

# Assessment of the Socio-Economic Impact of the Small-Scale Natural Resources Management Program (SNRM) in Indonesia: Case Study in Two Fishing Communities of South Sulawesi

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## 1. Introduction

Poverty is a widespread phenomenon in almost all developing countries, in part due to the people unable to fully benefit from natural and economic sources. As a result, poor society suffers from low quality of human resources, low income and productivity. In Indonesia, approximately 16.4 million people live in coastal areas, 32% of whom are living under the poverty line (Kusnadi *et al.* 2006). During the last two decades, many types of development projects have been designed and implemented for poverty alleviation, focusing on sustainable use of coastal resources and enhancement of fisheries livelihood (Idris 2004). The Government of Indonesia (GoI) has implemented coastal projects, usually consisting of both environmental and socio-economic aspects (Dahuri *et al.* 1999; Dudley and Gofar 2005; Hanson *et al.* 2003; Idris 2004; and White *et al.* 2005). To give some examples, Marine Resources Evaluation and Planning (MREP), Segara Anakan Conservation and Development Project (SACDP), Integrated Coral Reef Management Project (INTECOREEF), Coastal Resource Management Project (CRMP), Coral Reef Rehabilitation and Management Project (COREMAP) and Marine and Coastal Resource Management Project (MCRMP) have been supported by international donor agencies. The diversity and evolution of coastal projects in Indonesia are summarized at Table 1 (Hanson *et al.* 2003 and Idris 2004)

MCRMP had a pilot program called Small Scale Natural Resource Management (SNRM), whose experience and outcome would serve as a model for replication to other regions. Although SNRM that had begun in 2006 was already terminated, the outcome and impact of various activities of the SNRM programs have not yet been evaluated.

Thus, this paper purposes to investigate the socio-economic impacts of SNRM in some selected sites. It will analyze the income structure of typical household of SNRM participants, determine the factors affecting the adoption patterns in income-generating activities promoted, and assess the level of participation among respondents. This

**Table1. The evolution of coastal projects in Indonesia**

Year	Name of the projects	Donors
1993/1994 to 1998/1999	Marine Resources Evaluation and Planning (MREP)	The Asian Development Bank (ADB)
1997 to 2002	Segara Anakan Conservation and Development Project (SACDP)	The Asian Development Bank (ADB)
1997 to 2003	Coastal Resource Management Project (CRMP)	United States Agency for International Development (USAID)
1998 to 2003	Coral Reef Rehabilitation and Management Project (COREMAP – phase I)	AusAid, World Bank, ADB
2003 to 2008	Coral Reef Rehabilitation and Management Project (COREMAP – phase II)	AusAid, World Bank, ADB
2008 to 2014	Coral Reef Rehabilitation and Management Project (COREMAP – phase III)	AusAid, World Bank, ADB
1999	INTECOREEF (Integrated Coral Reef Management Project) in North Sulawesi	JICA
2002 - 2007	Marine and Coastal Resource Management Project (MCRMP)	The Asian Development Bank (ADB)

Source: Hanson et al. 2003, Idris 2004 (Unpublished) and Siry, 2006.

study focuses on the income generating activities, assets and financial management of household among SNRM participants.

## 2. Development of participation and community management

Participatory approaches to management of resources can be seen particularly in small-scale fisheries management (Hauck and Sowman, 2003). Alpizal (2006) explains that participation should be understood as a process which includes the opportunity of different sectors (resource users, stakeholders) to shared, decision-making process (empowerment) that leads to effective resource management. Kapoor (2001) summarized that participation includes expansion of information, representation of community, contribution to conflict resolution, and accountability.

Community management is defined as a sharing form of responsibility between government and society (stakeholder) by using a decentralization approach to make policy that involves group of resource consumers, consultants and colleagues (Berkes, 1991 and Jentoft, 1989). As long as one group member is aware of empowering with others, co-management will be sustainable. Therefore, co-management must be pursued in relation with other efforts to build the society (Jentoft, 2005).

