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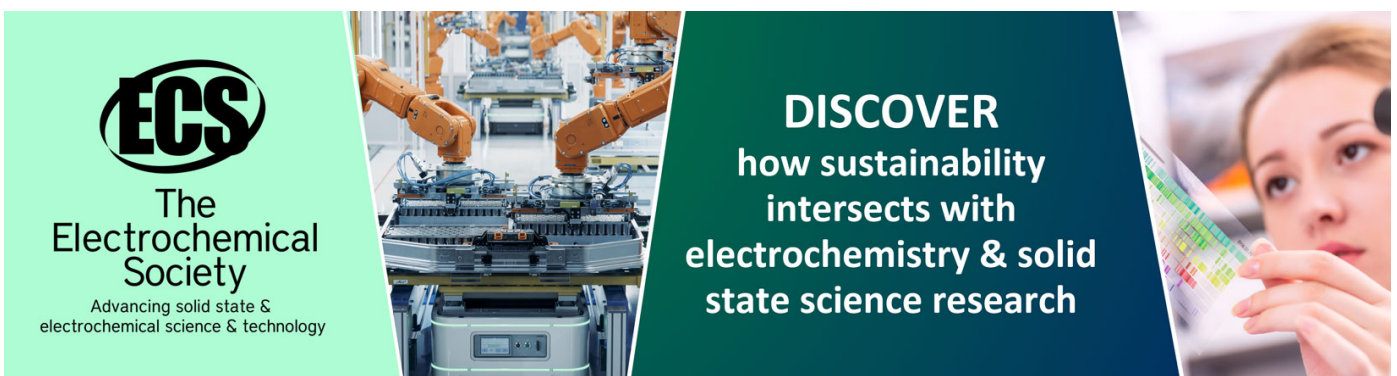
## Knowledge transfer on sustainable bamboo forest management through social capital approach in Ngada Regency, Indonesia

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# Knowledge transfer on sustainable bamboo forest management through social capital approach in Ngada Regency, Indonesia

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**Abstract.** Bamboo is known as multi-purposes plants and currently, has potentially used as wood substitution products. The demand for bamboo from industrial sector is even higher. Although many countries have practiced bamboo cultivation, in Indonesia Bamboo tends to be allowed to grow naturally and still lack of treatment. The threat of unsustainable exploitation can cause the decreasing of bamboo productivity and lead to its scarcity. The sustainable bamboo forest management system then emerged as a solution. But the knowledge of such system has not been transmitted massively among bamboo farmers and owners. This paper will discuss the transfer of knowledge on sustainable bamboo forest management using social capital as an approach. This paper uses data from research project conducted in 2018 to 2019, which is located in Ngada Regency, East Nusa Tenggara, Indonesia. The results indicated that social capitals such as trust, organizations, social networks, and norms or rules are embedded with social institutions that exist among community. This research shows that *Sa'o* and BUMDes could be the most potential media as a means on transferring knowledge about sustainable bamboo forest systems. Both can be used as an entry point for any actors to run a small-scale bamboo industry development program. However, there are some potential obstacles could be occurred during the process of knowledge transfer, such as in-group feeling among indigenous community, the assumption that bamboo is a social good, not an economic good, do not concerned with the commercialization of bamboo, the complexity of inheritance law in the customary (*adat*) system, and the involvement of *adat* elites in political practices related local elections.

## 1. Introduction

It is undeniable that bamboo known as a multi-purpose plant and currently has potential used as a wood substitution product. Through the modern utilization of bamboo with higher value-added opportunities, it will increase the community income. This has been proven in China where bamboo plays an important role in the development of industry in rural areas in Anji City, Zhejiang Province [1]. While globally, the demand for bamboo from industry players is increasing [2]. This phenomenon



has attracted industrial actors who want to boost the bamboo supply for the market. The bamboo engineering for industrial needs has been implemented in several countries such as in China, India, Vietnam, and the US [3,4]. Specifically, for example, there are industries that use bamboo as raw materials for constructions [2], furniture [5], foods [6], and even medicines [6-8].

Many countries have practiced bamboo cultivation such as in India dan China [9,10]. Despite this, bamboo cultivation is still rarely implemented in many regions in Indonesia. In this country, bamboo tends to be allowed to grow naturally and still lack of treatment. However, it does not mean that people in Indonesia are not familiar with bamboo. Studies show that in Java and Bali, for example, people know about bamboo and can differentiate bamboo species through traditional name [12]. They use bamboo as raw material for building houses, creating tools and appliances, as well as musical instruments [11,12]. Some parts of bamboo also could be eaten as an alternative food source [6]. Currently, as the tourism sector grows rapidly in Indonesia, many people create souvenirs using bamboo as its material for selling it to tourists [14].

