

Impact of Auction System for Swamps on Sustainability of Fishery Resources: a case in South Sumatra, Indonesia

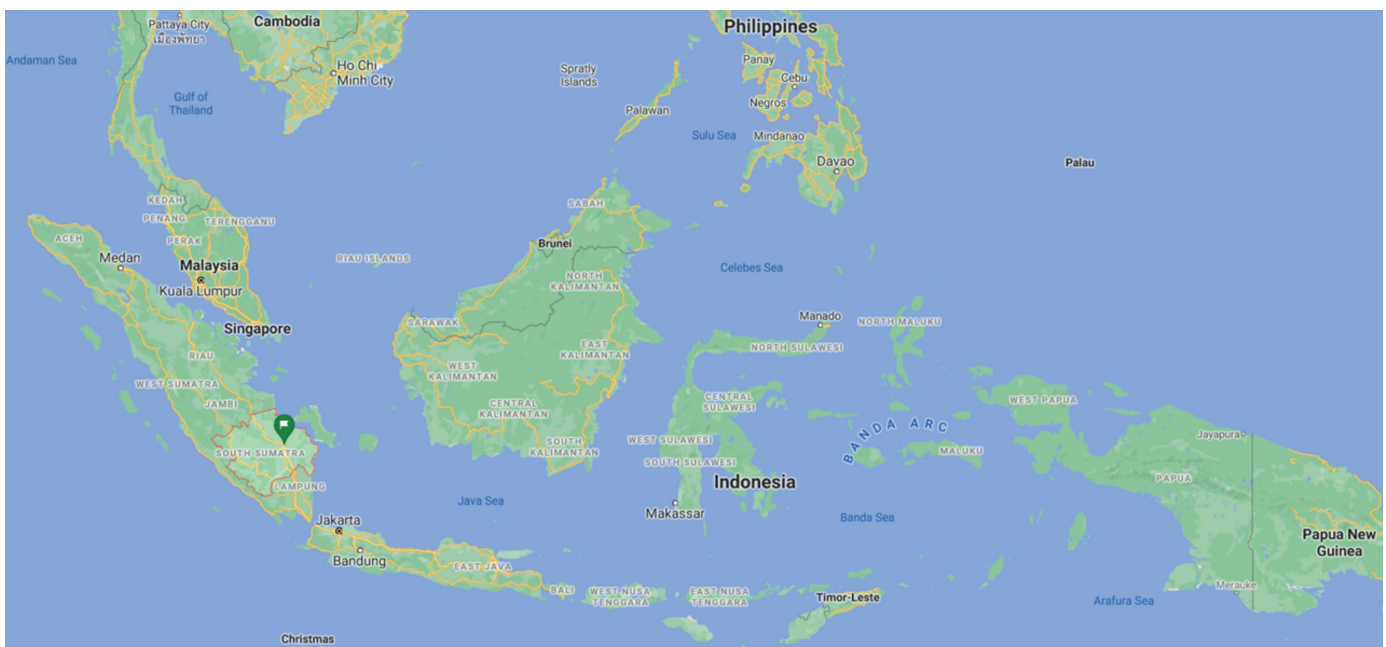
Bayu V. I. Yanti and Dina Muthmainnah

Management of swamps in several parts of Indonesia is carried out using an auction system, which is also known as “lelang lebak lebug” in South Sumatra, and has been practiced for generations. A study was carried out through literature analysis of data and information established from previous research efforts, to identify and assess the impact of the auction system on the biological resources and their sustainability. Results of the analysis indicated that such an auction system harms the sustainability of fishery biological resources. Negative impacts could be seen through the decline in populations of several fish species and the increasing scarcity of several species of economically-important fishes. In addition, drastic decline in fish production and productivity had also been observed from year to year

since the 1990s. Efforts to support the sustainability of living resources should take into consideration the concept of sustainable development with a view to promoting eco-social rationality with economic, social, and environmental dimensions. Several policy implications have economic dimension, *i.e.* the need to strike a balance between the fisheries communities’ economic interests (especially fishers and fish traders) and those of the Government (Regional Original Income). In the case of social dimension, the fishery communities need social engineering to participate in auctions and understand how to utilize the fishery resources sustainably. Determining the conservation areas or refuges and controlling of fishing efforts are some of the necessary aspects in the environmental dimension.