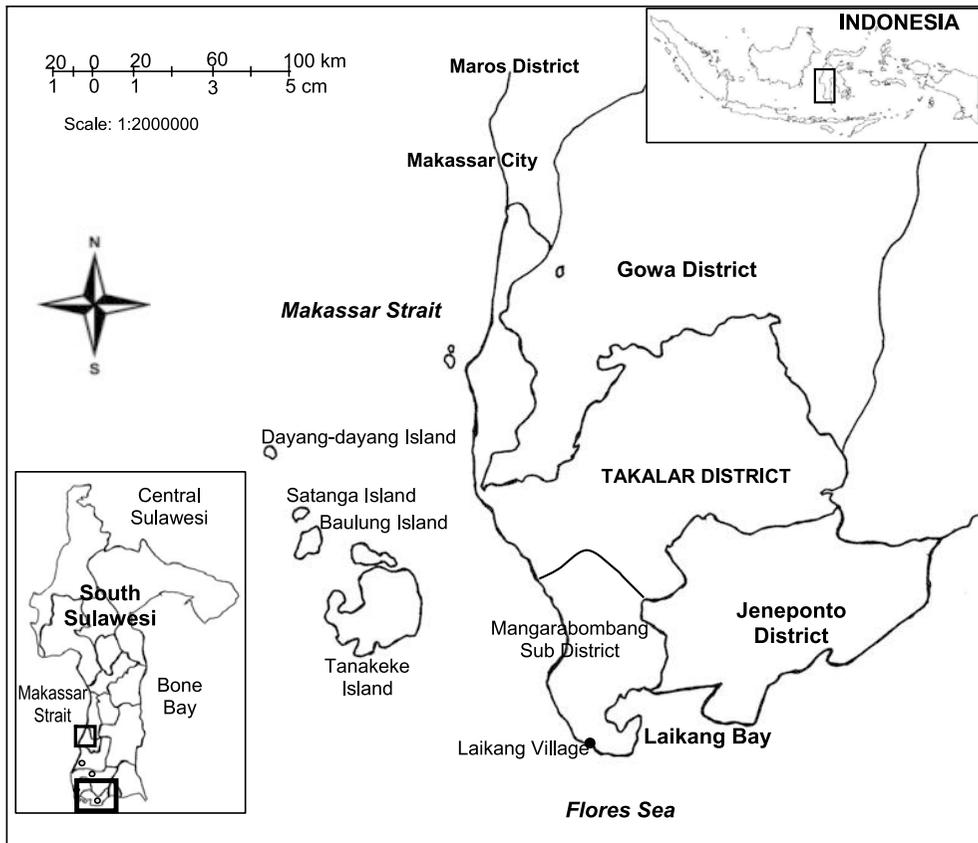
The concept of participation and co-management has been practiced in Indonesia. Implementation of those concepts reflected on the management system of natural resources such as *sasi* in Maluku, *panglima laot* in Aceh, *awig-awig* in Lombok and sea tenure (*hak ulayat laut*) in Papua. *Sasi* is a traditional agreement about the utilization of coastal resources among the people and legalized through the customary structural mechanism at the village level (Nikijuluw, 1994). *Panglima laot* is a person who leads in the customary practices dealing with capture fisheries and conflict resolution. *Awig-awig* is a traditional regulation governing the management of coastal fisheries resources appointed by the government at the village level and also referring to the customary institution and elite religious or traditional figure. Sea tenure (*Hak ulayat laut*) represents rules regulating the utilization of fishing grounds, fishing gear and punishment for violations. This regulation is led by three elements: local government, customary or traditional leader and religious leader (Kusumastanto et al, unpublished).

Since 1999, local autonomy under a decentralization regnum has been established in Indonesia, resulting to local stakeholders, including local government and local society, seeing more changes in the ways of management of local resources. They are backed by a legal umbrella to manage their resources particularly coastal, marine and fisheries resources. SNRM was one of the projects under the decentralization system, which encourages local people to manage the coastal resource as well as developing livelihood activities.

### **3. The scope of the study**

This study aims to analyze the socio-economic impacts of SNRM program on selected participating fishers in South Sulawesi Province. The specific objectives of this study are (1) to analyze household income structure, (2) to determine the factors influencing adoption patterns in income generating activities promoted by SNRM, and (3) to assess the level of participation among respondents.

Laikang Village in Takalar District and Nisombalia Village in Maros District were selected as the study sites, which are located in South Sulawesi Province (Figure 1).



**Figure 1. Map of two study sites in South Sulawesi Province**

Source: cited from <http://earth.google.com/>; <http://bkpm.go.id>; MFSO of Takalar District and Narayana Adicipta Persero (2007)

Takalar District with a land area of 566.51 km<sup>2</sup>, is located on the southern side of the capital city Makassar/Ujung Pandang of South Sulawesi Province<sup>1)</sup>. Data collections were conducted in Laikang Village, which is 63 km from Ujung Pandang. The second location was Maros District located on the west side of Ujung Pandang<sup>2)</sup>. Data collections were conducted in Nisombalia Village, which is 48 km from Ujung Pandang.

By using simple random sampling methods, 80 respondents who participated in SNRM program were selected to constitute a sample from 218 ex-SNRM participants of Laikang Village and 320 ex-participants of Nisombalia Village. This study focused only on ex-SNRM participants, not including any non-participants, due to various limitations such as time constraint, and certain difficulty in collect exact information from ex-participants in the interview process. A structured questionnaire was used for direct interview,

while semi structured questionnaire was used as a guide in focus group discussion. The topics of questionnaire covered situation of household income, changes in income generating activities and participation of respondents in SNRM programs. The samples were split between Laikang Village, Takalar District (40 samples) and Nisombalia Village, Maros District (40 samples). Key informants were selected purposively. They were the staff or researchers from related governmental agencies, research centers, universities, and local governmental offices. Community leaders (*tokoh masyarakat*), heads of the villages (*kepala desa*), religious leaders (*kyai/ustadz*) were also important key informants, all of whom understood the social and economic conditions of the village and SNRM program implemented there. Secondary data were collected including the final reports of the projects, annual reports, books, journals and any relevant statistical data. Descriptive statistics focused on socio economic conditions of respondents, characteristic of respondent's participation and income source's activities.

