Potential of Freshwater Fisheries as a Supporting Factor for *Minawisata* of Tasikmalaya

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A B S T R A K

Wilayah Kelurahan Cibunigeulis, Kecamatan Bungursari, Tasikmalaya merupakan wilayah yang unggul dengan potensi budi daya perikanan air tawar dan kegiatan minawisata. Adapun tujuan penelitian adalah untuk mengetahui karakteristik sektor perikanan air tawar sebagai daya dukung minawisata dan bentuk kegiatan potensi minawisata. Metode yang digunakan dalam penelitian ini adalah metode deskriptif kuantitatif. Hasil penelitian menunjukkan kegiatan pemeliharaan ikan memiliki kondisi fisik dan daya dukung tempat pemeliharan yang ideal seperti kolam, tenaga kerja, pembibitan, pengetahuan dan modal. Tahapan untuk pembudidayaan yang baik terdiri atas tahap persiapan kolam, pemupukan, pemijahan, dan penetasan telur menjadi larva ikan. Setelah itu memasuki tahap pendederan, tahap pembesaran, tahap pemanenan, tahap pengolahan dan tahap pemasaran. Adapun ikan yang di pelihara merupakan komoditas utama untuk kebutuhan konsumsi baik dalam kota dan luar kota. Beberapa produk ikan diantaranya ikan mas, ikan lele, ikan mujair, ikan nila, ikan nilem dan ikan lainnya. Adapun daya dukung untuk kegiatan minawisata diantaranya kegiatan pemancingan, kuliner produk makanan lokal dan pameran ikan.

Keywords:
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A B S T R A C T

Cibunigeulis Village, Bungursari District, Tasikmalaya has a huge the potential for freshwater fishery cultivation and *minawisata* activities. The research objective is to determine the characteristics of the freshwater fisheries sector as a supporting capacity for *minawisata* activities. The method used in this research is quantitative descriptive method. The results showed the cultivation of fisheries activities have a carrying capacity of ideal nurseries such as ponds, labor, breeding, knowledge and capital. The stages to have a good cultivation are the preparation stage of the pond, fertilizing, spawning, and hatching stage of the eggs become fish larva. The next stages, are the magnification stage, the harvesting stage, the processing stage and marketing stage. If these stages can be managed well it will also produce a good product. The fish are the primary commodity for consumption needs both inside the city and outside the city. Some fish products include, carp, catfish, Nile tilapia fish, tilapia, silver catfish and other fish. in terms of *Minawisata* activities, the village can be developed for fishing activities, culinary and fisheries exhibitions.

Introduction

Tasikmalaya city since 2001 experienced rapid growth and development because it supported by the validity of regional autonomy. Tasikmalaya government has the authority to regulate the appropriate economy based on its characteristics. In 2016, the structure of economy in Tasikmalaya city shows urban characteristics that are dominated by the tertiary sector (BPS, 2017). Based on the Gross Regional Domestic Product (on the basis of the constant ppaddy of 2010), in 2016 a tertiary sector consisting of services could achieve revenues of Rp. 8.7 trillion. The secondary sector consisting of an industrial field reaches Rp. 3.8 trillion and the primary sector consisting of agriculture and fisheries reaches to Rp. 0.6 trillion. Bungursari district is an excellent area in the development of primary sectors including agriculture and fisheries. BPS

Tasikmalaya (2017) noted that the district of the Bungursari in 2015 has fishery land area reaches 130.33 hectares and also has the highest fish production in Tasikmalaya as much as 1,802.93 tons.

Fisheries according to Banowati and Sriyanto (2013) and Nurdin, dkk (2017) is a business whose activities include catching, fish farming, processing to the marketing of both processed and not. Bungursari district potential of fisheries is highly supported by physical factors such as the availability of water resources, land availability, moderate temperature as the elevation is 430 meters above sea level. Location, social and demographic factors also affect, including distance to the city center which is far enough because the majority of the area is hinterland and directly adjacent to Tasikmalaya Regency. This has an impact on the population density that is not so densely populated that is 2,815 people per km2 because people prefer a location closer to the city.

