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Original Paper

INTEGRATED MANAGEMENT OF MANGROVES ECOSYSTEM IN *LAMPUNG MANGROVE CENTER* (LMC) EAST LAMPUNG REGENCY, INDONESIA

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ABSTRACT

Mangroves forest ecosystem along the east coastal in Lampung Mangrove Center (LMC) Margasari Village is a renewable resources. It is a border between two ecosystem. Because of that situation, more than one stakeholders involved. There are department involues, Forestry Fisheries and Marine, and Agriculture Department in East Lampung District. Often, the policy of each department is not efficient and effective. Based on that situation, on 2006, the mangroves management try to make an integrated model between the stakeholders. In this research, It want to know the effectiveness of that model. The samples in this research used Simple Random Sampling which they were 25 the people and the team of integrated management of University of Lampung and the East Lampung Regency government. The datas will be described and analysis with SWOT Analizing (Strength, Weakness, Opportunities, and Threats). The strategy of the integrated management will be defined after that. Integrated management of mangroves ecosystem in Margasari Village have in good management of sustainability approach and increase the welfare of the people. The position of the analzing of the integrated management is on the aggressive curve. It is indicated that the integrated management has been done since 2006 have progressive development, between the people, government, and University of Lampung. The strategies of management plan are education for the people on mangroves ecosystem functions and benefits, human resources development, law enforcement in break the rule in mangroves management (illegal loging and wild harvesting), development in international and national net working, science and technology development, and community empowerment and economyc increase.

Key words : Integrated management; mangrove ecosystem; stakeholder; SWOT Analysis.

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INTRODUCTION

The mangroves ecosystem in east coastal of Lampung give many functions and benefits for the living of the community. But, it was not yet fully understood by the community and the stakeholders, so the damaged of the forest continued to take place (The Forestry Department of Lampung, 2005). More than 50% of mangrove forest has been degradated or even it were lost completely caused by many factors, e.g. conversion of the forest mangrove for pond shrimp, urbanitation, pollution of the coast by the waste materials, oil and the industry, and the shortage of the awareness of community's.

The ecosystem of mangroves forest in *Lampung Mangrove Center* (LMC) Margasari Village was one of the formations of the forest that had the uniqueness compared to the other mangroves ecosystem. The width of forest was ± 700 Ha. This forest was located between the ocean territory and the land with the kind composition that adapted with this condition. The forest of mangrove had the good adaptation power from the place of the growth and its diversity of vegetation (Kustanti, 2008).

The characteristic is requirements for the integrated between the sciences and the policies in the development. Many sciences and

ISSN : 1410-5217
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the governments can involved on that ecosystem. Often, we meet no eficiency in mangroves ecosystem development. Based on that situation, both the community and the government pay attention to make better management of the forest. Adger and Cecilia (2000) stated integrated management between the stakeholder based on rasionality of responsibility for the crysis of institutional and management on forest. Especially in the protected area of mangroves forest which are big potential of conflict emerged among the government and community and also its happened on the forest resources at the protected area (Katherine, *et al*., 2002). Joint forest management in India between the community and government have a positive attitude for forest protection and management (Rishi, 2007).

Since 2005, the Chief of Margasari Village—through the government give the mangroves forest in their village to University of Lampung based on Letter Decree No. 170.07.02.2008/143/2005 about support for integrated mangroves management to University of Lampung and Letter decree of The Chief Regency No.B. 303/22/SK/2005 about "*Penetapan Lokasi untuk Pengelolaan Hutan Mangrove dalam Rangka Pendidikan, Pelestarian Lingkungan, dan Pemberdayaan Masyarakat seluas 700 Ha di Desa Margasari Kecamatan Labuhan Maringgai"*.

Many activities undergone by University of Lampung, community, and the government of East Lampung with the tripartite model cooperation until 2008. For three years (2005—2008) there was rarely found the data about the integrated management of mangroves in *Lampung Mangrove Center*. Even, this data was very important toward sustainability of management.

MATERIALS AND METHODS

The object of this research is the area of 700 ha mangroves located at Lampung Mangrove Center Margasari Village. This research was conducted for 3 months (July—November 2008). The trees of the forest was the planted forest since 1995.

Collecting Datas

This research used two kinds of datas. There are primary and secondary datas. The primary datas were the condition and the management of mangroves from coastal community, University of Lampung, and the local government. Whereas the secondary data had taken on condition of community of the forest, demography, and from the research book or other sources of literatures.