#### **4. SNRM as a part of MCRMP**

##### **1) Outline of SNRM program**

The GoI through the MMAF promotes small scale natural resource management (SNRM) program. This program was under the umbrella of the Marine and Coastal Resources Management Project (MCRMP). MCRMP aimed to increase the management capacity of marine and coastal resources management in 15 provinces and 42 district/cities in Indonesia. This program includes 4 components such as; 1) planning of marine and coastal resource management; 2) management of information and data ; 3) law enforcement; and 4) small scale natural resources management (SNRM). Officially, SNRM was operational from 2003 to 2008 during the same period as the MCRMP. It covered 42 districts/cities. However, there was much difference as to the actual implementation between areas. Nationally, SNRM had 2 main components such as economic development and small-scale coastal resource management at the village level. Economic development was conducted to improve the status of small-scale fishermen through implemented revolving funds. This is supposed to help fishers improve their incomes by introducing alternative livelihoods such as mariculture, training for food processing and revolving fund to support fishermen activity. Besides, the management of coastal resource was implemented by setting up marine protected area (MPA), mangrove rehabilitation, infrastructure development and set up the village fishing regulation.

In Laikang Village, the activity of SNRM terminated in 2007, as part of MCRMP. It

was oriented towards livelihood development rather than resource management. The activities of SNRM in this village included providing revolving funds by participating financial institutions, alternative livelihoods by introducing fish cage method and making the village regulations. Besides these activities, SNRM also focused on the environmental restoration through mangrove rehabilitation. The number of participants in SNRM program at Laikang Village was 218 persons.

Meanwhile, SNRM activities at Nisombalia Village, Marusu Sub-District, Maros District had started in 2006. The project covered activity to help the economic situation of people by giving loans through revolving funds and coastal environment rehabilitation by planting mangroves.

## **2) Limitation of SNRM program**

MCRMP-SNRM had two main purposes; economic development of coastal village and coastal environment restoration. Economic development program from MCRMP-SNRM have been achieved through the provision of revolving funds, which will support fisher's livelihoods to increase their income level.

The failures of some activities in Laikang Village and Nisombalia Village caused by several factors. Firstly, participants in SNRM projects did not understand the meaning of a project and its goal. Secondly, due to little assistance from government agencies, fishers could hardly implement new activities. Thirdly, project and village implementers suffered from lack of communication, coordination and inter-local governance cooperation. Fourth, some project implementers (local governmental officers) lacked understanding about the condition and potential of the project site. Lastly, internal conflict in the village became a great obstacle to design and implement project activities. Stakeholders faced the problems such as the lack of internal coordination, cooperation and communication particularly in Nisombalia Village. These problems will affect project failure or success in the field/area in the future.

## **5. Result and Discussions**

### **1) Household economic structure of respondents in two villages**

The income generating activities of respondents in Laikang Village can be divided into two types: capture fisheries and seaweed farming. Ten years ago, prior to the introduction and expansion of seaweed farming, the respondents had been involved only in capture fisheries, mostly one day fishing by adopting gillnets. Villagers then

began to implement seaweed culture by adopting the long line method. Those fishers who got more income from seaweed culture than capture fisheries naturally shifted to seaweed culture as a main income source. According to interviewed respondents in Laikang Village, all of them relied heavily on income coming from fisheries activities. Before SNRM started, 87.5% of respondents earned income of less than IDR 500,000 per month. After SNRM started, their income increased to more than IDR 1 million. At this point, the fisheries activities consisted of both capture fisheries and aquaculture (mainly seaweed). Meanwhile, in Nisombalia Village, 52.5% of respondents were classified into the income group with less than IDR 500,000. Through participation in the SNRM program, 87.5% respondents successfully increased their income by IDR 500,000 - 1,000,000. In both villages, therefore, SNRM activities gave a positive impact on improving the livelihood of participants. The amount of respondents' income reached the standard of regional minimum income (Indonesian called: *UMR*) for South Sulawesi Province in 2009<sup>9</sup>.

The income of respondents in two villages sharply increased compared to before the implementation of SNRM activities. At present, fishermen get more profit from their activities and seaweed culture has become their main income source. In Nisombalia Village, fishermen changed their jobs from fishing activity to fish peddling because they can get more income and are able to recycle their income for added business capital easily. Although incomes increased, 77.5% reported that they still could hardly manage their income source in a sustainable way. Respondents spent their money mostly for social costs and not for expansion of business activities and internal needs (Figure 2).

Figure 2 shows that 50-70% of their income was used for external expenditure, such as social donation, cultural and religious ceremonies. They spent money for buying durable goods like TV, refrigerator, and so on. Social interest remains a higher priority in the allocation of their increased income. Then, the management of household income becomes important in balancing internal needs, social and livelihood activities.