The characteristics of freshwater fisheries sector according to Subarnas, et al. (2007:48) consists of a place of cultivation and the type of fish to be cultivated. While the fisheries sector business according to Ayodya (2010:9) classified by capital and scale. Cibunigeulis village is highly potential in the fisheries sector. Based on the BPS data of the Bungursari District 2018, Cibunigeulis village has a land area used as a fisheries pond of 38.33 hectares and placed first among other villages in the district of Bungursari.

Geological conditions of Cibunigeulis village influenced by the eruption of Mount Galunggung in 1982. The ashes and the cold lava eruptions Galunggung had an impact on the settlement and the road that at that time was still included in the administrative area of Indihiang district. As a result, the whole area in Cibunigeulis consists of the rocks and sand material that results from Mount Galunggung explosion. The land was fertile and good for farming and fisheries.

The potential of water resources is quite high in Cibunigeulis village (Annual Development Planning of Cibunigeulis Village, 2018). By using the *Location Quotient* analysis, it has a water resource value of 1.25. The value is one value higher which indicates that water resources are an excellent factor which even the highest at the district level of the Bungursari. Cibunigeulis village has a high potency of a freshwater fisheries sector. This potential is utilized by the community in the form of fish cultivation. The freshwater fisheries sector affects the socio-economic condition of Cibunigeulis community . Besides of aquaculture activities, it also has the potential value to be used by *Minawisata* activities.

Minawisata is tourism activity with approaches on the development of fisheries and maritime affairs. Conceptually, Minawisata follows the principles of ecotourism development in the form of environmental sustainability, community empowerment, community participation and improving the economy of the local community. Therefore, it is necessary to support and develop the potential of freshwater fisheries that exist in the village, which later will become as a tourism attraction in Tasikmalaya. The purpose of research is to know the characteristics of freshwater fisheries sector as the main tourism attraction and the activities of *Minawisata* potency in Cibunigeulis village, Bungursari district, Tasikmalaya city.

Method

The methods used in this research are quantitative descriptive research methods. The quantitative descriptive method according to Priyono (2016:37) is a study conducted to give a picture of a symptom or phenomenon.

The research variables are used as follows:

1. The characteristics of freshwater fisheries are the location and place of fish cultivation, types of fish, maintenance systems and production processes, capital and business scale.

2. The activities from potential value of the region based on strengths, weaknesses, opportunities, and threats.

Data collection techniques are used as follows:

1. Observation on freshwater fishery activities
2. Interview with fish farmers, Cibunigeulis Village leader, Fisheries extension, and the community that has linkage with the fisheries sector.
3. Questionnaire data collection based on variables to be measured. Questionnaires were given to fish-makers, fish-processing, and fish-powered laborers.

The population of this research is 129 people of Cibunigeulis village resident who have a freshwater fisheries business, 1 person of fisheries extension worker, fisheries production group amounting to 11 people and fishery employee amounting to 30 people. The sample used is stratified random sampling, consist of 39 people which is divided into 3 layers that are homogeneous, there are, the cultivators, fisheries production, and fisheries employee. In addition, purposive sampling also used sample for collecting the data from 2 people namely Fisheries Extension worker of Bungursari District and the leader of Cibunigeulis Village *(lurah)*.

Results and Discussion

Freshwater Fishery Characteristics

Freshwater fisheries located in Cibunigeulis village has a water source for freshwater fisheries both from groundwater and surface water. The surface water actually comes from groundwater in the surrounding hills but appears to the surface as a spring. Hilly areas can be a catchment area when the rain happen, since it is also not so dense populated so that the absorption of water can be maximal with less run off. Based on the rainfall data for the past 10 years, including in a slightly wet climate with an average rainfall of more than 100 mm annually. List of sources of water in Cibunigeulis Village presented in table 1 as follows:

Table 1. List of water resources in Cibunigeulis village

No	Water Resource Name	Location
1	Leuwikidang	RT/RW 03/02
2	Gunung Muncang	RT/RW 01/05
3	Cihejo	RT/RW 04/05
4	Gunung Cariu Cayur	RT/RW 01/06
5	Gunung Cariu	RT/RW 02/06
6	Legok Nangka	RT/RW 03/06
7	Gunung Kokosan	RT/RW 04/06
8	Ranca Cihideung	RT/RW 03/07
9	Gunung Goong	RT/RW 02/08

Source: Data Plan Development Cibunigeulis Village 2018

Freshwater fisheries sector as a livelihood consists of water fish cultivation, workers who help the cultivation of fish power and fish production. The following data on the fish Pond Land is presented in table 2 as follows:

Table 2. Property Ownership and Pond SIze

No	Location (Hamlet)	Pond Ownership	Pond Size (Ha)
1	Gunung Cariu	34	10
2	Rancapasung	11	3
3	Pasir Angin	14	3
4	Leuwibudah	30	9
5	Sindang Wangi	16	3
6	Gunung Kokosan	12	3
7	Gunung Mareme	14	3
8	Jalan Cipanas Galunggung	12	2
9	Kp. Legok Nangka	10	2
	Jumlah	153	38

Source: Ministry of Agriculture and Fisheries of Tasikmalaya Year (2019)

The fish pond spread is strongly influenced by the location and height of the springs and water channels. Some of them directly use water sources derived from springs and there are gaining from the rest of the water channels and paddy fields irrigation. The map of fish pond distribution in Cibunigeulis village will be presented in Figure 1.

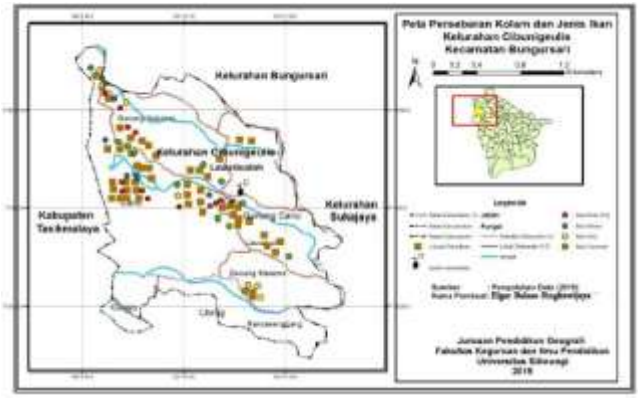

Figure 1. Pool and fish spread map

The fish shelter depends on the type and size used. This later affects the amount of fish, density, water circulation and discharge of water used. If the amount of fish exceeds the capacity then it is difficult to develop, but if it is less than the optimum amount, it can reduce the productivity. Here are the fish cultivation shelter and based on the type presented in table 3 as follows:

Table 3. Fish Cultivation Shelter

No	The Shelter of Fish Cultivation	Types of Pond	Total Amoout
1	Pond	Concrete Pond	12
		Ground Pond	13
		Pond of concrete ground mixture	4
		Cage	1
2	Paddy Fields	Minapadi	-
3	River and Paddy Fields	Cage	-
4	Pond dan Paddy Fields	Pond and Paddy Fields	3
	Total		33

Source: Primary Data (2019)

The scale of business done depends heavily on the area of the fish cultivation activity itself. The wider fishery activity is expected to have a considerable business scale. The following size data on land tenure of aquaculture is presented in table 8 as follows:

Table 8. The scale of business by the area of freshwater fisheries

No	Land Size (meter)	Details
1	< 200	3 Owners
2	200-400	5 Owners
3	> 400	22 Owners

Source: Data Processing Research (2019)

The following ponds used for freshwater aquaculture activities in Cibunigelis Village are presented in Figure 2 as follows:

(a) Individual Pond Ownership

(b) Communal Pond Ownership

Types of fish are cultivated more on the type of consumption fish. Some of the cultivated fish are presented in table 4 as follows:

Table 4. Types of fish cultivated in Cibunigeulis village

No	Type of Fish	The Amount (Ton)
1	Carp *(Ikan Mas)*	373,08
2	Nile Tilapia *(Nila)*	395,07
3	Gourami *(Gurame)*	157,18
4	Java Carp *(Tawes)*	98,08
5	Bonylip Barb *(Nilem)*	231,11
6	Catfish *(Lele)*	274,23
7	Tilapia Fish *(Mujair)*	140,20
8	Kissing Gourami	97,48
9	Others	34,69
	Total	1801,14

Source: Research Documentation (2019)

The cultivation system that is done is to give the food provided is quite diverse. Starting from water lice for small fish size (Burayak) and for the grown-

ups can be given pellets, leaves and bran. The following data feed types are presented in table 5 as follows:

Table 5. Types of feed given to fish

No	Type of Feed	Details
1	Water Lice	Given to a small fish (Burayak)
2	Leaves and natural feed	Given on adult fish for carp, carp and catfish
3	Pellet	Given to the adult fish for the type of carp, tilapia, carp, carp, Bonylip Barb, catfish, socialicious fish and fish kissing gourami
4	Bran and chicken dung	Given to the adult fish for the type of carp, tilapia, carp, carp, Bonylip Barb, catfish, socialicious fish and fish kissing gourami

Here's the feed for the fish presented in Figure 3 as follows:

(a) Feed dirt animals chicken and Taro leaves

(b) Figure 3 Pellet Fish

Figure 3. Fish feed (a) feed dirt animals chickens and keladi leaves and (b) pellet fish
Source: Research Documentation (2019)

Potential activities of *Minawisata*

Some forms of tourism activities that can be done in freshwater fisheries Cibunigeulis village are as follows:

1. Fishing
2. Culinary
3. Fish Exhibition

Freshwater fisheries sector in Cibunigeulis Village analyzed with SWOT. Strategies can be taken by utilizing strengths and opportunities and minimize the weaknesses and threats. Here is the identification of SWOT for the activity of the tourism activities in table 6 as follows:

Table 6. Freshwater Fisheries SWOT Analysis

Strengths	***Weakness***
1. Fish ponds that can be used for fishing activities. 2. Products processed fish as a taste of local culinary. 3. The activities of fish exhibition consumption and ornamental fish.	1. Pond fish should be properly maintained. 2. Local taste food has not been raised. 3. There are no fish exhibition activities.
Opportunities	***Threats***
1. Various types of fish ponds that can be used for fishing activities. 2. Fish Food Products diverse ranging from grilled fish, fried fish, fish pepes, Balado fish, pindang fish, pickled fish, sour sweet fish, fish satay, fish balls, fish chips, fish crackers, fish shredded and gepuk fish. 3. Fish exhibitions make educational activities for the community.	1. Pond fish may suffer lack of water discharge during the dry season if not managed properly. 2. Many fish food products are not good in terms of hygiene. 3. Less promotion will cause the activities to be not able to continue.

Source: Research Analysis (2019)

Discussion

The volcanic eruption of Mount Galunggung in 1982 affects today's physical condition of Cibunigeulis village. The ashes and cold lava eruptions have an impact on the residential area including economic activities. As a result, the whole

region covered by the rocks and sand material of Mount Galunggung explosion, and the land is fertile and good for agriculture and fisheries. Meanwhile, litology is formed from the rocks and the ashes of Mount Galunggung. The soil type dominates the surface is the ground gray Regosol, the Litosol in brown color and the Latosol reddish brown. Regosol soil has a loose structure with the texture of sand to the flung with the color of brown soil in the corrugated area to the plateau. Latosol soil is red, brown to yellowish with low nutrients to have a pH of between 4 to 6. The soil is suitable for harsh crops but is prone to erosion. In addition, alluvial land contained in the water flowing from the rivers and springs. This is because the soil is a precipitate carried away from the upstream of the water downstream. Even in the pond will be found many alluvial soil textured clay.

The location Cibunigeulis Village is located in the east of Tasikmalaya city with an area of 34 km². The distance from the government center of Tasikmalaya City as far as 7 km, from the center of district Bungursari by 1.5 km and from Singaparna as the center of the capital of Tasikmalaya district is 10 km. The accessibility from other tourism location is near to Situ Gede Tourism Park (Tasikmalaya city) and tourist attraction Mount Galunggung (Tasikmalaya Regency).

Water resources in Cibunigeulis village used to preserve fish consist of ponds, paddy fields and rivers. The source of water is derived from Mount Cariu Cayur, Mount Cariu, Mount Kokosan, Legok Nangka and Ranca Sarenggang which are used to irrigate the paddy fields and fish ponds. The use of the pond according to Ma'arif (2017:11) should be adapted to the characteristics of fish and its ability to adapt to the environment. The ownership of ponds are divided into as individual or private ownership and centralized or communal ponds. A privately owned pond means being cultivated for inidividual interest, while a centralized pond will be used by members of the Fish Cultivator Group with a yield-share system. A centralized pond is usually owned by the leader of the fish cultivator group, this type of pond is voluntarily used for the mutual benefit.

