Ethnobotanical study and identification of medicinal plants based on local knowledge

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Abstract. Indonesia is famous as a country with abundant plants biodiversity, many of them known for their medicinal properties. A study aimed to determine the types of medicinal plants and the efficacy of these plants has been conducted in four villages of Enrekang Regency, South Sulawesi Province of Indonesia. A survey sought information from the local community with a snowball sampling method, where data collection from one core source could expand into several other sources of information. The results showed that based on identification in the study locations, there were 27 types of plants commonly used by local healers (called: ‘Sanro’) as medicinal plants to treat patients. Among the plants were: black turmeric, yellow turmeric, yellow bamboo, candlenut, pomegranate, saba banana, cinnamon, guava, starfruit, garlic, soursop, papaya, palm sugar, ginger, java wood, durian, and shallots. Sometimes the ‘sanro’ used a mixture of those traditional plants in treatment by utilizing the main ingredients comes from the plants. The local people apply conservation and propagation of medicinal plants by intercropping in the yard around houses.

1. Introduction
Indonesia has around 30,000 types of medicinal plants, hence among this flora richness, Indonesia has the potential to develop herbal products with quality that equivalent to modern medicine [1]. Enrekang of South Sulawesi is one of the regions that has the potential of diverse natural resources, including medicinal plants. It has local commodities obtained both from the forest and those deliberately cultivated. The biophysical and agroclimatic conditions of the area with varying altitude from 100 - 1300 m above sea level, support for the thrive of various types of medicinal plants.

Medicinal plants are all types of plants that are known to have good properties in helping maintain health and treatment of illness [2]. Medicinal plants are very closely related to traditional medicine since most utilization of medicinal plants has not been based on clinical laboratory testing, but rather based on the experience of use [3]. Legally, traditional medicinal plants are recognized by Regulation Number 23 of 1992 concerning Health. It says: traditional medicines are ingredients or ingredients potion, in the form of plant materials, animal materials, minerals, extracted essence, or mixtures of these ingredients which have been used for treatment based on experience for generations [4]. Indeed, Indonesian has long recognized
and used medicinal plants for various health problems. Knowledge of medicinal plants is on experiences and skills basis, that have been passed down from previous generations [5].

Nowadays, the public's knowledge and understanding of medicinal plants are growing [6]. The community began to understand that the use of plants for medicine could be parallel and complement each other with modern medicine. Often, the use of medicinal plants for various functions is the first choice for treatment. Almost all people in Indonesia has ever used medicinal plants for treating a particular disease either during childhood or adulthood period [4].

The purpose of this study was to determine the types of medicinal plants and how to identify plants employed by the local healers in Enrekang Regency of South Sulawesi province.

2. Overview of the study location
This study was conducted in four villages within Enrekang Regency: 1) Batu Kede of Masalle District; 2) Batumila; 3) Salubulo and 4) Mangkawani; of Maiwa District. From various backgrounds of people in Enrekang, there are several cultures inherited by the ancestors related to various aspects in terms of governance, language, and kinship [7].

‘Sanro’ is a figure who is believed by the local communities to have certain advantages compared to others i.e. able to treat using both supernatural and spiritual methods. In terms of the use of plants, especially in maintaining and restoring health, Sanro groups utilize plants around them as an inseparable part of their lives. They use all necessary parts of the plants as ingredients. For preservation and propagation purpose, they cultivate some of the plants they often use around their home and neighborhood.

3. Study Methodology

3.1. Sampling method
This research was a survey by searching for information using the snowball sampling method. It allowed collecting data obtained from a core source that can lead to several other sources of information. Determination of informants was based on information from indigenous community leaders, tribal leaders, village heads, and other trusted sources who were considered as key respondents. They knew things closely related to respected activities.

3.2. Aspects of observation
Field observations and activities which were the follow-up activities based on information from informants include:

- Collection of medicinal plants.
- Management of medicinal plants.
- Methods of plants cultivation.
- Preparation and manufacture procedures of the medicinal potions.
- Methods of application of the medicinal herbs use, the efficacy of medicinal plants and plant parts used for medicinal purposes.

3.3. Aspects of observation
Observations were well documented, interviews were recorded, and samples and processes were taped and photographed. It was to ensure all information was well recorded together with all necessary additional data and materials.
4. Results

4.1. Identification of local healer (‘sanro’) as primary informants

One most important step of the survey was to gather information from key respondents regarding the names of well-known persons acknowledged as local healers. Based on their information, this study managed to do depth interview with several ‘sanro’ as seen in table 1.