The determination of the mangroves forest area (Margasari Village) of this research taken by purposive random sampling. As the village was around the mangroves forest, the determination of respondents was carried out with the Simple Random Sampling method used the following formula (Slovin, 1999).

$$n = \frac{N}{N(d^2) + 1}$$

Where:
n : the number samples
N : the number of second head of household of village
N : The Number of sample units of the respondent who was taken in the research
d : Precision 15%

The respondents of this research was taken by survey methods from the group of mangroves. By using the formula calculation for by the number of respondents are as follows:

$$n = \frac{N}{N(d^2) + 1}$$

$$n = \frac{12845}{12845(0.025) + 1}$$

$$n = \frac{12845}{322.125}$$

N = 39 respondents.

Based on the calculation, the number of samples was:

$$n = \frac{N1}{N} \text{ x } n$$

$$= \frac{7396}{12845} \text{ x } 44$$

= 25.334683 (25 samples)

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The determination of the eespondents in the Forestry Department and the Environmental Agency in Regency were determined by *purposive random sampling* (Creswell, 2003).

Data Analyisis

The data obtained from this research was analyzed SWOT. SWOT Analysis was one of methods that was applied with the aim to identify various factors systematically to determine the aim for management strategy of mangroves forest management.

Process compilation of SWOT analysis was carried out with three stages (Rangkuti, 2000):

1. stage of the data collection covered the primary data and the secondary data,
2. analysis stage,
3. taking stage to make decisions of management of mangroves forest.

Table 1. The Matrix of SWOT

IFAS / **EFAS**	**STRENGTHS (S)** **Determines the Strength of Internal Factors**	**WEAKNESS (W)** **Determines the Wekness of Internal Factors**
OPPORTUNITIES (O) **Determines the Opportunity of External Factors**	STRATEGY S-O To get the strategies by use the strengthness with the opportunities.	STRATEGY W-O To get the strategies by minimilizing of the weakness to use the opportunities.
THREATS (T) **Determines the Threats of External Factors**	STRATEGY S-T To get the strategies by use the strengthness to handle of the threats.	STRATEGY W-T To get the strategies by minimilizing of the weakness to use the opportunities and avoid the threats.

Source : Rangkuti (2000)

The alternates of the strategies were carried by using the method of brainstorming and discussions with community and the government that referred in results of data analysis and the available policies. Results on brainstorming and discussions process were used as input factors in compilation of concept strategies for management.

RESULTS AND DISCUSSION

Results

The integrated of mangroves ecosystem was carried out by alternative formulation on strategy of the mangrove forest management in the LMC by SWOT analysis. It could be presented in the SWOT matrix to determine the strategies of the mangrove forest mangrove in East Lampung Regency.

Based on **Table 2, 3,** and **4** the most reliable management on forest ecosystem mangrove in the Margasari Village was to the V cell that is the growth and the stability meaning that the strategy applied was consolidation. The consolidation that is continuation to carry out the co-ordination and the co-operation with the other side and strengthen the most united management with relatively more aggressive.

ISSN : 1410-5217
Acrredited : 83/Kep/Dikti/2009

Table 2. Internal Strategy Factors

No.	Internal Factors	Weight	Rating	Scoring
1.	**Strength :**			
	1. Forest Land 700 Ha	0.3	4	0.4
	2. Community Supports	0.2	4	0.8
	3. Regulation of Mangement	0.1	3	0.3
	4. Integrated Management	0.1	3	0.3
2.	**Weakness :**			
	1. The whole program did not adopted by stakeholder in mangroves management.	0.2	3	0.6
	2. Lack of coordinations.	0.1	3	0.3
	3. The community dependents	0.1	1	0.1
	4. Poor in Science and Tech. in forest management	0.1	2	0.2
	Total	**1.00**		**3.5**

Table 3. External Strategy Factors

No.	Exsternal Factors	Weighting	Rating	Scoring
1.	**Opportunity :**			
	1. National and International Networking	0.3	3	0.9
	2. Government Supports	0.2	3	0.6
	3. Emerged of new land around the forest	0.2	3	0.6
	4. The new economic business in mangroves products	0.1	2	0.2
2.	**Threats :**			
	1. Lack of fasilitation support.	0.1	1	0.1
	2. Sea level caused abration	0.1	1	0.1
	3. Low forcement in forest disturbance.	0.2	2	0.4
	Total	**1.00**		**2.9**

