



Fieldwork Notes

Gender and Social Assessment (Study of Micro Hydro Power Plants Development based on Local Natural Resources in Mamasa West Sulawesi)

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On August 2013, researcher team of IPB who had been doing pre feasibility study of Green Prosperity Program, they were visited a Mamasa District, West Sulawesi Province². Gender and Social Assessment (GSA) researchers in this research are: Dr. Titik Sumarti, Dr. Sofyan Sjaif and Muhammad Syafar, M.Kesos. The journey from Bogor City to Mamaju District (West Sulawesi) by aircraft, our destination visit several sub districts of Mamasa by car (Toyota Hilux), they are: Bambang, Mambi, Mamasa, Pana, Sumarorong. We had been going across in the street of Mamasa upper land, which are consist mountains, rivers, forest, agriculture and cascade.

Mamasa district is one district that have rich in natural resources³. Before the Netherlands invaded this area, Mamasa already own its traditional governance system called *Pitu Ulunna Salu*, which means seven rivers as a symbol or name of the seven community leaders in this area⁴. Along with the increase of population in Mamasa and migration of Tana Toraja residents to Limbong Kalua', Tandasau' and Tandalangngan, there were new traditional titles such as Mamasa, Sesena Padang, Osango, Balla, Mala'bo, Banua Sawa, Salu Bue and Messawa. To date, those areas are distributed into 17 sub-districts in Mamasa district. Pana sub-district is the farthest (95 km) sub-district from Mamasa city, the district capital, while the nearest sub district (3 km) from Mamasa city is Tawalian sub-district. This study, especially those related to micro hydro power plants development, were focused in two villages: Batanguru in Sumarorong sub district and Datu Baringan in Pana sub district.

Most of the community Fields were planted with cocoa and coffee to be sold, while for family's subsistence need of food some community

members planted banana, jackfruit, *durian* and others. The community used the land along the river side and hills for paddy field where they planted paddy (local genotypes or superior varieties) twice a year.

The forest area in Mamasa district can be categorized as protected forest (*hutan lindung/ HL*) and limited production forest (*hutan produksi terbatas/ HPT*). Badan Pusat Statistik (2012: p.164) reported that the forest area at Mamasa district was 198.873 Ha, consisted of protected forest (76%) and limited production forest (24%). The landscape in the study site was formed as a result of dynamic interactions between sustainable natural resource management (forest and water) and population growth followed by the increase in household economic needs.

Based on the above brief explanation, the GSA team had identified existing problems that potentially show the real economic development dynamic in the community and the impact of micro hydro power plant development to the community.

Landscape and Social-Culture Structure

The landscape in the study site is characterized with forest, river, and hills (mountain). The study site, in Batanguru and Datu Baringan villages, possessed wide area of forest but limited human resources. The farming activities in the study site were also conducted following the local wisdom rules. Limited access to village economic development was also induced by the poor road infrastructure to the villages. The community used the un-irrigated field and paddy field products for family's subsistence need of food, while coffee and cocoa were sold to fulfil the other living needs (house, cloth, education and health).

There were two main livelihood based on commodity in the study site: (1) family's subsistence need of food from un-irrigated field and paddy field; and (2) commercial livelihood to generate cash (coffee and cocoa). Coffee cultivation was conducted since 1930's, however coffee cultivation was stopped when coffee price decrease and cocoa was more profitable. The community was preferred to cultivate cocoa than coffee. Many community members decided to leave the village and became labor as alternative livelihood.

Paddy field management ability of the community was better than in un-irrigated field, income resulted from paddy field was still insufficient. This was because the community in the study site prefer to plant paddy only once a year. In order to fulfil their needs for food, the community planted

limited number of secondary crops such as cassava, sweet potato, vegetables and taro/yam in the un-irrigated field and paddy field.

In addition, the community was also raising livestock (buffalo, cow, pig and chicken) to support the household economy. Some community members who have paddy field also cultivate cat-fish, goldfish, and tilapias (Nila and Mujair) in a *mina-padi* system to support the food sufficiency. The accessibility to natural resources, agricultural based-livelihood activities, control to forest management, access to electricity, and the impact of Micro hydro project were summarized in Table below.