Table 1. Identity of local healers (‘sanro’) who were informants of the study

| No. | Name  | Age (year) | Main occupation | Educational background | Address                                      |
|-----|-------|------------|-----------------|------------------------|----------------------------------------------|
| 1   | Lahodding | 72         | Farmer          | Nautical school        | Malino, Kec. Maiwa Kab. Enrekang              |
| 2   | Wa’Leba  | 60         | Farmer          | Elementary             | Maroangin, Jl. Batuapi no.7                   |
| 3   | Tajang  | 51         | Farmer          | High school            | Baroko                                        |
| 4   | Wa’Ansu  | 70         | Farmer          | Elementary             | Maroangin, Jl. Batuapi no.10                  |
| 5   | Wa’Aci   | 66         | Farmer          | Elementary             | Maroangin, Jl Salubulo                        |

Based on interview of those informants, several aspects related with their knowledge and activities they involved related with therapy services (table 2).

Table 2. Aspects related with local healers (‘sanro’)

| Aspects                             | Percentage (%) |
|-------------------------------------|----------------|
| Source of knowledge                 |                |
| Grand parents                       | 40             |
| Parents                             | 0              |
| Other family members                | 0              |
| Friends                             | 0              |
| Formal education                    | 0              |
| Non-formal education                | 0              |
| Experience                          | 20             |
| Others                              | 40             |
| `Average number of ‘patients’ per month |          |
| 0                                   | 0              |
| 1-5 persons                         | 80             |
| 6-10 persons                        | 20             |
| >11 persons                         | 0              |
| Lainnya                             | 0              |
| Duration of becoming local healers (‘sanro’) |            |
| Up to 1 year                        | 0              |
| Up to 2 years                       | 0              |
| Up to 3 years                       | 0              |
| Up to 4 years                       | 40             |
| More than 4 years                   | 60             |
| Employable methods                  |                |
| Needle therapy                      | 0              |
| Massage                             | 40             |
| Spiritual therapy                   | 20             |
| Supranatural therapy                | 0              |
| Broken bones therapy                | 0              |
| Others                              | 40             |
| Medicine application method         |                |
| By consuming                        | 80             |
| By Rubbing                          | 20             |
From table 2, we understood that the consulted ‘sanro’ have been practicing for over three years. It is considered enough for them to be capable of providing information regarding plants in study location, which are medicinal following these ‘sanro’ activities.

4.2. Types of medicinal plants and their utilization in the study location

Based on the interviews with consulted ‘sanro’ in the three villages of Enrekang District, there were lots of plants which have been used for healing as in the following tables.

Table 3. Types of medicinal plants mostly used by Sanro in Batukede Village, District of Masalle, Enrekang Regency. Name of informant (‘sanro’): Lahodding

| No. | Indonesian Name of plants | Botanical Name | Employable part/s | Application methods | Efficacy | Related image |
|-----|---------------------------|----------------|-------------------|---------------------|----------|---------------|
| 1.  | Jambu biji                | *Psidium guajava* L. | Jambu biji leaves | by consuming        | treatment of diarrhea | ![Image](image1.png) |
| 2.  | Sirih                     | *Piper betle* L. | Ota leaves        | by consuming        | treatment for cholesterol and jaundice | ![Image](image2.png) |
| 3.  | Kunyit kuning             | *Curcuma longa* | Kunyi maridi bulbs | by consuming        | internal infection | ![Image](image3.png) |
| 4.  | Belimbing                 | *Averhoa bilimbi* L. | Caneneng leaves | by consuming        | cholesterol | ![Image](image4.png) |
| 5.  | paria                     | *Momordica charantia* | Paria leaves | by rubbing          | smallpox | ![Image](image5.png) |
| 6.  | Bawang putih              | *Allium sativum* Linn. | Lessuna puteh bulbs | by consuming, mixed with coconut water | cholesterol | ![Image](image6.png) |
| 7.  | Cemba                     | *Dacrycarpus imbricatus* | leaves | consuming mixed with vegetables | cholesterol | ![Image](image7.png) |
| 8.  | Pohon gantugan           |                  | bark | consuming mixed with vegetables | cholesterol | ![Image](image8.png) |
Table 4. Types of medicinal plants mostly used by Sanro in Mangkawani Village, District of Maiwa, Enrekang Regency. Name of informant (‘sanro’): Wa’ Leba