With income generating activities, respondents had more access to assets. They would invest in effective fishing gears and/ or conducting seaweed culture. Changes in ownership of asset before and after the project implementation are shown in Figure 3.

Figure 3 shows that, in Laikang Village, the number of some assets items increased after SNRM, while some other items decreased. It is noteworthy that investment in fishing gears decreased while investment in fishing boats remained stable. The reason is that seaweed culture was more lucrative than capture fisheries, thus making fishers paying less attention to capture fisheries. In Nisombalia Village, the respondents

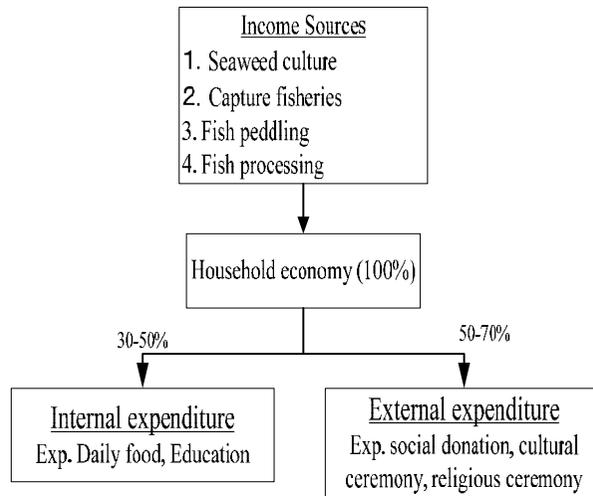


Figure 2. Household income distribution of respondents  
Source: Field observation, 2009

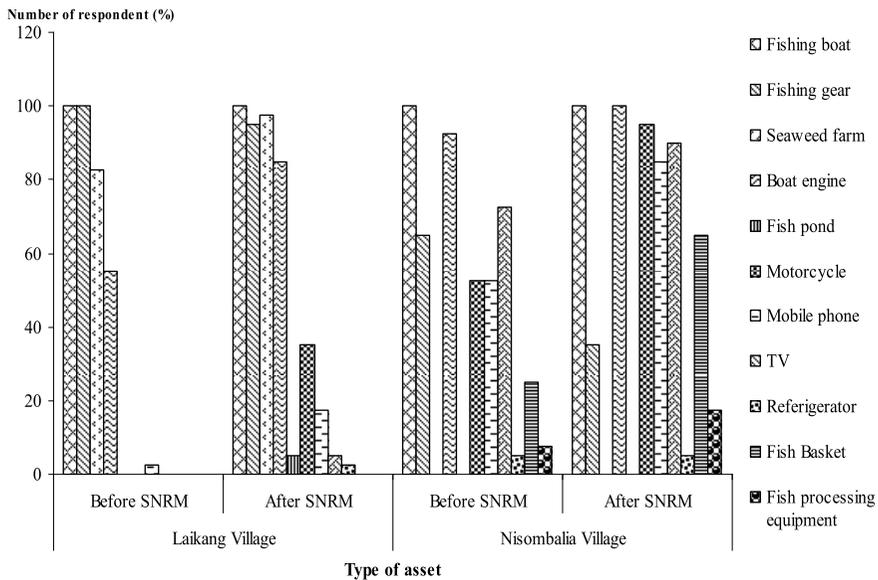


Figure 3. The asset of respondents following the period of SNRM implementation in the two study sites  
Source: Primary Data Analysis 2009

preferred to purchase fish baskets and motorcycles for their fish peddling business. They were more likely to disburse investment and expenditure of fisheries related business, less likely to spend for durable goods.

Most of the respondents in Laikang Village borrowed money from traders, in average

amounts ranging between IDR 400,000 - IDR 500,000. Their debts increased after they had participated in SNRM project activities. Fifty-five percent (55%) of the respondents borrowed money, ranging between IDR 900,000 and 1,100,000. In Nisombalia Village, before SNRM project had started, 80% of the respondents borrowed money ranging between IDR 400,000 to IDR 500,000. Their debts increased by IDR 900,000 to IDR 1,300,000 after their participation in SNRM project. The majority of the respondents (57.5%) borrowed money ranging between IDR 1,100,000 to IDR 1,300,000. These amounts were largely accumulated from two financial sources (informal moneylenders and *UPKMP*).

In both villages, respondents' indebtedness grew up faster compared with their income increase. Prior to SNRM project, the respondents borrowed money only from seaweed traders/middlemen. However, during the period of SNRM project, the respondents shifted their financial borrowing sources from the traders to financial institutions (*UPKMP*) established by SNRM. Nevertheless, they still had debts because the traders usually refused to receive their repayment. Finally, the amount of debt of respondent increased, partly due to their total accumulated loans from various sources.

