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Identification of Potential Reservoir System to Support the Development of Agrotourism Based Aquaculture (Case Study In Tanjungan Reservoir, Mojokerto City, East Java Province, Indonesia)

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Abstract: *Most potential tourism resources in Indonesia today is tourism based on natural resources including rural and agricultural landscape. One of the region that is developing its tourism sector is Tanjungan village, Mojokerto Regency. The main object is Tanjungan reservoir, but there are still obstacles in the development of this region that is the potential areas that can support the development of tourism has not been identified and there is no special fascination to attract tourists so it is necessary to identify the characteristic of the location and the tourist. The method used is bathymetry measurement method, analysis of reservoir water quality, identification and environmental suitability analysis and also public perception and tourists. Survey results showed Tanjungan reservoir water elevation change on the changing seasons, at the highest elevation of the peak volumes reached 141.113,30 m^3, and at the lowest elevation, volumes reached 16.062,29 m^3. Hydrological conditions in the form rain-fed with 5-6 wet months, with maximum rainfall is ≥ 200 mm/month. Fish production is currently divided into Catching and Fishery Household. Fishery cultivation land area 10,083 ha whereas the managed land is just 0,388 - 0,907 ha. TSS measurement results in Mojokerto Tanjungan Reservoir ranged between 50-95 mg/l. DO value around 4.8 - 11.1. Most of Tanjungan society are already know and ready to the development of their villages region. The results of tourist perception there is a difference of the desire between the different levels of education.*

Keywords: *Reservoir, Tanjungan, agrotourism, agricultural cultivation, aquaculture*

I. Introduction

In general, every region in Indonesia has always tried to develop their potential optimally which one of them is the tourism sector. One of the most potential tourism resources is tourism based on natural resources including rural landscapes such as agriculture and fisheries which have a high richness and diversity in various formations as well as local customs and culture attached to them. This development base is vital considering most regions of Indonesia is still a rural dominated by agricultural cultivation and fishery activities. One of the region that is developing its tourism sector is Tanjungan Village in Kemlagi Subdistrict, Mojokerto Regency. Development of fisheries sub-sector in this region has a very large business opportunity because besides planned to become a regional agro-tourism, The region also has a reservoir that is known as Tanjungan reservoirs. The potential problems that occurred in planning the development of agro-tourism in the area of Tanjungan is the lack of fascination the typical tourism object and tourist characterize from Tanjungan reservoirs.

Potential problems that will be developed Tanjungan reservoirs tourism related to the development of the concept of agrotourism in District Kemlagi are:

1. How does the potential for aquaculture could be used as a space tourism area Tanjungan reservoirs.
2. How fish species and cultivation techniques appropriate for use as a tourist attraction.
3. How does the perception of the public and tourists to agriculture as a tourism attraction.

The purpose of this research is besides conducting the development of tourism in Tanjungan reservoir and the area around with the addition of aquaculture as an icon or a tourism attraction, is also as the marketing place informal sector production Tanjungan village communities to enable them to be easily accessible by the tourists or the general public.

To support these objectives, the targets that should be achieved in this research is:

1. Conducting identification process Tanjungan reservoir tourism area space as the development of freshwater aquaculture area, followed with encourage the implementation of fisheries tourism development.
2. Conducting the survey process of desire perception and public opinion and tourists to the the development of aquaculture as a tourism attraction.

II. Research Methods

Description of Research Areas

The area where the implementation of this study are in Kemlagi subdistrict, Mojokerto regency more precisely in the area of Tanjungan reservoir. Tanjungan reservoirs can be reached from the city of Mojokerto by road/asphalt with the distance 12 km and the distance from Kemlagi subdistrict capital by road/asphalt is along 4.5 km. Astronomically, Tanjungan village is located on $7^{o}22'55"$ South latitude, $112^{o}24'01"$ East Longitude.

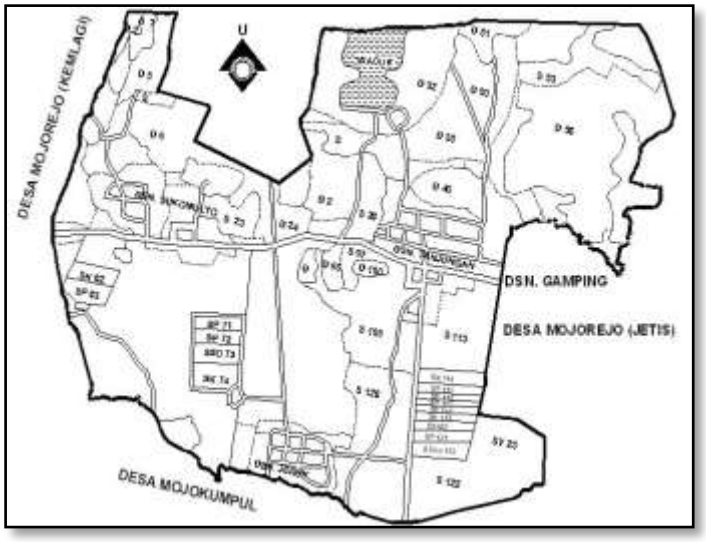


Figure 1 Tanjungan Village Administration, Kemlagi Subdistrict, Mojokerto Regency.

Data Collection Method

Methods of data collection in this study using survey method approach that is data collected indirectly by collecting them from the relevant authorities or a secondary data. The data collected is spatial data and non-spatial data that can describe the condition of the study area.

Besides secondary data, there is also the primary data collected but only support secondary data. Primary data that collected such as visual observation result in the form of a photo or video documentation or recording, measurements and direct interviews with relevant sources.

Method of Analysis

Based on the flow chart above this research processing started with identify the characteristics of agricultural cultivation include: the data of plant type, plant distribution data, the data of agricultural technology and agricultural production. Were then analyzed on the type of plant, analysis of agricultural cultivation techniques that used, analysis of the distribution of plant and crop production analysis. Beside that the other identification conducted is identification and analysis of biophysical and environmental reservoirs covering: bathymetry data collection, water quality data, hydrological data, Data of fish types and data of fish feed types. And then from the data mentioned could be analyzed the volume capacity of the reservoir, analysis of reservoir cultivation boundaries, analysis of fish species, and also analysis of fishery cultivation techniques. Other identification needs to be done in this study is the identification of community readiness and perceptions and also desires of the tourists that includes: community characteristics data, tourist characteristics data, Community readiness data, the data of perceptions and also desires of the tourists to the agriculture cultivation and aquaculture. So it can be analyzed on social analysis of community and also social analysis of tourist.

