COMMUNITY PARTICIPATION IN REHABILITATION, CONSERVATION AND MANAGEMENT OF MANGROVES: LESSONS FROM COASTAL AREAS OF SOUTH SULAWESI, INDONESIA

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ABSTRACT Local people in Tongke Tongke of Sinjai District, located on southeast coast of South Sulawesi (Indonesia), began to rehabilitate the coastal condition through mangrove plantation following example of the Pangasa villagers. They extended plantation plots step by step by planting seedlings of Rhizophora mucronata and succeeded in establishing mangrove forests Nowadays, they can provide mangrove seedlings to other districts in South Sulawesi, such as Bulukumba, Maros and Bantaeng, through mangrove rehabilitation programs supported by the Department of Forestry. The study was carried out in areas where mangrove conservation and rehabilitation were initiated and promoted collaboratively by both local people and governmental institutions in order to clarify the role of community participation in utilization, conservation and management of mangroves. Since mangrove conservation requires long–term maintenance, the expectation of local people in terms of both short-term and long-term economic benefits to be obtained from mangrove rehabilitation should be taken into consideration.

Key Words: Community participation; Mangrove rehabilitation; Economic benefit; Coastal resource management; South Sulawesi.

INTRODUCTION

> Mangroves are the characteristic littoral plant formations of tropical and subtropical sheltered coastlines and are at the interface between the land and the sea. The importance of mangrove stems from their pivotal role in both terrestrial and aquatic production, and by the many amenities provided within and beyond its boundaries (Vantomme, 1995: 1).

Mangroves are one of the most valuable natural resources of the coastal tropics and subtropics (Lal, 2003). They provide tangible and intangible benefits to the local people who inhabit coastal areas and their surroundings. The tangible benefits of mangroves comprise timber and non-timber products (Aksornkoae, 2000), while the intangible benefits include ecological and social functions, such as coastal protection against wave and current abrasion, shelter and habitat for wildlife, and ecotourism (Macintosh, 1996). Mangrove resources are seriously threatened and have disappeared during the last three decades. Human settlements, expansion of agricultural or salt-making lands, development of coastal industries, and more recently, expansion of coastal aquaculture, have caused damage to mangrove resources (Soegiarto, 2000).

For instance, due to the recent expansion of the market economy, mangrove forest resources in coastal areas of South Sulawesi, Indonesia, have been exploited in an unsustainable manner. The Provincial Development Planning Board of South Sulawesi Province (1998) revealed that due to the conversion of land to other uses, the areas of mangrove forests decreased sharply from 67,200 ha in 1982 to 34,300 ha in 1998. About 50% of mangrove fields vanished each decade. If this circumstance continues, the whole mangrove forests in the coastal areas of South Sulawesi would disappear leading to a serious damage of the coastal environment.

In 2000, the Provincial Land Rehabilitation and Soil Conservation Board supported by the Department of Forestry promoted and implemented mangrove rehabilitation and conservation programs in several districts of South Sulawesi. This was done to protect and preserve the mangrove resources and rehabilitate the coastal environment. The present study focuses on mangrove conservation undertaken initially by local people in Tongke Tongke and Pangasa of Sinjai District, and the government-supported mangrove rehabilitation programs in some selected coastal areas of South Sulawesi, such as Maros, Bantaeng and Bulukumba Districts. The mangrove seedlings planted in those areas were transplanted from Tongke Tongke and Pangasa of Sinjai District. The governmental institutions in each district covered the labor cost and provided subsidies, such as mangrove seedlings, fertilizers and pesticides in order to encourage the participation of local people. The purpose of the study is to analyze the role and expectation of local people in utilization, conservation and management of mangroves initiated and promoted collaboratively by both local people and governmental institutions.

RESEARCH AREAS AND METHODS

I. Research Areas

The study was carried out in some selected coastal areas of South Sulawesi, where mangrove rehabilitation and conservation were initiated and promoted collaboratively by both local people and governmental institutions, such as Tongke Tongke and Pangasa of Sinjai District, Bontobahari of Maros District, Kaili of Bantaeng District, and Dajo of Bulukumba District.

