

## Afore, The Measuring Instrument in South Nias Culture

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**Abstract.** Humans are called as *homo economicus* because they are able to count and fulfill their economic needs. The process does not just happen in human life, but based on experience, demands and certainly because of the knowledge possessed by the community. This ability becomes a science that deserves appreciation. The results of these cultural sources are the result of community technology that must be preserved as a local wisdom. *Afore* is a measurement tool in South Nias community and as a source of cultural technology that the community needs be preserved. The technology of society as a proof of civilization and has a calculation tool that when converted to modern mathematics has almost the same size. The results showed that the *afore* gauge was the traditional measurement tool for the people of South Nias used in measuring the unit of weight (kg) in this case determining the price of the weight and quantity of the pig. The smallest size in *afore* is *kudri*. If in custom, the smallest unit of measurement *afore* starting from *dua zo'e*, *dua zo'e amatona*, *tölu naso'e*, *tölu naso'e amatona*, *öfa zo'e*, *öfa zo'e amatona*, *otu öri*, *dua alisi*, *tölu alisi*, *öfa alisi*, *lima alisi*, *önö alisi*, *fitu alisi*, *walu alisi*. The *afore* measuring instrument for the people of South Nias is a tool for transactions. Because *afore*, in the form of arithmetic operations of addition, subtraction, multiplication and division. Thus, it can be concluded that the people of South Nias have a source of cultural knowledge technology as local knowledge and local wisdom that is continuously preserved. Local knowledge should be inherited from the ancestors of South Nias, namely *afore* used as a means of buying and selling and economic transactions with local wisdom

### 1. Introduction

The habits of the people and their habits can be a source of learning. The source of learning in the form of experience and results of local knowledge and show evidence that the community already has a social relationship that is built through transaction activities known as barter and hereinafter referred to as market. This activity had taken place in the Nias community in the southern region. To build and create transaction communication between communities through traditional measuring instruments called *afore*. *Afore* as a measurement tool for the people of South Nias that has been inherited and is still partly used by the people of South Nias. This measuring instrument is used as a transaction tool before recognizing modern measuring instruments in the form of scales. This measuring instrument is a legacy from the ancestors of the people of South Nias to the current generation and certainly a legacy in the future and that needs to be preserved. This activity becomes a legacy that has been passed down for generations, meaning that the ancestral inheritance is the result of activities that have been carried on for generations and from generation to generation. The legacy makes it as a source of social community survival and can be a source of learning that must be maintained and preserved.

Tradition is everything that is passed down from the past to the present. In practice, the tangible tradition of an activity carried out continuously and repeatedly as an effort to establish patterns of



behavior based on norms as future actions. Embodiment of such traditions, in the form of surrounding activities, the natural environment and social environment which is then interpreted as local knowledge or also called local wisdom.

Local wisdom is an embodiment of endurance and growth that is manifested through a way of life, knowledge, and various life strategies in the form of activities carried out by local communities to answer various problems in meeting the needs of life, while preserving culture. Every traditional society, in local wisdom basically there is a process to become knowledgeable. For this reason, local knowledge is important to be maintained and introduced so that the young generation as the next generation does not lose their identity because of the emergence of other cultures.

As the background above, what is the focus of the problem in this research is how the measurement tools must be used in the culture of the people of South Nias? With the aim to determine the use of afore measuring instruments as local knowledge of the cultural results of the people of South Nias and to see the suitability of the modern measuring unit.

## 2. Traditional culture and measures

### 2.1. Culture

A wealth of civilized society when they have a technology that still survives and is inherited for the current generation. According to Tylor (Prasetya, et al, 2009: 30) that "culture is a complex whole or fabric, which includes knowledge, beliefs, art, immorality, law, customs and other abilities obtained by someone as a member of society" [1]. Sarumaha and Laiya (2018) suggested that "this cultural tradition is loaded with values called genius local wisdom that can be utilized to improve the quality of human resources" [2]. This proves that local knowledge provides great benefits and becomes a new science for the development of knowledge both mathematically, socially and also in economic transactions in the modern era can still survive.

