

# Towards Sustainable Community-based Fishery Resources Management: The Tagal System of Sabah, Malaysia

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Map of Malaysia showing Peninsular Malaysia (left) and East Malaysia (right)

Sabah and Sarawak comprise East Malaysia, one of the country's two federal territories, the other being Peninsular Malaysia. East Malaysia occupies the northern third of the island of Borneo, having an area of approximately 202,020 km<sup>2</sup>, of which about 72,500 km<sup>2</sup> belongs to Sabah. With a coastline of about 1,440 km, Sabah is surrounded by the South China Sea in the west, Sulu Sea in the northeast and Celebes Sea in the east. Sabah's fishing zones are divided into coastal (less than 12 nautical miles (n mi) from the shore line) and offshore areas (12 n mi and beyond the EEZ boundary). The EEZ of Sabah is reported to be about 90,000 km<sup>2</sup>.

As the second largest state in Malaysia, Sabah has a population of about 2.5 million with more than 70% living in coastal areas and mostly dependent on agriculture and fisheries for their livelihoods. Sabah has a heterogeneous population varying in terms of their cultural backgrounds,

with the indigenous population making up some 30 groups using more than 50 indigenous languages and 80 dialects. Inhabitants of Chinese origin make up the main non-indigenous group. Islam is the main religion which was introduced towards the end of the 15<sup>th</sup> and 16<sup>th</sup> centuries through the Arab and Indian traders and also as a result of the expansion of the Brunei Malay Sultanate.

In 1775, the British East-India Company opened a trading base in Balembangan Island but it was the British North Borneo Chartered Company who effectively ruled Sabah from 1881 until 1942. After the World War II, Sabah became a British Crown Colony until August 1963 when it obtained self-government from Great Britain. In September 1963, Sabah together with Sarawak, Singapore and Malaya joined the Federation of Malaysia. The capital of Sabah is Kota Kinabalu, formerly known as Jesselton before its name was changed in 1968. The capital town Kota Kinabalu is situated at the foot of Mount Kinabalu.



Map of Malaysia showing Peninsular Malaysia (left) and East Malaysia (right)

More than one half of the total land area of Sabah is covered with tropical forests with deciduous woodlands. Many small islands near Kota Kinabalu on Sabah's western coast have some of the world's most diverse coral reefs and marine life. Its favorable climate and geographical location make Sabah one of Malaysia's major fish producing states. With the total fish production of 202,678 mt worth RM733.1 million in 2004 based on Sabah's Annual Fisheries Statistics Report of 2004, Sabah contributed more than 13% to Malaysia's total fish production in 2004 of 1,542,071 mt (FAO FishStat Plus 2008).

The marine fisheries sector is the main contributor to the total fish production of Sabah. In 2004, a total of 190,371 mt were landed from the marine fisheries with a wholesale value of RM 584.1 million (Sabah Annual Fisheries Statistics, 2004). The major landing areas in Sabah are Kota Kinabalu, Sandakan, Tawau, Kudat and Semporna (Isnain, 2007). The statistics also imply that only a small amount (about 12,307 mt) came from inland fisheries (including aquaculture).

For the rural communities in the interior areas of Sabah, freshwater fish is an important source of protein and the rural inhabitants have always depended on riverine fisheries for their livelihoods. While in the past fish could be easily harvested from the inland rivers, the development of the timber industry and extensive agricultural development including massive oil palm plantations have resulted in soil erosion, pollution and consequent destruction of the fish breeding grounds and habitats. Also as a result of overfishing, the freshwater fish stocks in its rivers have been rapidly decreasing, a situation that has greatly affected the poor rural communities that have been dependent on river fishes for their food and livelihood. Recognizing the declining status of the freshwater fish stocks, the Department of Fisheries (DOF) Malaysia and the State Government of Sabah took steps to address the concern by introducing freshwater aquaculture and introducing the concept of community-based fishery resources management in an attempt to revive Sabah's freshwater fishery resources.

### **Community-based Fisheries Management: The Tagal System of Sabah, Malaysia**

Being aware of the role of the coastal communities in co-managing the coastal and inland resources in the country, the DOF Malaysia has undertaken initiatives and approaches under an integrated resources management concept in order to achieve sustainable fisheries throughout the country. Specifically, the Tagal System which actually originated as a traditional system of forest stewardship was therefore adapted for the protection, restoration, conservation and management of the freshwater fishery resources of the country and most specifically in Sabah.

