

# “Use and Protect”

## How Indigenous Community Watershed Management in Sabah Sustains Micro-Hydro Systems

Adrian Lasimbang

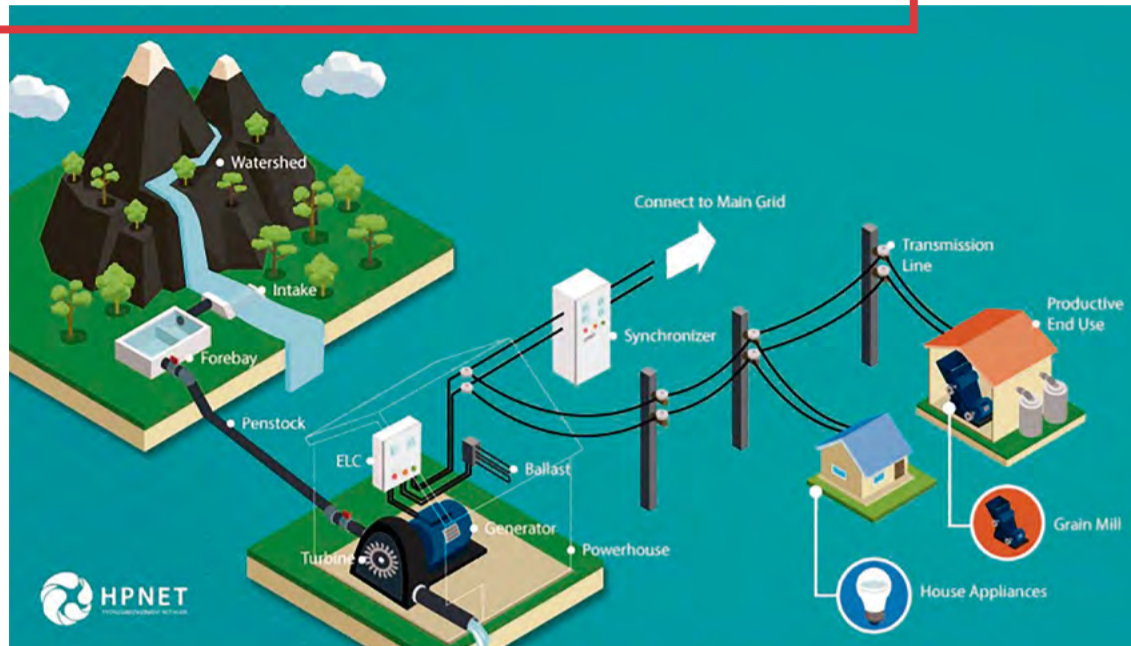


Fig. 1 (above): Typical setup of Micro Hydro Mini Grid system. (Figure courtesy of [www.hpnet.org](http://www.hpnet.org))

When the Malaysian state of Sabah grappled with destructive fishing methods and extensive logging in the 1960s, local Indigenous communities responded to this rapid destruction of the environment with the revitalization of *Tagal*. *Tagal* is our traditional system of sustainably managing our natural resources (particularly fish), endangered wildlife species, and medicinal plants. By 2008, 179 villages in kampung Notorrus alone had identified river areas for *Tagal* where no fishing would be allowed.

At present, Sabah is facing the challenge to provide enough freshwater for an increasing population as well as to ensure access to affordable, reliable, sustainable, and modern energy for all – UN Sustainable Development Goal number 7. This includes rural and Indigenous communities who cannot be connected to the national grid, or who do not want to be because they want to govern their own (ancestral) territories. Our *Tagal* traditional system again plays an important role in solving these challenges in a sustainable and just way.

My organization TONIBUNG (TObpinai Nngkokoton koBUruon KampuNG, meaning “Friends of Village Development”) is a local Indigenous-led organization working to improve energy access to rural communities in harmony with existing Indigenous conservation laws. We combine micro-hydropower technology with *Tagal* watershed management to provide sustainable energy for our communities while also showing to the national authorities that we can take good care of water catchment areas ourselves and ensure enough clean water and energy.

This also proves that the currently stalled construction of the Kaiduan mega-hydropower dam on our Indigenous lands – a looming disaster for our people, as it will flood 12 square kilometers of ancestral land and negatively impact Indigenous communities living downstream – should be revoked completely.

### Community-based micro-hydropower

A community-based micro-hydro system is managed and maintained by local communities. The most important component that needs to be maintained by the community, apart from the structure and equipment, is the watershed areas.

Micro-hydropower is a renewable energy technology that generates electricity using flowing water with a capacity of below 100kw.