Such a financial link between fishers and traders, locally called: *punggawa*<sup>4)</sup>-*sawi*, might be regarded as a kind of patron-client relationship, which can be found in many parts of Southeast Asia. In this study, patron-client can be described in the relationship between seaweed trader and seaweed farmer. A seaweed farmer goes to a seaweed trader directly to ask to borrow money. This kind of loan is done without any guarantee, but the seaweed farmer has to sell his product exclusively to the particular trader and moneylender. The trader gives loans to the seaweed farmer directly. When harvest time comes, the farmer exclusively sells seaweed to the traders who lend them money. Seaweed farmers should sell their product to whoever has given them advance payments. Generally speaking, the traders do not fix the time limits when borrowers should refund the loans. Neither guarantee, guarantor nor interest payment is required in this loan process. This system seemed helpful to farmers having problems with financial capital.

According to the respondents, they often received refusal from traders when they tried to repay the debts. The lenders intended to let the debt stay because they wanted to keep "*punggawa-sawi*" relationship with farmers. On the other hand, the seaweed farmers could not determine the price of their own product freely. As a result, they would depend heavily on the particular trader in the village dictating the price of their produce. Of course, "*punggawa sawi*" system has positive sides. It includes; 1] the

farmers can get loans through quick process; 2] there is no interest on the loans; 3] the farmers exclusively sell their harvest; 4] they will get cash payment. Meanwhile, the negative sides of “*punggawa sawi*” system are: 1] the farmers cannot determine the price of their harvest; 2] they cannot sell their product to any other traders than the particular trader as long as they have not paid debt to the trader yet.

Merlijn (1989) mentioned that this interlocked relationship causes an increase in fishers’ productions and productivity. It is natural that such a patron-client relationship consists of an exclusive trading activity in which fishers are obliged to market their products to a particular financial trader who gives advance payment. They in turn get both operational funds on daily basis and capital investment to boost their production.

## 2) Strategy of fishermen toward sustainable livelihoods activity

In this study, there was an observed shift in main livelihoods activity from capture fisheries to seaweed culture activity. However, many still conduct fishing activities as additional income of household economy. In Laikang Village, 77.5 % of respondents did not change their main business activity (Figure 4).

Shown in Figure 4, all respondents in Laikang Village shifted their main income

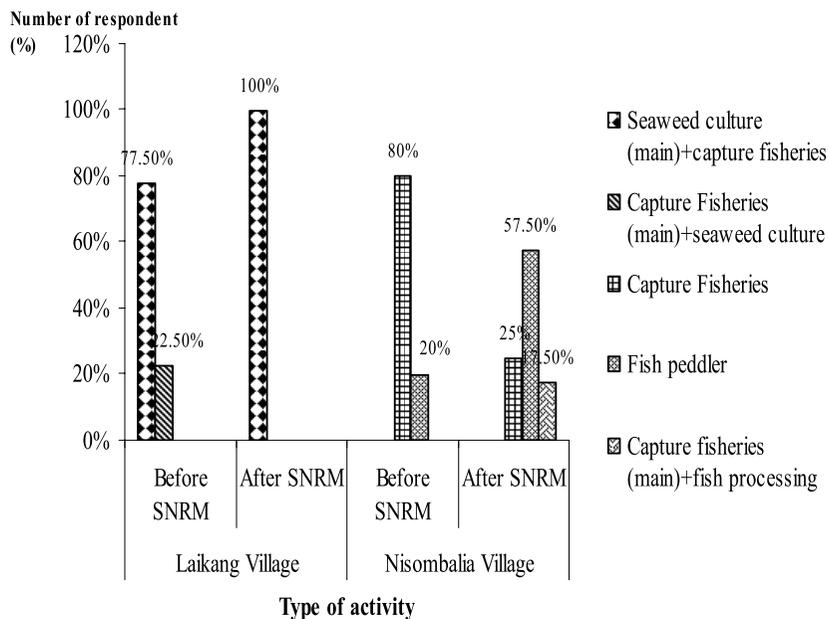


Figure 4. Changes of income generating activities of respondents

Source: Primary Data Analysis 2009

generating activity (IGA) to culturing the economic seaweed, *Eucheuma cottonii*. By doing so, they could gain double income sources. SNRM program successfully encouraged all respondents to adopt seaweed culture as the main job; while capture fisheries became the second job in Laikang Village. In Nisombalia, the number of respondents working in capture fisheries decreased from 80 % to 25 % , while fish peddlers increased from 20 % to 57.5 % . Meanwhile, 17.5 % of the respondents undertook capture fisheries and fish processing activities at one and the same time, in cases where the capture fisheries constituted a greater bulk for their main income. In this study area, fishers lacked post-harvest and processing activities. These activities might have helped solve a dilemma in small-scale fishery on “how to decrease poverty and reduce the fishing-dependent without increasing fishing effort” (Allison and Horemans 2006). Allison and Ellis (2001) suggested that encouraging alternative livelihoods within the fishing community with a complementary or substituting non- fishery activity would have better results. Livelihood diversification might be combined with other resources (Seavanen *et al.* 2005). However, fishers cannot be easily persuaded to go into such a diversification of their livelihood. They need some kind of technical and financial assistance until the products will have been accepted by the market continuously.

