

# Community-Based Coastal Resources Management in Indonesia: Examples and Initial Lessons from North Sulawesi

By:

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## Abstract

Proyek Pesisir (Coastal Resources Management Project – Indonesia), a cooperative initiative of the government of Indonesia and the U.S. Agency for International Development (USAID), has been working for 18 months in the province of North Sulawesi to establish effective models of participatory and community-based coastal resources management. Many of the issues in the province, and models being established through this project, pertain to the management of coral reefs which remain in good to excellent condition, although threatened from destructive and unsustainable use practices. Models, or examples of best practices being developed include: the formulation and implementation of village-based integrated coastal management plans, community-based marine sanctuaries, village ordinances, and participatory early actions. This paper describes the experiences and lessons learned by Proyek Pesisir in establishing community-based marine sanctuaries at one field site within the Minahasa Regency. It is argued that community-based and decentralized coral reef and coastal management initiatives can be established within the current institutional framework given the new openness within government and demands by the public for governance reforms.

*A paper presented at:  
International Tropical Marine Ecosystems Management Symposium  
Townsville, Australia, November 23- 26, 1998*

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# **1. SITE PROFILE AND BACKGROUND INFORMATION**

## **1.1 Project Context and Objectives**

Proyek Pesisir is the in-country title of the Indonesia Coastal Resources Management Project (henceforth CRMP) which is part of the USAID-BAPPENAS Natural Resources Management II (NRM II) Program being implemented between 1996 and 2003. The CRMP is implemented via the Coastal Resources Management Project II cooperative agreement between USAID/Washington and the Coastal Resources Center of the University of Rhode Island (CRC(URI)). The strategic objective is.... “to decentralize and strengthen natural resources management in Indonesia” (USAID, 1996:2).

The design of the NRM II program proposed that this objective would be achieved through the implementation of natural resources management programs dealing with forest resources and protected areas, coastal resources and biodiversity conservation. Each program coordinates at national, provincial and local levels with counterpart agencies of the Government of Indonesia (GoI) and with non-government, industry and academic organizations, resource users and communities directly.

Since the latter half of 1997, and especially since May, 1998, Indonesia has been seriously affected by political, financial and climatic changes. These changes pose considerable challenges for all development assistance programs, particularly those dealing with natural resources management. While the temptation exists for donors to focus exclusively on immediate needs of food security, and disaster relief, the CRMP recognizes that these issues will be better addressed in the medium to longer term by achievement of the NRM II strategic objective.

It is hypothesized that decentralized and strengthened natural resources management will enhance the ability of Indonesian resource users to cope with acute change phenomena and promote wiser decision making about the long-term use of resources. As noted by USAID (1996:2),... it will start Indonesia on the path towards sustainable management of its forestry, coastal and natural resources which support the livelihood of two-thirds of its (200 million) population, provide for over one half of its national income and are the most biologically diverse ecosystems in the world.

## **1.2 Project Organization**

The CRMP is deliberately positioned to interact with multiple institutions and address issues from the local to global levels. These relationships are fundamental and have been described as a series of purpose-oriented partnerships (Dutton et al., 1997) which enable the BAPPENAS-USAID aspirations for the NRM II program to be linked with broader GoI programs (e.g. the current coral reef rehabilitation and management project - COREMAP). They also enable the CRMP to contribute to the global initiatives, including the International Coral Reef Initiative.

