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**IMPLICATIONS OF SEAWEED CULTIVATION IN COASTAL  
AREA NUSA PENIDA BALI**

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**Abstract---**The people of Nusa Penida from the perspective of cultural history have undergone four stages of development. First, the initial pattern of life was based on a farmer-fisherman culture. Second, since the 1990s the northern coastal area of Nusa Penida has grown into a center for seaweed cultivation. Third, Nusa Penida then developed rapidly as a marine tourism destination. Fourth, due to the Covid-19 pandemic which destroyed the tourism sector, the people of Nusa Penida turned to seaweed cultivation again. Planting seaweed is considered an alternative and at the same times a guarantee for the economic survival of the people of Nusa Penida. This study aims to show the implications of using

Nusa Penida's comb for seaweed cultivation areas. The research approach is qualitative with a historical perspective, which is viewed from the theory of cultural ecology and the theory of social change. The main data source comes from the period 1990-2005 when seaweed cultivation was booming in Nusa Penida. Primary data collection techniques through in-depth interviews and secondary data obtained through relevant literature studies. The data analysis technique was carried out through three stages: classification, reduction, and concluding. The results of data analysis are presented in a qualitative descriptive manner. The research findings show that adaptation of seaweed cultivation in the coastal area of Nusa Penida has implications for local communities in economic, socio-cultural, and ecological dimensions. Besides having a positive effect, seaweed cultivation negatively impacts the physical, social, and cultural environment the positive influence is seen in efforts to conserve the coastal and hilly environment as a form of social control. From a cultural perspective, the seaweed farming community routinely carries out the ngaturang pakelem ceremony, to maintain harmony and harmony in the relationship between humans and the natural environment. The negative consequences of seaweed cultivation are environmental biophysical damage, conflicts of interest, and cultural degradation.

## 1. Introduction

Nusa Penida Island has two types of ecology, namely mainland, and coastal areas. The land area in the form of hills with dry land is used by residents for plantations. The coastal area is 25 km<sup>2</sup>, stretching from West to East, has white sand, and the current is not too heavy. The potential of the coast of Nusa Penida is utilized by the community as a seaweed cultivation area. Utilization of the coastal area of Nusa Penida as a seaweed cultivation business began in the 1980s. The development of seaweed cultivation was first carried out by the Bali Provincial Fisheries and Marine Service in collaboration with local fishermen. Since 1990 seaweed cultivation has been carried out intensively and widely by the residents of Nusa Penida.

Although Nusa Penida Island is classified as a small archipelago, from the perspective of cultural history it shows a very interesting development. Unlike the level of development of mainland Bali which develops linearly, namely from the culture of farmers directly to tourism services without going through the manufacturing industry sector ([Mardika, 2020](#)), but the culture of the people of Nusa Penida has experienced four levels of development. First, the initial basis of the life of the people of Nusa Penida is as a farmer-fisherman. In the hilly areas, people live as farmers in the fields (plantations), while in the coastal areas; a cultural community of fishermen develops. Second, since the 1990s the northern coastal area of Nusa Penida has grown into a center for seaweed cultivation. Third, Nusa Penida then developed rapidly as a Marine Tourism Destination Area. Fourth, due to the Covid-19 pandemic which destroyed the tourism center, the people of Nusa Penida returned to the seaweed cultivation business. Cultivating seaweed is considered an alternative and at the same times a guarantee for the economic survival of the people of Nusa Penida.

The development of seaweed cultivation with the characteristics of the coastal environment of Nusa Penida is very potential. This is supported by at least three factors. First, the availability of large enough human resources seaweed cultivation is not only occupied by residents from coastal areas but also by residents who live from hilly areas.