Start in 2012, the Environmental Bamboo Foundation (EBF) introduced sustainable bamboo clumps management known as “hutan bambu lestari” (HBL) (sustainable bamboo forestry/SBF) system. Nevertheless, the practice of sustainable bamboo forestry (SBF) system has not much yet been applied among rural communities in Indonesia, even though there were supports from the government and private sectors to introduce these techniques. For example, such has been introduced to bamboo farmers in Ngada District where bamboo (*Dendrocalamanus asper*) forest areas are massive. However, the knowledge of sustainable forest management techniques is still limited distributed and has not been transferred adequately to the bamboo farmers and owners. At the end, it is likely that the problem would have appeared if the demand of bamboo for industry grows up but not simultaneously followed by the massive process of knowledge transfer among bamboo farmers and owners. This could potentially cause the decreasing of bamboo stocks. It also can lead to its scarcity on community bamboo forest areas. The extinction of bamboo is more likely to happen if this problem cannot be solved.

Knowledge transfer on SBFM is crucial to be conducted. However, it needs an appropriate strategy to do so. Social capital among the community, such as trust, social networks, organizations, and norms [15], that is embedded in social institutions [16] then could be used as an alternative approach to begin the process of knowledge transfer. Although there is still lack of literature regarding the use of social capital in introducing SBFM systems, such approach has commonly been used in, for example, transforming knowledge on agroforestry systems among farmers in many countries [16,17], particularly in Indonesia [19]. Therefore, this paper aims to discuss how the knowledge transfer on sustainable bamboo forest management would be processed if social capital were taken as an approach.

