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Evaluation of Ground Arthropod Structure in Restoration Area of Talangagung Landfill as Edutourism Attraction, Kepanjen, Malang

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Abstract

Aim of this research is to know the composition, community structure and survival of ground arthropod in restoration area of Talangagung edutourism landfill (TPA Wisata Edukasi Talangagung). Arthopod survey was conducted with four methods, yellow pan trap, pit fall trap, berlesetullgren, and sweep net. The research was done in four different locations with twice repetition. Survey location was divided in three zone, which is zone one with 10 years restoration, zone two with five years restoration, and zone three which not yet restored, and reference site. Abiotic factor which observed in this research such as light intensity, humidity, and air temperature. Analysis of arthropod diversity and community structure in each site was calculated from importance value index (IVI) and diversity index (Shannon Wienner Index). The results show that diversity of ground arthropod in zone one, two, three, and reference site was on medium level which each score 1.9, 1.87, 1.71, and 2.08. Community structure with dominant pattern showed with IVI from Acrididae in zone one and zone three with IVI 67.2 % and 53.5 %. Myrmicidae in reference site dominance with IVI 51.4 % and Formicidae in zone one with IVI 48.6 %. Ground arthropod in zone one and reference site had similarity in community structure which showed in same cluster in biplot analysis and zone two and three was in another different cluster.

Keywords: Arthropod, diversity, restoration, community structure

INTRODUCTION

The increase of population in the world was affected to increase of total waste which produce every years, especially in urban area. The increase of total waste is not followed with increase of waste management infrastructure. It made waste management become more complex. Indonesia with total population more than 230 million people has a problem with waste management. Landfill in Indonesia is still use open dumping system to manage waste. Open dumping is waste management system which put the waste carelessly and after it is full, landfill will be ignored. Open dumping system can make contamination to environtment [1].

Talangagung edutourism landfill (*TPA Wisata Edukasi Talangagung*/TPA WET) is a landfill which located in District Kepanjen, Malang Regency, East Java. TPA WET can accommodate waste from eight districts in Malang Regency with total total number of population about 2.7 milion people. TPA WET accommodates 4.800 households with total waste 140 m^3 per day. Dump truck was used to transport waste to TPA WET. TPA WET is devided into three zone based on restoration time per area. Zone one is an area with 10 years restoration. Zone two with five years restoration, and zone three which still used as open dumping area.

Restoration is a preventive action from environmental threats and to empower conservation factor for conservation in degradated area. Aim of restoration is to restore some area into former condition like in the past [2]. Restoration activities in degradated area depend on diversity of plants species and availability of seeds [3]. Restoration activity in landfill former of TPA WET is one of efforts from settlements and local government to reduce environmental contaminant which causeed by open dumping system. Restoration activities give some benefits to settlements from economic sector and their ecological services. In economic sector, TPA WET was designed as edutourism destination and camping ground for public, which make benefits to settlements. Moreover, TPA WET was provided an installation of methane gas from open dumping waste area as energy source for settlements. But, until this day, data from ecological services of restoration activities in TPA WET is still unknown.

Arthropod has important roles to ecosystem, both directly and indirectly [4]. Absent of some arthropod in an ecosystem indicate that this ecosystem was disturbed and never reach

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balance condition. Importance roles of arthropods in ecosystem are as pollinator, decomposer, predator, parasitoid, and as bioindicator for some specific ecosystem health [3]. Ground arthropods have an important role in decomposition of organic matter in ecosystem. Aim of this research is to know about composition, community structure, and survival of ground Arthropod in restoration area in TPA WET.

MATERIALS AND METHODS

Study Site

This research was done on July 2015 at Talangagung edutourism landfill (TPA WET), Kepanjen District, Malang Regency, East Java. Identification of Arthropod was conducted in Laboratorium of Ecology and Animal Diversity, Biology Departement, Faculty of Mathematic and Science, University of Brawijaya. TPA WET is one of landfill in Malang Regency with an area of 2.5 ha and can accommodate waste from eight districts in Malang Regency. TPA WET is located on 8˚07'13,64''S and 112˚33'44,82''E and administratively located on Talangagung Village, Kepanjen District, Malang Regency (Fig. 1).

