

## Community-based sustainable rattan conservation: a case study in Lore Lindu National Park, Central Sulawesi

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### ABSTRACT

*Hamzari (2011) Community-based sustainable rattan conservation; a case study in Lore Lindu National Park, Central Sulawesi. Biodiversitas 12: 241-245.* The following research study focused on community-based rattan conservation and was conducted in a community located in the buffer zone of Lore Lindu National Park. The aims of the study were to generate a model for community-based rattan conservation and estimate the economic value of rattan management for the community. The results were expected to provide justification for the development of rattan management systems and strategies. The research was conducted using a combination of community education and evaluation of educational outputs. As a result, the research may be characterized as descriptive experimentation with a participative approach of andragogy. Data was collected through the employment of questionnaires, interviews, PRAs, and FGD techniques. Data were analyzed using quantitative and qualitative analysis. Based on result of analysis, inferential that community asses the effort of rattan conservation as a positive effort and its development requires additional support. The community has a desire to conduct efforts of rattan conservation continuously. The forms of rattan conservation that can be developed are rattan cultivation and selective rattan harvesting. The research developed conservation models in collaboration with rattan farming groups and involving community forestry approaches.

**Key words:** rattan, conservation, community based, sustainability.

### INTRODUCTION

Rattan is a potential non-timber forest product that has the potential to be developed as a commodity, both to meet national and international demands (Dominic and Camille 2001; Supriadi et al. 2002). Central Sulawesi uniquely located in such a manner that its ample natural forests are able support a various rattan varieties (Alrasyid 1980). The quality and prevalence of rattan has greatly decreased as a result of exploitation. The variables responsible for decreasing rattan populations include the lack of conservation efforts on the part of the government, private sector, and rattan farmers themselves. The lack of conservation efforts can be attributed to a lack of knowledge and skill held by rattan organizers, especially rattan farmers whom continue to employ simplistic techniques (Nasendi 1995).

Rattan conservation is a strategy that must be systematically developed in order to provide the best possible practices for rattan conservation on an ongoing basis. This will allow for rattan productivity to be more sustainable. Earnings generated by the community through the utilization of rattan have the potential to contribute to not only the local economy, but the national economy as well. Stakeholders involved in rattan industry claim to have special knowledge and skill about rattan conservation techniques, especially concerning rattan cultivation methods.

The exploitation of rattan and rise of rattan conservation awareness has promoted an initiative to employ trade certification for cultivated forests. It is expected that by 2010 all commercial forest products, including rattan, must be the result of cultivation. As a result, it is expected that by 2010 all forest products will be derived from commercialized sources and not the result of natural forest extraction.

In order to conduct research on conservation and management strategies for rattan in the rainforest margins of Lore Lindu National Park (LLNP), we have to know first know the value of rattan to the community. According to Bennett and Barichello (2006), aside from the physical components, the economic and social values of rattan must also be accounted for as an important variable in the calculation of total economics value. The result of the investigation is expectable to assure stakeholders involving for giving support to the conservation effort. This is an important aspect faced in sustainable forest management.

The dynamics and stability of rainforest margins is a central issue in the bio-conservation and sustainability of plant germplasm (Renuka 2004). The rate of degradation experienced in forest and biodiversity is a serious challenge facing in the current conservation efforts. Degradation is also becoming a big problem in the management of national parks, including Lore Lindu National Park. As a result of these issues and other, a comprehensive study on the conservation of rattan was considered of critical importance.

In general, this research aimed to produce a model of community-based rattan conservation and management, and evaluate the total economic value of rattan management for the community. So that, if a variety of potential rattan types increases economically, it can increase earnings and prosperity for community. Specifically, this research aimed to: (i) calculate the earnings of rattan farmers over the last 10 years; (ii) compare and contrast the attitudes and desires of rattan farmer to the expansion of efforts in the area of rattan conservation; (iii) determine strategies for conservation that can be undertaken by communities for the expansion of rattan conservation; (iv) determine strategies for rattan conservation that can be rapidly undertaken by rattan farmer.

## MATERIALS AND METHODS

The research was conducted utilizing a combination of community education and analysis of educational result. The research can be categorized as descriptive experimentation. The research was undertaken utilizing an andragogy approach. Data was collected using questionnaires, structured interviews, Participatory Rural Appraisal (PRE) and focus group discussions (FGD) (Tellu 2006). The data collection techniques were adjusted to accommodate the following: *First phase*: Rattan farmer training utilizing an andragogy approach. *Second phase*: Utilizing the PRE, RRA and FGD techniques to collect information on the potential types of conservation strategies that may be used by rattan farmers. *Third phase*: implementing rattan conservation strategies in the field, largely accomplished by the FGD method. *Fourth phase*: Evaluation and follow-up. This phase was jointly undertaken by researchers, rattan farmers and stakeholders, to ensure comprehensive and community-based rattan conservation strategies.

