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## **Mangrove Plantation and Land Property Rights: A Lesson from the Coastal Area of South Sulawesi, Indonesia**

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### **Abstract**

The study aims at clarifying the historical process of mangrove plantation conducted by local people and analyzing the present social conditions concerning the mangrove plantations in order to illuminate the role of local people in environmental conservation and elucidate the appropriate management of artificially established mangrove forests. The study was carried out in a village located on the southeast coast of South Sulawesi, featuring a coastal environment rehabilitated by the local people through mangrove plantation initiatives. They had gradually expanded the mangrove plantation by planting seedlings of *Rhizophora mucronata* since the 1980s and thus established 32 ha of mangrove forests along their village coastline. Community-based mangrove plantation is the most significant of the efforts to conserve and rehabilitate the coastal environment, while at the same time; it can provide local people with potential land for their economic activities, such as agriculture, coastal aquaculture and settlements. The property rights of the local people over the mangrove plantation should be taken into account by local government in order to compromise both the needs of local people and local government interests in terms of environmental conservation and coastal resources management.

**Keywords:** community-based resource management, environmental conservation, land property rights, mangrove plantation, South Sulawesi

### **I Introduction**

Situated between the land and the sea [Vantomme 1995: 1], mangroves represent the richest form of natural resource and an ecosystem that shelters the coastal areas of tropical and sub-tropical countries. The role of mangroves and their ecosystem is divided into two categories: namely tangible and intangible benefits. The tangible benefit of mangroves comprises timber and non-timber products [Zamora 1989: 51], while the intangible benefits include coastal protection against wave and current abrasions, shelter and habitat for wildlife, a buffer against pollutants, entrapment of upland run-off sediment, and a reduction in seawater turbidity, climate regulation and ecotourism [Vantomme 1995: 2; Macintosh 1996: 4; Ellison 2000: 220].

The deterioration of mangroves and their ecosystem, however, is currently one of the most

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important and urgent environmental issues in Southeast Asia. Human settlement, expansion of agricultural or salt-making lands, the development of coastal industries, and more recently, the expansion of coastal aquaculture, have caused considerable damage to mangrove forests [FAO 1985: 10; Inoue *et al.* 1999: 28]. Indonesia is no exception to such circumstances [Soemodihardjo and Soerianegara 1989: 95]. For the last three decades, the conversion and exploitation of mangroves have taken place over many coastal areas in Indonesia. For instance, due to the recent expansion of the market economy, mangroves and their resources in the coastal areas of South Sulawesi, Indonesia, have been exploited in an unsustainable mode. The Provincial Development Planning Board of South Sulawesi [1998: 7] revealed that, due to the conversion to fishponds and other uses, the area of mangrove forests had decreased markedly from 67,200 ha in 1982 to 34,300 ha in 1998.

Under such general circumstances, the presence of a village where mangrove forests were artificially established through local initiatives was remarkable. Villagers in Tongke Tongke, Sinjai District, located on the southeast coast of South Sulawesi, planted mangroves and rehabilitated the coastal conditions without any direction and assistance from governmental institutions. They had expanded mangrove plantations step by step by planting seedlings of *Rhizophora mucronata* since the 1980s and established 32 ha of mangroves along their village coastline. The mangrove plantation thus represented opportunities to gain potential new land for agriculture, coastal aquaculture and settlements.

However, disputes between the villagers and the local government over the ownership of the mangrove lands have been a crucial issue in Tongke Tongke. The condition has influenced the activities of local people concerning the utilization and management of the established mangrove lands, and the sustainability of the villagers' initiatives in mangrove plantation and coastal resources management. The study aims at clarifying the historical process of the mangrove plantation conducted by local people and analyzing the present social condition of their society with regard to the mangrove plantation, in order to illuminate the role of local people in environmental conservation and elucidate appropriate measures for managing mangrove plantation and for establishing sustainable coastal resource management.

## II Outline of Study Area and Methods

### II-1 Study Area

The study was carried out in a village called Tongke Tongke, through frequent visits over four years following 2000. As shown in Fig. 1, it used to be one of the sub-villages (*dusun*) in the Samataring



**Fig. 1** Research Area in Tongke Tongke

Sources: Base-map: ESRI DCW based on 1:1 million US DMA Navigation Charts (E00 format)

Boundaries: BPS (Central Bureau of Statistics) Indonesia (MapInfo format), 1998–2004