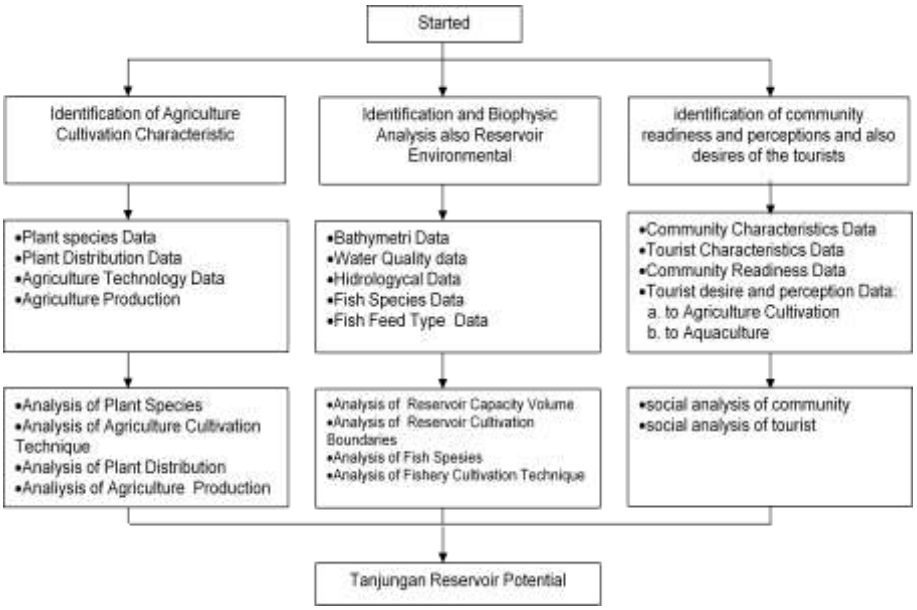


Figure 2. Flow Chart of Data Processing

III. Research Results

A. Characteristics Of Agriculture Cultivation

Data and Analysis of Plants Types

The main commodity from Tanjungan village is food crops, fruit and lowland vegetable. The diversity of agricultural products in this area can be seen as a potential agricultural, This potential can be developed into agro-tourism attraction.Plants cultivation in the village Tanjungan divided into five types of plants that are food plants, fruit plants, vegetable plants, ornamental plants and medicinal plants. Based on the season calendar and cropping patterns in Tanjungan village pepper, tomato, rice, soybeans and tobacco is a plant that is often planted and become one of the major commodities for the development of agro-tourism, this is because the continuity of the availability of adequate plants throughout the year.Plants that have a selling value and support the development of agrotourism is longan and food crops. Longan plant could develop to become typical souvenirs from Tanjungan village. This allows the plants to be planted along the main roads so that tourists are easy to access.For the rice plant, This plants is not specifically made an object agrotourism directly but the potential that can be developed is the method of rice cultivation itself. This is supported by the interests of tourists who want to directly involved feel became farmers while enjoying the natural beauty of the countryside.

Table 1. Types of Plants Cultivated in the village of Tanjungan

No	Species Plant	Scientific Name
	Food Plant	
1.	Paddy	*Oryza sativa*
2.	Corn	*Zea mays*
3.	Soybean	*Glycine max*
4.	Ground Nut	*Arachis hypogeal*
5.	Green Bean	*Phaseolus radiates*
6.	Cassava	*Manihot utilissima*
7.	Sweet Potato	*Ipomea batatas*
	Fruit Plant	
1.	Mango	*Mangifera indica*
2.	Sapodilla	*Manikara zapota*
3.	Soursup	*Annona muricata*
4.	Longan	*Nephelium longanum*
5.	Starfruit	*Averrhoa carambola*
6.	Melon	*Cucumis melo*
7.	Banana	*Musa paradisiacal*
8.	Sugar Apple	*Annona savamosa*
9.	Kedondong	*Spondias dulcis*
10.	Papaya	*Carica papaya*
11.	Jackfruit	*Artoparcus heterophyllus*
	Vegetable Plant	
1.	Red Chilli	*Capcisum annum*
2.	Cayenne Pepper	*Capcisum frutescens*
3.	Eggplant	*Solanum melongana*
4.	Tomatoes	*Solanum lycopersicum*
5.	Cauliflower	*Brassica lycopersicum*
6.	Collard Meat	*Brassica juncea*
7.	Cucumber	*Cucumis sativus*
8.	Long Beans	*Vigna sinensis*
9.	Snaps	*Phaseolus vulgaris*
	Medicinal Plant	
1.	Ginger	*Zingiber officinale*
2.	Turmeric	*Curcuma longa*
3.	Greater Galingale	*Kaempferia galangal*
4.	Wild Ginger	*Curcuma xanthorrhiza*
	Ornamental Plant	
1.	Caladium	*Caladium bicolor*
2.	Lidah Mertua	*Sansivera trifaciata*
3.	Shoes Flower	*Hibiscus rosasinensis*
4.	Japan Cambodia	*Adenium obesum*
5.	Rose	*Rosa damascene*
6.	Soka	*Ixora coccinea*

Data and Plants Distribution Analysis

Plants distribution that seen divided into three types namely linear, geometric and natural. Linear distribution is spread of plants that follow the path of the road and river banks that could give the firm impression in the form of a corridor. The second is geometric distribution a spread of land plants that make up the field of patterned and formed the view that diffuse or small areas. Whereas natural distribution is the spread that following landforms that can give broad impression.Plants that have the greatest potential area is food crops, where food crops have the potential area of 84.95 ha or around 38.52% from the entire area of the village. Whereas for vegetable plants has the potential area of 35800 m^2 or around 11.44% from the entire area of the village. While for fruit plants have the potential area of 28.56 ha or around 20.75% from the entire area of the village. And for ornamental dan medicinal plants its range is less from 1 ha from the entire area of the village, it is because most of the ornamental plants and medicinal plants grown in residential areas or yard close to home.