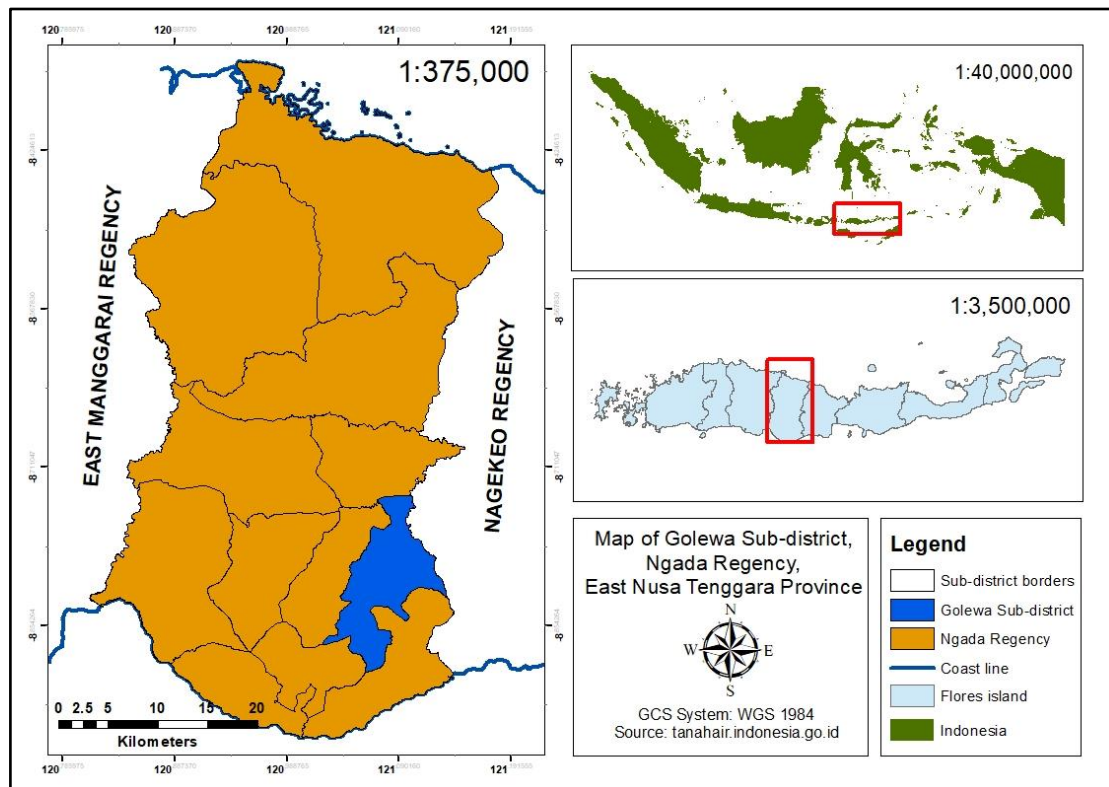
## 2. Materials and Methods

### 2.1. Location

The study was conducted in 2018 to 2019 and it was located in Golewa Sub-District, Ngada Regency, East Nusa Tenggara Province, Indonesia. Ngada Regency is a district located at the Center of Flores Island. It has Bajawa as its district capital. It has 1,776.72 km<sup>2</sup> of land area and 708.64 km<sup>2</sup> of the waters area. The length of the beach is 102.318 km with the width of the North Coast waters 381.58 km<sup>2</sup> with the coast length 58.168 km, the area of the South Coast waters 327.06 km<sup>2</sup> with the coast length 44.15 km [20].

Geographically, Ngada Regency located in between 8°20'24.28"-8°57'28.39" South Latitude and 120°48"-121°11" East Longitude coordinates. It has geographical boundaries such as in the eastern area bordering with Nagekeo Regency, while in the western part with East Manggarai Regency, in the Northern area bordering the Flores Sea and in the Southern part bordering the Savu Sea. The population in Ngada Regency is 162,299 and it has three major tribes, such as Nagekeo, Bajawa, and Riung.

In terms of bamboo, Ngada Regency is highly potential to be developed on it. Bamboo in Ngada is dominated by *bambu betung* species (*Dendrocalamus asper*). This species grows well in Ngada as it is suitable for local climatic and geographical conditions. There is also strong connection between bamboo and local culture. Ngada people have customary laws to protect bamboo from any threat. It is called as *waja* and *ri'i*. Since 2012, there has been a laminated bamboo industry in Ngada Regency, which is still operating up to now. It has bamboo supply from the bamboo forest surround Golewa Sub-District. The bamboo industry cooperates with NGOs in assisting the bamboo farmers and owners in the supply of their industrial materials.



**Figure 1.** Map of research location in Ngada Regency

## 2.2. Tools and materials

This study used tools such as voice recorders and notebooks for recording interviews; visual aids tools such as flipchart papers, pens and markers for assisting participative rural appraisals and focused group discussions; as well as socio-economic tools such as questionnaires and other documentation equipment e.g. digital cameras, smartphones, and computers. Meanwhile, materials that was used for this study were informants, respondents, and other objects e.g. artifacts, momentums, and socio-cultural events that fit with the study objectives and appeared the during data collection.

## 2.3. Procedures

This study combined quantitative and qualitative approaches in order to target the research objective. There four methods of data collection processed as follow.

First was socio-economic survey. This method was conducted in 2018 and 2019 towards ten purposed villages in Golewa Sub-District, Ngada Regency, they were Village Were I, Were IV, Dadawea, Radabata, Ratogesa, Ulubelu, Wajamala, Langagedha, Rakateda II, dan Sarasedu I. The 111 respondents (N=111) were interviewed as samplings using semi-structured questions written on questionnaire sheets. However, of those questions that were asked to the respondents only some

relevant topics would be discussed within the paper, such as the asset of social institutions among communities.

Second was ethnographic interview. This method was used to obtain detailed and in-depth information related to social and cultural realities [21]. In this case, this tool was employed to generate the information related to the construction of social capital on SBFM in Ngada. The interviews were conducted in July to August 2019 towards 8 key informants. The informants were selected with some criteria such as mastering knowledge of bamboo and its social, culture, and philosophical dimensions. The snowball technique was employed to determining the key informants. The open interview techniques were used with focusing on the study of customary dominance in bamboo forest management.

Third was focused group discussion (FGD). This method invited stakeholders to brainstorm about bamboo forest management, its problems as well as the possible solutions [21,22]. Two FGDs were done in 2018. The first was in Village Were I, in which focusing on the traditional bamboo management system. About 20 people attended this FGD with an equal gender proportion. The second FGD was in Village Ratogesa, which attended by 18 young people due to its stressing on the role of young people and its prospects on bamboo management. Meanwhile, another FGD was conducted in 2019 where by more than 30 villagers attended this meeting. Village Radabata was selected purposively as the host for the meeting. This FGD was focusing on identifying the role of BUMDes (village owned enterprises) and its potentials on supporting market of bamboo.

