

Original paper

## EMPOWERING COASTAL COMMUNITY BY IMPLEMENTING NATURAL RESOURCES MANAGEMENT (Case study in Southeast Sulawesi, Indonesia)

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### ABSTRACT

*Economic crisis in 1997-1998 had brought about the emergence of problems of coastal communities in Indonesia, including those in Southeast Sulawesi. Most of the problems still have taken place at present, leading to the degradation of ecosystem services for natural resources. Development activities in various sectors done through unsustainable practices of utilization of natural resources have contributed to increased environmental degradation, which resulted in drastically decreased on fish population. Recently, the government and people are aware that integrated natural resources of coastal and marine management have to be set based on scientific approach. There have been several strategies formulated. Among them is integrated coastal zone management, but unfortunately it has been using top down approach. Hence, local community has no access to the programs. The effective implementation of empowerment should involve all stakeholders who have access to the coastal resources. The objectives of this work were to reduce gradually coastal resources degradation, to change fishermen behavior using illegal fishing, and to create new job using natural resources. This work was implemented in Lasongko Bay of Buton island. The present work is formulated to reduce social economic problems, which has strong correlation with environmental degradation. The programs were formulated by local community in several discussion forums based on identification of their natural resources. To alleviate poverty, rehabilitation of environmental degradation was done first which consisted of planting mangrove seeds along shoreline of the bay and establishing marine protected area. Another program implemented was fish and seaweed cultures to improve community income. The local community in groups took full participation and involvement in all programs implemented due to the role of religion and traditional figures and youth leaders. To achieve the objectives and goals of the programs, each group had a leader and held monthly meeting to discuss strategies for better life. All programs implemented showed better hope for the future due to active participation of local community in maintaining all programs of environment rehabilitation. Similarly, activities of improving income also showed better production.*

**Keywords:** Empowering ; coastal community ; natural resources

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### INTRODUCTION

The phenomenon in the middle of 1997 was economic crisis which caused social, economic and politic of Indonesia. Unemployment increased from 4.68% in 1997 to 6.36% in 1999 and poor people increased from 22.5 million (11.34%) in 1996 to 48.4 million (23.5%) in 1999 (BPS Provinsi Sulawesi Tenggara, 2000). After ten years, the poor people continuously increased to 31.02 million (13.33%) in 2010 (BPS R.I. 2011). This crisis did not only affect

social, economic and politic, but also all of aspects of human life. Because of these problems, the main agenda now to be pursued is to attain recovery of the national economy through revitalization of economic resources, which so far have not been managed well. Among them are natural resources, which may create new economic growth of Indonesia.

One of the sectors affected by the crisis was marine and fishery sector. This is because

most of its infrastructure had high content of imported materials whose values were affected by the decreased value of Indonesian rupiah toward American dollar. Depreciation of Indonesian currency had made the value of imported materials more expensive.

Southeast Sulawesi has huge marine resources. The marine area covers 79.700 km<sup>2</sup> in size and 1.740 km in length. The annual potential of its fish resources is around 1.200 ton (DKP Sulawesi Tenggara, 2009). Other resources are crustacea, mollusks, coral reef, mangrove, seagrass bed and estuarine. Several coastal and marine resources have been exploited, but they have not yet given optimal benefit to coastal community. Generally, the main activities developed in coastal area are capture fishery, mariculture, brackishwater culture, marine/ocean services (transportation), trade, marine ecotourism, housing and industries.

Our observation from 2002 to 2006 in several places of Southeast Sulawesi, ecosystems and natural resources have showed heavy destruction and some organisms (such as turtles and giant clams) have even disappeared due to pursuance of development activities which are not environmentally friendly. Pollution constitutes the fact happening for years. According to Sonak and Shaw (2006) that major threats to the coastal environment are pollution from land based activities as well as offshore pollution, loss of biodiversity, overexploitation of fisheries resources, introduction of alien species through ship fouling and ballast water, coastal hazards etc. Coral reef and mangrove have showed decreasing physical, biological and economical functions which affect social economic aspects of coastal community. Similar problems are also found at converted mangrove forests in Jakarta Bay. The mangrove was converted into residential and industrial land uses, coastal community clear the forest to establish pond culture, mainly for prawn and milkfish, and mangrove forests are patchy, reserved for parks, integrated with pond culture (Adiwibowo, 2011). This condition affects directly population of fish, mollusks, crustacean and others which have drastically decreased. Aside that illegal fishing activity such as non selective fishing gears, cyanide and blast fishing are practiced in almost coastal waters. These destructions were caused by stakeholders who