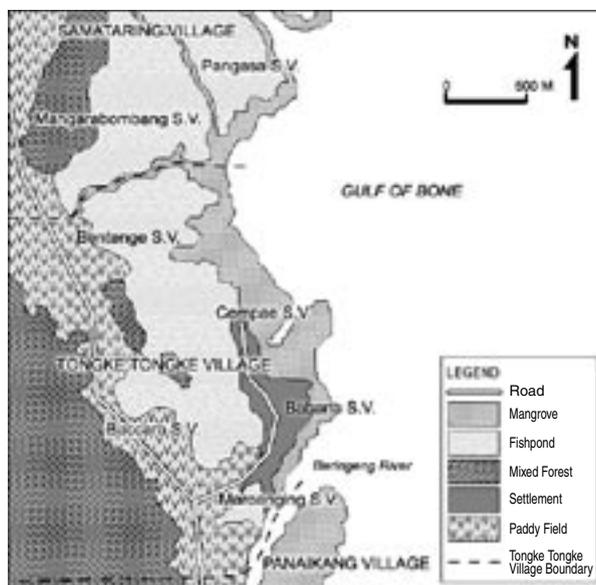
**Table 1** Area and Population of Sub-villages in Samataring Village, Sinjai District

Sub-village	Area (km <sup>2</sup> )	Population
Pangasa	1.15	448
Mangarabombang	1.25	880
Batu Lappa	2.10	1,287
Tongke Tongke	2.25	1,809
Maroanging	2.50	1,166
Total	9.25	5,590

Source: Samataring Village Office, 2000

village (*desa*), administratively part of the East Sinjai sub-district (*kecamatan*) of the Sinjai District (*kabupaten*), and the biggest sub-village in Samataring in terms of population (Table 1). It faces the Gulf of Bone and is located 7 km southeast of Sinjai, the capital city of Sinjai District, at a latitude of 120° 16'19"E and a longitude of 05° 09'1"S. The topography of Tongke Tongke consists of plains and hills situated at elevations ranging between 0–150 meters above sea level. Two rivers called the Sungai Baringeng and Sungai Sanjai stream down to the village coast covered by mangrove forests of 32 ha, which have been planted by the villagers since the 1980s. Meanwhile, fishponds, paddy fields and mixed forests are distributed within the western inland region of the village (Fig. 2).

Following the reformation of administrative divisions in 2003, the Tongke Tongke sub-village



**Fig. 2** Tongke Tongke and Its Surroundings

Source: Landsat ETM+ 1999

Note: S.V. indicates Sub-Village.

**Table 2** Occupation of Tongke Tongke Villagers

Occupation	Sub-village					Total
	Cempae	Babana	Bentenge	Maroanging	Baccara	
Farmer	10	8	35	20	75	148
Fisherman	300	150	35	50	25	560
Fish farmer	93	30	13	15	25	176
Civil servant	10	18	15	5	20	68
Entrepreneur	3	25	7	10	7	52
Smoked-fish seller	10	12	-	1	-	23
Fresh-fish seller	7	2	4	1	3	17
Total	433	245	109	102	155	1,044

Source: [Buku Perencanaan Desa Tongke Tongke [Planning Book of Tongke Tongke] 2004]

was reformed to a new village (*desa*), Tongke Tongke, merging with another of the sub-villages, Maroanging. It consists of five sub-villages, of which Cempae, Babana and Bentenge belonged to the former Tongke Tongke sub-village (Table 2). When the word, Tongke Tongke villagers (or simply, villagers), is used in the following descriptions, it refers mainly to the people living in four sub-divisions, excluding Baccara, because they are incorporated in the activities of the mangrove

plantation.

Tongke Tongke villagers belong mainly to the Bugis ethnic group, and their main occupation is fishing, as shown in Table 2. In particular, in the former Tongke Tongke sub-village, fishermen occupied more than 60% of the total number of households. They are engaged in in-shore fishing using various kinds of traps and off-shore fishing using net and angling equipment. Among other occupations, there are many householders engaged in fishing-related occupations, such as fish farmers who cultivate shrimp or fish in fishponds located in the west of the village compound and entrepreneurs and fish-sellers engaged in the processing and marketing of the fishery products.

## II-2 *Research Methods and Activities*

A mix of qualitative and quantitative methods consisting of interviews, observation and literature studies was employed. Interviews were conducted with the leader of the plantation group and all the members; including those who initiated the mangrove plantation and those who held mangrove forests in the village, focusing on their experience in terms of mangrove plantation, their perception of the coastal environmental rehabilitation and “ownership” of the established mangrove lands, and knowledge concerning fish and shrimp culture. Interviews were also carried out with district officers and staff of the relevant governmental institutions, such as the Forestry and Estate Department, the Fishery Department, the Agrarian Department and the Development Planning Board, in Sinjai District as well as with sub-district officers in order to gain a broader perspective and additional information concerning maps and written documents in relation to the utilization and management of mangrove forests and the registration of mangrove lands.

The areas of mangrove plantation, the physical condition of the mangroves, and the utilization and management of established mangrove lands as well as the socio-economic condition of the villagers, were measured and observed in order to verify the results obtained from the interviews. Each plot of planted mangroves was carefully measured and the “owners” of planted mangroves were identified. Furthermore, detailed information concerning the changes in the coastal environment, the process of the mangrove plantation and the fishpond construction was respectively collected in order to better understand the actual activities of the people engaged in establishing mangrove forests, developing fishponds, and rehabilitating the coastal environment.