Second, natural environmental factors as revealed from the results of Manuaba's research, it is stated that the conditions of the sea waters of Nusa Penida are very suitable for the growth of seaweed, especially cottonii and spinosum species, the bottom of the waters is slightly sandy, the water depth is sufficient, the winds and currents are not too heavy, and are protected from the effects of pollution (Manuaba, 1978:24). Third, market prospects from a marketing perspective, seaweed has a pretty bright prospect. Seaweed is classified as a commodity plant that is widely exported to foreign countries such as Singapore, China, HongKong, Japan, and France. Seaweed is very much needed by industries such as beauty, pharmaceutical, food, and so on (Soerjodinoto, 1985:43-44; Soetrisno, 1985:45-50).

Given the increasing demand for seaweed in several parts of the world, this sector has received more intensive treatment among the community. Therefore, the Klungkung Regency Government makes seaweed cultivation a leading sector for the people of Nusa Penida. Supported by a good cultivation system, a tenacious workforce, and smooth marketing so that the seaweed business is growing rapidly in the coastal area of Nusa Penida. Even the development of the seaweed business has been able to prosper the lives of local people which has never been experienced in previous times. Economically, the seaweed business is the main source of income for the local community and can create job opportunities by developing new businesses in the trade sector (Suwendri, 2005). However, behind the success achieved, the use of coastal areas in seaweed cultivation activities does not escape the negative impacts caused both to the natural environment of the coast, hills, and the socio-cultural environment.

Based on the above background, the problem to be studied is what are the implications of seaweed cultivation in the coastal area of Nusa Penida Bali more specifically it aims to map the positive and negative effects of seaweed cultivation on economic, socio-cultural, and ecological factors this study is expected to provide benefits for the community, especially seaweed farmers in Nusa Penida in increasing public understanding and awareness of the importance of the environment as a source of sustainable life.

## 2. Theory Basis

Several theories used as analytical tools in this study include the theory of cultural ecology developed by Steward (in Poerwanto, 2000:68-714), Kaplan and Manners (1999:101-107). Through this theory, it can be understood the process of human adaptation to the environment that has been changed by human culture. The theory of social change from Abdulsyani (2002:163) that social change is a change in culture and human behavior in society from certain circumstances to other circumstances. In this connection, the conflict theory proposed by Dahrendorf (1973:100-113) and Coser (1973:114-122) is also used. In people's lives, conflict is unavoidable. The conflict in question is the existence of conflicting elements, conflicts, differences in interests, views, and values in society.

Some relevant concepts in studying this problem include:

Dahuri (2004:154-156) in his book *Pengelolaan Sumber Daya Wilayah Pesisir dan Lautan secara Terpadu* (Integrated Management of Coastal and Ocean Resources), reveals that in order for coastal areas to be utilized optimally and sustainably, a management system for all development activities related to coastal areas is required so that the impact does not exceed its functional capacity. The occurrence of coastal environmental damage is rooted in poverty and the low level of knowledge of the perpetrators.

Poerwanto (2000:164-166) in his book *Kebudayaan dan Lingkungan dalam Perspektif Antropologi* (Culture and Environment in Anthropological Perspectives), reveals that as a result of the tendency of human beings to fulfill their human cultural desires excessively, this has an impact on the decline of biogeophysical resources.

Suyarto (2004) in his paper on the Environmental Degradation Process which was presented in the Amdal Basic Course revealed that the deterioration or damage to environmental resources can be viewed as environmental resources that are not following the conditions of life for living things. For the environment, natural damage can cause changes to human life. On the other hand, the environment can be more supportive for all living things if humans can manage it properly.

Suwendri (2005) the results of his research on *Seaweed Business and Its Impact on Environmental Conservation in Nusa Penida District: a Cultural Study* (Thesis) reveals that seaweed cultivation has been able to make a positive contribution to the level of community welfare, but also cannot be separated from the negative impacts caused against damage to the natural environment.

