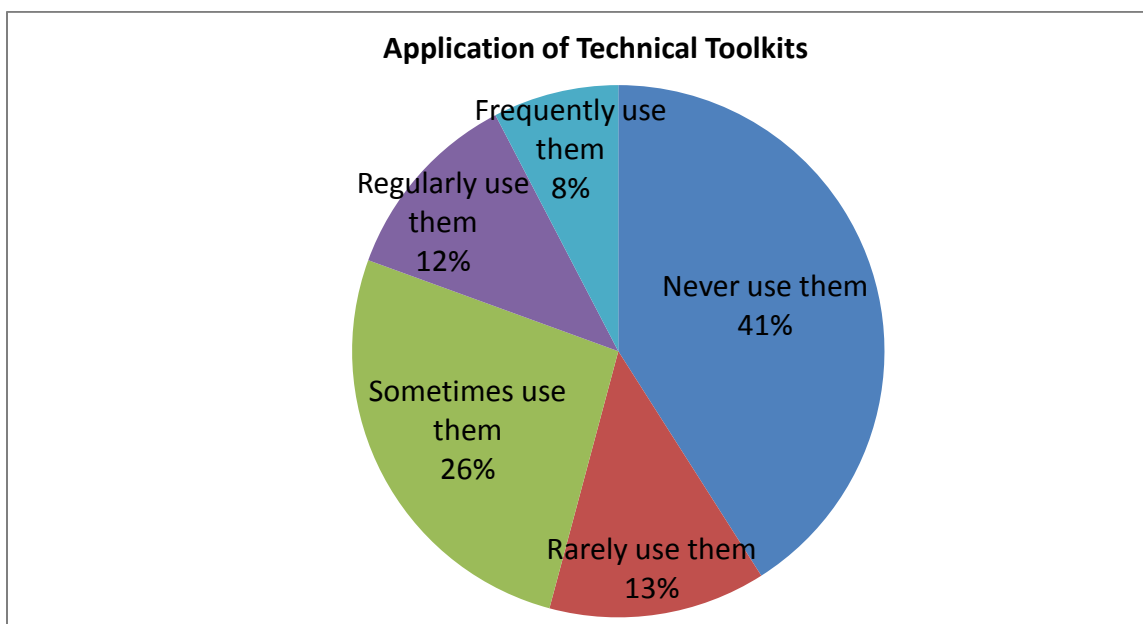
Figure 15. Application of USCTI guidebooks (n=144 National Informants).

Preserving or improving the biodiversity of the Coral Triangle by implementing MPAs and other marine management initiatives, providing information and concerning rationale and methods for EAFM, and sensitizing resource managers and users to the need for climate change planning in coastal areas were all laudable goals of the USCTI. In the end, however, achieving these goals depends upon the behavior of coastal resource users, whose behavior depends on their understanding of the coastal ecosystems involved. None of the countries involved in the USCTI have the resources to provide the surveillance and enforcement necessary to achieve these goals without the cooperation of the often widely spread and sometimes remote coastal populations using these important natural resources. Towards this end, this portion of the report focuses five questions. The sample used to answer these questions is composed of 2073 resource users. Villages are randomly selected within project and control municipalities. Resource users are randomly selected within villages. The distribution of the sample can be seen in Table 1.

Table 1. Political Structure of the Sample by Country					
	Project Municipalities/ Villages	N	Control Municipalities/ Villages	N	Total N
Philippines	7/20	573	6/10	326	899
Indonesia	2/20	629	3/10	305	934
Solomon Islands	1/2	79			79
Timor-Leste	1/3	103	2/2	58	161

Learning Question I: The project conducted trainings at government levels above the local community—at the national and municipal levels. Since it is the resource users who are expected to change behaviors in such a manner that the conservation goals of the USCTI trainings will have impact on the natural resources, the learning question in this section is:

What factors are related to village resource users participation in trainings involving marine protected areas, the ecosystem approach to fishery management and climate change?

Measurement Indicator: Participation in training is evaluated using a simple indicator composed of the summation of responses to three straight forward questions asking whether the resource user had participated in a) MPA training, b) fisheries management training, and c) climate change training. "Yes" responses were coded as "1" and "no" as zero. The coded values were summed resulting in a Total Trainings Indicator.

Analysis: Values on the training indicator range from zero to "3" and the distribution is strongly skewed to the right. The median and mode are zero and the arithmetic mean is 0.19 (N = 2065). This indicates a very small amount of training on these topics being conducted at the village level. Differences between project and control villages are statistically significant (means 0.20 and 0.17 respectively, U = 486,138.5, p = 0.039 (one-tailed test). Differences between communities are also statistically significant (Kruskal-Wallis H = 91.644, p<0.001).

Clearly the Solomon Islands had the highest score, but they also have no control villages sampled.

Further analyses will only be conducted using the countries with both control and project sites (Indonesia, Philippines, and Timor-Leste). Differences between project and control sites are statistically significant in the three countries (Table 2). They are in the expected direction (project higher than control) in all except the Philippines.

Table 2. Mean Values on Total Trainings Indicator by Country for Project and Control Villages

	Project	Control	U-value	N (project/control)	P
Philippines	0.164	0.259	87,358	572/324	0.015
Timor-Leste	0.560	0.143	3,597	100/56	<0.001
Indonesia	0.130	0.075	100,305	629/305	0.027

Values on the total training scale by country, by gender are noted in Table 3. Table 3 indicates that there are statistically significant differences between males and females with regard to total number of trainings attended in both the Philippines and Timor-Leste, with more males than females attending trainings in both countries.

Table 3. Mean Values on Total Trainings Indicator by Country, by Gender

	Male	Female	U-value	N (project/ control)	P
Philippines	0.229	0.157	100,641	528/362	0.022
Timor-Leste	0.453	0.344	3,326	95/61	0.027*
Indonesia	0.121	0.058	50,960	813/120	0.122

*1- tail test

Correlations between the total trainings indicator and age and education are found in Table 4. In both Timor-Leste and the Philippines, more highly educated people tend to become involved in more trainings. Age is negatively correlated with number of trainings in Timor-Leste, indicating that older people are less likely to become involved in training programs.

Table 4. Correlations (Spearman's r) between Total Trainings and Selected Variables

	Philippines	Indonesia	Timor-Leste
Age	0.056	-0.001	-0.185*
Education	0.152**	0.014	0.224**

*$p<0.050$ **$p<0.01$

Learning Question II: The project conducted trainings related to climate change, MPAs, and EABM. These trainings, exposure to MPAs and other project activities, as well as age, education

and gender (Rogers 1995) should have an impact on conservation beliefs of resource users in the USCTI project municipalities. The learning question in this section is:

What impact has the USCTI had on conservation beliefs?

Measurement Indicator: As a means of evaluating this impact on beliefs, a scale composed of nine items was used (Box 1). Resource users were read each item and asked if they agree strongly, agree, neither, disagree, or disagree strongly; hence a scale ranging from one to five. If the statement was not a conservation oriented belief (indicated with an asterisk in Box 1), "agree strongly" was given a score of "1" and disagree strongly a score of "5" (e.g., item 2 in the scale). If the item reflected a correct conservation belief, "disagree strongly" was given a score of 1 and agree strongly a score of 5. Scores on items in the scale were summed, resulting in the Conservation Beliefs Scale. The scale has a theoretical range of from nine to 45. The actual range is from 16 to 45 with median of 33, mode 33 and mean equal to 33.6, and the data were normally distributed (Figure 16).

> **Box 1. Conservation Belief Scale**
> *1. We have to take care of the land and the sea or it will not provide for us in the future.*
> *2. Fishing would be better if we cleared the coral where the fish hide from us.**
> *3. If our community works together we will be able to protect our resources.*
> *4. Farming in the village can have an effect on the fish.**
> *5. If we throw our garbage on the beach, the ocean takes it away and it causes no harm.**
> *6. We do not have to worry about the air and the sea, God will take care of it for us.**
> *7. Unless mangroves are protected we will not have any small fish to catch.*
> *8. There are so many fish in the ocean that no matter how many we catch, there will always be enough for our needs.**
> *9. Human activities do not influence the number of fish in the ocean.**
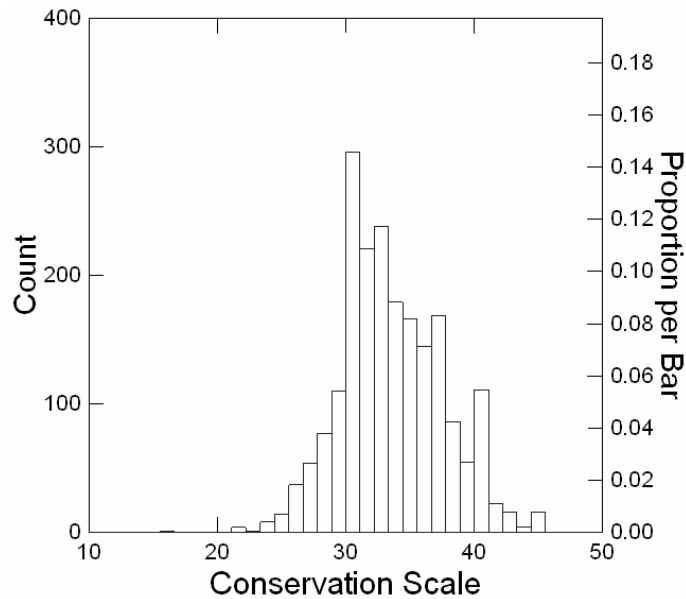
Figure 16. Distribution of Conservation Beliefs Scale.

Analysis: As a first step in the analysis, mean values for project and control sites are compared (mean=33.5 and 33.8 respectively; t=1.567, df=2028, p=0.117; pooled variance). The results indicate no statistically significant difference between project and control villages. The villages are found in four countries (Indonesia, Philippines, Solomon Islands, and Timor-Leste), which manifest varying contexts—human, natural and project.

Mean values on the conservation beliefs scale for project and control sites in the Philippines, Indonesia and Timor-Leste are found in Table 5. Table 5 indicates that mean values are higher in the project sites in the Philippines. In Indonesia and Timor-Leste Conservation Beliefs scores are higher in the control than the project villages—the opposite of what we expected.

Table 5. Mean Values on Conservation Belief Scale by Country for Project and Control Villages

	Project	Control	t-value	df	P
Philippines	35.0	34.2	2.716	857.000	0.007
Timor-Leste	33.5	36.1	4.110	143.405	<0.001*
Indonesia	32.1	32.9	3.391	715.098	0.001*

*separate variance

Correlations (Pearson's r) between the Conservation Beliefs Scale and selected variables are found in Table 6. Table 6 indicates statistically significant correlations between the conservation beliefs scale and the total trainings and total exposure scales in the Philippines. In Indonesia, we find significant correlations between the Conservation Beliefs Scale and Years Education and Total Trainings.

Table 6. Correlations (Pearson's r) between Conservation

Belief Scale and Selected Variables			
	Philippines	Indonesia	Timor-Leste
Age	0.001	-0.003	0.055
Education	-0.053	0.071*	0.026
Total Trainings	0.122**	-0.118**	-0.060
Total Exposure	0.133**	0.020	-0.039

*p<0.050 **p<0.001

Table 7 indicates that males score higher than females on the Conservation Beliefs Scale in Indonesia and that the presence of an MPA is associated with lower scores on the Conservation Beliefs Scale in both the Philippines and Timor-Leste.

Table 7. Mean Values on Conservation Belief Scale by Country by Gender and Presence of MPA

	Male	Female	t-value	df	P
Philippines	34.67	34.69	0.052	851	0.959
Timor-Leste	34.82	33.88	1.355	158	0.177
Indonesia	32.53	31.56	2.773	929	0.006
	MPA Present	**MPA Absent**	**t-value**	**df**	**P**
Philippines	34.30	35.00	2.138	768	0.033
Timor-Leste	33.46	36.21	4.182*	128.573	<0.001
Indonesia	32.70	32.34	1.458*	833.000	0.145

*Separate variance

Results clearly indicate that scores on the Conservation Beliefs Scale are lower in Indonesia, suggesting that the project had minimal impact on these beliefs. This interpretation is supported by the fact that Indonesian control sites scored higher than projects sites. The same holds true for Timor-Leste. The project seems to have had greater impact in the Philippines, although control sites also score relatively high. The findings for the Philippines are supported by the fact that Total Trainings and Total Exposure are statistically significantly positively correlated with the Conservation Beliefs Scale.

Unexpectedly, participation in project training seems to have had a negative effect on Conservation Beliefs Scale scores in Indonesia. This suggests that the trainings need to be restructured for Indonesia. Interestingly, males score higher than females in Indonesia suggesting that gender has an influence on these beliefs, and that females should be more involved in the restructured training. Finally, the presence of an MPA has had a positive effect on Conservation Belief Scale scores in both the Philippines and East Timor, indicating that MPAs have a function beyond that of protecting the resource—they also seem to function as an educational device.

Learning Question III: The project conducted trainings related to climate change, MPAs, and EABM. These trainings, exposure to MPAs and other project activities, as well as age, education and gender (Rogers 1995) should have an impact on resource users᾽ perceptions of how coral reefs and mangroves benefit their villages. Resource users in project villages are expected to have a greater knowledge of these benefits than those in no-project villages

Measurement Indicator: As a means of determining resource user᾽s perceptions of how coral reefs and mangroves benefit their villages, they were asked the two open ended questions in Box 2. If the respondent mentioned one of the categories listed under the question, it was circled. If they mentioned other categories of use, they were also recorded, but not analyzed in this report.

To obtain measure of resource users perceptions of how coral reefs and mangroves benefit their villages, if an item was mentioned in response to the question, it received a code of "1"; if not, it received a code of zero. The values were summed for each question resulting in two indicators: Coral Reef Value (range 0 to 5, mean 1.5, median 1, mode 1, N= 1996) and Mangrove (range 0 to 6, mean 1.17, median 1, mode 0, N= 2003). These two indicators were further summed to obtain an overall measure of perceived benefits of both coral reefs and mangroves: Coral and Mangrove Value, range "0" to "11", mean 2.67, median 2, mode 2, N = 1994). Finally responses that indicated knowledge of the ecological significance of the two resource types (responses marked with an asterisk in Box 1) were summed to provide a measure of Coral and Mangrove Eco-Value (range 0 to 6, mean 2.01, median 2, mode 1, N=1996). These latter two indicators were skewed to the right, so as a means of enabling more powerful analyses they were log-10 transformed and are referred to as Coral and Mangrove Value and Log Coral and Mangrove Eco-Value.

Box 2. Survey questions used to determine perceived values of coral reefs and mangroves.

What value do coral reefs have for you and your community?
a)   Fish nurseries/ supporting fisheries*
b)   Building material
c)   Protection from waves*
d)   Tourism
e)   Natural habitat*
What value do mangroves have for you and your community?
a)   Fish nurseries/ supporting fisheries*
b)   Firewood
c)   Building material
d)   Protection from flooding and other natural disaster*
e)   Tourism
f)   Natural habitat*

Analysis: A comparison of the Coral Reef Value and Mangrove Value indicators across project and control sites is found in Table 8. Table 8 indicates no statistically significant differences.

Table 8. Mean Values on Coral Reef Value and Mangrove Value Indicators for Project and Control Villages

	Project	Control	U-value	N	P
Coral Reef	1.51	1.48	428,668	1996	>0.050
Mangrove	1.20	1.10	439,085	2003	>0.050

As a next step in the analysis, mean values for project and control sites are compared for the two log transformed summary indicators (Table 9).   The results indicate no statistically significant difference between project and control villages for Log Coral Reef and Mangrove Value but a statistically significant difference for the Log Coral and Mangrove Eco-Value. Control villages score higher than project villages.