Table 2 Plants Type and its range in the Village Tanjungan

No	Plant Species	Area
A	**Food Plant**	**84.95 ha**
1.	Paddy	54.12 ha
2.	Corn	6.2 ha
3.	Soy bean	6.18 ha
4.	Ground nut	9.59 ha
5.	Green bean	1.22 ha
6.	Cassava	5.47 ha
7.	Sweet Potato	2.17 ha
B	**Fruit Plant**	
1.	Mango	191 trees
2.	Sapodilla	23 trees
3.	Soursup	33 trees
4.	Longan	73 trees
5.	Starfruit	52 trees
6.	Banana	3276 trees
7.	Sugar apple	41 trees
8.	Kedondong	255 trees
9.	Papaya	94 trees
10.	Jackfruit	47 trees
11.	Melon	2300 m^2
C	**Vegetable Plant**	**35800 m^2**
1.	Large chilli	7800 m^2
2.	Small chilli	4600 m^2
3.	Eggplant	7700 m^2
4.	Tomatoes	3600 m^2
5.	Cabbage	200 m^2
6.	Cucumber	4800 m^2
7.	Collard	2300 m^2
8.	Long bean	3700 m^2
9.	Snaps	1100 m^2
D	**Medicinal Plant**	**1982.22 m^2**
1.	Ginger	496.72 m^2
2.	Greater Galingale	475.9 m^2
3.	Turmeric	679.31 m^2
4.	Wild Ginger	330.29 m^2

Analysis of Agricultural Cultivation Techniques

As well as agriculture cultivation in general, in Tanjungan village also implements activities that are still conventional cultivation, started from processing methods, seeding until harvest activity. For the use of its own seed, on food crops such as rice, corn and soybeans still able to rely on the results of the seeds before. While for vegetables and fruits because there are development plans into a tourism area then the assistance of seeds and development of green house and plastic house get insentive from government and related parties.

Analysis of Agricultural production

Production for food crops, fruits and vegetables from each hamlets, the type and the amounts is different. Harvest period conducted each day and the results are transported alone by farmers. After harvested agricultural products are washed and packed in advance. Yields purchased by individuals to be marketed to Surabaya, Jombang and some areas in east java. But there is still no effort to process agricultural products into finished products which have a higher sale value.

B. Characteristics Of Aquaculture

Analysis of Reservoir Enviromental Biophysic

The type of soil in the area is dominated by Vertisol soil. The vertisol parent material generally is alkaline, for instance calcareous sedimentary rocks and igneous alkaline. Organic matter content is generally between 1.5 untill 4%. Soil color is influenced by the amount of humus and lime. Regarding the content of alkaline, This type of Soil contains the elements Ca and high mg, even in some circumstances may also be formed concretions of lime and accumulation lime soft.The largest proportion of land use is for paddy field, dry

land and fields. This suggests that the allocation of land for the production and fulfillment of needs is very high. Besides that the main driving for society economy comes from agriculture which in this case is very appropriate and supportive of the concept of agrotourism.Land in Tanjungan village is dominated by flat land (50%). This indicates that this area is not vulnerable to landslides, thus has the potential to be developed considering the spreading more strategic than others.

Bathymetry Data

Hydrological condition of Tanjungan village area is rainfed with 5-6 wet month, with maximum rainfall is ≥ 200 mm/month and 5-6 dry months. Drainage in the Tanjungan village is an artificial drainage, artificial drainage is drainage deliberately created by people like in paddy fields, dry land, along the road corridor and residential areas. Where the water flows from upstream to the reservoir area towards the south.

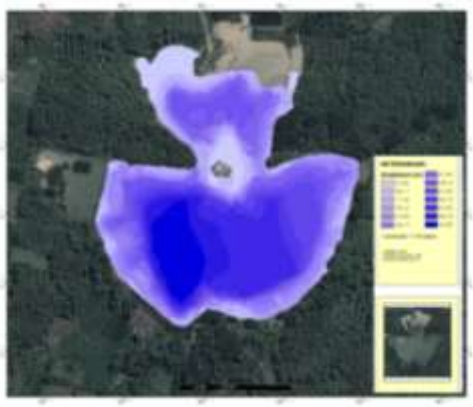


Figure 4. Tanjungan Reservoir Bathymetry Data

Analysis of Reservoir Storage

From the above table it can be seen that at elevation 74.00-75.50 Tanjungan reservoirs are in dry conditions. While at elevation 76.50-77.50 reservoir catchment conditions are in rainy conditions. And at elevation 78.50-79.50 Tanjungan reservoir conditions were in flooded conditions. Based on the results from analysis of reservoir storage then it also could be analyzed how much volume capacity of Tanjungan reservoir. The amount of Tanjungan reservoir volume capacity can be seen in Table 4. Based on the above table can be seen in the dry condition with an area of 388 m^2 the fish that can be accommodated in tanjungan reservoir is as much as 116.000 pieces, whereas for the spreading of seeds that can be accommodated is as much as 128.000 pieces.Meanwhile, if the reservoir Tanjungan in rainy conditions with an area of 907 m^2 then the fish that can be accommodated based on the area is as much as 544.120 pieces with a spreading capacity of seeds as much as 580.000 pieces.

Table 3. Analysis of Reservoir Storage

No	Elev.	Depth	interval (h)	Area(m^2)	volume(m^3)	Information
1	**79.50**	**-**	**-**	**100,825.34**	-	**Flood Condition**
2	79.00	0.50	0.50	93,189.44	30,000.96	
3	78.50	1.00	0.50	86,816.32	24,963.18	
4	78.00	1.50	0.50	62,962.75	19,940.27	**141,113.30 m^3**
5	**77.50**	**2.00**	**0.50**	**56,678.85**	**16,624.21**	**Rain Condition**
6	77.00	2.50	0.50	43,066.42	13,340.57	
7	76.50	3.00	0.50	36,976.98	11,149.92	
8	76.00	3.50	0.50	29,922.56	9,031.90	**66,208.89 m^3**
9	**75.50**	**4.00**	**0.50**	**24,268.87**	**6,526.53**	**Dry Condition**
10	75.00	4.50	0.50	14,890.30	4,366.80	
11	74.50	5.00	0.50	11,310.52	3,107.15	
12	74.00	5.50	0.50	7,332.38	2,061.81	
13	73.50	6.00	0.50	5,038.47		**16,062.29 m^3**
Total Volume					**141,113.30**	