## **1.3 Site Selection and Evolution**

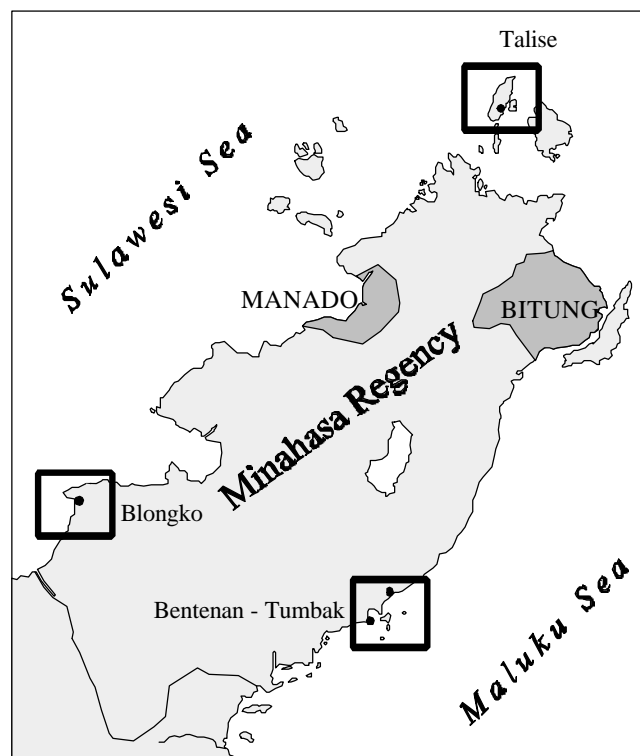
CRMP activities commenced in late 1995 with a customer survey and study of CRM needs and opportunities in Indonesia (CRC, 1995). Following review of that study and approval from USAID-BAPPENAS, CRC/URI commenced in-country operations in October, 1996.

The startup period (October 96-March 97) established the national (Jakarta) and initial local (North Sulawesi) program offices. Concurrently, the CRMP national learning partner, the newly-established Centre for Coastal and Marine Resources Studies (CCMRS) at the Bogor Agricultural Uni-

versity was contracted to assist with preliminary background studies. Initial activities in North Sulawesi included extensive consultation with local government and non-government organizations and communities, reviews of previous coastal project experience in Indonesia (Malik, 1997) and a rapid appraisal of coastal villages (Pollnac, et al., 1997) in the Regency Minahasa, the priority focal area for initial project development.

In July 1997, three field sites (Figure 1) were selected in North Sulawesi after consultation with local government authorities and local communities. This was followed by an initial socialization process with those communities to clarify expectations and identify appropriate approaches in each village. From October 1997, extension officers were stationed permanently in each community to facilitate project implementation. Since 1998, Proyek Pesisir field operations have expanded to the Provinces of Lampung and East Kalimantan, however, these programs are not discussed further, except insofar as to note that various lessons learned from North Sulawesi have guided project establishment in these new areas.

Figure 1: Proyek Pesisir field sites in North Sulawesi, Indonesia



## 2. METHODOLOGICAL APPROACH

### 2.1 An Integrated Project View

In this section of the paper, we discuss key elements of the methodological approach in an integrated way, describe the initial experiences of the most relevant aspects of our work, and our philosophical view of the indivisible links between all stages of the management cycle, from setting goals to reviewing performance. The following sections thus deliberately highlight only certain aspects of the CRMP experience. A more complete and elaborate account of experiences and lessons is being developed. One of the more innovative aspects of project design is developing approaches to and conducting learning reviews of aspects of CRMP practice - the first of those reviews is expected to be complete in early 1999.

## 2.2 Emphasizing Process - Integrated Management at Each Site

In field programs (local track), the goal of Proyek Pesisir is to establish examples of good practice in coastal resources management, through the development and application of methods, strategies, actions, local ordinances and plans, which can lead to improved or stable quality of life for the coastal communities, and stable or improved conditions of the coastal resources on which much of their livelihood depends.

A key project assumption is that in a country as large and diverse as Indonesia, no one planning model will be appropriate to all regions, provinces or for the thousands of coastal communities within the country. Any one province may also need to apply more than one approach to coastal planning and management. Therefore, it is likely that a range of models will be needed. Within and between the three project provinces in Indonesia, different planning approaches are being developed and tested (Proyek Pesisir, 1998). Based on initial experience gained in the first year of the project, the North Sulawesi field program is now focusing on three specific community-based management approaches:

- Community-based village-level marine sanctuaries
- Community-based village-level integrated coastal management plans
- Community-based village-level ordinances and policies

The conceptual framework for the community-based planning and implementation process in North Sulawesi is to carry out the following steps:

1. Communities Identified
2. Communities Oriented and Prepared for the Planning Process
3. Baselines Established
4. Issues Identified
5. Issues Validated and Prioritized
6. Management Options Developed
7. Management Options Selected and Adopted
8. Implementation Initiated
9. Review, Evaluation, Reflection and Adaptation Carried Out

For each step, assumptions of best practice, which are to be tested and validated, have been made. These assumptions are, in essence, a series of hypotheses based on local circumstances and previous worldwide experience, on how the planning and implementation process should be carried out to achieve final outcomes of stable or improved quality of life of coastal peoples, and stable or improved condition of coastal resources.

