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LESSON LEARN FROM THE INDIGINEOUS COMMUNITY TO MANAGE ENVIRONMENT AND DEVELOPING THE TOURISM OBJECT IN THE TAJI VILLAGES MALANG REGENCY, INDONESIA

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Abstract: This research was conducted in Taji Village which is a village located in the Bromo Tengger Semeru (BTS) area. The purpose of this study is to explore the strategy of the local community of Taji Village in preserving the environment to support the development of the Tourism Village. The method was conducted through physical surveyand socio-economic surveys. This research started from environmental physical research in the form of landslides with a geomorphological approach. Data collection on conservation efforts and socio-economic conditions was carried out through deep interviews, purposive questionnaires and deep interviews and also observations at tourist attractions in Taji Village. Based on the results of the study, it shows that the people of Taji Village are very aware that their area is an area that is prone to landslides. The local community of Taji Village has local wisdom as a conservation effort in the form of planting multi-strata plants on each part of the slopes in Taji Village with woody plants and horticultural crops. Conservation efforts with vegetative techniques through multi-strata plants, which are part of local wisdom actually make Taji Village a village that has a tourist destination i.e Arabica coffee cultivation and supporting tourism development such some of waterfall in Taji Village. Local wisdom carried out by the local community of Taji Village is also a community survival strategy because most of the life of the Taji Village community depends on the results of agriculture with weekly, monthly and annual harvest times.

Key words: lesson learned, indigenous community, conservation, disaster, tourism

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INTRODUCTION

East Java as a province that has a tourism industry development (Artaya et al., 2020). One area that has the potential as a tourist area is Taji Village, Jabung District, Malang Regency, East Java Province. Taji Village is a village located in the Bromo Tengger Semeru (BTS) area which has an altitude of 1,200 meters above sea level which is located on the central slope of Mount Bromo. The land use of Taji Village mostly is agriculture with woody plants and horticulture. Taji Village has tourism potential in the form of waterfalls. Seribu Coban and Kaki Langit Village are branding used by Taji Village to develop Tourism Village. Another potential developed by the community is Arabica coffee cultivation. The intercropping of coffee with various kinds of horticultural crops carried out by the local community of Taji Village as part of the conservation of their area prone to landslides is precisely one of the strategies that supports the development of Taji Village as a Tourism Village. But on the other hand, the phenomenon faced by Taji Village has a hilly morphology that has a threat of landslides. The Bromo Tengger Semeru (BTS) area as a whole is a volcanic area, so the geological formations formed are the result of the activities of the young quarter volcanic activity and the old quarter volcano. The type of rock found in this area consists of volcanic ash/tuff. Areas whose geological processes are influenced by volcanic processes will mostly produce soil with a high clay content, so that when rain occurs it will be easily dispersed. Geological processes that occur in the BTS area cause the formation of many coban or waterfalls.

The phenomenon of potential landslides faced by the people of Taji Village requires find strategies to survive. People living in disaster-prone areas have challenges to be in harmony with nature. According to (Ali et al., 2021) the indigenous understanding of community is requires and has a influence to disasrer risk reduction. Based on the result the integrating of indigenous perspective and community based reduction has closest relation in the Northern Pakistan. In addition, (Douglas et al., 2018) based on the researh explained that the local knowledge of the community can be used to inform resilience planning more effectively. Thus, the community has the big role to manage their environment such how they conserve their environment. An understanding of conservation must be interpreted as an effort to protect the environment long term not short term, so that in the application of conservation it must be community-based whose application is easy in application, local based materials, local based culture, local based knowledge, provide economic income.

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Many studies have been carried out on conservation strategies for landslide-prone areas. According (Liu et al., 2009) the conservation strategies can be thorough modelling future landscape to decrease the disaster with case study in the Mianjing China. Vegetation has a big role on the distribution of soil water in gully edges, thus it can be conservation way to manage the soil which has effect for landslide in the semi arid region (Wang et al., 2020). The other research explain that the vegetation on earth bunds can be the one solution for mitigating soil erosion in Mollisols region of Northeast China (Yan et al., 2021). However, conservation of landslide-prone areas based on local communities by planting coffee in an intercropping way on several slopes has become a tourist attraction to enjoy Arabica coffee with natural views. In several studies, planting of multistrata crops with coffee intercropping affects landscape configuration and conservation of natural vegetation. (Koelemeijer et al., 2021) stated has ben research that applied of agroforestry between woody plants and coffee in management landcape can be used to conservation way in the southwestern ethiopoa. This funding is also in line with Latini et al., 2020 and Mancini et al., 2021 which explained based on their research that reconciling coffee productivity and natural vegetation conservation has effect for system landscape in Brazil. In this study showed that coffee is the most conservative plant for soil quality improvement. The local community of Taji Village has lived in harmony with nature despite the threat of landslides. The rough morphological conditions of Taji Village encourage the Taji Village community to develop Taji Village as a Seribu Coban Village and Kaki Langit Village. The adaptation strategy and the value of regional resilience developed and owned by the local community of Taji Village are interesting studies and are rarely carried out. Several studies have shown that the threat of disaster is not a barrier in the development of an area, in fact the presence of a disaster can be an opportunity for the community to optimize the potential of the region and initiate new tourism objects from the appearance of the region after the disaster occurs (Liu et al., 2020; Lorenz and Dittmer, 2021b; Wahyuningtyas et al., 2020; Wright et al., 2020). The community has applied the concept that the community can live in harmony side by side with the threat of disaster and the concept that the threat of disaster can turn into a blessing if the community can process nature properly with a deep ecology approach (Morelli et al., 2016). This paper will elaborate a scientific explanation about the efforts of the community to live in harmony with the threat of landslides and elaborate on the physical condition of Taji Village as a supporting strategy in the development of Taji Village as a tourist village. Figure 1 shows the morphological position of the research area. It is located in the southwest of Mount Bromo.