Data Collection

Arthropod survey was done with four methods, i.e. yellow pan trap, pit fall trap, berlesetullgren, and sweep net. Yellow pan trap's method was used 12 yellow pans and located behind bush to camuflase it [5]. Whereas fit fall trap method used eight jam bottles which filled with detergent and alcohol liquid and wait until three hours to collect the Arthropods. Berlesetullgreen's method was conducted on laboratorium with soil sample from every site. Soil sample was put on funnel, after that its covered with another funnel with electric lamp and in the end of the soil funnel was put a bottle with formalin 5% to durable the Arthropods. Berlesetullgreen is a method to survey soil mesofauna [6]. Sweep net is method that conducted with swept the net around the location.

Survey and Data Analysis

Survey was done on four location with twice repetition in every location. Survey locataion was divided to three zone. Zone one with 10 years restoration, zone two with five years restoration, and zone three with not yet restored or still used as an open dumping area, and a reference site. Abiotic factors which collected in this research are light intensity, humidity, and air temperature. Analysis of Arthropod community structure and diversity in every site was obtained from importance value index (IVI) and diversity index (Shannon Wienner Index).

RESULTS AND DISCUSSION

Arthropod in TPA WET

Ground Arthropods was surveyed on four zone, zone one (10 years restoration), zone two (five years restoration), zone three (open dumping area), and reference site. Some Arthropod which found in TPA WET is familly Acrididae, Carabidae, Culicidae, Formi-cidae, Myrmicidae, Gryllidae, Specidae, etc (Fig. 2).



Figure 1. Map of observation site in Talangagung village (Google earth, 2014)

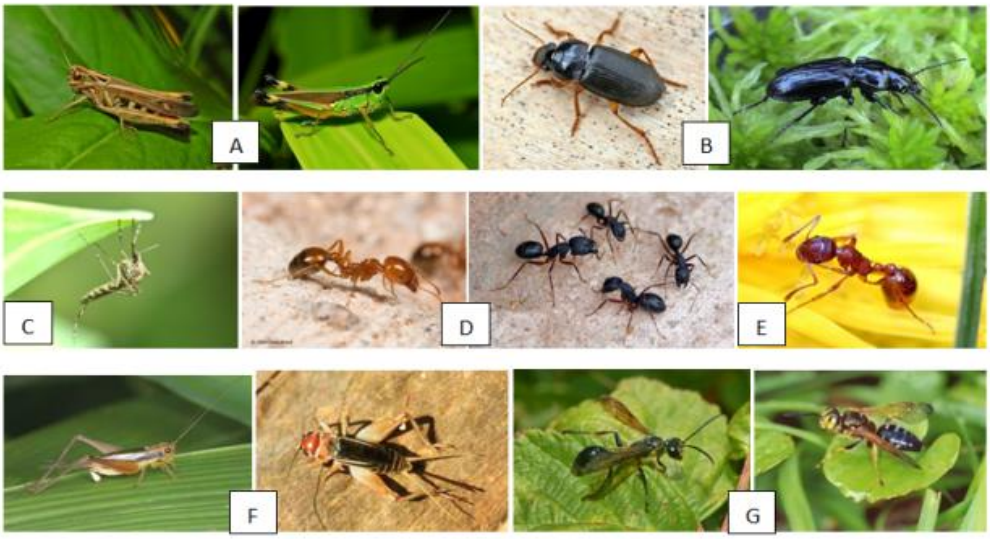

Figure 2. Arthropod family which found in TPA WET
Description: A. Acrididae, B. Carabidae, C. Culicidae, D. Formicidae, E. Myrmicidae, F. Gryllidae, G. Specidae.

Ground Arthropod have some important roles on food chain, especially as decomposer of organic matter in ecosystem. In addition, some arthropods is prey for another Arthropods to maintain Arthropod's sustainability. Arthropod community structure represent the abiotic factor which affected the soil condition and human activity around the location. In this research, Arthdopods can be used as indicator of restoration program in TPA WET.

Some family of Arthropods was dominated some zone. In zone one, Formicidae has the highest species abundance, while in zone two and three dominated by Acrididae. This is due to the location between zone two and three were closed thus both has similar Arthropods community structure. Otherwise, in reference site, Myrmicidae has the highest abundance. Population growth is affected by availability and variability of food source in every habitat [7].

