



Potential Mapping and Feasibility Study of Cepokolimo Village, Pacet District, Mojokerto Regency as a Tourism Village

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Abstract. Cepokolimo Village is located in the Pacet District, Mojokerto Regency, right at the foot of Mount Welirang, which has very supportive natural potential in the form of natural conditions, agriculture, animal husbandry, and home industry to become a tourist village. The existing potential has not been optimized for utilization, so research needs to be done to analyze the potential feasibility of Cepokolimo Village being used as a tourist village. This research is expected to determine the potential of Cepokolimo village to be used as a tourist village, so that it can contribute to improving the welfare of the cepokolimo village community. This research method uses ADO - ODTWA guidelines (Analysis of Operational Areas of Natural Tourist Attractions) to analyze the feasibility test for developing tourism potential in Cepokolimo Village so that data are obtained in the form of potential tourism maps, topographic maps, road maps and land use maps based on Geographic Information Systems (GIS) using ArcGIS software. The results show that the tourism potential in Cepokolimo Village is feasible to be developed as a tourist village both in terms of a tourist attraction with a presentation of 80%, easy accessibility gets 70%, infrastructure facilities that can support tourism activities get 90%, socio-economic conditions 83.3% and 100% clean water availability, with an average feasibility index of 84,66%.

Keywords: Mapping · Feasibility study · Tourism · Cepokolimo

1 Introduction

Cepokolimo Village is located in the Pacet sub-district, Mojokerto Regency, East Java Province, Indonesia. The village's location on the slopes of Mount Welirang makes Cepokolimo a village with high natural wealth. The natural condition of Cepokolimo Village consists of rice fields and pine forests with genuine products of various kinds of

fruits and vegetables. It is close to other tourist destinations, so it has the potential to be used as a tourist village. In addition to its natural potential, accessibility to Cepokolimo Village is also relatively easy, so it becomes a supporting factor in the development of Cepoklimo Village. However, this does not encourage economic growth, socio-culture and the welfare of the people of Cepokolimo Village.

Comprehensive tourism management in Cepokolimo Village needs to be done, namely by making Cepokolimo Village a tourist village in the form of the tourism industry so that it can generate existing potentials so that accelerated development is formed to encourage transformation both in terms of culture, social, and village economy [1–7] and increase productivity to build a prosperous society. This development is certainly carried out purely to take advantage of the existing natural potential so that it can raise the concept of ecotourism. The application of this ecotourism concept is based on a green economy that aims to avoid the risk of significant damage to the environment. For this reason, a mapping study in the form of accurate geospatial maps is needed to support various development plans with different regional scopes and precise scales so that all forms of land surface and objects can be seen [7, 8].

The mapping of the Cepokolimo Village area was made using the ArcGIS v10.1 application program, which is a software that functions to present a geographic information system in the form of contour data, area coordinates, elevation and some of them as well as map making with visualization in 2D or 3D format. After the condition of the area has been known through a mapping survey, the next step is to analyze the feasibility of developing the Cepokolimo Village area.

There have been no studies that examine the potential of Cepokolimo village to be used as a tourist village so that the results of the study can be used as support material in finding funding for the development of tourism villages.

2 Materials and Methods

The mapping of Cepokolimo Village area based on Geographic Information System. The software application used for mapping in the research is ArcGIS. The ArcGIS used in this study was desktop ArcGIS. ArcGIS desktop itself has three main components, namely: ArcView which is useful for managing comprehensive data, mapping, and analysis, ArcEditor which is useful for managing or editing spatial data, and ArcInfo is a useful component that provides features of the functions in GIS and includes the analysis of geoprocessing features. Mapping using ArcGIS was chosen because the software functions are complete [9]. In contrast, ADO – ODTWA (Analysis of Operational Areas of Natural Tourist Attractions) is used to analyse development feasibility. Data used to analyze feasibility using the ADO-ODTWA method in the form of Cepokolimo village profile data, topographic data, socioeconomic data, development resources, and tourism potential data.