### III Historical Process of Mangrove Plantation

#### III-1 *Prior to the Formation of the Planting Group*

In early twentieth century, the coastline of Tongke Tongke used to be a harbor for domestic transportation. Mangrove forests, in particular *Rhizophora mucronata*, were not found on the coastal side of the residential areas, while *Nyssa fruticosa*, *Avicennia* spp. and *Bruguiera* spp. were distributed within the lagoon and the estuary of Sungai Baringeng. During this period, the villagers of Tongke Tongke, who were mainly fishermen, carried out daily activities for a subsistence livelihood, such as fishing, sailing, collecting coastal and marine benthic resources, and agricultural farming. In the 1930s, Raja Bulu-Bulu Timur, the chief of a petit kingdom, constructed fishponds in the lagoon and along the coast of Tongke Tongke for rearing various coastal fisheries resources, such as black tiger shrimp, milkfish, and mud crabs.

Since the 1940s, the socio-political situation in Tongke Tongke and its surroundings had become unstable due to Dutch colonialism, the Japanese occupation and the Kahar Muzakkar movement [Cribb 1992]. As the villagers of Tongke Tongke were forced to move out to other areas, such as Kendari and Pulau Sembilan, coastal abrasion in Tongke Tongke began to take place due to their absence. Moreover, as nobody could take care of the fishponds, all those located on the coastal side were destroyed by abrasion and totally disappeared during this period.

In the early 1960s, just after the end of the Kahar Muzakkar movement, the villagers returned from exile under their own initiative, and their former subsistence economic activities gradually revived. On the other hand, the villagers of Pangasa and Mangarabombang, neighboring sub-villages of Tongke Tongke, also returned from exile and began to plant mangroves within the outer-fringe of the remaining natural mangrove forests to protect the fishponds they had previously established by cutting mangrove forests during the Dutch colonial period. In contrast to the Tongke Tongke case, the fishponds in Pangasa and Mangarabombang were not destroyed by abrasion, since the fringe of natural forest remained uncut and functioned as a protection for the fishponds. However, since the remaining forests were too thin to protect the fishponds, they began to further shelter them by planting mangrove seedlings. They used the seedlings of *Rhizophora mucronata*, introduced from the Siwa District, which did not originally grow in the Sinjai District. This was the first introduction of *Rhizophora mucronata* into the Sinjai District, and it is said that a descendent of the Raja Bulu-Bulu Timur, who had left the petit kingdom to avoid the political conflict and stayed in Siwa, brought it to Pangasa. Following the initial introduction, the villagers in Pangasa and Mangarabombang continued

to plant mangroves to protect the fishponds and when the mangrove forest had expanded to some extent, they cut more down and constructed fishponds. They kept mangroves uncut just adjacent to the fishpond dikes, river banks and the outermost fringe of the fishpond areas as protection against waves and current abrasion. Accordingly, the villagers of Pangasa and Mangarabombang gradually expanded their fishpond areas following their return.

Observing the experiences of the Pangasa and Mangarabombang villagers, some villagers in Tongke Tongke began to follow suit and plant seedlings in the border areas between Mangarabombang and Tongke Tongke during the 1970s. They planted *Rhizophora mucronata* obtained from Pangasa and Mangarabombang, and constructed fishponds by cutting planted mangrove forests once the forests were established. They also utilized them for firewood and timber for house building.

Following the successful planting of mangroves in the border areas, the villagers in Tongke Tongke began to extend their plantation to the coast of their residential areas, the present day sub-villages of Babana, Cempae and Maroanging, in early 1984. There were various motives for the villagers to plant mangroves, namely: getting firewood, securing property rights of the land, and protecting their residential areas from coastal abrasion and other natural hazards like storms. It is generally recognized that the intertidal areas of coastal ecosystem are open access and public space that nobody could own the resources. However, the local people claim them as private property when the mangrove forests have been established. In the initial stage, the plantation caused a conflict between the planters and the fishermen who did not join the plantation, since the planted mangroves disturbed their operations. However, the conflict was solved among themselves by providing spaces as corridors to allow passing fishing boats through and for setting fishing traps and operating collection of shrimp and fish larvae with a tool made of banana leaves. The conflict between the planter and other sectors e.g., shellfish or other benthos gatherer is negligible because they could collect shellfish and other benthos at the mangrove roots and at the tidal mud flat that was established due to mangrove plantation.