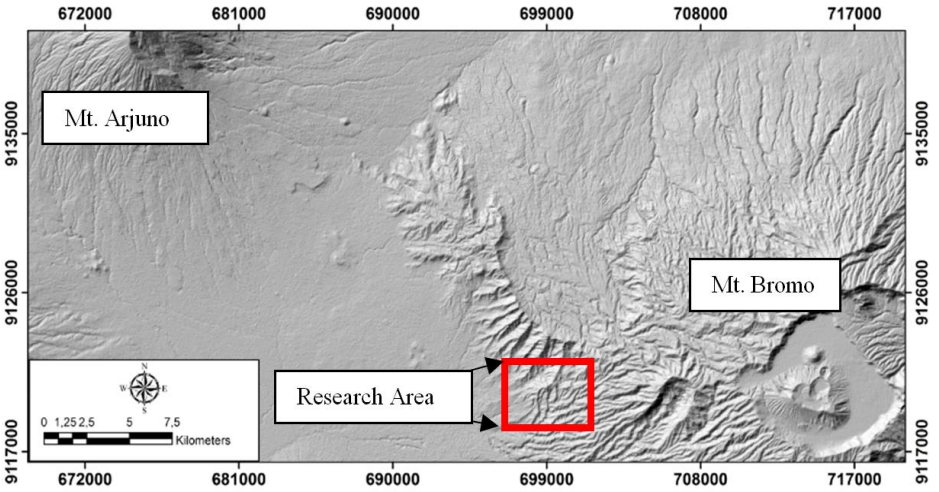

Figure 1. The morphological position of the research area using 3D model (Created by: Masruroh, 2021)

MATERIALS AND METHODS

This research was conducted through physical and socio-economic surveys. This research started from environmental physical research in the form of landslides with a geomorphological approach. Geomorphological aspects that affect the potential for landslides are slope morphology, elevation, slope direction and slope value. The morphology section based on research results mostly emphasizes slope analysis as part of the morphology that affects the potential for landslides (Keller et al., 2020). The data used to make landslide susceptibility map is TerraSAR-X. There are several stages in making a landslide map,i.e 1) DEM download processing; 2) DEM processing analysis; 3) Data processing using Topographic Position Index (TPI) analysis with algorithm. The research data was processed using Arc GIS 10.1 with the Topographix Position Index (TPI) analysis technique and for socio-economic data it was done through data reduction, data presentation and drawing conclusions. The elevations distribution variability increase with the spatial scale such relief generally increase from smaller to larger neighborhood size and algorithm of TPI (1) also consist radius (R) (Weiss, 2001; Wilson and Gallant, 2009).

$$TPI = Z_0 - Z \quad \text{..... (1)} \qquad DEV = \frac{Z0-Z}{SD} \quad \text{..... (2)} \qquad SD = \sqrt{\frac{1}{nR-1}\sum i = 1(Zi - \acute{Z})^2} \quad \text{.....(3)}$$

Topographic Position Index (TPI) has to support with the DEV algorithm to landform identification. DEV measures the topographic position of the central point (Z_0) DEV measures (2) the topographic position of local relief normalized to local surface roughness (De Reu et al., 2013; Liu et al., 2009; Sermin and Jeff, 2008). TPI and DEV were automated calculated using Arc GIS 10.2 tools and using Arc GIS script. TPI and DEV is the most data algorithm for created landform identification.

For the analysis of lessons learned from the local community of Taji Village who can live in harmony in landslide prone areas and the development of Taji Village as a Tourism Village is carried out through observation in the landslide that has high potential landslide, field surveys, focus group discussion with village government leader, 10 person as representatives of each neighborhood, and also representative form disaster preparedness team in Taji Village. Field surveys and observations include local community survival strategies against threats as well as strategies for developing Taji Village as a tourist village. Observations also include observing the behavior of people in their environment, including planting and

harvesting their agricultural products.The data analysis this research is tabulation and reduction based on the research problem. To find out this, data was collected with 20 respondents purposively. Figure 2 is a flowchart of methodology.

