

Sustainable fisheries analysis with empowerment of local wisdom in Pasaman Barat District, West Sumatra, Indonesia

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Abstract. Fish farming has become a commercial business, but the evidence so far is that progress has not been fully relied upon to boost the economy. The fisheries sub-sector, especially freshwater aquaculture, is based on the people's economy, which can strive to survive and still be able to contribute to the economy by strengthening cultural assets in the form of local wisdom. This research aims to investigate the implementation of sustainable fisheries development based on the application of local wisdom to achieve sustainable fisheries in West Pasaman Regency, West Sumatra Province, Indonesia. This study used a mixed-methods model approach. The survey was conducted by distributing questionnaires to the respondents from aquaculture fishers' households. The main findings of this study are sustainability and sustainable development are complex things where this can be achieved through an economic, ecological and social system where the pillars of economy and ecology are also need to consider social pillars including culture and institutions. To achieve sustainability, the scenario is built so that aquaculture activities in freshwater waters can be sustainable to achieve financial well-being, ecological sustainability in the form of availability of freshwater fish stocks and sustainability of local wisdom.

1 Introduction

Fisheries is still considered to be one of the industries that contributes to a nation's wealth in economic terms. Indonesia is a country with enormous potential in terms of both marine and fisheries, being an archipelagic country with huge potential for fish resources and high biodiversity. The development of science and the increasing advancement of technology in the field of fisheries has boosted the world's fisheries as a rapidly growing sector of the food industry. Fish farming in Indonesia has become a commercial business, but the evidence so far is that progress has not been fully relied upon to boost the national economy.

Economic development is one of the development goals that symbolises a better society. This economic perspective tends to dominate how we think about concepts of development

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and well-being. Development can be conceptualised as growth and expansion, change and improvement, transformation and modernisation, but in the process of development it turns out that development is also a cultural process because the economy is part of the cultural reality that can make economic sense. Economic growth is one of the development goals that symbolises social welfare. This economic behaviour tends to dominate how we think about development and welfare criteria. Development can be conceptualised as growth and expansion, change and improvement, transformation and modernisation, but it turns out that development is also a cultural process because the economy is part of a cultural reality that can make economic sense.

Strong cultural assets can serve as a foundation for driving national growth. Three Asian countries, particularly Japan, China and South Korea, are said to have succeeded in accelerating culture-based socio-economic development by leveraging cultural values through modernity. In these three countries, it is essential to accelerate cultural development in order to strengthen the economy by incorporating culture into economic activities. Cultural assets derived from local wisdom promote people's well-being. To understand the financial impact of culture, one must first understand the values and cultural norms that exist among individuals and their economic actions. Economic progress demonstrates the link between productivity in the economy and cultural development as a region's identity, which must complement each other to create economic prosperity by strengthening cultural resources through local wisdom, including in the fishing industry.

West Pasaman regency, part of West Sumatra province, is one of the districts in Indonesia with significant fishing potential. The fishing sector serves as the backbone of the community by providing food and protein sources. In West Pasaman Regency, West Sumatra Province is very dominant with the role of this sector in the economy of more than 39 percent of the Gross Regional Domestic Product (GRDP), but the growth rate of this sector is still very low, between 3 percent to 5 percent and even negative in 2020 of -1.29 percent, this indicates that West Pasaman Regency, West Sumatra Province relies on the agriculture, forestry and fisheries sector as the driver of the community's economy, but the growth rate of this sector is still very slow every year, indicating that the existing potential has not been optimally utilised, so it needs to be increased in order to be able to provide better economic contribution and welfare for the community. As one of the districts with considerable fishing potential in West Sumatra, the fisheries sector is the backbone of the economy. The welfare level of the people in West Pasaman Regency, West Sumatra Province, where the role of agriculture, forestry and fishery is very dominant, is still very low, ranging from Rp 24,302,000 to Rp 26,774,000 per year, or an average of Rp 2,000,000 per month. It can be seen that the level of Gross Regional Domestic Product (GRDP) per capita of the people in West Pasaman Regency West Pasaman Regency has not been able to create welfare for its people (1).