only pursued economic benefit without systematic efforts to sustain it. This phenomenon causes decreasing or disappearing sustainable capacity of coastal and marine ecosystems.

In general, those degradation of coastal and marine ecosystems led to low income of coastal community which in turn have been affecting welfare, health, sanitation, education, lack of job, and other social problems. One of the solution is integrated coastal management which is an accepted management framework to address coastal and marine environmental problems and conflicts and to achieve sustainable use of coastal resources (Barragán Muñoz *et al.*, 2003; Pollnac and Pomeroy, 2005) and to apply the key principles of harmonization, participation and strategic planning to the sustainable development of coastal areas (Vallega, 2001; Barker, 2005).

Our work done in 2003 - 2004 was partly to reduce these coastal community problems. The people were asked to involve and participate in this long term program. All problems were identified and discussed to find out better solution.

The work was implemented to achieve the objectives as follows:

1. to reduce gradually coastal natural resources degradation
2. to change fishermen/fish farmers behavior who use illegal fishing gears (such as cyanide and blast fishing)
3. to create new job by using natural resources from their surrounding with environmentally friendly technology.

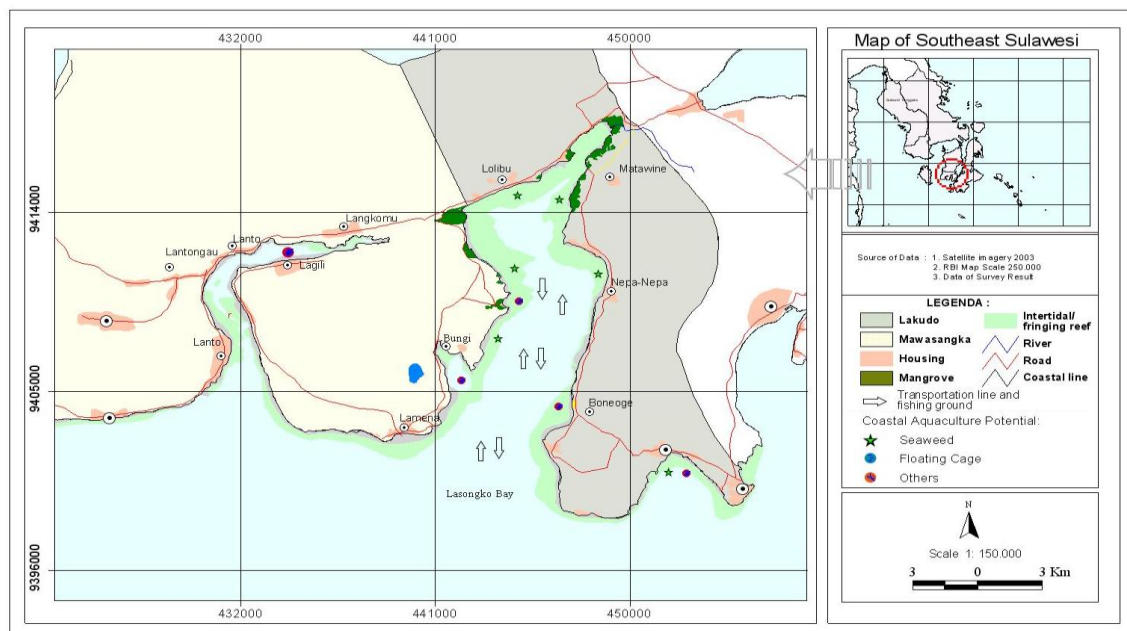
## MATERIALS AND METHODS

The work was carried out in Lasongko Bay (122°28'02" - 123°32'04"E and 5°15'32" - 5°26'30"S) in the western part of the main island of Buton, Southeast Sulawesi (**Fig.1**) (Bappeda Provinsi Sulawesi Tenggara and LP3MPK, 2003). The bay covers 2,521.87 ha and is located between Mawasangka Timur Sub-district and Lakudo Sub-district on the eastern and western parts, respectively and affected by Buton Sea which enter from southern section. Outflow of freshwater from surrounding the bay is very little because there is no river in the upland hence water salinity is high (25 - 32 ppt) along the year. At present,