RESULTS AND DISCUSSION

Taji Village Landslide Susceptibility

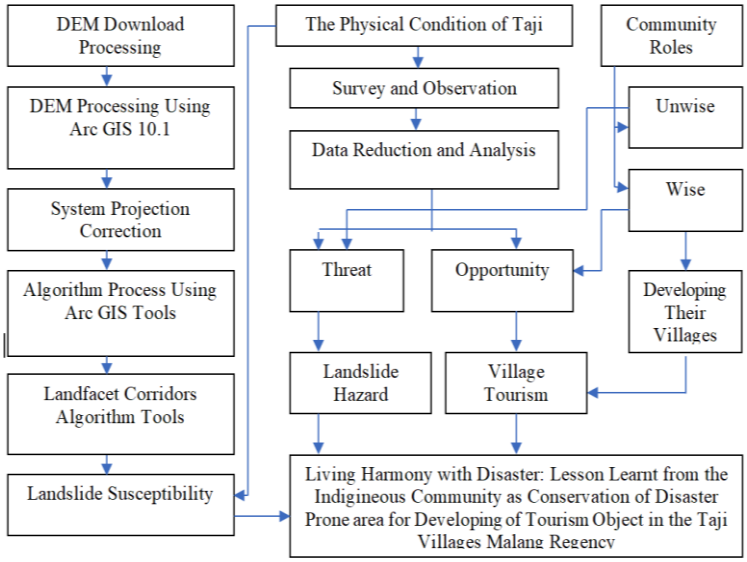

Figure 2. Flowchart of methodology

Landslides are natural disasters that have the potential to occur in areas with extreme topography. The physical conditions of the area that affect landslides are surface material, morphology, land use, and rainfall. The potential for landslides will increase in unconsolidated soil conditions (Bièvre et al., 2016; Co et al., 2015). Certain types of unconsolidated materials such as clay layers can also become slip raptures and produce typical landslides such as rotational landslides (Levent and Alper, 2009). Land use that is not in accordance with the physical conditions of the area can trigger landslides. This is because the soil has a maximum threshold for survival. When the soil mass load is greater than the maximum soil mass load limit, there will be movement of soil material. The potential for movement of soil material will be greater if the trigger factor is rain. Taji Village is a village located in the Bromo Tengger Semeru (BTS) area with an extreme morphology. In Taji Village, there are many cutting slopes for roads and settlements, causing unstable slopes and increasing the potential for landslides. The types of landslides that occur in Taji Village are translational and rotational types. Based on the association where landslides occur, each type of landslide has own characteristics. For the translational type of landslide, it is associated with roads with plant species such as cassava and grasses, while for rotational landslides it occurs in several agricultural lands with horticultural crops (Figure 3). Most of the landslides that occurred in Taji Village were shallow landslides. Differences in landslide characteristics and landslide activity will affect the type of conservation carried out. There were three types of landslides that occur in the Taji Village, such translational landslide, rotational landslide and complex landslide which is a combination of translational and rotational (Fig. 3). Utilization for agricultural land is one of the conservation activities carried out by the community for the conservation of rotational and complex types of landslides, while for translational type landslides are not processed by the society because it can cause landslide reactivation. In this study, researchers focused on the study of the upper Taji Village which has a high potential for landslides. Based on analysis using the Topographic Position Index (TPI) algorithm technique, landslide susceptibility in the upper part of Taji Village is divided into 3 classes, such high vulnerability, medium vulnerability and low vulnerability (Figure 3). Each vulnerability class has an area that is represented in the form of pixels (Table 1)

Table 1. Topographic Position Index (Source: Masruroh, 2021)

Landslide Susceptibility	Amount of Pixel	Percentage (%)
Low	9,959	20.44
Middle	18,923	52.13
High	7,420	27.43