Table 9. Mean Values on Summary Coral Reef Value and Mangrove Value Indicators for Project and Control Villages

	Project	Control	t-value*	df	p
Log Coral Reef and Mangrove Value	0.508	0.502	0.547	1,305.672	>0.050
Log Coral Reef and Mangrove Eco-Value	0.406	0.457	4.903	1,386.661	<0.001

*separate variance

The villages are found in four countries (Indonesia, Philippines, Solomon Islands, and Timor-Leste), which manifest varying contexts—human, natural and project. Cross country comparisons (Figures 17 and 18) finds statistically significant variance between the countries with regard to both the Log Coral Reef and Mangrove Value and the Log Coral and Mangrove Eco-Value indicators (F=310.434, df=3 1990, p<0.001 and F=270.386, df=3 1992, p<0.001, respectively). These findings indicate that project impacts should be examined within country. Since only Indonesia, Timor-Leste and the Philippines have control sites, this analysis will include only those three countries.
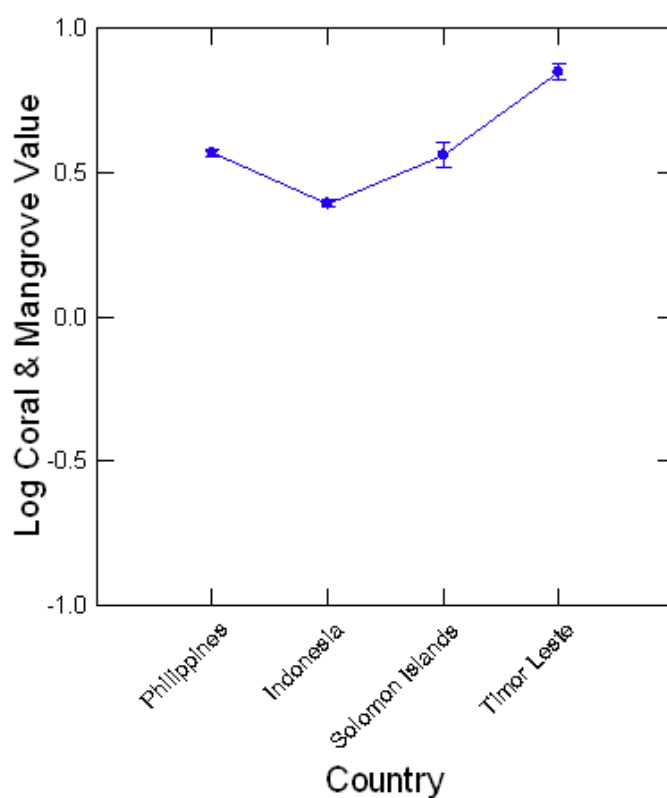
Figure 17. Cross-country comparison of Log Mean Coral and Mangrove Value.
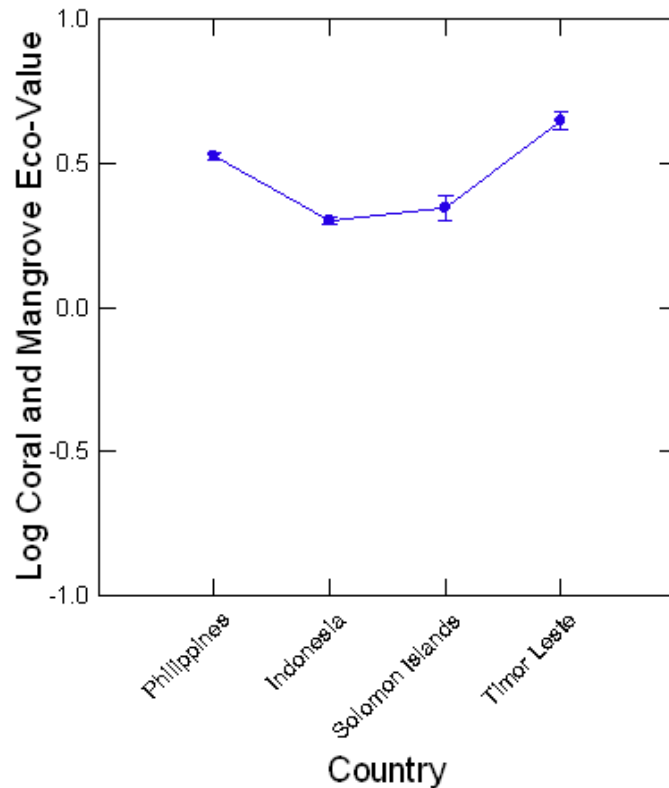
Figure 18. Cross-country comparison of Log Mean Coral and Mangrove Eco-value.

Table 10 indicates that all three countries manifest statistically significant differences with regard to the Log Coral and Mangrove Value summary scale. In the Philippines and Timor-Leste, the differences are in the expected direction with the project villages scoring higher (indicating a higher regard for coral reefs and mangroves) than the controls. In Indonesia, the control villages score significantly higher than the project villages.

Table 10. Mean Values by Country on Summary Indicators for Project and Control Villages

	Log Coral and Mangrove Value				
	Project	**Control**	**t-value**	**df**	**P**
Philippines	0.584	0.529	3.859	823.000	<0.001
Timor-Leste	0.875	0.792	3.563	156.000	<0.001
Indonesia	0.373	0.426	3.949	663.472	< 0.001*
	Log Coral and Mangrove Eco-Value				
	Project	**Control**	**t-value**	**df**	**P**
Philippines	0.531	0.507	1.637	824.000	>0.050
Timor-Leste	0.646	0.646	0.002	157.000	>0.050
Indonesia	0.261	0.380	8.912	930.000	<0.001

*separate variance

With regard to the Log Coral and Mangrove Eco-Value indicator, the differences between project and control villages are not significantly different in the Philippines and Timor-Leste, while in Indonesia, the control villages, once again, score higher (indicating a higher regard for coral reefs and mangroves) than the project villages.

Table 11 indicates that males score higher (indicating a higher regard for coral reefs and mangroves) than females on the Log Coral and Mangrove Value summary scale in all three countries. Likewise, the presence of an MPA is associated with higher scores on Log Coral and Mangrove Value summary scale in all three countries.

Table 11. Mean Values by Country on Log Coral and Mangrove Value for Project and Control Villages by Gender and Presence of MPA

	Male	Female	t-value	df	P
Philippines	0.582	0.542	2.869	628.686	<0.001*
Timor-Leste	0.872	0.808	2.564	96.094	<0.050*
Indonesia	0.403	0.304	4.323	143.318	<0.001*
	No MPA	**MPA**	**t-value**	**df**	**P**
Philippines	0.550	0.599	3.742	666.313	<0.001*
Timor-Leste	0.792	0.876	3.462	149.000	<0.005
Indonesia	0.342	0.464	9.288	834.000	<0.001

*Separate variance

Table 12 examines the effects of gender and presence of an MPA in the village on the Mangrove Eco-Value indicator. Once again, males score higher than females (indicating a higher regard for coral reefs and mangroves) in all three countries and the presence of an MPA has a positive impact on scores in the Philippines and Indonesia. Presence of an MPA does not seem to have any effect on the Eco-Value score in Timor-Leste, where MPA implementation is relatively recent in comparison to other countries.

Table 12. Mean Values by Country on Log Coral and Mangrove Value for Project and Control Villages by Gender and Presence of MPA

	Male	Female	t-value	df	P
Philippines	0.545	0.490	3.722	608.680	<0.001*
Timor-Leste	0.678	0.599	2.906	110.478	<0.005*
Indonesia	0.311	0.221	4.652	929.000	<0.001
	No MPA	**MPA**	**t-value**	**df**	**P**
Philippines	0.503	0.567	4.745	664.582	<0.001*
Timor-Leste	0.635	0.647	0.437	150.000	>0.050
Indonesia	0.283	0.337	3.988	834.000	<0.001*

*Separate variance

Table 13 presents correlations between the summary resource values indicators and selected variables such as age, education, participation in training programs and exposure to training and other project activities. Age is statistically significantly correlated with the Log Coral and Mangrove Value indicator only in the Philippines. As age increases so does the score on this scale, albeit weakly, so that the older the person, the great the perceived value of coral reefs and mangroves. Education is positively correlated with both of the indicators in Indonesia and the Philippines and with only the Eco-Value indicator in Timor-Leste. Finally, number of trainings attended is statistically significantly correlated with the Log Coral and Mangrove Value indicator only in Indonesia, while exposure to trainings and other project information activities is positively related to at least one of the indicators in all three countries. While Log Coral and Mangrove Value scores were low in Indonesia, trainings and MPA establishment improve these values.

Table 13. Correlations (Pearson's r) Between Selected Variables and the Summary Coral Reef Value and Mangrove Value Indicators.

	Philippines		Timor-Leste		Indonesia	
	Log Coral Mangrove Value	**Log Coral Mangrove Eco-Value**	**Log Coral Mangrove Value**	**Log Coral Mangrove Eco-Value**	**Log Coral Mangrove Value**	**Log Coral Mangrove Eco-Value**
Age	0.094**	0.057	-0.054	-0.028	-0.040	-0.023
Education	0.092**	0.074*	0.047	0.175*	0.194***	0.158***
Trainings	0.029	0.046	0.151	0.005	0.094**	0.055
Exposure	0.104**	0.121**	0.205*	0.006	0.169***	0.102**

*<0.050 **<0.010 ***<0.001

Learning Question IV: The project conducted trainings and information sessions directed at sensitizing residents to the need for fishing regulations and their surveillance and enforcement. All this should, if effective, reduce the amount of violations. The research question is:

Have project efforts sensitizing residents to the need for fishing regulations and their surveillance and enforcement resulted in decreasing the types of violations over time?

Measurement Indicator: Respondents were told they were going to be asked about illegal fishing in the local area. Respondents were then read a checklist of five types of illegal fishing: 1) dynamite/blast, 2) Cyanide/poison, 3) commercial trawling, 4) small mesh net, and 5) hookah/compressed air, and asked whether or not each type was practiced in village waters five years ago and at the present time. "Yes" responses were coded "1" and "no", zero. The values for the past and present were summed separately resulting in a value that could range from zero to five for each time period. To construct a measure representing "change", the past value was subtracted from the present. If there were more violations in the past, the change would be a negative value and vice-versa; hence, a high negative value indicates a drop in the number of illegal fishing types in the past five years.

Analysis: Values on the Violation Change indicator range from -5 to 3, with an arithmetic mean of -0.626 and a mode and median of 0 (N=1993) with slight left skewing. An analysis of difference in means for individuals in project and control villages indicates that the difference is statistically significant (means -0.673 and -0.527 respectively, t=3.095, df=1991, p=0.002), with the project villagers reporting a slightly larger decrease in the number of violation types. The villages are found in four countries, which manifest varying contexts—human, natural and project. There are also statistically significant between country differences (Figure 19, F-Ratio 5.507, df 3 1989, p=0.001). These findings indicate that project impacts should be examined within country. Since only Indonesia, Timor-Leste and the Philippines have control sites, this analysis will include only those three countries.
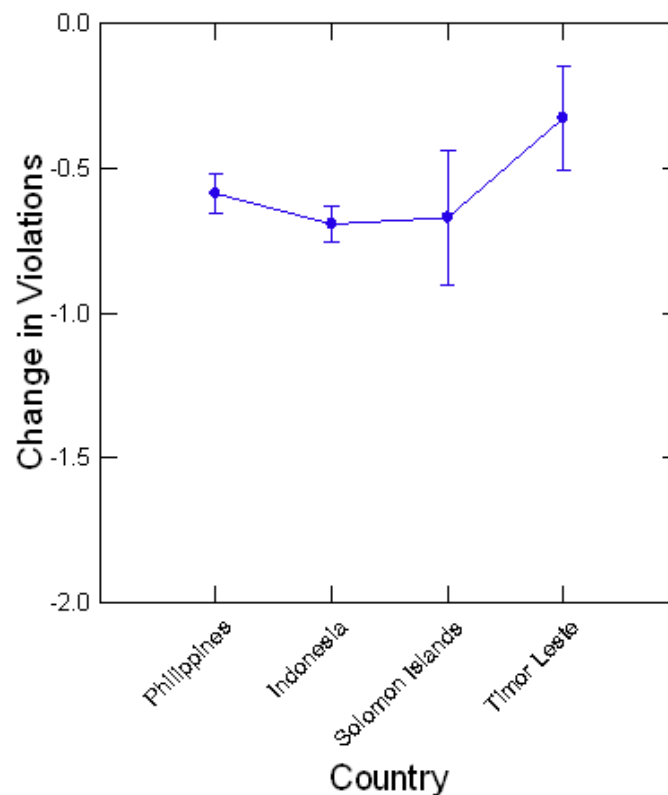
Figure 19. Cross country differences in mean total violation change values.

Turning to analyses by country, Table 14 examines the influence of the project, gender and the presence of an MPA on scores on the Violation Change Indicator. Project villages manifest a greater degree of decrease in the number of violation types than control villages in Timor-Leste and Indonesia. There is no difference between the project and control villages in the Philippines (where there is a long history of coastal and fisheries management projects throughout the country). Gender impacts reporting of violation types only in Indonesia, and villages with an MPA in all three countries manifest a greater degree of decrease in the number of violation types than villages without an MPA.

Table 14. Mean Values by Country on the Violation Change Indicator by Village Type, Gender and Presence of MPA

	Project	Control	t-value	df	p
Philippines	-0.594	-0.580	0.198	873.000	>0.050
Timor-Leste	-0.387	-0.087	3.344	80.442	<0.010*
Indonesia	-0.786	-0.505	4.177	701.111	<0.001*
	Male	**Female**	**t-value**	**df**	**P**
Philippines	-0.545	-0.651	1.558	867.000	>0.050
Timor-Leste	-0.268	-0.422	1.254	71.258	>0.050*
Indonesia	-0.721	-0.517	2.360	176.195	<0.050*
	No MPA	**MPA**	**t-value**	**df**	**P**
Philippines	-0.561	-0.721	2.008	449.690	<0.050*
Timor-Leste	-0.091	-0.391	3.265	74.402	<0.010*
Indonesia	-0.515	-0.932	5.797	747.297	<0.001*

*Separate variance

Table 15 includes correlations (Pearson's r) between the Violation Change indicator and variables such as age, education, training number and exposure to training and other project activities. Table 15 indicates that older resource users in Timor-Leste tend to report smaller decreases in the number of violation types than younger resource users. Finally, number of trainings and exposure to project information tends to result in resource users in Indonesia reporting larger decreases in the number of violation types.

Table 15. Correlations (Pearson's r) Between the Violation Change Indicator and Selected Variables.

	Philippines	Timor-Leste	Indonesia
Age	0.001	0.199*	0.009
Education	-0.016	-0.143	-0.042
Trainings	-0.022	0.102	-0.079*
Exposure	-0.010	0.117	-0.102**

*<0.050 **<0.010

Learning Question V: The project conducted trainings related to MPAs and encouraged local governments to implement MPAs in their villages. These efforts resulted in the development of new and or improvement of pre-existing MPAs. It is expected that existence of MPAs will improve coral reef conditions and increase fish populations near the sanctuary. Resource users are very sensitive to these types of changes, and it is expected that they will report more positive changes in project villages than in controls. Other variables found to be associated with MPA success (e.g., community participation and support, training, exposure to information) are also examined.

Measurement Indicator: As a means of determining resource user's perceptions of changes in fish abundance and coral reefs, they were asked the two questions in Box 3. The responses were summed to produce a Change in Coral and Fish Indicator. Values on the indicator ranged from "2" to "10", with an arithmetic mean of 6.64, a median of 7 and a mode of 8 (N=711).

Box 3. Change in Coral and Fish indicator.

In the last five years, has fish abundance near the sanctuary: 1) gotten much worse, 2) a little worse 3) not changed 4) improved a little 5) improved a lot?

In the last five years, have coral reef conditions 1) gotten much worse, 2) a little worse, 3) not changed, 4) improved a little 5) improved a lot?

Analysis: An examination of mean values on the Change in Coral and Fish Indicator indicated that the project sites manifest a higher score than the controls (means = 6.883 and 6.079, respectively; t = 5.337, df = 709, p<0.001). The villages are found in four countries, which manifest varying contexts—human, natural and project. Cross country comparisons (Figure 20) finds statistically significant differences between the countries with regard to the Change in Coral and Fish Indicator (F Ratio = 44.154, df = 3 707, p<0.001). These findings indicate that project impacts should be examined within country. Since only Indonesia, Timor-Leste and the Philippines have control sites this analysis will include only those three countries.
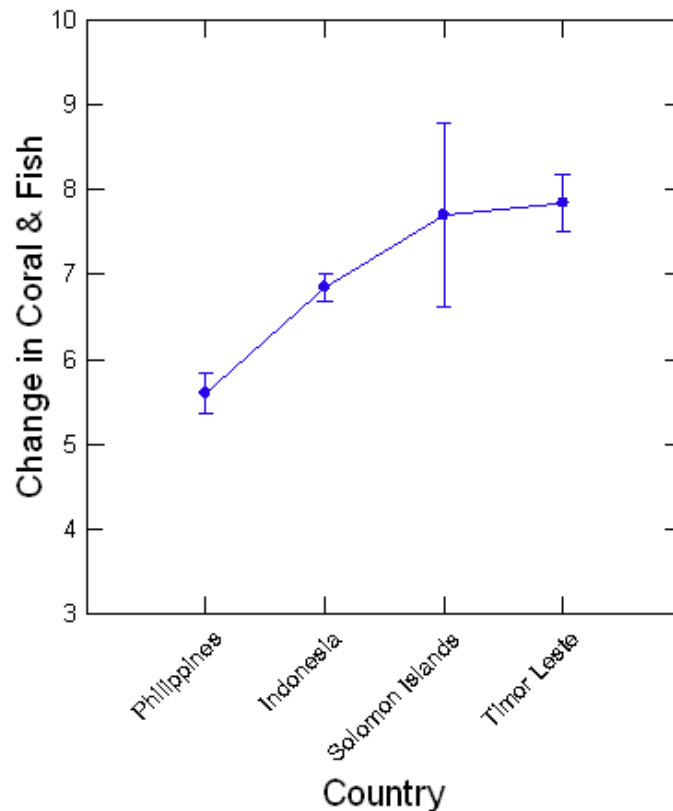
Figure 20. Cross-country comparison of the mean change in Coral and Fish indicator.