Fourth was participatory rural appraisal (PRA) [24]. This method was done towards two Sa'o (the smallest unit of traditional family system in Ngada) namely Sa'o Susuteme in Village Dadawea and Sa'o Gedhe Ana in Village Waia. About 25 people attended the PRA for each Sa'o. Those PRA were held in the first and at the end of March 2019. This method was aimed to identify the traditional bamboo forest management system among local communities.

#### *2.4. Data analysis*

Quantitative data from socio-economic survey were statistically analyzed using frequency tables and presented in the narrative manner. Qualitative data from ethnographic interviews, FGD and PRA were analyzed using thematic analysis technique which relied on the needs of this study, such as identification of social capital and social institutions, as well as potential barriers to knowledge transfer through social capital among communities. Those primary data were triangulated by dialogue with the literature gathered from scientific journals and popular writings. The final results of the overall data analysis were presented in a descriptive narrative form.

### **3. Social Capital: An Invisible Power Inside the Social Institutions**

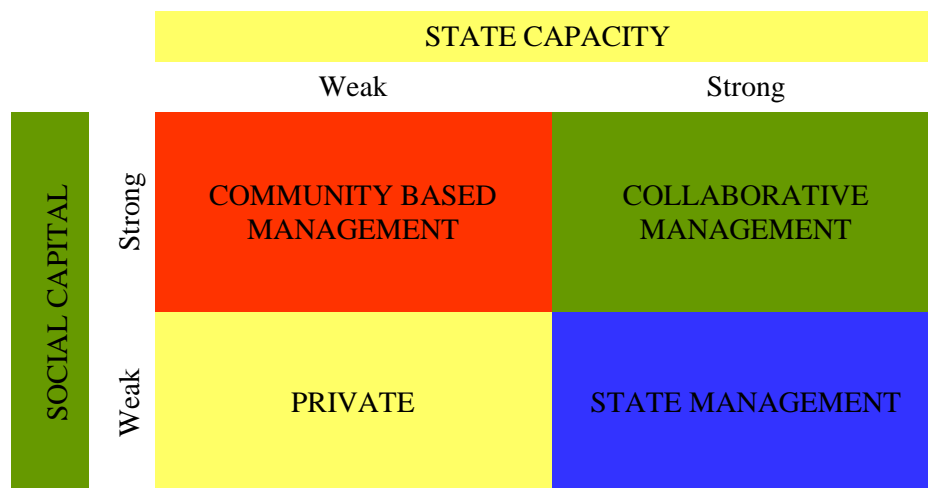
Lyda Judson Hanifan was the person who first used the term social capital. In his writing, *The Rural School Community Center*, the words social capital appeared when there was an explanation of the community's ability to overcome various problems independently [25]. The word capital refers to something that is owned or an asset that can make the community grow properly. Social capital can be in the form of good will, friendship, mutual sympathy, and social relations and cooperation between individuals and families that form a social group [25].

Social capital can be an overall effort related to the mastery of relationships between groups in an institutional network that is based on knowing and recognizing each other [26]. Social capital is determined by social structure and access to that structure. The social structure consists of organizations and rules that govern its members [15]. There are three pillars supporting social capital, namely trust, access of information, and norms [15]. Moreover, social capital is also can be seen as a feature of social organizations consisting of networks, norms, trusts that facilitate coordination and collaboration among social groups' members in order to reach common benefits [27]. Therefore, social capital is basically a potential asset that owned by the social groups, such as organizations, institutions, communities, or societies, which is commonly used for overcoming common issues and

reaching common goals. There are important elements that facilitate social groups activities, such as trust, networks, and norms.

In Indonesia, the discourse on social capital as a hidden power possessed by social groups has made a hot topic discussed among social scientists. For instance, there was a finding from social capital studies in Indonesia, which said that the strong social capital in the community is determined by effective communication and is colored by the similarity of concepts, competencies, connections, credibility as well as care among the group members [28]. While in the forestry sector, it was proven that social capital in Jambi and West Sumatera could encourage forest sustainability. This finding was contrast to the economic benefits of forests that lead to forest destruction [29]. Furthermore, there was a study about social capital bonding, which is an innovation based on traditional concept of social capital, that can be a power in encouraging the adaptation capacity of rural communities when carrying out infrastructure development in East Java [30].