Table 4. Analysis of Reservoir Volume Capacity

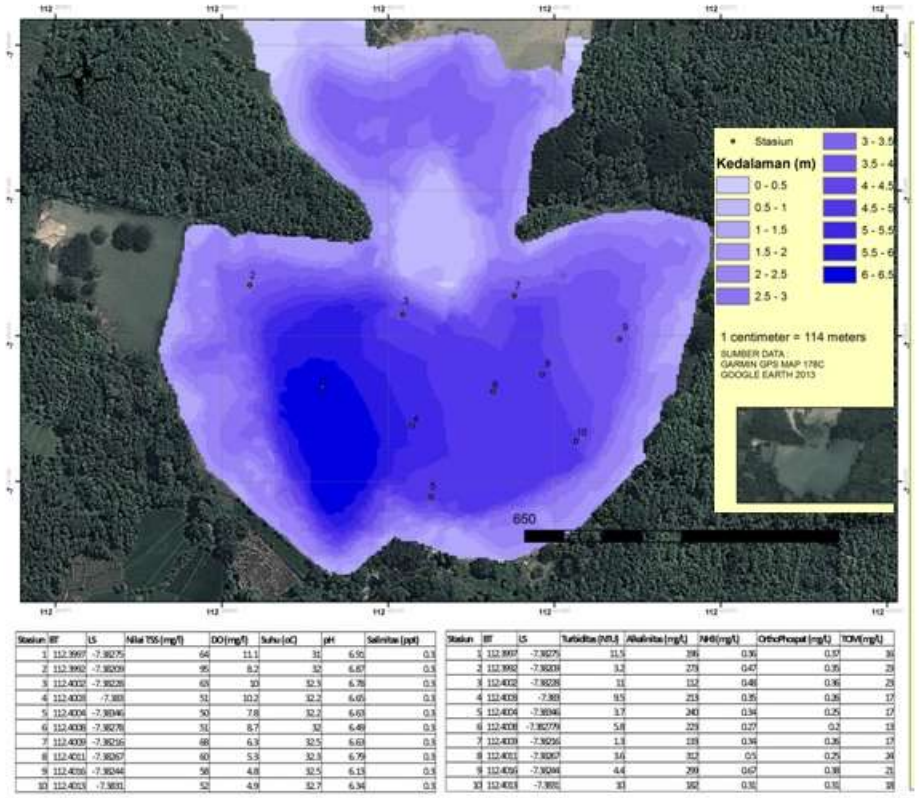
No	Elev.	Depth	interval (h)	Area (m^2)	Volume (m^3)	Information	Cultivation Boundary
1	**79.50**	**-**	**-**	**100,825.34**	-	**Flood Condition**	
2	79.00	0.50	0.50	93,189.44	30,000.96		
3	78.50	1.00	0.50	86,816.32	24,963.18		
4	78.00	1.50	0.50	62,962.75	19,940.27	**141,113.30 m^3**	
5	**77.50**	**2.00**	**0.50**	**56,678.85**	**16,624.21**	**Rain Condition**	**Area: 1,6 % x 56.679 = 907 m^2**
6	77.00	2.50	0.50	43,066.42	13,340.57		
7	76.50	3.00	0.50	36,976.98	11,149.92		**Base on Volume : 150 x 4 x 907 m^2 = 544.12 0 pieces Seeds Spreading : 54.412 x 110% = ~ 580.000 pieces**
8	76.00	3.50	0.50	29,922.56	9,031.90	**66,208.89 m^3**	
9	**75.50**	**4.00**	**0.50**	**24,268.87**	**6,526.53**	**Dry Condition**	**Area: 1,6 % x 24.269 = 388 m^2**
10	75.00	4.50	0.50	14,890.30	4,366.80		
11	74.50	5.00	0.50	11,310.52	3,107.15		**Base on Volume : 150 x 2 x 388 m^2 = 116.000 pieces Seeds Spreading : 11.600 x 110% = 128.000 pieces**
12	74.00	5.50	0.50	7,332.38	2,061.81		
13	73.50	6.00	0.50	5,038.47		**16,062.29 m^3**	
Total Volume					**141,113.30**		

Water Quality Analysis

Salinity values in tanjungan reservoir water is still good for freshwater fish cultivation, which ranged 0-0.3 ppt. The mean temperature in the Tanjungan reservoir get from all point ranges 31-32.7^{o}C, This due to long exposure time and surrounding climate changing that will affect the waters around and the least water entering the reservoir, but still can be used for fishery business.TSS measurement results in Mojokerto Tanjungan Reservoir ranged between 50-95 mg/l, this value is in the medium water condition and not disrupt the activities of fisheries, fish life will be dangerous and gill filament will clog in waters containing TSS more than 400 mg/l. DO values in Reservoir Tanjungan based the survey results was 4.8 - 11.1 mg/l, This value is still quite good, and can still be used for fishery cultivation business. DO balanced for animal cultivation is more than 5 mg/l. If the dissolved oxygen out of balance will cause stress to the fish because the brain does not receive enough oxygen supply, and death from lack of oxygen (anoxia) resulting fish body tissue can not bind oxygen dissolved in the blood.At chemical quality testing in 2013 with a different point on testing pH using the method of pH meter. pH values in Tanjungan reservoir ranged 6.13 – 6.91. Then reservoir conditions with pH 7 is still good for cultivation developed.The alkalinity values in Tanjungan reservoir ranged 112 – 312 ppm, average value ranges 200 ppm, then classified as medium for the cultivation, because it is generally a good environment for fish life is with values above 50 ppm alkalinity.Based on Table 5 it can be seen that all the parameters measured for the physical quality of water in the Tanjungan reservoir shows good results, except the parameters OrthoPhospat, where the analysis of the results obtained for these parameters occurred the condition of eutrophication at Tanjungan reservoir.

Table 5. Water Quality Analysis

Parameter	Condition	Requirement	Condition
TSS Value (mg/l)	61.2	400	Good
DO (mg/l)	7.73	5	Good
Temperature (oC)	32.17	28-30	Good
pH	6.622	4<PH<9.5	Good
Salinity (ppt)	0.3	5	Good
Turbidity (NTU)	6.4	10	Good
Alkalinity (mg/L)	218.3	>50	Good
NH3 (mg/L)	0.409	1.5	Good
OrthoPhospat (mg/L)	0.299	< 0.02	Eutrophication
TOM (mg/L)	18.9	100	Good



Stasiun	BT	LS	Nilai TSS (mg/l)	DO (mg/l)	Suhu (oC)	pH	Salinitas (ppt)
1	112.3997	-7.38275	64	11.1	31	6.95	0.1
2	112.3992	-7.38209	95	8.2	32	6.87	0.1
3	112.4032	-7.38228	63	10	32.1	6.78	0.1
4	112.4028	-7.383	51	10.2	32.2	6.65	0.1
5	112.4004	-7.38346	50	7.8	32.2	6.63	0.1
6	112.4038	-7.38279	51	8.7	32	6.49	0.1
7	112.4039	-7.38256	68	6.3	32.5	6.63	0.1
8	112.4011	-7.38267	60	5.9	32.3	6.79	0.1
9	112.4059	-7.38244	58	4.8	32.5	6.13	0.1
10	112.4053	-7.3831	52	4.9	32.7	6.34	0.1