Abundance

Arthropods abundance in some habitat was affected by diversity and availability of food source on that habitat [8]. Importance value index (IVI) showed an influence of Arthropods family to structure community in each zone (Fig. 3). Dominant family is a family which have IVI > 10%. Zone one has Formicidae as dominant family with 48.6%, while zone two and three has Acrididae as dominant family with IVI 53.5% and 67.2%, respectively. Myrmicidae is dominant family with 51.4% in reference site.

Ground Arthropods as a biotic component in ecosystem which dependent on environment factors. Change in environmental influence to presence and density of Arhtopods population. Density of ground Arthropods is affected by physic-chemistry soil factors. Diversity of ground arthropods is lower in disturbed area rather than in undisturbed area. Zone three in this research has the lowest arthropods diversity than other zone because zone three is an area with open dumping which disturb soil condition on that site.

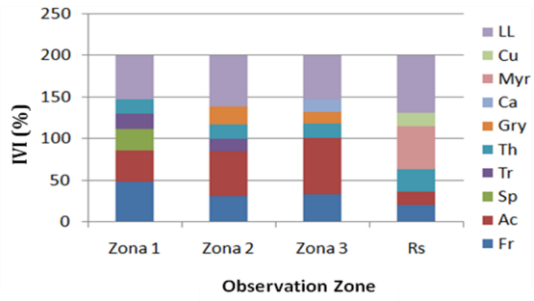

Figure 3. IVI of Arthropods in TPA WET
Description:
Fr=Formicidae Ac=Acrididae
Sp=Sphecidae Tr=Trichogrammatidae
Th=Thomicidae Gry=Gryllidae
Ca=Carabidae Myr=Myrmicidae
Cu=Culicidae LL=others,
Zona 1= 10 year restoration
Zona 2= 5 year restoration
Zona 3= 0 year restoration
Rs= Reference site

Ground Arthropods composition is affected by vegetation composition. Revegetation in zone one was done as 10 years and consist of some trees like *Samanea saman* Jacq and ground cover plants like *Axonopus compresus*. Vegetation composition in zone two is dominated by bushes and clump because restoration was conducted 5 years. Zone three is dominated by bushes and no trees, its make this area have no shade for ground Arthropods. In reference site, the vegetation is natural and dominanted by bushes, clump, and trees, especially Bambusasp. Presence of vegetation in some habitat give an ecological services to the animal which live there, as home, food source, and shading area. Change in community and vegetation composition in ecosystem have undirect effect to animal composition and vice versa.

Species Richness

Zone with the highest species richness is zone two with 16 species was found, followed by zone two and reference site with 14 species, and zone one with 13 species (Fig. 4). The highest species richness in zone two because of high diversity vegetation composition from bush and clump. Vegetation composition in zone two is dominated by *Imperata cylindrica*, *Galinsoga parviflora*, and *Samenea saman*.

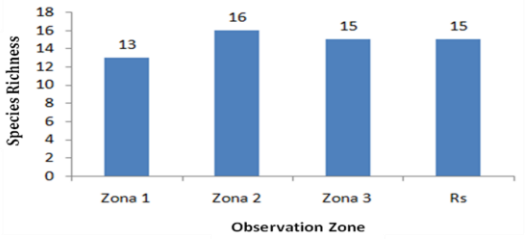

Figure 4. Species richness in every zone of TPA WET
Description:
Zona 1= 10 year restoration
Zona 2= 5 year restoration
Zona 3= 0 year restoration
Rs= Reference site

Arthropods diversity based on diversity index Shannon Wienner showed differences in every zone. The highest diversity index was found in reference site (2.08) which categorized as medium, and in zone one which 10 years restored (1.90), zone two which 5 years restored (1.87), and zone three which still used as open dumping area (1.71) (Fig. 5). It indicates that there were some improvements of environmental quality by restoration programme, where the longest restoration has the best environmental quality [9].