Daldjoeni and Suyitno in their book on *Rural, Environment, and Development*, reveal about environmental ethics. Environmental ethics is an ecological awareness that is a desire to be responsible for human behavior towards the environment. Changes in the views and attitudes of human life towards nature no longer view nature as merely an object in the sense of a resource that is completely drained to meet human needs, but instead maintains and manages nature towards goodness for the welfare of human life. Environmental ethics is the moral wisdom of how humans interact with their natural surroundings and the way humans manage ecosystems. Environmental ethics is the moral wisdom of how humans interact with their natural surroundings and the way humans manage ecosystems (Daldjoeni and Suyitno, 1985:137). Environmental ethics can also be defined as how humans should relate to the environment, what humans should do in responding to the world around them (Cheng, 2001:179-183).

Environmental ethics in Balinese society is based on the teachings of Tri Hita Karana. The concept of tri hita karana basically contains an understanding of the patterns of human adaptation to the environment (Pujaastawa, 2004:406). The environment in question includes the spiritual environment (parhyangan), the social environment (pawongan), and the natural environment (palemahan).

### 3. Research Method

The method used in this research is a qualitative method with a historical approach. The historical approach seeks to reconstruct the past phenomenon of seaweed cultivation, especially related to this study. The data were obtained from the results of previous studies when seaweed cultivation was growing rapidly in Nusa Penida from the 1990s to 2005 (Suwendri, 2005). Data collection techniques through in-depth interviews and observation the interview technique used the snowball sampling method. Interviews were first conducted with key informants and then continued with the following informants in a chain until they got a saturation point and the validity of the data extracted. Observations were made in the center of seaweed development, especially on the North Coast of Nusa Penida. In addition to primary data, secondary data obtained from the review of the relevant literature are also used. The data analysis technique was carried out through three stages: classification,

reduction, and concluding. The results of data analysis are presented in a qualitative descriptive manner (Moleong, 2000).

#### **4. Implications of Utilizing the Nusa Penida Coastal Area for Seaweed Cultivation**

The utilization of coastal areas during seaweed cultivation involves two kinds of ecosystems, namely the marine environment and the land (coastal) environment. The first step taken by farmers in seaweed cultivation is to choose a location. They choose a location based on calculations that they think are profitable, for example in terms of water depth when the seawater is receding. According to seaweed farmers, land suitable for planting Seaweed Island that is not dry or shallow when the seawater recedes. If they do not find suitable land for seaweed growth, they will dig up sand and coral to make seaweed planting plots.

Other activities carried out in the waters include installing stakes (piles). These stakes are installed around the planting area. The distance from one stake to another is approximately 50 cm. After the pegs are installed, then the staple rope (larger nylon rope) is attached. This rope is used to tie other small ropes as a place to tie seaweed seeds.

The use of land on the beach related to seaweed cultivation is making huts. This hut is used by farmers as temporary accommodation for residents who come from hilly areas. The hut is also used to store production tools, daily activities, and store crops. In addition, they also need land to dry their crops and dispose of seaweed waste including rigging that is no longer used. When the unfavorable seawater season arrives around August-September, farmers carry out maintenance and supervision of their seaweed such as cleaning seaweed from pests or nuisance plants, installing safety nets on their own land. The goal is to maintain the seaweed harvest so that it is not carried out by the current from his land. On the sidelines of their free time, while waiting for the harvest season to arrive, farmers carry out activities to repair the formerly damaged rigging or replace it with a new rope, and so on. Thus the grass farmer community with all its activities of grazing has become a routine sight every day looking beautiful and unique around the beach and waters.

#### **Negative Implications**

Every business or human activity can basically have an impact on the environment. The impact is defined as a strong influence that has both positive and negative consequences. Positive impacts need to be developed to spur the preservation and maintenance of environmental sustainability, while negative impacts are sought to control measures as early as possible so that negative impacts on the environment can be minimized or can still be tolerated. The utilization of coastal areas in seaweed cultivation in the past cannot be separated from the negative impacts caused. These negative impacts include:

**Natural/biophysical environment**, the biophysical environment is the biotic and abiotic environment that has not been influenced by human hands and has an effect on the human environment (Sumaatmadja, 1989:28). According to Amsyari (1989:12) what is meant by the physical environment is everything that is around humans in the form of living organisms other than humans themselves.