Tongke Tongke and Pangasa of Sinjai District, and Dajo of Bulukumba District are located on the southeast coast of South Sulawesi Province facing the Bone Gulf. Furthermore, Bontobahari of Maros District and Kaili of Bantaeng District are situated on the western and southern coasts of South Sulawesi Province facing the Makassar Strait and the Flores Sea, respectively (Fig. 1).

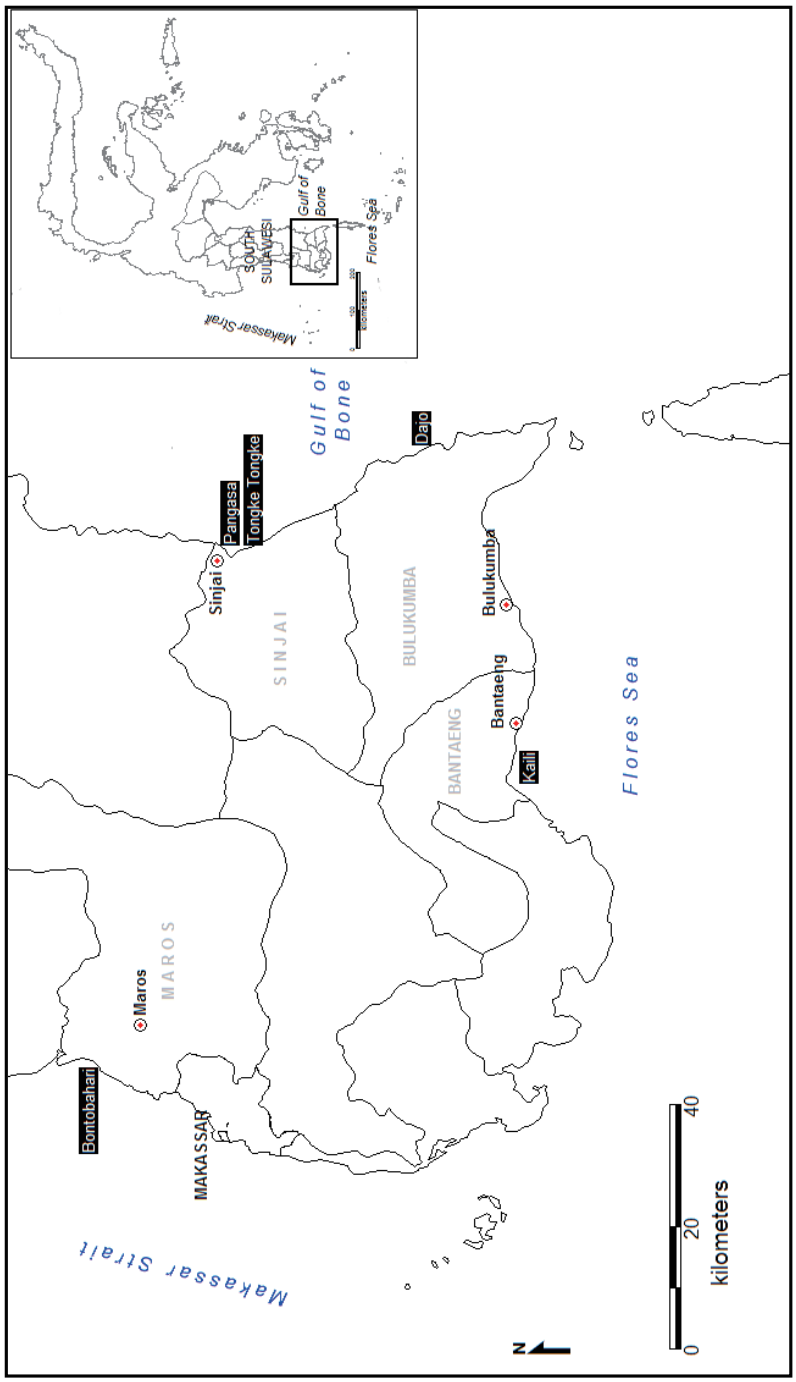

Fig. 1. Research Areas in South Sulawesi Province, Indonesia

II. Research Methods

Qualitative research methods consisting of interviews, observation and literature review were employed.