In 1985, a group for mangrove planters, headed by Mr. BB, was established to organize the villagers who planted mangroves. At the same time, a group for football known as ACI, “Aku Cinta Indonesia” or “I Love Indonesia” was also created and managed by Mr. ZD in Tongke Tongke. However, the group of mangrove planters did not function so well because the leader was too busy marketing fish products in Lappa, in the north Sinjai sub-district. On the other hand, the ACI football group flourished. Although the planter group was no longer functioning, the activities of the villagers in the mangrove plantation continued year by year. Ideas for rebuilding the organization of

mangrove planters re-emerged and the previous members were reorganized into a new group called ACI, in 1988, after the name of the football team. The management of the ACI group was handled by a leader, Mr. MTY, a secretary, Mr. ZD, and a treasurer, Mr. AMR, upon the recommendation of the chief of Tongke Tongke sub-village. The management of the ACI group started by reorganizing the mangrove planters and promoting the planting activities of the villagers. Since then, the planted area has more intensively expanded. Consequently, the mangrove forests of Tongke Tongke began to draw public interests, and in 1988, the Youth Generation Association, Karang Taruna, sent members from all over South Sulawesi to learn about how the local people managed their mangrove plantation. It was a good occasion for every member of Karang Taruna to learn and obtain knowledge which would be applicable to the coastal areas in their homelands. The government of Sinjai District also began to pay attention to the villagers' activities and tried to promote the development of mangrove forests in Tongke Tongke.

### III-2 *After the Award of Kalpataru Prize*

Since 1980, the President of the Republic of Indonesia has awarded the prize of Kalpataru<sup>1)</sup> to individuals or community groups who have contributed towards environmental conservation and rehabilitation. In early 1995, responding to the call for the application of Kalpataru by the Ministry of Environment to whole districts in Indonesia, the government of Sinjai District selected the activities of Tongke Tongke villagers and proposed the ACI group as one of the candidates for the prize. The final selection was performed by the Ministry of Environment and the ACI group was finally selected as one of the community groups to be awarded the Kalpataru prize. In order to receive this prize, the government of Sinjai District asked Mr. MTY, the leader of ACI, to go to Jakarta, and it was Mr. MTY that received the prize directly from the President. Since then, the government of Sinjai District has supported him as an important care-taker for conserving the mangrove forests. After the ACI group received the prize, the government of Sinjai District, staff of related institutions at all levels in South Sulawesi, and the ACI group leader tried to preserve and protect the mangrove forests in

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1) Kalpataru is the most prestigious environmental prize in Indonesia, which is awarded by the President of Republic of Indonesia to individuals or community organizations for outstanding achievements in the protection and improvement of the environment functions. Kalpataru means a livelihood tree, which illustrates the harmony of nature. The symbol of Kalpataru is adopted from the relief of Mendut Temple in West Java that pictured forest, land, water, air and other natural environments (<http://www.menlh.go.id/web-kalpa/>). From 1980 to 2003, 195 individuals and community organizations have been awarded the prize in various categories: environmental pioneer, environmental activist, environmental savior, and environmental adviser. The prize is offered every year by the Ministry of Environment to individuals or community groups on a competitive basis.

Tongke Tongke by prohibiting all people, including the group members, from cutting the forests. The mangrove forests in Tongke Tongke came to be valued as reflecting environmental protection and conservation, not only for the people of Tongke Tongke but also those of South Sulawesi Province, Indonesia, and even the wider world.

Since the prize was awarded, Tongke Tongke has become very famous and various kinds of assistance programs have been implemented. The 1995 Kalpataru winners, including the ACI leader, were given a chance to visit and observe the silvo-fishery system, *tambak tumpang sari*, featuring a combination of mangrove forests and fishponds, in Cikiong, West Java, which was initially developed and implemented there by the state forestry corporation, Perum Perhutani. Following this study trip, the silvo-fishery system was adopted and implemented by the leader of ACI in 1995 with financial support from the provincial government of South Sulawesi. Next year, in 1996, the Island Sustainability, Livelihood and Equity [ISLE 1996] program<sup>2)</sup> was also implemented. The ISLE program included a trial for raising crabs in the silvo-fishery pond. The pond was divided by fencing off several portions, in which the trial was conducted with different densities of crabs, but no production. As Niartiningsih [1996: 27], author of this trial, concluded, the crabs displayed an effective growth rate within the mangrove ecosystem, but a very low survival rate due to poor water quality, inadequate food management and a lack of uniformity in the crab sizes. It is also observed by the author that the silvo-fishery system introduced into the village appeared to have been unsustainable, because it could not simultaneously combine the environmental conservation and the economic development for the local people. Since the program was more focused on the mangrove conservation rather than the economic development of local people, nobody intended to follow the program. As a result, the implementation did not succeed because of insufficient management by the villagers, due in turn to lack of economic benefits.

On the other hand, certain changes began to occur within the ACI group, such as a degree of criticism aired against the management of the group. The criticism was basically directed towards the leader of ACI, since the members came to believe that the leader had monopolized the group management, in particular, following the awarding of the prize. Consequently, the ACI group was reformed and Mr. HAM was elected as the new leader in mid-2000. The following considerations seem to have been made based on his selection, (1) he has the largest mangrove forests, and (2) he

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2) The Island Sustainability, Livelihood and Equity (ISLE) program is a cooperative project between seven universities, i.e. Dalhousie University, Nova Scotia Agricultural College, Technical University of Nova Scotia, The University of Prince Edward Island, all in Canada; Hasanuddin University in Indonesia; the University of Philippines in the Visayas, the Philippines; and the University of the West Indies in the Caribbean.

possesses considerable capital as a fishery-products businessman in Tongke Tongke.