From Article 1 Point 31 of Environmental Protection and Management Law No. 32/2009 of Indonesia dated 3 October 2009 concerning Protection and Management of the Living Environment, Customary Law Communities or traditional communities are “groups of people who have been living in certain geographic areas from generation to generation because of their ancestral ties, having strong relationships with the environment, and heeding the existence of a value system that determines the economic, political, social and legal structures.” One of the environmental protection and management systems being adopted in Indonesia could be noted in the management system of inland water resources including those of deep pools in swamps.

Swamps have different characteristics from the other inland waters (*e.g.* lakes and reservoirs), as there is high difference in their water level between the dry and the rainy seasons (Arifin & Ondara, 1982; Muthmainnah & Gaffar, 2010). Swamp biodiversity is very rich in flora (plants including aquatic plants) as well as in fauna (animals including fish), having unique functions according to species. For example, there are plants that function as source of fish food or as nursery area, as well as spawning area. Fishing activities in swamps usually start at the beginning of the rainy season when fish migrate from main rivers for feeding or for spawning, and end during the middle of dry season when fish swim back to main rivers (Muthmainnah *et al.*, 2017).



Map of Indonesia showing South Sumatra Province
(Source: Google)



Figure 1. Example of swamp area for auction



Figure 2. Temporary house and fishing boat in an auctioned area

In several parts of Indonesia, the management applied for fishery activities in swamps (**Figures 1 and 2**) is carried out through an auction system. The most well-known auction system is the “lelang lebak lebung” or deep pool auction which is practiced in South Sumatra Province, especially in swamps with deep pools which are areas that never get dry, and serve as nursery grounds of various fish species during the dry season (Muthmainnah, 2020). Fishing in deep pools in swamp areas could be conducted by the winner of the auction, usually for a period of one year starting from January until December.

The winner of the auction has the right only for the fishing activities, because the ownership of auctioned area including the plants therein remain with the original landowner. There are three main stakeholders as beneficiaries of the auction system: the district government, fishing communities, and the capital owners, *e.g.* fish traders or fish processors needing supply of fish or raw materials for processing. The district government can turn the proceeds from the annual auction into a significant source of regional revenue for funding the Regional Development and Expenditure Budget.

The fish caught from the auctioned area are generally priced high because of the quality of the fish. Nonetheless, the fisher’s income is still considerably low. The prices of fish caught are determined by the winner of the auctioned swamps, but

since the fishers usually receive the money prior to the fishing activity, to be used in acquiring some fishing gear, they had to repay the auction winner the advanced amount by sending the fish catch. This condition has raised the question about the impact of the auction system on fish sustainability in the auctioned swamps areas.

Fishing Business Rights

Principally aimed at managing the fishery resources, the auction system is also meant to ensure that the natural resources are well utilized (Nasution, 1990). Nevertheless, it has been noted that the traditional community’s fishing effort in a particular auction area is usually being put to several disadvantages, especially that non-fishers are allowed to participate in the auction process and allowed to obtain the fishing rights (Zain, 1982). This has resulted in the right to fish as a business venture in South Sumatra’s swamp, especially in Ogan Komering Ilir Regency, as the right is obtained by traders/owners with capital but who do not work as fishers (Nasution *et al.*, 1992).

In such a situation therefore, the fishers obtain the fishing rights not directly from the government through the auction process but instead secure water lease from the auctioned winner/trader at a price higher than that from the auction process. This phenomenon has motivated the desire of fishers to catch more fish irrespective of the species and sizes of the fish in the auctioned area. Certainly, this has directly or indirectly harmed the fishery resources and the environment. Herewith are presented the several indicators of the negative impacts based on results of a study carried out to determine the sustainability of the auction system with respect to the state of the fishery resources.

Fish Population and its Production in Auctioned Areas

Results of the study on the activities of the auction system indicated decreasing populations of several fishes in the auctioned swamp areas (**Table 1**). Although catfish, a dominant fish in the swamp areas is still abundant, according to the traditional fishing community, this fish is less attractive to consumers and comes with lower prices compared to other fishes. This certain species of catfish is a hybrid of the African catfish with local catfish (Nasution, 2012).