Mean values for project and control villages by country indicate that while Indonesian project villages score statistically significantly higher on the Change in Coral and Fish Indicator, there is no difference in the Philippines (Table 16). In Timor-Leste, the control villages had no MPAs for comparison. Turning to impact of community consultation on Change in Coral and Fish Indicator scores, we find that in the Philippines, such consultation had a statisticall significant effect, with consulted communities scoring higher on the indicator.

Table 16. Mean Values by Country on the Change in Coral and Fish Indicator by Village Type and Community Consulted

	Project	Control	t-value	df	p
Philippines	5.472	5.740	-1.040	198.191	0.299*
Timor-Leste	*No MPAs in*	*Control sites*			
Indonesia	7.043	6.374	3.305	392.000	0.001
	Community Consulted	**Community Not Consulted**	**t-value**	**df**	**P**
Philippines	5.807	5.239	-2.205	168.265	0.029*
Timor-Leste	7.893	7.333	-1.176	8.292	0.272*
Indonesia	6.871	6.714	-0.554	365.000	0.580

*Separate variance

Table 17 examines correlations between scores on the Change in Coral and Fish Indicator and selected variables. The strength of the management committee is statistically significantly, positively correlated with perceived changes in coral and fish abundance near the MPA in both the Philippines and Indonesia. Also, in the Philippines, total exposure to project information efforts had a small, but positive effect of the score on the indicator. Degree of community support for the MPA is statistically significantly, positively correlated with perceived changes in coral and fish abundance near the MPA in Indonesia. In Timor-Leste, older individuals are more likely to perceive more positive change in coral and fish than younger individuals.

Table 17. Correlations (Pearson's r) Between the Violation Change in Coral and Fish Indicator and Selected Variables

	Philippines	Timor-Leste	Indonesia
Views Considered	0.056	0.176	-0.048
MPA Support	0.114	0.170	0.126*
Age	-0.040	0.196*	0.043
Education	0.056	0.118	-0.047
Total Trainings	0.107	-0.018	-0.034
Total Exposure	0.125*[1]	0.032	0.026
Management Committee Strength	0.282***	0.066	0.283***

***$p<0.001$ **$p<0.010$ *$p<0.050$ [1] based on 1 tail test

Increased Capacity

This section highlights findings demonstrating ways that capacity was increased through the USCTI program and challenges in creating increased capacity at multiple levels of governance. In general, this section relates to R1 of the Results Framework (Figure 3): Regional and national platforms strengthened to catalyze and sustain integrated marine and coastal management in the Coral Triangle.

The challenge of capacity developing during a five-year period in such a diverse context is tremendous.

> "I think people who haven't tried to do something like this grossly underestimate the difficulty in putting something together like this successfully. There are growing pains, you know. Growing capacity takes time, and if you have to find the right leadership, you have to have them be comfortable with one another. You have to train them, bring them up to speed on some of the substance of what they were doing, and I think that many consultants and many governments are too impatient and too driven by a narrowly defined set of outcomes that are well-intentioned but really get in the way of meaningful progress." – Jane Lubchencho, NOAA Administrator

Another major challenge that respondents highlighted was the complexity of designing a regional program for six countries with such divergent political and cultural contexts, as well as

differing levels of capacity. Each USCTI implementing partner also had different capacities and institutional cultures.

> "Well, there (are) lots of challenges. And I think one of the big ones is when you're trying to look across six countries. First of all, there's a lot of variation across the six countries. Even though they're all in the Coral Triangle, culturally, they've got three relatively developed, wealthy countries and three relatively undeveloped, poor countries, so that's one challenge. You know the countries like Philippines, Indonesia, and Malaysia all have pretty good databases and national government agencies and they track their work. Until this day there's no MPA database in … PNG, or not much. I mean, they're beginning to have one in Solomons. And of course in Timor they have one MPA so I wouldn't call that a database, but they have information, so there's that... But the challenge is you can't really equally track this across six countries in a real(ly) meaningful way until you've sorted out some of those basic issues of even being able to describe what you have... So that's a challenge." – NGO employee from non-CT6 country

> "It was anticipated … and mentioned in the original scope that all the countries were in different stages of development: economic development, civil, society development, NGO development, government capacity development. So, we knew it going in. The challenge was to hold the consortiums and CTI-CFF together until we got through that initial bumpy stage … NGOs had different capacities, staffs were bigger, smaller. Governments were bigger (or) smaller. Money available to the NGO, to government departments was bigger or smaller, (or) just (at) different stages. How very important in that theory of change or theory of action is: how do we create a level playing field from which all of these can play together and play well and effectively? … And how do we set this up …the regional exchanges, the regional technical working groups, the national technical working groups, learning exchanges, all these were tools that enabled us over a period of about three years to begin setting up a level playing field." – NGO employee from non-CT6 country

> "I think it's fairly difficult to run regional programs…. We're all in different levels, and it's very hard to deliver something that responds to the needs of all the individual countries. I think this should have been acknowledged in the beginning…the (different) level of capacity and understanding of management and issues to do with food security." – NGO employee from CT6 country

The USCTI sought to foster leadership and increase institutional capacity to improve marine resource management (USCTI 2010). The following section provides LP results from the social network analysis that measures the creation of leaders in the CT region and collaboration among REX participants. These results relate directly to IR1.2 (Institutional capacity and collaboration strengthened) and IR1.3 (Learning and information networks strengthened) Respondents were participants in REXs on CCA, EAFM, and/or MPAs. Figure 22 presents the full network (with isolates who did not nominate anyone and who were not nominated by anyone removed) with 193 nodes and 320 ties. 121 individuals responded to the survey; 19 of these

individuals did not nominate any individuals (these isolates were removed from the network diagrams). An additional 91 individuals were nominated, but were not survey respondents themselves. Nodes are sized by in-degree centrality ("prestige"). The overall density of the network, where density is equal to the total number of ties/total possible number of ties (Wasserman and Faust 1994) is 0.009. The average number of "out degree ties" (the number of people a respondent nominated) for the network is 1.514; the average number of "in degree ties" (the number of people who nominated a given respondent) is also 1.514. The average degree is 1.658 (the sum of in-degree and out-degree ties).

The diagram demonstrates a high degree of communication in the CT region fostered by the REXs (Figure 21). The diagram also demonstrates that the network is clearly dominated by a few highly central individuals, the two most central of whom are from the US and involved with the USCTI program. The centrality of regional partners within the network demonstrates the central role of this information-sharing network on the USCTI partners and their strength as technical advisors and experts. However, there are individuals within the CT6 countries who are also highly central to the network, including members of the Interim Regional Secretariat, national government employees in the Solomon Islands and the Philippines, and NGO staff in Timor-Leste. A potential weakness of a network with a few central individuals is that power and influence are not equally distributed throughout the network (Bodin and Crona 2009).
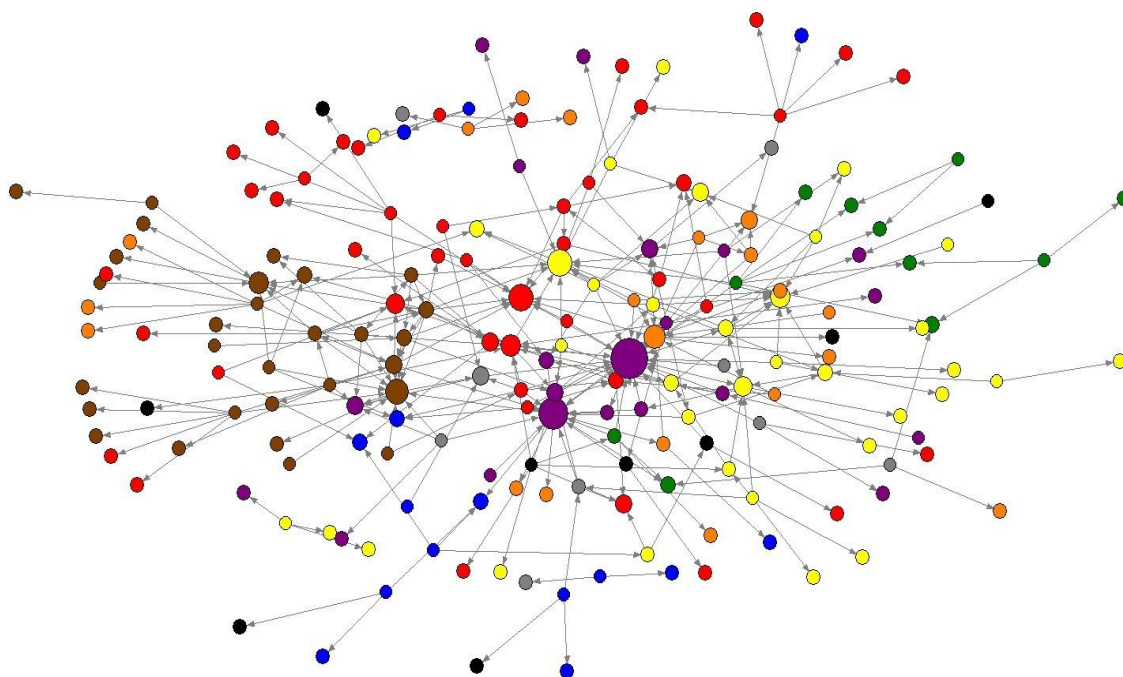
Figure 21. Overall communication network of REX participants (n=193 nodes) by nationality (respondents were asked to indicate their "primary nationality").

Legend

🔴 Indonesia
🔵 Malaysia
🟢 Papua New Guinea
🟡 Philippines
🟠 Solomon Islands
🟤 Timor-Leste
🟣 United States
⚪ Australia
⚫ Other Country

When the same data are presented by country, the connections among informants from different countries become more apparent. Figure 22 represents the full network (193 nodes, 320 ties, isolates removed), clustered by country with nodes sized by in-degree centrality. The network includes both respondents and nominees. The purple cluster represents those from the United States – who are mainly linked to USCTI, and a set of actors that includes the two most "prestigious" (i.e., highest number of in-degree ties) individuals in the network. In Indonesia, the most prestigious actor is a national government employee who was part of the Interim Regional Secretariat. In Malaysia, the prestigious actors include a government employee and two NGO employees. In Papua New Guinea, a government staff and an independent consultant are the most prestigious actors. The most prestigious actor in the Philippines is an NGO employee, and in the Solomon Islands, the most prestigious actor is a

national government employee. In Timor-Leste, the most prestigious individual is an NGO employee. This network shows the numerous communication pathways that exist among CT6 countries. However, the regional network is less dense than the individual within-country networks. This measure of regional network density serves as a baseline and demonstrates that this network is still in development with room for the creation of more "bridging ties" among the countries to help increase communication and information sharing among the CT6 actors (e.g., Lin 2001; Adler and Kwon 2002; Burt 2005). The creation of this regional network demonstrates considerable progress toward R1 of the Results Framework, the strengthening regional and national platforms, and IR1.3 (Learning and information networks strengthened).
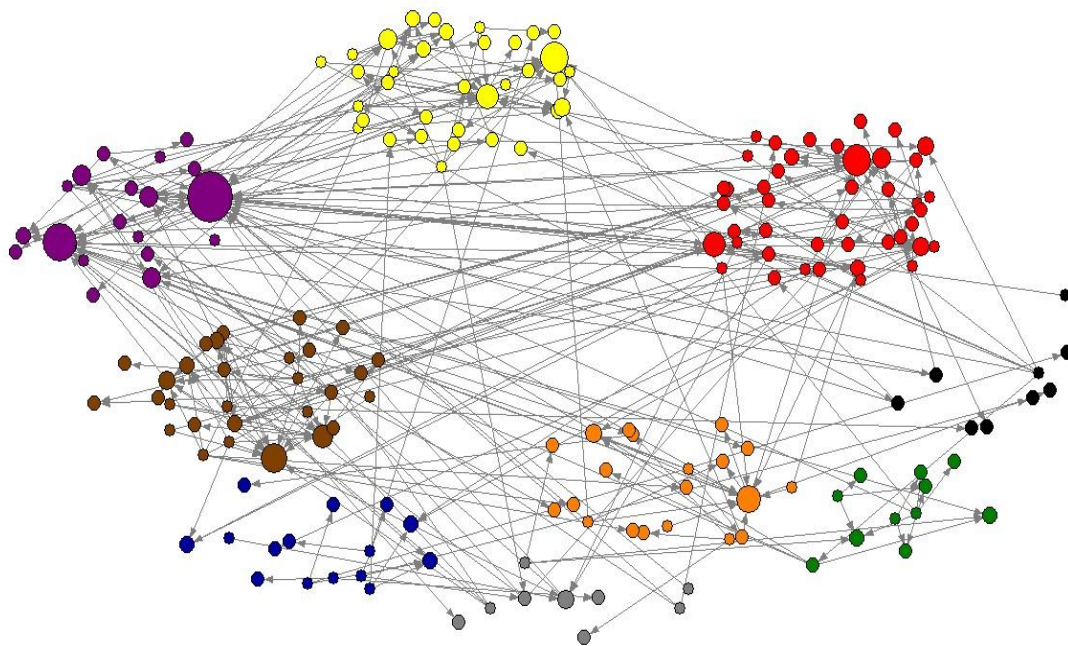

Figure 22. Overall communication network of REX participants by country.

A high proportion of SNA informants reported making contacts with people outside their home countries through the REXs (Figure 23). For each individual respondent nominated, they were asked whether or not they knew this person prior to the start of CTI-CFF. This graph shows the responses for those nominated outside of the respondent's country. For in-country nominees, 68 percent of respondents indicated that they knew the individual they nominated prior to CTI-CFF. For nominees outside of the country of the respondent, the majority of respondents did not know this individual prior to the start of CTI-CFF.
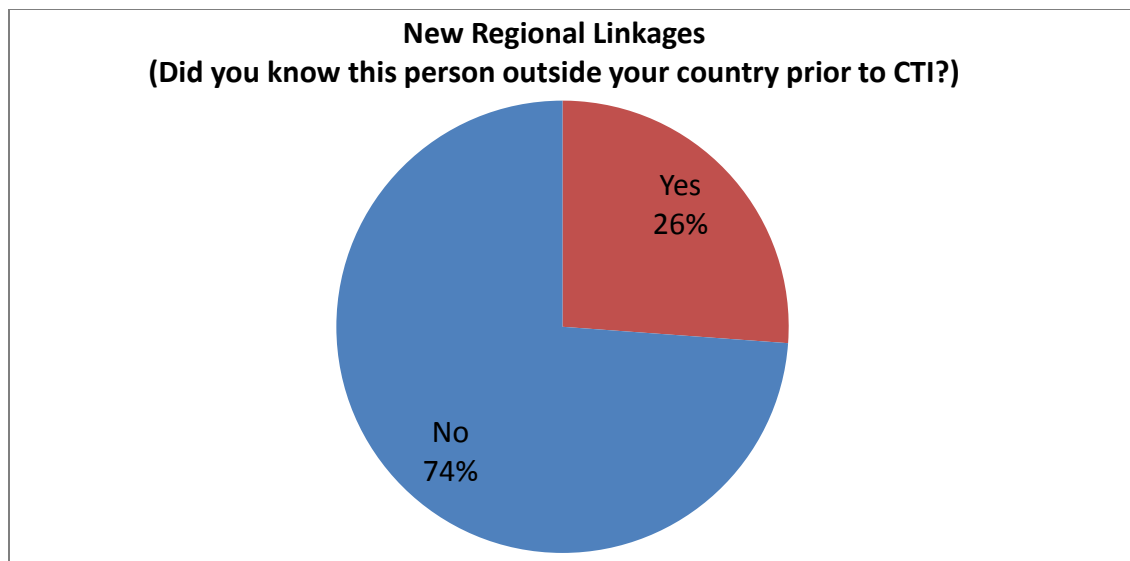
Figure 23. Creation of new regional communication channels (n=121 REX Participants).

Key informant interviews underscored the importance of the REXs in the creation of new CT communication networks. In general, for large-scale environmental collaborations, exchanging ideas and disseminating knowledge are recognized as key network functions (Schneider et al. 2003; Crona and Bodin 2006; Lauber et al. 2008; Lowry et al. 2009).