mangrove, which has grown well along the shoreline of the bay in the last two decades, almost disappears. The other is coral reef which is now experiencing heavy degradation due to fishermen's use blast fishing to catch fish (Bappeda Provinsi Sulawesi Tenggara and PPWPL, 2002).

Soil texture of the bay varies in all sections. In the western and southern sections,

soil texture is composed of sandy, crushed and dead corals, while in the northern and eastern section is dominated by silt (muddy substrate). The above-mentioned characteristics of the bay were identified together with local people. This method was used to explore the nature of the bay and to design the economic activities of local people.



**Fig. 1.** Map of empowering coastal community by integrated natural resources management

### *Identification of Natural Resources Potential*

In the present condition, several natural resources can be used to improve income of the coastal community. These are mangrove, coral reef and coastal water.

Mangrove and coral reef are found at several small locations, while coastal waters is suitable for seaweed and fish culture using raft and floating cage as indicated by water quality, substrate, indicator species such as coral reef and seagrass, and free from pollution, waves and wind. The potential location for it is approximately 1,500 ha (**Fig. 1**) (Bappeda Provinsi Sulawesi Tenggara and LP3MPK, 2003).

### *The Coastal Community Empowerment Approach*

All problems identified with local key persons were discussed to formulate an action plan and

implementation (**Fig. 2**). There were three problems/issues related to the poverty alleviation of the local community, namely low participation of community in development, over exploitation of the resources, and low income. These three problems had to be solved by several action plans implemented. The program targets had to be set based on capacity of the people and natural resources in their surrounding in order to achieve the objective of program and sustain livelihood. The entire programs were designed to improve income and welfare of community, create new job and government income. It was hoped that the economic activities related to fishery commodity industries would emerge in broad scale so new job would absorb unemployed

Once this step achieved, fishery sector might have multiplier effect to other development sectors (Dinas KUKM Provinsi Sulawesi Tenggara and Jurusan Perikanan Unhalu, 2002). In good government regulation, therefore, income and welfare improvement and

local government revenue can be generated in multi-sector of development.

### *Participation of the Local Community*

The general problems/issues were identified based on several previous study results (**Fig. 2**). These problems/issues were noted and discussed with several local key persons (religion, traditional, and community figures and youth organization leaders). The discussion to those persons took place in any kind of situation such as during wedding party preparation, traditional ceremony, at sport court, after Moslems praying in mosque, national flag rising ceremony and other events. Reid (2004) emphasized that local communities must play an active role in protected areas planning and management if marine conservation initiatives are to succeed. In order to attain support from local communities, social, cultural and economic considerations must be incorporated in conservation initiatives. This approach was very important because they could influence their followers and constituents.

The next step was key persons communicating with their each constituent about the problems/issues formulated. The researches acted only as facilitators who facilitated and directed the discussion among them to achieve a rational program and objectives based on existing condition of natural resources, infrastructure and ability of human resources. The problems/issues solving relied on simple opinions of “grass root”. The meeting forum was conducted monthly to discuss and evaluate any new information and previous methods implemented.

### *Setting Programs and Groups*

Based on existing condition of coastal natural resources and environmental, the bay was divided into two locations, one in northern part (Lakudo Sub-district) and the other in southern part (Mawasangka Timur Sub-district). The coastal waters in Mawasangka Timur was suitable for fish and sea weed cultures hence they were directed to economic activities, while coastal waters in Lakudo had to be protected due to natural resources degradation. The local community participated in environmental rehabilitation; planting mangrove seeds and marking marine protected area of coral reef and

seagrass of  $\pm 13$  ha. Involving people into these two programs were aimed to realize how important natural resources is. The people who having heavy environmental degradation had to learn much from the other whose environment was maintained. The former must work hard to enable them work on productive activity like in the latter who realize that environment and its resources must be maintained to sustain their livelihood.