The project has not completed all of these steps yet, and will require at least another year before management plans are adopted and plan implementation begins. However, through an approach referred to as “early actions,” (designed to build support for the larger planning effort and test implementation procedures), some implementation activities which can be completed quickly and at low cost to address initial issues identified, are being conducted while the longer term planning process progresses. While many previous Indonesian donor funded and foreign assisted projects have stopped at the plan development and approval stage (Malik, 1997), Proyek Pesisir intends to continue at these field sites until implementation is formally supported through normal Government of Indonesia budgeting and implementation channels.

### **2.3 Catalysts of Integrated Management: Community-Based Extension Officers**

We believe that one of the most important ways to assist our partners to reach desired outcomes is to encourage a high level of participation in the planning and implementation process. Experience in similar programs (e.g. Sri Lanka: Dutton, 1997) have shown that an extension agent can be critical to facilitating this process. The extension officer acts as the principal catalyst and coordinator for community-based activities by the project with technical support provided by the CRMP provincial (Manado) office, local consultants, non-government organizations and local government agencies.

Proyek Pesisir extension officers live in and work full-time in the communities, and are trained in a range of disciplines, from marine ecology to community development. Despite the fact that all extension workers had college degrees, we found that significant investments were required to build the capacity of these officers to enable them to effectively interact with communities across the spectrum of local coastal management issues. To ensure adequate coordination and reporting of progress, field extension officers come into the Manado office on a monthly basis. Though meeting with other field extension officers, feedback and peer problem solving occurs. In addition, senior extension staff and consultants mentor the field staff and provide periodic training activities to build the capacity of the field extension team.

The current field extension officers will not, however, remain assigned in the communities forever. Once plans and/or ordinances are developed, approved and implementation initiated, and the community has developed sufficient capacity, the extension officer will be withdrawn from full-time assignment in the community. They will then start outreach and planning activities in neighboring coastal villages as well as documentation of lessons and approaches based on the results at the initial field sites. The full-time assignment of the field extension officer is estimated for a period of from one to three years, and will be followed by part time visits for at least one year after their full time withdrawal. To facilitate this transition, field assistants (members of each community) have been appointed and work (and train) alongside CRMP extension staff.

### **2.4 Enabling Integration - The Importance of Interagency Coordination**

Under current centralized administration systems of the government of Indonesia, Provincial governments have been the primary agent for enabling the implementation of typically “top-down” initiatives. Unfortunately in the context of coastal and other ‘environmental management’ initiatives, this typically involves narrow ‘sectorally-based’ agencies with little mandate, will, experience or capacity. Of particular concern was (and remains) the lack of experience within these agencies to work cooperatively with government and non-government stakeholders in coastal resources management, and the lack of accountability inherent in the governance processes which prevailed under the Soeharto government.

Proyek Pesisir initially began to cautiously address these problems in 1997 by working with the Provincial Planning Agency (BAPPEDA), a local University (UNSRAT) and with a multi-agency Provincial Working Group (who played the key role in site selection), whilst concurrently engaging with key provincial NGOs, industry, and community organizations. As our experience has grown and the ‘comfort level’ among partners increased, initially defined roles are changing. For example, the Provincial Working Group has been reconstituted to provide more emphasis on policy development and overall project guidance.

At the village level, CRMP extension officers work closely with local village government, particularly the village head (“*Kepala Desa*”) and the village development council (“*LKMD*”), and are responsible for additional coordination with the District (“*Kecamatan*”) government. The Manado office maintains linkages with Provincial government and at the Regency (“*Kabupaten*”) level by acting as the secretariat of a Provincial Advisory Group and a Regency Task Force. The Regency Task Force on the other hand, formed in the project’s second year, focuses on coordinating implementation actions at the field site level. While these mechanisms provide both horizontal and vertical linkages throughout the government system, it is within the communities where most of the activities and discussions take place. Communities themselves are deciding allowable and prohibited activities within marine sanctuaries, site location, sanctions, management structure, and authority of the management committees. At the village sites, including the case of Blongko described below, primary responsibility for enforcement, management and compliance lies with the community, however, it is essential that government understands, accepts and empowers these initiatives.