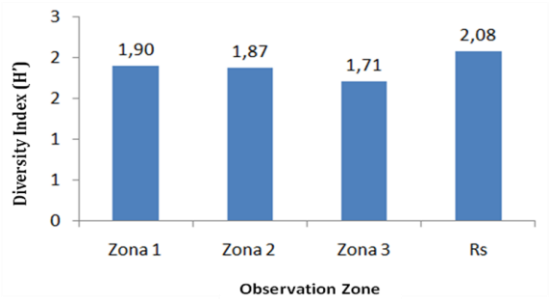

Figure 5. Diversity Index (H') in every zone based on Shannon Wiener Index
Description:
Zona 1= 10 year restoration
Zona 2= 5 year restoration
Zona 3= 0 year restoration
Rs= Reference site

The diversity of Arthropods in each family of every zone was affected by resource which provide by environmental. In zone two and three which dominated by grasses was found Miridae and Mantidae. The exsistence of this species make Acrididae which is a predator can dominate the site. Predators is a group of organisme which have generalism feeding pattern, which can adapted to a habitat that has poor resources [10].

Cluster Analysis

Cluster analysis from IVI, diversity index, abiotic factor, was devided research zone into two cluster, which zone one and reference site in first cluster and zone two and zone three in second cluster (Fig. 6). Its affected by environmental factors that has influences to diversity of arthropods in every zone (Fig. 7).

Reference site was respresented with high organic matter. Number of organic matter in soil can affect to high diversity of ground arthropods [11]. Zone one which represented with high number of Formicidae show that this area has good organic matter. Formicidae is a family of Arthropods that has roles as pollinator, reconditioner of soil degradation, etc. Formicidae is a bioindicator of soil ecosystem health [12].

Reference site represented by high number of Myrmicidae. Presence of Myrmicidae in some area is affected by management factor, soil variation, and agricultural practice [13]. Myrmicidae is an important predator in ecosystem and it is predicted to protect agricultural crops from pests [14].

Zone two and three was located in one cluster which characterized with high value of conductivity. It caused by a puddle from waste open dumping system in this area. Moreover, zone two and three represented by high number of some family like Acrididae, Gryllidae, and Carabidae. It indicates that this area was disturbed. Grasshoppers (Acrididae) and crikers (Gryllidae) live in some different habitat like forest, bushes, settlement area, agricultural fields, etc [15]. In natural habitat, grasshoppers play roles as predator, scavenger, decomposer, and natural enemies for other Arthropods [16].

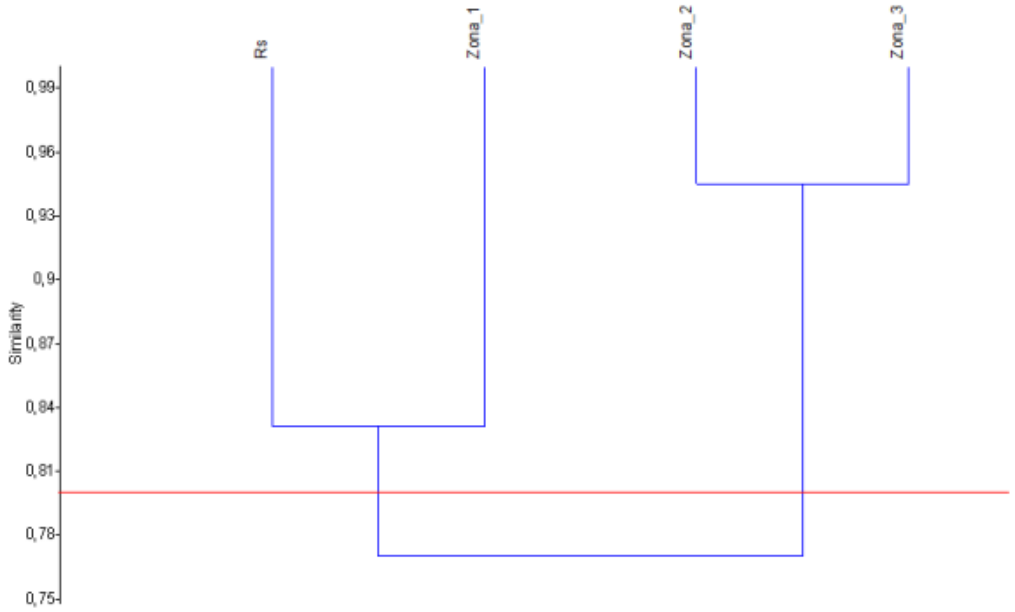

Figure 6. Cluster analysis IVI, H' and abiotic factor
Description: Zona 1= 10 year restoration; Zona 2= 5 year restoration; Zona 3= 0 year restoration; Rs= Reference site

