

Analysis of Sustainable Fisheries with Empowerment of Local Wisdom in Pasaman Barat District, West Sumatra, Indonesia

Baginda Parsaulian^{1*}, *Agus Irianto*², and *Hasdi Aimon*³

¹ Environmental and Development Studies, Universitas Negeri Padang, 25000 West Sumatra, Indonesia

² Environmental and Development Studies, Universitas Negeri Padang, 25000 West Sumatra, Indonesia

³ Environmental and Development Studies, Universitas Negeri Padang, 25000 West Sumatra, Indonesia

Abstract. Fish farming has become a commercial business field, but the fact that has been revealed so far is that progress has not been fully relied upon to lift the economy. The fisheries sub-sector especially freshwater aquaculture based on the people's economy, which can be strived to survive and still be able to contribute to the economy through empowering cultural assets in the form of local wisdom. This research aims to study the implementation of sustainable fisheries development based on the application of local wisdom for achieving sustainable fisheries in West Pasaman Regency, West Sumatra Province, Indonesia. This study used a mixed-method model approach. The survey was conducted by distributing questionnaires to aquaculture fishermen household respondents. The important 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 the economy and ecology are also must 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 welfare, ecological sustainability in the form of the availability of freshwater fishery stocks, and the sustainability of local wisdom.

INTRODUCTION

The fishery is still considered one of the economic sectors that contributes to the welfare of a nation when measured economically. Indonesia is a country that has enormous potential both in terms of marine and fisheries as an archipelagic country that has enormous potential for fish resources and has high biodiversity. The development of science and the increasing advancement of technology in the field of fisheries have fueled world fisheries as a rapidly growing food industry sector. Fish farming in Indonesia has become a commercial business field, but the fact that has been revealed so far is that progress has not been fully relied upon to lift the national economy.

* Corresponding author: bagindaparsaulian@yahoo.com

Economic development represents one of the development goals that symbolizes a better society. This economic perspective tends to dominate how we think about concepts of development and welfare. Development can be conceptualized as growth and expansion, change and improvement, transformation and modernization, but in the development process, it transforms out that development is also a cultural process because the economy is part of cultural reality, which can make economic sense. Economic growth is one of the development goals that symbolizes societal welfare. This economic conduct tends to dominate how we think about development and welfare criteria. Development can be conceptualized as growth and expansion, change and improvement, transformation and modernization, but it transforms out that development is also a process of culture because the economy is part of a cultural reality, which can make economic sense.

Strong cultural assets can serve as the foundation for driving national growth. Three Asian countries, especially Japan, China, and South Korea, are said to have succeeded in speeding culture-based socioeconomic development by leveraging on cultural values through modernity. In these three countries, it is vital to expedite cultural development in order to strengthen the economy by including this culture in economic activity. Cultural assets derived from local wisdom promote people's well-being. To comprehend the financial impact of culture, one must first grasp the values and cultural norms that exist among individuals and their economic actions. Economic advancement demonstrates the link between productivity in the economy and cultural development as a region's identity, both of which must complement mutually in order to create economic prosperity by empowering cultural resources through local wisdom, including one in the fisheries industry.

West Pasaman District, which is part of West Sumatra Province, is one of the districts in Indonesia with significant fishing potential. The fishing sector serves as the community's backbone 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 minus in 2020 of -1.29 percent, this indicates that West Pasaman Regency, West Sumatra Province relies on the agriculture, forestry and fisheries sectors as a driver of the community's economy but the growth rate of this sector is still very slow every year and indicates that the existing potential has not been optimally utilized so that 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 fishery potential in West Sumatra, the fisheries sector is the backbone of the economy. The level of welfare of the people of West Pasaman Regency, West Sumatra Province, with the role of the agricultural, forestry, and fisheries sectors, which are very dominant, is still very low, ranging from Rp. 24,302,000 up 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 pay attention to the Fish Cultivator Exchange Rate as a measurement tool for goods or services needed for production needs and household consumption needs, the fish cultivator exchange rate is the ratio between the price index received by the fish cultivator and the price index paid by the fish cultivator expressed as a percentage. An overview of the Exchange Rate for Fish Cultivator Fishermen in West Pasaman Regency, West Sumatra Province, Indonesia, shows that it is still insufficient to meet the daily needs of cultivators. The value of the Fish Cultivator 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 cultivators in West Pasaman Regency, West Sumatra 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 has never been 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 the establishment of fisheries management cultivation and improving the welfare of society, the values and norms adhered towards by the community in the form of local wisdom, which represent the community's wisdom in managing natural resources and the environment, can be empowered. Local wisdom is the view of the life of the local community, which has a relationship with meeting the needs of life both materially and socially (2), this local wisdom becomes a connecting point from one generation to the next because local wisdom is a concept, an idea, and an idea that are always transmitted to the next generation so that harmony is built in managing life and its environment (3).