Related to seaweed cultivation, some consequences involve two kinds of ecosystems, namely aquatic ecosystems (sea) and coastal ecosystems (land). Both ecosystems appear to

have changed. In the early days of seaweed cultivation, dredging of the seabed was carried out, especially in shallow waters. This is done to obtain sufficient water depth for the growth of seaweed so that when the seawater recedes the seaweed does not wither or die. To get sufficient depth, the seabed which was previously in the form of sand and seagrass must be drained in such away. The large rocks were crushed and driven to the shore/land. The existence of coral reefs and seagrass beds as a place to live for various types of fish is disturbed.

The condition of the beach before the use of seaweed cultivation activities still looks natural with a wide and gently sloping stretch of white sand. At low tide, local people look for fish on the sidelines of seagrass beds that grow naturally and between mounds of rock where schools of small fish take shelter. Now, this is no longer found because the entire surface of the seafloor is inundated with seawater, the lowest point of which is about 50 cm deep. The rocks where the fish had been hiding had been crushed and thrown ashore.

In addition to having an impact on marine waters, terrestrial ecosystems (coastal environment) are also contaminated as a result of human activities in the waters. The seaside or coastal areas are also not spared from human behavior disturbances. Before the development of seaweed cultivation, the condition of the coast still looked natural. The plants that can live in it are in the form of beach forest (beach forest), the locals call it rolling, such as pandanus trees, bekul trees, katang-katang (*ipomoeacaprae*), and padang lari (*spinifex littoreus*). When seaweed cultivation is growing, the existence of the coastal forest has been cleared by residents for the purpose of drying seaweed, lodging, and processing seaweed. Now only a small part of the coastal forest can be found, such as on the northern coast of Penatan Ped Temple.

In addition to the clearing of coastal forests, disturbances also occur in reforestation. In the process of planting seaweed using the "off-bottom method," a rope fastener is needed on which the seaweed depends, namely in the form of stakes or piles. These stakes are obtained from felling trees that grow more in hilly areas such as gamal (*gliricida sepium*), lamtoro (*leucaena*), juwet (*syzygium cumini*), and the like. There was a wild and uncontrollable feeling of timber trees. If this is allowed to continue, reforestation in Nusa Penida is in danger of failing.

**Social environment**, the social environment is the power of society and various norm systems around individuals or groups of people that affect their behavior and interactions (Depdikbud, 2001:675). According to Sumaatmadja, the social environment is an element or component of humans, both individuals, and groups that affect the formation of human personality that occurs through direct or indirect contact.

Seaweed cultivation harms the social environment, namely the development of slum settlements in coastal areas along with seaweed development centers, especially in the coastal environment of Ped Village. This is as a result of the attractiveness of the seaweed business which tempts the community to earn a decent income. Finally, people who live in hilly areas take an active role in seaweed cultivation. They have no permanent residence on the coast. To facilitate activities in the management of seaweed, they live around the state land area on the coast. The lands along the coast have been used for seaweed processing activities. In the area, a cottage was built in the form of huts as a place for seaweed farming



activities. The rows of huts present an environment that seems shabby. The panoramic beauty of the white sandy beach is hindered by these shabby huts.

Another social implication is the occurrence of competition in the ownership and control of marine natural resources. This competition occurs among the seaweed farmers themselves. In this regard, those who have large capital in the form of money and human resources tend to try to get wider arable land; on the other hand, those who have limited resource capabilities are unable to compete so they only have relatively narrow seaweed land. Sea waters in the context of seaweed cultivation business, become plots by private or individual ownership/rights based on mutual agreement among the seaweed farming communities themselves.