Another change took place in September 2000, due to intervention implemented by the local government. The government of Sinjai District decided to construct a fish-marketing center in Tongke Tongke in order to promote the marketing of local fishery products. The new leader accepted this plan and asked some of the members to allow their mangrove lands to be used as the site for constructing the center. Subsequently, part of the mangrove forests were cut and reclaimed for construction. This was the first large-scale and legal conversion of mangrove forests following the creation of the plantation. The Ministry of Environment also provided 20 million rupiah to the ACI group in order to promote eco-tourism development in Tongke Tongke in December 2000. In order to make use of this provision, the villagers constructed a pier-type walk-way 50 meters long acting as a path for those wishing to enter the mangrove forests.

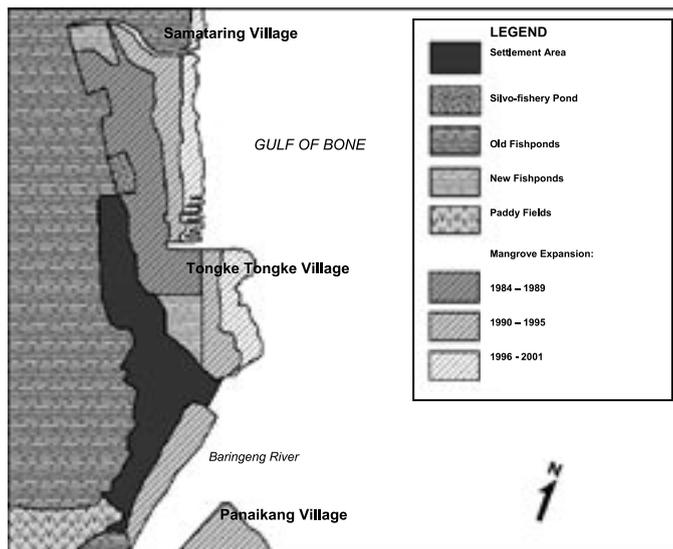
The existing mangrove forests, covering an area of 32 ha in Tongke Tongke, not only provide a safer place to protect local people and their properties from coastal hazards but also generate potential lands for their economic activities such as settlements, agriculture, and fishponds. Although some Tongke Tongke villagers currently still continue to plant mangrove seedlings, the expansion of plantation areas is not as significant as previously due to the considerable difficulty in enlarging the mangrove plantation due to heavy waves, current abrasion and barnacle attacks. On the other hand, some villagers, although the number was limited yet, began to busy themselves by cutting the established mangrove forests to reclaim lands for fishponds, agriculture and residences due to the change of circumstances, i.e., less control from the present leader of ACI group because of his busy commitment to his fish-marketing business.

#### **IV Method of Mangrove Plantation**

Planting carried out by the local people in Tongke Tongke starts with negotiation among the individual members concerned. Anyone who wishes to open a new plantation plot has to ask permission from the foregoing adjacent planters who “own” the planted plots. The ACI group does not have the function of allocating such plots to members. Everybody who wishes to plant with his/her capacity can obtain a plot to be planted following agreement of negotiations. The plot size to be planted totally depends on the planter’s capacity, but there are two regulations the planter must follow: border and corridor making. The new planter is not allowed to plant seedlings too close to the foregoing plots. A gap, usually of two-meters, should be maintained as the border between plots. Corridors for allowing fishing boats to pass are also to remain unplanted. These should have a width

of around 3 to 5 meters and be installed at intervals of around 10 to 15 meters. At present, a total of seven corridors exist within the 1,050 to 1,750 meters length of the collective planted area along the coastline (Fig. 3).

In the initial stage of the villagers' plantation activities, they had to obtain mangrove seedlings externally. Most of the villagers collected and acquired seedlings from the neighboring villages of Pangasa and Mangarabombang by plucking mature seedlings using a hook installed on a bamboo stick and/or by hand, or by gathering freshly fallen seedlings. Matured seedlings are light green in color and contain yellow cotyledon and green hypocotyl [Hachinohe *et al.* 1998: 11]. Local people recognize the maturity from its morphological characteristics; since it matures when the cover of the plumulae, the shoot of the mangrove seedlings, can be easily removed. Some villagers obtained seedlings by purchasing from other villagers at the price of 5 rupiah/seedling (currently, 100 rupiah/seedling). Villagers who had enough capital, such as Mr. HAM, the present leader of ACI, asked other villagers to collect mangrove seedlings in Pangasa and Mangarabombang and plant them in their allocated plots at a wage of 10 rupiah/seedling (currently, this type of wage planting is not practiced because of unstable legal condition of the land planted with mangroves). Nowadays, since the planted mangroves have expanded enough to bear fruits, the seedlings are prepared in Tongke Tongke. The mangrove seedlings are kept under the planter houses until the planting starts at the



**Fig. 3** Expansion of Mangrove Plantation in Tongke Tongke  
Source: Fieldwork and interviews with local people, 2001

time of low tide.