A “smart-partnership” approach between the local communities and the Sabah State Government, the Tagal System was adopted with the main objective of protecting and reviving the depleted freshwater fishery resources of Sabah. The implementation of the Tagal System is being promoted by empowering the concerned local communities based on Section 58 of the Sabah Native Courts Rules of 1995 (Native Customary Law) and Section 36 of the Sabah Inland Fisheries and Aquaculture Enactment (2003). These regulations specifically give the Fisheries Department of Sabah State the authority to manage and regulate all

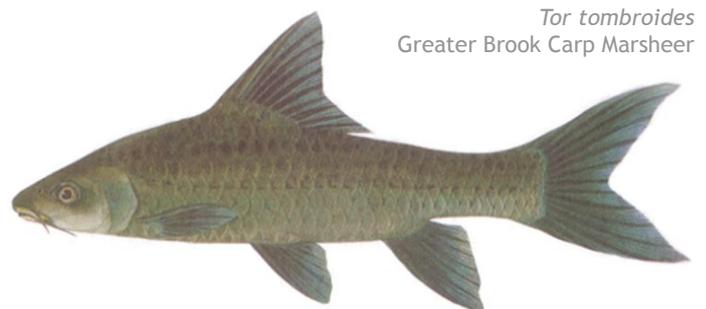
fisheries activities in its inland waters. “Tagal System”, which literally means “fishing in rivers is prohibited by the concerned communities for a certain pre-agreed period of time” aims to restore the depleting fisheries resources, keep the rivers free from pollution, and generate income to the communities concerned. Under the Tagal System however, concerned communities are still allowed to harvest fish from the rivers but in a sustainable manner.

The Tagal System was developed by the Sabah State Government and the Department of Fisheries (DOF) of Sabah upon recognizing the urgent need to address the problems of depleting freshwater fishery resources as indicated in the State's decreasing production from freshwater fisheries. Although the State did not have adequate fisheries laws for regulating inland fisheries in the past, the State Fisheries Department managed to successfully implement the Community-Based Fishery Resources Management (CBRM) concept which is now locally called the “Tagal System”.

### **Target Species for the Tagal System**

Before the Tagal System, Sabah had very little experience in community-based freshwater and inland fishery resources management. However, the need for co-management was deemed necessary in view of the impact of irresponsible fisheries in many rivers in Sabah on the fishery resources with many fish species becoming almost extinct including the most famous “Malaysian Red Mahseer or Greater Brook Carp” (*Tor tombroides*) also known as “kelah” in Bahasa Malaysia.

The Malaysian Red Mahseer or kelah belongs to the Tor Genera under the Family Cyprinidae. It lives in particular deep water pools in rivers and does not usually migrate to other pools, which makes a kelah resource management system practically feasible. As a food fish, kelah commands a high market price and is an extremely expensive fish, costing around RM 200 (USD 57) per kg. Kelah is a potential candidate species for aquaculture as it can survive in highly oxygenated waters. In addition, Kelah is also highly esteemed as a game fish and to catch a good size kelah is always a challenge for sports fishers because of its



*Tor tombroides*  
Greater Brook Carp Marsheer



*Fish massage (above) and foot massage (below) at the Luanti Tagal System*

fighting ability. Found mainly in the upper parts of the rivers particularly in highly oxygenated waters, kelah was once abundant in many rivers of Sabah. However, several kelah stocks have suffered serious decline and are now considered threatened because of pollution in the rivers, loss of habitats and irresponsible fishing. Generally, Mahseers are known to inhabit the rivers and lakes, specifically in rapid streams with rocky bottoms where the fish also breeds. Mahseers are omnivorous that feed on algae, crustaceans, insects and other fishes as well as on fruits and other particles that fall from trees overhead their habitats.

## Extent of Adoption of Tagal System in Sabah, Malaysia

Before the formal Tagal System was practiced in Sabah, the communities along the rivers were already practicing sustainable river fishing in order to conserve the kelah fishery resource. But after 2001, the State Fisheries Department of Sabah expanded such community-based effort by demarcating the rivers depending on the size of the deep pools along the villages near the river, an approach which was patterned after the original Tagal management system. Therefore, under the Tagal management system each pre-assigned stretch of a river is divided into three zones: **red**, **yellow** and **green** zones.