1. Interviews

Open-ended interviews were conducted with the group leaders and villagers who have undertaken locally-initiated mangrove plantation and participated in the government-supported mangrove rehabilitation programs. The subject of interviews mainly consisted of their experiences, perceptions, motivations, expectations and knowledge about mangrove plantations. Opinions and perceptions from government officials were also collected in order to get a holistic perspective regarding the utilization and management of mangroves, and the ownership of the planted mangroves as well as newly established lands.

2. Observation

Local people's participation was observed during the program initiation and implementation and after its completion. Methods of mangrove plantation, managemt of mangrove seedlings, and the current condition of mangroves were also observed in order to understand the role and expectation of the local people in managing the mangroves and sustaining the programs.

3. Literature review

Written materials and maps were collected from the district governmental and related institutions, such as Forestry and Soil Conservation Office, Marine and Fisheries Office, Sub-district Offices and Village Offices in order to augment the results obtained from the interviews and observation.

RESULTS AND DISCUSSION

I. Locally Initiated and Government-Supported Mangrove Plantation

Planting methods, management of mangroves, land status and the present mangrove conditions observed in some selected coastal areas of South Sulawesi are shown in Table 1. Land holdings and ownership of the planted mangroves at each research site were differently recognized by government officials and these conditions seem to affect local people's participation in the mangrove rehabilitation programs.

Local people in Tongke Tongke and Pangasa of Sinjai District, located on southeast coast of South Sulawesi, Indonesia, began to rehabilitate the coastal conditions by their own efforts through establishing mangrove plantation. The Pangasa villagers started the plantation in the colonial period and Tongke Tongke villagers started in the 1980s following the examples of Pangasa vil-

Table 1. Planting methods, management of mangroves, land status and mangrove conditions observed in mangrove rehabilitation and management in some selected coastal areas of South Sulawesi, Indonesia

Village	Planting Methods	Management	Land Status	Present Condition of Mangroves
Locally Initiated Mangrove Plantation				
PS	Villagers planted mangroves, *Rhizophora mucronata* , and extended the plantation step by step a long the	Individual	Individual (de-facto ownership)	Most of the planted mangroves were converted to fishponds
TT	Villagers planted mangroves by following the Pangasa villagers did	Individual and Collective	Individual (de-facto ownership)	Due to the *Kalpataru* , the planted mangroves were obliged uncut by local
Government-supported Mangrove Plantation				
BB	Planting mangroves within villager's fishponds	Individual	Individual	The planted mangroves were cut by the villagers
KL	Mangroves were planted and managed by 17 villagers	Collective	State	The planted mangroves were washed away by waves and currents
DJ	Local people allocated coastal area into 48 plots and each member occupied and managed one plot	Individual and Collective	Individual (de-facto ownership)	The planted mangroves grew up well with survival rate about 75%

PS: Pangasa, Sinjai District; TK: Tongke Tongke, Sinjai District; BB: Bontobahari, Maros District; KL: Kaili, Bantaeng District; DJ: Dajo, Bulukumba District

lagers. They extended plantation plots step by step by planting seedlings of Rhizophora mucronata and succeeded in establishing mangrove forest. About 15 ha of the planted mangroves in Pangasa were recently kept uncut due to large scale conversion to fishponds after the mangroves were established. Through the conversion, the Pangasa villagers obtained economic benefits from the planted mangroves by producing shrimps, fish and seaweed within the reclaimed fishponds. The coastal environment is protected against storms, waves and currents by the remaining mangroves in the outermost fringe of the reclaimed fishpond areas.

Although mangrove plantation in Tongke Tongke was undertaken initially by the local people, the management system changed after the villagers in Tongke Tongke were awarded an environmental prize, Kalpataru, the most prestigious environmental prize in Indonesia, by the President of the Republic of Indonesia. Due to the environmental prize, local people were forbidden to cut and use the planted mangroves. At the initial stage of plantation, local people planted mangroves and extended plantation step by step by themselves. After the Kalpataru award, however, the planted mangroves were collectively protected and managed by the leader of ACI (Aku Cinta Indonesia or I Love Indonesia), mangrove conservation group and the local people. At the moment, Tongke Tongke villagers have already stopped extending the plantation due to lack of economic benefits from the mangroves. However, some villagers tried to cut and use mangroves from around the center of the plantations without being noticed.