Meanwhile, in the institutional perspective, social capital is perceived as an entity that is integrated with the organization or groups in society. Social capital has a connection with the capacity of the state in natural resource management [16]. Figure 2 shows that the private institutional model is the weakest in terms of social capital and state capacity. It is normally occurred with private companies. Whereas state management institutions have a strong state capacity but do not put social capital out as its priority. It makes its position then becomes weak. This is commonly happened in government institutions or BUMDes. On the other hand, strong social capital and weak state domination lie in the community-based management institutional model. This model is commonly found in natural resource management systems in Indonesia. Lastly, the most ideal institutional model is so called collaborative management. In this model, social capital and state capacity are equally strong in sustaining the institutional superstructure and infrastructure. Partnerships in social forestry schemes in Indonesia may be a good example for this model.



**Figure 2.** Natural resource management options based on state capacity and social capital [16]

## 4. Results and Discussions

### 4.1. Identifying social capital in Ngada

The existence of social capital in a society cannot be seen explicitly. However, it will be more easily perceived through the institutions that exist in society, whether formal and informal [16]. Identification of social capital in Ngada Regency was carried out through the existing social institutions that exist in the community.

**Table 1.** Social institutions in Golewa, Ngada

No.	Institutions	Answers	HBL- patrilineal	HBL- matrilineal	Non-SBFM	Total	%
	Desa		Were 1, Were 4	Dadawea, Radabata, Ratogesa, Ulubelu, Wajamala	Langagedha, Rakateda II, Sarasedu I		
1	Adat	Yes	27	47	17	91	81.98
		No	2	10	8	20	18.02
		Total	29	57	25	111	
2	Farmers	Yes	13	35	16	64	57.66
		No	16	22	9	47	42.34
		Total	29	57	25	111	
3	Fisheries	Yes	0	0	0	0	-
		No	29	57	25	111	100.00
		Total	29	57	25	111	
4	Water users	Yes	11	10	0	21	18.92
		No	18	47	25	90	81.08
		Total	29	57	25	111	
5	Religious	Yes	29	57	25	111	100.00
		No	0	0	0	0	-
		Total	29	57	25	111	
6	Ethnicities	Yes	1	3	1	5	4.50
	(Place of origin)	No	28	54	24	106	95.50
		Total	29	57	25	111	
7	Women/Arisan	Yes	24	51	20	95	85.59
		No	5	6	5	16	14.41
		Total	29	57	25	111	
8	Young people	Yes	11	20	12	43	38.74
		No	18	37	13	68	61.26
		Total	29	57	25	111	
9	Cooperation (gotong royong)	Yes	19	25	14	58	52.25
		No	10	32	11	53	47.75
		Total	29	57	25	111	

Source. Primary data of socio-economic survey 2018-2019

Table 1 shows that of the nine social institutions that were asked to respondents, only fisherman groups were not available. It made sense as the location of the Golewa Sub-District was in mountainous areas, which was fertile. Another reason was because the sample villages were also located in the mountainous region. Of the nine social institutions identified on survey, religious groups and indigenous (adat) groups played a very dominant role in people's lives. Meanwhile, the results of in-depth interviews, FGDs, and PRA showed that, generally, social institutions in the community consisted of formal and informal institutions as seen in table 2.

**Table 2.** Formal and informal institutions in Golewa, Ngada

Formal institutions	Informal institutions
BUMDes	Indigenous groups/Adat
Koperasi	Religious Groups
Farmer Groups	Young People
Village Government	Women/Arisan

Source: Primary data of ethnographic interviews, FGD, and PRA, 2018-2019

The forms of formal institutions that have been identified in Ngada District and have relevance to sustainable bamboo management were BUMDes, Koperasi, Farmer Groups, and Village Governments. BUMDes is a village government-owned business institution that aims as a source of income for the village government. This institution is established based on government regulations.

BUMDes venture capital comes from the government as well. While, Koperasi is alternative institutions besides banks and moneylenders, which is operating in the countryside. The main function of Koperasi is generally as a savings and loan institution. Communities borrow money from Koperasi mostly to have business capital, finance children's schooling, and traditional party events purposes. Communities re-pay Koperasi loans by paying in installments from the profits of their business or harvests. On the other hand, farmer groups were apparently less popular in the Golewa. Many farmer groups have been formed but they were not working. The coffee farmer group was the most active group in the study site. Farmer groups are a place for its members to share knowledge, information, and control the harvest price by middlemen. Finally, the last institution is the village government. This is the most formal institution that exists at the village level. This institution is an extension of the central government. In addition to carrying out administrative functions of government, the village government is the front line for succeeding government development programs. The effectiveness of village government depends on the quality of the leaders and apparatus in it.