There are several types of fish ponds used for cultivation such as ground ponds, concrete ponds, semi-concrete ponds and ground, cage pond, river cage, and *Minapadi*. The cultivators have a different amount of ponds. For concrete ponds, cultivators usually have 1-11 ponds with an area of 400 m² - 800 m². Cultivator who has a ground pond usually only amounted to 1-5 ponds with an area of less than 200 m² - 800 m². The cultivator who has a cages pond usually has only 1-2 pools with an area of 200 m² - 400 m².

The concrete pond is owned by a large-capital cultivator. As for the semi-concrete pond and the land is owned by cultivator with moderate amount of capital. This happens because the cementing is done after the cultivator has gained the profit. As for pond cages usually used by the cultivator of catfish. The cultivator is carried out the polyclinic system between Catfish and Bonylip Barb. fish The catfish is kept in the middle of the pond and is restricted by nets so that catfish are not united with Bonylip Barb fish, and do not eat the existing Bonylip Barb fish. Pond cages also used by the cultivator to nurture the fish seed to facilitate its cultivation.

Minapadi Pond is an fishery activity in which cultivating fish before planting paddy. The pond of *Minapadi* according to Khairuman and Amri (2008:3) is the cultivation of fish that is done along with planting or maintenance of paddy. Cultivating the fish that keeps it in the paddy fields either as a *Minapadi* or in a certain term although in a small amount is carried out continuously depending on the capacity of the paddy paddies. The concept of planting in a certain term is by waiting for 25 days so that the paddy seeds are ready for planting, then the paddy fields will be empty.

Fish cultivator cultivates various types of fish. Fish that can be cultivated according to Cahyono (2000:1) consist of Snakeskin Gourami, Snakehead fish, Cork, Java Carp, Tilapia Fish, Catfish, Carp, Gourami, Nile Tilapia, Tilapia, Basa Fish, Hampala Barb, Bonylip Barb, Kissing Gourami, Hoven's carp, Silver Catfish, Tinfoil Barb, Bagrid Catfish, Marble Goby. Fish are kept among them are carp, Nile Tilapia, Gourami, Kissing Gourami, Java Carp, Catfish, Silver Catfish and Snakeskin Gourami. The most widely preserved fish are Carp, Nile Tilapia, Tilapia, and Java Carp. In cultivation activities, cultivatorrarely change the type of fish maintained, because of the collecting trader demand is constant. For example, the collecting traders who are looking for gourami will come to the gourami cultivator that he has known before. Another factor because of the experience gained after cultivating a certain fish becomes knowledge for the next cultivation process. The most cultivated fish is Nile Tilapia because it can be cultivated in a short time, within 3 months only it can already be harvested.

The process of the production of freshwater fisheries cultivation consists of several stages, namely the preparation of ponds, fertilization, parent cultivation, spawning, hatching eggs, decomposition, magnification, harvesting, processing, and marketing. For all these production processes are not done by a person or single cultivator. Cultivators usually focus on a few stages only. The preparation stage of the pond, the pond to be used first dried, cleared from dirt

and grass. The damaged embankment must be patched, a cracked embankment and small holes should be patched by Sandy Clay (Djarijah, 1996:45).

The first stage of preparing the pond by drying the pond after harvesting, then used chalk to steriliate and balance of pH to prevent acid, and it is along by the distribution of organic fertilizer grows phytoplankton. Furthermore, the spawning process, with the chosen of parent which has a fair growing and healthy. The cultivators do the fish spawning more than 10 times a year depending on the type of fish, the area of the pond, the number of parent owned. The next step is the cultivation of small fish with a size of 1-3 cm to fish measuring 5-8 cm or more. Then, continued with cultivation activities to produce fish size consumption. Usually the fish that is marketed is a fish that has a size of 300-500 grams per tail. For tilapia usually requested is 1 kilo per 8 fish with 3 months time, while for the restaurant demand usually 1 kilo per 4 fish or 1 kilo per 2 fish, and this will take 5 months. The cultivation of fish will spend a lot of money because the feeding of pellets will be more and more as the fish grow.

Harvesting can also be a total harvest system or selective harvest. The total harvest is the harvest that takes the fish ready to harvest as a whole without exception. While the selective harvest is done if the size of the preserved fish grows not uniform so that the harvested only fish with a certain size (Khairuman and Amri, 2008:76). The harvesting time is done differently according to the size. For consumption size of fish, pond fish will be dried slowly. For size of fish reaches to 3 cm, it will be used nets. For the larva-sized fish, fish will be harvested using the soft materials fabric to be careful, since it is very small in size. The cultivators averagely are able to harvest fish consumption as much as 3000 kg within 3 months. It is influenced by the size of the pond where the average production reaches to 800 m^2 and the feeding of the pellets two times per day.