Seaweed land ownership of each individual is not evenly distributed, some have a planting area of more than 10 acres, but on the other hand, there are also those who have a planting area of only one to two acres. The sharp inequality in terms of land ownership can trigger tensions if each party is not aware of its capabilities in seaweed exploitation. This can be seen from the expression of one seaweed farmer, that “*ia anak ngelah, kadung makelinggah pasihe nyidayang pulaina bulung*” (he owns it, so as wide as the sea can be planted with seaweed). The above expression implies that among seaweed farmers themselves, there has been a gap or social jealousy in the control of marine natural resources as a place to earn a living. In other cases, for example, there are vacant locations that have not been cultivated but have been claimed as private property. Those who wish to cultivate seaweed in that location must purchase from the claimant. This situation is very different compared to when the seaweed business was not yet developed; people were free to use the coast for free regardless of the size they wanted.

Another social implication was seen when Nusa Penida emerged as a new tourist area. There was a conflict of interest between the seaweed cultivation business and the tourism sector. On the one hand, the seaweed farming community wants to use the coastal area optimally to develop the seaweed cultivation business, while on the other hand, the tourism sector expects the beach to remain clean, beautiful, and sustainable. In this connection, among seaweed farmers, before the prohibition on doing business, they continued to work intensively, even if necessary to continue to expand the cultivation area. On the coast of Jungutbatu, for example, an area that is quite well developed for seaweed development, there is also a tourist boat port (cruise ship attraction activity). This kind of condition is certainly very prone to causing physical collisions because both parties feel uncomfortable in trying.

**Cultural Environment**, the cultural environment includes the state of the cultural value system, customs, and way of life of the community that surrounds a person's life (Depdikbud, 2001:675). The development of the seaweed cultivation business brings with it a negative impact on the cultural environment of the local community. In this connection it can be mentioned, the shifting of the gotong-royong system among seaweed farming communities the gotong-royong system is a sub-system of the Balinese socio-cultural system, so changes in the gotong-royong system can be seen in the context of changing the Balinese socio-cultural system as a whole.

Before the development of the seaweed cultivation business, especially in terms of mutual assistance, a mutual cooperation system called *ngajakang* was still in effect, for example in building houses and working on agricultural land. Neighbors can still ask for

help from other neighbors. Those who have worked only need to prepare food for those who work without getting any money in return. But in the next period, when the seaweed business developed, the money economy system entered the countryside and the wage work system. This phenomenon has a big influence on the existence of the gotong-royong system. In fact, in essence, the money-based economic system has entered various fields of life for the people of Nusa Penida Bali. The only difference is the level/intensity according to the standard of living of the people concerned. The economic factor of money and the wage work system can be categorized as factors that can shift and weaken the mutual cooperation system. On the other hand, money culture fosters economic attitudes and efficient thinking among citizens (Geriya et al, 1986:105).

**Lack of clean living culture**, the negative impact of the seaweed business on the cultural environment that is no less important to note is the lack of clean living behavior among seaweed farming communities. This can be seen from the business activities of seaweed cultivation, for example, after the activities of the waste rigging used to bind the seaweed are dumped into the sea so that the beach looks dirty.

#### **Positive Implications: Environmental Conservation Effort**

Efforts made by the seaweed farming community in preserving the natural, social, and cultural environment are in the form of social control. The broader understanding of social control includes all processes, whether planned or not, educating, inviting, or even forcing citizens to comply with applicable social rules and values (Soekanto, 2000: 226-230). Social control can be exercised by individuals against a social group or by a group against other groups or against individuals. Social control aims to achieve harmony between stability and changes in society. Or in other words, social control aims to achieve a state of peace or harmony and harmony.

Social control in this regard is the existence of supervision (control) on deviations, disturbances that occur in the community so that the changes that occur can be controlled and do not spread and invite disaster for the community. Some concrete actions taken by the seaweed farming community to preserve the environment, whether natural, social, or cultural, include

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**A. Public Awareness of the Biophysical Environment.** Recognizing the actions of humans that are not environmentally friendly to meet the needs of life so that it is feared that it can cause a disaster for human life itself, the seaweed farming community members have taken concrete actions/actions to maintain a comfortable, beautiful, and sustainable environment. Both in the coastal (sea) and inland areas, including:

- (1) Overcoming the expansion of coastal abrasion. This effort is carried out by both the government and the community. The emergence of residents' awareness of the dangers posed by coastal abrasion in the vicinity, then the installation of beach protection was made. Coastal safeguards aim to prevent widespread coastal erosion and inundation of coastal areas due to overtopping. According to Soeharjono and Budiana (2003:45-46), there are two types of coastal protection structures, namely soft protection and hard protection.