Respondents included those individuals living around the TNLL, primarily those undertaking rattan farming and in direct contact with the TNLL. In each of the eight village located in the buffer zone, 15 to 20 individuals were selected to participate. Besides, it also is taken some stakeholders involving direct in management and rattan commerce. Estimating the economics value of rattan management was accomplished with structural interviews and filling inquiries. The observation of research implementation was done step by step according to the development stages of the activity of research in the field.

## RESULTS AND DISCUSSION

Based on the results of questionnaire analysis, PRA and FGD, results can be grouped into four groups: rattan farmer identity; activity of taking rattan; expense and earnings components of rattan farmer; and rattan conservation.

### Rattan farmer identity

Rattan farmers whom are involved in the harvesting and collection of rattan tend to be categorized as being a

productive age, that is, young and strong enough to be able to yield goods and services for living. Rattan collection is a viable manner to provide added economic gain for a family as a means of secondary or tertiary income, and generates much enthusiasm/interest from people living near forests.

Men dominate rattan collection, however, women can sometimes be found in the practice as well. As a rule of thumb, for every man found in the practice of rattan, there are two women involved in some context. Women tend to exist in the capacity of support, cooking for rattan collection crews. So the women do not make activity as within reason the men takes rattan. Harvesting and collecting rattan is a form of work that does not demand education or special skills, thereby allowing it to be undertaken by a variety of individuals from varying backgrounds and training (or lack thereof) (Rachman and Supriadi 2001). Most rattan farmers have a basic level of education; generally this involves only elementary school (including this category is which have never gone to school or not finish basic school (*Sekolah Dasar*) and junior high school (*Sekolah Menengah Pertama*).

According to Januminro (2002), the engagement of individuals in rattan harvesting as a side job has existed in the region for a long time. Frequently, these individuals are full time workers of the farming trade, although occasionally individuals can also originate from carpentry, commerce and public servant (*pegawai negeri sipil*). The harvesting and collection of rattan is predominantly undertaken when there is little or no activity on the farm. For example, if the farmer has free time or is in between cultivate periods; the individual will carry out rattan collection and harvesting. A similar trend is exhibited by rattan merchants; when there is excess rattan harvested and brought to market, the price of rattan will decrease. For most individuals, rattan farming is not the main source of income. While it does provide supplemental income, many confess that the money generated from the harvesting and collection of rattan is very small.

### Activity of taking rattan

Although rattan collection is in most cases a side activity, it is frequently practiced by individuals for a long period of time. Generally, individuals have been collecting rattan for between 6-15 years, although some have been collecting for less than five years and some more than 16 years. Based on information collected from informants, the amount of rattan taken from the forest is not influenced by the duration of the involvement the farmer in the activity (Table 1).

**Table 1.** Average rattan collection patterns of farmers

Number of days involved in collection per year	Number of years farmer has been involved in rattan collection (yr)	Total amount of rattan collected (kg)
1	> 10-8	80 <
2-3	8-6	80
14	< 6	61-80

The number of days required by every rattan farmer to collect and harvest rattan varies. The amount of rattan that can be removed is strongly influenced by the distance between the location of the rattan and the location of the farmer's residence, the geographic makeup of the area (topography) and the population of favorite rattan present. The number of days required by rattan farmers to harvest and collect rattan year to year is dependent on the time required to travel between the forests and residences.

The ability of rattan farmers to bring a number of rattans each time to forest decreases. In the time category 8 to 10 years, rattan farmers are able to collect 80 or more kgs of rattan. This trend decreases with time; in the time category less than eight years, rattan farmers are only able to collect between 61-80 kgs. These results exhibit the decreasing trend in the amount of rattan that is able to be harvested and collected from year to year. The variables largely responsible for this trend include the distance between the farmer's home and the location of rattan, the level geographic difficulty (topography), and the population of favorite rattan species.

According to Duran (2001), rattan farmers possess specific selection methods for rattan. They apply criteria specified by merchant. These criteria generally include the vision of morphology of the rattan and its type. Additional criterion applied include the rattan species, level of bar maturity, bar length, bar diameter, other bar color and other criterion, usual of vision of bar like path depth or bar shine. However, these criteria hardly influence the price of rattan at the rattan farmer level.

