Bamboo Utilization on Peleng Island, Indonesia: Unveiling Local Knowledge and Diverse Applications

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ABSTRACT

Bamboo is a useful plant with significant cultural and economic importance, particularly in small Indonesian islands, such as Peleng Island in Central Sulawesi. This paper explores bamboo utilization on Peleng Island, aiming to broaden our understanding of bamboo use on small Indonesian islands and shed light on local wisdom in bamboo utilization. The research was conducted on Peleng Island in 2019. Information on bamboo utilization was gathered through in-depth interviews with residents. Bamboo materials were collected and sent to the Herbarium Bogoriense for identification. The data were analyzed descriptively. There are six bamboo species utilized on Peleng Island, namely Bambusa vulgaris, Dendrocalamus asper, Gigantochloa atter, Neololeba atra, Schizostachyum brachycladum, and Schizostachyum lima. Bamboo on Peleng Island is used for building materials (roofs, pillars, and wall weaving), cooking traditional foods like nasi jaha and bambu suman, and for various other uses (ornamental plants, water containers, stairs, poles for picking fruits/cloves, pest traps, and fish trap).

Keywords: Banggai Kepulauan, bamboo, local wisdom, Peleng Island

INTRODUCTION

Bamboo worldwide is estimated to have 123 genera (Ahmad et al., 2021), with between 1439 (Widjaja et al., 2014) and 1662 species (Canava et al., 2017). In Indonesia, 24 genera and 175 bamboo species have been reported (Damayanto & Ferirenta, 2021), with 105 species reportedly endemic to the area (Widjaja, 2019). New species recently published have increased the number of bamboo species in Indonesia (Ervianti et al., 2019; Muzakki, 2020; Widjaja, 2020, 2023).

(Bamboo is a versatile plant that) As a versatile plant, humans have utilized bamboo since ancient times (Hsiung, 1987; Dlamini et al., 2022; Mohan et al., 2022). It is not only used as a building material but also for crafts, art, food, and musical instruments. In Indonesia, bamboo holds significant cultural and economic importance, particularly in regions situated on small islands. Due to their compact size, these areas often contend with limited natural resources. Peleng Island, located in the Banggai Kepulauan Regency, Central Sulawesi, is one of Indonesia's small islands with great bamboo potential.. There are eight bamboo species reported on Banggai Kepulauan, namely Bambusa tuldoides, B. vulgaris, Dendrocalamus asper, Gigantochloa atter, Neololeba atra, Schizostachyum brachycladum, S. lima, and Thyrsostachys siamensis (Damayanto & Rahmawati, 2020). Most of these species are significantly utilized in Banggai Kepulauan, particularly in Peleng Island. In this paper, we explore the utilization of bamboo on Peleng Island, aiming to expand our understanding of how bamboo is used on small islands in Indonesia. Our findings are expected to offer new insights into the local wisdom associated with bamboo utilization in these areas.

METHODS

The research was conducted from June to July 2019 on Peleng Island, Banggai Kepulauan Regency, Central Sulawesi Province, Indonesia (Figure 1). Information on bamboo utilization on Peleng Island was obtained through in-depth interviews (Table 1) with local residents. Bamboo materials were also collected to create herbarium specimens for identification purposes. These bamboo specimens were sent to the Herbarium Bogoriense (BO) for processing and further identification. Bamboo identification was conducted using references from the bamboo collection at BO and literature such as Widjaja (1987, 1997, 2001a, 2001b), Widjaja et al. (2005), and Dransfield & Widjaja (1995). The data were then analyzed descriptively.

Table 1. List of questions about bamboo and its use on Peleng Island

No.	Questions
1	How many bamboo species are recognized in this village?
2	How frequently do you use bamboo for personal purposes?
3	Where do you typically source your bamboo?
4	Which parts of the bamboo (roots, young shoots, culms, leaves, or all parts of them) have you utilized for personal use?
5	What are the uses of those bamboo parts?
6	Can you show the bamboo utilization products in this village?
7	Can you describe or demonstrate how to make those products?
8	Do you regularly consume young shoots of bamboo? If so, which bamboo species are consumed?
9	Have you ever used bamboo for medicinal purposes? If yes, which bamboo species and parts are used?
10	What are the traditional or local beliefs regarding bamboo in this village?