The ADO–ODTWA (Analysis of Operation Areas for Natural Tourist Attractions) guidelines assess five variables: tourist attraction, accessibility, supporting infrastructure, socio-economic conditions, and the availability of clean water [10]. The assessment of these five variables is carried out by giving weights and values, which will then be used

to find scores, as seen in formula (1).

$$S = N \times B \quad (1)$$

Information:

S = Score of a variable

N = Number of variable values in a criterion

B = Weighted value

While the determination of the Feasibility Index (IK) of each variable is by comparing the score to the maximum score of a variable with the formula (2):

$$IK = \frac{S}{SM} \times 100\% \quad (2)$$

Information:

S = Variable score

SM = Variable maximum score

IK = Feasibility Index

The feasibility index obtained is then analyzed for feasibility using the level of ecotourism feasibility as follows [11]:

IK > 66,6% worth developing

33,3% < IK < 66,6% not yet feasible to develop

IK < 33,3% is not feasible to develop

3 Results and Discussion

Analysis of tourism development feasibility based on five variables, namely: tourist attraction, accessibility, infrastructure, socio-economic conditions and the availability of clean water [10]. Those variables was carried out by map modelling. The potential of an area/village can be seen in the form of a map if the information in the map is equipped with land resources and human resources [12].

Modelling regional maps represents locations in the form of contours, water flows, roads, and administrative boundaries, as well as tourism potential in the Cepokolimo Village area. The modelling of this map must be in accordance with the coordinates of the location under study [13]. For this study, the coordinate system of the area used in the map modelling is the coordinate system of the Mojokerto Regency area, so the geographic coordinate system data entered is WGS 1984 UTM zone 49S.

3.1 Tourist Attraction Analysis

The tourist attraction is the main factor that causes tourist trips [14–17]. Identification of tourism attractions potential was carried out by observing the state of the natural environment and the social conditions of the local community. The aspects reviewed in analyzing the tourist attraction in Cepokolimo Village consist of the uniqueness of natural resources, prominent natural resources, cleanliness of the location, comfort and possible tourism activities [10]. Based on the observations contained in the map of the

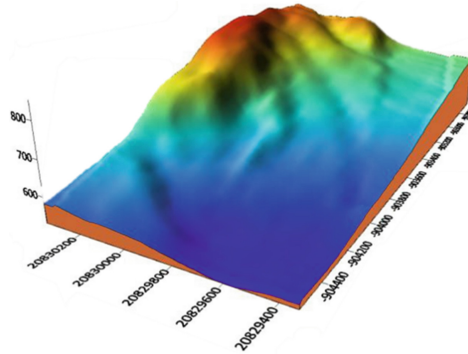


Fig. 1. Cepokolimo Village Topographic Conditions



Fig. 2. Cepokolimo Village Tourist Attraction

tourism potential of Cepokolimo Village (Fig. 4), it is known that the natural resources that stand out and the uniqueness of natural resources in Cepokolimo Village are quite a lot, such as pine forest hill areas, rice fields, plantation land, livestock and banteng arts. The potential of tourism attraction can be seen in the Fig. 2.

The most prominent natural resources in Cepokolimo Village are hill areas of pine forest and agriculture. Cepokolimo Village has an area dominated by agricultural land with 62.63% (242.38 Ha). Land use and topographic map can be seen on Fig. 3.

In addition to knowing the existing natural tourism potential, from the land use map above, it showed that the potential tourism areas in Cepokolimo Village are not affected by industry, busy roads, and residential areas to avoid vandalism and garbage. Beside that Cepokolimo Village is in a highland area with a range between 525 MSL - 825 MSL, so it has a cool climate that provides comfort where the average temperature in this area during the day reaches 26 °C and 20 °C at night, air pressure 1010 hPa–1012 hPa and relative humidity 80%–95% with the ground surface being not flat but rather steep. The condition of the ground surface is suitable for mountain bike tracking. With the shape