If we consider the fish farmers' exchange rate as a measure of goods or services needed for production needs and household consumption needs, the fish farmers' exchange rate is the ratio between the price index received by the fish farmers and the price index paid by the fish farmers, expressed as a percentage. An overview of the exchange rate for fish farmers in West Pasaman Regency, West Sumatra Province, Indonesia, shows that it is still insufficient to meet the daily needs of fish farmers. The value of the fish farmers' exchange rate (NTPi) is only slightly above the value of 100, so it can be concluded that the exchange rate is only around 100 (1). Means that the fishing community has broken even and is not yet prosperous; the increase or decrease in the production price of fish farmers in West Pasaman Regency, West Sumatera Province is the same as the percentage increase or decrease in the price of consumer goods, and the income of the aquaculture community is the same as their expenditure. Therefore, another approach is needed to improve the welfare of the aquaculture community, one of which is something that has been owned but never

empowered before, namely local wisdom, especially in the fisheries sector. Where fishing activities with community-based economic empowerment are very important and strategic for economic progress in establishing fisheries management cultivation and improving the welfare of society, the values and norms adhered to by the community in the form of local wisdom, which represents the wisdom of the community in managing natural resources and the environment, can be empowered. Local wisdom is the view of life of the local community that has a relationship with meeting the needs of life, both material and social (2), this local wisdom becomes a link from one generation to the next, because local wisdom is a concept, an idea and an idea that is always transmitted to the next generation, so that harmony is built in the management of life and its environment (3).

Fisheries activities in West Pasaman Regency, West Sumatra Province, have been supported by the government to develop extensively, but sustainable growth in the sector has not yet been achieved. The growth of the fisheries sector is necessary to meet food and nutrition security in the future, but it is also a challenge in terms of managing its impact on the environment. Based on the above description, this research aims to explain the application of cultural values in fisheries. Fisheries activities in West Pasaman Regency, West Sumatra Province, have been encouraged by the government to expand; however, sustainable growth in this industry has yet to be achieved. The expansion of the aquaculture sector is vital for future food and nutrition security, but it also poses a problem in terms of regulating its environmental impact.

In line with the above statement, the purpose of this research is to explain how the application of cultural values or local wisdom that has existed in society for a long time has had an economic impact, either directly or indirectly, in helping to conserve the environment and prevent environmental damage to achieve the ultimate goal of sustainability.

2 Research Methodology

In this study, researchers collect and analyse data, integrate findings and draw inferential conclusions by using two approaches - quantitative research methods and qualitative research as a comprehensive analysis to answer research problems carried out in a research period. Thus, the study uses the concurrent embedded model, a strategy in which quantitative research methods are used to analyse the responses of respondents or research informants, including experts, to the variables of local wisdom in achieving sustainable fisheries in West Pasaman Regency, West Sumatra Province, Indonesia. A mixed methods approach was used to formulate the problem in the study. Combined research or mixed method is a research method that combines quantitative research methods with qualitative research methods to be used together in a research activity to obtain more valid, comprehensive, reliable and objective data (4).

3 Results and discussions

One of the challenges in the fisheries sector is the existence of externalities, because fish resources in ecological systems are public goods, so the costs of environmental damage are shared, even though the exploitation of these resources generates benefits that are enjoyed privately. Humans must maintain and take care of their environment; this view places humans and their environment in a functional or holistic relationship (5). The parts of resource sustainability that are exploited as public goods are carried together with the soul of this restricted fishing culture, and when the costs of environmental degradation and externalities occur, they are also shared. The community as a whole will implement the

banned fish with an environmentally friendly approach, starting with the planting of seeds in the pond, feeding the fish with food or feed, maintenance, periodic inspection, fish treatment and routine maintenance. Environmental damage or degradation will be reduced as a result of increased understanding of the importance of culture and customs in environmental conservation, allowing fish stocks to be conserved and production to be carried out in a sustainable manner for both present and future generations. Fish farmed using local knowledge are local fish with high economic value, with the aim of achieving commercial value while also being valuable for the conservation of biological nature, particularly the extinction of natural habitats. Cultural assets can promote the well-being of the local community and the growth of the region through local wisdom (6).