Coastal protection in Nusa Penida is generally carried out with hard security structures in the form of revetments and seawalls. Revetments are coastal protection structures that are made parallel to the coast and usually have a sloping surface. The structure consists of concrete or piles of stone, while the seawall is almost similar to a revetment but with a staircase structure (Soeharjono and Budiana, 2003: 46).

There are also beach safeguards carried out by residents based on their own awareness. This is usually done on the beach around the cultivation area. Coastal safeguards are made by utilizing the excavated rocks of the seaweed planting site. The rocks are installed perpendicular and parallel to the shoreline.

- (2) Changes in negative behavior in a positive direction. In addition to making coastal protection, the seaweed farming community has changed their negative behavior to no longer excavate the seabed for the benefit of seaweed cultivation. This change in attitude has emerged since there was an appeal or prohibition from the authorities so that people do not do similar things. If this happens again, the person concerned must be reported. Now the Klungkung Regency Government has designated the Nusa Penida seaweed cultivation area as one of the marine conservation areas (KKP) since 2012 which refers to the Klungkung Regent Regulation No.12 of 2010 concerning Reserves for the Nusa Penida Aquatic Conservation Area.
- (3) Promote reforestation. Another awareness of the physical environment that exists on land can be seen from the community's own efforts to carry out reforestation specifically as found in Lembongan Village. Plant shade trees in places where the woody plants can live well so that reforestation can take place sustainably.

Another effort made by the community, especially among stake users in preserving the natural environment so that it remains green, is in the form of a collective agreement that is preventive in nature, namely the planting system of "cutting one stem and planting three trees" (Astika, 1998). This method shows that there is awareness among the community about the importance of preserving the environment, especially maintaining existing trees so that they can grow one after another (sustainably).

In fact, the people of Nusa Penida since ancient times have had a wise understanding of the natural environment in an effort to prevent the danger of erosion on their land, especially for hilly land. At the edge of the plot of land, trees are planted and protected by rocks (bataran) which are arranged in the form of a terrace. In addition to keeping the soil from landslides in the rainy season, it can also present a beautiful natural panorama.

**B. Public Awareness of the Social Environment.** Seaweed cultivation has implications for the social dimension of society. The values that appear are as follows.

- (1) An attitude of mutual understanding. Another thing that can be mentioned for example in the use of the beach between the seaweed business and the marine tourism sector in this regard, the community has an awareness that the beach belongs to the public and can be managed jointly by anyone, so each of them tries to keep themselves from physically touching, meaning that marine tourism activities in this case cruise ship activities can be carried out in areas that deeper in a place where there is no seaweed cultivation activity and the aquaculture farmers are also trying to a certain depth which they think is still a safe limit for doing business.

- (2) Develop a culture of shame. Public awareness of the social environment can also be seen in terms of developing the shame of the residents so that they do not do actions that can harm other parties or among fellow seaweed farmers. For example, what happened in Lembongan Village, the seaweed farming community held a security system against the presence of seaweed in the waters. To maintain beach security, social sanctions are applied to someone if it is proven that they violate the agreed rules, for example, the person concerned is asked to surround the village and hand over a certain amount of rice or money to the traditional village. This method is quite effective in controlling human behavior to do as much good as possible so that it does not become the subject of gossip in the community.

The form of awareness that is quite widespread among the seaweed farming community in Ped Village towards the social environment can actually be seen in the installation of safety nets in each of the respective seaweed planting areas. This safety net indirectly functions as a barrier to ownership with those next to it. In this way, it can suppress the emergence of unfavorable possibilities on each side of the seaweed farmers.