> "The most important achievement of CTI-CFF is…the sisterhood and the brotherhood. This is the intangible….Let's say, before we never spoke (to) each other. We did not have friends in PNG to talk to about the conservation. (If) we do not have friends, we cannot exchange easily." – CT6 National Government Policy Maker from Indonesia

> "Without our knowledge, they've been texting, asking who or what they're doing. I mean, how they were doing it…So this kind of bond was developed." – NGO employee from CT6 country

> "(The REXs are) a good way of sharing what others have been doing, knowing what others have been doing, how they do it, what they have done. I think it is a good way of meeting and bonding, networking." – NGO employee from CT6 country

Figure 24 presents the "Ego-Network" (the personal network for one individual) for the most central actor (as calculated by undirected degree centrality) in the network, an NGO employee from the US Nodes are sized by in-degree centrality (within the entire network) and color-coded by country. This actor also has the highest prestige (in-degree ties) in the network. This actor is sought after by both regional partners and by individuals from many CT6 countries (though neither Timor-Leste nor Malaysia). It is notable that the most central person is from the United States. Over time, it is possible that a CT6 national could become the most central person in the network. While this individual was the most central in the network, informants who nominated this actor also communicated amongst themselves.
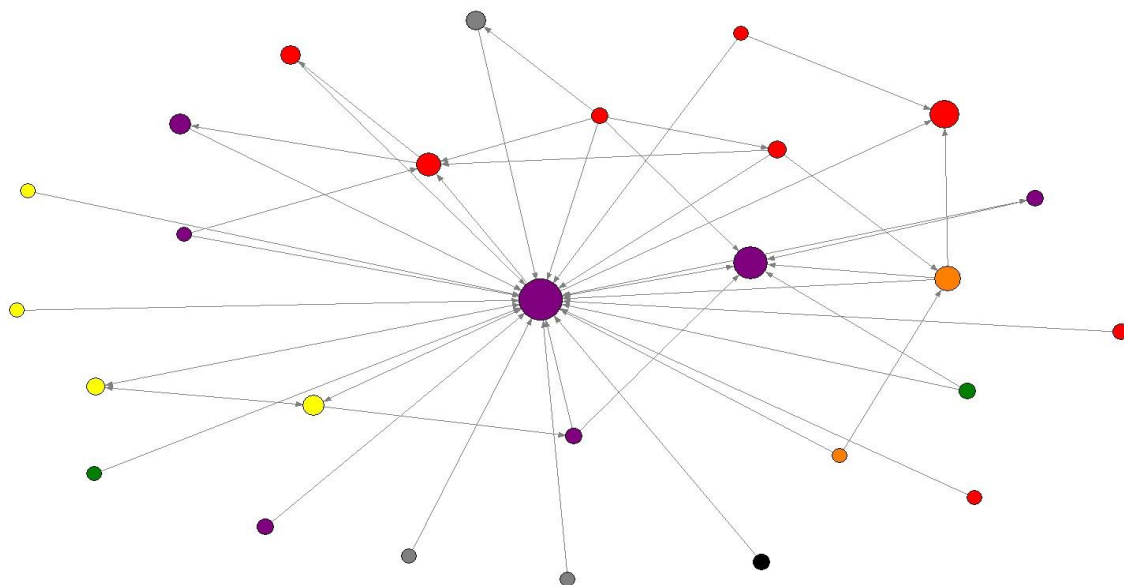
Figure 24. Ego-network of most central actor.

Responses regarding why respondents communicated with this actor (Figure 25) were well distributed across the six main response options, though the highest ranked answer was "technical knowledge" (N = 21) followed by "connections to other" (N=19). Support by external actors with technical abilities has been shown to improve MPA network success in the Philippines (Christie et al. 2009b).

Figure 25. Motivations to communicate with most central actor.

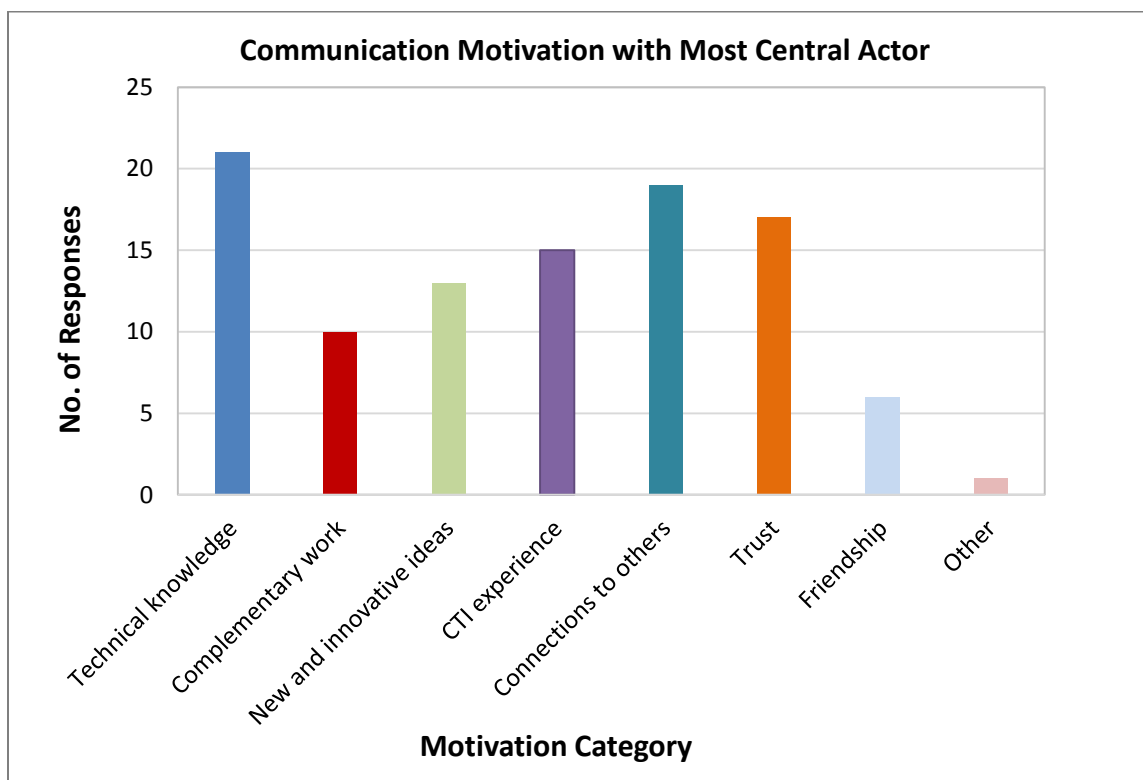Figure 26 presents the Ego-Network for the most central actor in the Solomon Islands. Nodes are sized by in-degree centrality (within the entire network) and color-coded by country (see legend above). This actor is the sixth most prestigious actor in the entire network and is sought after by respondents within country, as well as a number of regional partners. This actor is a crucial link for the Solomon Islands in terms of communication at the regional level.
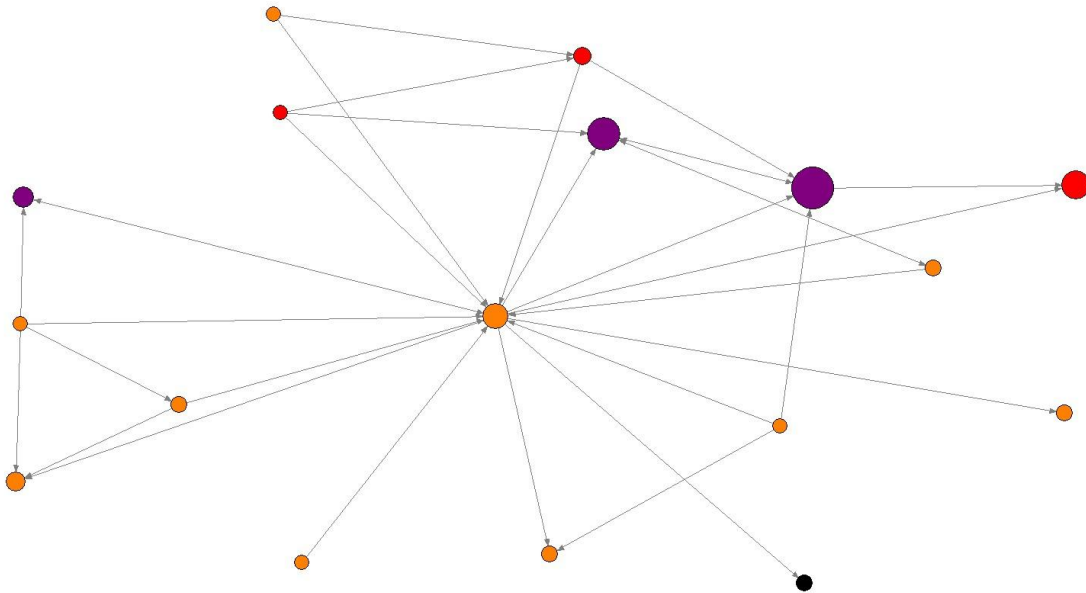

Figure 26. Ego-network for most central REX participant from Solomon Islands.

The main reason people indicated they communicated with this actor was "connections to others" (N=7), followed by "CTI experience" and "trust" (N=6, for both) (Figure 27). It is interesting that "connections to others" was ranked so highly; both respondents within the Solomon Islands and outside of the Solomon Islands selected this response. This could indicate that people see this actor as a very important bridging actor who helps connect the Solomon Islands to the larger CT region and helps regional partners connect to those in the Solomons. Individuals like this central Solomon Islands actor who serve as a bridge and help connect subgroups are often key to a network's success by allowing the network to share information more efficiently and rapidly (Hartley and Glass 2010). Additionally, both trust and bridging connections are commonly cited as reasons that actors in a network may be more central than others (e.g., Burt 2005; Ramirez-Sanchez and Pinkerton 2009).
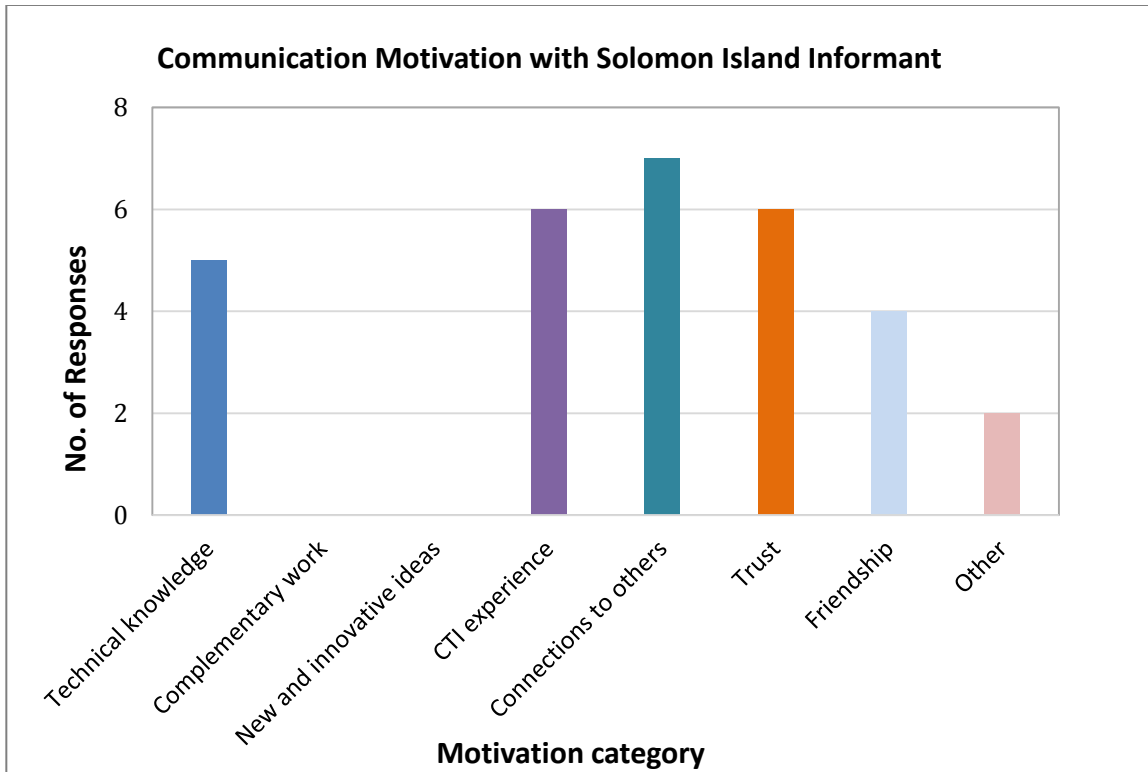
Figure 27. Motivations to communicate with most central actor from Solomon Islands.

The USCTI contributed to the empowerment of historically marginalized people in the CT region. Most notably, the interviews highlighted that the creation of social networks and mentoring relationships empowered women from CT6 countries:

Interviewer: "What do you learn from the regional and how is that different from what you learn from your national counterparts?

Informant: I think I learn about technical issues ... and understanding how they would be implemented on the ground. At the regional level, I learned leadership. I got a lot of mentoring at the regional level. I think that's where I just learned by doing and I think there's a lot of copying, copying off ... the leadership ... I'm inspired by women in this forum. I've learned a lot, like women can play a great role in leadership … I come from a background where women are not so much considered… I work in an environment with men… I think it had given me confidence, yes confidence, in playing that role at the regional level... Like our NCC is more than 60 percent women... We talk marine science. This influences also the perspectives of the male in society as well—for us in Solomons. They will always laugh at us because they all say we'll run logistics but at the end of the day we'll be there debating on issues of national importance about marine and coastal resource management.

Interviewer: Would you say that's a relatively recent phenomenon and related to the CTI process?

Informant: Yes! Yes! ... It's a good forum and a network within women... There's a whole lot of need for opportunities in this sector for women participation not just at the community level but women playing a leading role... My mentor is Director Lynnette and Jessica (from Philippines government)... A lot of sharing of debates and just by observing, I learn a lot from them… I exchange emails on a daily basis with them…Every time they encourage women like themselves." – CT6 national government policy maker

The REX process had a number of additional positive impacts:

"I think that (the REXs) just brought some level of cohesion, some level of improved…capacity to govern that regional at that higher level… So I think one of the big success are those inter-personal and inter-country relationships." – NGO employee from non-CT6 country

"The exchanges have been very beneficial in terms of knowledge and capacity building, and interacting with people from other countries helped me become more broadminded." – CT6 national government policy maker

Respondents were asked to respond to the following question: "On a scale of one to ten (with "1" signifying no increase and "10" signifying significant increase) to what extent have Regional Exchanges increased capacity to be able to implement new policies in your country?" This question demonstrates that respondents place a high value on the REXs and the information that they gained from them (Figure 28) and show progress toward IR1.2 (Institutional capacity and collaboration strengthened). This theme was echoed in the regional interviews.

"The REXs are an opportunity to exchange and to be able to make other countries understand who we are and appreciate that we have these differences in how we do things." – CT6 national government policy maker

"To bring together people who are working toward a common goal to learn from each other has been hugely valuable. And I think when I look at how they're drawing on each other now and saying how do you do this, would you come teach us how to create a management effectiveness framework, or whatever. It might be to look to each other instead of looking outside, like to NOAA or the NGOs; I think that's a really brilliant shift." – Government employee from non-CT6-country

However, some people also noted that the REXs were expensive and time-consuming.

"Those regional exchanges are expensive, they're incredibly difficult to organize, and at the same time they were a huge drain on the participants, especially some of the NCC members who are from small countries. Who were … going to so many of them every year and still had to do their jobs at home." – NGO employee from non-CT6 country

Another regional partner reiterated the sentiment regarding the time and costs of the REXs. However, this partner also acknowledged that, while the REXs could have been implemented more efficiently, she was pleasantly surprised by their effectiveness.

> "I was pretty critical of having lots of REXs, I have to admit. I was one of the people in the early stages that felt that they could be a blessing and also they could be the devil in disguise ... because what I was concerned about was that you'd get the same government people trying to engage with the CTI-CFF but also trying to go to those REXs. It meant a lot of traveling. It meant taking them away from their jobs in country, and from the things that they were doing- especially if you talk about an environment department like in the Solomon Islands that only has a couple of people. And a lot of those people… would be constantly traveling on REXs…. I've been pleasantly surprised with the REXs…. For someone to go from Solomon Islands to (the) Philippines to see what's happening with community… or coastal fisheries or MPA work. It's a really good thing." – NGO employee from non-CT6 country

Additionally, numerous respondents also indicated the REX meetings built their capacity and exposed them to national level issues that were previously overlooked. For example, one CT6 national government policymaker stated.