Fishery activities in West Pasaman Regency, West Sumatra Province, have received support from the government to be widely developed, but sustainable growth in this sector has not yet been achieved. The growth of the fishery 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 description above, this research aims to explain the application of cultural values in fisheries. Fisheries activities in West Pasaman Regency, West Sumatra Province, have received government encouragement to expand; however, sustainable growth in this industry has yet to be accomplished. The expansion of the aquaculture sector is vital for the future security of food and nutrition, but it is also a problem in terms of regulating its environmental impact.

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

RESEARCH METHODOLOGY

In this study, researchers collect and analyze 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 one research time. Thus study use the *concurrent embedded model*, a strategy in which quantitative research methods are used to analyze 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).

RESULTS AND DISCUSSIONS

One of the challenges in the fisheries sector is the existence of externalities because fish resources in ecological systems are public commodities, thus the costs of environmental damage are shared, even as the exploitation of these resources builds advantages that are enjoyed privately. Humans must maintain and stand by their surroundings; this viewpoint places humans and their environment in a functional or

holistic relationship (5). The parts of resource sustainability exploited as public goods will be all together carried with the soul of this restricted fishing culture, and if the costs of environmental degradation and externalities occur, they will also be shared borne. The community at large implements prohibited fish with an environmentally friendly approach, beginning with throwing the seeds into the pond, giving fish food or feed, maintenance, periodic control, 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 preservation, allowing fish stocks to be preserved and production that is carried out in a sustainable manner by both current and future generations. The fish farmed in the implementation of local knowledge are local fish with high economic worth, with the goal of obtaining commercial value while also being valuable for the preservation of biological nature, particularly the extinction of natural habitats. Cultural assets may encourage local community welfare and the growth of the region through local wisdom (6).

Previous research studies that have been undertaken to measure sustainable fisheries have not addressed all dimensions empirically. Only sustainable fishing practices were studied in the ecological component. According to the findings of ecological research, the fishing sector in industrialized countries not only provides food but also recreation areas (7) and are a source of livelihood in developing countries, the crucial significance of the fisheries sector in the economy creates challenges to the inland waters sector, with overfishing being the most common hazard to fisheries from the internal sector (8). The people's economy is an economic system based on the economic power of the people. While the people's economy is an economic activity or business carried out by common individuals who independently manage any economic resources that can be cultivated and controlled, especially the fisheries sector, with the primary goal of reaching their own and their families' basic needs without sacrificing the interests of other communities. The crucial significance of the fisheries sector in the economy creates challenges to the inland waters sector, with overfishing being the most common hazard to fisheries from the internal sector. According to Article 33 of the 1945 Constitution, populist economics is an economic system aimed at achieving people's economic sovereignty. A populist economy is structured as a joint venture based on the principle of kinship, production branches that are important to the state and affect the livelihoods of many people are controlled by the state, and land, water, and all wealth contained therein are 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 fishery local wisdom that has long been applied by the community but is still limited to a local scale. The concept of prohibited fish is one kind of local wisdom that is applied to aquatic farming practices. Cultural assets, such as local wisdom forbidden fishing, can be empowered to achieve long-term financial well-being for the community, ecological sustainability in the form of freshwater fishery stock availability, and long-term sustainability of local wisdom forbidden fishing itself. Because local wisdom is a concept, idea, and ideas that are always transmitted to the next generation so that harmony is built in managing life and its environment, it becomes a connecting point from one generation to the next (9,10,11), subsequent research shows that local people as beneficiaries who are directly related to fish resources when working with local governments are generally more effective in achieving the expected results so community participation is an important factor in the management of conservation areas and the sustainability of fish resources (12,13). Subsequent research has found that local communities will benefit if they participate and carry out their roles in resource management through their traditional knowledge to formulate sustainable management strategies, role of culture in the utilization of natural resources place 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 utilizing resources. This cultural capacity is used to balance utilization and capture, and the potential that is expected to be processed and as an important consideration for local communities in utilizing resources to achieve fishery sustainability (14, 15).

According to observations, the inhabitants of West Pasaman Province in West Sumatra apply local wisdom to aquaculture activities, including a culture of community-based forbidden fishing grown in local rivers as an agreement to keep fish that have been in the river for a long time alive. Local knowledge appears in the form of taboos or prohibitions in the oversight of fishing resources in West Pasaman Regency, West Sumatra Province. Both have distinct philosophical underpinnings. Abstinence follows a religion-magical pattern, whereas prohibition follows customary law standards. Despite their differing roots, both are in favor of maintaining the balance between the environment and ensuring the survival of community members. Activities in the fisheries sector include and are inextricably linked to institutional responsibilities, as the fishery sector cannot attain sustainability without fisheries institutions. A social system border that is covered by formal and non-formal norms as controllers and directors of interactions between humans in their access to resources is known as institutional..