**C. Public awareness of the cultural environment**, namely the development of theological awareness. To maintain harmony with the natural environment, each group of seaweed farmers builds holy places located on the beach. In this holy place, they held various types of religious rituals related to seaweed cultivation activities to invoke fertility, to ask for the inner and outer safety of Ida Hyang Widhi (Almighty God) in his manifestation as the god of the sea, namely Dewa Baruna/Bathara Segara. The community believes that the safeties of humans working at sea as well as the good and bad growth of seaweed are all controlled by Bathara Segara (God of the Sea). The ritual takes place every six months (210 days) or it can be carried out once a year (420 days). The timing of the ceremony varies between groups of seaweed farmers depending on the mutual agreement of group members. There are those who carry out the ceremony on the Fifth Purnama, Purnama Kawulu, Tilem kepitu, or based on the pawukon, namely on Tumpek Pengatag (Tumpek Bubuh) day. In addition to these days, there is also a community of seaweed farmers who perform ceremonies incidentally or at any time depending on the condition of the seaweed. If the growth of seaweed in a row is not good, then a Paklem ceremony will be held at sea (Suwendri, 2005:2090).

Starting in 2018, the implementation of this Paklem tradition has grown. The coastal community of Nusa Penida held a ceremony simultaneously called the Ngusaba Madya Jagat ceremony which was held on Purnamaning Kapat (September-October). The essence of this ceremony is basically the same, namely ngaturang pakelem at sea ([www.balitoursclub.net/nyepi-laut](http://www.balitoursclub.net/nyepi-laut)). The ceremony took place at Penataran Ped Temple (odd years) and Batumedawu Temple (even years). In the concept of the Hindu philosophy of Tri Hita Karana, this ceremony aims to maintain balance or harmony between the relationship between humans and God, humans and their natural environment, which leads to human welfare. This ceremony is also meant as an expression of gratitude to Ida Sanghyang Widhi Wasa in his manifestation as the ruler of the sea realm of Dewa Baruna for all the gifts that have been bestowed on humans.

The next day Nyepi Segara was held. This tradition is a form of local wisdom as a control mechanism in environmental management. Nyepi means silent, lonely (sipeng), and immediately the same as the sea (pasih). So the sea is quiet from human activities. People

are prohibited from doing fishing activities for 24 hours starting in the morning at 06.00 until arriving the next day at 06.00. Prohibited activities such as fishing, crossing (for sea transportation business), and seaweed cultivation activities this tradition is carried out regularly every year, exactly the day after Purnama Kapat (Pangelong apisan Sasih Kapat). The symbolic meaning of the tradition is to give nature a chance to breathe, rest, pause for a moment. Which every day is loaded with the burden of human activities in it. People believe that on the day of Nyepi Segara Dewa Bharuna/God of the sea rulers' doe's yoga, so they should not be disturbed. If it is violated there will be an unwanted disaster. Therefore, as a tribute to the God of the Sea, people are not allowed to do activities at sea for a full day.

## 5. Conclusions and Suggestions

Based on the explanation above, it can be concluded as follows. Utilization of the marine sector, especially seaweed cultivation by the Klungkung Regency Government is the right choice in improving the welfare of its people. This policy must be followed by a wise attitude from the community in treating the environment. In the cultivation of seaweed, besides having a positive impact on the socio-economic life of the local community, it also cannot be separated from the negative impact.

To overcome the negative impacts, it is necessary to have a social control system in an effort to preserve the environment, namely, the cultural behavior of citizens, both real (skala) and intangible (niskala). In fact, there are efforts to raise public awareness to always maintain the sustainability of coastal areas/sea waters and reforestation in hilly areas. The intangible aspect is reflected in the community's adherence to the value system, norms, as a joint consensus that has been institutionalized among seaweed farmer groups in the form of local wisdom, namely the tradition of the ngaturang pakelem ceremony at sea which means harmonization of human relations with the natural environment.

The negative impact of the use of coastal areas in seaweed cultivation in the past should be a mirror in the present to always prioritize ecological wisdom so that this sector can be maintained sustainably.

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