The initial fund for this work was provided by Marine and Coastal Resources Management Project (MCRMP) through Regional Planning and Development Board of Buton Regency, while all programs set were partly funded by the project using “revolving fund approach”. After a year, the group funded in first year would return the fund through a bank and then would be revolved for next group in the second year. The group funded in the second year monitored all activities of groups funded in the first year in order to make activities better and safe (**Fig. 3**).

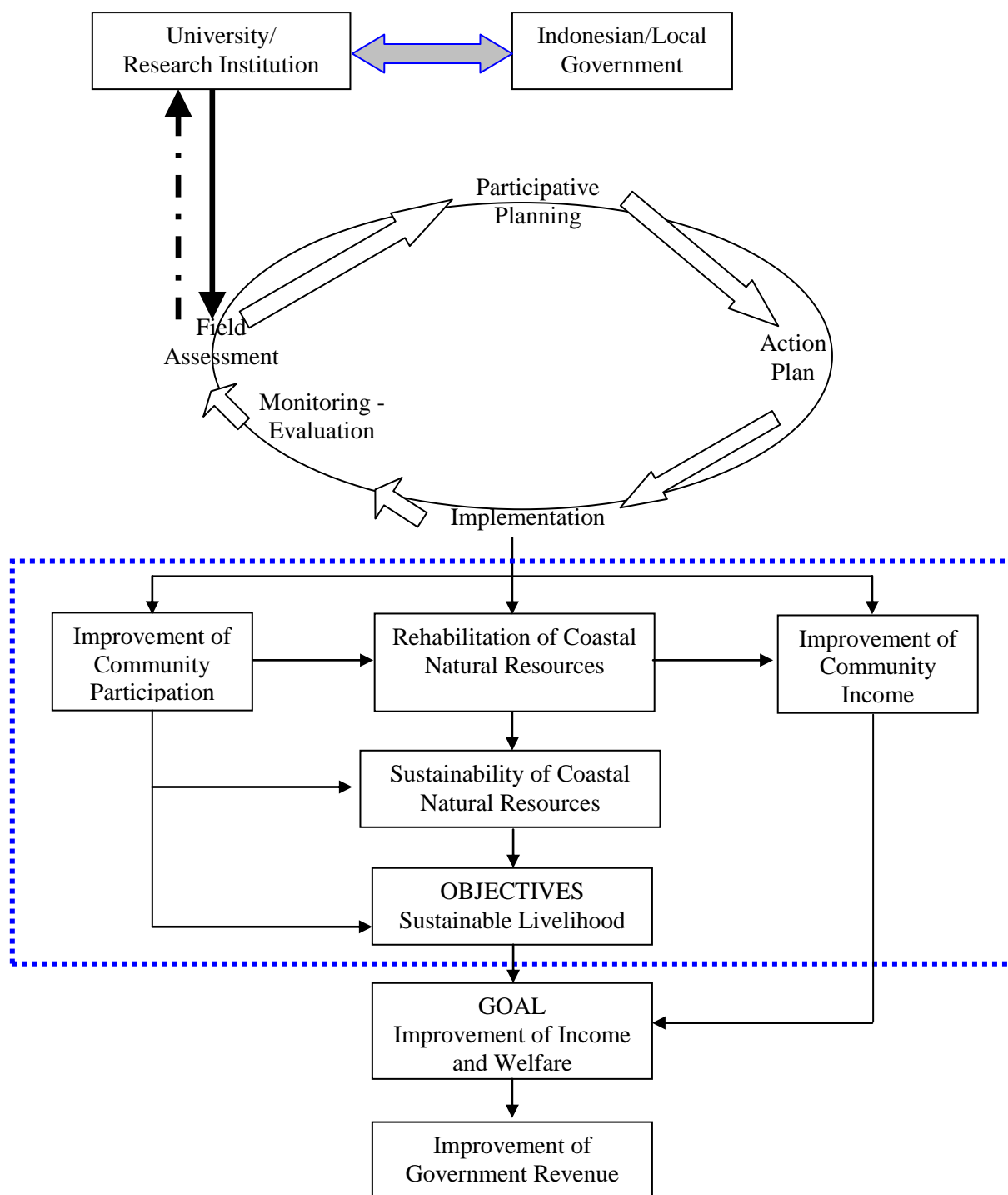
## **RESULTS AND DISCUSSION**

### *Environmental Rehabilitation*

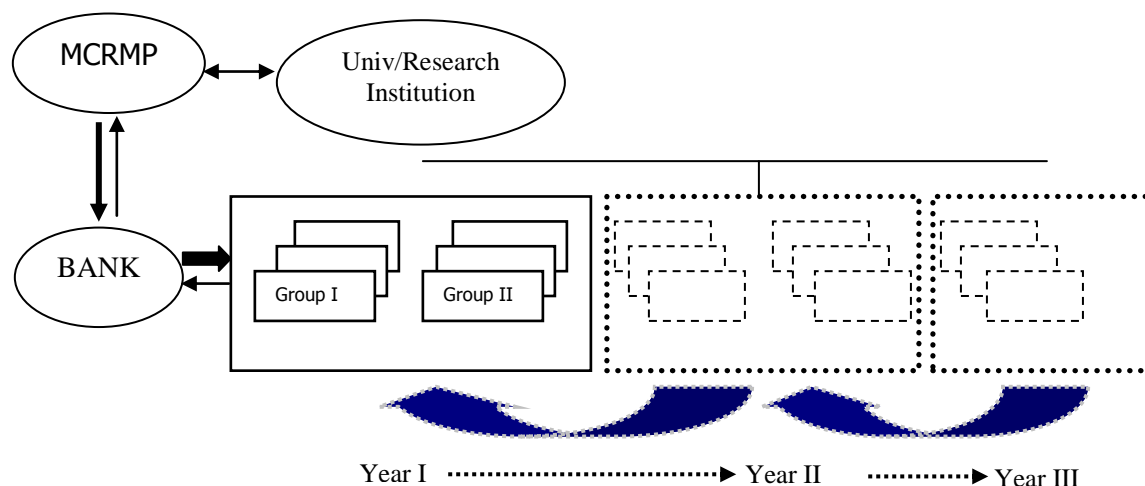
One of important coastal natural resources is mangrove forest. It has physical, biological and economical functions to human life. Physically, mangrove prevents wind and waves to coastal community and infrastructure such as road, housing and fish pond, while biologically it provides feeding, spawning and nursery grounds for many organisms such as mud crab, swimming crab, shrimp and fish due to availability of shelter and food. Hence, it is said that mangrove area has high productivity of fish. It also provides wood and other products such as honeybee. These have important economic value for people who depend on coastal resources for their life.

Mangrove forests in Lakudo district are experiencing degradation due to heavy exploitation. People cut off mangrove trees to build house, ranch fence and garden, fish trap materials and firewood. It was converted in large scale to fishpond, road, housing, industry and public space achieving 60 – 70% from the total area (Bappeda Provinsi Sulawesi Tenggara and PPWPL, 2002).

Another coastal resource is coral reef which has been exploited for road construction material, reclamation and lime. Coral reef is fragile to water environmental change such as high temperature, high turbidity and low salinity.



**Fig. 2.** Framework of Empowering Coastal Community



**Fig. 3.** Empowering local community using revolving fund approach. Group funded in the second year monitors all activities of group funded in the first year, etc.

Harbor of boat and use of blast fishing for collecting fish is currently wide problem right now. Degradation of coral reef covers almost all areas not only in Lakudo Bay but also around Southeast Sulawesi waters.