Moreover, as shown in **Table 2**, the sizes of fish in the auctioned area had been changing. Before the 1990s the fish size was bigger than those after the 1990s, also implying that changes in the environment have been taking place. Moreover, the average weight of fish in 1996 and 2001 also changed (**Table 3**). The decreasing sizes occurred in seven economically-important fishes. According to the fishers, it has also become difficult to catch these fishes.

Table 1. Opinion by fishers regarding the condition of fish populations

Common and scientific names of fishes in auction area	Ratio of fish quantity	
	Period	Period
Snakeskin gourami (<i>Trichopodus pectoralis</i>)	XXXX	X
Climbing perch (<i>Anabas testudineus</i>)	XXXX	X
Striped snakehead (<i>Channa striatus</i>)	XXXX	X
Three spot gourami (<i>Trichopodus trichopterus</i>)	XXXX	XXXX
Glass catfish (<i>Kryptopterus bicirrhis</i>)	XX	---
Bronze featherback (<i>Notopterus notopterus</i>)	XXXX	---
Tinfoil barb (<i>Barbonymus schwanenfeldii</i>)	XXXX	---
Giant freshwater prawn (<i>Macrobrachium rosenbergii</i>)	XXXX	---
Philippine catfish (<i>Clarias batrachus</i>)	XX	XXXX

Source: Nasution (2012)

Where: XXXX = overflow; XXX = lots; XX = moderate; X = a little; --- = rare

Table 2. Average amount of fish catch before and after 1990s in kg

Common and scientific names of fishes in auction area	Number of tails per kg	
	Before 1990s	After 1990s
Snakeskin gourami (<i>Trichopodus pectoralis</i>)	20-25	30-45
Climbing perch (<i>Anabas testudineus</i>)	8-10	15-18
Philippine catfish (<i>Clarias batrachus</i>)	10	20
Three spot gourami (<i>Trichopodus trichopterus</i>)	30	60
Striped snakehead (<i>Channa striatus</i>)	2-3	4-10

Source: Nasution (2012)

Table 3. Average weight of individual fishes caught in 1996 and 2001

Common and scientific names of fishes in auction area	Average weight (g/indv)	
	1996	2001
Indonesian snakehead (<i>Channa micropeltes</i>)	2,000-3,000	1,000-1,500
Striped snakehead (<i>Channa striatus</i>)	1,000-2,000	600-1,000
<i>Channa melanopterus</i>	1,500-2,000	350-500
<i>Channa pleurophthalma</i>	500-1,000	300-400
Kissing gourami (<i>Helostoma temminckii</i>)	80-100	50-60
Snakeskin gourami (<i>Trichopodus pectoralis</i>)	80-100	40-50
Philippine catfish (<i>Clarias batrachus</i>)	300-400	100-200

Source: Modified from Nasution et al. (2002)

The total fish production of fishers in an auction area before and after the 1990s in a day and whole week is shown in **Table 4**. These facts illustrate that the total fish production had decreased drastically, for during the period before the 1990s, fishers could catch 80 kg/day of fish, but after the 1990s the fishers could only come up with 25 kg/day (Nasution, 2012).

Therefore, from the information gathered through this study, it could be said that the auction system harmed the fishery resources and aquatic plants, rather than maintaining the sustainability of the fishery resources which appeared difficult to achieve. While fish productivity of the auctioned area based on the catch of fishers decline as well as the diversity of fishery resources, and the areas that support the sustainability of economically-important economic fishes had also decreased.

Table 4. Total fish capture production before and after 1990s

Period	Total fish production (kg)	
	Before 1990s	After 1990s
In a week	250	90
In a day	80	25

Source: Nasution (2012)

Advocating Eco-social Rationality

The utilization of natural resources should provide benefits to all users, either directly or indirectly. In terms of the use of natural resources, this is known as the utilization in natural harmony. Utilization in harmony with nature means the use of natural resources that must consider the carrying capacity of nature in producing the products from the resources.

For the of maximum benefit that users could obtain from the fish and plant resources in a swamp ecosystem, the exploitation should consider the various dimensions associated with their utilization. This dimension is seen in natural resource (fish and plant resources) utilization and natural resource users (humans, fishers). Such harmonious use of nature has implications on sustainable development, because basically, the meaning of sustainable development is “to meet current needs without sacrificing future generations’ ability to satisfy their needs” (WCED, 1987).

