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## Economically Important Rattans of Central Sulawesi, Indonesia

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Rattans are a large and diverse group of Old World climbing palms in the subfamily Calamoidae that are widely used throughout Asia for household purposes and furniture manufacturing. Perhaps nowhere is rattan more economically important than in the Indonesian province of Central Sulawesi where tons of cane are harvested for the furniture industry and thousands of households rely on rattan for cash income and domestic uses.

It is thus somewhat surprising that the rattan flora of Central Sulawesi remains poorly described and that little is known about its ecology or role in rural households. This paper identifies economically important rattan and their uses and values, estimates of plant and cane populations, and some of the opportunities and constraints to local management of wild rattan in southern Lore Lindu National Park (LLNP) in Central Sulawesi (Fig. 1). This region is of major conservation importance and is also a significant, but now illegal source of rattan cane (Schweithelm et al. 1992).

### The Identity, Use, and Value of Rattan

A survey of rattan use in two forest villages near southern LLNP, Moa and Au, suggests that six species are particularly important to rural households (Table 1). *Calamus zollingeri* ('batang'), a robust, clustering species, which produces high-quality, large-diameter canes dominates the commercial rattan trade. In addition, young 'batang' shoots are eaten as a vegetable and canes occasionally used in traditional medicine (in a solution of cinnamon, clove, and eucalyptus oil) for topical treatment of muscle ailments and broken bones.

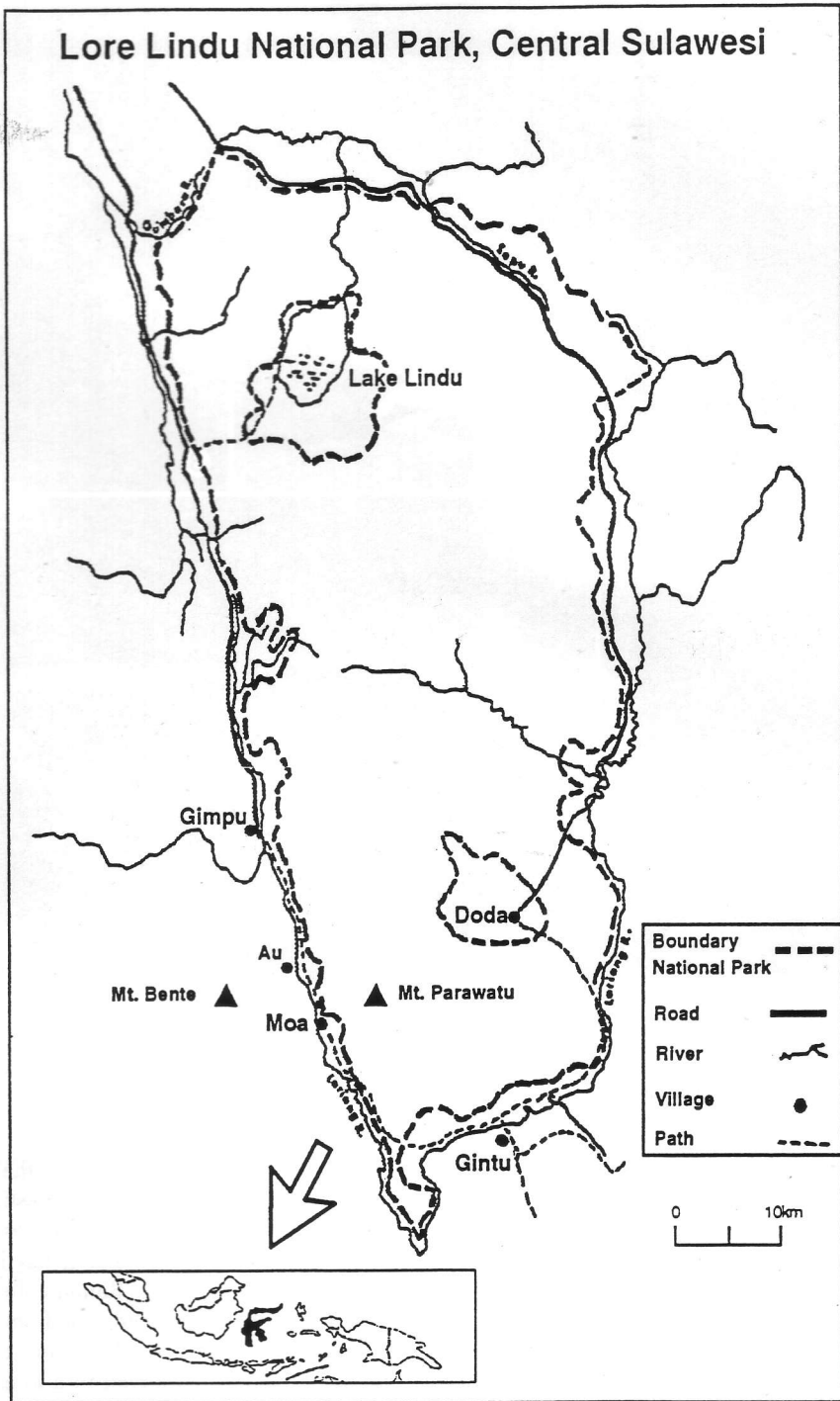
'Togisi' (*Calamus leptostachys*) is also widely gathered. It is a solitary or clustering species that produces excellent-quality small-diameter canes, which are split for commercial sale or for household binding and weaving. 'Noko' (*Daemonorops robusta*) is a robust, clustering rattan that produces low-quality cane; it is not gathered commercially,