> "I gave a lot of credit to the regional program in exposing me to a lot of issues, concepts... I've learned there's a whole range of issues out there not yet considered…at the national level." – CT6 national government policy maker
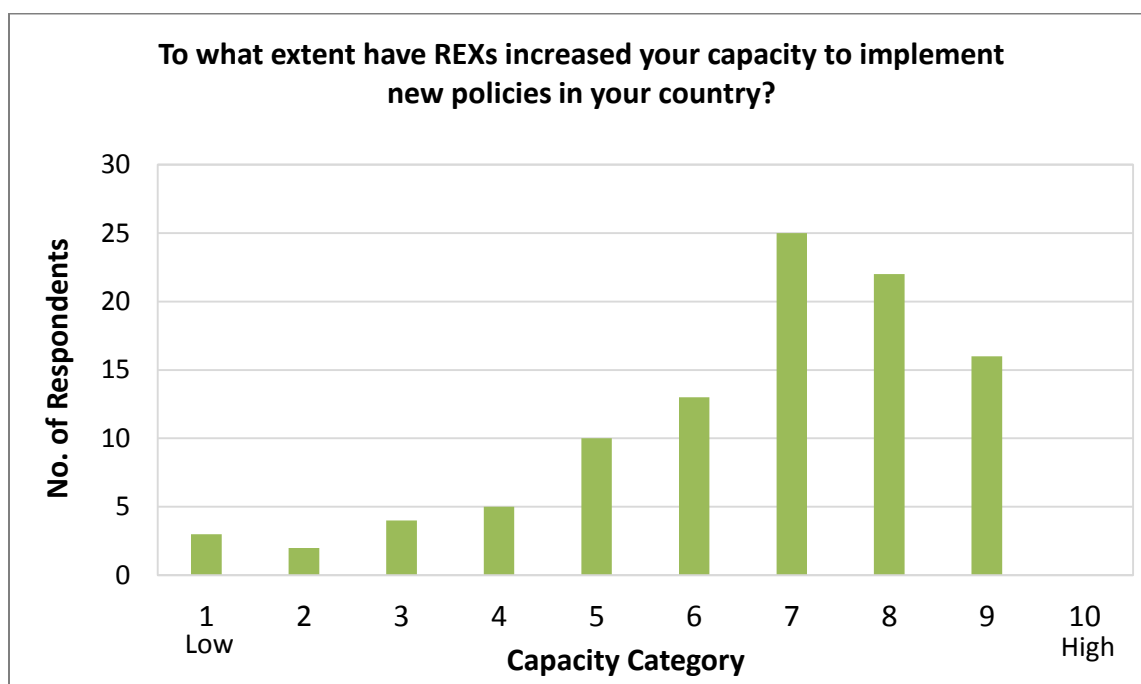

Figure 28. Influence of REX meetings on building capacity for implementing new policies. N = 100; Mean = 6.62; Median = 7.00; Mode = 7.00

Respondents were asked to indicate whether or not what they have learned at a REX has ever influenced them to take action in their country. The majority of the respondents (74 percent) felt REXs had enabled them to take action in their country (Figure 29), further highlighting the value of the REXs.

Has what you learned at a REX ever influenced you to take action in your country?

- No response 7%
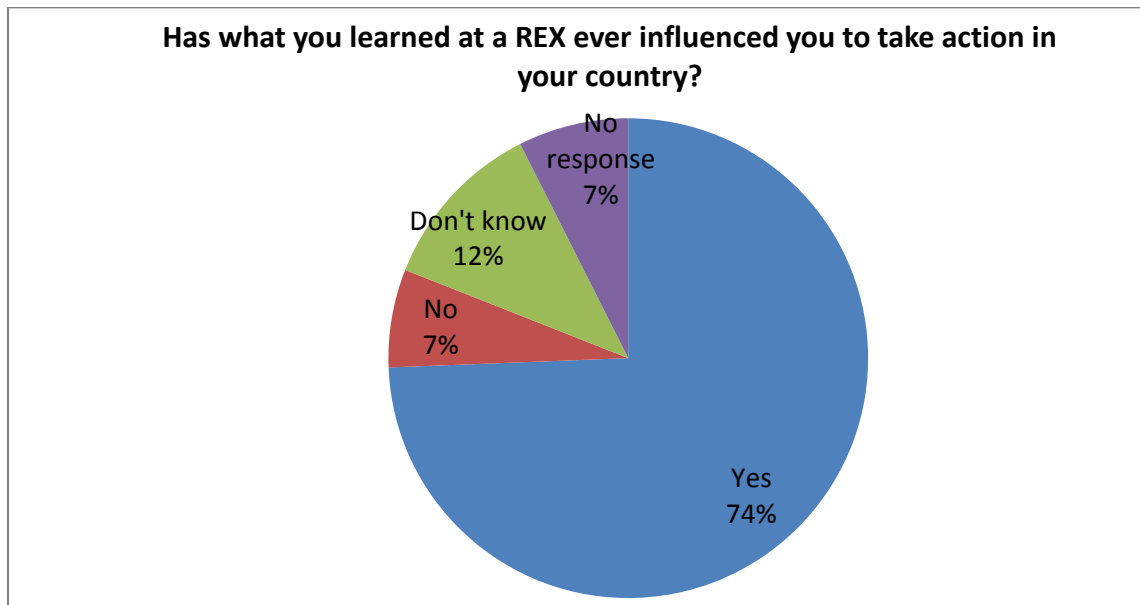- Don't know 12%
- No 7%
- Yes 74%

Figure 29. REXs influencing action (n=121 REX Participants).

The above results and generally positive response to the USCTI REXs and learning network efforts suggest considerable progress toward a regional community of practice. The tangible outcomes range from improved gender equity, to technical capacity, to policy implementation. These outcomes validate the USCTI design principles and demonstrate that investment in human and institutional capacity development is essential to progress toward CTI-CFF goals. The creation of regional leaders is likely to be a lasting USCTI legacy. Continued investment in learning networks is essential toward progress.

Improved Governance

This section of the report demonstrates specific instances where the USCTI helped improve governance at the regional and national levels, which relates to R1 in the Results Framework (Regional and national platforms strengthened to catalyse and sustain integrated marine and coastal management in the Coral Triangle).

The CT region is vast with differences in cultures, institutional arrangments, centralization of policy making, and experience with integrated planning.

> "Well I think for those who thought we were going to have perfect vertical integration, it's almost impossible. Because there're just too many layers, especially when you're

targeting regional to national. I mean even between national and local, it's often a big disconnect in the larger countries. And then to go from regional to local seems like a real stretch…. And then you know, these national agencies are understaffed, and they don't really have influence across their country. Like in the Philippines. What influence does a particular ...bureau have in 1,600 MPAs? It helps manage a few of the national sites, but it's certainly not going to have direct contact on all of these protected areas… It depends a lot on how the government system is set up in the country, how decentralized it is. So it's been a dilemma, there's been a lot of criticism about that. I don't know if there's any easy answer." – NGO employee from non-CT6 country

Improved collaborative relations between relevant institutions have the potential to foster vertical and horizontal integration, which can improve ocean governance. We asked respondents to indicate how collaboration between local and national government agencies, between NGOs, and between government agencies and NGO has changed over the last five years using a ten-point scaled questions, where "1" implied no improvement and "10" high improvement. Improvements in collaboration between institutional stakeholders over the last five years were detected (Figure 30). Difference between regional and national respondents was not significant (p>0.050, U test).
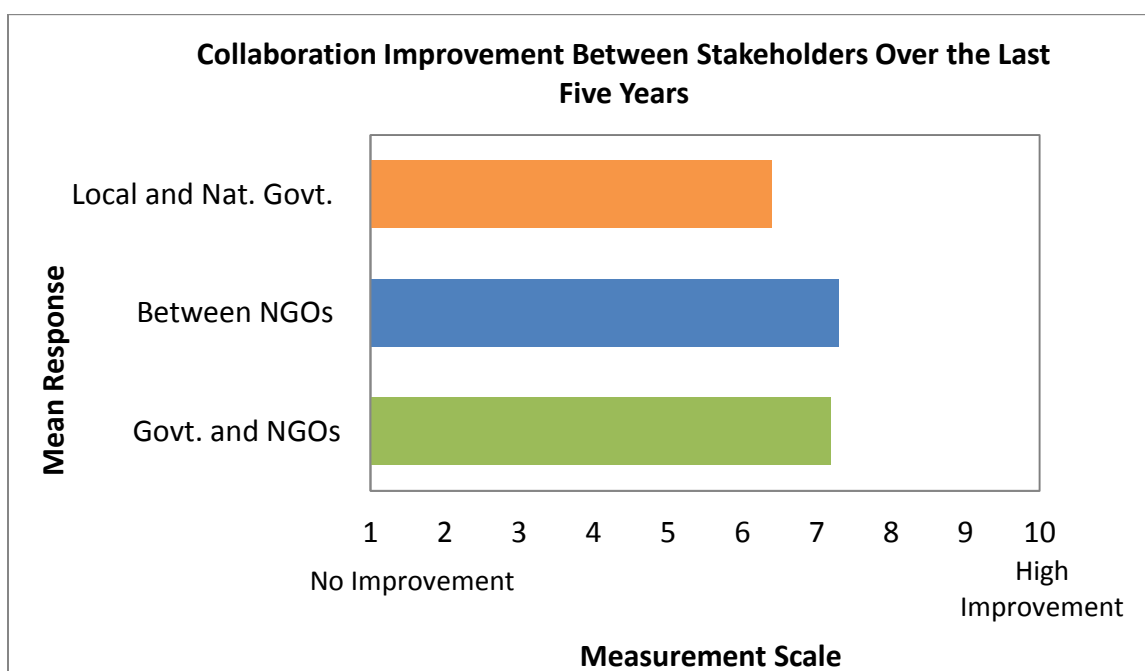
Figure 30. Improvement in collaboration between CTI institutional stakeholders (local and national government (n=145); between NGOs (n=62); and government and NGOs (n=169)).

The qualitative assessment also yielded strong evidence of improvements in collaboration between institutional stakeholders. Improved collaboration between international NGOs as part of the CTSP was challenging, innovative and, ultimately, rewarding. The following quotes are examples from interviews conducted.

"Five years later we're still talking… We've learned more about each other's strengths and weakness and we've developed some trust that we didn't have before…CTSP have given us a reason where we've had to talk and it's just very helpful…That dialogue is always helpful… it's been a good thing." – CTSP NGO regional leader

"…For the beginnings of CTSP, I must say it was a bit touch and go among the three NGOs, at least in the first year. Then, you know after the first year, it all changed, and I think everybody began to realize that the issues we're dealing with are so much bigger than these individual programs of even our big NGOs... And in the last three or four years… it seemed to be really quite a nice working group. And we tended to think more of the bigger project and not so much of just -- we work for an individual organization. And it tended to work out really quite well, so I think in that way the three NGOs learned quite a bit." – CTSP NGO regional leader

The relations between the NGOs and national governments have also improved in various contexts.

Interviewer: "So for the last five years, and you can be frank with me, how has the interaction been between you and the international NGOs—always productive, sometimes quite challenging?"

Respondent: "Sometimes quite challenging… So for 'Solomons' there's huge progress from NGOs doing implementation and there's also changes in perspective for NGOs because they really wanted to work with the government in this program... They have a place to come and talk with the government if they wanted changes... Maybe in the past they've wanted to talk with the government but there's no mechanism for them to talk with us... They don't want to report to government... It's more important (for them) to report to donors... But in this program we've made efforts to make a system in-house so that they can report to us written submissions … like once every two months... So the partnerships have grown--NGO and government partnership. That's one of the successes of the program..." – CT6 National Government Policy Maker

One of the innovative strategies employed by the USCTI was the attempt to integrate the themes of MPAs, EAFM, and CCA—a form of horizontal integration. Local government officials were asked to rate the past and present degree of integration of MPA, fisheries and climate change policies using a ten-point scale, where "1" signified no integration and "10" signified full integration. The degree of change was calculated by subtracting past mean value from present mean value. The difference between project (n=19) and control (n=15) evaluations by local government authorities was statistically significant ($P < 0.050$, U-test) (Figure 31).

**Integration of MPAs, Fisheries, Climate Change Policies
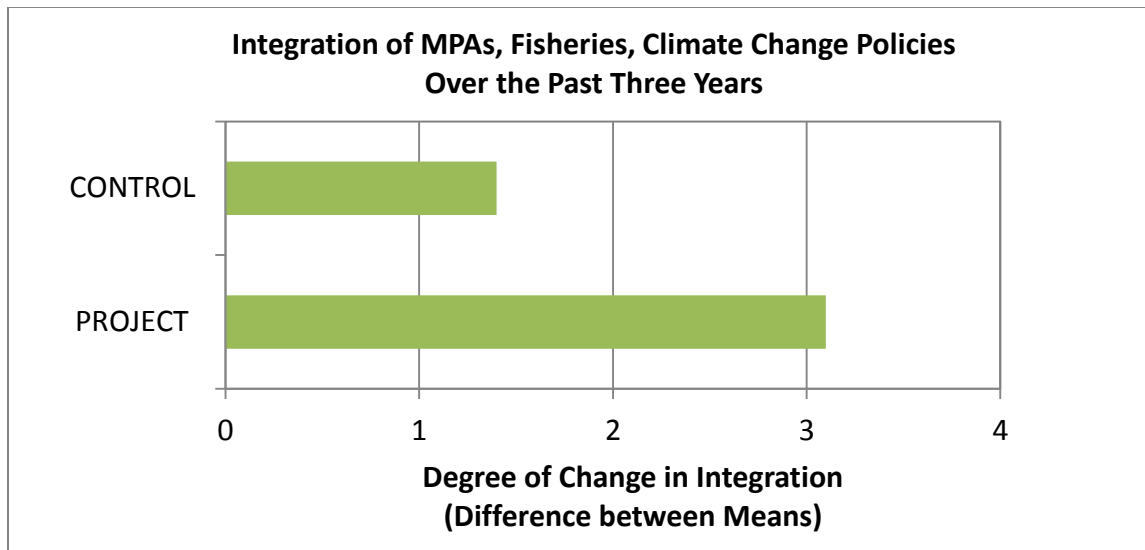Over the Past Three Years**

Figure 31. Degree of change (past vs. present) in MPA, EAFM and CCA policy integration at control and project sites (n=34). These responses were perceptions held by local government officials.

The development of a regional program is innovative and challenging in this diverse context with pressing national and local needs.

> "You know, (we) seem to think of our own parochial, national, or boundaries. But the…ecological value, the biodiversity value, the economic value of having this protected and managed…seems to be still so far off. And I would think there is some sort of…necessity for buy-in in the region. Not just by the people around but even by governments and what incentive…what it is for them… Governments will always look at it from their interests, whether they join CTI. Why do I have to participate in this regional effort when I am not necessarily benefiting from that? So…showing those values in the economic, either biodiversity, either…whatever benefits that the country would get, I think is necessary… I don't think it was communicated to the countries, and if ever that was communicated, I don't think it sank in. " – NGO employee from CT6 country

> "Really there is also the expectation that your country will continue (to) support--to make it happen regionally. And sometimes if you don't have the support to facilitate those things to happen it is sometimes hard to make countr(ies)… commit themselves… They also have a lot of priorities in-country sometimes –so regional collaboration will fall probably in the middle or the bottom priority list…." – NGO employee from CT6 country

Respondents were asked how important they believed it was to link regional level action the local level using ten-point questions, where "1" signified low importance and "10" signified high importance. Both regional and national respondents believed it was important to link regional program activities to local level action—a form of vertical integration (Figure 32).