At present, fishers need new appropriate technology to improve the quality of products and increase their market value, since the price of dried seaweed increased. Diversification of livelihood activities has reduced destructive fishing practices, and made finding fishing ground with abundant resources easier, decreasing operational cost and increasing fish catch. Sievanen *et al* (2005) said that seaweed farming could reduce the ecological impact of fishing activities in combination with other resource management tools. SNRM gave start-up funds to stimulate and increase business such as assistance in procuring capture equipment, tools for fish peddling and milkfish presto (as a new livelihood activity).

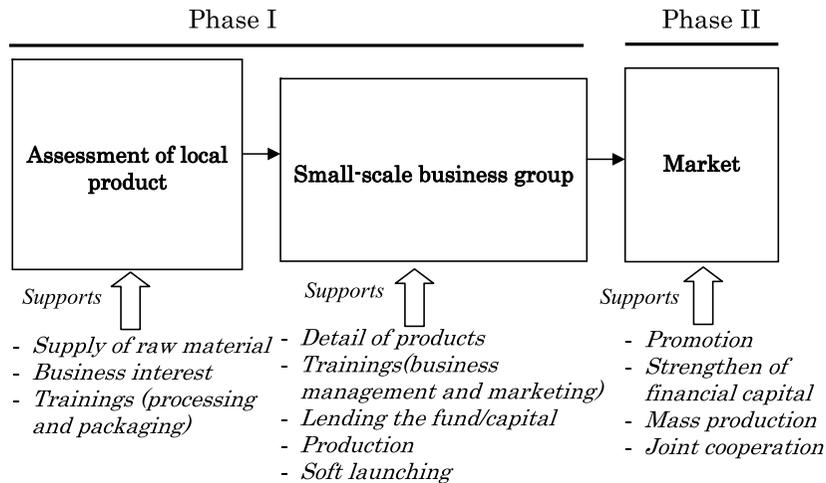
According to the field survey, there were some reasons why the respondents change or do not change their jobs. In Laikang Village, many respondents answered that they did not change activities because of: 1) the main job was still productive, producing a lot of profit with a little amount of capital: 2) they were worried about the risks caused by switching to a new job. Meanwhile, those respondents who changed their activities gave the reasons as follow: 1) a new business needs low operational cost: 2) it makes lots of profit: 3) many fishers have been successful in doing alternative new businesses.

In Nisombalia, those respondents who changed main activity had the following

reasons; 75% of respondents gave the reason related with profit, 20% were motivated by taking a look at others' successful experiences. Meanwhile, the reasons for the respondents who did not change their jobs were as follows; 1) profit; 2) operational cost; 3) financial capital; and 4) market opportunities. They felt that there was no guarantee that new businesses would be more profitable than the present activity. "Greater profit" and "better business opportunity" were the major causes to stimulate fishers to involve alternative livelihoods. They felt that their previous income was not enough for their daily needs, and some just followed successful cases of others. Respondents expected that fish peddling (*pa'gandeng*) would be more profitable than fishing activity, and they still had a good business opportunity for at least 2-5 years later.

How to raise operational funds is usually a great obstacle for fishers to change their livelihood. They have hardly accumulated own capital for investment in a new livelihood. Another constraint for altering livelihood is a lack of market information. In the survey, 25% of respondents expected that their present business was profitable enough to continue it; however, those respondents who anticipated a good prospect of their present business for development accounted only for 25%. According to the survey results in two selected villages, a lack of capital was not always regarded as a main obstacle to affect the sustainability of livelihood activities. Like other livelihood assistance projects, SNRM provided a source of financial capital for those fishers who would develop their present livelihood or adopt alternative ones. However, Suyanto (2004) argued that the financial capital given to such fishers does not always ensure better living conditions.

Alternative livelihoods, which are introduced to poor or small-scale fishers, should bring more economic benefit by making their products more marketable. In fact, however, in cases where a newly introduced livelihood is considerably capital-intensive, the small-scale fishers could hardly start without any support. These businesses can be developed through joint ventures between fishermen. They cooperate with other fishermen to solve problems on limited financial capital. Figure 5 shows the framework of developing local fishery products. According to the field survey and observation, respondents faced some difficulties in developing local products into marketable ones, to develop the existing products, or new products that are introduced by SNRM or other projects. In this step, the main point is developing business, which is introduced to fishermen. The role of local government is to invite the trainers for some activities such as processing fishery products, business management, and promotion of new product.



**Figure 5. Conceptual framework for local fishery products development in the study villages**  
 Source: Field observation 2009

Developing the new product will be based on the people's interest and local resource. The second phase is the effective commercialization of products.

### 3) Characteristics of respondents' participation in activities of SNRM

In Laikang Village, the highest level of participation among villagers was seen in seaweed culture and revolving fund activities, while the lowest participation was in the operation of fish cages. There was a tendency for fishers to maintain their activities that existed before SNRM. In Nisombalia Village, 90% of the respondents knew socialization, and all respondents knew both mangrove plantation and revolving fund activities. Respondents (60%) in Nisombalia preferred fish peddling rather than fishing. The number of fish peddlers increased, while those fishers engaged in capture fisheries decreased. Therefore, respondents in Nisombalia Village had much more concern towards fish peddling.

