**Sasi Lompa: a critical review of the contribution of local practices to sustainable marine resource management in Central Maluku, Indonesia**

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**Abstract.** *Sasi* system is one of the customary practices in Maluku that are seen by locals and outsiders as a culturally appropriate means of regulating terrestrial as well as marine resources. This paper examines the recent *buka sasi* (open season) practices for *lompa* fish (*Trisina baelama*) in Haruku village from the point of view of its effectiveness as ecological management techniques and as local knowledge. Particular attention is paid to the gears and techniques used to catch the fish and to the local responses in harvesting. Findings show the changes on ways of harvesting that may lead to shifting of the spirit and meaning of *sasi lompa*, especially in the context of sustainability issue.

**1. Introduction**

In the last decades, attention has been paid significantly to the existence of indigenous ecological management system and social institutions for their contribution to local resource extraction, including *sasi* system in Central Maluku in regulating terrestrial and marine resources. The essence and practices of *sasi* have been discussed as supporting good management strategies, such as flexibility, adaptability, participation, equity, and sustainability [1, 2, 3, 4, 5, 6, 7,8]. *Sasi* is often claimed by locals and other stakeholders as a resource management tool with the aim of sustainable resource use. Statements by local people about the relevance of *sasi* for sustainable harvest suggest that by practicing *sasi*, they believe they can obtain better harvest than without *sasi*. It is assumed that through *sasi*, there is less extraction of resources than without *sasi*. Furthermore, *sasi* as rhetoric about sustainability might play a role in the maintenance of local institutions. However, *sasi* has weakened in practice in many Central Maluku villages [4].

*Sasi* for *lompa* (*Trisina baelama*) fish is one of the *sasi* that is still practiced by people of Haruku. Haruku village is one of villages located in Haruku Island in Central Maluku, eastern Indonesia. Haruku places *sasi on lompa* fish (*sasi lompa*) in their river and marine area that are considered as communal property. It is set annually based on local knowledge on migration pattern of the fish. Besides, it is based on a myth that is shared among the locals, seeing the *lompa* fish as an ‘heirloom fish’ which was given to them by their ancestors, so that the *lompa* must be preserved until harvest time to maintain their relationship with the ancestors [5, 9]. This religious—culturally perspective on *lompa* should be a basis to support a sustainable behavior toward the fish, especially during the open season (*buka sasi*).
Is the current practice of *sasi lompa* still showing sustainability objective for the marine resource as it is claimed? Or, whether the practice serves mainly short-term harvest amount and other objectives, such as economic, politics, legal, social, or cultural at the expense of long term environmental health. Through the use of fishing gears in open season, I examine the association of concept and practice of *sasi* system in the context of sustainability issue.

2. Methods

2.1. Research location
Research was conducted in the village of Haruku, located in Haruku island, lying east of Ambon Island, where the capital city of Maluku Province situated. Administratively, Haruku Island consists of eleven villages from a single sub-district, namely Kecamatan Pulau Haruku, as part of Central Maluku District. Population of Haruku Island in 2017 is 27,812. About eight percent of them (2336 people, 486 households) occupy the village of Haruku, which covers 13 km². Population of Haruku village engages mostly in agriculture as farmers; they also do fishing activities due to the location of the village on the coast. This village is flowed by Wai Ira river with its branch named Learisa Kayeli river which is one of the lompa fish habitat.

2.2. Methods
Qualitative methods using in data collecting is observation in which I participated in open season (*buka sasi*) for *lompa* fish in October 2017. I attended a series of customary ritual, followed by activity of catching fish and post-harvest processing. I observed the way people act and response, and the fishing gears being used to catch *lompa* fish. General interviews were conducted to participants, they are local people (male and female) who engage in the open season as well as participants from outside the village. Documentation helps to analyze observation. My experience in attending *sasi lompa* events in previous years was used as a reference to interpret the 2017 observations. Study on literatures was done particularly on *sasi* and *sasi lompa*, and is presented as a part of research result.

3. Results and Discussion

3.1. What is *sasi*
The idea of *sasi* is to regulate access to certain resources and territory on land and sea under a variety of property regimes. Generally, *sasi* is imposed to protect certain plants and animals from exploitation in certain area for certain periods of time. Plants and animals resources that being imposed, such as coconuts, nutmeg, areca nuts, pineapples, cuscus, as well as marine resources, such as fish, trochus shell, and sea cucumber. While *sasi* on land is mostly applied to individual property, *sasi* on the sea applies to resources that are considered to be communal property [6].