It is significant to note that since Proyek Pesisir commenced, Indonesia has undergone massive social, economic and political change. The entire machinery of government is being reengineered, and there is a genuine demand for more open, accountable, equitable and flexible forms of governance. The Manado Office and the Jakarta Project Office maintain close links with key national institutions including BAPPENAS (National Development Planning Board) and BANGDA (Directorate General for Regional Development of the Ministry of Home Affairs). These links provide both the foundation for legitimization of project activity (e.g. ensuring funding is available to Provinces for coastal initiatives) and the springboard for ultimately replicating project-derived practices and policy reforms. The current ‘*reformasi*’ era within Indonesia is an unprecedented window of opportunity’ for demonstrating to government how communities can be entrusted to manage coastal resources properly. The CRMP has seized that opportunity by:

- Developing an accountable system for community development and management actions which is now being promoted as a model for channeling government funding into poor communities,
- Facilitating interchange between communities and governments in a range of local (e.g. village based trifling), provincial (e.g. seminars), national (e.g. conference) and international forums (e.g. study tours), and;
- Ensuring that provincial and national level policy makers visit field sites to learn how communities can be supported to be better coastal resource stewards.

Those initiatives are leading to greater acceptance of the validity of community-based resource management and are helping shape the natural resources policy reform agenda for Indonesia in the next millennium.

## **2.5 Creating Models: A Marine Sanctuary at the Blongko Village Field Site**

Adapting global experience to the Indonesian context of coastal resources management has been suggested by Dahuri et al., (1996). The successful Apo Island marine sanctuary in the Philippines (White, 1989; Calumpong, 1993) is an example of one model which Proyek Pesisir is attempting to adapt and test in North Sulawesi. The purpose of a community-based marine sanctuary is twofold. First, it can provide a biological function of biodiversity protection, and a protected spawning and nursery ground for marine organisms. Second, and particularly important to the local community, it can have an economic function of sustaining or increasing reef-related fish production, and in some cases, be a marine tourism destination for divers and snorkelers.

Global experience on approaches to developing collaborative and community-based management of coral reefs (White et al., 1994) has been employed as a basis for the process being followed in the establishment and management of the first Indonesian community-based marine sanctuary in the village of Blongko. The specific steps in the process are as follows:

1. Community Socialization
2. Public Education and Capacity Building
3. Community Consultation and Village Ordinance Formulation
4. Village Ordinance Approval
5. Implementation

Community Socialization: This process started with the extension officer establishing a project office within the village office, and conducting a series of formal meetings and informal discussions with various social and religious groups to inform them about the project goals and process. During this initial period, the extension officer also prepared an ecological and human history of the community (Kasmidi, 1998) by interviewing elderly residents and other key informants about changes in population and settlement patterns, and changes in long-term conditions and use of coastal resources. This helped community members get to know the extension officer and visa versa and helped them obtain a better understanding of the management issues within the community. Through this process the villagers also provided a historical perspective of how the present state of the environment and community had come about. In addition, a technical team conducted initial surveys of the reefs and mangroves in the village, and the extension officer initiated a systematic socioeconomic survey of the community to determine baseline conditions.

Public Education and Capacity Building: The idea of making six hectares of the coast containing a fringing coral reef and mangrove forest into a marine sanctuary came about after a representative of Blongko village visited the marine sanctuary at Apo Island in the Philippines. This was followed by a reciprocal visit by the Apo Island Barangay Captain and member of the women's cooperative to observe Blongko and exchange ideas. The *Kepala Desa* (head of the village) in Blongko and the community quickly understood the Apo Island group's description of how their community-driven marine sanctuary effort was developed and implemented. The extension officer held numerous public education events on marine and coral reef ecology, and the marine sanctuary concept. Training was also conducted coral reef mapping and monitoring. This information was then incorporated into the marine sanctuary planning process. Realizing the potential benefits of increased fish production from a sanctuary, and the value of the local fishery to their community in supporting the livelihoods of future generations, the community engaged in efforts with Proyek Pesisir staff to identify a proper site, and to develop a local ordinance to regulate the proposed protected area. Within a few months, the community fully supported the marine sanctuary concept. This was a major milestone in the process of establishing the marine sanctuary.

