

# Ethnobotany of Manggarai Ethnic in Ruteng Mountains, Flores, Indonesia

Elisa Iswandono<sup>1</sup>, Ervival A.M. Zuhud<sup>2</sup>, Agus Hikmat<sup>2</sup>, Nandi Kosmaryandi<sup>2</sup>

## ABSTRACT

*Manggarai ethnic in the mountains of Ruteng have ethnobotany knowledge in the utilization of forest plant to meet their needs. Loss of traditional knowledge would have negative impacts on forest resources, because the indigenous people would have less knowledge on sustainable ways to manage the existing forest resources. This study aims to analyze the level of knowledge of ethnobotany, retention rate, and the rate of change of the annual retention on the indigenous people in the Ruteng mountains. This research was conducted in the Kampong Mano, Lerang, and Wae Rebo, Manggarai District within the Province of Nusa Tenggara Timur in July 2014 to July 2015. The data was obtained through Focus Group Discussion (FGD) semi-structured and in-depth interviews and were analyzed for the level of ethnobotany knowledge, ethnobotany retention index, testing the significance of the factors that affect the level of knowledge with Kruskal Wallis test and Man Whitney. The results of this study shows that the Manggarai communities in the Mountains of Ruteng have local knowledge to meet daily needs, especially food, and medicine through the utilization of forest plant. The level of ethnobotany knowledge is high because the indigenous people still depend their live to forest resources, practice traditional rituals, and inheritance knowledge. The ethnobotany knowledge of young generation decreased that can be indicated forest degradation because the indigenous people would have less knowledge to manage and utilize forest resources.*

*Keywords: ethnobotany knowledge, forest plant, Manggarai tribe, Ruteng, traditional*

## INTRODUCTION

Ethnobotany is the study of the interaction between human and plant resources (Cotton 1996; Minnis 2000; Anderson *et al.* 2011; Pei 2013) and important in the conservation of forest plants (Pei 2013). Local communities has interacted with the forest for hundreds of years and are dependent on forest resources so as to have the knowledge of how to use sustainable forest plants (Pei *et al.*, 2009; Pei 2013). A small, compact and unique local community is a self-sustaining community capable of sustainably managing forests as a result of the experience of living dependent and in harmony with nature for hundreds of years.

The loss of local people who have traditional ecological knowledge and socio-economically dependent on the fulfillment of life is one of the causes of tropical forest destruction (Rai & Lalramnghinglova 2010). One effort to prevent the loss of local knowledge is to know the level of local knowledge, retention, and annual changes based on ethnobotany approaches because plants have an important role for local communities. This study aims to describe the ethnobotany knowledge, analyze the level of knowledge of ethnobotany, retention rate and the rate of change of the annual retention on the Manggarai ethnic.

## METHODS

This research was carried out for 6 months from July to December 2014. The sample location includes three *kampong* (small traditional village), two *kampong* located around Forest Ruteng, namely *kampong* Mano (8.578° - 8.609°S and 120.528° - 120.552°E), *kampong* Lerang (8.652° - 8.660°S and 120.549° - 120.568°E) and *kampong* Wae Rebo (8.752° - 8.778° and 120.274° - 120.291°) in the Forest Todo (Figure 1).

The data was obtained through survey, participant observation, focus group discussion (FGD) and in-dept interviews with informants set based on the status and role in the

---

<sup>1</sup> Balai Besar KSDA NTT (Natural Resources Conservation Center of Nusa Tenggara Timur)

<sup>2</sup> Department of Conservation of Forest Resources and Ecosystem, Faculty of Forestry, Bogor Agricultural University.

community by purposive and snowball (Sugiyono 2010). The number of respondents 90 people according to age classes and traditional village (kampong). Age-class assessment is based on the ability of local community knowledge acquired during late adolescence or early adulthood, around the age of 15 years (Zent 2009).

Measuring the level of knowledge and ethnobotany using the formula (Philip Gentry 1993a, 1993b): Testing the significance of the factors affecting the level of knowledge of ethnobotany with non-parametric statistical significance (0.05): 1) Kruskal Wallis test, to test the knowledge of ethnobotany differences between kampong and age classes; 2) Man Whitney test, to test the knowledge of the differences of men and women. Measurement of ethnobotany retention index and the level of sustainability using the equation Zent (2009):