The **Green Zone** is an “open fishing zone” where fishing is allowed all year round for all Tagal members under strict Tagal regulations, e.g. using regulated fishing methods (no gillnet fishing allowed but only cast-netting and angling). The **Yellow Zone** is open once or twice a year particularly during community celebrations or festivals. In this zone encircling gillnets could be used and the catch is shared by the Tagal members after deducting some portions for the Tagal committee’s administrative costs. The **Red Zone** is exclusively for the conservation of the Tagal fishery resources and is opened for sports fishing after paying certain but reasonable entrance fees. The cost of sport fishing is RM50/day from 0800 to 1600 plus cost of local guides at RM50/two guests.

Under such demarcation or zoning, one community could have as many as five deep pools (also called “lubuk”) which are identified as Deep Pools 1-5, in the pre-assigned stretch of a river depending on the location of the community. In case five “lubuks” are assigned to one community, Deep Pool 1 could be reserved as a **Red Zone** where no fishing is allowed while Deep Pools 2-4 could be **Yellow Zones**, where harvesting of fish is allowed only once or twice a year. In Deep Pools 2-3 for example, the quantity of fish caught is equally shared among the members of the local Tagal system, while in Deep Pool 4 (also a **Yellow Zone**) where fishing is also allowed once a year, the amount of fish caught is sold to public markets to generate funds for the Tagal committee. In Deep Pool 5, which is indicated as **Green Zone**, fishing is allowed all year round for all Tagal members under the strict Tagal regulations.

Sabah has now more than 240 Tagal Systems, where each Tagal is required to have a Tagal committee, and must be registered with the DOF of Sabah. Although the Tagal System already existed for sometime in Malaysia, its operations and management have never been codified before in the way that it is being done in Sabah. Therefore, the Sabah experience can serve as a lesson and learning experience on how such a system could be implemented properly and very effectively. Malaysia’s fisheries authorities are now looking at the details on how the system works including its enforcement and the participation of the local people at the community level. Some of the most successful and popular Tagal Systems in Sabah include those in Babagon, Notoruss, Kiburot, Nalapak, and Luanti.

The Babagon Tagal System is located near the Fish Hatchery Center of DOF Sabah with 128 members from 100 households. This Tagal System comprises two zones only: **red** and **yellow** zones. Since this Tagal System is situated near the capital town of Kota Kinabalu, many sports fishers visit the locality regularly. Nonetheless, the sports fishers are required to follow the catch-and-release rule when fishing

thus, the sports fishing activity would have no adverse effect to the kelah fishery resources. The Notoruss Tagal System is the oldest system and is also located near Kota Kinabalu, with about 100 members. The system has two zones: **yellow** and **red**, and regular fishing activities are not practiced. The Kiburot Tagal System has three zones with about 120 members.

The Nalapak Tagal System is located in Ranau District some 70 km away from Kota Kinabalu. It was established in early 2008 with its Chair, the first chair-lady among all the Tagal systems in Sabah. It has 400 members from 40 households (those who own lands along the river also join the system as members). There are three zones with its red zone just recently developed. Three cases of violations were reported in 2008; with the two cases resolved by the village chief based on the Native Law resulting in the punishment and settlement of one cattle, and the other case which was a violation of the electric fishing regulation is being settled in the district native law court.

Luant Tagal System is also located in Ranau District with 293 members. Established in December 2002, the Luanti Tagal System is one of the most active Tagal groups in Sabah and is more oriented towards eco-tourism. The chairman of Luanti Tagal System also serves as chairman of the Ranau District Tagal Group comprising 72 Tagal committees. The “fish foot and body massage”, which was initiated by the Luanti Tagal System in 2006, is a very unique innovation to play with the river fishes without hurting them. The Luanti Tagal Committee has been promoting the “fish massage” but making sure that the fishes are not harmed. Reports showed that over 7,000 visitors were received in 2008 of which about 10% were foreigners. The charge per person for a 15-minute “fish massage” is RM10 for Malaysians and RM20 per person for foreigners. The DOF of Sabah constructed a dressing room for tourists while additional facilities like guest houses were constructed by the Luanti Tagal Committee. As this eco-tourism business venture in the locality has been successful, it has benefited the members through additional incomes. The Luanti Tagal System is restricted to only the **red zone** which focused on the protection of the fishery resources, and has been given the Malaysia River Care Award in 2006 by the Sabah State Administration for their successful efforts in conserving the riverine resources.

## Management of the Tagal System

Although the Tagal System is directly under the Fisheries Department (DOF) of Sabah as the lead agency, the communities along the rivers could participate in this system’s partnership. However, the communities must have traditional use rights to several deep pools in certain

stretches of a river. With technical advice from the District Fisheries Officer, the concerned communities also form their respective Tagal committees to manage and utilize their assigned fishery resources under the leadership of a community headman. The responsibilities of the communities are mainly to protect their respective fish stocks from poachers, overfishing, illegal fishing and any other activities that could pollute the rivers and water bodies, and destroy the fish habitats. The communities also have the privilege to harvest the fish, as the case may be, in a sustainable manner and in accordance with the regulations related to their designated zones.