Common rattan species taken by rattan farmer in the Kulawi District include species of rotan batang (*Calamus zollingeri* Becc.), rotan lambang (*Calamus ornatus* var. *celebicus* Blume ex Schult.f.), rotan tohiti (*Calamus inops* Becc.) and rotan noko (*Daemonorops robusta* Warb.). The selection of rattan species is based on those found in the buffer zone of Lore Lindu National Park. When compared to other species of rattan, those found in LLNP receive a high price at market. The harvesting and collection of rattan from the forest is generally done by groups of rattan farmers, although some individuals collect on their own. Groups of rattan farmers divide their sales revenue among all group members, while individual formation accompany one another into the forest, but undertake and manage their own harvesting separately (Sinaga 1986).

### Factors, time, and cost

Costs borne by rattan farmers include those associated with equipment, the cost of living and others. The level of cost bourn by each rattan farmer varies and usually increases time to time. Variations in cost may be caused by the duration of time spent residing in the field collecting rattan, and increases to everyday living cost; meanwhile, the price of rattan does not increase significantly. During the last eight to ten years the price of rattan has been estimated at Rp. 10.000 to Rp. 20.000. At the time of research, the price of rattan was estimated at between Rp. 50.000 to Rp. 100.000.

The selling price of rattan varies, although it is hardly dependent on rattan criterion from in forest (MoC 2001).

When all rattan criterion are met, the seller shall receive the maximum price for their product; however, is some criterion are not met, the price of the rattan will decrease according to the number of criterion left unfulfilled. The highest selling prices are received for *C. zollingeri*, *C. ornatus* and *C. inops*. Rattan selling prices from year experiences improvement, but doesn't give improvement of income significant because the operating expenses also increase.

According to INBAR (1999), the level of income generated by each rattan farmer varies. That is highly dependent on the amount collected and the rattan species itself. The value of rattan collected six to ten years ago was high when compared to the average income at the time; however, the current value of rattan is lower when compared with the current average income. This exemplifies the general trend of decreasing earnings seen annually. This trend is caused especially by the quantity of rattan harvested and collected. The selling price of rattan has not increased to the same degree as the increasing costs associated with harvesting and collecting rattan.

### Conservation aspect of rattan

According to MoF (2006), the harvesting and collection of rattan requires a permit from government through the Regency Forestry Department. Permits may be issued to (i) individuals with optimum 100 tons, and (ii) co-operations with optimum 500 tons.

Legal permits given directly to co-operations and individuals only applied by 33 rattan farmer, while the other is form of legal permit that wrong opening of target because it was given to big merchant generally resides in Palu city. The permit owner looks for extension of hand in countryside to use their permit, with a note of result obtained from forest must be sold to the permit owner. As a result the price of at farmer level often made a fool by permit owner so that rattan farmer gets a minimum real advantage. Rattan permits should be government regulated, which would enable direct representation and protection of the farmer's rights and allow for easier access to individual permits.

Based on provisions accompanying the issuance of permits for rattan, whether they are for co-operation or for individual, all permit holders are obliged to undertake some of conservation activity, especially replanting of rattan (MoF 2002). In reality, rattan farmers do not always follow this rule, especially if a rattan farmer is only using the permit from merchant. This demonstrates a lack of attention from merchant and rattan farmer about the importance of rattan conservation.

Technical knowledge and skill of rattan, especially rattan farmer about rattan conservation is low. Rattan farmers generally have never heard about rattan conservation; only a small schema of rattan farmers has ever heard about rattan conservation concepts. Although there is ample space, conservation practices traditionally have not been undertaken. Referring to the condition, required training about rattan conservation technique for rattan farmer (Siebert 1991).

Information about terms or concepts associated with rattan conservation was obtained from various informants. Rattan farmers whom have heard terms or conservation concepts of rattan are obtained especially from nongovernmental organization (NGO), Ministry of Forestry, rangers of LLNP and researchers/high education. A lack of information received by rattan farmer proves that there is still a weak socialization process of rattan conservation concepts, especially in anticipating the application of commerce certification result of forest cultivation, including result of forest in form non timber forest products such as rattan. This is also one of the root causes for the decline in population and production of favorite rattan species.

The population and production of rattan decline every year. Some of the root causes responsible for this trend include: a lack of conservation effort by rattan farmer and government, and the slow rate at which rattan grows (Unhas 1996). The reason for a lack of conservation efforts may be attributed to the lack of socialization and knowledge about rattan conservation. Generally rattan farmer cannot undertake conservation effort for rattan because they simple do not know how to do it. Additionally, there is a lack of willingness and time to undertake conservation activities. There is a great need for a revitalization of efforts to generate awareness of the importance of rattan conservation and activities.

There are many actions that can be taken to maintain rattan productivity. In the long term, conservation processes can involve many local individuals. While in the short term, rattan farmers shall apply collection principles of rattan selective harvesting and wise use. To execute the effort, is the involvement of government and all stakeholders associated with rattan commerce is critical.