Sustainable development, that includes sustainable fisheries, is founded on three pillars: economic, social, and environmental. Efforts to maintain a natural balance (green) are part of a measure of environmental concern among business actors in one industry (16). From an economic and cultural dimension, this will have an impact on boosting the welfare of the community, as culture in the form of participatory, adaptable, and sustainable local wisdom values has the ability to benefit the local economy. The production of prohibited river fishing 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 tons at each harvest or every year. Official data collection for forbidden fishing items has never occurred, and their economic value has never been determined by the local fisheries agency or BPS West Pasaman Regency, West Sumatra Province, therefore the production value is still not well recorded. If the average price of freshwater fish is Rp. 25,000 (twenty-five thousand rupiahs) per kilogram, the economic value of forbidden fish production is between Rp. 275,000,000 (two hundred and seventy-five million rupiahs) per harvest or year (1).

According to observations, the people of West Pasaman Province in 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 fish that have been in the river for many years alive. At present, the local wisdom of forbidden fish in West Pasaman Regency, West Sumatra Province, is still considered something unique that should 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 fishing resources in West Pasaman Regency, West Sumatra Province. Both have unique philosophical foundations. Abstinence follows a religion-magical pattern, while prohibition follows customary law values; despite their distinct foundations, both are in favor of the balance of nature and ensure life for everyone in the community in question. Activities in the fisheries sector include and are inextricably linked to institutional duties, as the fishing sector cannot attain sustainability without fisheries organizations. A social system that is defended by formal and non-formal standards as controllers and directors of interactions between humans in their access to resources are described as institutional.

Traditional societies usually have certain rules in place to prevent excessive exploitation; for example, harvesting a specific species is strictly controlled, and prohibitions on hunting or harvesting are enforced in certain areas; if they are violated, they will face customary sanctions. In fishing activities that apply the principles of culture and

local wisdom preventing fishing, the use of environmentally friendly equipment (nanotechnology), basically equipment that does not harm nature, so that fish are collected according to size according demand, is used. market with high commercial value while protecting the sustainability of fish seeds for future harvest. In the banned fishery paradigm, the major purpose of prohibition is capturing fish outside of the prescribed period. That is, the many varieties of fish that exist in the river are the major assets of restricted fishing, which are retained in the river and collectively controlled. Prior to the adoption of the prohibited fishing management approach, the community viewed the river flow as a shared resource that was open to everybody. At the time, everyone could catch fish at any time they wanted as long as they didn't use unlawful methods like manuba, poisoning, or even electric shocks. Prohibited fishing affects not only the neighboring individuals but also 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 type of community-based management of fisheries resources, which is carried out by closing seasons or areas for a set period of time. So that fishing is only done once a year, according with Islamic religious holidays, especially Eid al-Fitr. Forbidden fishing is an environment for fish that cannot be captured in any form. The type of fish that is retained is one that has economic value. From the perspective of the environment, measured fishing permits fish to develop and reproduce well. Fish can be taken after reaching a specific size in order to prevent extinction. The community-implemented prohibited fishing management approach is participatory, flexible, and long-term in terms of maintaining fishery resources, particularly local fish.

The fishing industry in West Pasaman Regency, West Sumatra Province, has traditionally employed local wisdom in aquaculture, with outlawed fishing being the dominating local wisdom. Economically, the proceeds from forbidden fish are primarily used for community activities including replenishing village or village treasury funds, funds to build worship facilities, sources of financing for village or village activities, and, from a social standpoint, increasing the village or village community's friendship. 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 utilization of resources through forbidden fishing activities because they have an interest in these natural resources due to the economic results of fishing activities. The prohibition will be applied for community or village development. Local wisdom in fisheries is carried through in the form of traditions that are economically advantageous for the village or village economy, for the growth of the local village or village, and for the preservation of culture. Based on observations, it was discovered that sustainability and sustainable development are complex concepts that can be achieved through an economic, ecological, and social system (economy-ecological-social system), in which the economic and ecological pillars must also consider social pillars such as culture and institutions (institutional). To achieve sustainability, all of these factors must be integrated.

CONCLUSIONS

Sustainability and sustainable development are complex concepts that can be fulfilled through 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 of these aspects must be considered in order to attain sustainability. Using local wisdom, cultural assets can support local community welfare 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 built in such a way that aquaculture activities in freshwater waterways are financially viable as well as ecologically sustainable due to the existence of freshwater fishery stocks and culturally sustainable.

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