Under the Tagal System collaborative and partnership arrangement, the community protects their Tagal sites by putting up sign boards at strategic sites as well as promoting public awareness programs. Under the Native Customary Law and the Sabah Inland Fisheries and Aquaculture Enactment, offenders of the Tagal regulations could be fined certain amount of money or even imprisonment for a maximum of two years. Angling is allowed under the Tagal System on a “catch-and-release basis”, where exotic fishes such as the African catfish once caught should be culled and sold bringing additional cash to the communities. The Tagal regulations also stipulate that sports fishers and anglers must hire a local guide (one guide for a maximum of two anglers) and must pay the prescribed amount for the sports fishing. Financing the operations of the Tagal System is mainly sourced from the annual contributions of the Tagal committee members, annual sale of catch in the green zone, sale of catch from fishing competitions during sports fishing, and ecotourism such as boat rentals, sale of food and souvenirs, charges from home-stay, charges for sports fishing, fish feeding ventures, and fish “body and foot” massage, etc. The funds are used to cover administrative expenditures and to support some community members having financial difficulties and to defray certain expenses during the celebration of community festivities.

In addition to providing technical advice to the Tagal committees, the DOF of Sabah also monitors the progress of all existing Tagal Systems, conducts research to further improve the system, and promotes human resources capacity building. The DOF further promotes ecotourism activities including sports fishing and fish feeding in waters under the Tagal management system in order to generate additional income for the local communities. As a result of the adoption of the Tagal System, rehabilitation of many depleted freshwater resources of the upstream rivers of Sabah has been successful especially the indigenous fish species. The Tagal System of Sabah has been well known all over Malaysia and was awarded in 2005 the “Outstanding Sabah Environmental Friendly Project Award 2005” by the Sabah Environmental Action Committee.

## Issues and Concerns

It is obvious that the success of any Tagal System approach would depend on very specific conditions and the system can only be effectively applicable to areas where similar surroundings exist (**Box 1**). In addition, the certain peculiarities of the target fish species and its surroundings should be taken into consideration in order to sustain the success of a Tagal System.

In the State of Sabah, while logging activities expanded a few years ago, many loggers have reached the deeper parts of the forests and discovered the previously unreachable stretches of rivers where the prized kelah are now being fished sometimes with the use of chemicals. While irresponsible catching of kelah continued, it has now become difficult for anglers to produce even a small sized kelah and the fish was feared to be at the edge of becoming extinct.

With the adoption of the Tagal System, few kelah sanctuaries have been established where certain stretches of the freshwater systems are preserved mainly for the breeding of this fish species. After 1-3 years of implementing the Tagal System, a successful harvest of kelah had been achieved. Although the Tagal System is a native tradition of preserving and protecting fish stocks for the benefit of the communities, the adoption of such system has not been successful in some areas. Among the reasons cited were the large population of some communities, changes in agricultural practices with cash-trapped economies, and the general lack of interest and indifferences of the people in the communities. Considering that the Tagal System is simple to manage, the community's responsibility is mainly to look after a stretch of river waters nearby with the community members serving as policemen and where nobody is allowed to fish in their areas of responsibility. The communities also make sure that the river is not polluted and can only harvest the fish in a pre-agreed period for the benefit of the whole community. The communities also make it a point to release the small-sized fish as well as breeders that are caught in order to sustain the fish stocks.

### Box 1. Specific conditions and peculiarities of the Tagal System in Sabah, Malaysia

- The target fish (Malaysian red mahseer or kelah) stays in one deep pool of a river throughout its life cycle and hardly migrate to other areas unlike other types of river fishes
- The fish is omnivorous and feeds on the particles falling from trees along the river in addition to animal feeds
- *Kelah* is an extremely expensive fish that costs at around RM 200 (USD 57) per kg
- The communities along the rivers hardly rely on fisheries as their full-time occupation as the members are mostly engaged in other business ventures in forestry and agriculture
- A strong community native law governs the villages



Protected river by a Tagal Committee, where cutting of trees in the river basin is not allowed



Sign board describing the rules and regulations of the Tagal System

## Way Forward

As a natural river conservation system, Tagal System has been a phenomenal success in Sabah, reaping bumper harvests for the communities that have embraced it. The system has also provided the anglers the chance to catch the elusive kelah in clean river environments. The eco-tourism potential of the Tagal System, with rivers being returned to their natural state, is unprecedented in Sabah, Malaysia. After the successful rehabilitation of the State's depleted freshwater resources, the DOF of Sabah is currently promoting the expansion of the system to new areas throughout the whole country that do not yet adopt the system.