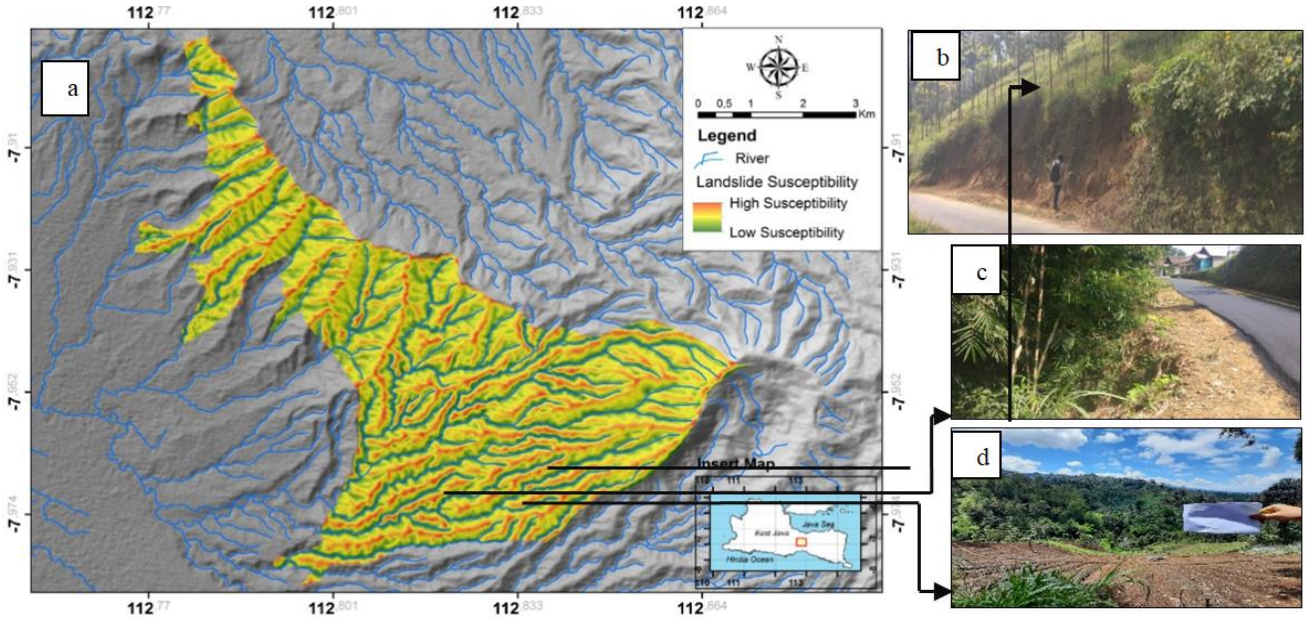

Figure 3. a) Landslide Hazard Map; b) Rotational Landslide (x: 112,838, y: -7,955); c) Translational Landslide (x: 112,82, -7,963); complex landslide (x: 112,837, y: -7,966) (Created by: Heni Masruroh, 2021)

The distribution of low landslide susceptibility class is located at the top of the hill. This is because at the top of the hill is a plain, so there is no energy to move the material. The distribution of middle susceptibility is in the morphology of the upper slope until middle slope. It is because the upper slope to the middle slope is a zone of soil material movement and is a part of very intensive processing. Incompatibility of land management can have an impact on increasing the potential for landslides. Most of the people of Taji Village utilize the upper slopes to the lower slopes by utilizing agricultural land with an intercropping system of horticultural crops. The distribution of high hazard class follows the pattern of river flow and is associated with roads. The cause of the high class of landslide susceptibility associated with roads is due to the influence of cutting slopes for roads and the effect of vehicle vibrations which can affect the potential for material movement. This phenomenon shows that humans can indeed initiate landslides. This is in accordance with research (Froude, 2018) that human activities can be initiate to landside occur such as in the Central America and South of Mexico.

Taji Village Conservation with Multi Strata Plants to Support Taji Tourism Village

Factors that affect landslides can be in the form of physical conditions and human activities. Human activities are very important in influencing landslides because they can trigger or reduce the risk of landslides. Human intervention has played a key role in stimulating natural antecedents of landslides. According (Liu et al., 2020), areas that have the potential for disasters still have the opportunity to be developed into tourist destinations. One of the ways to develop tourist destinations is to build community resilience to maintain people's income. This research was conducted in Aceh Indonesia. Human activities can also reduce the risk of landslides in an area. Human is also can manage their environment as the one of conservation by applied of agroforestry. Agroforestry is a soil conservation effort that combines tree crops, or annual crops with other commodity crops that are planted together or alternately. According (Meylan et al., 2013) in costa rica based farmers have a very big role in land management as one of the efforts to mitigate soil erosion.

The people of Taji Village practice mixed gardens for economic income and one way to conserve landslides, especially vegetative conservation. The people of Taji Village think that mixed gardens are a solution that provides economic and environmental benefits.The people of Taji Village already have awareness about the high potential for landslides in their area. The community is more selective in determining the type of vegetation in each morphological unit and considers land planting and land clearing. Both have an influence on the potential for landslides. The slope of the slope will change if a landslide occurs. This will have an impact on soil erodibility, runoff and infiltration. The people of Taji Village are limited in utilizing land that has a high slope. The Taji Village community treats the depositional portion of the landslide. However, the community cannot plant plants arbitrarily without considering the type and morphological unit.

The community can only plant certain types of plants in certain morphological units. This is important because the type of plant will affect the load on the soil mass. Land use in Taji Village shows spatial planning based on the physical characteristics of the area. Spatial planning includes types of vegetation, morphological units, and areas where landslides occur. Vegetation types such as bamboo, cloves, and other woody plants have been planted on its peak. Mixed gardens that combine coffee plantations with horticultural crops such as carrots, apples, potatoes are applied on the upper slopes to the lower slopes. For foot slopes applied to seasonal vegetation. Most of the local agroforestry plantations in the study area are mixed gardens with local plantations such as clove, coffee, apple, carrot, cassava and local horticultural plantations.