The dynamics of culture is a necessary thing. This is inseparable from human activities with the role of their minds. Cultural dynamics or changes can occur due to various things. The result of this culture is a manifestation of the humanity of local wisdom which is considered good so that it experiences continual reinforcement. Will it remains without change, culture and the changes in society that will answer it. That is, along with the age it will make local culture as local knowledge will be lost.

### 2.2. Local culture

Technology does not occur or just appear, but through a process of civilization that is able to meet the needs of society. Sarumaha (2019) revealed that "the technology produced by the community shows a civilization that can be achieved in the era of the industrial revolution" [3] as a technology from a local wisdom continues to be preserved, until today one of the technologies from the South Nias is still used namely the afore-as a tool for transaction. That transaction tool proves a civilization of an economic society. According to Wikantiyoso and Tutuko, (2009:7) that local wisdom is positive human behavior in dealing with nature and the surrounding environment, which can be sourced from religious values, customs, ancestral advice or local culture, which is built naturally in a community community to adapt to the surrounding environment [4].

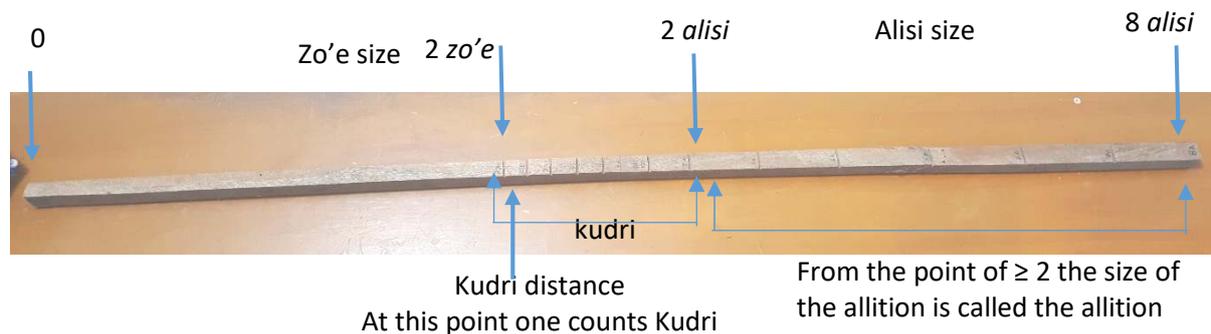
Furthermore Rajini (2014) states that "local wisdom is a legacy of the past that comes from the ancestors, which is not only found in traditional literature (oral literature or written literature) as a reflection of the speakers' community, but is present in various real life fields, such as philosophy and views life, health and architecture" [5]. More emphasized by Ayatrohaedi, 1986: 11) said that "the potential of the cultural elements of the region as proven ability to survive until now" [6]. Local wisdom as a cultural manifestation that occurs with reinforcement in people's lives shows, Exploring Local Wisdom as a form of humanization in culture.

From the above concept of local wisdom is a heritage associated with the surrounding environment that relies on the philosophy of values, methods and behaviors derived from customs, advice ancestor of the cultural elements of local potential and proven ability and lasted until today this as evidence of human civilization.

### 2.3. Traditional Measuring Instrument

As a social being and homo economicus shows that humans have shown their qualities as humans who are able to count. This means that the survival of a traditional society is strengthened by economy. Economy in this case is the power of food and transaction processes that occur in a society. The tool of transaction become a requirement in a transaction. Transaction tools in the Chinese community are known as abacus. Until now the Chinese people who trade in Medan still use the abacus as a counting tool with unique techniques and patterns. In transactions they do not use modern tools such as computers or calculators. According to an unnamed source saying that "the abacus tool has become a tradition and is easy to use and accurate" [7]. This means that it does not require electricity and operating systems or certain applications to calculate the economic value of each transaction that occurs.