Typically, the system is designed as a runoff river system which does not require construction of large dams for water storage. The micro-hydro system relies solely on the available flow of the river. Therefore, it relies directly on watersheds to sustain the water flow. The system consists of several components such as penstock pipes, a turbine, a generator, and the distribution system [Fig. 1]. These components need to be well maintained and require a trained person to operate and maintain. As this requires funding, communities can struggle to maintain operations and, in many cases, abandon the system if they can no longer afford it.

The sustainability of operations of a micro-hydro system also relies very much on the availability of adequate water discharge throughout the year. A well conserved forest in the watershed area where the micro hydro system is installed will ensure sufficient water resource availability throughout the year, as the forest retains and then gradually releases abundant rainwater that falls in the monsoon season. Land conversion in the watershed will decrease water discharge during the dry season. It will also increase conflict over those limited water resources between those needing it for agriculture, plantations, fisheries, industry on the one hand, and those needing it for drinking water supply on the other. Both of these effects can disrupt the operations of a micro-hydro system.

Therefore, in order to ensure continuous electricity supply to the community, both the regulation of water resource usage and land use management within the watershed area are important. Any disturbance in the watershed area, particularly agricultural activities, can cause land degradation. Land degradation upstream of the watershed will affect the hydrological condition in a way

that will disrupt the sustainability of existing micro-hydro systems. Heavy rain can cause floods and landslides that can severely damage the intake weir and parts of the penstock pipes of the structure. Severe damage caused by natural disasters generally requires high maintenance costs, which community funds often cannot cover.

### Case study on community-based watershed management in Ulu Papar, Sabah

A community-based model ensures that the community has a sense of ownership of the micro-hydro system. A sense of ownership makes a community embrace the project as their own and invest more

time and effort to ensure the success of the project. If the community embraces the project as their own, they will be more aware and willing to work together to achieve a common goal effectively. Community involvement at every stage of development increases ownership and participation and results in a more reliable and better quality micro-hydropower system.

Ulu Papar is a region located at the upper Papar river in Sabah. It is a very remote area that can only be reached by jeep track roads or by hiking along the salt trails. There are six villages located near the Crocker Range Park. Micro-hydro projects have been developed and implemented in Ulu Papar since 2004.

All six community-based micro-hydro systems installed in Ulu Papar – in Kampung Terian, Kampung Buayan, Kampung Tiku, Kampung Pongobonon, Kampung Kalangaan, and Kampung Longkogungan – have established watershed management protocols. These protocols are a set of rules to manage the area based on the local *Tagal* Indigenous management system. *Tagal* applies the concept of “*Gompi-Guno*” (“use and protect”). Though most widely used and recognized in the protection of fish resources in the rivers in Sabah, the *Tagal* system can also be applied to protect the forest. Our organization used the *Tagal* system to design and implement the community watershed protocol in order to ensure better watershed management for micro-hydro systems. The first protocol was developed in Kampung Terian in 2003 with assistance from the PACOS Trust, a community-based organization dedicated to supporting Indigenous communities in Sabah.

### Background of community protocol

Protocols for the management and care of important resources such as water catchments, forests, rivers, as well as forest and aquatic life have existed in Kampung Terian since a long time ago, but only in oral form. Fortunately, the younger generation in this village has been exposed to environmental issues that are becoming critical in Malaysia and are being hotly discussed globally. The younger generation sees these unwritten protocols as an important heritage that should be documented and practiced in the management and protection of water catchment areas.

This Terian Community Protocol on water catchment protection practices has been produced through cooperation with the Terian community, guided by the PACOS Trust. The production of this protocol is very important to the Terian community. It also ensures the continuity of our management and protection of our water catchments by the next generations to come.

This protocol is being put into practice and serves as a guide for the Terian community as well as other communities who are fighting for sustainable water



Fig. 2 (left): A Indigenous community operator presenting the micro-hydro setup at his village in nearby Long Lamai, Sarawak. (Photo courtesy of TONIBUNG, 2015)



catchment areas through management based on traditional knowledge and practices. In addition, this protocol has been made into a book for youth in the communities, explaining to them how to care for this very precious treasure. This ensures our traditional knowledge is passed down to future generations of Indigenous engineers who work with their communities to develop and harness their resources on their own terms while incentivizing environmental stewardship.