but young shoots are prized as a vegetable and eaten regularly by local people. Boiled shoots of *C. zollingeri* and *D. robusta* taste somewhat like asparagus, with *D. robusta* preferred by most due to its sweeter taste. The rattans 'lambang' (*Calamus ornatus* var. *celebicus*), 'ombol' (*Calamus symphysipus*), and 'ronti' (*Calamus leiocaulis*) are collected commercially, for weaving into roofing shingles (leaves) and for binding, respectively, but are less widely used than the other three species.

Household economic reliance upon cane harvesting varies. Families who lack access to irrigated rice production, such as many in Moa, are particularly dependent upon rattan harvesting, while others collect cane only as a supplementary source of income. In Moa and Au, virtually all able-bodied men between the ages of 15 and 40 gather *C. zollingeri* cane for cash income at least occasionally. Cut cane is either sold in the village (to a local trader) or floated down river to Gimpu where purchase prices are higher. The cane is then transported by truck to the provincial capital of Palu where rattan processing facilities boil, straighten, remove exterior silica sheaths, and otherwise prepare the cane for shipment to furniture manufacturing centers on Java.

The volume of rattan harvested from the region is not known. The Indonesian Government reports that the entire Central Sulawesi province produced 17,300 tons of cane in 1993, with 5438 tons produced in Donggala District (Bappeda 1994). However, a rattan transport cooperative near Gimpu, a small subdistrict within Donggala, recorded 12,000 tons of cane transported out of the Lariang River drainage alone in 1993 (KUD, pers. comm.).

The economic importance of rattan to rural households can be glimpsed by working with collectors in the field. An experienced collector can gather approximately 200 kg of cane a day. Good-quality cane sells for Rp 100/kg in Moa or Rp 150/kg downriver in Gimpu; thus collectors can



1. Location of study area near Lore Lindu National Park, Central Sulawesi.



2. Large-diameter rattans such as *Calamus zollingeri* are used to make furniture in Java. 3. The rattan *Calamus zollingeri* prefers high-light environments such as those found in natural tree fall gaps. 4. *Calamus leptostachys* produces high-quality cane that is split and used for binding and basketry. 5. Rattan canes are floated down river where they are loaded onto trucks for transport to cane-processing facilities in Palu, Central Sulawesi.

earn up to Rp 20,000/day (US \$1 = Rp 2,200; 1995). Average earnings from cane harvesting are much lower than this due to time spent transporting cane from forest to market and the tiring nature of the work, but still exceed alternative wage opportunities.

### Rattan Plant and Cane Supplies in Natural Forests

To estimate rattan populations, I established three 10 × 500 m transects in primary collecting areas near Moa and Au and recorded the number of plants and canes, evidence of harvesting and

sprouting, and cane lengths of the six locally important species (Table 2). Interestingly, *C. zollingeri* is the most abundant species in all sites, notwithstanding the fact that it has been repeatedly harvested for years. Rattan collectors in Au, for example, have gathered cane from the sampled forests for approximately 20 years. Similarly, 396 cut canes/ha were observed in a forest near Moa, with 140 canes/ha still available for harvest.

The effects of rattan harvesting on plant and cane populations are not known. This preliminary study suggests that *C. zollingeri* populations may be lower (76 vs. 176 and 104 mature plants/ha)



Table 1. Economically important rattans in Moa and Au, Sulawesi.

Species	Local Name	Uses, Market and Value
<i>Calamus leptostachys</i> Becc. ex Heyne	togisi	binding (hh <sup>a</sup> and sale) (Rp 2,500 <sup>b</sup> /100 split canes)
<i>Calamus leiocaulis</i> Becc. ex Heyne	ronti	binding (hh and sale) (Rp 2,500/100 split canes)
<i>Calamus ornatus</i> var. <i>celebicus</i> Becc.	lambang	secondary commercial cane (Rp 50–150/kg) fruits (hh)
<i>Calamus symphysipus</i> Becc.	ombol	roofing (hh and sale) (Rp 200/shingle)
<i>Calamus zollingeri</i> Becc.	batang	primary commercial cane (Rp 100–350/kg) food (shoots; hh and sale) (Rp 100/shoot) medicine
<i>Daemonorops robusta</i> Warb.	noko	roofing (hh and sale) (Rp 200/shingle) food (shoots; hh and sale) (Rp 100/shoot)

<sup>a</sup> hh—used for domestic household purposes, not sold.