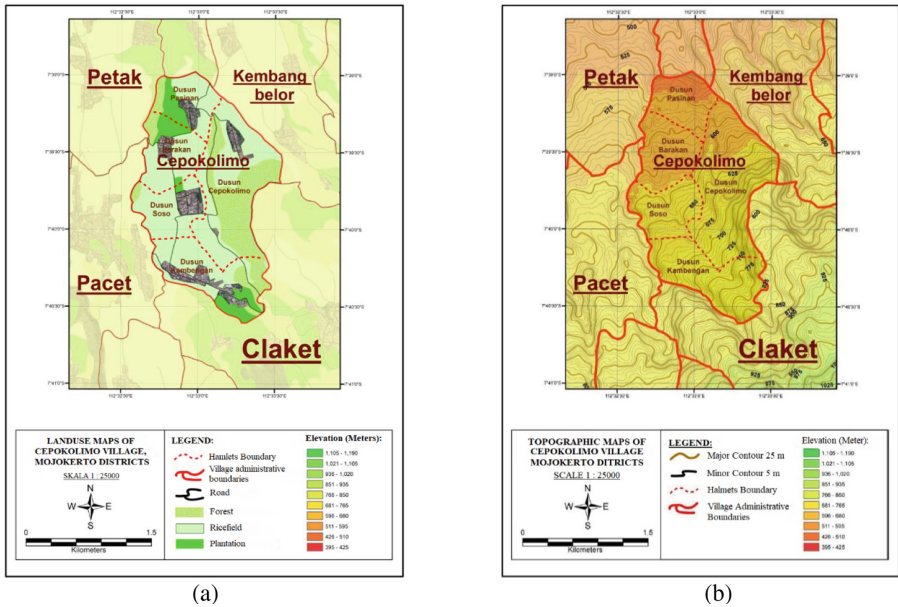


Fig. 3. Land Use Map (a) and Topographic Map (b) of Cepokolimo Village

of the area being in the highlands of the camp and enjoying the natural scenery, it is a suitable activity.

The potential tourist attractions in Cepokolimo Village, a map of Cepokolimo village's tourism potential is made as Fig. 4.

The weight for the criteria of tourist attraction is 6. Considering of attraction is the principal capital that allows the formation of a tourist village and the arrival of visitors. For the assessment of tourist attraction criteria can be seen in Table 1.

3.2 Accessibility Analysis

Accessibility is an important supporting factor for someone travelling from one place to another [15, 18, 19]. Several factors determine the ease of access in the form of distance from the city center, road conditions, and travel time from the city center [10].

A map of the shape and width of the road in the village area was made to find out the condition of the streets in Cepokolimo Village (Fig. 5a). From the map of road conditions and width, it can be seen that the road in Cepokolimo Village is a road that can be passed by first-class vehicles (sedans, jeeps, pickups/small trucks, buses) and second-class (2-axle trucks) and can only be given by one lane of cars because the road width is 3–4 m. The distribution of damaged roads is in Cepokolimo and Baraan Village. The road in Cepokolimo is a pavement layer of concrete with the type of damage that occurs on the street in the form of longitudinal cracks where the cracks are around the center of the pavement that is parallel or in the direction of the road axis. The solution that can do with this type of damage is patching, re-coating, or reconstructing roads. The pavement layer on the street in Baraan is a pavement layer of asphalt. Road damage on this road

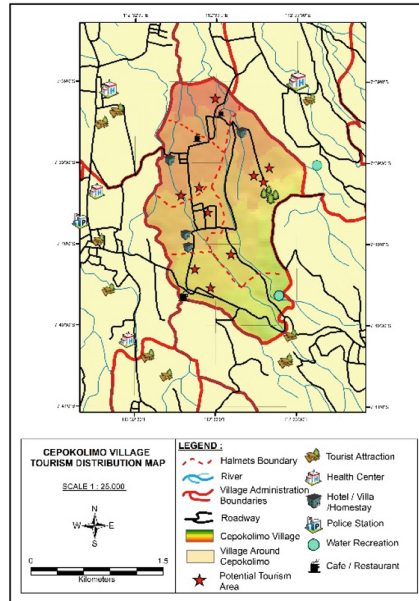


Fig. 4. Tourism and Potential Tourism Map in Cepokolimo Village

segment is in the form of potholes. This is because the cracks in the road are left alone so that water seeps in and makes the road layer brittle. This damage can be repaired by patching.

The distance from the center of the Capital City of East Java Province, namely Surabaya, to Cepokolimo Village, as shown in the map above (Fig. 5b), Cepokolimo Village is ± 62 km with a travel time of about 1 h 20 min. Meanwhile, the distance from Mojokerto City is ± 31 km, Sidoarjo City ± 45 km, Batu City ± 35 km, and Pandaan ± 23 km.

The weight of the accessibility assessment is 5, because it is an essential factor in encouraging tourism potential. The evaluation of accessibility criteria can be seen in Table 2.

3.3 Analysis of Facilities and Infrastructure

Accommodation and infrastructure are supporting factors in a tourism activity [10]. Accommodation and infrastructure support tourism activities but are not urgent matters. Infrastructure facilities in Cepokolimo Village consist of stalls/restaurants, one souvenir shop named Jockymilk, ten inns in the form of villas and homestays and no bank. For health facilities, there is four infrastructure consisting of four integrated healthcare center, and one provides eight units of drinking water/clean water, an electricity network has been entered, a telephone network can be accessed, and bridges and roads..

Although not all of the facilities and infrastructure needed are located in Cepokolimo Village, as shown in Fig. 4, the incomplete facilities and infrastructure are located within a radius of <10 km.