While informal institutions that have been identified and have a relevance to sustainable bamboo management were adat, religious groups, young people, and women/arisan. The adat institution was the most influential informal organizations in Ngada Regency. The results of the ethnographic interview explained, since the initial phase of its formation, the Ngada community has been using a tribal social system to regulate their living governance. The smallest unit of the tribe as a social system was so called as Sa'o. Sa'o managed several family heads who were members in one tribe. The regulation included a matter of kinship law. This kinship law would ultimately determine inheritance law and land tenure law as well as economic regulation.

In Village Were, most of the tribes applied a patrilineal system. Men played an important role in making decisions and especially about accepting inheritance. Whereas in other regions, such as Villages Radabata, Dadawea, Ratogesa and other lower regions, they had tendency to adhere to matrilineal kinship. In the matrilineal system mothers had the right to make decisions in a negotiation in Sa'o. Women also had the right to occupy Sa'o's traditional house as a place to live. However, in reality these women still sought the opinions and considerations of adult men in Sa'o before deciding on a matter. For example, it occurred when women called for decision in terms of determining the use of bamboo, land use for planting, types of commodities to be planted.

Sa'o operates a prohibition system to avoid ecosystem damage and crop failure. *Waja* and *rii* customary law are clear examples for this prohibition system. *Waja* is basically a prohibition for not doing anything in a location (garden) in a certain period of time. This purposed to restore the condition of the damaged ecosystem so that it can be reused in the future. While *rii* is a traditional ritual to operate a ban on taking the harvest of certain commodities where the Sa'o will use the commodity for certain purposes. The *rii* application also has a certain period of time to protect the yield to be harvested. Therefore, the harvest can be maximized as expected.

Relations in between Sa'o as well as in between tribes could be a powerful power for indigenous people in Ngada. The social relations can be seen clearly, for example when the traditional houses of Sa'o are being repaired. The depth of the relationship is shown by the presence of each tribe representatives and other Sa'o groups to the traditional ceremony. They usually bring rice, moke (palm wine), and livestock (buffalo, pigs, chickens) to give to the Sa'o family who are repairing their house. All those gifts then were cooked and then to eat together.

Next is the religious group. The majority of Ngada people embrace Catholicism so that the existing religious social groups are generally organized by and have affiliation with Catholic Church. For example, the Catholic Base Group (Kelompok Umat Basis-KUB) whose members are also members of the Catholic Churches. In addition to the religious activities, KUB also carries out social activities such as choir training, village cleansing, and early childhood education. The influence of the church can also be seen in youth. The role of youth is organized by the Catholic Church institution, which is named as the Catholic Youth (Orang Muda Katolik - OMK). Almost all young people in the Catholic Church in Golewa are OMK members. OMK activities are generally in the fields of youth and sports, such as organizing volleyball competitions, football, choirs, and performing arts. OMK also facilitates



training and sharing knowledge about entrepreneurship independently. Lastly, another informal group is arisan. This group is dominated by mothers and commonly formed in the neighborhood level. Arisan is not just a matter of who gets money for social gathering, but rather it has substantial matters on the communality and communication between members regarding the actual social problems being faced together.

#### 4.2. *The potential institutions with powerful social capital*

Based on the results of social capital identification, it is known that there are two social institutions that have the potential to be utilized in order to support the transfer of knowledge on SBFM, namely Sa'o, which is an informal institution and BUMDes originating from formal institutions. The characteristics of those institutions are explained in Table 3.

**Table 3.** The potential of social capital to support SBFM

Community based management (Sa'o)	State management (BUMDes)
1. Trust is high	1. Trust is low (if leader were charismatic, trust could be high)
2. Bottom up	2. Top down
3. Obedience to leaders/patrimonial is high	3. Obedience to leaders/patrimonial is low (If leader were charismatic, this obedience could be high)
4. Have a management system at the Sa'o level (extended family). It has impacts on regulating roles and functions in smaller level (nuclear family).	4. Bureaucratic management system (formal organizational structure)
5. A high work ethic based on communal interest	5. Project based work ethic
6. Minimum of vested/political interest	6. Strong vested/political interest
7. Traditional (adat) legal base (waja/rii)	7. Government legal based (village decrees)
8. Traditional lobby approach (socio-cultural trust building) through ritual, traditional ceremony, live-in, and sustainable accompaniment.	8. Political lobby approach and bureaucratic regulations.
e.g. Sa'o Negu Wulla in Village Dadawea	e.g. BUMDes in Village Radabata