Pangasa villagers also planted mangroves and established fishponds by themselves, without financial support from government institutions. No external authority or organization controls the management of mangroves and newly established lands. They keep the mangroves on the fishpond dikes and outermost fringe of the reclaimed fishpond areas as a protection against wave and current abrasion. The villagers got their fishponds registered as private properties.

Mangrove rehabilitation programs in Bantaeng and Bulukumba District also involved local people. Those programs provided subsidies, such as labor costs and mangrove seedlings. However, the programs are different in terms of land holding and ownership of planted mangroves. In Dajo village, there was an agreement between the local people and the local government institution that the local people would be given the right to manage the mangroves under government control. Local people and local authorities divided the coastal area into 48 plots and each member occupied and managed one plot (25m x 100m). In addition, the plantation was also monitored and controlled by the leader of the mangrove conservation group. Although no more subsidies were given to the local people, they still take care of the plantation. As a result, planted mangroves grew up well with a survival rate of about 75%. On the other hand, in Kaili, mangroves were collectively planted and managed by the villagers. When subsidies ended, villagers stopped managing the plantation because they were not given the right to own the planted mangroves and the plots. Finally, the entire planted mangroves in Kaili were washed away by waves and current abrasion.

In the initial stage of the plantation in Bontobahari, Maros District, the program showed harmonious collaboration between the government institution and the local people. The local people provided a place for planting mangroves within their fishponds. The government institution not only covered the plantation costs but also provided mangrove seedlings, milkfish larva, fertilizers, and pesticides for their fishponds. As a result, the mangroves initially grew up well, with a survival rate of over 80% because fishpond dikes sheltered and protected them from wave and current abrasion. However, recently, most of the villagers who were involved in the program cut the whole planted mangroves due to the following reasons:

1. The planted mangroves were naturally damaged by severe dry conditions.
2. The planted mangroves did not increase fish production as promised by the government institution when the program started.
3. The planted mangroves became a place of abode for many predators which fed on fishes and shrimps.
4. The local people thought that the land may be taken away and become state-controlled mangrove forest.

The fishponds in Bontobahari were owned by the villagers as private properties, therefore the local people in Bontobahari could freely cut and use the plantation. Noble (2000) noted that through resource ownership, coastal communities can attain a measure of autonomy from outside influence and hence greater control over communities' socio-economic destiny.

From study, it is obvious that land holding and ownership of planted mangroves are the most significant factors in utilization, conservation and management of mangroves. Land holding and ownership of planted mangrove should be taken into consideration for promoting and implementing the mangrove rehabilitation program.

II. Economic Benefits of Mangrove Rehabilitation and Community Participation

The findings of the Tongke Tongke and Pangasa study reveals that mangrove plantation provides potential lands for agricultural crops and coastal aquaculture. The lands on which mangroves were planted or intended to be planted in Tongke Tongke and Pangasa have been recognized by the villagers as individual properties. However, the local authorities have not approved the property rights of the villagers. As a result, the status of the mangrove lands in Tongke-Tongke and Pangasa remains de-facto ownership.

Boers (2001), who enacted a project in Pangasa, demonstrated the goal of the project through the application of simple fishpond management practices and appropriate technology to increase significantly the production of commercially valuable commodities. Coastal aquaculture has expanded under the rationale of providing economic benefits at national, regional, community and household levels (Neiland *et al*., 2001; Perez-Sanchez & Munir, 2003). On the other hand,

due to the ban by the local authorities on Tongke Tongke people, some villagers sold their mangrove-lands to investors because they could not establish fishponds by themselves.

In the governmental mangrove rehabilitation programs, villagers were classified as laborers (Kaili) and de-facto owners (Bontobahari and Dajo). The advantages that the villagers obtained from the programs were divided into short-term and long-term economic benefits. Short-term economic benefits consisted of subsidies, such as labor costs and mangrove seedling in Kaili and Dajo, and fish larvae, fertilizers and pesticides in Bontobahari. Long-term economic benefits from planted mangroves were given to the villagers of Dajo. An agreement signed between the local people and local authorities entitled the former to own the planted mangroves. Due to these circumstances, mangrove plantation in Kaili was not taken care of by the villagers especially after the subsidies terminated. On the other hand, although no further subsidies were given to the Dajo villagers, they continued to take care of the plantation because the planted mangrove would be owned by them.