During *sasi* times, it is prohibited anyone to harvest the resources upon which *sasi* has been imposed. The right holders over resources are suspended when the area is closed under *sasi*. The length of the closing period varies depending on the resources. The area of the *sasi* is marked by a *sasi* sign, commonly young coconut leaves.

Customary officers constitute the framework of the *sasi* institution. In Central Maluku, a customary institution called the *kewang* institution, has responsibility for controlling environmental management of all resources in the village domain, especially during the *sasi* time (see the *kewang* regulation, for example, in [10,11] where *sasi* is part of *kewang* regulations).
Sasi rules have been written down in some villages and are read out in the sasi ritual. Sasi includes sanctions and punishment for violators as set by the village council. These include corporal punishments or fines. Nowadays, sanctions usually involve monetary fines.

Sasi contains not only ecological objectives, but has also a cultural-religious meaning, and social, political, administrative, and economic objectives [3, 5, 6]. All these aspects are closely interwoven and influence the function and practice of sasi in social life. At one time a particular aspect may have had more important than others, but at another time, other aspects have become dominant.

3.2. Open season of sasi lompa
The sasi imposed on lompa fish is closed for a year. During the close season (tutup sasi, close sasi), it is forbidden to catch the fish in the sasi area of river and sea. The open season (buka sasi, open sasi) to harvest the lompa fish is annually around October and the beginning of November after the kewang observe that the fish have grown in the size ready for harvesting. Usually the sasi is opened only for one or two days. The date selected is obtained by calculating the position of the moon which affects the duration of the low tide.

Before opening the sasi in the morning, the series of ritual are carried out at night, led by the head of kewang. Sasi regulations are read out again as an announcement, as it was done at the time the sasi was imposed (close season). It is read at several particular crossroads in the village to remind the people of things that are regulated or prohibited in the implementation of sasi (Figure 1).

Figure 1. Sasi regulation is read out at some sites in the village

After the eating together ritual of kewang, at 3.30 am the kewang light the bonds of dried coconut leaves as bonfires at the mouth of the river to attract and draw the lompa fish into the river earlier than usual according to the tidal calculation. After about three hours later when many schools of lompa fish crowd into the river, people install a stretch of net across the river mouth so that the fish will not be able to escape to the sea when the tide ebbs (Figure 2).

When the tide begins to go out, the sounds of drum indicate the time to start harvesting. Villagers, old and young, male and female, participate to catch the fish in the river. The river is full of people. Participants also include people from neighboring villages and kin or friends from outside the island. The
presence of these categories of participants related to the status of lompa fish that have no economic value. As mentioned in local myth, the fish is inherited to the people by their ancestors. The fish are caught not for sale, only for household consumption or distributed or shared to families and friends as a sign of relationship. This is different when compare to sasi for trochus or sea cucumber where these marine resources are seen as market commodities, so participants are limited to the villagers as rights holders. In another words, open sasi for lompa fish contains more cultural and social objectives, where through this annual event Haruku people are grateful and share blessings from their ancestors (lompa fish) and gather to strengthen relationship with their kin and friends who stay outside the island.

Figure 2. A stretch of net at the river mouth to trap the lompa fish inside the river

3.3. Sustainability issue on sasi lompa
Sustainability is one of the main aspects offered by sasi system as a local marine resource management of small island. The aspect is contained in the concept of sasi and is described in its regulations. In the case of lompa fish, moreover, the fish as a gift from the ancestors gives an obligation to the locals to preserve it and to treat it specifically in harvesting.

From regulations of sasi lompa (sasi for marine and river area), there are a number of rules that prohibit catching lompa fish during period of sasi, regulate the use of certain fishing gears, and even emphasize maintaining sea and river conditions. They include (a) it is forbidden to catch or bother lompa fish within the area covered by sasi in any way whatsoever; (b) if lompa fish enter the sea outside anchorage area, it cannot be caught with a fine mesh net; (c) the catching of fish in the sasi area is prohibited by using any fishing gears, with the exception of throw net (jala) by wading, not boating, at waist-deep water depth for adults; (d) it is prohibited to use a small mesh-size karoro net within the sasi area and beyond; (e) it is forbidden to enter the river in motor boats or speed boats with engines running; (f) the washing of kitchen utensils in the river is prohibited; and (g) cutting the trees, except for sago palm, on the river banks near the sasi site is prohibited.
The prohibitions in using certain fishing gears are related to the mesh size in order to support sustainability of resources. The karoro net, for example, is the factory made net with mesh size about 2 mm or less, that was introduced about 30 years ago among the locals. Its mesh size is smaller than throw net (jala) that usually used in harvesting lompa fish. The jala has mesh size about 0.5 inch or more. The introduction of karoro net caused a change to the sasi lompa regulations, that is, by adding a ban on the use of this type of net. So, the rule appeared as a response toward the impact of introduction of the new fishing gear on lompa exploitation.