The Terian community really hopes that the Malaysian government will start to realize the important contribution of the community for the care and management of nature. Indigenous communities have contributed greatly to forest sustainability, especially water catchment areas in Sabah, and they have positively impacted environmental issues such as global warming, biodiversity conservation, and recognition of the Ulu Papar region as a 'Biosphere Reserve' by UNESCO. Therefore, it is the responsibility of the government and other related parties to start paying attention and recognized *Tagal* as a traditional practice for conservation and accept our community protocols as a legitimate law, specifically in Sabah and generally in Malaysia.

In particular, we are putting forward a viable alternative to the still pending construction of the controversial, destructive Kaiduan Dam. Our work with community protocols proves that the Terian community has its own system based on traditional knowledge and practices, resulting in good, sustainable care of water catchment areas. It is hoped that relevant parties will see this as an important practice and adopt these more environmentally friendly alternatives to obtain clean water supply and green energy. It is also hoped that they will rescind the construction of the Kaiduan Dam once and for all.

### Resource management systems of the Dusun community in Terian, Ulu Papar

For the Terian community, without productive land and natural resources, the existence of our culture, practices and traditional knowledge will be affected. Therefore, the sustainability of our management of available resources is important. *Gompi-Guno* is one key practice in the

management of resources based on traditional knowledge. The *Gompi-Guno* concept means "use and protect," where resources that are used or taken will be replanted or given time to regenerate, while available resources are conserved to ensure the continuity of such resources for community use.

The *Gompi-Guno* concept practiced by our community in Terian has also been incorporated in our water catchment protection and management system. For example, when an individual violates a rule, such as polluting the river, it is believed that the river spirit will retaliate. This is based on the belief that springs and rivers in water catchment areas have spirits that act as guardians of the area and will give retribution to individuals who disturb or damage the area.

All main tributary rivers leading to the water catchment area cannot be disturbed. Our community has a holistic community protocol for the protection and management of the water catchment based on our traditional knowledge that is in line with conventional water catchment management systems.

The *Tagal* system is also integrated into the water catchment management protocol

because the tributary rivers flow into the main river that has been placed under *Tagal*. For example, *Tagal* river rules prohibit the throwing of waste that can pollute as well as fishing methods that are dangerous such as use of chemicals and electricity. *Tagal* is the responsibility of the community together. It is governed and carried out by the community, based on mutual agreement and discussion. Management of water catchments in Terian Village is thus communal, based on mutual ownership, and relying on consultations and democratic decision-making.

Our community has established a special taskforce to monitor the water catchment to ensure that the area is free from pollution and disturbances. When someone is accused of violating the rules, the individual will be brought to the *Tagal* committee together with the village chief. If found guilty, the individual will be given a fine/*Sogit* amounting to RM500 (roughly 100 Euro) and a pig that is at least 50kg in weight. This fine is paid to the community.

### Conclusion

The sustainability of the community-based micro-hydro system depends very much on the management of the surrounding watersheds. Failure to adequately manage land use and activities within the watershed area of the river basin used for the system results in many disruptions to operations due to flooding, siltation, landslides, and reduced quantity and quality of water flow. These problems are aggravated by climate change, which further demonstrates the need for better watershed management. The use of traditional wisdom and practices instills a sense of ownership by the community towards the micro-hydro system, which is key for the success of any community-based projects.

The community management of watersheds based on traditional *Tagal* practice not only incentivizes the community to protect the watershed, but also asserts custodianship by the community towards the natural resources that they depend on for their livelihood. This use of community protocols is a strong example of how Indigenous traditional systems can play a role in grassroots-level freshwater management and renewable electricity provisioning. This contributes towards the global goal of combating climate change and reversing the loss of biodiversity.

**Adrian 'Banie' Lasimbang** is a member of the Indigenous Kadazan-Dusun community in Sabah, Borneo. He is the founder of TONIBUNG, a social enterprise that promotes capacity building and the establishment of renewable energy mini grids for rural communities in Malaysia. He is also director of the Center for Renewable Energy & Appropriate Technology (CREATE). He has worked in community watershed conservation projects since 1999 and is a former member of the Malaysian Senate. Email: [lasimbang@gmail.com](mailto:lasimbang@gmail.com)

Fig. 3 (top): Indigenous community members welding a HDPE pipe using butt welding machine in nearby Long Lamai, Sarawak. (Photo courtesy of TONIBUNG, 2015)

Fig. 4 (right): Indigenous community operators conducting repairs of a micro-hydro turbine at Kampung Terian Penampang, Sabah. (Photo courtesy of TONIBUNG, 2020)

Fig. 5 (far right): River flow at Kobulu River providing water flow for a 20-kilowatt runoff river system installed for Kampung Buayan, Sabah. (Photo courtesy of TONIBUNG, c. 2018)