Stasiun	BT	LS	Turbiditas (NTU)	Alkalinitas (mg/L)	NH3 (mg/L)	OrthoPhospat (mg/L)	TOM (mg/L)
1	112.3997	-7.38275	11.5	286	0.36	0.37	16
2	112.3992	-7.38209	3.2	273	0.47	0.35	23
3	112.4032	-7.38228	11	112	0.48	0.36	23
4	112.4028	-7.383	9.5	213	0.35	0.26	17
5	112.4004	-7.38346	3.7	240	0.34	0.25	17
6	112.4038	-7.382779	5.8	229	0.27	0.2	13
7	112.4039	-7.38256	1.3	193	0.34	0.26	17
8	112.4011	-7.38267	3.6	312	0.5	0.29	24
9	112.4059	-7.38244	4.4	299	0.67	0.38	21
10	112.4053	-7.3831	13	162	0.35	0.35	18

Figure 5. Tanjungan Reservoir Water Quality Data

Feed Type Data

The average fish cultivation in Tanjungan reservoir using pellets. For the daily feed, usually every day 2-5 kg as much as 2-3 times a day. The composition of a given food should be adapted to the type of fish for example Tilapia fish fish besides natural foods can be given additional food, intensively cultivated, in the form of bran, coconut pulp, pellets or kitchen food scraps (rice, vegetables etc.).

Feed Availability

The average fish cultivation in Tanjungan reservoir using pellets for the daily feed, usually every day 2-5 kg as much as 2-3 times a day. The composition of a given food should be adapted to the type of fish for example Tilapia fish fish besides natural foods can be given additional food, intensively cultivated, in the form of bran, coconut pulp, pellets or kitchen food scraps (rice, vegetables etc.).The area of Tanjungan reservoir currently is 10 Ha. For aquaculture in the reservoir should not exceed 1,6 % from the total area of the reservoir. Thus the total area of proper cultivation in the Tanjungan reservoir is 1.600 m^2, but the exploited area is still les than 0.1% from cultivated land area which may be used. While existing cultivated land area is still far below the permissible limits that is 100 m^2. Total cultivation in Tanjungan Reservoir according to existing data, there is one site, then based on the number of cultivation, the amount of feed that is released during the day amounted to:

1 x 42.5 kg/day → 42.5 kg/day

If the total area allowed for cultivation land is 1.600 m^2, then the amount of feed entering Tanjungan reservoir in one day is equal to:

42.5 x 1.600/100 → 680 kg/day

Feeding value of the maximum limits for fish cultivation in Tanjungan reservoirs in one day is equal to 680 kg/day. Meanwhile, from the results of the survey interviews with local cultivators in Tanjungan Reservoir, the cultivators provide feed average of 2 kg/day.

C. Characteristics Of Community

The state of Population

Communities in the downstream reservoir is homogeneous society from ethnic aspects, that is people with Javanese culture, more than that they are united again because tied to the values of the same religion of Islam which is the majority religion.

The population of the village Tanjungan until the year 2011, there were 3,092 person, spreading in three hamlets which is Tanjungan Hamlet, Sukomulyo Hamlet, and Jeruk hamlet all located in downstrem reservoirs . Population in the village of Tanjungan can be seen in Figure 7 below:

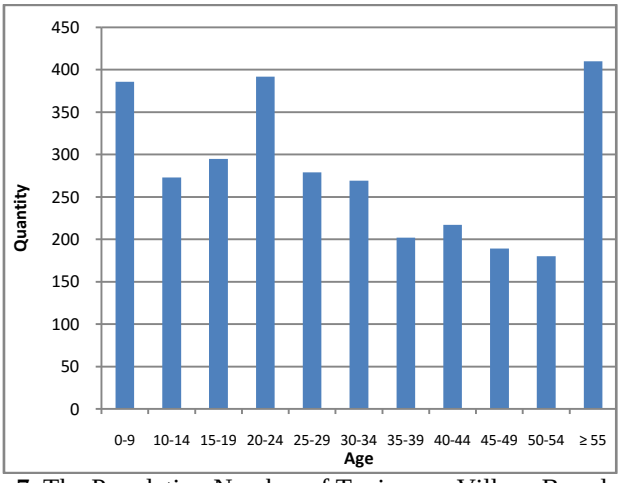


Figure 7. The Population Number of Tanjungan Village Based on Age

Education

Based on the population of Tanjungan village the number is 3092 person, if reviewed in terms of education, then 35.41% population is illiterate and did not finish Elementary school. And most of the population educated graduated from Elementary School (38.87%). This condition requires a special guidance for residents as a form of motivation and mentoring to enable them to develop and manage this agrotourism, considering they will play an important role in it. The education of Tanjungan village population could be seen in figure 8 below

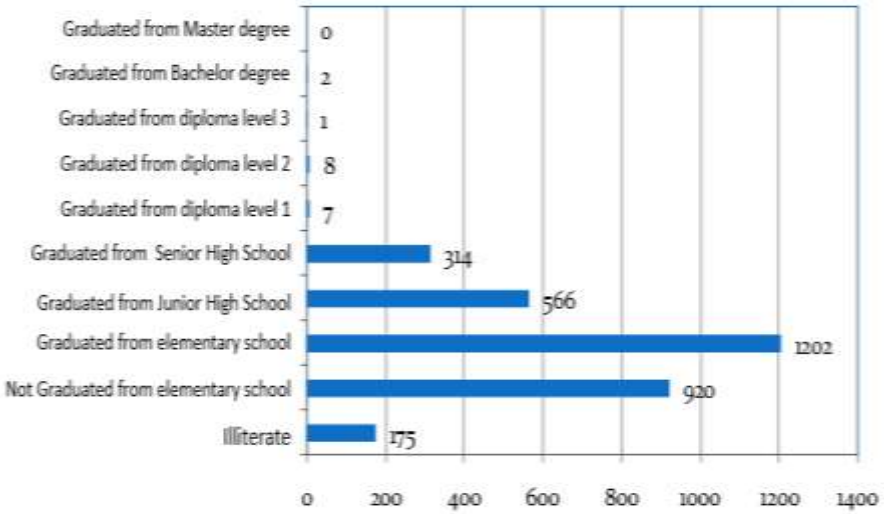


Figure 8. The education of Tanjungan village population

Population Livelihood

The state of the population in terms from livelihood classified in a variety of livelihood that is, farmers, civil servants, private employees, employees of state-owned companies, financial institutions services, trade services, and other industries.Tanjungan Villagers that work in agriculture as farmers is quite high compared to other business sectors. It can be concluded that the agricultural sector plays an important role in the governance community life of the Tanjungan village. This composition causing agriculture greatly affect the shape of rural economy because most of the income in agriculture is used to meet the daily needs and the rest are used as capital in the next farm management.The existence of the local community is very influential on the successful management of the Tanjungan reservoir area , therefore the community must be involved either directly or indirectly in activities related to fishery resource management activities.The composition of Tanjungan village population livelihoods can be seen in Figure 9 below:

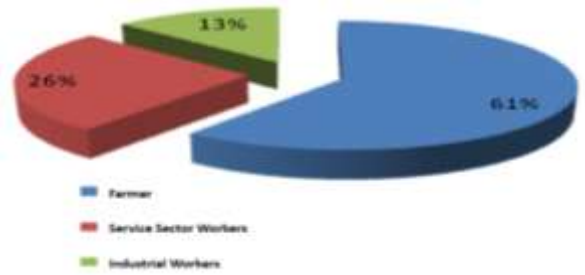


Figure 9. Tanjungan Village Population Livelihood

Public Perception To The Tanjungan reservoir Area

Forms of knowledge and society perception to Tanjungan reservoir area stated that the condition of the water Tanjungan reservoir included in good categories or meet for fishing activities. Good category or meet standards for fishing activities, indicates that the water quality in the reservoir is not polluted, either by domestic waste such as garbage, plastics, waste household as well as waste from agriculture, such as drugs agriculture (fertilizers) and sedimentation.While fish are often caught using fishing gear and the cultivation net cages are tilapia fish, mas, catfish, gabus, mujair, tawes, bawal and bandeng. At the present the existence of the fish have not been able to improve the local economy. One way to improve the local economy is through the diversification of aquaculture or fishery product processing.

While the type of fish that is cultivated in Tanjungan Reservoir is Tilapia fish fish and Catfish fish. The Result of fish cultivation are used to meet the needs of tourists who visit the Tanjungan reservoir, such as fish culinary tourism. Beside that, cultivated fish are also used as fish bait, the goal is to attract tourists or anglers in the fishing race. Those activities essentially to promote Tanjungan Reservoir as a leading tourist destination in Mojokerto, so it can raise the local economy around the Reservoir.The existence Tanjungan Reservoir area can provide benefits to the surrounding community in which can create jobs or business opportunities that is with declare the existence of reservoirs Tanjungan for freshwater fish cultivation and exploit the potential of reservoirs used as the tourism potential.Management of Tanjungan reservoir is still not optimal especially the cooperation and support managers and relevant agencies to the surrounding community, this is expressed by the respondents, but expressed permission to business quite easily given by the manager or local government so it can open up a variety of jobs. Based on the information seen less inequality support and cooperation of the manager or agencies related to public, whereas the collaboration between managers and relevant agencies with the public is needed in the potential sustainable development of Tanjungan reservoir, in order to avoid gaps in the future.

Community Readiness in the Development of Agrotourism

Awareness and community involvement in reservoir environmental conservation is still relatively good. Based on observations in the field, many people who actively participate in the management of reservoirs. Village officials are working together with the local community to establish Tanjungan reservoir potential. In the development of agro-tourism, community as one of the key stakeholders who need to know the assessment in the development of agro-tourism. Based on the results of interviews that have been conducted found that the readiness of Tanjungan villagers in terms of agro-tourism development is included in the category of very good. This means Tanjungan villagers ready to participate in developing agrotourism.The results of the survey on the readiness of the community in the development of agro-tourism can be seen in Figure 10. From the survey results it is known that the majority of the Tanjungan society believes positively to the development of the tourism area of their villages, most of them agree that their village become tourism village, the objective is that many visitor come to their village and expect to be able to increase their income. In addition, most of Tanjungan people already have a basic as a tour guide so they are ready when their territory visited by many tourists. And the last point most people agree when aquaculture used as an icon in their local tourism. Because the fisheries sector become additional value to the concept of tourism development existing reservoirs in their region.

Besides that other forms of community readiness is public knowledge about agro-tourism Tanjungan village what will be developed in the village. In addition, an understanding of the community impact of what will be caused by the development of agro-tourism in their village. From the survey results it is known that the majority of the Tanjungan society believes positively to the development of the tourism area of their villages, most of them agree that their village become tourism village, the objective is that many visitor come to their village and expect to be able to increase their income. In addition, most of Tanjungan people already have a basic as a tour guide so they are ready when their territory visited by many tourists. And the last point most people agree when aquaculture used as an icon in their local tourism. Because the fisheries sector become additional value to the concept of tourism development existing reservoirs in their region.

