Diversity of Local Food in Sasak Ethnic, Lombok Island, West Nusa Tenggara

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Abstract. Several species of local plants in Lombok are formerly often used by the community as an alternative food. Community awareness of the food usually comes from life experience, knowledge from generation to generation, and local wisdom. These things need attention for the sake of sustainability. The ethnobotany study is necessary. The aim of this study was to make an inventory of non-rice local food diversity of East Lombok district, West Nusa Tenggara. This research was executed through open interview and direct observation in the field. This study is one of the local food conservation efforts for strengthening national food security. The results of ethnobotany studies recorded 15 species of non-rice local foods contain carbohydrate. The most widely used plant part is the tubers/rhizomes. Until now, the species of non-rice food plants, remain cultivated but without handling such as rice (Oryza sativa) and maize (Zea mays).

1. Introduction

Different of plants cultivated by the community as alternative food and a source of carbohydrates in Indonesia is very diverse. To meet the caloric needs of the Indonesian population, the intensive cultivation is still limited to rice and corn. This will pose a risk to food security, because in terms of food balance, especially the balance of carbohydrates, the Indonesian diet is considered less than ideal. This is due to the high consumption of rice as the only source of calories [1]. Carbohydrates (KH) are the main food source because they are the source of energy, followed by proteins and vitamins which are complementary needs [2].

In response to these problems, the government implemented a food diversification program started in 1972, but its implementation still not produce the expected changes in diet [1] Food diversification that includes the diversity of consumption of carbohydrate, protein, fat, vitamin and mineral resources is still less than optimal due to the limited production of diverse agricultural food commodities. Based on these facts, for the non-rice foods can be considered as a new source of carbohydrates.

Lombok island is one of the areas in the province of West Nusa Tenggara, predominantly inhabited by the Sasak ethnic which is a native of this area. In this island, Dioscorea spp was commonly used by the community as an alternative food. The community's knowledge of plants generally comes from life experiences and knowledge from generation to generation. The local knowledge and wisdom of the community needs to get the attention of all parties. Therefore, this research needs to be done to make an inventory of the diversity for non-rice local foods producing carbohydrate (KH).
This research is one of methods to increase the role of local food plants as substitutes for the main food that its existence has begun to diminish. Besides that, this research is also expected to strengthen and generate local food to strengthen national food security.

2. Methodology
Ethnobotany data of food-producing carbohydrates (KH) was carried out according to methods reported in [3, 4, 5] with some modifications. The research was done by non-structural interviews and "open ended", and direct observation in the field. The interview is aimed at local people who know and use plants as carbohydrate-producing foods. The plant species recorded its local name, parts used and their status (cultivation or wild). Unknown species of scientific name, made herbarium according to Nesbitt reference [6] then identified in Herbarium Bogoriensises, Botany Division-Research Center for Biology, LIPI.

This research was conducted in Jeruk Manis and Kembang Kuning villages, East Lombok-West Nusa Tenggara regency, the area bordering Rinjani Mountain National Park. The majority of the population are Muslims and their main livelihood is as farmers.

3. Results and Discussion
Currently, the rapid advances in cultivation technology cannot be obstructed. Slowly but surely, the type of carbohydrate-producing tubers began to be abandoned and replaced with the type of carbohydrate-producing plants that have relatively easy harvest handling and post-harvest process.

Indonesia has 77 types of non-rice food sources, such as cassava (*Manihot esculenta*), maize (*Zea mays*), ganyong (*Canna indica*), gambili (*Dioscorea aculeata*), taro (*Alocasia spp.*), sago (*Metroxylon sagu*), beans, sweet potatoes (*Ipomoea batatas*), etc. [7]. Of various tubers possessed by Indonesia, cassava is the most important source of carbohydrate followed by sweet potatoes in second place [8].

The results of the study showed 15 species of local food plants used by the Sasak community in Jeruk Manis and Kembang Kuning villages, East Lombok regency (Table 1).

| Scientific name                  | Local name         | Family       | Part of use | Status                      |
|----------------------------------|--------------------|--------------|-------------|-----------------------------|
| *Alocasia mocrarrhiza* (L.)      | Bira               | Araceae      | tuber       | cultivation without maintenance |
| *Canna indica* L.                | Sebet              | Cannaceae    | tuber       | cultivation without maintenance |
| *Dioscorea alata* L.             | Uwi piit, egal     | Dioscoreaceae| tuber       | cultivation without maintenance |
| *Dioscorea bulbifera* L.         | Kalem              | Dioscoreaceae| tuber       | cultivation without maintenance |
| *Dioscorea esculenta* (Lour.) Burkill | Kembili        | Dioscoreaceae| tuber       | cultivation without maintenance |
| *Dioscorea hispida* Dennst.      | boyod, gadung     | Dioscoreaceae| tuber       | Wild                        |
| *Dioscore* sp.                   | Gadung kendit     | Dioscoreaceae| tuber       | Wild                        |
| *Ipomoea batatas* (L.) Lam.      | Ambon jama        | Convolvulaceae| tuber       | cultivation without maintenance |
| *Lablab purpureus* (L.) Sweet    | Komak              | Fabaceae     | Fruit       | cultivation without maintenance |
| *Manihot esculenta* Crantz       | Ambon jawa        | Euphorbiaceae| tuber       | cultivation without maintenance |
| *Maranta arundinacea* L.         | Marus              | Marantaceae  | Tuber       | cultivation without maintenance |
Based on interviews and observations in the field, only four species "boyod" or "gadung reket" *Dioscorea hispida*, "gadung kendit" *Dioscorea* sp., and "babaye" *Pueraria montana* var. *lobata* and "kenebele") are wild species that grow in forest areas or shrubs. Meanwhile,11 others species are planted but generally without maintenance except for *Zea mays*. Corn is planted and maintained intensively (cultivation with maintenance) (Table 1).

