

## **Emic and Ethic Knowledge of Bamboo's Characteristic in Process of Making Angklung**

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**Abstract.** Bamboo as raw material of angklung has not received special attention yet, whereas the quality of angklung will be highly influenced by the quality of bamboo as its main material. Only bamboo with certain character can produce angklung with the quality of good sound and proper tone. Unfortunately the knowledge of the local community regarding the characteristics of bamboo is still qualitative hence that the process of knowledge inheritance was obstructed. Therefore in this research, society knowledge (emic knowledge) will be translated scientifically in order to obtain the quantitative data of bamboo characteristic for angklung. The methods used was a qualitative and quantitative descriptive. The emic data was collected with deep interview with the selected informants in purposive. The key informant on this research was the owner of Bale Angklung Bandung. Quantifying emic data was conducting by the measurement and laboratory test of physical properties (the water content), chemical properties (the concentration of sugar reducing/Luff Schoorl) and anatomy (the density of vascular bundles). The measurement aimed to determine the reed diameter, the minimum length of internode, the physical condition of drying, the reed uprightness, the reed roundness, and the depreciation. The result showed that the scope of local knowledge regarding making angklung was varying. Not all of the craftsmen understood the steps and the characteristics of bamboo that used in the main material selection process. Some of bamboo characteristic for angklung could be quantifying, including the chosen bamboo which having 44 cm of minimum length, the reed uprightness was 45-90° above the ground, and the circles reed round with the maximum diameter change tolerate outside the reed is 0,15 cm. But there are still many more local knowledge that could not be construed scientifically so it needs further excavation. In main material selection process, the most treatment and bamboo characteristic selection was conducted to gather bamboo in the low water and sugar level at average 7.5% and 0.54%. The low water level will prevent the reed shrinks after drying process. After drying, the bamboo will be compact with the average of density vascular bundles is 142.63 number/mm.

**Keywords:** Ethic and emic, angklung, quantification

### **Introduction**

Angklung is a local wisdom of Sundanese people who have been recognized by UNESCO as Masterpieces of the Oral and Intangible Heritage of Humanity. The rapid penetration of foreign culture led an enthusiast of angklung prone to missing. In addition, there is a threat that if Indonesia cannot preserve the angklung well, the angklung recognition as a musical instrument world will be revoked. It does not close the possibility that the angklung can be claimed by other nations. Therefore it need an effort to preserve the angklung.

Currently, the angklung conservation effort are focused on improving the culture of playing angklung but has not come to the making angklung inheritance knowledge process, which is the main goal. In the process of making angklung, needed the special knowledge about the raw materials that used, because not all of bamboo can produce the clear sound and the right tone [8]. This local knowledge (emic knowledge) only owned by certain people who will understand angklung and has a qualified musicality. So it need effort of knowledge inheritance about the bamboo characteristics and processing techniques to avoid the extinction of knowledge and

maintain the existence of angklung in the future.

Inheritance knowledge of making angklung is still difficult to do because there are still no standard of making angklung [1]. Information about the bamboo's characteristic that used for angklung are still qualitative so that become an inhibitor of the inheritance process. The qualitative bamboo's characteristic are dry reed bamboo, long internode reed, and the round reed. Information about the characteristics of bamboo should be quantifying to obtain a measure of bamboo that used in the process of making angklung. Therefore, this study aims to documenting the local knowledge (emic knowledge) about the bamboo's characteristics that used in the process of making angklung then scientifically translated by measuring and laboratory testing to quantify the character of designated angklung bamboo. It expected to simplify the process of angklung knowledge inheritance, angklung preserve and raise awareness of bamboo as an angklung raw material.

## Research Method

The method used is a mixture of qualitative and quantitative descriptive. The emic data done with deep interview with the key informant that purposively selected. The key informant on this research is the owner of Bale Angklung Bandung. The information about bamboo characteristic then scientifically translated through measurement and laboratory test of anatomy (the density ties vessels), physics (the water level), and chemistry (the sugar level/Luff Schorl) so it obtained the conduct characteristic knowledge of bamboo for angklung. The measurement is to find out the diameter reed, the minimum length of internode, the physical condition of drying, the uprightness reed, the roundness reed, and the depreciation. The laboratory test of water level, reducing sugar level, and density ties vessels are for translating the dry reed based on the key informant from drying process result. The laboratory test of water and reducing sugar level are based on SNI-01-2981-1992 and SNI-01-2982-1992. Bamboo for the laboratory test used the sixth internode, which is for 'do' note in small

octave. This research only discusses process of tube tone making, which is dominantly affected in sound quality that angklung produced.