Previous research to measure sustainable fisheries has not empirically addressed all dimensions. Only the ecological dimension has looked at sustainable fishing practices. According to the findings of ecological research, the fisheries sector in industrialised countries provides not only food, but also recreation (7), and in developing countries it is a source of livelihood; the critical importance of the fisheries sector in the economy poses challenges to the inland fisheries sector, with overfishing being the most common threat to inland fisheries (8). The people's economy is an economic system based on the economic power of the people. The people's economy is an economic activity or business carried out by ordinary individuals who independently manage all economic resources that can be cultivated and controlled, especially the fisheries sector, with the primary objective of meeting their own and their families' basic needs without sacrificing the interests of other communities. According to Article 33 of the 1945 Constitution, a populist economy is an economic system that aims to achieve the economic sovereignty of the people. A populist economy is structured as a joint venture based on the principle of kinship, with production sectors that are important to the state and affect the livelihood of many people being controlled by the state, and land, water and all the wealth contained therein being controlled by the state and used for the greatest prosperity of the people.

The region has cultural assets in freshwater aquaculture in the form of a unique local fishing wisdom that has long been applied by the community, but is still limited to a local scale. The concept of forbidden fish is one type of local wisdom applied to aquaculture practices. Cultural assets, such as the local wisdom of no-fishing, can be empowered to achieve long-term financial well-being for the community, ecological sustainability in the form of freshwater fish stock availability, and long-term sustainability of the local wisdom of no-fishing itself. As local wisdom is a concept, an idea and ideas that are always passed on to the next generation so that harmony is built in the management of life and its environment, it becomes a link from one generation to the next (9,10,11), subsequent research shows that local people as beneficiaries directly related to fish resources when working with local governments are generally more effective in achieving the expected results, so that community participation is an important factor in the management of protected areas and the sustainability of fish resources (12,13). Subsequent research has found that local communities benefit when they participate and play their role in resource management through their traditional knowledge to formulate sustainable management strategies. The role of culture in the use of natural resources places cultural capacities, knowledge and technology systems, religion, traditions and social capital (ethics and environmental wisdom, norms and legal institutions) as important in the context of resource use. This cultural capacity is used to balance exploitation and capture and the potential expected to be processed, and as an important consideration for local communities in using resources to achieve fisheries sustainability (14, 15).

According to observations, the people of West Pasaman Regency, West Sumatra, apply local wisdom to aquaculture activities, including a culture of community-based prohibition of fishing in local rivers as an agreement to keep alive fish that have been in the river for a

long time. Local knowledge appears in the form of taboos or prohibitions in the monitoring of fisheries resources in West Pasaman Regency, West Sumatra Province. Both have different philosophical underpinnings. Abstinence follows a religious-magical pattern, while prohibition follows customary law standards. Despite their different roots, both are concerned with maintaining the balance of the environment and ensuring the survival of community members. Activities in the fisheries sector involve and are inextricably linked to institutional responsibilities, as the fisheries sector cannot achieve sustainability without fisheries institutions. A social system boundary that is covered by formal and non-formal norms as controllers and directors of interactions between people in their access to resources is known as institutional.

Sustainable development, including sustainable fisheries, rests on three pillars: economic, social and environmental. Efforts to maintain a natural balance (green) are part of a measure of environmental concern among economic operators in an industry (16). From an economic and cultural perspective, this will have an impact on the wellbeing of the community, as culture in the form of participatory, adaptable and sustainable local wisdom values has the capacity to benefit the local economy. The production of prohibited river fish is expected to be developed in several sub-districts in West Pasaman Regency, West Sumatra Province, with an average total production of between 11 and 13 tonnes per harvest or per year. There has never been an official collection of data on banned fish products and their economic value has never been determined by the local fisheries agency or BPS West Pasaman Regency, West Sumatra Province, so the production value is still not well recorded. If the average price of freshwater fish is Rp. 25,000 (twenty-five thousand rupiah) per kilogram, the economic value of the production of illegal fish is between Rp. 275,000,000 (two hundred and seventy-five million rupiah) per harvest or year (1).