This degradation give wide impact on fish productivity which has shown decreasing trend since the last two decades. The organisms as migratory, temporary and permanent residents no longer inhabit these ecosystems. Fish production caught by fishermen decreases drastically due to overexploitation, pollution and ecosystem degradation. According to Sonak and Shaw (2006) that the capacity of aquatic ecosystems to produce fish is reduced on account of increase in fishing efforts, increase in fishing intensity and unsustainable practices and loss of nursing grounds. Overfishing was formally recognized as a problem in early 1900s (World Resources, 2000-2001). The study conducted in 1991 – 1992 showed that the worsen coral reef ecosystem the lower fish production caught local fishermen in Southeast Sulawesi waters (La Sara and Hamid, 1992). Population of crustacean in this location decreased sharply due to over-exploitation and degradation of seagrass bed (Supardan, 2006; Hamid, La Sara and Halili, 2006). Hence, fishermen income is very low and even is not enough to fulfill daily basic needs for their families. Shaw (2006) points out that the relationship between human security and the environment is most pronounced in areas of human dependence on access to natural resources.

Realizing these phenomena both coastal natural resources were set as the main programs to be rehabilitated. Mangrove seeds were collected from local area. Rise seedlings of mangrove were maintained for 2 months (**Fig. 4**) and planted along shoreline. Around 45,000 seeds were planted along shoreline of 10 km which covered 4 villages. Each local community group participated in seeds planting. Students of elementary and high school, fishermen, fish farmers, youth organizations, religion and traditional figures took full participation (**Fig. 4 and 5**). All mangrove juveniles were maintained by each local community group, which was directed by religion and traditional figures as a group leader.

The groups of local community were also concerned with degradation of coral reef and seagrass ecosystems. They realize that these ecosystems have been causing negatively their source of income. Discussion of all groups concluded that some sites at the bay had to be protected for 5 – 10 years to allow coral reef and seagrass to grow and recover. Similar way in Madagascar, strategy focuses on empowering coastal communities to manage their own resources by developing marine protection initiatives designed to sustain local fisheries and safeguard marine biodiversity (Blue Ventures, 2010). Van den Bor *et al.*, (1997) have suggested that the community empowering approach generates the need to identify 'new pathways' for working and that the responsibility for identifying such pathways should fall to trained individuals.





**Fig. 4.** Rise seedlings of mangrove were maintained by local community



**Fig. 5.** Mangrove seeds were planted along shoreline. Students and others participated in seeds planting

Marine protected area was set on the northern section of the bay (**Fig. 6**). The area had loss its function as feeding, spawning and nursery sites (**Fig. 7**). Around 44 ha of the area had been declared as marine protected area and all activities were prohibited in this site within 5

– 10 years depending on the rate of recovery. The area was marked with signboard, floating rope and floating ball as boundary. Only fishermen using fishing longline and gillnet were allowed to catch fish just out of the site area.



**Fig. 6.** Local community and signboard at marine protected area

In supervising and monitoring the project, local community guided by facilitator formed an organization and local regulation to take forward action on coastal natural management

and poverty alleviation (**Fig. 8**). This approach might help them to be more aware of exploitation of natural resources.



**Fig. 7.** Under water of coral reef degradation to be protected

The leaders took an action to prepare a local regulation concept of coastal management in maintaining its resources. Among items of regulation concept consisted of reward and punishment to individual or group. For example, use of illegal fishing was prohibited. If one cut a mangrove tree then he would plant 10 mangrove trees and maintained them until

the trees grew up or if the trees were not planted then he would be fined with Rp100,000. The other item of scholarship award from the project will be given to individual student for a year, or if the school took action to maintain coastal environment then the award in the form of sport facilities or literatures would be given to the school.



**Fig. 8.** Discussion under old house of local community for supervising and monitoring the project (left) and facilitators were giving explanation how to formulate action plan (right)

### *Income Improvement*

Empowering the local community for achieving a secured livelihood was the main objective of the work. This was achieved by adopting a

participatory approach. From the planning and budgeting of the activities through to implementation, monitoring and evaluation, the local community representatives were closely involved. Each and every decision comes from



them but facilitated by researchers and local facilitators. Similar work had been done by Ahmad, *et al.*, (2005) in Bangladesh.