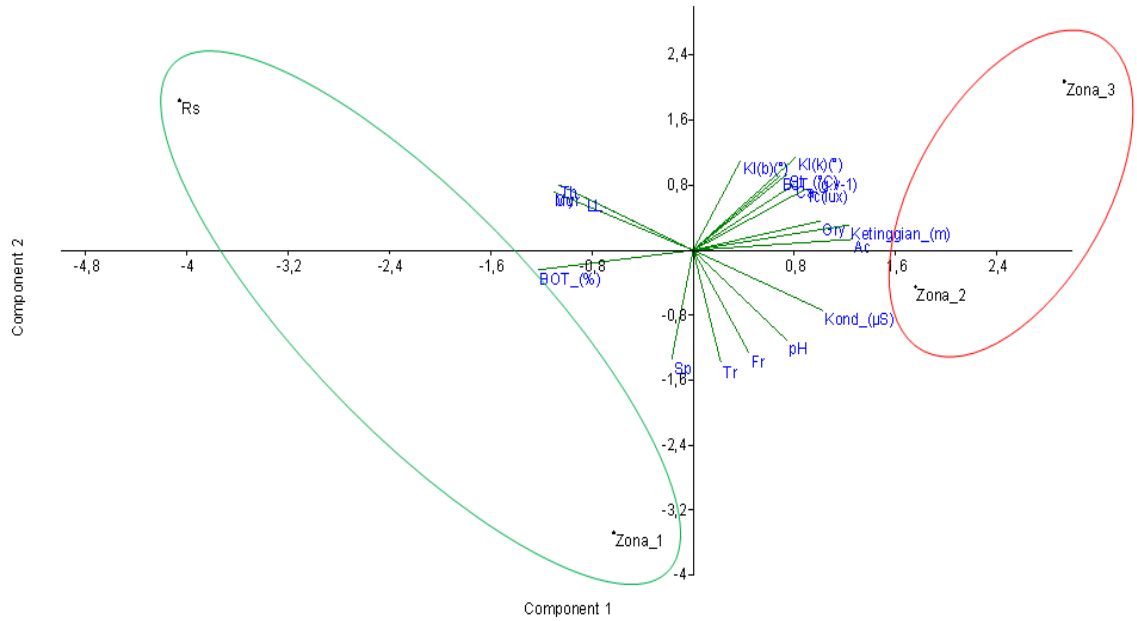

Figure 7. Biplot analysis IVI, H' and abiotic factor
Description: Fr=Formicidae, Ac=Acrididae, Sp=Sphecidae, Tr=Trichogrammatidae,Th=Thomicidae, Gry=Gryllidae, Ca=Carabidae, Myr=Myrmicidae, Cu=Culicidaedan LL=others, Zona 1= 10 year restoration; Zona 2= 5 year restoration; Zona 3= 0 year restoration; Rs= Reference site, pH=soil pH, Kond (µS)= Soil conductivity, Height (m), BOT= Soil organic matter (%), BJT= soil specific gravity (⟦g.v⟧^(-1)), Ic (lux)=light intensity, Kl(b)(%)=wet humidity, Kl(k)(%)=Dry humidity.

Every group of Arthropod have different response to environmental and climate changes [17]. Grasshoppers and member of Orthoptera family play an important roles to stabilize forest ecosystem [15]. Zone two and three was in a same location separated about 10 m apart. It make these area was clusterd in same cluster and sharing some resource, migration area, dan home range. Arthropods can move from one area to another to foraging, nesting, or mating [18].

Abiotic Factors

Abiotic factor in every zone (Fig. 8) was less differences, especially in pH about 6-7, important factor that influence the presence and abundance of ground Arthropod. Ground Arthropod can live in habitat with high or low acidic level, depend on preferency of Arthropod [19]. Soil conductivity in each zone was low (9-15 µS.cm^{-1}). Soil composition is diverse, one of the composition is salt, role as conductor, comparable with the number of electron. Conductivity indicate the ions contained in the soil composition [20].