Table 4. Internal – External Matrix Strategies

Total Score of Internal Strategies

Total Score of External Strategies	Strong 4.0	Average 3.0	Weak 2.0 – 1.0
High	I Growing	II Growing	III Smaler
3.0 Medium	IV Stability	**V Growing / Stability**	I Smaler
2.0 Low 1.0	I Growing	I Growing	I Liquidation

ISSN : 1410-5217
Acrredited : 83/Kep/Dikti/2009

Table 5. Internal dan External Matrix

Internal Factors	Rating	External Factors	Rating
Strength :		**Opportunity :**	
1. Forest Land 700 Ha	4	1.National and International Networking	3
2. Community Supports	3	2. Government Supports	3
3. Regulation of Management	3	3.Acression of land forest	3
		4.The new economic business in mangroves products	2
4.Integrated Management	3		
Total	**13**	**Total**	**11**
Weakness :		**Threats :**	
1.The wholly of program did not adopted by stakeholder in mangroves management.	3	1. Lack of fasilitation support.	1
2. Lack of coordinations.	3	2. Sea level caused abration	1
3.The community dependents	1	3. Low inforcement in forest disturbance.	2
4.The poorness of Science and Tech. in forest management	2		
Total	**9**	**Total**	**4**
Strength : 13/4 = 3,25		Opportunity : 11/4 = 2,75	
Weakness : 9/4 = 2,25		Threats : 4/3 = 1,3	

Analysis:

Strength – Weakness = 4.75 – 2.25 = 1.00 (**X**) …… IFAS
Opportunity – Threats = 2.75 – 1.30 = 1.45 (**Y**) …… EFAS

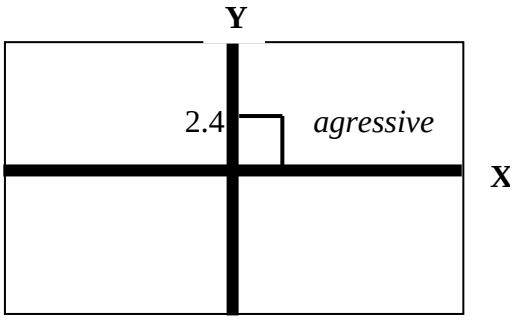

Fig 2. The Position of Internal and External Factors

We can see that the meeting point (IFAS,EFAS) was located on I quadrant (**Fig. 2**). Based on results, strategy applied was aggressive strategy. The aggressive strategy was the strategy that gave priority to actions immediately by stimulating the activities in making use of the opportunity and pressing threats from the element the environment. As for strategies that must be carried out could be known by using **Table 6.**

ISSN : 1410-5217
Acrredited : 83/Kep/Dikti/2009

Table 6. The SWOT matrix on united management strategy of mangrove forest ecosystem to Lampung Mangrove Center, East Lampung Regency, Indonesia

IFAS / EFAS	***Strenght*** 1.Forest Land 700 Ha 2.Community Support 3.Regulation of Management 4.Integrated Management	***Weakness*** 1.The wholly of program did not adopted by stakeholder in mangroves management. 2. Lack of coordinations. 3.The community dependents 4.The poorness of Science and Tech. in forest management
Opportunity	Strategy S-O	Strategy W-O
1.National and International Networking 2.Government Supports 3.Acression of land forest 4.The new economic business in mangroves products	1.Maintain the existing of mangroves forest siutable with their benefit and function. 2.Maintainthe support of community and the government in integrated management. 3.To extend the networking in integrated management for social welfare and sustainability of forest.	1.More active in coordination the program in integrated management of mangrovesforest among the team. 2.Look for new inovation and disemination of Sci & Tech for search the new economic exertion. 3.Give the extension education, training for community about the sustainability of mangroves forest and the understanding of Integrated Management.
Threats 1.Lack of fasilitation support. 2.Sea level caused abration 3.Low inforcement in forest disturbance.	Strategy S-T 1. Need the available of fasilitation in Integrated Management. 2. Increase the local initiative and stakeholder in disaster mitigation. 3. Law Enforcement in Management of Mangroves.	Strategy W-T 1. Empowerment in forest protection organisation by East Lampung Forestry Department. 2. Plan and do rehabilitation on mangroves degradation, by community or by government. 3. Law enforcement in mangroves management. 4. Increase the awareness of community in integrated management of mangroves.