The cases presented above reveal that the local people preferred economic benefits rather than ecological functions of the planted mangroves. On the other hand, local government officers were more focused on the ecological functions of the mangroves. Due to the big gap in their motivation between the local government and the local people, most of the mangrove rehabilitation programs promoted and implemented by governmental institutions were unsuccessful as shown in Kaili and Bontobahari. Therefore, harmonious collaboration between local authorities and local people is an important factor for the successful implementation of the mangrove rehabilitation programs.

The detailed explanation of local people's expectation from mangrove plantation is shown in Fig. 2. Number (1) indicates mangrove plantation initiated by local people in Tongke Tongke and Pangasa of Sinjai District. They allocated plots, planted mangroves, and managed the planted mangroves and the newly established lands by their own efforts for about 10-15 years. Although the maintenance of mangroves needs much time, the villagers continued to plant mangroves because they can own the planted mangroves and the newly established lands. On the other hand, number (2) indicates mangrove rehabilitation programs in Bontobahari and Kaili, which lasted only for one year or less than 5 years. Due to limited time, budgets, and labor provided by the mangrove rehabilitation governmental programs, villagers lacked interest to maintain the mangroves and sustain the programs.

Number (3) illustrates that the mangrove rehabilitation program in Dajo, Bulukumba district, provided short-term and long-term economic benefits, as the planted mangroves were owned and managed by the villages. Therefore, the mangrove plants were better taken care of.

Number (4) illustrates that since mangrove plantation requires long-term maintenance, community participation is necessary in order to sustain the programs. White (2001) also noted that public participation continues to be a fundamental aspect of planning activity. However, the economic benefits to be obtained from

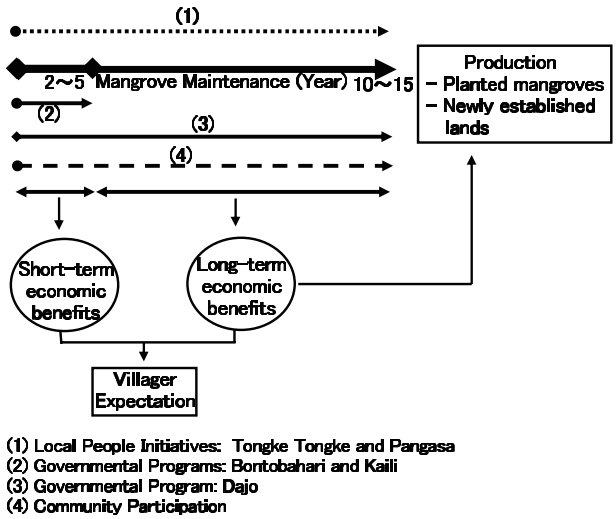

Fig. 2. Mangrove Maintenance and Expectation of the Local People in Mangrove Rehabilitation and Management Programs.

mangrove rehabilitation programs should be taken into consideration. Short-term and long-term economic benefits could be the basic stakes related to the management of coastal resources.

III. Community Participation in Mangrove Rehabilitation and Management Programs

FAO (1998) classified community participation into seven categories: manipulative participation, passive participation, participation by consultation, participation for material incentives, functional participation, interactive participation, and self-mobilization. The results of the study is discussed in light of these categorization.

Participation for material incentives takes place when people participate in a project for food, cash or other materials. In this case, local people have no stake in prolonging participation when the incentives end. On the other hand, self-mobilization is participation by taking initiatives independent of external institutions. They develop contacts with external institutions in order to get the resources and technical advice they need.

From the case studies, "self-mobilization participation" was observed in mangrove conservation initiated by the local people in Tongke Tongke and Pangasa. On the other hand, "participation for economic incentives" was observed in government-supported mangrove rehabilitation programs in Kaili and Bontobahari. Government-supported mangrove rehabilitation programs seem to be unable to provide incentives to local people for maintaining the planted mangroves until the products can be harvested and utilized. Self-mobilization participation is

required for sustaining the government-supported programs. The challenge is in altering local people's involvement from "participation for economic incentives" to "self-mobilization participation."