Description	Study Site	
	Batanguru Village - Sumarorong Sub district	Datu Baringan Village - Pana Sub district
Access to Natural Resources (Source: BPS, 2012)	Protected forest (HL) is 9,37% of the total HL in Mamasa; Plant production forest (HPT) is 5,13% of the total HPT in Mamasa; Rice paddy fields are 870 Ha. Non rice paddy fields are 5.160 Ha (allocated for cocoa (1, 90%) Robusta coffee (5%), Arabica coffee (14,28%), and the rest is food crops, fruits and vegetables)	Protected forest (HL) is 5,34% the total HL in Mamasa; Plant production forest (HPT) is 16,47% of the total HPT in Mamasa; Rice paddy fields are 1.035 Ha. Non Rice paddy fields are 8.535 Ha (allocated for cocoa (10,54%), Robusta coffee (7,03%), Arabica coffee (5,86%) and the rest is food crops, fruits and vegetables)
Control over forest and water management	Based on local knowledge and leadership	Based on local knowledge and village leadership
People's access to electricity	2 (two) Turbines; the 1st turbine is managed by the community, and the other belongs to the individual that can be used by the public. There is a plan to build a 2.5 MW hydroelectric power sourced from the river in the village	1 (one) turbine managed by the community
Impact of micro hydro development Process	Ecologically very potential to be developed as it is still supported by a sustainable forest resources	

Source: data has been re-analyzed (GSA team, 2013)

The preserved natural resources require communities to conserve the forests to maintain the availability of water particularly for economic resources⁵. Water resource management in the village of Batanguru is as follow: There are four hamlets that manage community-based and personal (individual property) micro hydro power plants (turbines)⁶. Turbine I is

managed individually (individual property claims) that is given for free in the hamlet of *Sambungin* and *Ratte*. This turbine was built in 2010 by one the village leaders (LGI). Turbine II is managed by communities in the hamlet of *Kollonglaw*. Turbine III is managed by Minanga rural communities.

In terms of water resources management for the turbines, residents of Datu Baringan obtain electrical service. With the existence of this electricity power, people's understanding about fluctuation of water starts to grow. The reduced water flow implies a decrease in the water energy which then affects the electrical power. Women in the village of Datu Baringan recognize this condition, as indicate: "*..... it is feel that amount of water declines in the dry season*".⁷ One reason is that steep land (slope around 50-75 degrees) is cultivated without teras-sering system and no initiative of reforestation.

Based on the description above, the developments of micro hydro power plants that have been run in the two study sites so far have potential ecologically sustainable impact. Available natural resources are essential to be maintained in order to preserve water to generate electrical energy. People's aspiration to manage turbines collectively reveal that cohesiveness between man and nature can live and preserved synergistically for mutual benefit through empowerment approach, as Narayan (2002) stated that empowerment is the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives. This essential activity can be carried out through mentoring and continuous education in maintaining the natural resources.

Local Wisdom, Indigenous Institution, Formal Institution and Impact of the Micro Hydro Power Plants Development

Value system is embedded system in the community to protect value of social relationships at various levels, social structure and social stratification. If a change occurs in the relationship, it will affect the various levels of the community. Local knowledge can be understood as a system of local knowledge that has been acknowledged, practiced and become a tradition in the community in the management of natural resources and human life (social and economic systems). In the local wisdom, there is recognized regulatory mechanism based on the custom values agreed upon community members. Local knowledge can also be transformed into a

form of institutional or social capital based of community development institutions.

Another local wisdom followed by the citizens is *tak malo mulelleng kayu lan tondok kediari pariane*, which means trees should not be cut down in the village before rice harvest, because the rice plants need water up to harvest. The term is also recognized and practices inherently in social life of the communities of villages Batanguru and Datu Baringan in maintaining their forest.

One unique fact in the study area is the value system of mutual cooperation (*gotong royong*). There are 2 kinds of mutual cooperation, namely *Ma'saro* and *Sibule*. The term *Ma'saro* generally used to help special events such as party/celebration, death as well as cultivating and harvesting rice. While the term *Sibulele* is used for mutual cooperation in the coffee plantations⁸. This agreement is determined on the time frame of mutual aid period. If his working time in the field has not been completed by the agreed time, the field owners need to pay the rest of the time in accordance with the initial agreement.

Another relatively strong local wisdom found in the study area is custom related to land. Inheritance system already exists and a lot of land is still available to be used for the new household. Inheritance pattern emerged when the gardens (cocoa and coffee) as well as the use of rice fields reappear. In the case of inheritance dry fields (trees/area) and rice paddy field, farmers do not distinguish between the first and last child, male and female, all divided equally on their children to be developed to meet the needs of their families. All households practice a mutual cooperation to each other and it forms social institutions in the community-level for both formal and non-formal.

