

Managing Indonesian Coral Reefs: Lessons from Coral Reef Rehabilitation and Management Program

Suharsono

Research Center For Oceanography – Indonesian Institute of Sciences, PO. BOX 4801/JKTF, Jakarta
Indonesia

Abstract. In 1998, the Indonesian government launched the Coral Reef Rehabilitation and Management Program (COREMAP) with the objective to enhance the health of coral reefs and to improve the welfare of coastal communities depending on coral reefs. The first National Policy, strategy and action plan was established in 2001 and implemented in 15 districts of 7 provinces. Scientific monitoring of coral reefs and socio-economic condition of dependent surrounding communities were carried out. Results indicated an improving trend in terms of live coral cover. Scientific results will be translated into popular articles in simple language which can be easily understood by all levels of stakeholders to enhance understanding of the importance of coral reefs. Components of community awareness and community control produced the most significant impact by reducing rates of degradation. Handing over management rights and control to local community stakeholders have proven efficient by increasing fisheries yield and community income. Television media and the involvement of community leaders proved the most efficient awareness media. Involvement of government officials in the awareness campaign activities has increased their appreciation of the importance of coral reefs for the people.

Key words : Coral Reef , Lessons Learned, Management

Introduction

Indonesia is the largest archipelagic country in the world (5000 km long, 2000 km wide) composed of 18,110 islands with a coastline of 108,920 km. Two shallow seas (the Sunda shelf in the west and the Sahul shelf in the east) are separated by a deep ocean that has existed since the Eocene (Tomascik et al, 1997). The Sulawesi, Flores and Banda Seas never dried up, in contrast to the Sunda and Sahul shelves, providing a chance for the marine biota to evolve continuously. Thus the waters surrounding the Sulawesi and Banda Seas are now one of the centers of biodiversity and Indonesia contains about 14 % of the world's reefs which are distributed unevenly from Sabang to Merauke with the highest concentration around Sulawesi and Banda seas.

More than 5 million Indonesian citizens depend on shallow water fisheries. Most of them are traditional fishermen who live at a subsistence level and depend fully on coral reefs resources. Despite this significant dependency, coral reefs in Indonesia are under serious threat from destructive fishing, bleaching events and pollution.

Aware of the importance of coral reefs to Indonesian society and the livelihoods of millions of coastal dwellers, and that reefs in Indonesia are under serious threat, the Indonesian government introduced a policy, strategy and action plan to

improve the management of coral reef ecosystems. This paper tries to share the experience and the learning process to manage coral reefs in a developing country like Indonesia, starting from drafting the policy, strategy and action plan and its application process.

National Policy, Strategy and Action Plan

Drafting of the plan involved stakeholders at national level (academics, government officials, NGOs) as well as from all over Indonesia. After due consideration of inputs at national and local levels, a National Policy, Strategy and Action Plan was finally agreed upon, with the main objective of managing the coral reef ecosystems based on the balance between conservation and utilization. This plan was to be designed and implemented in an integrated and synergistic manner by the central and regional governments, civil societies, private sectors, higher education institutions and non government organizations. This National Policy, Strategy and Action Plan (NSPA) comprised 7 policies, 9 strategies and 34 action plans. Better known as "Coral Reef Rehabilitation and Management Program", it is sub-divided into three execution phases (initiation phase of 3 years, acceleration phase of 6 years and institutionalization phase of 6 years; COREMAP

LIPI 2001). The Action Plan of this program has five components: community awareness and education, control and surveillance, research and monitoring, community-based management, and institutional strengthening.

The COREMAP program was implemented in 7 Provinces (15 Districts) since 1998. The NPSA was made acceptable to all concerned and a legal basis for coral reef management was established. After much advocacy ranging from local communities to members of parliaments and the President, Constitution No. 27 of 2007 was decreed by the State Minister of Marine Affairs and Fisheries.