As part of developing the community capacity to manage a marine sanctuary, a grant project was created. Communities could prepare two to three page proposals to take "early action" to address simple coastal management problems which do not require large sums of money or a long duration to complete. The objective behind these "early actions" in Blongko was to help build support for the marine sanctuary planning effort, and test implementation strategies. Proposals were approved if they followed the procedures and met established criteria that include public participation in the proposal development, widespread community support for the proposals and community contributions (labor, materials or partial financing). These early actions in Blongko and other communities have typically been small scale, only several hundred dollars, and have been for actions such as construction of latrines and wells, construction of a community meeting and information center,

mangrove replanting, and small scale drinking water supply development. Blongko is currently preparing proposals for installation of signboards and sanctuary boundary markers. Community groups who implement the grants are trained in simple accounting and financial reporting procedures, and are required to submit a finance report and technical report upon completion of the grant project. Expenditure reports are posted in the village office for full public disclosure and accounting books are open to public review by anyone in the community. The early action program was instrumental in developing trust with the community, and demonstrating the project desire to listen to community needs, and commitment to act.

Community Consultation and Village Ordinance Formulation: After the extension officer conducted a series of formal and informal meetings and small group discussions, a local legal consultant (based on inputs provided by the community) drafted an ordinance. Additional meetings were held to discuss the draft ordinance and modify the contents. One stakeholder group - reef gleaners - never attended the formal meetings, but it was proposed that no walking over the reef flat would be allowed, which would impact their ability to reach gleaning areas on the other side of the sanctuary. The extension had to make special efforts to meet with gleaners informally and discuss this proposed prohibition. After much discussion, the gleaners agreed with this proposal as they had an alternative trail behind the mangroves they could use with minimal inconvenience to reach the other side of the sanctuary.

Site selection was also another area of important discussion and decision making. A series of three community training programs on coral reef monitoring and mapping using the Manta Tow technique were conducted where the community themselves mapped the coral condition along their village. Fraser, et al., (1998) showed that the community generated data was not statistically different from professionally collected data. This map was used as the basis of discussions for selecting the actual marine sanctuary site. The first area recommended by the technical team as the best site was on a far point, which had the best coral cover and fish abundance. The community however, rejected this location as it was often visited by bomb fishers from outside the community and was typically a resting location for fishers returning from offshore fishing trips. Other alternatives were considered. A reef in front of the village was proposed, but this area had tidal fishponds (locally called "*bonor*" and constructed from coral rock) on the reef flat. The technical team was concerned this might have a negative impact on the sanctuary concept. Finally, a third site was selected by the community with moderately good coral cover and within sight of the village.

The technical team recommended that the marine sanctuary only consist of a core zone as a way of keeping management and the language in the ordinance simple. However, the community was concerned that light boats used for night fishing of anchovies, if fishing too close to the sanctuary, would attract small fish out of the sanctuary, thereby having a negative impact on its function. Therefore, the community decided to include a buffer zone around the sanctuary which prohibited the use of light boats within 100 meters of the core zone boundary. This is one of several cases where the community decided on a stricter set of regulations than was recommended by the technical team.

An especially interesting event occurred which helped reinforce the marine sanctuary concept among the fishers in the village. One Blongko fisher was out at a fish aggregating device approximately three hours from shore when he met a Philippine fishing boat. One of the Filipinos spoke Indonesian and they started a conversation about fishing. The Blongko fisher mentioned the marine sanctuary concept being proposed and the visit of Apo Island residents to their community. The Filipino fisher from General Santos City was aware of the success of the Apo Island marine sanctuary and encouraged the Blongko fisher to support the establishment of the sanctuary in his vil-



lage. The Blongko fisher previously was willing to go along with the sanctuary concept, but after this chance meeting at sea, became a strong supporter and advocate of the sanctuary.