The plants planted by the community are used to increase the economic income of the Taji Village community. Community income based on the plants planted is categorized into weekly income, monthly income, and annual income. All of this is based on harvest time. Local plantations in their planting system have implemented in accordance with the agricultural system. This indicates that local plantations in the study area are based on natural and ecological resource management systems. Agricultural management that has been carried out in Taji Village aims to increase economic income and environmental sustainability. Agroforestry with local mixed gardens can be a solution in environmental management (Zuazo et al., 2006). This is because plants are one of the factors that have an influence on soil conditions that affect the process of infiltration, runoff, and soil mass loads. For the most part, unvegetated soils have greater runoff than infiltration. This affects the process of moving soil material during the rainy season. The existence of a multistrata crop planting system with intercropping of woody plants and horticulture in the form of coffee and vegetables not only has a positive impact on environmental sustainability. The application of the intercropping system as one of the supports for tourism in Taji Village, such as coffee tourism by enjoying the natural beauty of Taji Village. The existence of coffee tourism in Taji Village is an attraction to visit Taji Village in addition to the 1000 Coban in Taji Village.

Development of Taji Village as a Tourist Village

The Bromo Tengger Semeru (BTS) area as a whole is a volcanic area, so the geological formations formed are the result of the activities of the young quarter volcanic activity and the old quarter volcano. The type of rock found in this area consists of volcanic ash/tuff. Areas whose geological processes are influenced by volcanic processes will mostly produce soil with a high clay content, so that when rain occurs it will be easily dispersed. Geological processes that occur in the BTS area cause the formation of many cobans or waterfalls. Taji Village as one of the villages located in the BTS

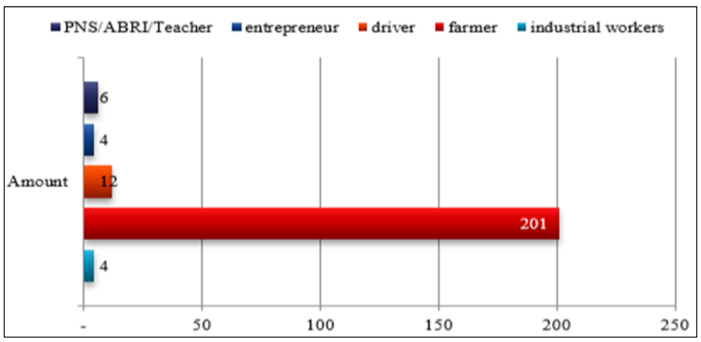

Figure 4. Types of Work for the Taji Village Community
(Source: Taji Village Potential Data, 2021)

area has a high potential for landslides, but on the other hand the occurrence of past geological processes has caused Taji Village to have many trials. The condition of the landscape of Taji Village has an impact on the socio-economic conditions of the community. Most of the people of Taji Village have jobs as farmers. The occupations of the people of Taji Village are divided into farmers, private sector, enterpreneur, drivers and civil servants/ABRI and teachers (Figure 4).

For the local community of Taji Village, the threat of landslides is not a barrier to developing the village. There have been many studies that discuss areas that are prone to disasters but can also be developed into tourism destinantion.There is a very close relationship between disaster and tourism. Post-disaster events can result in the formation of the earth's surface that can be used for tourism. In this case, the community does have a very important role. People who are able to manage their environment even though they are prone to disasters will be created into a society that has good resilience. The eruption of Kelud Volcano is the one example of a disaster that has a positive impact so that tourism is formed and provides income. Based on (Bachri et al., 2015) eruption of the Kelud volcano gave rise to the concept of a human volcano, namely that an eruption does not only have a negative impact on life. In addition, there are other studies (Table 2).

Table 2. Some of previous research regarding developing tourism in the disaster prone area

Type of Disaster	Study Area	Method	Finding	References
Landslide and Flash Flood	Indian Himalaya	Historical Reconstruction	There are closest relation between tourism and disaster. In the disaster-prone areas, tourism still has an important role	Lorenz and Dittmer, 2021a
Natural Disaster	A Global Analysis	Gravity model for tourism demand	Tourism is shaped by various factors and forces, including exogenous factors. Natural disasters events are prime examples of such determinants. As a result it has the potential to significantly affect tourism flows	Rosselló et al., 2020
Natural Disaster	Kaikoura, New Zealand	Questionnaire	Visitors or tourists after a disaster has a very important role to be very important for the social and economic recovery of a disaster-prone area destination.	(Fountain and Cradock-Henry, 2020)
Flood	Kerala, Southwestern India	Literature Review and government documentations	Although the area is prone to disasters. But have good management in environmental management. Then it can be used for tourism	Azzali et al., 2021

Based on several previous studies in table 1.2 according to the phenomenon in Taji Village. The Taji Village community is able to manage their environment and survive. Even the community is able to optimize environmental management and develop it into a tourist object. The phenomenon that occurred in Taji Village shows that the potential for disasters in an area does not only have a negative impact, but if the community can optimize environmental management, it can be used for tourism. There is a relationship between tourism and disaster (Lorenz and Dittmer, 2021a). In recent years, the people of Taji Village have developed their Coban potential to become a tourist destination with the 1000 Coban branding. In addition to the 1000 coban branding, Taji Village also has the branding of village called “Kaki Langit”. Currently, Taji Village is developing 4 Coban as tourist destinations under the guidance of Perhutani. Through the development of tourist attractions 1000 Coban can provide income for the community and become part of community empowerment. Some of the cobans located in Taji Village are Coban Siuk, Coban Jahe, Coban Tarzan, and Coban Sari. Visitors can not only enjoy the beauty of the coban, but also can enjoy the white water rafting that can be enjoyed by visitors at the Coban Jahe (Figure 5).