Research and monitoring included an education and training program as well as the establishment of an Information and Training Center (CRITC) at which 727 trainees (512 men and 215 women) were trained. Monitoring results of reefs appear to show no significant declines in reef quality (Table 1, Figs. 1 and 2). Coral reefs distribution was mapped using Landsat TM, resulting in imagery of ~19,500 km². 590 coral species in 82 genera or about 80 % of the world's total coral fauna (Fig. 3) were found.

Table 1. Status of Coral Reef Condition based on Percentage live Coral Cover from 77 areas and 908 stations (over what time frame?) [change commas to decimal points in % cover]

Location	Stations	Excellent	Good	Fair	Poor
West	362	5.5	27.1	33.9	33.4
Central	274	5.1	30.3	44.9	19.7
East	272	5.9	17.3	34.2	42.6
Total	908	5.5	25.1	37.3	32.1

Utilization pattern of coral reefs in Indonesia may be differentiated into three categories, (i) fishers who utilize coral reefs at one place for a certain time before moving on to other sites; (ii) fishing groups who use coral reefs at a fixed locality only; and (iii) those who fish periodically far away from their home. Relocation was motivated by the destruction and decrease in productivity of coral reef resources. This migrant fishing includes moving the entire family from one site to the next over a period of years. The migration cycle starting from the search for new locality rich in fish resources, followed by moving the whole family and developing a new settlement until the depletion of the resources and starting over again extends over some 50–60 years. Annual average population growth rate in coastal villages is 2.24% and migrant ratio 10-50%. (Kramer and Simanjuntak, 2000). Roaming fishermen move among islands during trips taking 3 – 6 months. This group has the highest potential for reef destruction due to absence of sense of ownership and emotional attachment to the location of exploitation and consists often of

Bajo, Bugis and Madura clans who travel the entire Indonesian waters (Figure 4). Improved community awareness and provision of alternate incomes were identified as key prerequisites to alter destructive behavior and the program had some successes.

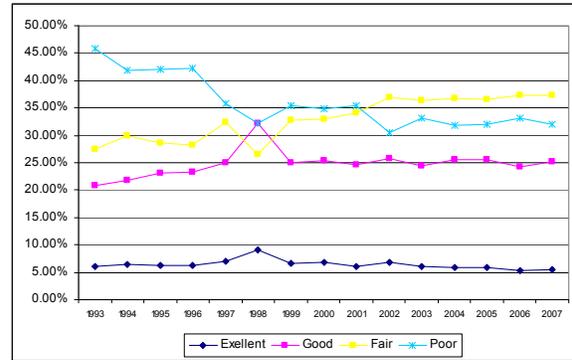


Figure 1. Trend of Coral Reef Condition (1993 – 2007)

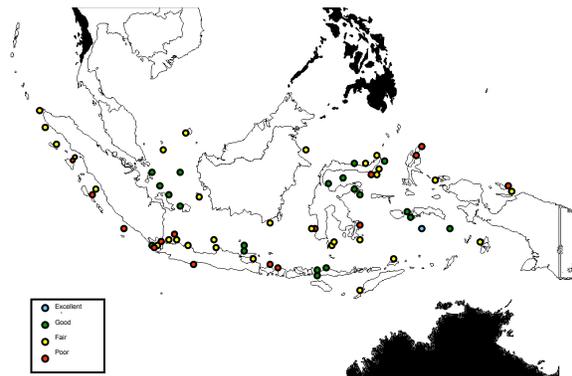


Figure 2. Coral Reef Condition in Indonesia [legend impossible to read—please fix figure]

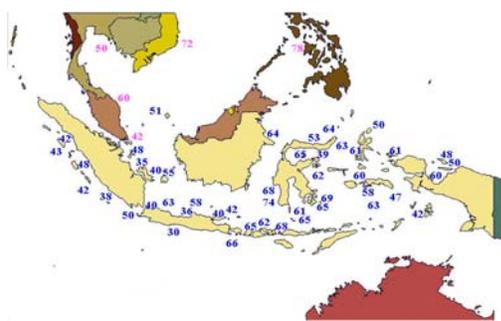


Figure 3. The Distribution of Coral genera in Indonesia.