RESULTS AND DISCUSSION

There are six bamboo species used on Peleng Island in daily life, namely Bambusa vulgaris, Dendrocalamus asper, Gigantochloa atter, Neololeba atra, Schizostachyum brachycladum, and Schizostachyum lima (Figure 2–3). This constitutes approximately 75% of the eight bamboo species found on Peleng Island (Damayanto & Rahmawati, 2020). The utilization of bamboo on Peleng Island can be categorized into three types, namely (1) as a building material (Figure 4), (2) for food preparation, and (3) for other purposes. As a building material, bamboo in Peleng Island is usually used as house roofs, pillars, and wall weaving. The traditional roofs of houses on Peleng Island are made from materials such as bamboo, rattan, and sago palm leaves. These roofs are known as ato in Peleng Island (Figure 5). The ato is made from bamboo G. atter, locally known as bambu peling. This bamboo is used as the main support pole (Figure 6) for sago palm leaves (Metroxylon sp.). Bambu peling is abundantly available on Peleng Island, making it a popular choice for ato support poles. According to Dransfield & Widjaja (1995), G. atter has long been known as a building material in Southeast Asia.

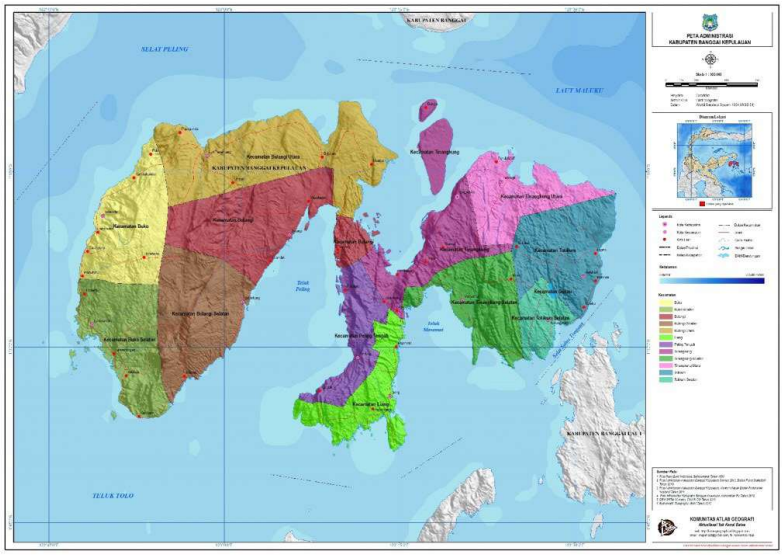

Figure 1. Research Location on Peleng Island, Banggai Kepulauan Regency, Central Sulawesi Province (Source: BPKPPST, 2015)

Figure 2. *Bambusa vulgaris, Dendrocalamus asper*, and *Gigantochloa* atter (from left to right)

Figure 3. *Neololeba atra, Schizostachyum brachycladum*, and *Schizostachyum lima* (from left to right)

Figure 4. Bamboo for building materials in Peleng Island

The ato is crafted by folding mature sago palm leaves and placing them precisely on the bamboo support poles, then securing them with rattan (*Calamus* sp.) (Figure 6). In regions like Kokolomboy, Leme-leme Darat Village in Bulagi Subdistrict, and Alul Village in Buko Subdistrict, where natural forest cover is abundant, residents still use sliced rattan to tie the ato. Despite its increasing scarcity, rattan remains relatively accessible in these areas. However, in Alul Village and Kokolomboy, rattan is no longer found in the surroundings, and villagers must go deep into the forest to gather rattan. Fortunately, residents of Alul Village have begun cultivating rattan around their gardens. In areas without natural forests, such as Tinangkung and North Tinangkung Subdistricts, materials for sewing ato, such as bamboo *N. atra*, locally known as bambu lonas, are used. Bambu lonas is preferred for its flexibility and durability, making it suitable for sewing *ato*.