Village Ordinance Approval: Final community approval of the ordinance took place at an all-village meeting called specifically for this purpose in September, 1998. Copies of the final ordinance were made and distributed to every household in the village prior to the meeting. The final ordinance contains sections detailing the following:

- Legal basis that supports the establishment of a community-based marine sanctuary and the goals of a marine sanctuary.
- Location of the marine sanctuary.
- Responsibilities of the management group and community in sanctuary management.
- Allowable activities in the marine sanctuary and buffer zone.
- Prohibited activities in the marine sanctuary and buffer zone.
- Penalties for violations.
- Attached map of the marine sanctuary location.

The approved village ordinance is being submitted to district and regent officials for their concurrence and toward gaining additional strength and support for implementation and enforcement. Provincial, Regency, and District officials have been kept informed concerning the sanctuary development throughout the process. High level delegations from Provincial and National agencies have also visited Blongko and expressed their support and encouragement in promoting the sanctuary concept and continuing this initial experiment in Blongko. The entire process, from the initial assignment of the extension officer at the field site to ordinance approval, has taken one year.

Implementation: Even before the village ordinance was completed, initial implementation activities were started and being planned. Already an information/meeting center is under construction; placement of boundary markers is underway; information signs are being created; a management committee has been formed; and a community group has been trained to monitor coral condition using the Manta Tow technique. A management group is in the early stages of formulating a management plan for the marine sanctuary.

### **3.0 REFLECTIONS AND LESSONS LEARNED TO DATE**

In a project as innovative and timely (in the Indonesian context) as *Proyek Pesisir* is, it is tempting to seize the quick lessons and begin to apply those practices and models which offer hope to protect biodiversity, alleviate poverty and improve livelihoods. The rate of degradation of Indonesia's vast coastal and marine resources, particularly coral reefs (see Suharsono, 1998), climate and development induced natural disasters (Dutton and Crawford, 1998), the urgency of dealing with economic decline and the importance of governance reforms (Ginting, 1998) all predicate an urgent response from policy makers.

But where to begin and what kinds of initiatives work best? Perhaps the most consistent lesson learned to date is that the previous development paradigms of the "New Order" government of former president Soeharto have led Indonesia to the brink of collapse today. Entrenched corruption, collusion and nepotism ("*KKN*"), failure to acknowledge the legitimacy of public (c.f. corporate) control of resources, ill conceived and improperly designed investment projects and laws, failure to encourage equitable development of outer provinces and a lack of willingness to share information amongst stakeholders are all very real problems facing Indonesian coastal resource

users and managers today. The good news is that those problems are now being openly discussed and are beginning to be systematically addressed. It is in this context that Proyek Pesisir is assisting communities, governments, industry, and other stakeholders to explore, test and share solutions.

Some of the initial practices and policies derived from specific aspects of our work to date which are likely to assist this process are defined below. These are suggested not as a comprehensive set of guidelines, but rather as a basis for consideration in the design of complementary initiatives in the future. An unfortunate hallmark of most past coastal management initiatives has been a tendency to not learn from past experience.

### **3.2 Initial Lessons from Planning and Management Activities**

Map and understand the niche of the project: Considerable effort was expended in project design and later in an initial six month start up' period on determining how best a coastal resources management initiative could be developed which properly addressed local and national needs. That consultation was undertaken by an experienced international and local project team and involved extensive consultation with project sponsors and clients. Initial consultation has now led to informal and formal channels for enabling the CRMP to be vertically and horizontally integrated with government and non-government governance processes.

Use the right human resources to build an extended team: Proyek Pesisir expended considerable efforts in finding suitable staff and consultants and in developing a close working relationship with all key counterparts. This is a challenge typical of most coastal initiatives, however, is exacerbated in Indonesia by (a) lack of experienced professionals and (b) the lack of precedent for integrated, partnership-oriented project teams. Considerable effort has been made to select an appropriate balance of skills (including the often under estimated administrative support) and in building trust and communication within the extended team (which we perceive as ranging from villagers to Ministers).

Work incrementally and adaptively: The process of developing one field program at a time, and then one key initiative at each field site, has worked well. For example, in the case of the Blongko Marine Sanctuary it has allowed resources to be concentrated to ensure the first sanctuary was established properly with appropriate public process and sufficient technical inputs. Cross visits between communities have increased the speed at which acceptance of the marine sanctuary concept is occurring at other field locations. Therefore disseminating experience after establishment of an initial successful pilot site is recommended.