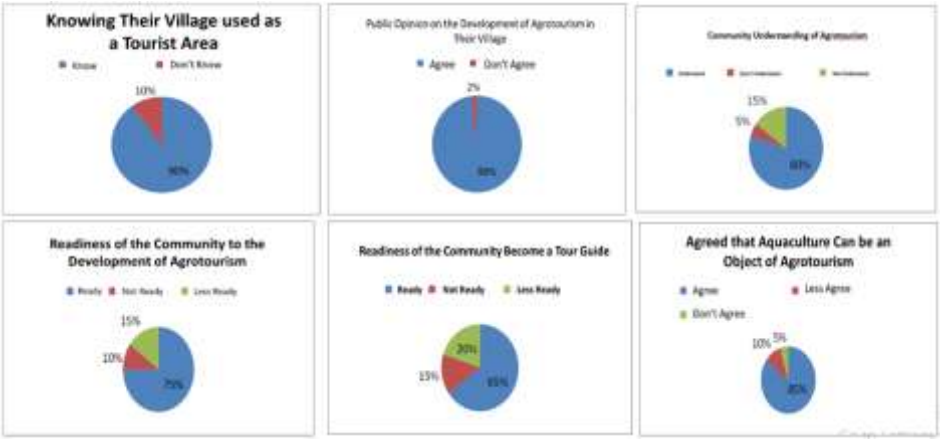


Figure 10. Community Readiness Survey Results

C. Potential Tourist Perception

In the development of agrotourism we also need to understand what are the desires from the tourist, because tourists also one important stakeholder since become one of the main factors to be directed where the development of agro-tourism planning.Travelers intended here is that tourists who come from urban in particular the city of Malang with different income levels and different age from the age 15 years to more from the 25 years. The Assessment is how the perception of tourists to the development of agrotourism-based aquaculture and the second is a an overview what agrotourism as desired by potential tourist.From the survey results it is known that the type of fish affect tourist attraction, to attract the attention of tourists come to tourism sites, because there are differences in tourist desire in determining the type of fish based on the income level of tourist. Based on the multikorelation results for travelers with incomes of less from one million more satisfied with their dominant fish species tilapia fish and mujair. For income between one million and three million are in the central this shows to be more flexible for all types of fish. And for tourists who have an income of more than three million dominant select carp fish as the attractiveness the most preferred type of fish. Meanwhile, when seen from the age of tourist. For fish mujair and Catfish dominant preferred by tourists aged 15-18 years. While for tilapia fish more dominant for tourist aged > 25 year. And carp fish more inclined at the age of 19-25 years more ordered.

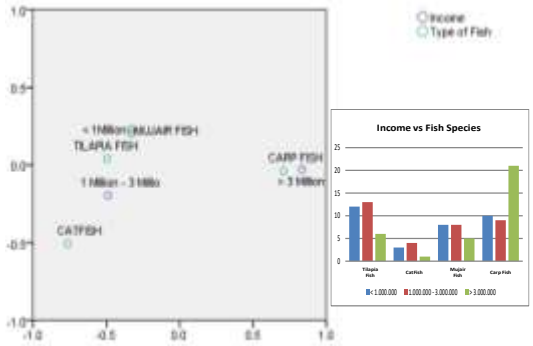


Figure 11. The relationship between income and Fish Species

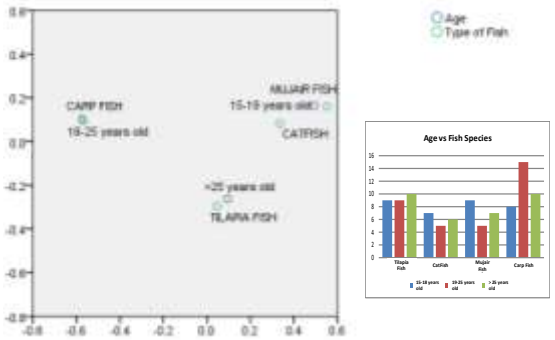


Figure 12. Relationship Between Age and Fish Species

From the multicorelation analysis between the income levels of tourist and techniques of aquaculture is dominance in the harvesting of fish, all income levels expressed most liked cultivation techniques at harvest. Beside the harvest for parent maintenance and enlargement technique also favored by tourists predominantly with revenues over 3 million dollars whereas spawing or spawning techniques favored by tourists with incomes above 1-3 million and 3 million dollars.Meanwhile, if viewed in terms of age of tourist, similar to the level of income the harvest technique favored by tourists is more dominant than the other cultivation techniques, when viewed the distribution of multicorelation results beside the harvest, for spawning potentially favored by the age of 15-18 years, for the maintenance of parent are preferred by tourists aged 18-25 years. While enlargement technique here is less favored.

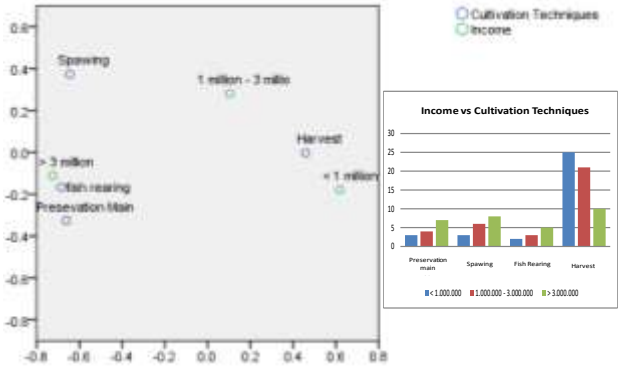


Figure 13. The relationship between the income level and cultivation techniques

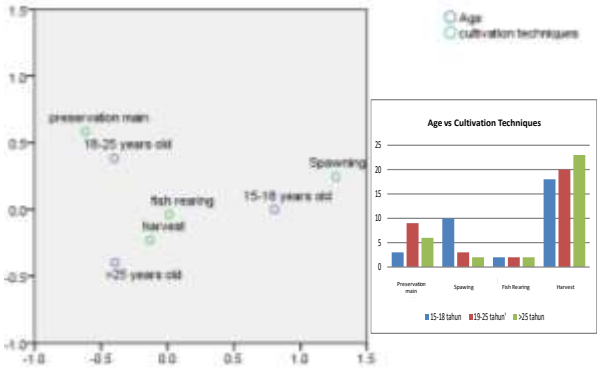


Figure 14. The relationship between age and cultivation techniques

From the survey results between income level and type of attraction is known for the fishing attractions most dominating travelers desire almost all tourists with different income levels whereas for the outbond attractions are more likely to be dominated by tourist income between 1-3 million dollars. While the attraction of feeding, water bike and boat rental dominant chosen by travelers with incomes over 3 million dollars.While the relationship between age and tourist attractions, as well as income, fishing attraction dominated the choice of travelers besides fishing outbound also includes attractions that dominate tourist choice, while for the water bike and boat rental is dominated by voters aged 15-25 years. And the attraction of feeding is still considered less attractive by the tourists.

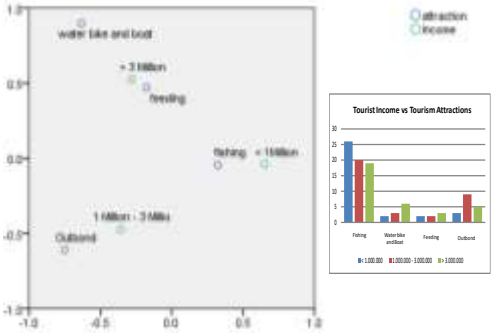


Figure 15. The relationship between the of tourist income and Tourism Attractions