## Result and discussion

The process of making angklung is a series of very complex process. In this process, the selected bamboo processed into a tube chain that produce melodious voice with proper tone. Outside that process, there is a process that also important, named raw material selection process. This process will certainly determine the quality of bamboo, also the angklung produced.

The preliminary survey obtains that the scope of some craftsmen's knowledge in Bandung about angklung making process were varying. Not all of the craftsmen know the steps and the characteristics of bamboo that used in the main material selection process. The craftsmen who do not know the main material selection process rely on vendor as the insurer of bamboo. In this research, the informant from Bale Angklung Bandung is a craftsman who knows the whole steps, from the selection process to the making angklung process.

### Emic and ethic knowledge of raw material selection

Angklung with the low resistance and quality tone, can be caused by a mistake in accuracy factors of selecting type and drying raw materials/bamboo. One of the bamboo weakness is their low resistance [6]. So it required a selective selection process. Hence, the documentation of raw materials selection knowledge become an important information. According to informants, the selection of raw materials is divided into three stages, namely:

#### Bamboo election

Characteristic of bamboo used in an election bamboo is:

#### Growing region

The bamboo that grows along the southern coast of West Java at the height of  $\pm 500$  masl is good for angklung. It caused by the diameter of the bamboo that grows in that

area is not great and it is good for angklung. Bamboo that grows in the mountain slopes are also good for making angklung. Scientifically, the bamboo that grows in the valley absorbs more water than the bamboo that grows on the slopes of the mountain [7]. This fact led to the bamboo's moisture become higher and will cracks the reed when it dried.

### Bamboo's species

The good bamboo for angklung is Wulung and Temen/ *Gigantochloa atroviolaceae* and *Gigantochloa atter*. Besides the attractive aesthetics, composition of fibres in bamboo reed Black is also good in delivering voice [4]. Beside the anatomical properties, Black Bamboo also has the basic physical and mechanical properties that suitable for musical instruments [5].

### Uprightness of bamboo

Reed stands is related with the water content of reeds. The sloping bamboo is relative to storing more water content, so when it dry it will cause wrinkles on the reed. The upright bamboo is a bamboo that has a slope only in the range 45-90° from the ground surface. Where the ratio of straight and curved sections in a single reed is 79.68%: 20:30% or can be rounded to 80%: 20%

### Age of bamboo

The 4-5 years old bamboo is good for Angklung. This relates to the conservation and nutritional adequacy of bamboo. At the age of 4-5 years, bamboo had not a shoots, so the result of photosynthesis is used for bamboo reed self. Election of age was also related with concentration of the water and the sugar on the reeds. But this study were not obtained the water and sugar content because of bamboo has not entered the harvest period.

### The long segment

The good tone tube does not have a node in the centre of the tube tone. So the elected bamboo from the selection process should be have a long segment. After did a measurement of the average length segment is 44 cm.

### Diameter of reed bamboo

From the measurement results obtained that the outer diameter size for the tone tube is 3.7 to 4.4 cm. When it compared with the outer diameter, the thickness of reed is about 10 to 16% from the outer diameter length (10% < x < 16%). The length of the inside diameter (hollow reed) is 70 to 75% of the outer diameter length (70% < x < 75%). Bamboo that is too thick will cause the sound produced becomes submerged.

Table 1. Bamboo's characteristic of raw material selection

BAMBOO'S CHARACTERISTIC		
No	EMIC	ETHIC
1	Grows along the southern coast of West Java at the height of ± 500 [masl]	
2	Bamboo's local name: Temen and Wulung	Species: <i>Gigantochloa atroviolaceae</i> and <i>Gigantochloa atter</i>
3	Straight reed with the curved end	Upright of reed degree: 45° - 90° Ratio of straight: curved = 80 %: 20%
4	Long segment	Average of length internode = 44 [cm]
5	Age: 4 - 5 Years Old	When the logging does not pose sugar aroma
		Less Water
		Compact Reed
6	Reed diameter	Diameter inside = (70% < x < 75%) of outer diameter Reed Thickness = (10 % < x < 16%) of outer diameter.

