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I.   INTRODUCTION

Indonesia has been supplying 80% of rattan world market and therefore people consider rattan as one of very important non-wood forest products not only at local level but also in international trade.

There are 316 rattan species of 7 genera can naturally be found in Indonesia to date. Rattan species which are domesticated by the Dayak community of Kalimantan Island are *Calamus cesius* and *Calamus tradhycoleus* belongs to a small diameter species.

The high potential of rattan resources in Indonesia of promising market prospective has made rattan be a very strategic asset.

Importunely the small holder's rattan has been cultivating a number of rattans from natural forest only. The imbalance between supply and demand of raw material of rattan will eventually threaten the sustainability of rattan resources and even to result in indirect to negative externality impacts to others forest resources. So as the efforts of making use efficiently rattan's raw materials on a sustainable base can meet the balance of annually available cutting and harvesting socio-economic and environment aspects.

In order to achieve the above-mentioned objective, a holistic inventory carried out at both natural and planted forests by applying proper and accurate inventory technique is required so as the potency of each species and distribution pattern can be known.

For this reason, a manual in guiding inventory survey using inventory technique that can be used widely to all regions in the area is required.

II.   METODOLOGY OF INVENTORY

Method of inventory to use by rattan smallholder is as follows:

II.1. Orientation

This activity is to find out general information on rattan distribution in each rattan farm.

Orientation result is to be used as one of considerations in establishing sample units of various forest clusters in each selected areas.

II.2. Field Measurement

The activity is aimed at obtaining data and information of estimating macro-based rattan potency on forest clusters to be surveyed. Field measurement is carried out on selected forest clusters.

II.3. Equipment And Supporting Materials

Equipment and supporting materials generally used in inventory are:

1) Rattan situation-map
2) Stationary
3) Tally sheet
4) Roll meter
5) Caliper
6) Compass
7) Personal use.

II.4. Data Collecting

Data items need to be collected in rattan inventory activity are:

1) Names of rattan species
2) Rattan potency of each species
3) Potency of all rattan species
4) Potential of rattan regeneration.

II.5. Sampling Technique

Sampling technique to use depends on the condition of rattan farm to survey. If the whole area to be survey is less than 5 hectares then census method is applied, reversely if it is more than 5 hectares, then a simple sampling technique is applied.

II.6. Sampling Unit

To rattan farm has more than 5 hectares then sampling unit is made by applying Systematic Continuous Strip Sampling, viz. straight line of 10–20 meters with intensity in inventory varies from 1.5–10% depending on the requirement. If a high accuracy in inventory rate is going to be achieved, then the higher intensity is applied, and vice versa if the inventory is just to know rattan potency at macro-scale then a lower sampling intensity is appropriate.

II.7. Sampling Method

Sampling unit technique applied at all samplings are generally using systematic with random start. Firstly, starting point of sampling technique is randomly predetermined, while other sampling unit is determined by systematic sampling by applying fixed intervals of same distance among the samplings.

Hence, inter-line distance is depending on the required sampling intensity if (L) is baseline length (1 km) and (n) is the number of lines which are to be used as sampling lines, then the interline interval (U) is:

$$U = \frac{L}{n} \ (1 \text{ km})$$

II.8. Data Collecting

II.8.1. Method of Identifying Rattan Species

Identifying rattan name and tree species is made through local names and/or commercial names with the aid of local people.

II.8.2. Method of Identifying Maturity

Growth rate of rattan is classified into 4 groups, viz. old rattan (length >25 meters), slightly old rattan (length 15–24.99 meters), young rattan (length 3.00–14.99 meters) and shoots (length <3.00 meters)

II.8.3. Measurement and Data Recording

Measurement is made in every contiguous 50 meters length in each baseline with 10–20 meters width on left- and right hand side of starting point line. Measurement in lines is done upon the number of clumps, number of single rattan, and length of rattan canes. In addition, condition of rattan growth and other areas which need replanting or enrichment, are also recorded.

The length of rattan cane to measure is from the basal part up to the height of free-of-leaf sheath and its midrib. In addition, tree species other than rattan found in line measurement are also recoded. The results of measurement are recorded in a tally sheet previously prepared.

II.8.4. Estimating Wet-weight of Sample Rattan

Rattan sampling should represent each species and class of rattan (old, slightly old and young). Five single rattans are sampled for each species and class of rattan. If rattan is in clumps, then clump that have more than 10 single canes, the minimum of 3 canes should be sampled. Cutting sample rattan from basal part up to free-of-leaf sheath and its midrib is made to the sampled cane.

In order to know the wet-weight of rattan, clump rattan is cut at every 10 meters length. Then sampled rattan is weighed in order to know average wet- weight of sampled rattan.

III. DATA ANALYSIS

III.1. Data Processing

All data obtained from field measurement are directly tabulated. The tabulation is aimed at validating data management so that biased data can be eliminated. Tabulation uses the table form as of Tale 1.

III.2. Data Analysis

Data analysis includes both quantitative (statistical) and qualitative analysis. Analysis includes identification of rattan species, estimation of rattan potency per hectare and potency estimation of rattan of category old, slightly old, young, and shoot.

Identification of rattan species includes characteristics and morphological natures of every rattan species (starts with local name and scientific name), in order to obtain the accuracy of botanical names of rattan plant. Identification of rattan species can be carried out by fitting the morphological characteristics and nature of rattan with species-recognition clues.

III.3. Statistical Calculation

Process of calculating rattan potency is carried out through a simple statistical calculation.

IV.   YIELD REGULATION

IV.1. Establishment Of Potency Table

After potency data obtained, then the data imputed into potency table. This table depicts the illustration concerning rattan potency in the farm and to be used as a reference in yield regulation. The potency table used is as of Table 1.

Table 1. Potency Data

Nr.	Rattan Species	Total Potency			
		Old	Slightly old	Young	Shoot
1	A				
2	B				
3	C				
4	D				
5	E				
..	..				
m	………….				
	TOTAL	Σ	Σ	Σ	Σ

IV.2. Annual Harvest Block Arrangement

Rattan plantation of small- and large-diameter are generally harvested at 10 years old and at 15 years old subsequently if the maintenance is carried out every 2–3 years.

In order to obtain sustainable yield, a yield regulation planning is required so that production of rattan can be made annually. In yield regulation, rattan area is arranged into 3 harvesting blocks based on the potency level and plant density.

IV.3. Yield Harvesting Planning

Having been divided into harvesting blocks then harvest yield arrangement can be made on rattan farm. The allowable volume of rattan is principally not more than the mean annual increment (MAI). By the established harvest blocks the optimum quality rattan production can be obtained so that every year the owner to earn continued cash income. It also eventually roles in making supply and demand of raw rattan balanced.

Rattan harvest is to carry out only on harvestable rattans with cane length >25 meters or classified as old rattan groups (free from leaf sheath).