The concept of sustainable development also involves combining the preservation of natural resources, environment, and construction which in this case, refers to the responsible utilization of the fishery resources in the auctioned swamp areas. Therefore, utilizing and managing natural resources and the environment including in auctioned areas, need the concern and attention of all members of the society on the conditions of the resources in the future. However, sustainable development does not mean no constructions or land changes at all.

Sustainable development approach needs to have the same assumptions, and the basic principles that guide users to achieve a truly sustainable development. The principle of sustainable development is also consistent with the emergence of eco-social rationalism, pioneered by John Dryzek, Ulrich Beck, and Andre Gorz, which later became the basis of rationality thinking that is more suitable for contemporary political economy. The eco-social rationality approach is believed to be capable of addressing environmental problems that are rooted in social issues, where social problems are institutional, ideological, psychological, and cultural in nature (Little, 2000).

In the eco-social rationalism, the environment is seen as a whole and has an end goal for all creatures. The emergence of environmental problems is a result of works of humans who want to control the universe. The notion of economic rationality put forward does not merely maximize material benefits and utility but also considers social and environmental rationality. Dryzek realizes that environmental problems usually arise from social structures and institutions and the aggregation of various human activities. Meanwhile, the eco-social rationalism approach is known to involve all social movements and social organization of an economic system as well as the government, which regulates it in the form of rules and regulations, which are politically outlined in policy documents. Thus, the primary basis used to frame the overall analysis to support the sustainability of biological resources in the swamp areas is the concept of sustainable fisheries development with the perspective of eco-social rationality.

Way to Support the Sustainability of Fishery Resources

Efforts to support sustainability of the biological resources in the auctioned swamp areas within sustainable development concept with simple eco-social rationality should focus on the utilization and management of these natural resources by people who are concerned with the economic, social, and environmental dimensions. The following recommendations are therefore put forward.

Economic Dimensions

The economic dimension must balance the economic interests of the traditional fishery community, especially the fishers and fish traders, and the government as a form Regional Original Income. In this case, to avoid the significant role of non-fishers in the auction system, only the natural members of traditional community should be the only ones who have the voice to bid in the auction, who are fishers regardless of the origin of the fishers’ capital. Fishers in this position can make prior agreements with traders regarding the amount of loan with capital interest and determine the price of fish before the auction. In addition, fishers should also have bargaining position against traders or owners of the capital.

On the other hand, the district government as the auctioneer can set the standard price at the start of the auction, not to increase the prices yearly. Thus, fishers can estimate whether they still could get some profit if they obtain fishing business rights in the waters that are the object of the auction, *e.g.*, swamp areas. The district government should also allocate funds for fostering the management of the swamp areas which could be not less than 10 % of the value of the proceeds from the auction. This guidance is intended to benefit the traditional fisher communities, fishery resources, and the environment, and provides the fisheries technical guidance to officers, including the fisheries extension workers.

Social Dimensions

Under the social dimension, there is a need for social engineering of the fishery communities participating in the auction. They should be made to understand how to utilize fish resources in order to achieve sustainability. Relevant information should be disseminated, which could include the recruitment process of fish resources, the role of plants in the life of fishes, the need for location and services of fish resource conservation, friendly fishing activities, fostering the role of women fishers (wives), and the importance of fishers institutions in achieving the sustainability of fishery resources, and the environment, including the plants.

Environmental Dimensions

Environmental dimension is crucial in the auctioned area as under the auction system, part of the auctioned area should be determined to serve as a conservation or reserve area, especially for the auction of areas with fishes that are of high economic value and also the location of such conservation area. Then, restrictions are placed, *e.g.* on plants' use in the auctioned ecosystem, especially for plants that are sources of food for fish, and considering that the fish, spawning areas, and nursery areas for fish have significant economic values.

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About the Authors

Ms. Bayu Vita Indah Yanti is a Junior Researcher at Research Centre for Marine and Fisheries Socio-economics of the Ministry of Marine Affairs and Fisheries in Jakarta, Indonesia.

Dr. Dina Muthmainnah is the Head of Research and Development at SEAFDEC/IFRDMD and the Senior Researcher at the Research Institute for Inland Fisheries and Extension of the Ministry of Marine Affairs and Fisheries in Palembang, Indonesia.