The Tagal System had been initiated by the communities in coping with the hard situation where the fishery resources had been dwindling due to degradation of the fish habitats and over-fishing including the use of illegal fishing methods. The fish that was once abundant and available in the rivers could hardly be seen in the mid-1900s. Many village leaders started to take actions by persuading the inhabitants to restore the fish habitats and control fishing activities starting in the late 1900s. In fact, the local people agreed to stop fishing for a while. Such efforts were materialized when the Tagal System in Tuaran District was practiced starting in 1987 and the second attempt which followed in

1991 in Kota Belud District, with the third system made operational in 1997. The State Fisheries Office initially supported this system until 1999 and thereafter the number of Tagal Systems has increased to more than 240 riverine communities. This is an ideal development under the co-management model, where the initial idea is derived from the motivation of community inhabitants considering their acute needs and thus, initial actions are initiated by them. The authorities actually came into the picture through their support in such movement and in the further development of the system. The evolution process and the outcome in terms of co-management approach of the Tagal System are therefore very commendable.

It has been almost 20 years after the commencement of the first Tagal in Sabah. Nevertheless, it is evident that the riverine fishery resources of Sabah have been rehabilitated and in many communities the system has contributed to local business development like eco-tourism. It is important that the efforts in community-based resources management (CBRM) should coincide with the community development in an integrated manner.

In the states of Sabah and Sarawak, special attention has been focused on the Tagal System for the last seven or eight years with notably increasing number of communities getting involved in the system. The DOF Malaysia is also attempting to introduce this system in other states. In addition, the DOF Sabah has initiated the expansion of similar approach to be applied in marine fisheries. Basically, the approach of CBRM in either marine fisheries or freshwater fisheries is identical, but the scale of area coverage differs, especially in the case of the riverine fisheries.

The peculiarities and advantages of the target fish species for the Tagal System lie in their characteristics to live in the same deep pools throughout their lives. Therefore, a scientific research should be conducted to trace the movement of the fish by tagging in order to substantiate this theory or belief. In case of marine waters, a similar system can be applied straightaway to some non-migratory species of fish or crustaceans or shellfishes. But, it could be difficult to apply the same system in the case of a common fish, without combining various approaches or having some modifications. The approach incorporating fish aggregating or enhancing devices as employed in the SEAFDEC project on Integrated Coastal Resources Management in Pulau Langkawi, Malaysia (ICRM-PL) can be one of the suggested models. The planned implementation of the Tagal System in the marine waters in Kota Kinabalu using artificial reefs (ARs), may work for protecting some non-migratory species of fish as the ARs can retain to some extent, the fish schools in a certain zone.

The enforcement of self-regulatory measures by the Native Law is the backbone of CBRM in the Tagal System. There are a number of native laws in most fishing communities, but these should be importantly legislated with the authorities as these could be used as tools for local enforcement like the case of the Tagal System. This model is certainly applicable to the marine fisheries sector together with supporting fisheries laws enacted by the authorities.

It was also observed that in some deep pools, there were too many fish stocked, which could be beyond the optimum level of holding density of a certain deep-pool. A scientific research should be conducted to determine the optimum density level and that over-stocked fish should be effectively harvested.

Considering also that a hatchery technique for Masheer may have already been developed in Sabah, such effort should be verified and provided with technical support. Since the cost of the fish is quite expensive, releasing fish fingerlings could also be considered as means of rehabilitating the fish stocks. However, this would be effective only if the fish really stays in one deep pool as the people believe.

## References

- FAO FishStatPlus 2008. FAO Rome, Italy
- Isnain, I. 2007. Information collection of demersal resources as surimi raw materials in Sabah, Malaysia. Paper presented during the SEAFDEC Regional Workshop on the Information Collection of Demersal Resources as Surimi Raw Materials in Southeast Asian Waters, Chiang Rai, Thailand, 18-20 December 2007.
- Sabah Annual Fisheries Statistic 2004 – Department of Fisheries, Sabah, East Malaysia
- Wong, Jephrein Zefrinus. 2008. Pers. Comm. The Tagal System of Malaysia.

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