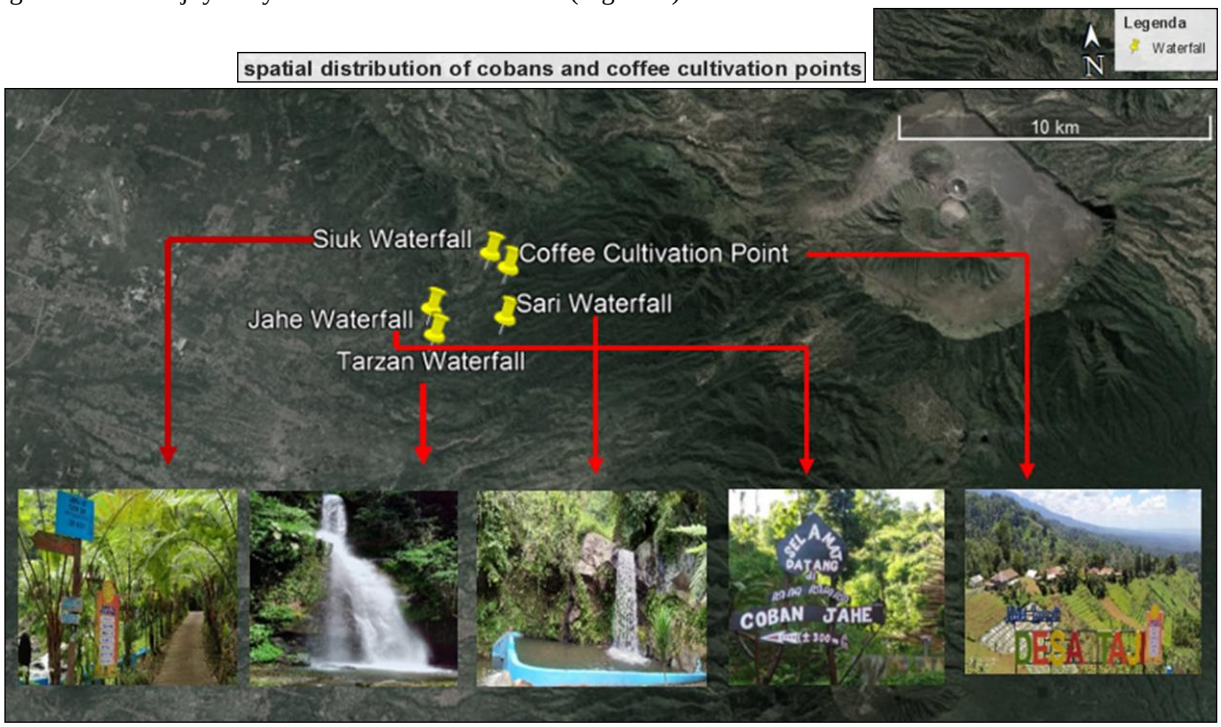

Figure 5. Coban in Taji Village and Coffee Tourism Center (Researcher, 2021)

The landscape that is owned by Taji Village does not only consist of several coban, but Taji Village is also called as "Kaki Langit"thus visitors can see a very interesting landscape in Malang Regency. The topographical position of Taji Village not only poses a threat, but also provides an opportunity to be developed into a tourist village by offering landscape. The development of Taji Village as a tourist village is also supported by the typical coffee of Taji Village. In the discussion sub-chapter on how the local community in Taji Village for land conservation, it is stated that the local community in Taji Village uses an agforestry system with multi-strata plants from woody plants to horticultural crops. One of the plants that is conservative to the movement of soil material is coffee. The local community of Taji Village grows coffee not only as part of conservation efforts, but the coffee grown by the local community of Taji Village has become an icon of Taji coffee. Based on information from the community, Kopi Taji has premium quality with the Arabica type. Coffee cultivation carried out by the local community of Taji Village supports Taji Village as a Tourism Village.

The agricultural potential of Taji Village is also used by the community to develop Small and Medium Enterprises (MSMEs) which are initiated by Family Welfare Empowerment (PKK) women by producing ganyong cookies (Cogan) and coffee cookies typical of Taji Village. The uniqueness of cookies from Taji Village is that they are made from tubers and coffee. The results of the MSME production of the local community of Taji Village are unique cookies produced by the local community of Taji Village. Based on the findings in the field and the development of the Taji Tourism Village, it provides learning and knowledge that the threat of disaster is not an obstacle in developing the village. The physiographic condition of Taji Village has two impacts on the community, such the threat of disaster and opportunity. Based on the findings in the field, it shows that the people of Taji Village can live in harmony with the threats and the local people of Taji Village are able to seize opportunities from physiographic conditions to be developed into a 1000 Coban Tourism Village and offer unique Arabica coffee as well as ganyong cookies and coffee cookies. The values developed by the local people of Taji Village in conserving the threat of landslides and changing the concept of disaster threats into tourism opportunities are interesting things that can be learned from the local people of Taji Village, so that the local people of Taji Village can live in harmony with disasters. Currently, Taji Village is developing the branding of the Kaki Langit Village.