An interview source from Ziraluo said that "afore it is carried out through the exchange the value of one item with other goods in the form of the width of the pigs' chest circumference to be exchanged with other items" [8]. Nias community has been around since the megalithic era, this is known from megalithic sites in several villages in South Nias. Afore measuring devices have been known as traditional measurement devices and are thought to have been known at that time too. This is evidence that the process of the formation of megaliths was made in an event of sacrifice of hundreds or even thousands of pigs that were used by the Nias aristocracy to hold a party or ceremony (owasa) in elevating the status of a nobleman. Through the sacrifice event, they use the afore as a transaction tool to get a large number of pigs that are measured in order to find out how many pigs are offered to the big event (owasa).



**Figure 1.** Afore tools to measure the people of South Nias

Source: Researcher's documentation, 2018

This traditional measurement tool can also be called a traditional economic activity because economic activity is based on the habits of the people that are patterned from cultural and historical values that they believe in and in an effort to meet needs. The typical people who live in a traditional economic system are oriented to survival.

### 3. Research Result

In this section, the researcher describes and illustrates the results of the study that afore can be calculated starting from *two zo'e*, *two zo'e ½ (amatona)*, *tölu zo'e*, *tölu zo'e ½ (amatona)*, *öfa zo'e*, *öfa zo'e ½ (amatona)*, *100 (otu) öri*, *two alisi*, *tölu alisi*, *öfa alisi*, *five alisi*, *önö alisi*, *fitu alisi*, *walu alisi*. Afore measuring devices also have the smallest units, called *kundri* and *föfö*, these unit names are only used after reaching the unit names above for example being between *two zo'e* with *two zo'e amatona* usually called *sambua kundri ambö two zo'e amatona*, while *föfö* used if when seen its size is in the middle of the *kundri* unit usually *1 (sambua) kundri* is equal to *two föfö*. However, the unit of *Föfö* is rarely used because usually when measured the excess size of the *afore* can be the size of *Föfö* but the value is not calculated but is used as a bonus.

Furthermore, the segments of size between *zo'e* to the next *zo'e* are called *Kudri*. One *zo'e* to the next *zo'e* of eight *kudri*. Based on the results of interviews with informants and direct observations, the researcher can analyze that the afore measuring device with a modern measuring instrument is

reviewed mathematically as follows: The initial calculation on the afore gauge is two zo'e or equal to eight kundri, if by using a tool modern measurement weighing 10 kg, 2 (two) zo'e amatona 12.5 kg, 3 (tölu) zo'e = 15 kg, 3 (tölu) zo'e = 15 kg, 3 (tölu) naso'e amatona = 16.25 kg, 4 (öfa) zo'e = 17.5 kg, (öfa) zo'e amatona = 18.75 kg, 100 (otu) öri = 20 kg, 2 (two) alisi = 25 kg, 3 (tölu) Alisi = 35 kg, 4 (öfa) Alisi = 40 kg, 5 (five alisi) = 50 kg, 6 (önö) Alisi = 60 kg called sajilo, 7 (fitu) Alisi = 70 kg, 8 (walu) Alisi = 80 kg. Explanation above for more details can be seen in table 1 about the names of the units of measure, the distance from the base of each unit to the Kundri and the price of each unit.

**Table 1.** The Compatibility of Afore Measuring Tools with Modern Measuring Instruments along with Sequence of Unit Names, Distance and Prices for Each Unit