The mangrove seedlings are planted one by one at interval distances of about 30-40cm and about one third of the mangrove seedling is inserted into the soil. The villagers have maintained a high planting density in order to protect the seedlings from waves and currents. Thinning of planted mangroves was once planned by the villagers when the mangroves were established. Malamassam [1996: 17], who examined the growth conditions of planted mangroves in Tongke Tongke under the ISLE project, recommended thinning because of its significant contribution to the household incomes and welfare. However, the local government officials and the former ACI leader prohibited any such thinning for the sake of coastal environmental protection.

As mentioned earlier, efforts to establish mangrove forests in Tongke Tongke were very arduous, since mangrove seedlings were often washed away by waves and currents. However, the villagers practiced re-planting very frequently whenever the seedlings disappeared. Without such efforts, the mangrove forests could not have become so well established as is visible today (Fig. 4). As shown in Fig. 4, the difference of heights indicates the difference of plantation years. According to fieldwork data in 2001, mangroves aged 15 years have height ranging between 7.30-10.30 meters. At the moment, some villagers have tried to plant two or three mangrove seedlings within one hole in order to protect them from waves and currents. Since the forest matured, the villagers have begun to work to raise mangrove seedlings in plastic bags to sell them to other areas at a price of 500 rupiah/seedling.



Fig. 4 Mangrove Plantation in Tongke Tongke, 2001

## V Mangrove Plantation and Land Property Rights

Coastal water is generally perceived as an open access resource notwithstanding the fact that it is under the direct control of the state [Adger and Luttrell 2000: 77]. As Ostrom *et al.* [1999: 278] explained, open access regimes, such as the seas and the atmosphere, have long been considered to be spaces where nobody is authorized to own the resources. The absence of any formal property-right systems allows access from anyone to utilize the existing resources within coastal waters. Article 33 of *Undang Undang Dasar 1945*, the Fundamental Law of Indonesia, stated that the earth and water and their natural resources are controlled by the state and should be utilized for human prosperity. Based on this regulation, the coastal water and the land in Indonesia are defined to be under governmental control and may be utilized and managed by the government for human prosperity. Coastal waters in Tongke Tongke, Pangasa and other areas of the Sinjai District are no exception of this regulation.

The villagers of Tongke Tongke and Pangasa actually recognize that coastal water is subject to open access. However, the mangrove plantation they established in the intertidal areas of coastal water generated newly established land due to the sedimentation process. It usually takes 10 to 15 years until land planted with mangroves can be utilized for fishpond construction and other purposes. In the case of Pangasa, however, the villagers have actually converted the mangrove plantation into fishponds and they have been partially registered by the local government as “private properties.” However, land ownership of such “private properties” has not been recognized by the government. Instead of providing ownership, the government has approved the use of this land as fishponds by rendering them objects of taxation. As a form of compensation for “land ownership,” the local government asked the local people to pay taxes called *pajak bumi dan bangunan*, or taxes for land and building for their registered fishponds.

Similar circumstances could be observed in both Tongke Tongke and Pangasa in terms of their expectations for the use of the mangrove forests. The villagers of Tongke Tongke also expected that the artificially-established mangrove lands could be “owned” by them following the establishment of the mangrove forests. Besides the use of mangroves for timber and firewood, they intended to secure the property rights of the established mangrove lands. However, a different condition has arisen since the Kalpataru Prize was awarded. In spite of the *de-facto* ownership recognized among the villagers themselves, the local government has not approved the property rights of the local people and did not allow the people to cut and utilize their mangroves. It can be said that the prize

triggered differing perspectives between the governmental institutions and the local people in terms of the utilization and management of the established mangrove lands. Perspective of local people in terms of the utilization and management of the established mangrove lands actually did not change. The local people wanted to obtain economic benefits from their mangrove lands; on the other hand, the local government wanted to preserve them for the purposes of mangrove conservation and coastal environmental protection due to the prize.

Since the prize was awarded, the local government stated that mangrove forests in Tongke Tongke should be preserved for the purposes of environmental conservation under governmental control. Consequently, the villagers became unable to obtain economic benefits from mangrove use, such as collecting firewood and fishpond construction. This fact forced them to find alternative means of obtaining economic advantages, i.e., the transaction of mangrove plantation plots. Since such plots were recognized as private properties by the villagers, it is the course of nature that their sale and purchase should take place among them without any government legal approval.