The development of Taji Village into a tourist village and able to provide economic income to the community according to research conducted by (Azzali et al., 2021) in Kerala. The research conducted shows that after the flood disaster in Kerola has changed the physical appearance of the area but with the disaster it provides experience for the community to always be prepared for disasters and prepare for all possibilities that will occur for future disasters. Based on this research, the community plays an important role in reducing disaster risk. The development of Taji Village as a Tourism Village which also has a landslide threat provides evidence that the community has an important role in environmental management. Knowledge of disaster adaptation can be obtained based on experience and also the values of local wisdom.

CONCLUSION

The environment physical condition in Taji Village is not an obstacle to developing Taji Village as a Tourism Village. The community has a very important role in environmental management and optimizing tourism potential. Various efforts have been made by the community for disaster risk reduction. The community has managed the landscape well for agricultural purposes. Management carried out by the community not only has a positive impact on environmental sustainability but also supports the development of Taji Village as a Tourism Village.

Communities in environmental management also consider economic income to be able to survive. The community has managed nature in the best way that is able to combine preserving the environment through multi-strata conservation and maintaining economic income with the development of Tourism Villages.

REFERENCES

Ali, T., Paton, D., Buergelt, P.T., Smith, J.A., Jehan, N., & Siddique, A. (2021). Integrating Indigenous perspectives and community-based disaster risk reduction: A pathway for sustainable Indigenous development in Northern Pakistan. *International Journal of Disaster Risk Reduction*, *59*, 102263. https://doi.org/10.1016/j.ijdrr.2021.102263

Artaya, I.P., Arimbawa, I.G., Baktiono, R.A., & Kamisutara, M. (2020). Analysis of Tourist Satisfaction Levels in Malang Regency, East Java in the New Normal Era Using Categorical Test. *The Spirit of Society Journal*, *4*(1), 13–22. https://doi.org/10.29138/scj.v4i1.1141

Azzali, S., Kamble, Z., Thirumaran, K., Wong, C., & Wood, J. (2021). Mitigating Impact From Natural Disasters, Building Resilience in Tourism: The Case of Kerala. In *Economic Effects of Natural Disasters*. INC. https://doi.org/10.1016/b978-0-12-817465-4.00008-x

Bachri, S., Stötter, J., Monreal, M., & Sartohadi, J. (2015). *The calamity of eruptions , or an eruption of benefits ? Mt . Bromo human – volcano system a case study of an open-risk perception*. 277–290. https://doi.org/10.5194/nhess-15-277-2015

Bièvre, G., Jongmans, D., Goutaland, D., Pathier, E., & Zumbo, V. (2016). Geophysical characterization of the lithological control on the kinematic pattern in a large clayey landslide (Avignonet, French Alps). *Landslides*, *13*(3), 423–436. https://doi.org/10.1007/s10346-015-0579-0

Co, N., Çak, Ö., Erduran, M., & Kutlu, Y.A. (2015). *A potential landslide area investigated by 2 . 5D electrical resistivity tomography : case study from Çanakkale , Turkey*. *2*. https://doi.org/10.1007/s12517-015-2026-x

De Reu, J., Bourgeois, J., Bats, M., Zwertvaegher, A., Gelorini, V., De Smedt, P., Chu, W., Antrop, M., De Maeyer, P., Finke, P., Van Meirvenne, M., Verniers, J., & Crombé, P. (2013). Application of the topographic position index to heterogeneous landscapes. *Geomorphology*, *186*, 39–49. https://doi.org/10.1016/j.geomorph.2012.12.015

Douglas, E.M., Reardon, K.M., & Täger, M.C. (2018). Participatory action research as a means of achieving ecological wisdom within climate change resiliency planning. *Journal of Urban Management*, *7*(3), 152–160. https://doi.org/10.1016/j.jum.2018.05.003

Durán, Z.V.H., Martínez, J.R.F., Pleguezuelo, C.R.R., Martínez. R.A., & Rodríguez, B.C. (2006). Soil-erosion and runoff prevention by plant covers in a mountainous area (SE Spain): Implications for sustainable agriculture. *Environmentalist*, *26*(4), 309–319. https://doi.org/10.1007/s10669-006-0160-4

Fountain, J., & Cradock-Henry, N. (2020). Recovery, risk and resilience: Post-disaster tourism experiences in Kaikōura, New Zealand. *Tourism Management Perspectives*, *35*(May), 100695. https://doi.org/10.1016/j.tmp.2020.100695

Froude, M.J. (2018). Global fatal landslide occurrence from 2004 to 2016. *Natural Hazards and Earth System Sciences*, *18*(8), 2161–2181. https://doi.org/10.5194/nhess-18-2161-2018

Keller, E., Adamaitis, C., Alessio, P., Anderson, S., Goto, E., Gray, S., Gurrola, L., & Morell, K. (2020). Applications in geomorphology. *Geomorphology*, *366*, 106729. https://doi.org/10.1016/j.geomorph.2019.04.001

Koelemeijer, I.A., Tack, A.J.M., Zewdie, B., Nemomissa, S., & Hylander, K. (2021). *Agriculture , Ecosystems and Environment Management intensity and landscape configuration affect the potential for woody plant regeneration in coffee agroforestry*. 313, (November 2020).