| No. | Name of plants | Employable part/s | Application methods | Efficacy | Related image |
|-----|----------------|--------------------|---------------------|----------|---------------|
| 1.  | Paria Momordica charantia | Paria leaves | by rubbing | treatment for smallpox |
| 2.  | Sirsak Annona muricata L. | Serikaja leaves | by consuming | Post-surgery treatment and for cholesterol |
| 3.  | Pepaya Carica papaya | Bandike leaves | by consuming | Malaria |
| 4.  | Binahong Bassela rubra linn | Binahong leaves | by consuming | for internal wound infection |
| 5.  | Ketapang dan sirih Cassia alata | Ketapang & Ota Bark and leaves | by consuming | Diabetes |
| 6.  | Alpukat Persea amaricana | Alpukat leaves | by consuming | Kidney treatment |
| 7.  | Pepaya Carica papaya | Bandike resin | by consuming | helminthic |

Table 5. Types of medicinal plants mostly used by Sanro in Batukede Village, District of Baroko, Enrekang Regency. Name of informant (‘sanro’): Tajang

| No. | Name of plants | Employable part/s | Application methods | Efficacy | Related image |
|-----|----------------|--------------------|---------------------|----------|---------------|
| 1.  | Kunyit hitam Curcuma longa | Kanyi bolong bulbs | by consuming | treatment of diarrhea |
| 2.  | Kunyit kuning Curcuma caesia | Kunyti maridi bulbs | by consuming and rubbing | treatment for cholesterol and jaundice |
Table 6. Types of medicinal plants mostly used by Sanro in Mangkawani Village, District of Maiwa, Enrekang Regency. Name of informant (‘sanro’): Wa’ Ansu

| No. | Indonesian | Botanical | Name of plants | Employable part/s | Application methods | Efficacy | Related image |
|-----|------------|-----------|----------------|-------------------|---------------------|----------|---------------|
| 1.  | Kayu jawa  | Stelechoca rpus burahol | Kayu jawa bark | by consuming | Liver treatment | ![image](image1.png) |
| 2.  | Durian     | Durio zibethinus | Durian bark | by consuming | cholesterol | ![image](image2.png) |
| 3.  | Sirih      | Piper betle L. | Ota leaves | by consuming | strengthen teeth | ![image](image3.png) |
| 4.  | Kunyit kunig | Curcuma longa | Kunyi bulbs | by consuming with egg and honey | boosting energy | ![image](image4.png) |
Table 7. Types of medicinal plants mostly used by Sanro in Salubulo Village, District of Maiwa, Enrekang Regency. Name of informant (‘sanro’): Wa’ Aci

| No. | Plants / Mixture of plants | Employable part/s | Application methods | Efficacy | Related image |
|-----|-----------------------------|-------------------|---------------------|----------|---------------|
| 1.  | Kunyit, kelapa, dan bawang merah | Curcuma longa, Elaeis guineensis Allium cepa L. | young leaves, bulbs | by rubbing | treatment of chicken pox |
| 2.  | alang-alang dan kapuk randu | Imperata cylindrica, Ceiba petandra | roots | by consuming | gastric pain |
| 3.  | Kelapa dan gula uren | Elaeis guineensis dan Arena pinnata | water and sugary essence | by consuming | fish poisoning |
| 4.  | Jahe | Zingiber officinale | Pana cella | Umbi | by consuming and rubbing | for scabies treatment |

Leaves are part that are widely used by sanro for their treatment. The use leaves for medicinal plants is suitable for sustainability as it does not adversely affect the survival of plants as opposed to other parts. The utilization of roots, stems, bark, and tubers, means removal or destruction of plants. Therefore, sustainability efforts need to involve propagation and reproduction of the plants. Figure 1 shows the use of the parts.

![Figure 1. Parts of plants used by local healer (‘sanro’) in study location](image-url)
5. Conclusion
This study identified a collection of 27 medicinal plants used by 'sanro' to treat their patients in the study location. The use of those plants are materials that are pure traditional in terms of the process, tools, and methods. Yet, variations among those local healers which result in a different application of methods applied even for the same plant materials. It includes the purpose of use of a particular plant might vary among them.

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