Linking regional activities to the local level is often cited as a crucial element to the success of regional environmental initiatives (e.g., Hanf and Underdal 1990; Keohane et al. 1993; Young 2006; Mills et al. 2010). This suggests respondents placed high value on vertical integration. There was no statistical difference between countries ($p>0.050$, Kruskal-Wallis test), or between regional (n=22) and national (n=36) respondents ($p>0.050$, Mann Whitney U test).
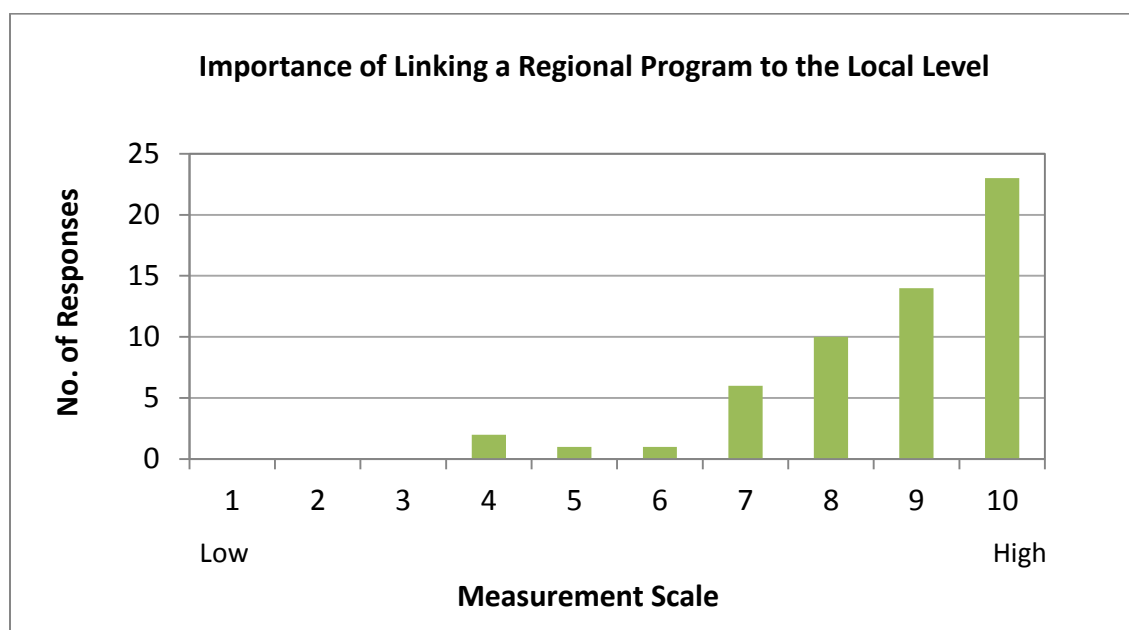

Figure 32. National and regional respondents were queried on the importance of linking regional program activities to the local level (n=58).

The qualitative assessment also detected strong evidence for the importance of linking regional activities to local levels:

> "CTI and the other international meetings I attended gave me the opportunity to learn from other countries new ideas or ways of doing things that I can bring down to the community level, so then I can bring the community experience back up to the national and regional level." – CT6 National Government Policy Maker

Despite the belief held by national and regional respondents about the importance to link regional activities to the local level, evidence suggests that such vertical integration is incomplete. In fact, this may be an ongoing challenge that will require continued support. Community leaders in both control and project sites were asked how many times they were visited by national, provincial and local government officials in their communities. The mean number of visits were compared for responses from control and project communities. Project communities were not statistically different from control communities ($p>0.05$, t-test): National visits (Project, n=48, Control, n=19); Provincial visits (Project, n=49, Control, n=18), and Local visits (Project, n=41, Control, n=18). Efforts to improve vertical integration strategies are needed (Figure 33).
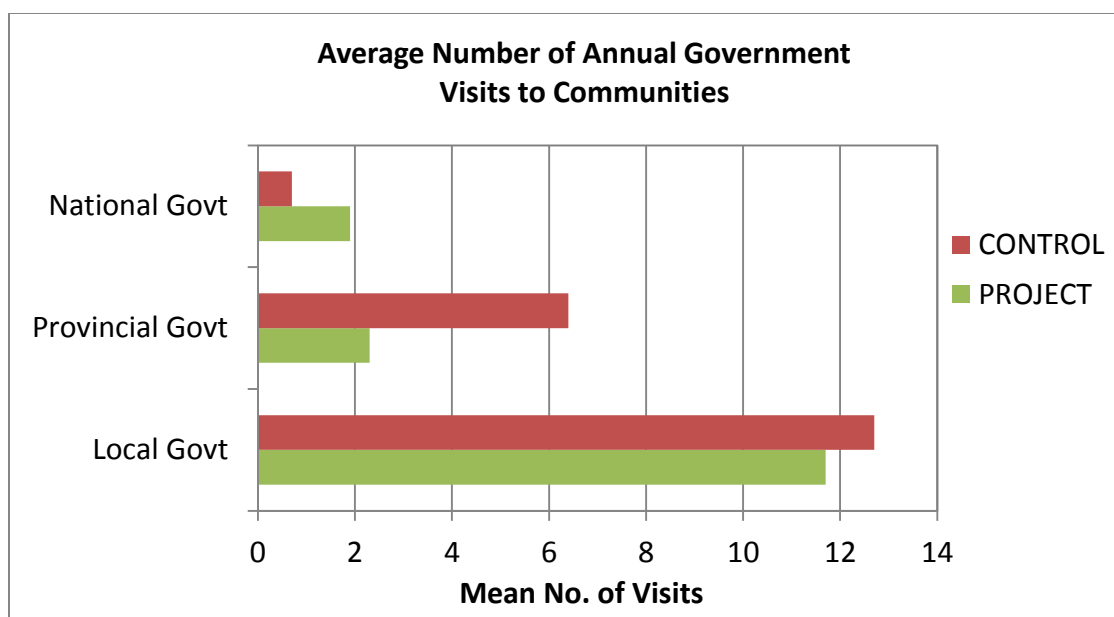
Figure 33. Community leader responses to the average number of visits by government officials in their communities (n=67).

Process Sustainability

Sustaining progress made through the USCTI toward CTI-CFF goals is a complex and challenging process. Historically, short-term progress has not always been sustained beyond external technical and financial support (Christie et al. 2005). However, investments in participatory planning processes and capacity development at the individual and institutional levels, amongst other dimensions, have been shown to improve the likelihood of sustained progress (Christie et al. 2005; Pollnac and Pomeroy 2005). The Results Framework (Figure 3) addresses process sustainability through R1 (Regional and national platforms strengthened to catalyze and *sustain* integrated marine and coastal management in the Coral Triangle) and IR1.5 (Sustainable financing mobilized).

One of the notable outcomes from the USCTI was the development of a sense of belonging to the Coral Triangle region. When national and regional respondents were asked if the USCTI helped create a sense of belonging to the Coral Triangle region using a five-point scale, 95 percent said they strongly agreed or agreed (Figure 34). For simplification, strongly disagree, disagree and neutral responses were aggregated. There was no significant difference between countries ($p > 0.050$, Kruskal-Wallis test) or between national (n=146) and regional (n=22) respondents ($p > 0.05$, Mann Whitney U test). These results indicate there was a strong sense of belonging to CT region, suggesting a sense of ownership that may improve chances for sustainability (Christie et al. 2005).

Developed a Sense of Belonging to the Coral Triangle Region
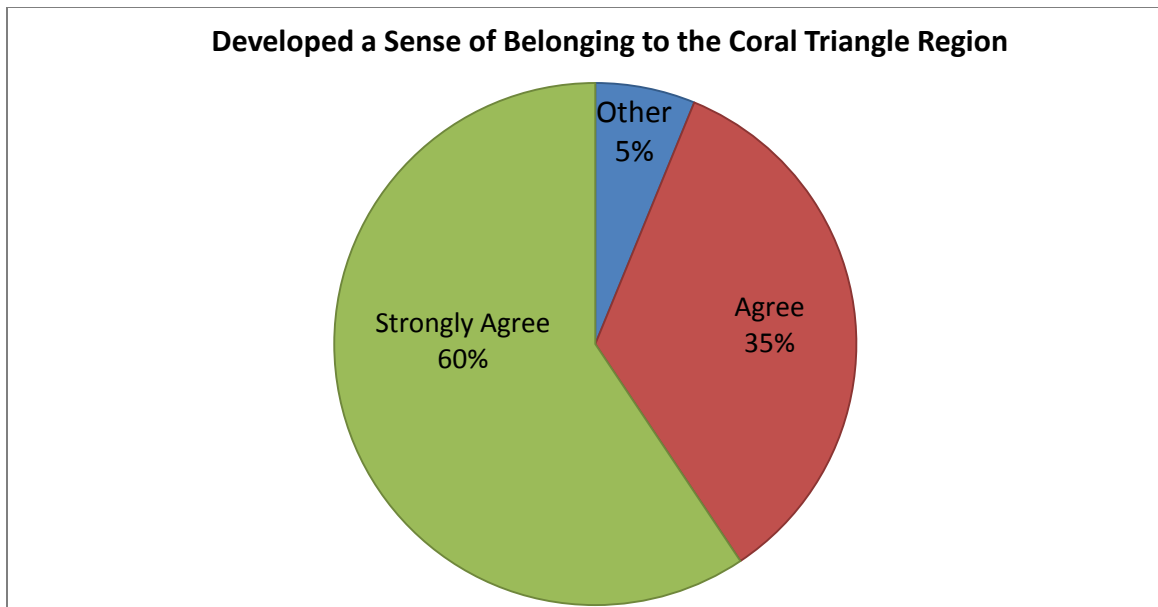
Other 5%

Agree 35%

Strongly Agree 60%

Figure 34. Regional and national respondent beliefs about the USCTI creating a sense of belonging to the Coral Triangle region (n=170).

Increasing the sense of belonging to the region improved communication between countries on issues such as climate change. Ideally this communication is informed by monitoring information collected through the CTI-CFF and shared through tools such as CT Atlas.

> "Everybody is saying, we are all part of the Coral Triangle. People who don't know about Coral Triangle *will* know about Coral Triangle. So there is something regional that everybody participates in--that bonds the six countries together… (L)et's say climate change trends…If Malaysia complains about coral bleaching and also Philippines complains about coral bleaching. (W)hat happens in PNG? What happens in Indonesia? By having to compare, having the data, the status — that is togetherness. So to have the knowledge … binds people together." - CT6 National Government Policy Maker

The National Plans of Action (NPOA) developed by each CT country were an attempt to develop clear national policies and initiate in-country processes and policies that will last beyond the USCTI. National and regional respondents were asked about their familiarity with their NPOA using a yes/no question and its level of application using a ten-point scaled question, where "1" signified low application and "10" signified high application. There was a high degree of familiarity with NPOA (92 percent) and respondents believed it had moderate levels of application (Figure 35). Additional effort to increase the level of application of the NPOAs in each country is needed.
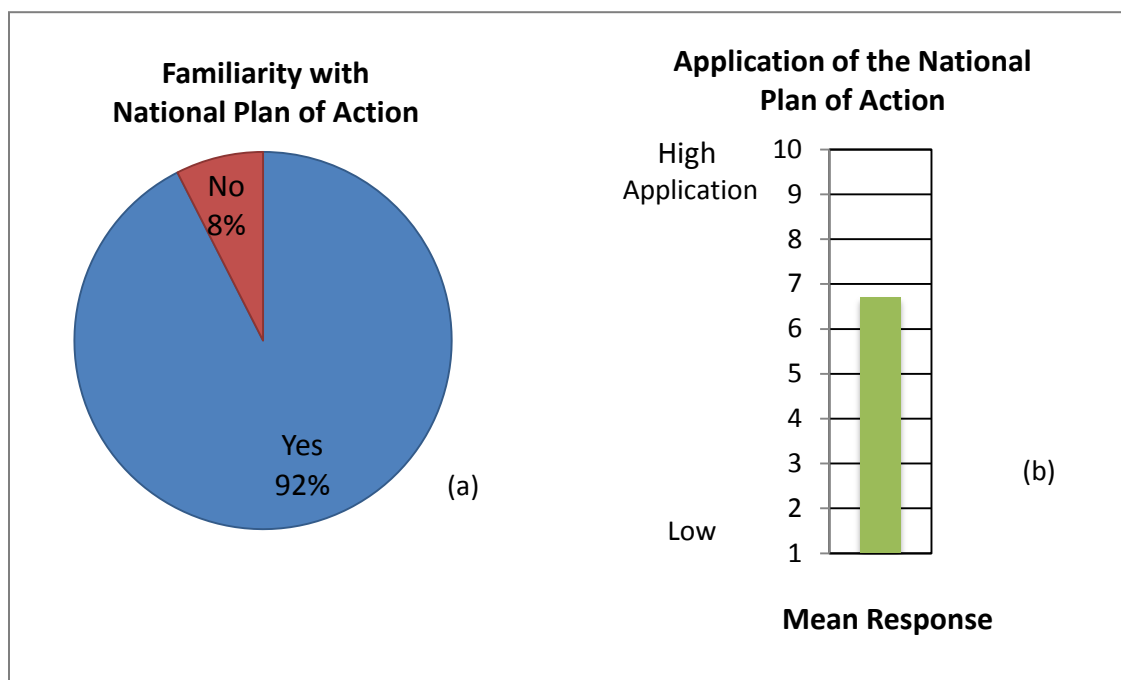
Figure 35. (a) National respondent familiarity with National Plans of Action and (b) their perception about its application (n=147).

Differences between countries were significant (p<0.050, Kruskal-Wallis test) for the application of the NPOA. Philippine respondents perceived the NPOA to have significantly greater application than respondents from Indonesia (U=244.5, p=0.009), Solomon Islands (U=259.5, p=0.033), and Malaysia (U=170.0, p=0.012). Respondents from Timor-Leste also perceived significantly greater application of the NPOA than respondents from Indonesia (U=129.0, p=0.032) and Malaysia (U=87.5, p=0.028). There were some indications in the qualitative interviews that NPOAs and CTI-CFF are affecting government budget priorities:

> "The national coordinating committees for the most part are operational. The national programs and subnational programs are being aligned with the regional and national plans of action. Budget resources are following that program alignment. There is visible impact. There's visible gravity in the national programs and budget of membership in the CTI-CFF." – NGO employee from non-CT6 country

> "But the (Coastal and Marine Management Office now) has a regular budget. So, now we're lucky compared to before.... And now it's clear what the office will be doing. Our action plan, our work plan is clear for us on what to do. And now it has, I can say, it has support from the national government – that we are implementing this and this and this. We have a … Sustainable Coral Reef Ecosystem Management Program. Now we were informed that (we have) a supplemental budget of 100 million (pesos) supplemental for 2014...We have now a clear program for coastal and marine with the NPOA." – CT6 national government policy maker

An additional important action at the national level is the creation of national coordination bodies, which are essential to improved vertical and horizontal integration. Interviews with national level informants indicate the establishment of the National Coordinating Committees had a significant and positive impact at national levels.

> Interviewer: "And finally, when you look at your participation in the whole CTSP and the NCC, what story comes to mind?"
>
> National Government Informant: "The story that comes into mind is... NCC is ...a government-led forum. It's (the) thing that you look forward to every month. It's a place where you say: my issue will be talked about… There will be a plan on addressing it… Whatever community challenge that had been raised... I know that the NCC will be the place that we make a plan. That's my story." – CT6 national government policy maker

Perceived funding availability to meet CTI goals post-USCTI involvement was another measure of process sustainability measured, which relates to IR1.5 (Sustainable financing mobilized). Donor-funded programs often suffer when initial support ends (Christie et al. 2005; Pollnac and Pomeroy 2005). We asked respondents whether they believed adequate funding would be available post-USCTI involvement using a yes/no question. This question was directed at national and regional respondents. Interestingly, more than half of the respondents believed adequate funding will be available to meet the CTI-CFF goals post-USCTI involvement (Figure 36). The difference between regional and national respondents was significant ($p < 0.050$, chi sq test), with national respondents holding a stronger belief about adequate funding availability to meet CTI goals after USCTI involvement ends. In addition to regional-level investments, investment in regional programs at the national level is another important mechanism (Tengberg and Cabanban 2013). The LP did not study whether regional or national funding mechanisms were preferable.

Adequate Funding Availability to Meet CTI Goals After the USCTI Ends
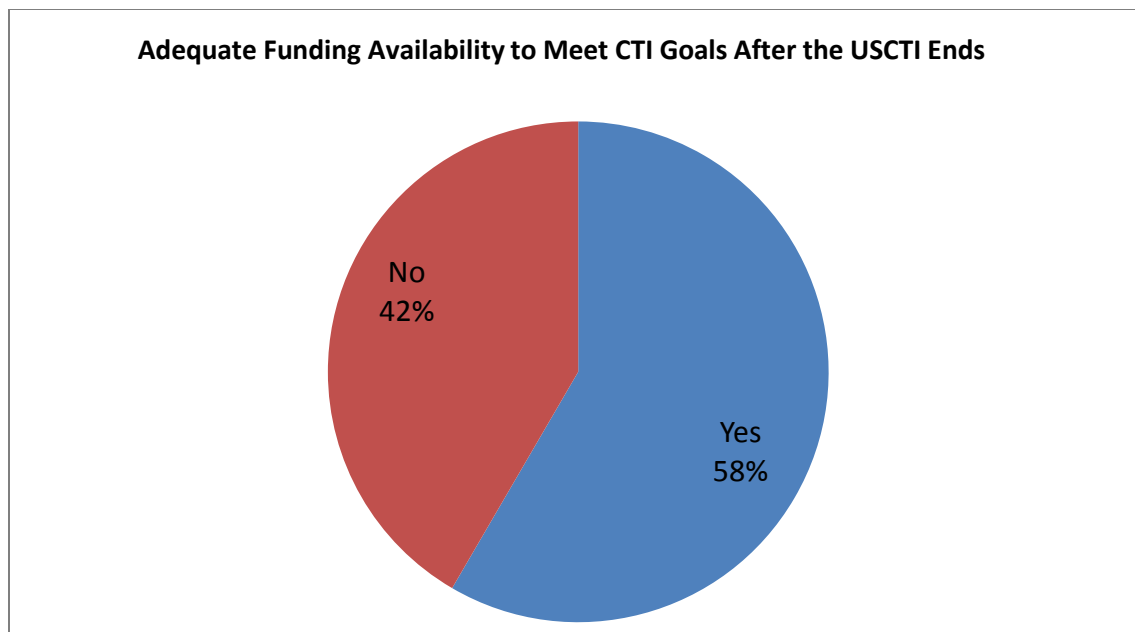
No
42%

Yes
58%

Figure 36. Regional and national respondent beliefs about whether adequate funding would be available post-USCTI involvement (n=125).