All possible income generating activities can be done by local community. Most activities done were traditional fish capture, traditional agriculture such as cashew nut, and fishery home industry such as dried and salted fish. Generally, fishing provides

livelihood opportunities and nutrition to the traditional coastal communities (Sonak and Shaw, 2006). According to Nurbambang (2003), the process of community empowerment would be preferable to notice the value system, growth institution and develop in the local communities, potency of the local resources and business unit in coastal community.



**Fig. 9.** Fish culture using floating cages

Income improving activity was practiced in Mawasangka Timur Sub-district located in western part of the bay (**Fig. 1**). There was a big potential of natural resources promising for poverty alleviation which covered marine and coastal resources of the bay. Fish, crustacean, mollusks and seaweed could be cultured in the large scale. Culture technology of these organisms was simple, low cost and easy to be implemented. All materials needed were available locally. The local community just needed technical skill and changing their “**hunter habits**” (fisherman) to be “**waiter habits**” (fish farmer). Technical skill might be improved through training or learning by doing. These were conducted for 2 – 3 months. Based on preliminary study conducted, there were at least two kinds of activities that could be implemented for income improvement. Fish and seaweed cultures using floating cage and raft, respectively, were the most feasible economically and suitable

technically (**Fig. 9 and 10**). Marketing for the production was set by researchers, local facilitators and leaders of each group through collaboration with buyers. This collaboration provided mutual benefit to both fish farmers and buyers. To maintain fish and seaweed cultures production the local facilitators assisted in culture technical management. The programs have just run for six months and the results gave good production. In Bangladesh, the success of fishing community because they have participated in capacity building and development activities. Their participation is centered on Village Organization. Also they have participated in different government organization and NGO initiated activities starting from planning to implementation and evaluation through to adopting a participatory approach. These have assisted them to become aware and be empowered to secure their members’ livelihoods (Ahmad, *et al.*, 2005).



**Fig. 10.** Seaweed culture using raft bamboos (A) and post harvest (B)

The elements for success of these activities (adopted from Shaffer, 1989) have been discussed with group members namely that the groups must have: (1) motivation and enthusiasm that these activities could produce better results, (2) enhance belief and expectation of self-help that a belief in the future of the groups and a conviction depend on the action of group members, (3) work hard and maintain the process, (4) focus on present activities, (5) maintain collaboration among members and build network with outside supports (buyers), and (6) formal and informal leaders must be enthusiastic and support group members, and also accept critics. He also acts as a pioneer in community developments to achieve purposes and goals of development efforts.

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## REFERENCE

- Adiwibowo, A. 2011. Raising the Sustainable and Alternative Pathways for Empowering Poor Community Resilience In The Sinking Fish Farmer Villages: Jakarta Bay Experience. Faculty of Mathematic and Natural Sciences, University of Indonesia. Jakarta.
- Ahmad, Z., D. Kumar, A.K.M.N. Alam, A. Krishna Deb, K.H.J. Hossain, F. Suhrawardy, N.N. Talukudar, F. Ahmed, and A.M. Dhar. 2005. Empowerment of Coastal Fishing Communities for Livelihood Security: Compendium of Best Practices and Lessons Learnt. GOB/UNDP/FAO Project. UNDP-FAO-FIAT-PANIS. Cox's Bazar, Bangladesh.
- BAPPEDA Provinsi Sulawesi Tenggara and LP3MPK. 2003. Penyusunan Rencana