Source: Primary data, 2015

### Harvesting

The best harvesting time is from April to September at 9:00 to 14:00 o'clock. These timing are related with the water content in the bamboo reeds. According to key informants, at night the groundwater will rise

to bamboo reeds and peak the highest concentration of water. So when the harvesting do in the morning before 09.00 o'clock, the water content in the bamboo is still a lot and has not gone down. Scientifically, in the dry season the bamboo will stop to growth so the reeds becomes hard. It is a good time to do the harvesting [2]. The timing of the harvest is also related with a bamboo photosynthesis [5].

In principle, the elected bamboo for angklung is a bamboo that have low water content. This avoids the reed become wrinkled after drying. The stages of harvesting bamboo is:

1. Cutting bamboo on the third segment. This selection is relating to the bamboo conservation
2. Let the bamboo hanging. This position causes the leaves will absorb the water from the reed so it will accelerate the drying process.
3. Let off the reed and prune the braches. The withered leaves showed the water content of the reed has been reduced. Further, pruning twigs in a reed. Then brought reed to land drying.

### Drying

According to key informants, good conditions for drying are in the shade where the light is not too high and not too humid. After the measurements obtained that a) the intensity of light at 625.3 Lux; c) a temperature of 32.6 ° C; d) moisture 43.7%; and e) wind speed of 11.67 m / s.

Drying process was did as optimally as possible to get a dry reed. This is done because if the bamboo is not perfect dry the reed will be humid, so it can be a medium of fungi. The dry reed cause the low concentration of water and sugar also the compact reed. After laboratory tests, the content of water, sugar and compactness reed expected by informants from drying result is an average of 7.5%, 0.54% and 142.63 sum/ mm.

Informants said that the reed of Wulung Bamboo is more compact, more dense and harder than Temen Bamboo. This is in line

with the results of laboratory tests which showed that Wulung Bamboo has a low density of vascular bundles. So bamboo fibre is more packed than the vascular bundles. Definition of compactness reed by informants related to fibre and cavity vessel. That requires to testing the fibre density of reeds. But in this study, fibre density cannot be done because of the tool limitation. So reed compactness was translated from the number of cavities / vascular bundles and the density of vascular bundles. The solid fibre of Wulung Bamboo because the sound produced become louder. While many cavities causes the sound that produced by Bamboo Temen become more melodic. Therefore, Temen Bamboo is recommended for angklung indoor materials and Wulung Bamboo is recommended for outdoor angklung material.

The correlation chart in Figure 1 shows that the number of vascular bundles, moisture content, and reducing sugar directly proportional. Vessels is the transport path of water and glucose, so when the vessels are less, the water content become decreased. The dissolved sugar in the water has indirectly reduced.

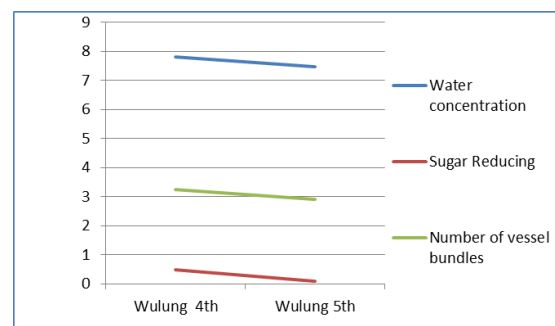


Figure 1. Correlation chart of water concentration, sugar reducing and number of vessel bundles. Source: Primary data, 2015

### Emic and Ethic Knowledge of Angklung Making Process

The process of angklung making is processing ready-made reeds to be formed as a tube chain that produce melodious voice with proper tone. As for process of making are consist of:

### Tone tube making

In the tone tube making process, there are choosing bamboo reed and bakalan tube making steps. The bamboo characters that used in the bamboo choosing step are:

1. Bamboo with the roundness reed. It is hard to find bamboo with the perfect roundness. Based on the key informant, the round reed is a reed with little changes in diameter outside reed when follow the circle reed. After measuring the bamboo with good roundness according to informant, it will obtain diameter length changes around 0.11 cm to 0.15 cm. Hence, it can be concluded that good bamboo for angklung is bamboo with maximum tolerance of diameter change outside reed is 0.15 cm.
2. Flat nodus/segment. Temen and Wulung Bamboo has a straight and long fibre. The nodus/ segment are flat and not concave or convex, so the incoming sound to the tube will be reflected uniformly which can cause the sound becomes clear [9].
3. Branches root not protrude inside. It relates with aesthetic, but could not scientifically prove that this character will also related to the sound that bamboo produced.
4. Free from fungus. Fungus causing the value of angklung aesthetics diminished.