Table 3 indicates the household-wide distribution of mangrove-land holdings within Tongke Tongke. Out of a total of 101 “owners,” 75.2% belongs to very small-scale owners, possessing an average of just 1.2 plots with an average holding of 0.1 ha. Their total land occupied just 21.8% of the total area of mangrove lands in Tongke Tongke. During the initial stage of the mangrove plantation, the plantation plots could not be enlarged due to heavy waves and current abrasions. The number of available seedlings was also a limiting factor, since they had to be collected from the neighboring villages of Mangarabombang and Pangasa, as considerably arduous task. On the other hand, those who possess large holdings of more than 1 ha account for 6.9% of the total mangrove-land holders. They held 54.8% of the total mangrove-territory in Tongke Tongke, and the average size of holding and number of plots was 2.4 ha and 3.8, respectively. They accumulated mangrove lands by asking

**Table 3** Distribution of Mangrove Plantation Plots by Land Holding Size Division

Land Holding Size Division (ha)	Number of “Owners”	Number of Plots	Total Land (ha)	Average Size of Holding (ha)	Average Number of Plots
0-0.25	76 (75.2)	89 (60.5)	7.0 (21.8)	0.1	1.2
0.26-0.50	13 (12.9)	22 (15.0)	4.1 (12.8)	0.3	1.7
0.51-0.75	4 (3.9)	8 (5.4)	2.6 (8.0)	0.7	2.0
0.76-1.00	1 (1.0)	1 (0.7)	0.8 (2.5)	0.8	1.0
1<	7 (6.9)	27 (18.4)	17.5 (54.8)	2.4	3.8
Total	101	147	31.9	0.9	1.9

Source: Fieldwork data, 2001

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other villagers to plant mangrove seedlings in their plantation plots or purchasing mangrove lands from other small-scale holders in the village. Some villagers sold their lands to prosperous villagers in order to gain ample cash. As Table 3 indicates, the fact that more than half of the total mangrove lands are owned by just 6.9% of the total owners suggests that the local people were more interested in obtaining economic benefits than protecting or conserving the coastal environment through the use of mangrove plantations.

Even though the property rights of the planted mangroves have not been well defined by the government, the local people have already generated a revenue earner for their livelihood. This case clearly shows how land holding is so important in daily life of the people of South Sulawesi. This condition seems to be significantly associated with the socio-cultural characteristics of the people of South Sulawesi, particularly the Bugis people, whose livelihood basically depends on agriculture. Mattulada [1986: 105] explains that the livelihood of the South Sulawesi peoples is basically influenced by two environments, the land and the sea. However, he also emphasizes that the Bugis and Makassar peoples are greatly concerned with possessing the land for agriculture even though they are famous for their characteristics as seafarers and migrants. The land generated between the sea and the land in Tongke Tongke also represents a space that has been created with such concerns.

A similar observation is offered by Tanaka [1986a; 1986b], who studied the adaptation process of the Bugis migrants to new environments in Riau Province, Sumatera and Kabupaten Luwu of South Sulawesi. He revealed that the Bugis people practiced a wider variation of agricultural adaptation when compared to other ethnic groups, such as the Javanese in Riau and the Torajanes in Kabupaten Luwu. In both cases, the Bugis migrants had a tendency to establish their economic base by combining multiple activities, such as agriculture combined with aquaculture. They obtained agricultural lands by clearing forests for growing rice and/or commercial crops, and additionally opened the fishponds for aquaculture, or vice versa. Bugis migrants in the coastal lowland of Riau Province and Kabupaten Luwu established paddy fields and fishponds by clearing natural forests or coastal forests such as mangroves. However, Pangasa, Mangarabombang and Tongke Tongke villagers constructed fishponds by planting mangroves in their coastal environment. Although the method for creating a new opportunity to obtain economic benefits from their environment differs between migrants and residents respectively, their behavior seem to unify the common characteristics of the Bugis people.

## **VI Government Regulation and Socio-Economic Aspect of the Villagers' Mangrove Plantation**

The President of the Republic of Indonesia has enacted the Decree No. 23/1997 with regard to natural resource management in Indonesia. The decree, the first point of the article 41, noted "when anyone breached the law by destroying the living environments, he/she would be jailed for 10 years or fined 500 million rupiah (about US\$ 60,000)." Following the Presidential Decree, the government of Sinjai District also enacted the Regulation No. 8/1999 to specifically control the utilization, conservation and management of mangrove forests. The article 12 noted that the "utilization of mangrove forests could be practiced in the manner of selective cutting with considering the sustainability of mangrove resources." Furthermore, it stated "the planted mangroves which have covered an area of over 50 meters width in coastal areas could be utilized for household requirements" [Government of Sinjai District 1999: 8]. The regulation actually afforded an opportunity to the villagers to utilize the planted mangroves, but it did not clearly define which parts of the mangrove lands could be utilized for their livelihood. For this reason, the local government and the former ACI leader did not allow the villagers to cut the mangroves and utilize their lands for other purposes.