Supporting facilities and infrastructure are the convenience and enjoyment of visitors because one of the factors needed in tourism activities [15, 16, 19] and their nature as a support and their procurement is not too complex. The weight of infrastructure and facilities is 3. The evaluation of infrastructure and facilities criteria can be seen in Table 3.

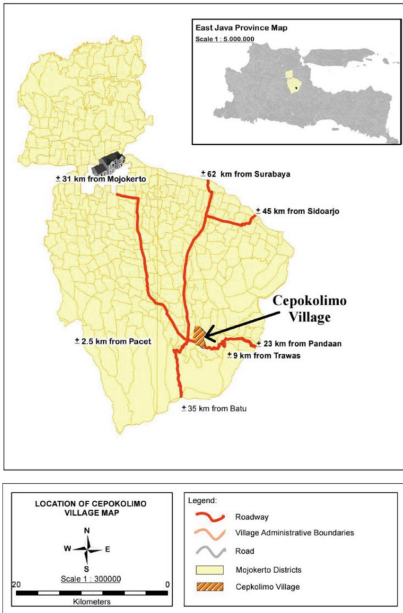
Table 1. Criteria for Assessment of Tourist Attractions in Cepokolimo Village

No	Elements/Sub Elements	Score				
1	The uniqueness of natural resources: a. Flora b. Fauna c. Caves d. Lakes e. Culture	There are 5 30	There are 4 25	There are 3 20	There are 2 15	There are 1 10
2	Prominent natural resources: a. Rivers b. Rocks c. Culture d. Water e. Natural phenomena	There are 5 30	There are 4 25	There are 3 20	There are 2 15	There are 1 10
3	Nature tourism activities that can be done: a. Enjoying the beauty of nature b. Seeing flora and fauna c. Trekking d. Research e. Camping	There are 5 30	There are 4 25	There are 3 20	There are 2 15	There are 1 10
4	The cleanliness of the tourist attraction location is not influenced by: a. Industry b. Busy roads c. Residential areas d. Garbage e. Vandalism	There are 5 30	There are 4 25	There are 3 20	There are 2 15	There are 1 10

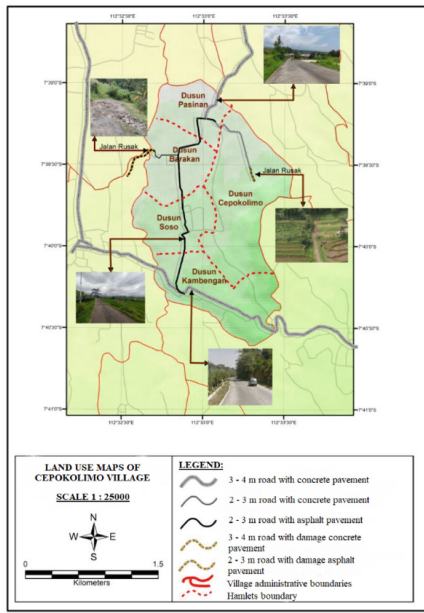
(continued)

Table 1. Criteria for Assessment of Tourist Attractions in Cepkolimo Village(continued)

No	Elements/Sub Elements	Score				
5	Comfort: a. Clean and cool air b. Free from annoying odors c. Free from noise d. No disturbing traffic e. Good service to visitors	There are 5 30	There are 4 25	There are 3 20	There are 2 15	There are 1 10



(a)



(b)

Fig. 5. Village Location Map (a) and Road Condition and Width Map (b) of Cepkolimo Village

3.4 Analysis of Social and Economic Conditions

With information about the population’s composition, the population’s quality can be known, which will have an impact on awareness to take part, especially in general development and tourism development, so that the development planning process can take place according to the plan [10, 20, 21].

As seen in the land use map (Fig. 3), the area of Cepkolimo Village is dominated by agricultural land. This causes the livelihood of the majority of the people of Cepkolimo

Table 2. Accessibility Assessment Criteria

No	Elements/Sub Elements	Score			
		Good	Good Enough	Moderate	Bad
1	Road conditions	30	25	20	15
2	Distance from the city center	<5 km 30	5–10 km 25	10–15 km 20	> 15 km 15
3	Travel time from the city center	1–2 h 30	2–3 h 25	3–4 h 20	≥5 h 15

Table 3. Criteria for Assessment of Infrastructure and Facilities

No	Elements/Sub Elements	Score				
		≥ 4	There are 3	There are 2	There are 1	Tidak There are
1	Facilities: a. Restaurant b. Bank c. Market d. Souvenir Shop e. Lodging	50	40	30	20	10
2	Infrastructure: a. Post office b. Public Health Center c. Water Network d. Electrical Network e. Telephone Network f. Bridge g. Road h. Parking Area	50	40	30	20	10

Village as many as 91% are farmers and ranchers with the most educational background. Namely, 46% are elementary school graduates (elementary schools). The results of data processing regarding the livelihoods and educational experience of the Cepokolimo Village community can be seen in Fig. 6.