Fish marketing activities depend on the level of demand and supply. Marketing according to Hanafiah and Saefuddin (2006:109) is all efforts or actions related to the move of goods and services from manufacturer to consumer. After the harvesting activities, the fish that has been produced will be sold to the collecting traders, and fish distributor in Tasikmalaya city. Some cultivators have directly sold them to the Cikurubuk market. Fish order can come from Tasikmalaya and outside Tasikmalaya city such as of Jakarta, Bandung, Sukabumi, Tasikmalaya and Cianjur. The fish collecting traders will use a pickup car if the fish purchased more than 3 quintal. But most of the harvested fish will be transported using a motorcycle, since average harvest production is only able to produce 3 quintal of fish.

Minawisata activities essentially are a form of tourism activities based on the fishery activities of both the on the land and water. It can be done directly by the community or also managed individually. However, the benchmark for the success of the tourism is the participation of the community to build fisheries activities based on tourism. There are several potential activities that can be done on freshwater aquaculture activities including fishing, culinary and fish exhibitions.

Fishing is an activity of catching fish related to job (fisherman) and outdoor sport activities. Fishing activities according to Wudianto et al (1999) can be carried out by general irrigation and special ponds. Water, generally, are the surface of the earth that is permanently flooded with a common and non-individual property, for example: Reservoirs, rivers, lakes, situ, swamps, and dams. Meanwhile, the special pond is technically an artificial water that is limited and human made (filled with water, dried, arranged according to our will). For the use of fish ponds is needed special maintenance such as maintaining the stability of water discharge, keep the water pH to prevent it to be too acidic, divided into parts to comfort make a convenient fishing. The variety type of fish let the visitors to choose their own type to fish. The potential use of ponds for fishing activities that can be done is by renting ponds (daily pond, collective pond, kilograms system, and fishing rods).

Culinary activities are an effort to process raw materials into finished goods with a flavors value. The variety of culinary products depends on the type of fish to be used that will create culinary variation for Minawisata. The numerous amount of it, will be the tourism attraction and have a good commercial value. These products must be related to local flavors, so that the community can develop culinary diversity in their own local uniqueness. Some products of fish based are ranging from grilled fish, fried fish, fish *pepes (steamed fish)*, *Balado* fish, *pindang* fish, pickled fish, sweet tamarind fish, fish satay, fish balls, fish chips, fish crackers, fish shredded and *gepuk* fish.

Fish exhibition activities in *Minawisata* aims to promote the excellent products of fisheries that exist in Cibunigeulis village. Some types of fish exhibited can be a fish consumption and ornamental fish. Fish consumption that will be exhibited such as carp, carp, tilapia, silver catfish and catfish. While the freshwater ornamental fish that can be exhibited such as Betta fish, guppy fish, Louhan fish and Discus fish. This exhibition can be done annually considering that such exhibits are not always exist in every region.

Conclusion

Cibunigeulis village has an economic potential for fish cultivation activities, it is the ideal

place in terms of physical condition and the capacity, such as such as ponds existence, cultivator, nursery, knowledge and capital. In this case, it is necessary to have a good production process in managing the cultivation. The stages are the preparation stage of the pond, fertilizing stage, spawning stage, and hatching stage of the eggs become fish larva. The next stages, are the magnification stage, the harvesting stage, the processing stage and marketing stage. If these stages can be managed well it will also produce a good product. The fish are the primary commodity for consumption needs both inside the city and outside the city. Some fish products include, carp, catfish, Nile tilapia fish, tilapia, silver catfish and other fish. For the scale of business are large, medium and small. In terms of the size of ponds, most of the cultivator has a large business scale with an area of more than 400 m². In terms of labor use most of the cultivators are included on a small business scale. For the capital gain, they use their own capital and borrow from some institution. A some of the cultivator after they gain profit, they will borrow the money to the bank to expand its business. The last, in terms of *Minawisata* activities, the village can be developed for fishing activities, culinary and fisheries exhibitions.

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