In this study, answers of respondents can be divided into three levels. **Good-level** participation means that they participated in SNRM program starting from the phase of socialization, implementation until post-implementation. **Fair-level** participation means that the respondents participated only in the socialization and implementation phases. **Low-level** participation means the respondents only participated in the socialization process. In this study, socialization is a part of planning phase because the result of socialization is for consideration to revise the project plan. In the socialization phase,

local project manager was involve some representative of the village to discuss about SNRM project design.

The activities of SNRM in Laikang Village had good initial appreciation and reception. In this village, 87.5% of the respondents had good responses to the activities of socialization, mangrove plantation and revolving funds. Meanwhile, in Nisombalia Village, 82.5% of the respondents were positive to the socialization session. However, they gave poor responses and feedbacks to the implementation of mangrove plantation and revolving fund activities (Figure 6).

According to the results of participation analysis, there are two types of activities, which could be developed as alternative livelihood, namely seaweed culture and fish peddling. ICM experience of Indonesia and the Philippines indicates that achievements and benefits influenced continuing participant’s involvement in the project activities and sustaining the projects (Pollnac and Pomeroy 2005 and Pomeroy *et al.* 2005). The respondents have maintained both seaweed culture (in Laikang Village) and fish peddling (in Nisombalia Village) after the termination of SNRM. Seaweed culture has become a main income source besides capture fisheries. Fish peddling has developed slowly

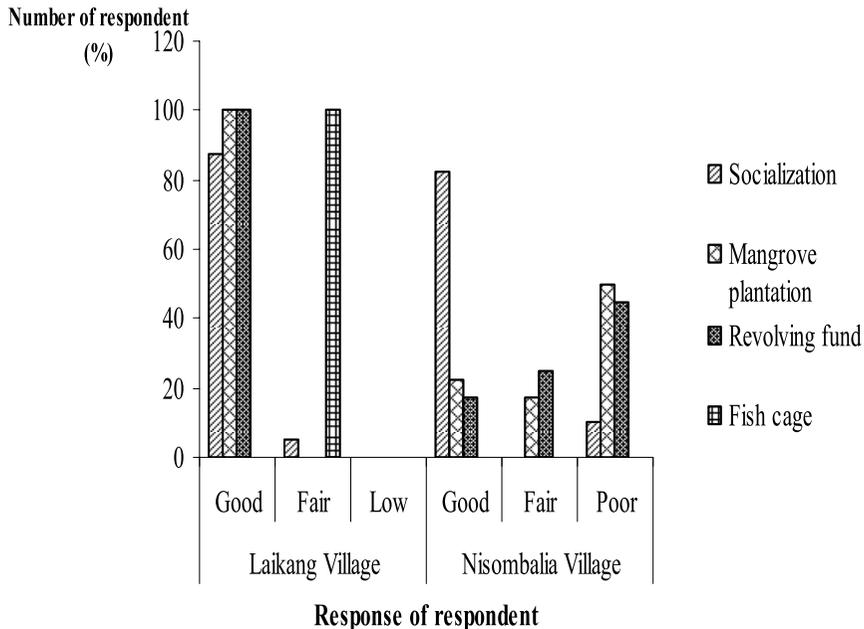


Figure 6. Responses of the respondents to SNRM’s activities  
Source: Primary Data Analysis 2009

because consumers' preference of fresh fish is increasingly high. These fresh fish were obtained from capture and culture ponds in South Sulawesi.

Unsustainable activity<sup>5)</sup> of SNRM at both Laikang and Nisombalia Villages was caused by several factors. The first factor is that respondents did not understand the meaning of a project and the goals that need to be achieved. The second is the lack of assistance in activities, which lead to unsuccessful project activities. The third is the lack of communication, coordination and inter-local governance cooperation (between project and village implementers). The fourth is the lack of understanding on the real situation and potentials of the project site. The fifth is the internal conflict in a village (*Desa*) level. SNRM projects faced almost the same problems with regard to the relationship between central and local governments in coastal area management, as did the Philippines (Lowry *et al.* 2005). If those problems could not be solved, it would cause project to failure in the future.

Such experiences in both villages indicate that there were some mismanagements of disseminating project concept and information to fishers. They tended to develop only the currently existing livelihood activities in improving their household income. They knew the opportunity and risk of existing livelihood activities. On the other hand, due to declining fish catch in Nisombalia, fishers were encouraged to find another alternative livelihood both inside and outside fisheries. The alternative livelihood might be as a response of fishers to changing situation in fishing activity. It might also follow the co-management system currently operating in some parts of Indonesia such as *Panglima Laot* in Nangroe Aceh Darussalam (NAD), *awig-awig* in West Nusa Tenggara, and Sasi in Maluku (Satria 2009 and Novaczek 2001). Grafton (2010) and Badjeck *et al* (2009) who said that fishers as individuals should undertake adaptation measures to respond to any changes in the situation of the resources including climate change.