Location of Batanguru Village is relatively more open compared to other three villages. Money is used economically in this village. Institutional cooperation in rice harvesting has been already formed as money wages (called: *Massaro*). The half of production is sold to pay wages which is paid each day. The wages for male is IDR 40,000 and IDR 30,000 for female. Female's wages are cheaper because female is considered to have less energy than men.

The characteristics of institutional activity in the study area are as follow: the institutional of farmer groups is more politically nuanced as it is driven to a political constituency, and women have limited/weak on roles, responsibilities, access to and control in formal institutions. However, the indigenous institution (such as *sima* cooperation) is a social mechanism to improve the welfare of citizens as well as strengthening social cohesion,

both among women and men with women. Therefore, the turbine project will be potentially sustainable if supported by indigenous institutions (see Table below) and citizen welfare and the inherent values of mutual aid-oriented church.

Institution	Study Site	
	Batanguru Village - Sumarorong Sub district	Datu Baringan Village - Pana Sub district
Forming	-	-
Management	Head, Secretary, Treasurer, and operator	Head, Secretary, Treasurer, and operator
Source of assistance	-	-
Access to Energy	-	-
Access to services	Starting from 15.00-07.00 Sunday 24 hours. All residents have used the electricity	Starting from 15.00-07.00 Sunday 24 hours. All residents have used the electricity

Source: data has been re-analyzed (GSA team, 2013)

Gender and Its Role

Mamasa district shows the strength of social integration between traditional institutions (trust), church and village governments. By custom, the residents of Batanguru and Datu Baringan are western Toraja ethnic, but the descents of both villages are from Tana Toraja. Protestant is religion for nearly 100 percent of the residents. In that context, the gender relations, division of roles and responsibilities between male and female still follow the tradition of male primary responsibility of earning a living and doing heavy works, female are responsible for household activities and doing light works when working in the garden or fields. Gender relation is manifested in group cooperation in agricultural activities in the rice paddy or dry land fields, namely in the form of labor exchange or rotating social gathering (male and female).

Division of labor and responsibilities between male and female in economic activities, household and social can be seen in Table below. Residents in the four villages have limited area of home garden which is planted with papaya, sweet potatoes, corn, some coffee plants, clove, patchouli and *seong* (similar to mint leaves). For rice farming and cocoa plantation activities, the cooperation is carried out between male and female, both among family members as well as cooperation with other people (relatives, neighbours). Division of works between male and female is assigned for livestock raising, where large livestock raised by male and small livestock (pigs, chickens) by female. Activities for animal feed (grass,

leaves of sweet potato, papaya) can be done by both male and female, where female is dominant in cutting (chopping) the feed.

Activity	Division of labor and responsibilities (Dominant)		
	Male	Female	Together
Home garden		√	
Rice paddy field			√
Cocoa			√
Large livestock (cow/buffalo)	√		
Small livestock (pig/chicken)		√	
Wood/rattan	√		
Patchouli/Clove/Seong			√
Trader (collector)	√		
Rice milling	√		
Shop/kiosk of food needs		√	
Reproductive activities		√	
Social activities			√

Source: primary data, GSA team 2013.

Furthermore, access to assets (resources) and its benefits can be seen in Table below. Hilly locations in the four villages, even very steep, especially in the village of Datu Baringan contribute to the limitation of female access to the cocoa and coffee plantations compared to rice. Similarly, access of female to markets tends to be relatively limited due to the damage condition of the road infrastructure. However, in the village of Datu Baringan, encountered a peasant female who brought a horse to transport her crops to market and return home by riding the horse. While in terms of cooperation on exchange of labor for agricultural activities, then both male and female have access to such cooperation, as compared to formal groups such as farmers' groups that tend to only male who have access.

Asset (Resources)	Access (Dominant)		
	Male	Female	Together
Land: Cocoa	√		
Home garden			√
Rice paddy field		√	
Labor (cooperation)			√
Seed		√	
Training and extension	√		
Farmer group	√		
Social Organization			√
Kinship Organization			√

Asset (Resources)	Access (Dominant)		
	Male	Female	Together
Market	✓		
Income		✓	
Loans			✓

Source: primary data, GSA team 2013.