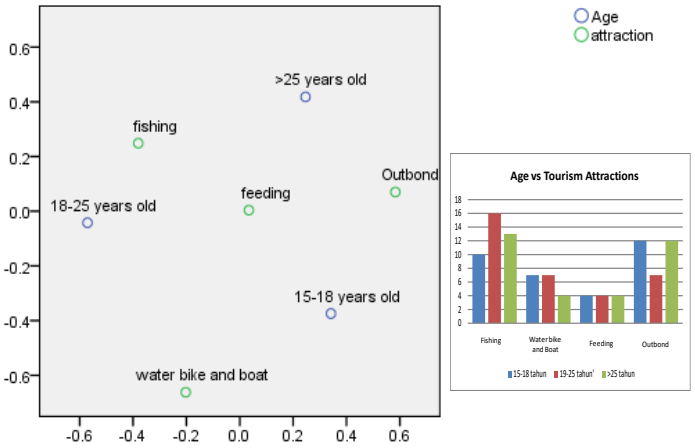


Figure 16. The relationship between the age of tourist and tourism attractions

In a tourism world facilities greatly affects the visitor's interest and the comfort level while in tourist sites, so that the facility is very important to assess how much of the most important tourist purposes according to them.From the survey results it can be seen that for incomes of less than 1 million selecting preferred took souvenir, then for 1-3 million income more dominant choose took souvenir and restaurant and the last for travelers with income over 3 million more dominant given additional cottages and camping facilities. Meanwhile, when seen from the relationship of age and facilities, then obtained for age of 15-18 years at the time they were at a tourism site choose to find souvenir shops and restaurants, for 19-25 years age they tend to choose campsites and age above 25 years they tend to assess the availability of lodging.

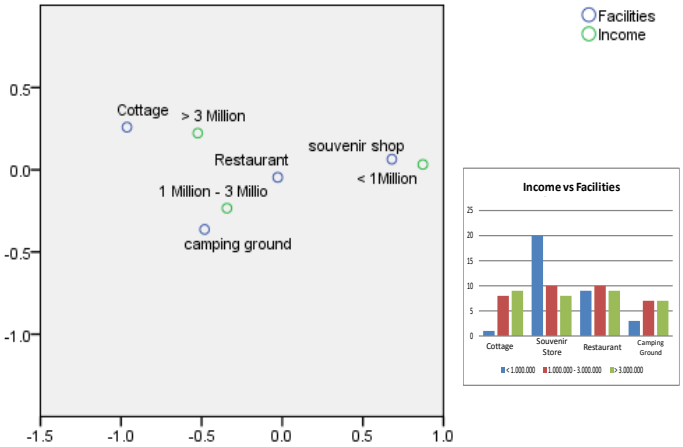


Figure 17. The relationship between level of income and tourism facilities

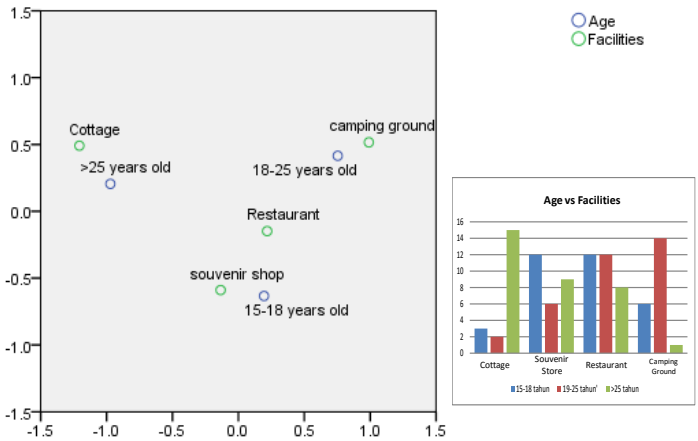


Figure 18. The relationship between age of tourist and tourism facilities

IV. Discussion

A. The potential of Agricultural Sector

From interviews that have been conducted and the analysis that also have been performed then it was found that, in agriculture Tanjungan village still has the potential to developed into agricultural agrotourism area. Because from the results of the mapping of potential tourist visiting the Tanjungan reservoir most tourists like agrotourism in there. For the distribution of plant species Tanjungan village already could be used as a potential agrotourism. Such example is agrotourism in other areas like nurseries florets which is agrotourism site in Bogor. Where there are a wide variety of plants, both ornamental and medicinal plants. Beside that there was also agrowisata Turi in Sleman Yogyakarta. Where in this agrotourism tourists can explore salak garden. There is also a garden agrotourism Batuah located in Kutai Kartanegara, East Kalimantan. In this agrotourism there are various kinds of plants, such as ornamental plants, fruits, medicines and the rare plants.

With the tourism attractions which can be shown to increase the attractiveness for tourists to visit the Tanjungan village agrotourism. Attractions which can be shown is for food crops, fruit crops, vegetable crops, agricultural technology and home composting.

B. The Potential of Fisheries Sector

For fisheries sector Tanjungan village is very potential for agrotourism development in the fisheries sector. That is because in the Tanjungan village there is an icon namely Tanjungan reservoirs. In where Tanjungan reservoir is a core agrotourism which could be developed better.Attractions that can be taken also based on the potential that exists in the reservoir that is aquaculture. As well as agricultural cultivation, aquaculture also has a main base for determine the attraction through the period of breeding fish or fishery cultivation. For fishery commodities the same with fruit and vegetable crops, tourist activity for each month varies depending on the cultivation activity from communities around. For example, in April just started breeding mujair fish, so in this month can be used by tourists for follow the activity of mujair breeding, besides that tourists are also given a variety of materials about mujair, ranging from seed to harvest. And in the same month there is activity for harvest Tilapia fish and Catfish commodity. Tourist here can also view and participate with the community fish harvesting activities or fishing. Similarly, performed on-the other months depending on fish cultivation activities undertaken.While for the attractions in the Tanjungan reservoir, which can be done by tourists is limited activity in the passive activity like enjoying the scenery and observing existing object and resting. While for tourists who like fishing is provided fishing space. With the arrangement and effort, Karamba / cage fishery can be developed as an agrotourism object. Because besides aquaculture itself attract tourists, it also could be used as a fishing area as a value added

V. Conclusion

1. Aquaculture potential could still be used as a very attractive tourism area, because fishery cultivation has great potential if developed as a tourism attraction.
2. Species of fish that apropriate in Tanjungan reservoirs are Tilapia fish fish, Gurame, Mujair and also Catfish.
3. Public perception on agricultural cultivation is also very good, in which Tanjungan village society understand that in their area will be developed agrotourism.
4. The survey results of potential tourists interest to the types of plants that can be used as an attraction for junior high school students choosing fruit plants and vegetable plants while high school students, college students and workers prefer food crops and fruit plants.
5. Based on the research results of the harvest and planting periods in each commodity become basis for determining the attraction or fascination of agrotourism. So that tourists can arrange tourism activities in accordance with their pleasure and interest.

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