Discussion

SWOT analysis of the integrated mangrove management was a tool for analysis the program of mangroves sustainability. Based on the condition in the field as well as results with approach of the SWOT analysis then the alternative to the most integrated management strategy the forest ecosystem mangrove could be carried out as follows:

The counseling of the integrated model of mangroves management

The management based on the community initiative, e.g. about the benefit and the function of the forest mangrove. The counseling of the plan of the forest management was carried out in the the same understanding among the stakeholder and the exploitation between related sides in part stakeholders, the community (the farmer's group), the local higher education institution (University of Lampung) and NGOs.

ISSN : 1410-5217
Acrredited : 83/Kep/Dikti/2009

The counseling was between the community carried out by the Forestry service of East Lampung that is the Integrated Mangroves Management Team.

The Improvement of HRD in mangrove forest management.

It was carried out through the increase in knowledge and skills in the management of the forest region mangrove that is giving counselling and the training periodically, so as the community knew, the benefit and the function of the forest mangrove for the life, the introduction to various plants of mangrove and it use.

Plan the next action in integrated management based on regulation

For Example : management of mangrove forest that is Undang-Undang No.41 (1999) about forestry, Undang-Undang No.5 (1990) about conservation of resources and the ecosystem, Undang-Undang No. 27 (2007) about Little Islands and Coastal Management. All regulations were used in the coordination among stakeholder e.g. the regional government, forestry district, and the Village (the forestry Service and the community's related agency).

The next program is responsibility by University of Lampung to conduct coordination between the stakeholders in mangroves management activity.

Minimize the disturbance of mangroves forest

There were mangroves convertions, illegal logging activity, and plundering by involving the community as the security power. Efforts that must be carried out in the handling to overcome this matter includes :

a. Rehabilitation of degradated land by activity in mangroves rehabilitation.
b. Patrol routinely both from the side and the community of forestry service around forest.
c. Law enforcement for the degradater man from destructive forest.

Develop Networking for national and international level to support integrated mangroves management.

In developing program of integrated mangroves management need to open networking for national and international level. Networking is needed to establish and to ensure the sustainability of mangrove management toward.

Develop the science and technology and publish scientific paper on mangroves ecosysytem.

It means to looks for the innovation for increase in welfare of the community and conservation of the forest mangrove. University of Lampung as an agent who get the permit to manage that forest have a duty to search to find the science & technology about the benefit and developing the science about mangroves ecosystem.

The development of the economy was carried out with the utilization of the potential produced by the non wood forest mangrove. It took the form of the cultivation of the freshwater fish, the honeybee, various source of feed, palm juice sugar. Whereas the institutional development of the community was carried out by means of activating again the agency of village economics like KUD (Koperasi Unit Desa/Village Unit Corporation) and the community's other agency.

In carrying out the forest management mangrove in the East Lampung Regency was based on results of the research in the location and results of the interview with the respondents in the level of the community and the level of the East Lampung Regency (the Team of Integrated Management in Regency). There were about the aspect of planning of all the activities and special programs that had a purpose for conservation of the forest management mangrove through good planning. The Team of integrated management of mangroves had special programs for conservation and the protection of the forest management mangrove. The program was owned by the Forestry District in East Lampung Regency.

The Finishing of the institutional structure of the forest management mangrove that headed to the institutional re-construction activity of the forest management mangrove and

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revitalization the unit of the forest management mangrove in the field.

Officially forestry in this case the Integrated Mangrove management Team the Mangrove forest also carried out the management and assistance against the community. The community of fishpond was bundled into the farmer's group that was chaired by someone who was regarded as well-off and became the cadre or the representative from the Integrated Mangrove management Team. Routinely 3 months very much the Service of Forestry District in East Lampung carried out counselling that was held in the Village, or at the time of certain their respective territory co-ordination carried out the tour of inspection, visited the activity available in the region while giving counselling and controlling their activity.

CONCLUSION

The integrated management of mangrove forest in LMC along the east Lampung Indonesia have been undergone from 2005 till 2008. It can be concluded as follow:

1. The integrated management between the community, the coordinator of management (University of Lampung), and the Government was in good condition with the agresif scale (little growth) based on SWOT Analysis.
2. The management stategies based on the that situation are: a). counseling of the integrated model of mangroves management in LMC among the stakeholder; b). **i**mprovement of HRD in mangrove forest management; c). plan the next action in integrated management based on regulation; d). minimize the disturbance of mangroves forest; e). develop the networking national and international in the program development to support in integrated mangroves management; and f). develop sci. and tech. and publish the yield of research in mangroves ecosytem.

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