Power relations in decision-making between male and female can be seen in Table below. Management all agricultural activities for paddy fields and plantations of cocoa and coffee, it tends to give priority to the family (male and female together). Loan payments, purchasing goods and donations for marriage should be discussed, but for the kitchen affairs decided only by female. Formal group activities, such as farmers' groups, village meetings and training are likely to be male dominant decided⁹.

Asset (Resources)	Access (Dominant)		
	Male	Female	Together
Inherited land			✓
Purchasing new land			✓
Dry land farming	✓		
Home gardening			✓
Rice paddy farming		✓	
Labor (group)			✓
Seed			✓
Training and extension	✓		
Farmer group	✓		
Social Organization			✓
Kinship Organization			✓
Marketing			✓
Using income		✓	
Loan decision			✓

Source: primary data, GSA team 2013.

Micro Hydro Power Plants Development are potentially sustainable in Mamasa District because it can be used for appropriate technology (threshing and milling of rice, pork feed chopper, coffee grinding). The appropriate technology can ease the workload of female, as long as access to markets (road infrastructure) is repaired. Women already have access and have a role in government program so it be used to meet female's needs in order to improve their welfare. Therefore, green development would be reduced poverty in rural areas that are rich in natural resources¹⁰, through several good governance approaches on natural resources management which is involved community participation and other stakeholders.

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² The rationale of choosing Mamasa district as study site according to GSA team, are as follow: (1) the location possessed forest area and productive land; (2) the location had electrical energy source from micro hydro power plants; and (3) the location had agricultural resources (maize, cassava, peanut, vegetables, and mungbean).

³ Mamasa district is adjacent to Mamuju district (North), Majene district (West), South Sulawesi Province (East), and to Polewali Mandar district (South). Mamasa district covered 3.005,88 km² area, with population number of 142.416 people at the year 2011 and population growth rate of 2 percent/year (Badan Pusat Statistik Kabupaten Mamasa, 2012: p.4).

⁴ The seven community leaders were Tabulahan, Mambi, Aralle, Bambang, Rantebulahan, Matangnga, and Tabang (Badan Pusat Statistik Kabupaten Mamasa, 2012: p.6).

⁵ In both villages, Batanguru and Datu Baringan, the village chief has roles in responding social and economic dynamics through community development programs. However, they differ in the turbine management. There are two Turbine managements in Batanguru, individual based and community based, while in Datu Baringan turbine management is kinship based. As noted by informant research: "... *Batanguru has a unique management of the turbine because in addition to community-based turbines, there are also individual-based management in the village, which then grow rapidly by serving PNPM turbine business ...*" (Interview LNG, a former village head of Batanguru) Further information "... *Datu Baringan is an example of kinship based management for turbine management...*" (Interview SOR, the village head Datu Baringan). Local government assistance needed for both community, not only charity approach but also empower them to manage turbine, as Adi (2005: p.32) stated that "... *program bantuan pengembangan daerah' bukanlah suatu bantuan yang bersifat charitative (amal) belaka, tetapi ia merupakan program yang terencana untuk mengembangkan suatu daerah.*"

⁶ Interview with LNG in Batanguru that the village plans to build new turbine projects of 2.5 MW (2500 KW) in order to increase the power of electricity in Batanguru and generally for villages in the Sumarorong district, where technical installations (intek) is located in Banea.

⁷ This information is based on interviews with local community at Datu Baringan.

⁸ *Sibulele* is a mutual aid agreement by some households to maintain their coffee plantations. This cooperation always defensible by community, as Syafar (2017: p.2) stated that *kerjasama dilandasi oleh rasa saling percaya dalam berkomunitas.*

⁹ It was explained by Mrs Ur (48 th, farmers): "...*Usually male attends the meeting. We consider that both male and female represent all the families, and it is the same, but let the male participated. Usually farmers' groups meeting are taken place in the evening, at 18.00 up after work. At that time, female still take care home activities...*"

¹⁰ The existing conditions showed a paradox: abundant natural resources have no positive correlation with the prosperity of the community, whereas natural resources as a livelihood asset for community to improve their welfare. Syafar (2015: p.126) stated that "... *sumber mata pencaharian masyarakat pedesaan terikat dalam satu kesatuan ekologi yang memiliki relasi kuat antara manusia dengan sumberdaya alamnya, termasuk juga bagi masyarakat yang berada di desa-desa sekitarnya...*" Therefore, this condition threaten the country's ability to sustain economic growth and reduce poverty.

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