The regulations on fishing gears during the close season and the length of open season period (1-2 days), aims to limit access to malpractice of fishing and prevent overfishing or over-harvesting. Prohibition against behavior of using particular fishing gears when sasi is imposed is controlled by the existence of sanctions. But how behavior in harvesting during one or two days open sasi can be controlled? There is no clear regulation for using fishing gears on harvesting the lompa fish in the river in open season. Almost all villagers and their kin and friends from outside the village and island go out to catch the lompa fish that have been trapped in the river. It might result in overfishing of the fish in that one day.

Usually people catch the lompa on the river using throw nets (jala). However, since the karoro net was introduced about 30 years ago, this fishing gear has also been used to catch the lompa in open sasi. Since then, the karoro net has been increasingly used, its number exceeds jala net. At the 2017 open sasi I observed, jala (throw net) is only a few left, operated by old men. Karoro net can be bought in a store, and compared to jala net, no particular skill is needed for sewing karoro net. Likewise, it does not require high skill to operate it in catching lompa fish in the river in open sasi. Thus, kin and friends from city or town without a background as fishers can join to operate it easily. As a consequence, the mesh size used in open sasi is getting smaller, from about 0.5 inch to around 2 mm and less.

Furthermore, my observation at the opening of sasi lompa in 2017 resulted in another finding of the use of fishing gear, that is, the use of new equipment in the form of mosquito net (kelambu, is usually installed around a bed to avoid mosquitoes). Besides buying, people can also use an old mosquito net that is no longer used. According to some locals, the use of kelambu net has started from 2016 that is a year before. My observation said that quite a number of people use kelambu nets. An informant noticed that more kelambu nets were used at 2017 opening sasi compare to 2016. Like karoro net, the mosquito net can be operated together in groups, adults and children without special skills. The use of these two fishing gears will in turn contribute to the decline in jala net usage, which requires certain skills to make, operate and maintain it. Three kinds of nets used and their catch are presented in Figure 3 and Figure 4.

The core problem regarding sustainability being discussed here is the use of mosquito net (kelambu net) resulting in the smaller mesh size used to catch lompa fish during open sasi. The mesh size of kelambu net is only 1 mm or less.

It was visibly observed that the size of the fish caught in a kelambu net is smaller than what is caught by a jala net because of the mesh size. The way to catch fish with a kelambu net also makes it difficult to the fish to escape, especially on very shallow water. The mosquito net is spread out on shallow water bases and is held around by several people, sometimes rocks arranged around it to limit the movement of fish; the low tide motion made large and small lompa fish are forced into the stretch of kelambu net.

Of the three types of net used in harvesting activity in open sasi by so many people, the changes in the mesh size of the fishing gear which are getting smaller will bring impact to unsustainable harvests. Protecting and preventing the lompa fish for several months during the sasi is imposed (close sasi) does not seem to be comparable to the fishing behavior and use of fishing gears at the one-to-two days open sasi for harvesting lompa.
4. Conclusion
The sustainability aspect contains in the concept and the meaning of sasi which is outlined in the regulations should also be consistent in practice, both during the close sasi and the open sasi. Thus, sasi as a local knowledge of small-island land and marine resource management can be sustainable as well [12].

From an anthropological perspective, this research shows that the use and the change of fishing gears as well as fishing technique practiced at harvesting time failed to show consistency with the meaning of sasi in the context of sustainability. The practice provides short-term human benefits at the expense of long-term sustainability of river or marine resource. The impact of changing the mesh size might be encountered at the harvesting season of sasi in the future. An informant indicated this assumption one year later; saying that the lompa harvest in 2018 was less than in 2017. This statement and the findings of this research can encourage more research on the current status and condition of fish stocks for sustainable fisheries. Meanwhile, this research finding could contribute to regulatory adjustments for harvesting lompa fish at the open sasi event in Haruku.
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