No	Unit	The range	Size	Weight	Price (Rp)
1	<i>Sakundri</i>	<i>Sambua kundri</i>	<i>Sakundri</i>	1,25kg	
2	<i>Dua kundri</i>	<i>Sambua kundri</i>	<i>Dua kundri</i>	2,5kg	
3	<i>Tölu kundri</i>	<i>Sambua kundri</i>	<i>Tölu kundri</i>	3,75kg	
4	<i>Öfa kundri</i>	<i>Sambua kundri</i>	<i>Öfa kundri</i>	4kg	
5	<i>Lima kundri</i>	<i>Sambua kundri</i>	<i>Lima kundri</i>	4,25kg	
6	<i>Önö kundri</i>	<i>Sambua kundri</i>	<i>Önö kundri</i>	4,5kg	
7	<i>Fitu kundri</i>		<i>Fitu kundri</i>	4,75kg	
8	<i>Dua zo'e</i>	The distance between units from the base of the two zo'e is walu kundri	<i>Walu kundri</i>	10 kg	300.000
9	<i>Dua zo'e amatona</i>	The distance of the first unit to the second unit is two kundri	<i>Fulu kundri</i>	12,5 kg	375.000
10	<i>Tölu zo'e</i>	The distance between the second unit and the third unit is two kundri	<i>Felendrua kundri</i>	15 kg	450.000
11	<i>Tölu zo'e amatona</i>	The distance between the third unit and the fourth unit is sakundri	<i>Feledölu kundri</i>	16,25 kg	487.000
12	<i>Öfa zo'e</i>	The distance between the fourth unit and the fifth unit is sambu kundri	<i>Feleöfa kundri</i>	17,5 kg	525.000
13	<i>Öfa zo'e amatona</i>	The distance between the fifth unit and the sixth unit is sambua kundri	<i>Felelima kundri</i>	18,75 kg	562.500
14	<i>Otu öri (dua farajo'e)</i>	The distance between the sixth unit and the seventh unit is sambua kundri	<i>Feleönö kundri</i>	20 kg	600.000
15	<i>Dua alisi</i>	The distance between the seventh unit and the eighth unit is sambua kundri	<i>Dua wulu kundri</i>	25 kg	750.000
16	<i>Telu alisi</i>	The distance between the eighth unit and the ninth unit is öfa kundri	<i>Dua wulu awalu kundri</i>	35 kg	1.105.000
17	<i>Öfa alisi</i>	The distance between the ninth unit and the tenth unit is walu kundri	<i>Tölu nafulu arua kundri</i>	40 kg	1.200.000
18	<i>Lima alisi</i>	The distance between the tenth unit with the eleventh is öfa kundri	<i>Öfa wulu kundri</i>	50 kg	1.500.000
19	<i>Önöalisi (sajilo)</i>	The distance between the eleventh and the twelfth units is walu kundri	<i>Öfa wulu awalu kundri</i>	60 kg	1.800.000
20	<i>Fitu alisi</i>	The distance between the twelfth unit and the thirteenth unit is walu kundri	<i>Lima wulu a'önö kundri</i>	70 kg	2.100.000
21	<i>Walu alisi</i>	The distance between the thirteenth unit and the fourteenth unit is walu kundri	<i>Önö nafulu a'öfa kundri</i>	80 kg	2.400.000

Source: Research results are in accordance with current prices

From the table above it can be seen that the transaction system of the ancestors of the people of South Nias at the time when they carried out the sale and purchase interactions that were previously carried out by barter had changed when the afore was used as a measurement tool in the transaction. It is estimated that in the megalithic era, the Nias community had used the afore. Transactions often occur during owasa (parties) and require hundreds of pigs. Process payments using grain or any other goods they have for exchange later. The price in the above table starts with the size of two zo'e in the customary process and mböwö, giving something to the guest will be calculated at least and as low as two zo'e. mBöwö that is served to family guests, this measure when calculated in economic value is

very large in value. Not the price, but it will give a deep meaning when it is served to guests. The greater the afore size that is served, the greater the mbowo given and will make both the guest and host satisfied. Through this mböwö we can see the size of adat in the community. This measure also becomes the standard in determining the price of other goods. Afore is a measuring tool to assess an item to be exchanged with other goods so that it will provide benefits between sellers and buyers.

Calculating the exchange of values and prices of goods, the people of South Nias use rice grain. The size of the number of rice grains, i.e. one zo'e of grain (sambua jo'e fakhe), can be sorted like the grain size in table 2 below.

**Table 2.** Grain order and grain unit

No	Measuring Measure Unit	Information	Afore
1	<i>Famoto</i>	<i>2 teko</i>	
2	<i>Matona dumbva</i>	<i>4 teko</i>	
3	<i>Sadumbva</i>	<i>8 teko</i>	
4	<i>Matona urö</i>	<i>3 dumbva</i>	
5	<i>Sagurö</i>	<i>6 dumbva</i>	
6	<i>Matona zo'e</i>	<i>15 dumbva</i>	
7	<i>Sazo'e</i>	<i>30 dumbva</i>	1 zo'e

Source: Research results

The following is an explanation of price equality by using grain, that is, if the size of a pig is two zo'e mo'alogo bawi, the price is the same as using as much grain as sazo'e fakhe or 30 dzumba of grain. From the explanation above, it is clear that the Nias people had already known the calculations and numbers from 0-9 as well as the mathematical numbers that are currently in force, both with numbers and arithmetic operations used, only distinguished from the language used, namely Nias language South.