| Species                  | Common Name | Family     | Type   | Method                        |
|--------------------------|-------------|------------|--------|-------------------------------|
| *Phaseolus lunatus* L.   | Komak kuning| Fabaceae   | Fruit  | cultivation without maintenance |
| *Pueraria Montana* var.  | Babaye      | Fabaceae   | tuber  | Wild                          |
| *Zea mays* L.            | Jagung      | Poaceae    | Fruit  | cultivation with maintenance  |
| Sp 1                     | Kenebele    |            | tuber  | wild                          |

In the world, *Dioscorea* genus as alternative food consists of 28 species [9], while in Indonesia it is known 6 species [10]. Exploration results and interviews with local communities in the study area identified five species of *Dioscorea* that are used as food source by the Sasak ethnic. Among the five species of *Dioscorea*, *Dioscorea alata* is most commonly cultivated and utilized by local communities at study sites. In Java, this species is known by the local name "uwi / uwimanis / kelapa" [10]. Period of growth ranging from planting to the adult experiences four phases [11]. Research conducted Praptiwi, et al [12] showed that the nutritional composition of sweet Uwi harvested in phase three and four had no difference. Thus, it can be harvested more quickly to shorten the time of planting and more quickly used as a source of carbohydrate.

In contrast to *Dioscorea alata*, *Dioscorea hispida* is not widely used as a foodstuff because it is known tuber only in the famine season. According to Sumunar & Estiasih [13], gadung tuber is one source of high carbohydrate foods. Carbohydrates in gadung are dominated by starch. Besides having carbohydrate content also, it contains as well cyanide which can cause poisoning and death. Some process to remove the remaining HCN content or minimize need to be done so that the gadung tuber becomes safe and feasible to consume. Mean while, the research by Nugroho and Estyaniyana [14] used...
dried tuber starch *Dioscorea hispida* from Timor Leste, Central Kalimantan and Yogyakarta having the highest toxicity originating from Timor Leste. Thus, this species of dry bulb in Timor Leste is used as a repellent of rice lice.

Garut (*Maranta arundinacea*) is one of the plants in which the tuber is widely used by local communities in Indonesia, especially those living in rural areas. This species comes from Tropical America, and then spreads widely to other tropical countries among others Indonesia, India, Sri Lanka and Philippines [8]. This species grows in various regions of Indonesia. In the study sites, this species is often cultivated in garden or home yards without intensive maintenance, even growing in the shrub area and the edge of the national park. Amylose content of tubers is relatively lower than cassava (*Manihot esculenta*) or sago (*Metroxylon sagu*), but high potassium percentage [15], easily digested for infant and sick foods [8]. The use of medicinal ingredients for tubers has been demonstrated. Among others, tuber porridge is used as a tapel for flatulence and tuber flour mixed with milk or water for antidote poisoning or problems with the stomach [10, 15]. Unfortunately, the Sasak community at the study site does not recognize its utilization as a traditional medicine.

Even though, the morphological variability of hyacinth bean (*Lablab purpureus*) is wide, many cultivars extinct. This species is used most often by the Sasak community as food and can also be used as forage feed, green manure, silage and ground cover. This species is believed to be native from India, Southeast Asia or Africa, and naturalized and cultivated in tropical and subtropical regions, especially in India, Southeast Asia, Egypt and Sudan [16]. In the study site, the 'komak' is generally planted flowers are white or violet. The planting is carried out in the bunds of garden [10, 11, 18]. Per 100 gram edible portion immature pods contains 82.4 g water, 4.5 g protein, 0.1 g fat, 10.0 g carbohydrates, 2.0 g fibre, and 1.0 g ash. The presence of cyanogenic glycoside has been reported in certain cultivars [16].

The most rarely used species as food by Sasak community is “babaye” (*Pueraria montana* var. *lobata*); because this species lives wildly dan rare to be found. According to local communities, the harvesting process is quite difficult.

*Canna indica* or commonly known as ganyong is usually grown as an ornamental plant, because the colour of leaves and flowers varies. In the study sites, it is generally grown as green leaf and planted in garden or home yard. In Vietnam, the sticks are dried and then processed into noodles, while the young buds are made into green [17]. The Sasak community at the study site only recognizes the use of tubers as non-rice food or snacks.

The results show that the younger generation is also around 20 years old who live in this area are no longer familiar with the species of non-rice food plants mentioned above. It seems that modern technology, the flow of globalization and tourist visits has eroded the local wisdom, culture and traditional knowledge of Indonesia's biodiversity. This needs to be immediately anticipated by conducting an inventory and further research, so that the species that can potentially be to develop, so that diversification of food diversity can walk well.

4. Conclusion

The Sasak people in Jeruk Manis and Kembang Kuning villages are still familiar with the species of non-rice food. Fifteen species of non-rice food plants that are used in the famine season or as snacks were recorded. Eleven species have been cultivated even without intensive maintenance. This shows the local wisdom of Sasak people in handling food security for their survival.

5. References

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