Latini, A.O., Silva, D.P., Souza, F.M.L., Ferreira, M.C., Moura, M.S., & Suarez, N.F. (2020). Reconciling coffee productivity and natural vegetation conservation in an agroecosystem landscape in Brazil. *Journal for Nature Conservation*, *57*(May). https://doi.org/10.1016/j.jnc.2020.125902

Levent, Y., & Alper, E.Æ. (2009). *Investigation of the nature of slip surface using geochemical analyses and 2-D electrical resistivity tomography : a case study from Lapseki area , NW Turkey*. 1167–1175. https://doi.org/10.1007/s00254-008-1594-4

Liu, M., Hu, Y., Chang, Y., He, X., & Zhang, W. (2009). Land use and land cover change analysis and prediction in the upper reaches of the minjiang river, China. *Environmental Management*, *43*(5), 899–907. https://doi.org/10.1007/s00267-008-9263-7

Liu, Y.F., Liu, Y., Shi, Z.H., López-Vicente, M., & Wu, G.L. (2020). Effectiveness of re-vegetated forest and grassland on soil erosion control in the semi-arid Loess Plateau. *Catena*, *195*(26), 104787. https://doi.org/10.1016/j.catena.2020.104787

Lorenz, D.F., & Dittmer, C. (2021a). Disasters in the 'abode of gods'—Vulnerabilities and tourism in the Indian Himalaya. *International Journal of Disaster Risk Reduction*, *55*(January), 102054. https://doi.org/10.1016/j.ijdrr.2021.102054

Lorenz, D.F., & Dittmer, C. (2021b). *International Journal of Disaster Risk Reduction Disasters in the ' abode of gods '— Vulnerabilities and tourism in the Indian Himalaya*, 55 (January).

Mancini, H., Bianchi, F.J.J.A., Maria, I., & Tittonell, P. (2021). *Agriculture , Ecosystems and Environment Impact of agroecological management on plant diversity and soil-based ecosystem services in pasture and coffee systems in the Atlantic forest of Brazil*. *305*(May 2020).

Meylan, L., Merot, A., Gary, C., & Rapidel, B. (2013). Combining a typology and a conceptual model of cropping system to explore the diversity of relationships between ecosystem services: The case of erosion control in coffee-based agroforestry systems in Costa Rica. *Agricultural Systems*, *118*, 52–64. https://doi.org/10.1016/j.agsy.2013.02.002

Morelli, F., Tryjanowski, P., & Benedetti, Y. (2016). Differences between niches of anthropocentric and biocentric conservationists: Wearing old clothes to look modern? *Journal for Nature Conservation*, *34*, 101–106. https://doi.org/10.1016/j.jnc.2016.09.005

Rosselló, J., Becken, S., & Santana-Gallego, M. (2020). The effects of natural disasters on international tourism: A global analysis. *Tourism Management*, *79*(December 2019). https://doi.org/10.1016/j.tourman.2020.104080

Sermin, T., & Jeff, J. (2008). GIS-based automated landform classification and topographic, landcover and geologic attributes of landforms around the Yazoren Polje, Turkey. In *Journal of Applied Sciences*, 8(6), 910–921.

Wahyuningtyas, N., Kodir, A., Idris, I., & Islam, M.N. (2020). Accelerating tourism development by community preparedness on disaster risk in Lombok, Indonesia. *Geojournal of Tourism and Geosites*, *29*(2), 545–553. https://doi.org/10.30892/gtg.29213-488

Wang, K., Ma, Z., Zhang, X., Ma, J., Zhang, L., & Zheng, J. (2020). Effects of vegetation on the distribution of soil water in gully edges in a semi-arid region. *Catena*, *195*(September 2019), 104719. https://doi.org/10.1016/j.catena.2020.104719

Weiss, A. (2001). Topographic position and landforms analysis. *Poster Presentation, ESRI User Conference, San Diego, CA*, *64*, 227–245. http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Topographic+Position+and+Landforms+Analysis#0

Wilson, J.P., & Gallant, J.C. (2009). *Digital terrain analysis.pdf (application/pdf Object)*. *1988*, 1–28. http://media.wiley.com/product_data/excerpt/85/04713218/0471321885.pdf

Wright, K., Kelman, I., & Dodds, R. (2020). *Annals of Tourism Research Tourism development from disaster capitalism*. *May*, 30–32.

Yan, Y., Zhen, H., Zhai, X., Li, J., Hu, W., Ding, C., Qi, Z., Qiao, B., Li, H., Liu, X., & Zhang, X. (2021). The role of vegetation on earth bunds in mitigating soil erosion in Mollisols region of Northeast China. *Catena*, *196* (August 2020), 104927. https://doi.org/10.1016/j.catena.2020.104927

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