## 6. Conclusions

SNRM applied a comprehensive approach for the sustainability of coastal resource management and improvement of livelihoods. The main findings show that the household economy of respondents joining SNRM improved. The respondent's income increased, and it was used for buying the equipment (strings, fish basket and motorcycle) for the prospective fishery businesses, such as seaweed culture and fish peddling. Some changed their main business to others, which provided a wide variety of opportunities whereby they could increase household net income. On the other hand, some did not change their

main jobs because they still obtained enough amount of income. Although fishers always pay much attention to how to increase economic benefit, some perceive how importantly they should conserve coastal environment by participating in a management group and replanting mangrove trees. The group is responsible for preserving mangrove ecosystem that SNRM had rehabilitated and replanted mangrove trees. Nevertheless, not all activities of SNRM have been sustained after the project was terminated.

Therefore, Government of Indonesia should encourage all stakeholders, especially local government to realize the importance of its roles. Local government should provide the technical assistance and control to the project activities in project sites. Private sectors, such as fisheries industries related to food, processing and fishing can actively participate in developing fisheries products, and contributing to the growth of local economy. Meanwhile, central government still provides the roles as a partner in funding, concept and supervision. Cooperation among all stakeholders should have a greater role in developing the coastal areas. The help of religious figures (*kyai/ustadz*) is of a great use in the socialization process of the project purpose and encourage people to participate in project activities. Local government should gradually reduce its dependence on the central government for future projects.

### **Acknowledgement**

The authors would like to express the deepest thanks and appreciation to all the fishermen who participated in the interview research and Dr. Lawrence Liao, visiting professor of the Graduate School of Biosphere Science, Hiroshima University for his academic suggestions.

### **Notes**

- 1) Geographically, this district has a land area of 566.51 km<sup>2</sup> located between 5°3' -5°38' South Latitude and 119°22' up to 119°39' East Longitude (Marine and Fisheries Service Office of Takalar District and Narayana Adicipta Persero 2007).
- 2) This district located between 40°45' - 50°07' South Latitude and 109°205' - 129°12' East Longitude (<http://www.bkpm.go.id>).
- 3) *UMR* of South Sulawesi Province in 2009 is IDR. 905,000,- (nine hundred five thousand, Indonesian rupiah) ([www.sulsel.go.id](http://www.sulsel.go.id)). 1 USD = 9,500 IDR (Indonesian Rupiah).
- 4) *Punggawa* refers to the people who lend money to fishers and have the preferential

and exclusive right to buy fisheries products from those fishers who borrow money from him.

- 5) Unsustainable activity refers to the project activity, which stopped after the project finished. People did not develop the project activity introduced by SNRM. Unsustainable project activities in Laikang Village consist of training for product processing and introducing fish cage. Meanwhile, in Nisombalia Village, training for product processing, revolving fund program as a micro credit and mangrove restoration were not sustainable.

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# Assessment of the Socio-Economic Impact of the Small-Scale Natural Resources Management Program (SNRM) in Indonesia: Case Study in Two Fishing Communities of South Sulawesi

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## **Abstract**

Many inhabitants of coastal communities in Indonesia are heavily dependent on the sea for their life. The objectives of this study were (1) to describe the typical household income, (2) to determine the factors influencing in income generating activities, and (3) to identify participation level among respondents. Structured and semi-structured questionnaires were prepared to obtain qualitative data. Interviews were conducted with ex-SNRM participants. Findings show that household income of respondents was improved after having joining the SNRM. The respondents who had not gained enough income switched into more lucrative income-generating activities. Increased income could be attributed to seaweed culture and fish peddling. Finally, the business profitability encouraged respondents to diversify and participate in the SNRM activities.

**Keywords** : livelihood, natural resource management, Small-Scale Natural Resource Management Program (SNRM), diversification, seaweed

## 南スラウェシの二つの漁村社会における 小規模資源管理プログラムとその社会経済的影響の評価

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### 要約

本研究の目的は、南スラウェシの漁村において実施された小規模資源管理プログラム (Small-scale Natural Resource Management Program, SNRM) の社会経済的な影響を評価することである。このプログラムには、漁獲漁業に従事する漁民への海藻養殖の普及活動が含まれていたが、この活動が資源利用及び生計活動に大きなインパクトを与えた。そこで、本稿では、二つの漁村を事例に、SNRMに参加した漁民に対するアンケート調査を実施・分析し、第1に、漁村住民の家計所得状況を明らかにし、第2に、所得の源泉に影響を与える諸要因を分析することにした。第3には、調査回答者のSNRMへの参加レベルを分析した。SNRMに参加することにより、回答者の多くが家計所得を向上させていた。所得を十分に得られなかった回答者の中には、海藻養殖に加えて魚の行商など生計活動を多角化させて、所得増大をはかっていた。SNRMへの参加をきっかけに、2つの事例漁村とも、住民の生計活動の多様化が進んでいた。海藻養殖の普及によって、沿岸域の利用形態が大きく変わった点が注目される。

**キーワード：**資源管理, SNRM, 多様化, 海藻, 生計活動