Fig. 3 shows the role and participation of local people in mangrove plantation both in the locally-intiated and government-supported programs. It also describes how local people's participation alters from "participation for economic incentives" to "self-mobilization participation." At the initial stage of mangrove rehabilitation programs in Kaili and Bontobahari, local people joined and supported the programs because they obtained some subsidies. In Kaili, the local people were laborers and they supported and assisted governmental officers in implementing the program for wages (income). In Bontobahari, local people were the owners of the fishponds and mangroves. While the program was being implemented villagers worked as laborers. However, they became the owners of the mangroves planted on their lands. On the other hand, the local people in Tongke Tongke and Pangasa took initiatives independent of external institutions. They expected to benefit from the planted mangroves and the newly established lands.

Planted mangroves and the newly established lands under government control were given to the local people in Dajo as individual properties. Although no more subsidies were given, the local people continued to take care of the

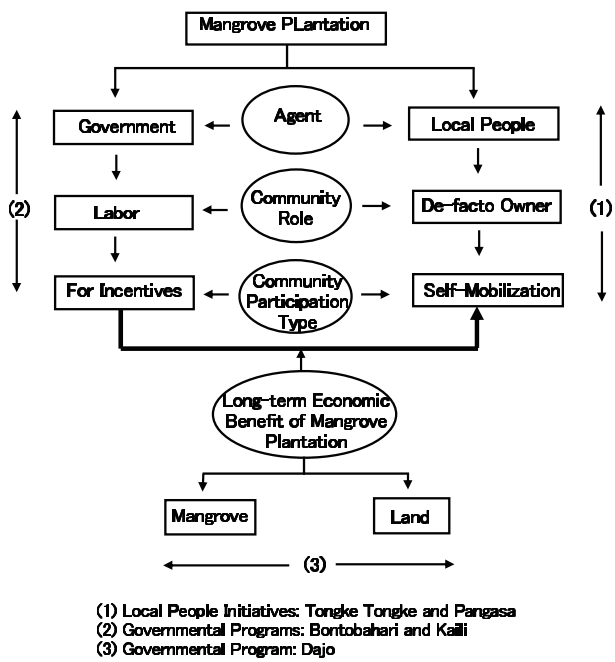

Fig. 3. Alteration of the Local People Participation in Mangrove Rehabilitation and Management Programs

plantation because the mangroves and the newly established lands have become their private properties. This seems to be the main reason why the mangrove rehabilitation program in Dajo was more successful than other programs (the survival rate of the mangrove forests was about 75%). The program also provided a space for coastal fishing communities and a corridor for the villagers' fishing boats. Initially, there was a conflict of interest between coastal fishing communities and the program officers over land utilization. The local communities originally used the area for coastal fishing activities, such as catching larvae of shrimps and fishes by using banana leaves as well as collecting gastropods and mollusks. In order to solve the conflict, the government officials asked some representatives of the villagers to visit the mangrove plantation in Tongke Tongke of Sinjai District and get lessons from them. Conflict resolution has become an increasingly important part of the public process in managing national forest lands for multiple uses (Martin *et al*., 2000). Methods of mangrove plantation in Tongke Tongke were adopted by the villagers of Dajo. The methods of mangrove planting, taking care of seedlings, landholding and ownership of the planted mangroves as well as problem solving practiced by Dajo villagers, are also recently followed by the coastal people surrounding them.

CONCLUSION

Although community participation plays an important role in rehabilitation, conservation and management of mangroves, economic benefits to the local people to be derived from the planted mangroves and the newly established lands seem to be necessary in order to sustain the programs, as shown in the cases of Pangasa, Sinjai District (locally-initiated) and Dajo, Bulukumba District (governmental program). Land holding and ownership of planted mangroves are the most significant factors in utilization, conservation and management of mangroves. Since mangrove conservation requires long-term maintenance, the expectations of the local people in terms of both short-term and long-term economic benefits to be obtained from mangrove rehabilitation and conservation should be addressed. This could lead to "self-mobilization participation" and sustainable management of natural resources in coastal areas.

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