The development of robust institutions across a diverse and challenging context is a tremendous challenge.

> "I don't have doubt about the capacity (of the Interim Regional Secretariat), but my concern is the nature of it being managed by government officials who are, at the same time, doing so many important things in their jobs. Because I believe if this is done by people who are really recruited only for doing this, then much much better outcomes and results can be made. So I don't have any question about the capacity of the secretariat, the officials in this ministry running (it). But their time, they also have challenges to manage their time... And plus then it affects on the timeliness of the products, the timeliness of processing, you know, of works. It affects… (progress) because timeliness goes with momentum and how we sustain momentum. And so for a good momentum we'll be lost if we don't make decision on time." – NGO employee from CT6 country

Balancing the roles and influence of diverse countries is also complex.

> "They've got three years as an interim-regional secretary… never once have they requested any of the Solomon islanders, even for ways in which to support the regional secretary. I thought that countries would be willing to do that. But if they've taken the leadership role, asking how they will be running the Interim Regional Secretary it would be really good…. I'm a bit worried. If they keep on doing this, it will make Solomon islanders go far away and … we'll be doing our own stuff." – Government policy maker from CT6 country

When national and regional respondents were asked about the importance for ratifying the Regional Secretariat using a 3-point scaled question, most felt it was either somewhat or very important (Figure 37). Differences between respondent countries and respondent type were not significant (p>0.050, Kruskal Wallis test and Mann Whitney U test, respectively). This implies respondents at the national and regional levels support and desire the ratification of the Regional Secretariat, a finding that was echoed in the interviews:

> "I think that's where the Interim Regional Secretariat needs to be established on a permanent basis. Because we need a facilitator to (coordinate). And I think that's where the challenge is, because…the secretariat has been interim. But I think it can occur if you have that support system in place…. So without the support system, the infrastructure within the Regional Secretariat to take on the tasks of having this convened and all that, it will die…and you know…the death of the project." – NGO employee from CT6 country

> "I think for me the importance is getting the Regional Secretariat and the focal secretariat to drive regional agendas and to reach out to the global community on other issues that are important to the region. That I think, for me, has to happen. And as a country we would want to have that support at the regional level--for coordination, promoting regional issues into the other forums that are out there and collectively join our voices under this Regional Secretariat. I think for us that would be important." – CT6 national government policy-maker
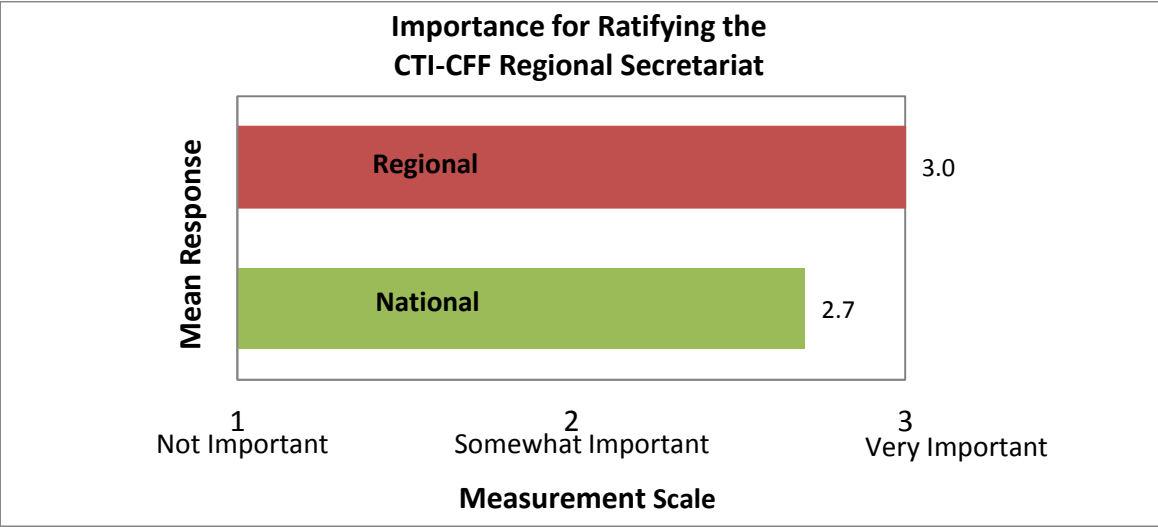
Figure 37. Importance of ratifying the CTI-CFF Regional Secretariat held by national and regional respondents (n=54).

National and regional respondents were also asked about how capable they believed the Regional Secretariat was for performing its responsibility using a five-point scaled question (Figure 38). Despite perceiving high importance for ratifying the Regional Secretariat (Figure 37), both national and regional respondents were less optimistic about its institutional capacity,

albeit national respondents believed it had significantly greater capacity than regional respondents (Figure 38).
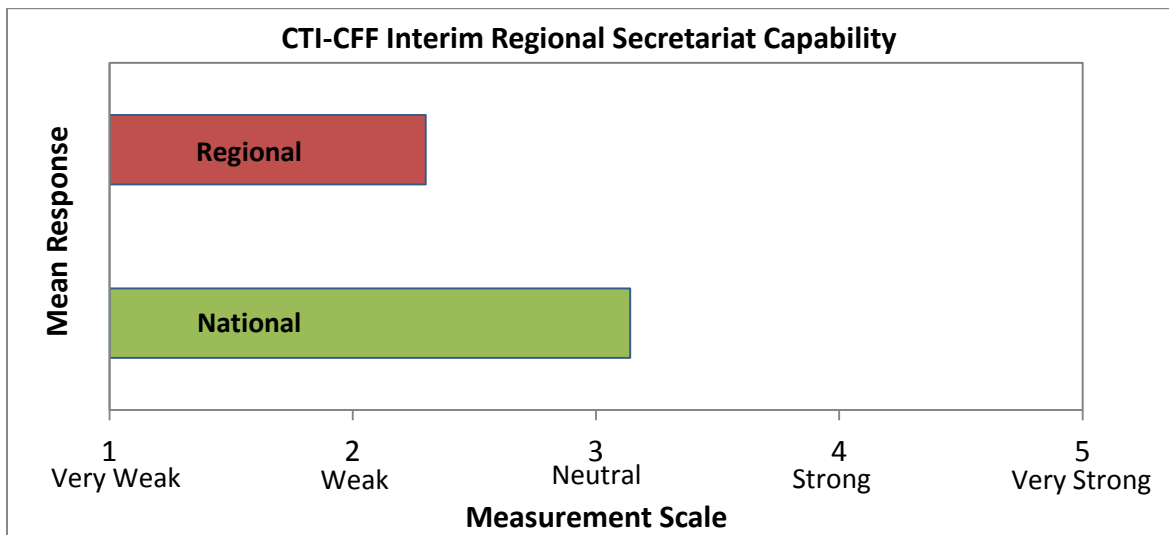

Figure 38. Perceived capability of the Regional Secretariat held by national and regional respondents (n=49).

When regional and national respondents were asked about whether they perceived the costs for implementing regional programs outweighed the benefits using a five-point scaled question (Figure 39), almost twice as many regional and national respondents disagree (43 percent) than agree (23 percent) with the statement. The survey and interview data show there is some concern about the costs associated with a regional program, with some respondents indicating regional programs required high levels of travel, monetary costs for organizing meetings, and time conflicts with other occupational responsibilities. The difference between national (n=35) and regional (n=21) respondents was not significant (p>0.050, Mann Whitney U test).
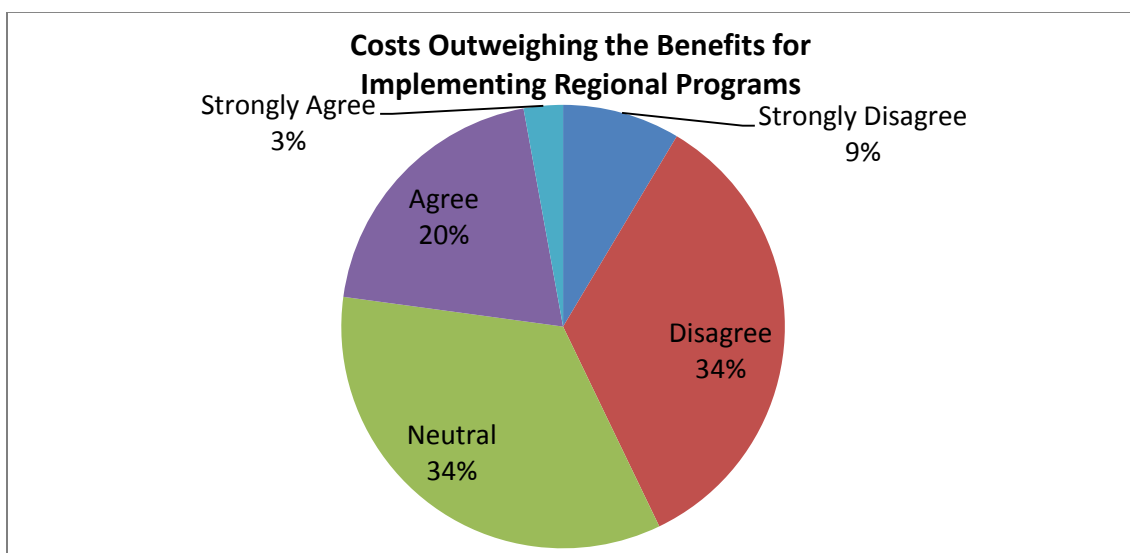
Figure 39. National and regional respondents were asked about whether costs associated with implementing regional programs outweighed the benefits (n=56).

When national and regional respondents were asked about the level of burden associated with implementing a regional program like the CTI-CFF using a ten-point scaled question, where "1" signified low burden and "10" signified high burden, most held neutral perceptions and differences between respondent types and represented countries were not significant (p>0.050, Mann Whitney U test and Kruskal Wallis test, respectively, Figure 40).
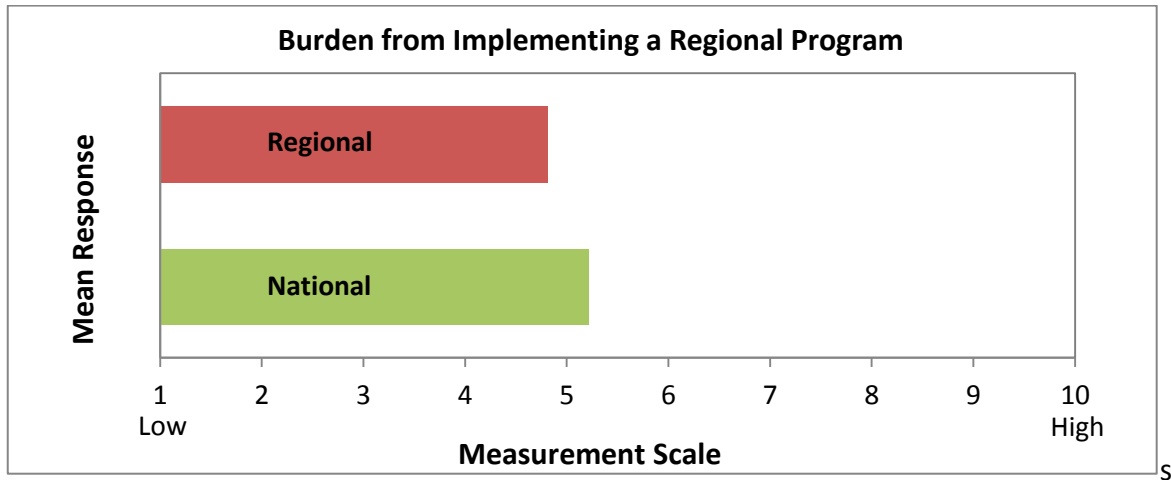
Figure 40. Level of perceived burden from implementing a regional program held my national and regional respondents (n=56).

There have been and currently are a wide array of coastal management, marine conservation, fisheries management programs in the region. Climate change planning is starting. Regional and national respondents were asked about the level of significance of the CTI-CFF using a five-point scaled question, where response options ranged from (1) very insignificant, (2) insignificant, (3) neutral, (4) significant, and (5) very significant. For simplification, very insignificant, insignificant, and neutral responses were aggregated in Figure 34. There were no significant difference between countries (H(5)=10.208, p>0.05) or between national (n=148) and regional (n=22) respondents (U=1423.0, p>0.05). It is unequivocal that the CTI-CFF is perceived as having a high degree of importance in the region (Figure 41).

Coral Triangle Initiative Significance

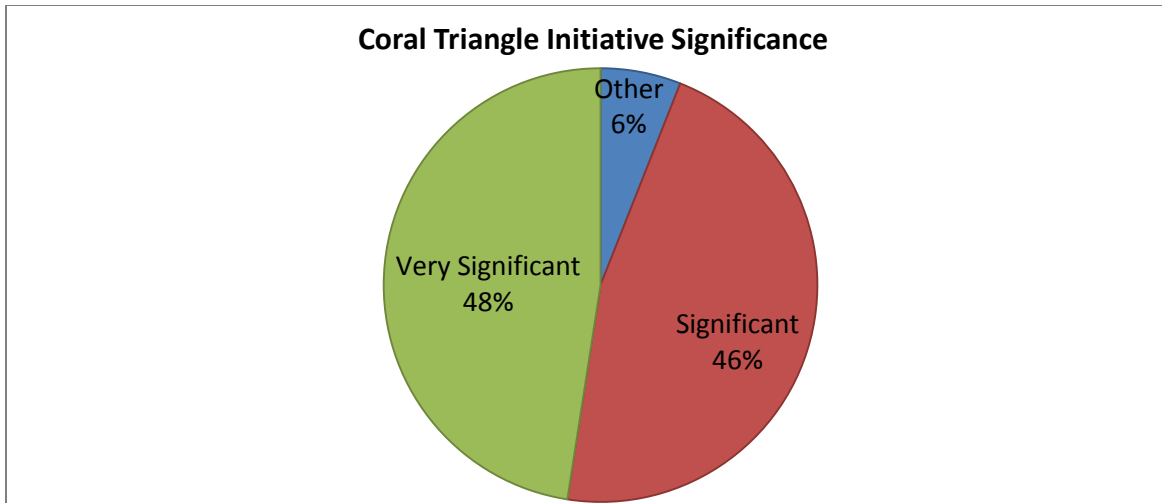Figure 41. Perceived Coral Triangle Initiative significance held by regional and national respondents (n=170).

V. Conclusions and Recommendations

The following LP conclusions and recommendations focus on key questions highlighted in the LP implementation plan as represented in Figure 2. They are based exclusively on the data presented in this report. Most notably, surveys and interviews of thousands of informants from various levels of society clearly demonstrate that the USCTI program has had a significant positive impact in the CT region. The USCTI was innovative on a number of fronts. Progress was made in terms of both process and outcome—essential ingredients to sustained environmental management programs (Christie et al. 2005; Christie et al. 2007). The LP results suggest a few logical next steps to take to improve regional ocean governance.

The CT region has a wide range of social ecological conditions, cultures, histories, and capacities. There are modest indications that social ecological conditions are improving in project sites across the region. Management activities intended to improve social ecological conditions are advancing and promising. MPAs, EAFM, CCA planning and implementation are progressing, with the greatest tangible progress on MPAs at the local and regional levels. The declaration of the Coral Triangle MPA System is a landmark accomplishment. MPA awareness, monitoring, and implementation of MPAs are improving in project sites. The declaration of new MPAs in Solomon Islands, Timor-Leste, and Malaysia are tangible steps forward. EAFM and CCA concepts are diffusing among policy makers throughout the region. The development of tangible EAFM and CCA actions and policies are in relatively early, but promising, stages.

The development of a broad range of well-designed educational materials and guidebooks is impressive and valued. Adoption of these normative and educational materials is at an early stage and represents an opportunity for the next stages of US government and international NGO support for the CTI-CFF in partnership with CT countries. This has been considerable

progress in the development of MPA, EAFM, CCA training programs and educational systems at community, national and regional levels.