Even though the government has enacted regulations, such as the Presidential Decree No. 23/1997 and Regulation No. 8/1999 of Sinjai District, the implementation of such regulations remained insufficient. It seems as if the regulations were specifically implemented with the people of Tongke Tongke in mind, because cutting mangroves and conversion to fishponds in other coastal areas of Sinjai District have been always overlooked by the relevant officers of the Sinjai District. However, recently, the same situation also became apparent in Tongke Tongke. Observing measures of mangrove utilization and management in Pangasa, some "owners" of the mangrove lands in Tongke Tongke also tried to convert their lands to fishponds by cutting down the forests. It reflects the actual situation in the village that although field officers of Sinjai District were aware of the activities of such villagers, they could not do anything to stop them, because the mangrove forests were established by the villagers without any governmental support. Even though legal regulations were enacted, they did not actually function due to the lack of operating and controlling systems.

Such circumstances illustrate a considerable gap of interests between local people and government respectively concerning the utilization, conservation and management of mangrove forests in Tongke Tongke. As mentioned earlier, the local people wanted to obtain the economic advantages derived from the mangrove lands such as obtaining firewood and land ownership. On the

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other hand, the local government wanted to promote environmentally-sound programs by conserving the mangrove forests and protecting the coastal environment. The local government seems to be more interested in the benefits to be obtained from the promotion of successful conservation of the coastal environment in Tongke Tongke rather than the economic advantages to be obtained from land taxation of the established fishponds, because the environmentally-sound program would be a better trade-mark indicating economic development of Sinjai District. Such polar opposite views between them regarding management of the mangrove lands created inevitable conflict.

It is also interesting to see the area of mangrove forests in Tongke Tongke, as reported by the government of Sinjai District. The Government of Sinjai District [2000b: 7] wrote in its report that there were mangrove forests in Tongke Tongke with an area of about 783 ha. On the other hand, to ensure the total area of mangrove forests in Sinjai District, the District Office of Forestry and Soil Conservation of Sinjai conducted a survey in 2000, and revealed the figure to be around 496 ha, of which 76.5 ha was located in Tongke Tongke [Government of Sinjai District 2000a: 5]. Both reports seem to have been prepared just for providing the information concerning the area of mangrove forests in Sinjai District for the people who visit Tongke Tongke to learn community-based mangrove plantation. However, the measurement of this study revealed that the mangrove forest areas of Tongke Tongke numbered only about 32 ha. This big gap was supposed to be derived from an intentional over-estimation of the Sinjai District government, who was in the position of proposing the ACI group as a candidate for the Kalpataru Prize.

As mentioned earlier, the President awarded the Kalpataru Prize to the ACI group due to their achievement in coastal conservation and rehabilitation through mangrove plantation initiatives. However, this study revealed that the motivation of the Tongke Tongke villagers was to obtain firewood, secure land property rights and protect the residential areas from coastal abrasion. In conclusion, it can be said that the villagers were highly motivated by economic orientation rather than the concept of mangrove conservation and coastal environmental rehabilitation, and that the conflict was provoked by government intervention which intended to make the name of Sinjai known to the public.

Even though the governments have provided the honor of an environmental prize and financial support to the people in Tongke Tongke, they remain some questions regarding the mangrove plantation. How can they use the mangrove forests and how can they obtain economic benefits from them? How can they acquire governmental approval in order to utilize the mangroves and how can they obtain the registration of land property rights? These questions are yet to be resolved.

## VII Concluding Remarks

The community-based approach is generally introduced as the most relevant example of efforts in many developmental schemes and environmental conservation programs. However, this study reveals that getting into local society and institutions also represents a key task for those implementing the projects and programs. In the case of conserving and rehabilitating coastal environment or mangrove forests, the participation of local people is also the most important prerequisite. However, as the case of Tongke Tongke suggests, focusing on the economic incentives of local people seems inevitable when the participatory or community-based approach would be implemented.

In the case of Tongke Tongke, due to discrepancies between local people and government, the conflict arose concerning the management of artificially-established mangrove forests. Such conflicts seem to persist in future until the proper legal status of the mangrove lands is settled. Short-term economic benefits such as financial support from the government are important factors in order to promote environmentally-sound activities of the people. However, the long-term economic benefits derived from the mangrove plantation, such as providing property rights on mangrove lands, should also be taken into consideration. It is a matter of course, as this case study shows, that the role of leaders in local community also represents an important factor in order to retain the balance between short- and long-term benefits and to finally solve the conflicts.

Even though the government has enacted regulations such as the Presidential Decree No. 23/1997 and the Regulation No. 8/1999 of the Sinjai District concerning the utilization, conservation and management of mangroves, they were not properly implemented. As this case study shows, different management systems were observed between Tongke Tongke and its neighboring villages, and based on this, it is evident that, in addition to provision of economic benefits to the local people, the enforcement of legal systems and proper implementation of regulations should be taken into account in order to provide suitable circumstances for sustainable coastal resources management.

The findings of this study provide valuable lessons with regard to the management of mangrove forests, which are voluntarily and artificially established by local people. Although it is certainly a difficult issue to allocate property rights for land created in the sea, which is legally defined as a “public” space and actually recognized as an open access space, the local government should try to observe the real motivation of local people and take this into account in order to devise a real solution that could accommodate both the interests of the local people and the local government.

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