The conditions of the social and economic environment encourage the development of potential tourism areas to be carried out optimally. The weight for assessing socio-economic and environmental conditions is 5. For the assessment of the criteria for socio-economic conditions, it can be seen in the Table 4.

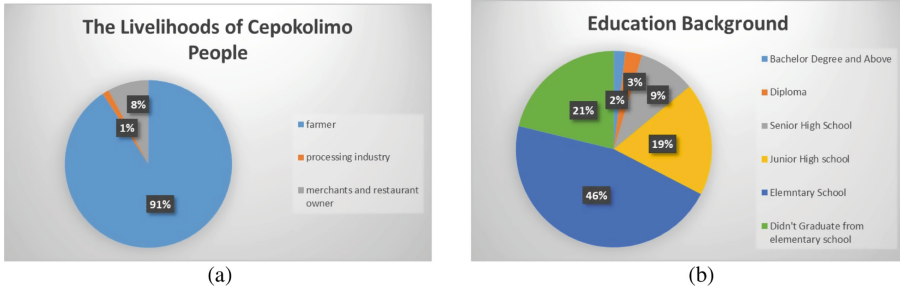


Fig. 6. Economic (a) and Social (b) Condition of Cepokolimo Village Community

Table 4. Criteria for Assessment of Socio-Economic Conditions

No	Elements/Sub Elements	Score			
1	People’s livelihood	Farmer 30	Mostly small traders, small industries and crafts 25	Wholesalers, large industries and crafts 20	Office employees, civil servants, state-owned enterprises 15
2	Educational background	Mostly high school and above 30	Mostly junior high school 25	Mostly elementary school 20	Mostly did not graduate from elementary school 15

3.5 Availability of Clean Water Analysis

Availability of clean water is a must in areas of potential tourism objects. Apart from being a means of complementing facilities in tourist areas, water conditions also affect the agricultural sector of the local population and are one of the most vital human needs. Cepokolimo Village is in the highlands and hills, the water for living needs comes from natural springs so that it can be consumed directly without the need for processing first. With topographic conditions, as shown in Fig. 1, the drainage for water distribution for community needs and irrigation of rice fields is relatively easy with continuity throughout the year.

The availability of clean water is essential in developing potential tourism areas for service and management [10, 22–24]. The weight for the assessment of this indicator is 6. The evaluation of the criteria for the availability of clean water can be seen in Table 5.

Table 5. Criteria for Assessment of Clean Water Availability

No	Elements/Sub Elements	Score			
		1	Feasibility of consumption	Can be consumed directly 30	Need to do simple processing 25
2	Ease of flow water	Very Easy 30	Easy 25	Somewhat Difficult 20	Difficult 15
3	Continuity of water availability	throughout the year 30	6–9 months 25	3–6 months 20	< 3 months 15
4	The distance of springs to the location	0–1 km 30	1,1–2 km 25	2,1–4 km 20	> 4 km 15

Table 6. Calculation Results of the Feasibility Index for Cepokolimo Village Development

No	Criteria	Score (S)	Max Score (SM)	Index (%) (S/SM)*100%	Description
1	Tourist Attraction	720	900	80.00%	Feasible
2	Accessibility	350	450	70.00%	Feasible
3	Facilities and Infrastructure	270	300	90.00%	Feasible
4	Social and Economic Conditions	250	300	83.30%	Feasible
5	Availability of Clean Water	720	720	100.00%	Feasible
Feasibility level (index average)				84.66%	Feasible

After analyzing the variables above, it can then be calculated the feasibility index of tourism development in Cepokolimo Village with the results that can be seen in the Table 6.

Based on the Table 6, the tourism potential in Cepokolimo Village is feasible to be developed and used as a tourist village with a feasibility level of 84.66%.

4 Conclusion

The results of the assessment using the ADO-ODTWA method are 84.66%, which means that Cepokolimo village has great potential and can be used as a tourist village with the concept of ecotourism so that the application of a green economy can be done.

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