It has been observed that the people of West Pasaman Regency, West Sumatra, apply local wisdom to aquaculture activities, including a culture of community-based forbidden fishing established in local rivers as an agreement to keep alive fish that have been in the river for many years. At present, the local wisdom of forbidden fish in West Pasaman Regency, West Sumatra Province, is still seen as something unique to be preserved and tends to be used as a cultural tourism object. Local knowledge appears in the form of taboos or prohibitions in the management of fishery resources in West Pasaman Regency, West Sumatra Province. Both have unique philosophical underpinnings. Abstinence follows a religious-magical pattern, while prohibition follows customary values; despite their different foundations, both are in favour of the balance of nature and ensure the livelihood of everyone in the community. Activities in the fisheries sector include and are inextricably linked to institutional duties, as the fisheries sector cannot achieve sustainability without fisheries organisations. A social system that is defended by formal and non-formal norms that control and direct the interactions between people in their access to resources is called institutional.

Traditional societies usually have certain rules to prevent over-exploitation; for example, harvesting of a particular species is strictly controlled, and bans on hunting or harvesting are enforced in certain areas, with customary sanctions for violations. In fishing activities that apply the principles of culture and local wisdom that prohibit fishing, the use of environmentally friendly equipment (nanotechnology) is used, basically equipment that does not harm nature, so that fish are collected according to size according to demand. Market with high commercial value, while protecting the sustainability of fish seeds for future harvesting. In the prohibited fishing paradigm, the main purpose of the prohibition is to catch fish outside the prescribed period. This means that the many species of fish that exist in the river are the main assets of the closed fishery, which are retained in the river and collectively controlled. Prior to the adoption of the restricted fishing management approach, the community viewed the river as a common resource open to all. At that time,

anyone could catch fish whenever they wanted, as long as they didn't use illegal methods such as manuba, poisoning or even electric shocks. Illegal fishing affects not only the neighbouring people but also the environment, with ecological, economic and socio-cultural consequences.

According to observations in West Pasaman Regency, three components are at work in the management of forbidden fish: myths, customary law provisions and customary institutions with a kind of community-based management of fishery resources, which is carried out by closing seasons or areas for a certain period of time. This means that fishing only takes place once a year, in accordance with Islamic religious holidays, especially Eid al-Fitr. Forbidden fishing is an environment for fish that cannot be caught in any form. The type of fish that is retained is one that has economic value. From an environmental perspective, moderate fishing allows fish to develop and reproduce well. Fish can be taken when they reach a certain size to prevent extinction. The Community approach to the management of closed fisheries is participatory, flexible and long-term in order to conserve fishery resources, especially local fish.

The fishing industry in West Pasaman Regency, West Sumatra Province, has traditionally used local wisdom in aquaculture, with prohibited fishing being the dominant local wisdom. Economically, the proceeds from the prohibited fish are mainly used for community activities, including replenishing the village or community treasury, funds for the construction of worship facilities, sources of funding for village or community activities, and, from a social point of view, increasing the friendship of the village or community. Based on previous observations and research in West Pasaman Regency, West Sumatra Province, it can be seen that local communities participate in exercising control over the use of resources through prohibited fishing activities because they have an interest in these natural resources due to the economic results of fishing activities. The ban is used for community or village development. Local wisdom in fishing is passed on in the form of traditions that are economically advantageous for the village or community economy, for the growth of the local village or community, and for the preservation of culture. Based on observations, it has been found that sustainability and sustainable development are complex concepts that can be achieved through an economic, ecological and social system (economic-ecological-social system), in which the economic and ecological pillars must also take into account social pillars such as culture and institutions (institutional). All these factors must be integrated to achieve sustainability.

4 Conclusions

Sustainability and sustainable development are complex concepts that can be fulfilled by an economic, ecological and social system (economy-ecology-social system), with economic and ecological pillars balanced by social pillars such as culture and institutions. All these aspects need to be considered to achieve sustainability. By harnessing local wisdom, cultural assets can support local community well-being and regional growth. Local knowledge can be used to achieve long-term financial well-being for the community, long-term ecological sustainability in the form of available freshwater fishing stocks, and long-term sustainability of the local wisdom forbidden fish itself. To achieve sustainability, the scenario is constructed so that freshwater aquaculture activities are both financially viable and ecologically and culturally sustainable through the existence of freshwater fish stocks.

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