Rivalry between the local institutions and minimal knowledge of officials and communities regarding conservation-based management principles proved challenging. Existing institutions were targeted for education and capacity building and the program concentrated on enhancing knowledge and skill in prevention of reef degradation as well as sustainable use of the

resource. Increased community participation led within three years to increased catch which in turn enhances community income after management rights were conferred to the coastal community in Mapor, Riau Province (Mujiyani, 2007)

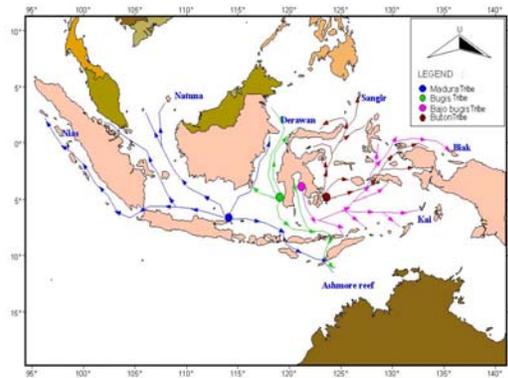


Figure 4. Route of Sea Wandering Fisherman of Madura, Bugis, Buton & Bajo Tribe

All fishermen that joined the COREMAP program understood and voluntarily follow the program, fully realizing the importance of managing coral reef resources. Conflict occurred with non residence fishermen taking resources managed by the local fishermen. Thus acknowledgment of the local community's management right and full transfer of responsibility are important. Control by local community proved efficient from psychological and budgetary viewpoints, since the community was able to control extensive areas at a reasonable cost. Lack of coordination between community officials and law-enforcement officers was observed and negated many fledgling successes.

Control and community awareness programs reduced fishing activities using explosive. While in the past, bombers were considered friendly by the local populace (bombers took only big fish allowing the population to collect the small ones), this attitude is beginning to change. The immediate result is that the coral reefs located near human settlement seem to be in better condition than the more remote ones. This condition is a reversal of that observed a decade ago where the coral reefs near human settlement were the most severely degraded.

Also a community awareness program was directed to all level existing in the communities starting from the decision makers, member of parliament, President, to the local community inhabiting the coastal areas. Overall 63% of the general public and 71% of the coastal communities were aware of the "Save our Coral Reef" campaign

(Coremap, 2002). Most effective media were TV and radio programs. In coastal communities and local governments campaign events or a visit by a prominent figure proved efficient.

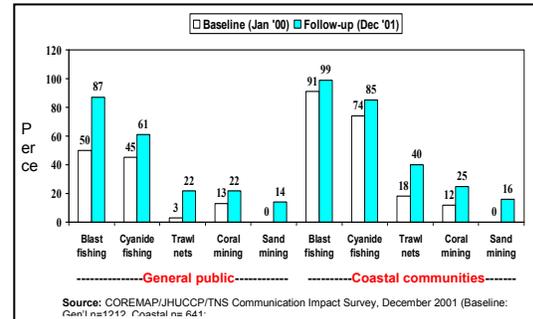


Figure 5. Percent who regard specific fishing techniques as threatening to coral reefs, 2000-2001

Lack of education and scientific knowledge of the coastal communities was a main causes for marine resources degradation. In Indonesia, formal education curricula are characteristically land-oriented and similar for all schools, whether located on the coastal or far inland. Aware of the importance of formal education, text books on marine life were distributed. For the 6-year elementary school, 7 books; one a teacher-guide, six for grades 1 to 6, were produced. The Central Education Service was involved and the books have been adopted by the Local Education Services.

While coral reef conservation in Indonesia remains challenging, our program has shown that society-wide information, increased education and empowerment of local resource stewards has helped to significantly advance conservation goals.

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