##### 4.2.1. Sa'o

The most powerful and potential social capital in informal institution was reflected in Sa'o. This institution undoubtedly could be categorized as the community-based management model because it has strong social capital and weak state domination [16]. Sa'o is the smallest unit of tribal social system adopted by the Ngada people. Social cohesion in Sa'o is constructed through the elements of social capital, such as high trust. Trust grows from the intensive interactions that last for a very long time [28]. This certainly has been carried out since the ancestors of the Ngada people traveled to the foot of Mount Inerie in Flores from Rear Yunnan in China, as explained in ethnographic interview. The similarity of fate, history, ancestors and forged through the long journey of living together as a group makes trust naturally flourish among Sa'o members. It leads to create a patrimonial leadership in Sa'o, which is hereditary based on the obedience of its members. The leader of Sa'o will be customarily determined according to his descendant line.

Initiations at Sa'o appeared in a bottom up manner. The close relationship and the high trust among members made up each individual problem become a common problem. Therefore, to determine a solution it is often to held a deliberated meeting between fellow members of Sa'o. Patrimonialism in the Sa'o makes leadership run stable. The decision was taken after listening to input and information from traditional deliberated meeting. That decision was always firmly determined, undoubted, and implemented consistently by the leader of Sa'o and all members.

Sa'o also has a fairly good household management system. Sa'o is an extended family [31] and has many communal assets, which were jointly managed such as land, houses, gardens, or human

resources. The amount of the assets is regulated in the division of tasks that is appointed to each family leader in Sa'o (nuclear family) [31]. The division of tasks did not conduct authoritatively by the leader Sa'o but it was based on deliberated meeting. It aimed to avoid misunderstandings and to ensure that each Sa'o member accepted the decisions. Due to those processes, the predetermined work was usually carried out happily and fostered a positive work ethic that encouraged Sa'o members.

Sa'o is an informal social institution based on adat (traditional system) and it is non-political. Therefore, the adat elites must not put their political interests into Sa'o. It aims to maintain the trust, norms and rules of adat, as well as social cohesion that have long been developed. On the other hand, Sa'o is referring itself towards customary law. For example, there were customary law of *waja* and *rii*, which are applied for protecting natural resource. However, according to the PRA, currently, *waja* and *rii* need to be formally strengthened if they want to be implemented in today's society. Strengthening the role of customary law in village level could be processed throughout the village regulations [32]. For example, making village regulations (Perdes) regarding *waja* or *rii* in villages that has wide scale of bamboo forest

Adat lobbying is the approach that is importantly needed when put Sa'o as an entry point for the knowledge transfer activities, such as promoting the thousand-bamboo village program or SBFM knowledge. Building social and cultural trust between program implementers and the Sa'o community could be a part of lobbying. The lobbying can be also conducted through traditional rituals, traditional ceremonies, staying periodically in a time that is not short (live-in), and building a network with Sa'o members or its representative in order to carry out ongoing assistance. The possible output of the succeeded lobbying could produce the best model of institution, which is a collaborative management model [16].

#### 4.2.2. BUMDes

In contrast, BUMDes could be categorized as part of state management institutions [16]. It is because BUMDes has a strong state capacity but it does not put social capital out as its priority. However, it is still possible to select BUMDes as formal institution, which is a potential media to support knowledge transfer on SBFM. This institution is often touted as the most possible entrance to transfer knowledge about SBFM to the community. It is because BUMDes has a strong legal basis and financial resources, which is certainty. Human resources at BUMDes can also be appointed at any time to work based on a decree or bylaws. Financially, the BUMDes funding source is already available, for example there is village funds that could be used as financial support for BUMDes.

The distribution of tasks is carried out based on formal documents. The work approach is BUMDes environment is top-down. It is often that the head of BUMDes takes decisions unilaterally without any deliberation processes. This makes BUMD bureaucratic and causes low obedience to leaders. The work ethic that grows is also low. Different situations will occur if the BUMDes is led by person who has social influence, whether inside or outside the organization. That influence can certainly change the work ethic, obedience, and trust in its members to be a positive direction.