Figure 5. Traditional roofs, called *ato*, in Peleng Island

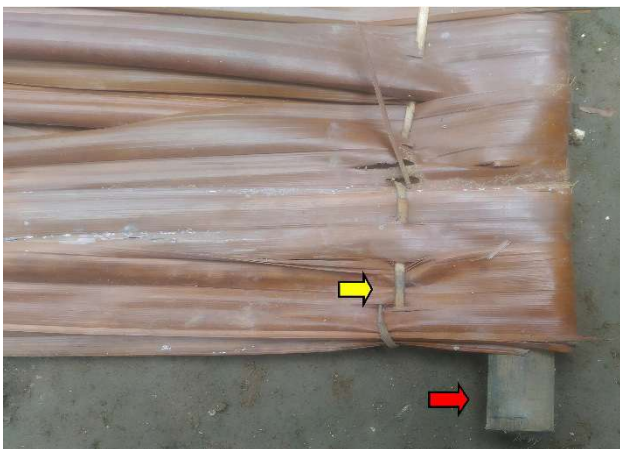

Figure 6. *Ato* with the main support pole from bamboo culm (red arrow) and rope from sliced rattan (yellow arrow)

Sago palm leaves are chosen as ato material due to their abundance on Peleng Island, their wide leaf blades, which allow for the creation of many ato with relatively few leaves. Most local residents can now purchase ato at traditional markets. These ato are sold at an average price of Rp. 3,000 per sheet, with a length of approximately 2 meters. On average, ato can last for 3-5 years, depending on the rainfall in the area. If damaged, only the sago palm leaf part of the ato must be replaced, as the bamboo support poles are usually still strong and can be reused. This is one of the local wisdom of the people of Peleng Island that directly contributes to the sustainable utilization of bamboo.

Most houses on Peleng Island still use bamboo and wood boards as the main building materials. Specifically for pillars, the preferred bamboo species is *D. asper*, locally known as pontung (betung in Indonesia). Bambu pontung has long been known for its strong structure compared to other bamboo species, making it ideal for building pillars. However, due to the difficulty in finding *bambu pontung* in Peleng Island, *bambu peling* (*G. atter*) is still commonly used. Widjaja (2001a) states that *D. asper* has been known as a building material in the Java region, especially for pillars, and some are used for furniture, chopsticks, toothpicks, paper, and musical instruments. The culm diameters of this bamboo are reported to reach 20 cm (Widjaja et al., 2005), making it very suitable for building pillars. Dransfield & Widjaja (1995) state that the culms of *D. asper* have very thick walls and are very strong and flexible, making them also frequently used in bridge construction.

As mentioned earlier, most houses on Peleng Island still use bamboo and wood boards as the main building materials, including for the walls of their homes. For those who are more affluent in Peleng Island, building a house with wooden boards or even concrete is relatively easy. Therefore, the walls of their homes can be made of wooden boards or bricks. However, for less financially capable people, weaving from bamboo is usually used for house walls (Figure 7). The bamboo species used for this purpose is *S. lima*, locally known as *bambu toi* in Tinangkung and North Tinangkung Subdistricts or lambangan in Bulagi and Buko Subdistricts. In addition to *S. lima*, bamboo species such as *S. brachycladum*, known locally as *bambu lemayu* or *lamayu*, are also often used for wall weaving. Bamboo *S. lima* is chosen for wall weaving because it is abundant on Peleng Island. This bamboo also has thin walls (up to 4 mm) with very long internodes that are suitable for weaving.

Figure 7. Bamboo weaving for house walls in Peleng Island

In addition to being used as a building material, bamboo on Peleng Island is also utilized as a container for cooking food. *Nasi jaha* (Figure 8) and *bambu suman* are examples of traditional foods from Peleng Island that are typically cooked and served in bamboo containers. The process of making *nasi jaha* and *bambu suman* is very similar to the process of making *lemang*, which is famous in the Sumatra and Malaysia regions. If *lemang* is made from rice (Dransfield & Widjaja, 1995), then *nasi jaha* is made from glutinous rice, and *bambu suman* is made from *taro*. Making *nasi jaha* begins with preparing straight bamboo culms with long internodes and thin walls. The bamboo species used is *S. brachycladum*. This bamboo species is often used in making lemang (Dransfield & Widjaja, 1995; Widjaja, 2001a) because the characteristics of its culms are very suitable for speeding up and maintaining the cooking process.