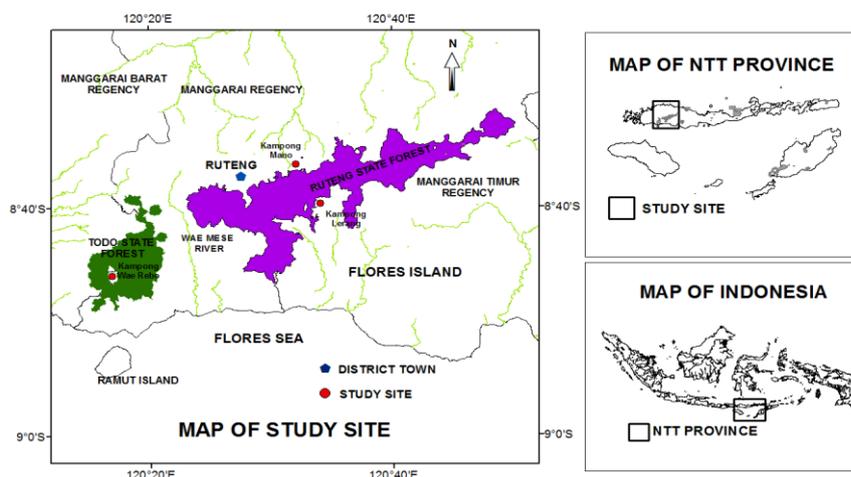


Figure 1 Map of study sites

## RESULTS AND DISCUSSION

### Ethnobotanical Knowledge of Manggarai Tribe in Ruteng Mountains

Number of forest plant species are utilized by Manggarai people in Ruteng Mountains as many as 161 species (75 families) are divided into 12 kinds of utilization (Table 2). The number of species over 60% in as many as 276 species of forest plant in Ruteng Forest (Wiriadinata 1998), 252 species (Verheijen 1977). Usefulness group that has the highest number of plant species are 73 species of medicinal plants (28,57%) and food 40 species (15,87%). People still use the medicinal plant parts of bark, leaves, roots, and all parts of herbs to cure as many as 40 kinds of diseases.

Tabel 2. Species and Family of Usefulness Forest Plant

Usefulness Plant	Number of Species	Number of Family
Food	40	22
Beverage	4	4
Medicine	73	46
Wood Buildings	32	15
Poison	5	5
Dye	2	2
Equipment and craft materials	34	8
Firewood	31	18
rope material	14	9
Fodder	8	4
myths, legends and rituals	6	4

### Level of Knowledge, Retention and Annual Change of Knowledge in Ethnobotany

The average level of knowledge of ethnobotany (Mg) of respondents is quite high, which is between 0,848 to the age class (AC) 1 up to 0.957 at AC 4 (Table 3). Kruskal Wallis test results on residence factors showed the P value = 0.173 ( $> 0.05$ ), meaning that the difference residence does not cause a difference in the level of knowledge. Mann Whitney test for gender differences in factors indicate the value of P = 0.000 ( $< 0.05$ ), meaning that there are differences in the level of knowledge of ethnobotany men and women. This is because the men in charge of taking forest product while the women do the work at home and help work in the garden.

Kruskal Wallis test on the different of age classes (AC) indicates the value of P = 0.000 ( $< 0.05$ ), meaning that each AC have different levels of knowledge. Lowest knowledge level is at AC 1 and increasing until AC 4 because of the increasing experience in the utilization of forest plant species and interaction with the outside community as researchers and tourists. At AC 5 decrease in the level of knowledge due to aging that causes memory loss (Zent 2009).

The retention rate (RG) is a local community's ability to retain knowledge of ethnobotany (Zent 2009). The lowest RG is AC 1 because of the young age of causes have not been actively involved in traditional institutions and the lack of experience in the forest. Manggarai Community people decreased knowledge of ethnobotany. RG on all AC affects the annual rate of change in knowledge of ethnobotany (CA). The lowest CA is the AC 1 and AC 2. The CA of AC 1 is -0.00661 per year, it means that after next 151.29 year, ethnobotanical knowledge will be lost at AC 1. CA of AC 1 is -00 319 per year, its means that after next 131.48 year, the ethnobotanical knowledge at AC 2 will be lost. The decreasing of traditional knowledge due to reduced time to interact with the forest as a result of changes in work activities, such as tourist guide, or porters, and formal education that marginalize local knowledge of ethnobotany.