Use experienced community members as extension agents and trainers to other communities: Community members and fishers talking to other community members and fishers is often more persuasive than accepting the views of a community outsider however well intentioned they might be. The cross visits with the Philippines increased the speed at which we were able to adapt the community-based marine sanctuary concept to the Indonesian context and is increasing the speed at which it is being transferred from the initial site in Blongko to other sites in North Sulawesi. This technique has also proven effective in the successful integrated pest management program (farmer to farmer training) in Indonesia.

Develop and implement a public education strategy early on in the planning process: In retrospect, it probably would be better to do more public education events early on than we actually implemented, and have a public education strategy in place at an earlier period in the sanctuary planning

process.

Engage local government institutions early on in the planning process: Line government agencies such as fisheries, forestry, and the Provincial Planning Board, although informed and supportive of activities, have only occasionally involved their staff in actual field activities. This is a lost opportunity for these agencies to learn the details of the marine sanctuary planning process. Engaging the local line agencies more in the next round of field site marine sanctuary establishment is being attempted, and will help with the second phase of the project strategy which is a scaling-up of the concept as part of a provincial coastal management extension program.

### **3.3 Lessons Learned in Capacity Building**

Carefully assess the capacity of local partners and communities at the onset of a project: We initially overestimated the capability of institutions and personnel, and the speed at which work could be accomplished. It required us to continually make adjustments in work and training strategies to move at the pace of our staff, local counterparts and communities to ensure that the work was done properly and that the proper foundations were put in place before the next steps in the process progress.

Build the skills of staff and supply appropriate technical assistance in stages: Both training and technical assistance interventions need to be interspersed with immediate opportunities for applications on-the-job. Therefore, the content of training and technical assistance should be carefully linked to the skills required of staff at the appropriate time in the planning cycle. This allows staff to apply, analyze and improve skills as they go, and achieve a certain level of competency before moving to the next set of tasks. For projects that have a heavy emphasis on capacity building, setting clear performance and results milestones and achieving them before moving on to the next set of activities is more important than carrying out activities within a certain time frame with little attention to quality.

### **3.4 Initial Lessons Learned in Research, Monitoring and Performance Evaluation**

A significant amount of resources are required to undertake systematic monitoring: The CRMP expends considerable effort (time and funds) on monitoring and performance evaluation, especially at field sites. This is considered necessary as the field sites are being viewed as experimental sites when best practice approaches are being tested and validated. It is felt that without strong and persuasive evidence of the effectiveness of the models being developed, it will be less likely that they will be replicated or adopted on a wider scale. In addition, if a systematic monitoring program is not put in place for model testing (often justified to speed the process up, or to save costs), and we are not certain of impacts of interventions, we run a danger of decisions for larger scale investments for replication being wrong. The risks and costs of being wrong, could exceed by several orders of magnitude the initial pilot model testing investments. This would be a tragic waste of large sums of taxpayer money, and loss of precious time. If environmental trends are negative, going down a dead end means even more severe conditions for the next round of needed interventions, and reluctant communities unwilling to accept what may again be bad advice given previously. Finally, staff resources on approaches which may ultimately prove to be ineffective would be wasted. Once models of best practice are validated, replication to other areas would require a smaller set of indicators, and a simpler, less costly and time consuming approach to monitoring.

Use research as an overt extension tool for ICM: The process of ICM model testing is analogous to the research and development conducted at agricultural experiment stations and their associated

extension delivery systems for developing improved varieties of rice. No agricultural researcher or extension program would dare make recommendations to farmers regarding levels and timing of pesticide and fertilizer applications, without first having a high level of certainty of the crop yields and profits to be expected. No ICM approaches should be widely disseminated either until there is a high level of certainty that they will have positive results. A century of agricultural extension experience worldwide, and the integrated pest management program approach implemented with great success in Indonesia (which includes significant farmer participation in action research, training and extension), has lessons which can be applied to the development and adoption of best practices in coastal management.

## **ACKNOWLEDGEMENTS**

The authors gratefully acknowledge the advice and assistance of CRMP colleagues and advisors in developing the ideas expressed in this paper. The ideas and opinions expressed in the paper are those of the authors and do not necessarily reflect the views of CRMP counterpart agencies or USAID.

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