The ambitious integrated approach used by the USCTI is maturing and represents the leading edge of regional marine resource management. The USCTI has resulted in progress in both thematic integration (linking MPAs with EAFM with CCA) and institutional integration. The recently developed Integration Guide (Flower et al. 2013) is a valuable resource that could become more useful with increased dissemination and institutionalization. There remain considerable challenges to improve vertical integration in the region—a process that is highly valued and will require ongoing attention. Many challenges and barriers exist, only some of which a program such as the CTI-CFF can address. Investing in human and institutional capacity and fostering such linkages with guidelines, networks and practical exercises designed to solve pressing problems emerge as important processes to maintain.

One of the most significant achievements of the USCTI is the creation of learning networks at various levels within the CT region. Social network analysis and key informant interviews clearly document the progress toward and value of the regional and in-country networks that have been fostered by REXs and other means. Currently, the regional communication network, as measured, involves individuals from the US and CT nations (and some from Australia and other countries). The international dimensions of this network that includes individuals from both inside and outside CT countries is predictable and appropriate given the scope and cause of problems and need for capacity development. The importance of the CT, the cause of the problems, and scale of the challenge are global in nature. There are also indications that leadership is developing. National policy makers and other REX participants are dedicated and interested in the continuation of national and regional learning networks. They welcome support from capable, respectful and collaborative individuals from other countries both within and outside the CT region. The role of female leaders in these networks is apparent and is contributing to the ongoing empowerment of women who participate in the CTI-CFF.

The establishment of a strong and multi-national Regional Secretariat is highly valued. Hopefully, the Secretariat will be established in 2014. Considerable effort should be focused on ensuring that the Secretariat, once established, is highly skilled and effective.

A CT regional identity is also emerging. Communication between country leaders, leadership creation, and vertical integration through regional and national CTI-CFF plans has supported this regional identity. Continued effort should be focused on maintaining these processes that increase institutional and human capacity. The implementation of tangible policies on regional problems such as climate change, illegal, unreported, and unregulated (IUU) fishing, or unsustainable trade will cement and validate the creation of the CTI-CFF and its regional approach to ocean governance. Establishing linkages to regional/global institutions (e.g., Food and Agriculture Organization, United Nations Development Program) has begun and could be strengthened.

Last, the US CTI Support Program Implementing Partners (WWF, TNC, CI, NOAA, PI) have dramatically improved their collaboration during the last five years. This represents a remarkable success given distinct institutional cultures and inherent barriers to inter-institutional collaboration. Also notable is the improved collaborative relationships between the international NGOs and CT national government agencies. Additional analyses will more fully investigate these institutional changes.

Conclusion	Recommendation
Learning Project identified key outcomes and linked them to ocean governance challenges	Invest in learning program led by third party in collaboration with implementing partners
Perceived social and ecological improvements; national and regional respondents are optimistic	US government should continue significant investment in the CTI
MPA implementation is inconsistent but improving in program sites	Continue investment in CTMPAS, trainings, and monitoring
EAFM is at early stages of implementation but concept is diffusing among national policy makers	Continue training and begin implementation, especially at local levels
Climate change education and planning is gaining momentum	Strengthen regional, national, local planning and action taking with guidelines developed
Integration of conservation and food security policy development is increasing and resonates with resource users, policy makers and program implementers	Strengthen commitment to food security while meeting conservation targets
Regional exchanges support regional identity, CT6 leadership creation and policy implementation	Increase investment in regional learning networks and mentorship; eventually pass network management responsibilities to CT6 institutions
Uptake of guidebooks limited	Embed guidebooks in educational programs and ensure translation to CT6 languages
Vertical integration important to national and regional informants, but room for improvements	Increase investment in national learning networks and practical site based exchanges
Inter-NGO and NGO-government collaboration is improving	Maintain international NGO collaboration to support CT6 governments and NGO institutions
Ratification and effective development of Regional Secretariat high priority	Establish multi-national Regional Secretariat; strengthen commitment to regional problems e.g., IUU fishing, unsustainable international trade of marine products, and regional climate change science and policies

VI. References

Adler, P. S., and S.-W. Kwon. 2002. Social Capital: Prospects for a New Concept. The Academy of Management Review 1:17–40.

Berkes, F. 2006. From community-based resource management to complex systems: the scale issue and marine commons. Ecology and Society 11 (1): 45

Bodin, Ö., and B. I. Crona. 2009. The role of social networks in natural resource governance: What relational patterns make a difference? Global Environmental Change 19:366–374.

Borgatti, S.P., A, Mehra, D.J. Brass, and G. Labianca 2009. Network analysis in the social sciences. *Science* 323:892-895.

Burt, R. S. 2005. Brokerage and Closure: An Introduction to Social Capital. Oxford University Press, New York.

Christie, P., K. Lowry, A.T. White, E.G. Oracion, L. Sievanen, R.S. Pomeroy, R.B. Pollnac, J. Patlis, L. Eisma. 2005. Key findings from a multidisciplinary examination of integrated coastal management process sustainability. *Ocean and Coastal Management* 48:468-483.

Christie, P. et al. 2009a. Tropical Marine EBM Feasibility: A Synthesis of Case Studies and Comparative Analyses. Coastal Management 37:374–385.

Christie, P., R.B. Pollnac, E.G. Oracion, A. Sabonsolin, R. Diaz, D. Pietri. 2009b. Back to basics: An empirical study demonstrating the importance of local-level dynamics for the success of tropical marine ecosystem-based management. *Coastal Management* 37: 349-373.

Cinner, J.E., T.R. McClanahan, et al 2012 Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. *Global Environmental Change* 22: 12-20.

The Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security. 2009. Regional Plan of Action: Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF). 42pg.

Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF). 2013. Coral Triangle Marine Protected Area System Framework and Action Plan. CTI-CFF, United States Agency for International Development Coral Triangle Support Partnership and US National Oceanic and Atmospheric Administration, Cebu City, Philippines. 75 pp.

Crona, B., and Ö. Bodin. 2006. What You Know is Who You Know? Communication Patterns Among Resource Users as a Prerequisite for Co-management. Ecology and Society 11.

Fidelman, P., and J. A. Ekstrom. 2012. Mapping seascapes of international environmental arrangements in the Coral Triangle. Marine Policy 36:993–1004. Elsevier.

Fidelman, P., L. Evans, M. Fabinyi, S. Foale, J. Cinner, and F. Rosen. 2012. Governing large-scale marine commons: Contextual challenges in the Coral Triangle. Marine Policy 36:42–53.

Flower, K.R., Atkinson, S.R., Brainard, R., Courtney, C., Parker, B.A., Parks, J., Pomeroy, R., & White, A. (2013). Toward ecosystem-based coastal area and fisheries management in the Coral Triangle: Integrated strategies and guidance. Jakarta, Indonesia: Coral Triangle Initiative Support Program for the US Agency for International Development.

Green, S., P. Christie, A. B. Meneses, L. Karrer, S. Campbell, A. White, S. Kilarski, G. Samonte-Tan, H. Fox, and J. Claussen. 2011. Emerging marine protected area networks in the coral triangle: Lessons and way forward. Conservation and Society 9:173.

Foale, S. et al. 2012. Food security and the Coral Triangle Initiative. Marine Policy 38: 174-183.

Hanf, K., and A. Underdal. 1990. Domesticating International Committments: Linking National and International Decision-Making. Pages 149–170 in A. Underdal, editor. International Politics of Environmental Management. Kluwer, Dordrecht.

Hartley, T. W., and C. Glass. 2010. Science-to-management pathways in US Atlantic herring management: using governance network structure and function to track information flow and potential influence. ICES Journal of Marine Science 67:1154–1163.

Keohane, R. O., P. M. Haas, and M. A. Levy. 1993. The Effectiveness of International Environmental Institutions. Page 448 in P. M. Haas, R. O. Keohane, and M. A. Levy, editors. Institutions for the Earth: Sources of Effective International Environmental Protection. The MIT Press, Cambridge.

Lauber, T. B., D. J. Decker, and B. A. Knuth. 2008. Social networks and community-based natural resource management. Environmental Management 42:677–687.

Lin, N. 2001. Social Capital: A Theory of Social Structure and Action. Cambridge University Press, Cambridge.

Lowry, G. K., A. T. White, and P. Christie. 2009. Scaling Up to Networks of Marine Protected Areas in the Philippines: Biophysical, Legal, Institutional, and Social Considerations. Coastal Management 37:274–290.

Mills, M., R. L. Pressey, R. Weeks, S. Foale, and N. C. Ban. 2010. A mismatch of scales: challenges in planning for implementation of marine protected areas in the Coral Triangle. Conservation Letters 3:6-13.

McClanahan, T.R., J.E. Cinner, et al 2009 Identifying Reefs of Hope and Hopeful actions: Contextualizing Environmental, Ecological, and Social Parameters to Respond Effectively to Climate Change. *Conservation Biology* 23(3):662-671.

Miles, M.B. and A. M. Huberman. 1994. *Qualitative Data Analysis*. Second edition. Sage, Thousand Oaks, CA.

National CTI Coordination Committee 2011 *Marine Protected Area Management Effectiveness Management Tool. (MPA MEAT).*

National Science Foundation. (2002). *The 2002 User-Friendly Handbook for Project Evaluation*. Retrieved on 1-8-14 from http://www.nsf.gov/pubs/2002/ nsf02057/nsf02057.pdf.

Oliver, D. G., Serovich, J. M., Mason, T. L. 2005. Constraints and Opportunities with Interview Transcription: Towards Reflection in Qualitative Research. *Social Forces* 84 (2): 1273-1289.

Patton, M.Q. 2001. *Qualitative Research and Evaluation Methods (3rd Edition).* Sage, Newbury Park, CA.

Pollnac, R.B. and B.R. Crawford 2000 *Assessing Behavioral Aspects of Coastal Resource Use.* Proyek Pesisir Publications Special Report. Coastal Resources Center Coastal Management Report #2226. Narragansett RI: Coastal Resources Center, University of Rhode Island.

Pollnac, R., and R. Pomeroy. 2005. Factors influencing the sustainability of integrated coastal management projects in the Philippines and Indonesia. Ocean & Coastal Management 48:233–251.

Ramirez-Sanchez, S., and E. Pinkerton. 2009. The Impact of Resource Scarcity on Bonding and Bridging Social Capital : the Case of Fishers ' Information-Sharing Networks in Loreto . Ecology and Society 14.

Rogers, E.M. 1995. Diffusion of innovations. 5th edition. New York, The Free Press.

Schneider, M., J. Scholz, M. Lubell, D. Mindruta, and M. Edwardsen. 2003. Building Consensual Institutions: Networks and the National Estuary Program. American Journal of Political Science 47:143–158.

Social Impact. Final Evaluation of the US Coral Triangle Initiative (USCTI) Program. USAID Evaluation Report. Contract Number: RAN-I-00-09-00019. October 17, 2013.

Strauss, A. and J. Corbin. 1990. *The Basics of Qualitative Research Grounded Theory Procedures and Techniques*. Newbury Park: Sage.

Tengberg, A., Cabanban, A.S. 2013. Lessons learned from investing in marine and coastal management initiatives in the East Asian Seas. Marine Policy 38: 355–364.

TNC (The Nature Conservancy), WWF (World Wildlife Fund), CI (Conservation International) and WCS (Wildlife Conservation Society). 2008. Marine protected area networks in the Coral Triangle: development and lessons. TNC, WWF, CI, WCS and the United States Agency for International Development, Cebu City, Philippines. 106 p.

The US Coral Triangle Initiative (CTI) Support Program. 2010. Midterm Program Performance Evaluation Report. 54 p.

The WorldFish Center. The US Coral Triangle Initiative (CTI) Support Program. Midterm Program Performance Evaluation Report. Contract No. AID-486-O-10-00062. October 11, 2010

Vaccaro, I, E.A. Smith and S. Aswani 2011 *Environmental Social Sciences: Methods and Research Design*. Cambridge UK: Cambridge University Press.

Wasserman, S., and K. Faust. 1994. Social Network Analysis: Methods and Applications. Cambridge University Press, Cambridge.

Yin, R.K. 2008. *Case Study Research: Design and Methods (4th edition)*. Newbury Park: Sage.

Young, O. 2006. Vertical Interplay among Scale-dependent Environmental and Resource Regimes. Ecology and Society 11.

Annex 1: Methods

Methods:

A multiple method approach was used to triangulate findings for this study, which allows for greater internal and external validity. The methods employed include: (1) document analysis, (2) social surveys, and (3) semi-structured interviews. The study sites and informant selection choices were made by the LP leadership team, in consultation with the US CTI and CTSP partners.

(1) Document analysis:

A detailed assessment of the US CTI policy documents, including design and accomplishment reports (e.g., the CTSP implementation agreement, yearly progress reports, REX summary reports) and relevant previous studies contracted by the US CTI (e.g., the mid-term US CTI evaluation). Documents were systematically analyzed for the above themes with the analysis informing the creation of survey instruments and interview guides.

(2) Social Surveys:

Three types of social surveys were used: (a) community survey of informants living within CTI integration sites in Indonesia, Philippines, Solomon Islands, and Timor-Leste; (b) social network survey of Regional Exchange (REX) participants; and (c) leadership survey of US CTI, CTI-CFF, and CTSP members in Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor-Leste. The survey questions were phrased in a manner relevant for all contexts and translated into the most appropriate language for each respective country. Except when noted, surveys were implemented face-to-face by LP team members. Data generated from these surveys were analyzed using SYSTAT, SPSS, and UCINET software.

(2a) Community survey:

There were four levels of surveys in each community: (1) marine resource users, (2) community conservation leaders, (3) community leaders, and (4) local government leaders. Marine resource users were randomly sampled while other informant types were purposively sampled. Surveys were conducted in Bahasa Indonesian, Tagalog, Tetum, Neo Melanesian pidgin, and English. Specific objectives for project areas were identified in collaboration with US CTI and CSTP leadership. Indicators to assess the progress toward achieving these objectives were developed using, as appropriate, the most current, well-tested indicators adopted and/or adapted from research completed in Southeast Asia (e.g., Cinner, et al. 2012; McClanahan, et al. 2009; National CTI Coordination Committee 2011; Pollnac and Crawford 2000; Vaccaro, et al. 2011). The indicators included contextual data (e.g., environmental, political, demographic) that are related to the key project indicators in other reviews. There was limited or no baseline data available in most sites, and baseline free methods for assessment of change in indicators were used (Pollnac and Crawford 2000).

(2b) Social network survey:

Social network analysis (e.g., Borgatti et al. 2009; Wasserman and Faust, 1994) was conducted across the CT region by focusing on participants in the US CTI-sponsored Regional Exchanges (REXs) meetings on MPAs, EAFM, and CCA. This assessment was conducted with the use of a short, online survey tool asking informants to nominate the people that they most frequently communicated with about CTI-CFF and US CTI-related topics.

(2c) Leadership survey:

The leadership survey evaluated senior leadership from the US CTI, CTSP, and CTI-CFF as well as technical experts working for governmental or non-governmental (NGO) organizations at a national or regional level. These informants were purposely sampled and initially identified in collaboration with CTSP and US CTI leadership. The objective of this survey was to evaluate dimensions and links between these informants, explore the themes and questions detailed in the proposal, with a focus on progress made toward national/regional policies and norms, national/regional systems supported field level implementation and policies, and development of robust national/regional institutions.

(3) Semi-structured interviews:

Semi-structured interviews were conducted at the national level in Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor-Leste. Regional level interviews were also performed that included informants from national ministerial leadership, US CTI leadership, NGOs, and scientific community (Patton 2001). These interviews asked core questions consistently across the US CTI leadership and CT6 countries, but were adapted to identify contextual influence on the US CTI design and implementation in each country. Informants were purposely sampled and initially identified in collaboration with CTSP and US CTI leadership. The sample was terminated once conceptual saturation was reached, such as when the 'storyline' underpinning the case study's main point was consistent within informant type.

Interviews were conducted in Bahasa Indonesia, Tagalog, and English. Narratives were translated (as necessary), transcribed, and then coded and analyzed using Atlas.ti software to increase the defensibility of conclusions. The interview data were analyzed using a grounded theory approach (Strauss and Corbin 1990; Miles and Huberman 1994). Predetermined and emergent code categories were applied to the data and Boolean search commands allowed for an examination of relations between data categories (e.g., gender and involvement in CTSP activities). The interviews were used to assess US CTI progress toward program goals and provided a complement to the field surveys and social network analysis. Narratives, such as those generated from the semi-structured interviews, are a powerful means by which commonly overlooked (and statistically insignificant) but important opinions can be captured (Miles and Hubermann, 1994; Patton, 2001).