The elected bamboo then processed into bakalan. Bakalan is the term that refer to a new processed tone tube according to the physical size of some tone kind (diameter, height tubes, high resonance tube), but has not done the tunings. The step of making bakalan is:

1. Determine the middle of the reed. The middle part of the reed is determined from lateral branch location
2. Make a feet tube (suku). Food tube is made in the bottom section and parallel to the lateral buds reed
3. Make a high-tube. High size tube is depends on the kind of tone that will be created.

4. Make a resonance tube. Resonance tube size depends on the type of tone that will be made.
5. Make a *coakan*. *Coakan* is term that refers to the opening part of the body tube.

The mostly craftsmen, when the process of make the *bakalan* is completed, the craftsmen will directly continue to the tuning step. However, according to key informants, the formed *bakalan* is not able to continue to the tuning process immediately but must be dried first. The dried process will occur the shrinkage on the tube feeder. After measurement, shrinkage was occurred in a mass tubes amount of 0.96 g. Besides that, the shrinkage also occurs in the tube body. This is evident from the diameter of tube body that become smaller. At the upper, middle and lower of outer body tube diameter, occurred shrinkages amount of 0.02 cm, 0.01 cm and 0.02 cm. The shrinkage also occurs in the top, middle and bottom of diameter coakan, there are 0.12 cm, 0.13 cm and 0.13 cm. basically, the shrinkage that occurs is not too significant. However, the drying process on the tube feeder will increase the amount of the water content reduced, so it will affecting the tube sound produce. This shrinkage will be affected by the thickness of the cell wall. The thicker the cell wall, the greater the shrinkage will occur [3]

### Tuning

Tuning is a process of giving a tone to the bakalan tube. This process is needed the eyesight, good hearing and musical talent. From the measurement results obtained the sharpen patten, there are the lower resonance tube made the tone produced will be higher and when the coakan gap was width the tone will be higher. In addition, it also obtained the pattern size of node points:

High of Hole Knot = High tubes – (High tubes: 3)

### Assembling

In this process the tone tube and the frame are assembled into a single unit.

## Conclusion and suggestion

Based on the research result, it can be conclude that local knowledge in the process of angklung making is very complex and not thoroughly scientifically translate yet so the quantifying process of emic knowledge is very important to do. In this case, the quantifying will help in the inheritance process of angklung making knowledge. The further research hopefully will furnish the deficiency of this research, such as multiply the key informants, measuring the fibre density, and examining the bamboo characteristic on skeleton tube.

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## Literature References

- [1] Diratmasasmita, H.,. Private communication. 2015
- [2] Edningtias, D., and Winarti, V., Mahu Tahu Tentang Bambu ?. Kementrian Kehutanan, Bogor, 2012.
- [3] Manuhuwa, E. and M. Loiwatu.2007. Komponen Kimia Tiga Jenis Bambu. Universitas Pattimura, Ambon, 2007.
- [4] Nuriyatin, N. Studi Analisa Sifat-Sifat Dasar Bambu pada Beberapa Tujuan. Institut Pertanian Bogor, 2000.
- [5] Oktawirani, Panca, Perencanaan Interpretasi Berbasis Konservasi Bambu Sebagai Bahan Baku Angklung Di Saung Angklung Udjo, Institut Pertanian Bogor, Bogor, 2013.
- [6] Swara, P, Pengawetan Kayu dan Bambu, KDT, Jakarta, 1997
- [7] Soeprayitno, T., Tobing, T. L. & Widjaja, E. A, Why the Sundanese of West Java prefer slope-inhabiting *G. pseudoarundinaceae* to those growing in the valey? In Rao, I. V. Ramunaja Gnanaharan, R dan Sastry, C. B (penyunting). *Bamboo Current Research*: 215-217 (1990)
- [8] Widaja, Elizabeth A, The Angklung and other West Javanese Bamboo Musical Instruments. In *Bamboo Research in Asia: Proceedings of a Workshop held in Singapore, 28-30 May 1980*, ed. by Gilles Lessard and Amy Chouinard: 201-4. Ottawa: International Development Research Centre (1980)
- [9] Widaja, Elizabeth A. Orasi APU: Pelajaran Terpetik dari Mendalami Bambu Indonesia Untuk pengembangannya di Masa Depan. *Berita Biologi* 8(3) (2006).