Figure 8. *Nasi jaha* in the bamboo culms (left) and the slice of *nasi jaha* (right) in Peleng Island

The mature culms of *S. brachycladum* are cut in the middle internode to obtain long internodes with not-too-thin walls. If the walls are too thin, they will easily break when cooked later. The node in the bottom part of the bamboo culm is left, while the top part is removed to serve as the opening for inserting food ingredients. After the bamboo's inside is washed, it is lined with young banana leaves. The process of inserting banana leaves must be done carefully to avoid tearing the leaves. Mature banana leaves are not recommended for making nasi jaha because they easily tear when inserted into the narrow bamboo hole. Glutinous rice that has been washed is then inserted into the bamboo hole but not to the point of filling the space inside the bamboo culm. Glutinous rice is usually purchased in the Luwuk region (mainland Sulawesi); if it is not available in large quantities, it is mixed with regular rice. After that, coconut milk is added until the glutinous rice is submerged. The top hole of the bamboo is stuffed with banana leaves; then, it is burned in hot embers (not directly in the fire).

Cooked nasi jaha is indicated by the loss of water content (coconut milk) inside. After cooking, nasi jaha is cooled, then split and cut into pieces (Figure 8). The price per piece in traditional markets on Peleng Island is an average of Rp. 1,000. Making bambu suman is similar to nasi jaha, but the ingredients used are taro. Taro is peeled, washed, and grated, then mixed with grated coconut, and placed in bamboo before being burned. Before burning, salt and a little water can be added according to taste and a little water. In areas with limited water, such as Alul Village, Bulagi Subdistrict, the making of *nasi jaha* and *bambu suman* usually does not use coconut milk or water. To overcome this, the bamboo species used as containers is B. vulgaris, locally known as aok tuu. Bamboo *B. vulgaris* has thicker culms and shorter internodes compared to *S. brachycladum* (Widjaja, 2001a; 2001b; Widjaja et al., 2005), so the burning process uses direct fire. The thick culms of *B. vulgaris* contain enough water, so when burned, they release enough water to aid in cooking.

In addition to *nasi jaha* and *bambu suman*, the young shoots of *D. asper, B. vulgaris*, and *G. atter* are commonly used as vegetables on Peleng Island (Figure 9). These young bamboo shoots are prepared by carefully removing the outer layers until a smooth, whitish surface is revealed, then thinly sliced and washed. Known for their delicious and sweet taste, the young shoots of D. asper have been enjoyed for generations (Widjaja, 1987; Dransfield & Widjaja, 1995; Widjaja, 2001a; Damayanto, 2018). Similarly, *B. vulgaris* is prized for its tasty young shoots (Widjaja et al., 2014), although locals note a slightly bitter flavour than *D. asper*. The young shoots of *G. atter* are also popular and widely used as vegetables (Widiarti, 2003), and they are appreciated for their delicious flavour (Widjaja et al., 2014).

Figure 9. The vegetables from young shoot of bamboo in Peleng Island

Various uses of bamboo on Peleng Island, besides being used as a building material and food, have also been revealed in this study. Bamboo species such as S. brachycladum have been used as ornamental plants, water containers, and stairs. Bamboo S. lima is used as a pole for picking fruits and cloves, and a pole filled with sticky sap to trap pests on plantation crops. Bamboo B. vulgaris is also known to be used as a fish trap or locally known as kalason.

CONCLUSION

There are six bamboo species used on Peleng Island in daily life, namely Bambusa vulgaris (aok tuu), Dendrocalamus asper (pontung or betung), Gigantochloa atter (bambu peling), Neololeba atra (bambu lonas), Schizostachyum brachycladum (bambu lemayu or lamayu), and Schizostachyum lima (bambu toi or lambangan). Bamboo on Peleng Island is extensively used for three main purposes: as a building material for roofs, pillars, and wall weaving; for cooking traditional foods like nasi jaha and bambu suman; and for various other uses such as ornamental plants, water containers, stairs, pole for picking fruits/cloves, pest traps, and fish trap.

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