#### 4. Discussion

The use of afore measuring instruments as local knowledge is a traditional calculation tool for the people of South Nias at the time of the transaction, the exchange value transaction of an item and as a cultural value in adat called bowo. This measurement can be equated with modern measuring instruments, this is when viewed in afore measure that when the standard size is used for economic value, the exchange value of an item and customary value with a minimum pig size and 2 (two) zo'e. If it is less than two zo'e, this usually does not need to be measured because the standard used to be served is böwö or gift (sumane) for guests, the standard is two zo'e. It means that the habits of the people of South Nias when welcoming guests, they entertain with special food consisting of rice and pork dishes. The rice and pork given are cut according to the bosi (stages) that have been determined, and the standard size of pork used at least 2 (two) zo'e should not be less but can be more. So to find out the bosi (stages) afore measuring devices are needed to measure the size and weight of pigs and can be used as a dumbva rice measurement tool instead if there is no afore. The size of the pig has been estimated and is subsequently estimated by the size of a number of dumbvae.

The calculation of afore measuring instrument it does not meet the possibility of weaknesses in the calculation process. Suherman, et al, (2003: 16) state that "in the early stages of mathematics shaped from human experience in the world empirically, because mathematics as human activity then the experience is processed in the world of ratios, processed in analysis and synthesis with reasoning in cognitive structures" [9]. Laiya (2017) suggested that "mathematics is not only in mathematical calculations but can be related to the habits of a society" [10]. In this condition the wealth and quality of a society that the people of South Nias have reached a good level of civilization by having traditional measurement tools as local knowledge that can be used in transactions. Transactions that occur show that humans are economic creatures capable of counting and surviving through transactions that take place during human life. Sartini (2004) also emphasized that the wealth of local wisdom became fertile enough land to be dug up, discussed and analyzed given that cultural development factors occurred so rapidly [11].

"Local cultural values are the first values known by an individual that exists or is born from the cultural community. What has become part of the community, should be well preserved, that is by using it again not ignoring it (resurrect). Maintenance and even more so in the development of local culture, namely Nias culture has become an element of national education, Sarumaha [12] Local knowledge as technology and innovation. In addition, this study even though the study was afore, but it has a relationship to the calculation with the dumbva measuring instrument. Dumbva is a measurement tool for the people of South Nias in measuring rice volume. Because one zo'e afore is equal to 8 kudri, meaning one zo'e is equal to 30 dumbva.

## 5. Conclusion

The conclusion in this study is that first, the afore measuring instrument is a traditional measuring instrument from the knowledge of the Nias people, especially the people of South Nias to measure the weight of pigs in units (kg) in determining prices. This measure is known as the afore size, namely two zo'e, two zo'e amatona, tölu naso'e, tölu naso'e amatona, öfa zo'e, öfa zo'e amatona, otu öri, two allisi, tölu alisi, öfa alisi, five alisi, önö alisi, fitu alisi, walu alisi. Second, the afore measuring instrument of the people of South Nias is local knowledge that can be calculated through arithmetic operations, namely the operations of addition, subtraction, multiplication and division. Appropriate and can be paired mathematically. This shows that the people of South Nias have a source of cultural knowledge as local knowledge and local wisdom and technology that should be preserved. Suggestions expected in this study, namely 1) Afore measuring instrument should be used as a measurement tool to determine the weight and price of an item so that the value of local wisdom can be maintained and preserved for generations to come. 2) The suitability of afore measuring instruments with modern measuring instruments can be implemented in everyday life because it is suitable for modern mathematical calculations. And, afore measuring devices can be used as a medium of learning in solving problems to students so that they will continue to be studied by future generations as local knowledge that is timeless.

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