BUMDes is also vulnerable to vested interests and political interests because of its existence that cannot be separated from village government institutions. The local democratic events such as regional general election to choose local leader e.g. governor, regent, major, or village head, known as *pilkada*, will strongly affect the performance of BUMDes. The will to power instinct of each village head or local political elites will make it possible to threaten the existence of BUMDes in carrying out their duties and functions.

An example for previous explanation was occurred in BUMDes Radabata. Although the foundation of the formal legal superstructure was strong and the infrastructure of funding and human resources were adequate, in practice, the implementation was not able to last long and not sustainable. Out of the six BUMDes institutions, only one was running with not optimal condition. The BUMDes of the brick plant was a clear example of which the state capacity did not always guarantee the sustainability of programs or projects. Conversely, potential social capital that is built from the bottom is very important needed in moving the community in the business sector.

However, there is still possible and necessary approach if want to use BUMDes as the entry point for applying knowledge transfer on SBFM towards community. It needs a strong political lobbying supported by formal and bureaucratic regulations in order to ensure that all plans would be run as expected.

#### *4.3. Potential issues in knowledge transfer on SBFM*

Although the two institutions are very potential to be an option for knowledge transfer processes on SBFM, it does not mean that there will be no obstacles. There are some potential obstacles that might be encountered in the process of knowledge transfer on SBFM.

##### *4.3.1. In-group attitude*

Although the survey shows that public is open to outsiders, nevertheless the attitude of in-group feeling still cannot be eliminated. In-group feeling is an attitude that is inherent in traditional society [33]. By neglecting this attitude, it will potentially ignite resistance local people to foreign people. The process of transferring knowledge about SBFM will be difficult and can even fail if there are problems in the community.

##### *4.3.2. Bamboo is a social goods, not economic goods*

For local people, Bamboo is not a priority commodity for meeting economic needs. The fertile and cold in Golewa region makes local people choose the plantation sector (coffee, cloves, corn, sugar palm) and agriculture (ginger, pumpkin, and vegetables) as the main commodity for their income. Instead, bamboo is used in subsistent manner by almost all of its owners, both by the Sa'o community and individuals. Although there are some people who claim to have sold it, but the buyer usually is their own neighbor. And they sold it not for a large-scale industry that consistently sustainable. This will be a limiting factor for the knowledge transfer process on SBFM.

##### *4.3.3. Do not care about the commercialization of bamboo*

The player of bamboo industry in Ngada is only PT Indo Bambu. Although they have implemented SBFM, the SBFM's knowledge and practice remains in the company workers. The bamboo owners only signing contract letter in order to give permit for company to manage their bamboos using SBFM system. Bamboo owners also sell their bamboo pieces. Meanwhile, through their workers, the company carries out the SBFM in the bamboo forest areas, which belong to bamboo owners. The attitude, which merely wanting to earn money easily (without work), will certainly hamper the process of knowledge transfer on SBFM.

##### *4.3.4. The complexity of inheritance law in customary systems*

Most of the young people reluctant to be involved in managing bamboo with their family members. The reason was because they realized that they would not benefit the rights to sell bamboo. The youths (teenagers) who have participated in bamboo management in their family (both extended and nuclear family) claimed that they were only seconded without receiving a share of bamboo sales profits. Youth understanding of communal and private land rules and inheritance law is also poor. Therefore, young people tend to have a negative perception of bamboo management system, which operated in their family, such as bamboo is the business of the elderly, does not make money for youth, and is complicated to divide the land (inheritance) that has bamboo in it.

##### *4.3.5. The traditional elite involvement in political practices*

The rise of political processes such as general election results in fragmented village communities. This political fragmentation has the potential to cause social and cultural fragmentation in society. Local elites who need votes will use the strategy to enter Sa'o and influence citizens to vote themselves. This is a significant latent challenge for facilitators of knowledge transfer on SBFM who will do their job. Furthermore, it is also potentially disrupting and even frustrating the efforts to transfer knowledge on SBFM. This socio-cultural fragmentation has potential for conflict outbrake.

## 5. Conclusion

This study concludes that social capital in the Ngada community is inherent in the existence of social organizations. Sa'o and BUMDes are two potential organizations to become strategic options as media for knowledge transfer on SBFM. However, some obstacles are still likely to arise when the two options are chosen, such as in-group feeling, bamboo is a social goods and not an economic goods, do not concerned with the commercialization of bamboo, the complexity of inheritance law in customary systems, and traditional elite involvement in political practices.

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