<sup>b</sup> Rp 2,200 = US\$ 1.00 (1995).

Table 2. Rattan populations in forests near Mao and Au, central Sulawesi (summary of data from 10 × 500 m transects). na—not applicable; plants not harvested for this purpose.

Species	Plants (ha)		Canes (ha)		Sprouts (ha) Cut for Food	Mean Cane Length (m)
	Mature	Immature	Mature	Cut		
<i>C. leptostachys</i>						
Moa	30	336	16	4	na	14 ± 10
Moa	16	178	8	0	na	10 ± 7
Au	32	418	28	0	na	18 ± 13
<i>C. leiocaulis</i>						
Moa	2	44	2	0	na	15
Moa	10	14	12	0	na	14 ± 5
Au	12	50	10	2	na	11 ± 6
<i>C. ornatus</i>						
Moa	14	132	4	0	na	29 ± 24
Moa	20	162	20	0	na	16 ± 9
Au	6	4	10	0	na	11 ± 3
<i>C. symphysipus</i>						
Moa	4	24	na	na	na	9 ± 2
Moa	8	52	na	na	na	10 ± 1
Au	0	4	na	na	na	—
<i>C. zollingeri</i> <sup>a</sup>						
Moa	174	612	140	396	18 <sup>a</sup>	28 ± 16
Moa	104	392	98	166	16 <sup>b</sup>	25 ± 14
Au	76	308	38	108	0 <sup>b</sup>	16 ± 8
<i>D. robusta</i>						
Moa	10	620	na	na	8 <sup>b</sup>	13 ± 6
Moa	20	988	na	na	30 <sup>b</sup>	15 ± 4
Au	22	608	na	na	4 <sup>b</sup>	15 ± 6

<sup>a</sup> Aggressive, clustering species; not all immature are distinct individuals.

<sup>b</sup> Immature, young shoots eaten, evidence of previous collection does not persist (no woody cane stumps).

and mean cane lengths shorter (16 m vs. 28 and 25 m) in Au, where cane-harvesting pressures are greater, than in Moa; only 508 m of harvestable *C. zollingeri* cane/ha were observed in the Au forest, while 2,450 and 3,920 m/ha were observed in Mao. On the other hand, rattan collectors in Au report no changes in the availability of *C. zollingeri* canes over the years. Rattan populations in Au and Moa may simply differ due to edaphic, elevation, and other environmental variables.

### Conservation and Management Implications

The effects of rattan harvesting on plant and cane populations are part of an ongoing study that seeks to develop sustained-yield cane-harvesting guidelines and explore opportunities for local management of rattan. At present, large quantities of *C. zollingeri* are harvested illegally from within Lore Lindu National Park. However, local residents collected rattan in this area long before it was designated as a park and many believe they have traditional rights to forest products.

The Director of the Indonesian Department of Forestry Conservation recently indicated that the Government of Indonesia may support the establishment of traditional-use zones in Lore Lindu National Park. This represents a significant departure from the strictly preservationist policies of the past. To establish traditional rattan-use zones, it will first be necessary to determine the abundance of rattan plants and canes, cane resprout and growth rates, the effects of cane harvesting on other flora and fauna, existing customary and legal systems of forest extraction rights, and means by which forest communities might manage rattan harvesting.

At present, Au appears to be the only village in the region that is attempting to manage rattan extraction. In 1989, Au villagers unilaterally declared that rattan gathering in the forests to the west of the village would no longer be open access, but would instead be reserved for the exclusive use of Au residents. Their rationale was to insure a continued supply of rattan for home use and cash income, and to protect the watershed upon which the village's irrigated rice fields depend.

The attempt by Au residents to manage rattan resources raises several interesting questions. What is the history of forest product access in Au and how did the community establish an exclusive-use zone? Is the exclusive-use zone respected

by rattan collectors from neighboring villages and if so, why? How was Au able to implement these guidelines on public forest land without involvement by Indonesian government authorities? Is the current rate of rattan harvesting sustainable? Answers to these questions must await further study. However, it is interesting to note that Au collectors gather most *C. zollingeri* cane within one-hour walk of the village and most *C. leptostachys* cane within 20 minutes, all from the village forest. Furthermore, village leaders and rattan collectors from nearby villages report that they are aware of and respect the Au exclusive-use zone.

Joint community and government management of forest resources poses many challenges. However, Au residents appear to have initiated several components of effective forest management, including defining rightholders, the type of rights granted, and when and where these rights extend. If rattan can be harvested on a sustainable basis without adversely affecting biodiversity conservation objectives and if local communities can manage cane harvesting on public lands, granting forest villages exclusive-use zones for the extraction of rattan could generate much-needed incentives for conservation among a population that is currently distrustful of park management efforts.

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