- Zonasi di Kawasan MCMA Sulawesi Tenggara. BAPPEDA Provinsi Sulawesi Tenggara. Kendari. (in Indonesian)
- BAPPEDA Provinsi Sulawesi Tenggara and PPWPL UNHALU. 2002. Identifikasi Aktivitas Bagi Peningkatan Masyarakat Pesisir dan Pengelolaan Sumberdaya Pesisir dan Laut di Lokasi MCMA Propinsi Sulawesi Tenggara. BAPPEDA Provinsi Sulawesi Tenggara. Kendari. (in Indonesian )
- Barker, A. 2005. Capacity Building for Sustainability: Towards Community Development in Coastal Scotland. *J. Environ. Manag.* 75: 11–19.
- Barragán J. M. Muñoz, J.R. Dadon, S.D. Matteucci, J. H. Morello C. Baxendale A. Rodríguez 2003. Preliminary Basis for an Integrated Management Program for the Coastal Zone of Argentina. *Coast. Manag.* 31: 55–77.
- Blue Ventures. 2010. <http://www.livewiththesea.org>. Empowering communities for conservation: your chance to vote for sustainable seas (retrieved Agustus 17, 2011).
- BPS Provinsi Sulawesi Tenggara. 2000. Sulawesi Tenggara Dalam Angka. Biro Pusat Statistik. Kendari. (in Indonesian)
- BPS R.I. 2011. [http://www.bps.go.id/getfile.php/Penjelasan Data Kemiskinan](http://www.bps.go.id/getfile.php/Penjelasan>Data/Kemiskinan) (retrieved February 8, 2011). (In Indonesian)
- Dinas KUKM Provinsi Sulawesi Tenggara and Jurusan Perikanan UNHALU. 2002. Identifikasi Sumberdaya Ikan Unggulan di Sulawesi Tenggara. Kendari. (in Indonesian )
- DKP Sulawesi Tenggara. 2009. Annual Report of Marine and Fishery Affairs. Kendari.
- Hamid, A., La Sara and Halili. 2006. Pembentukan Daerah Suaka Perikanan Kepiting Rajungan di Kawasan Teluk Lasongko Kabupaten Buton. Program Mitra Bahari Direktorat Jenderal Pesisir dan Pulau-Pulau Kecil. Departemen Kelautan. Kendari. (in Indonesian )
- La Sara and A. Hamid. 1992. Hubungan antara Tingkat Eksploitasi Terumbu Karang dengan Hasil Tangkapan Nelayan di Perairan Sulawesi Tenggara. Lembaga Penelitian Unhalu, Kendari. (in Indonesian)
- Nurbambang, A. 2003. Economic Empowerment for Coastal Community. Presented at Tele International Video Conference on 8 April 2003.
- Pollnac, R and B.R.S. Pomeroy. 2005. Factors Influencing the Sustainability of Integrated Coastal Management Projects in the Philippines and Indonesia. *Ocean & Coas. Manage.* 48: 233–251.
- Reid, J.W. 2004. Researching the Role of Communities in Integrated Coastal Management in Nova Scotia. Thesis. Dalhousie University, Halifax, NS.
- Shafer, R. E. 1989. Community Economics. Economic Structure and Change in Smaller Communities. Iowa State University, Ames, Iowa.
- Shaw, R. 2006. Community-based Climate Change Adaptation in Vietnam: Inter-linkages of Environment, Disaster, and Human Security, pp 521-547. In : *Multiple Dimensions of Global Environmental Change*. Sonak S (ed). Teri Press, New Delhi, India.
- Sonak, S. and R. Shaw, 2006. Integrating human security concerns in ICZM: An Emerging Challenge. In : *Integrated Coastal Zone Management (ICZM): The Global Challenge*. Krishnamurthy R. et al., (eds): Research Publishing.
- Supardan, A. 2006. Kebijakan Pemanfaatan Sumberdaya Ikan Teluk Lasongko. Makalah yang Disampaikan pada Rapat Koordinasi Pengelolaan Terpadu Teluk

- Lasongko, Bau-Bau: 14 November 2006. (in Indonesian )
- Vallega, A. 2001. Focus on Integrated Coastal Management-Comparing Perspectives. *Ocean & Coas. Manag.* 44: 119–134.
- Van den Bor, W., J. Bryden, A. Fuller. 1997. Rethinking Rural Human Resource Management: the Impact of Globalisation and Rural Restructuring on Rural Education and Training in Western Europe, Mansholt Studies, Wageningen.
- World Resources. 2000 – 2001. People and Ecosystems: the fraying web of life. World Resources Institute. Washington D.C.