Table 3. The level of knowledge, retention index, and annual change knowledge of ethnobotany

Age Class	MG <sub>j</sub>	RG	RC	CA
<b>Kampong Mano</b>				
1 (10-24)	0,829	0,920239	0,885808	-0,00761
2 (25-39)	0,901	0,962626	0,950717	-0,00329
3 (40-54)	0,936	0,987656	0,998707	-0,0000862
4 (55-69)	0,948	1,011144	1,01114	0,000743
5 (70-84)	0,937	1	1	0
<b>Kampong Lerang</b>				
1 ( $\leq 24$ )	0,842	0,929507	0,895374	-0,00698
2 (25-39)	0,907	0,963285	0,946498	-0,00357
3 (40-54)	0,941	0,982558	0,996065	-0,00026
4 (55-69)	0,958	1,013703	1,0137	0,000913
5 ( $> 69$ )	0,945	1	1	0
<b>Kampong Wae Rebo</b>				
1 ( $\leq 24$ )	0,871	0,941224	0,921239	-0,00525
2 (25-39)	0,925	0,978792	0,958887	-0,00274
3 (40-54)	0,945	0,979656	0,989451	-0,0007
4 (55-69)	0,965	1,010056	1,01005	0,00067
5 ( $> 69$ )	0,955	1	1	0
<b>Average</b>				
1 ( $\leq 24$ )	0,848	0,930	0,901	-0,00661
2 (25-39)	0,911	0,968	0,952	-0,00319
3 (40-54)	0,941	0,983	0,995	-0,00035
4 (55-69)	0,957	1,012	1,012	0,000775

5 (>69)                      0,946                      1                      1                      0

Description:  $M_{gj}$  = the average of the level of age class knowledge  $j$ ;  $RG$  = the level of retention of ethnobotany;  $RC$  = the level of cumulative retention;  $CA$  = the level of annual change

### CONCLUSION

Manggarai Community in Ruteng Mountains has made conservation through the utilization of a variety forest plant and is the same as medium level of pressure to the forest because the utilization is not on one particular species and habitats that play a role in the maintenance of ecosystem. The decreasing of these traditional knowledge due to reduced time to interact with the forest that marginalize local knowledge of ethnobotany and closing access to forest plant utilization. Therefore, forest management should accommodate traditional community to utilize forest plant to maintain the sustainable traditional knowledge.

### REFERENCES

- Anderson PJ, Putz FE. 2002. Harvesting and Conservation: are Both Possible for the Palm, *Iriartea deltoidea*?. *Forest Ecology and Management*. 170(1–3): 271–283.
- Anderson EN, Pearsal DM, Hunn ES, Turner JN. 2011. *Ethnobiology*. New Jersey (US): John Wiley & Sons Inc.
- Cotton CM. 1996. *Ethnobotany: principles and applications*. New York (US): John Wiley & Sons Inc.
- Pei SJ, Zhang G, Huai H. 2009. Application of Traditional Knowledge in Forest Management: Ethnobotanical Indicator of Sustainable Forest Use. *Forest Ecology and Management*. 257(10): 2017–2021.
- Pei SJ. 2013. Ethnobotany and Sustainable Use of Biodiversity. *Plant and Diversity Resources*. 35(4): 401–406. <http://dx.doi.org/10.7677/ynzwyj201313002>
- Phillips O, Gentry AH. 1993a. The useful plants of Tambopata. Peru. I. Statistical hypothesis tests with a new quantitative technique. *Economic Botany*. 47(1): 15–32.
- Phillips O, Gentry AH. 1993b. The useful plants of Tambopata. Peru. II. Additional hypothesis testing in quantitative ethnobotany. *Economic Botany*. 47(1): 33–43.
- Rai PK, Lalramnghinglova H. 2010. Lesser known plants of Mizoram, North East India: An Indo-Burma hotspot region. *Journal of Medicinal Plants Resources*. 4(13): 1301–1307. <http://dx.doi.org/10.5897/JMPR09.480>
- Rist L, Shaanker RU, Gulland EJM, Ghazoul J. 2010. The Use of Traditional Ecological Knowledge in Forest Management: an Example from India. *Ecology and Society*. 15(1): 3.
- Sugiyono 2010. *Metode Penelitian Administrasi*. Bandung (ID): CV Alfabeta.
- Turner NJ, Luczaj LJ, Migliorini P, Pieroni A, Dreon AL, Sacchetti LE, Paoletti MG. 2011. Edible and Tended Wild Plants. *Critical Reviews in Plant Sciences*. 30(1): 198–225.
- Verheijen JAJ. 1977. *Logat Nama-nama Tumbuhan di Manggarai-Flores*. Ruteng (ID): Regio SVD.
- Wiradinata 1998. *Floristic Distribution of Ruteng Nature Recreation Park*. Bogor (ID): LIPI.
- Zent S. 2009. *Methodology for Developing a Vitality index of Traditional Environmental Knowledge (VITEK)*. Caracas (VE): Instituto Venezolano de Investigaciones Cientificas.