According to Barkmann et al. (2004), rattan conservation that can be undertaken by rattan farmer themselves, include the nursery bed process and cultivation, seedling split and cultivation (seedling scarce). This can be done if rattan farmer is supplied with adequate knowledge and skills about the rattan cultivated process. By embarking on the conservation process, rattan farmers will receive various benefits in return.

The results of the final observations and discussions during the PRA and FGD processes form the basis of the conservation activities that can be done by the rattan farmer (seedling split and seedling cultivation). These were selected for several reasons, namely: (i) easier to be done, (ii) time required to complete the activity is relative brief, (iii) the level of viability is high, (iv) easier to collect specimens from the forest than from matured fruit, and (v) the care process is relatively easier.

Based on the reasons mentioned before, it can be explained that if form of the conservation developed by rattan farmer is through seedling split and the cultivation, need to pay attention: (i) Seed which spitted must be known the type surely and prerequisite of good seed conditions, (ii) In doing split should not destroy the mains crop, (iii) Seedling care done to be continual and periodical.

The conservation process itself can be insufficient, especially if it will be done in bigger number. In consequence, thought needs to be put into the diversification of conservation processes besides split and seed cultivation. Processes that are more accurate may be accomplished through the use of nursery beds and cultivation of seed Astuti et al. (2001). Therefore, rattan farmers shall step by step do nursery bed process from seed (rattan seed) and next step is planting safely and keeping well based on conservation method of rattan.

Besides the processes recommended above, rattan farmers also need to carry out strategic steps in the form of attitude and wise behavior concerning the harvesting and collection of rattan. One of the most important actions to be followed by rattan farmers is to not take rattan that is flowering or is bearing fruit. The attitude like this will guarantee sustainability of produce of rattan, especially rattan type having barred unique.

There are various obtainable benefits by rattan farmer, especially about defensible rattan productivity on an ongoing basis. If defensible rattan productivity on an ongoing basis, hence earnings rattan farmer can be improved and in the end can increase prosperity rattan farmer. To support the need to maintain rattan productivity, the role of government is required. The Government is expected to regulate actively in so many thing, especially in the case of execution of rattan conservation on an ongoing basis, of rattan commercial system and prohibition of raw rattan export. This arrangement is very importance because the government has the power and resources to adequately develop efforts relating to conservation and rattan commercial arrangements.

Stands at conservation effort which can be done by rattan farmer, the government shall thought of correct strategic steps of which can support rattan conservation effort to base-community. One strategic step that must be undertaken is to give amenity to obtain area concession of rattan conservation and incentive to rattan farmers to conservation rattan.

Based on the results of problems synthesized during the PRA and FGD activities, it was identified that some problems that require solutions: (i) problem of land supply and preparation, (ii) land permission, (iii) rattan garden security, (iv) cost of maintenance, (v) education, (vi) traditional forest and community forest, and (vii) the relationship of with Lore Lindu National Park

## CONCLUSION AND RECOMMENDATION

Based on the analysis of result and discussions of this research, several conclusions have been made: (i) The total economic value of rattan management to finite at rattan farmer level is Rp. 100.000 to Rp.150.000. This number consists of a nature value of Rp. 50.000 to Rp. 100.000, and an added value (income) for rattan farmer of Rp. 25.000 to Rp. 50.000; (ii) The level of earnings by rattan farmers from year to year is increasing quantitatively, but from the angle of value it doesn't increase; (iii) The community, especially rattan farmers, assess conservation

efforts for rattan as a positive effort and need to be supported to undertake conservation activities. In consequence, they have a mind to carry out conservation efforts for rattan for improving rattan productivity on an ongoing basis; (iv) There are a number of forms of rattan conservation which can be developed by the community; particularly rattan farmers may carry out nursery and cultivation, carry out seedling split (thinning) and cultivation, and take rattan selectively and wise; (v) Conservation model which can be developed by community, especially rattan farmer is constructing a collaboration in the form of group of rattan farmer and conduct conservation through traditional forest and social forest approaches; (vi) The conservation model which has been employed by rattan farmer as result from this establishment process and research is processing split and cultivation of seed.

Based on the conclusions formulated above, it is recommended that although rattan farmers have chosen the conservation techniques of split and cultivation of seed developed during research, with consideration of amenity of the execution, but for the sake of larger ones, it recommended that rattan farmer can develop step by step and sustainability of conservation process through the nursery technique and cultivation of seed. In conclusion, the involvement of all stakeholders involved in the commerce of rattan, especially the government, is critical so that rattan conservation can be done systematically and sustainable.

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