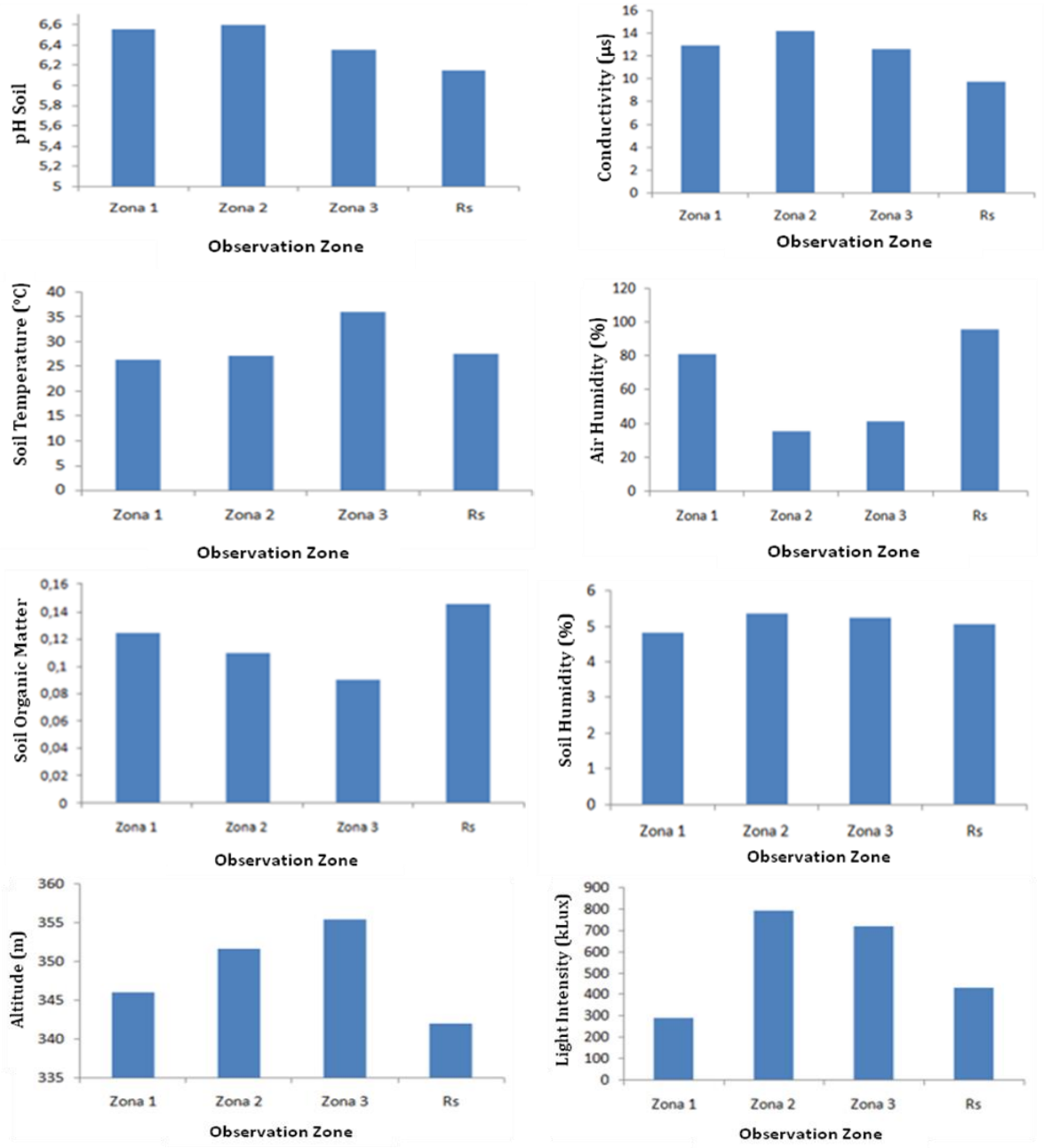

Figure 5. Abiotic factor in every zone in TPA WET

Description: Zona 1= 10 year restoration; Zona 2= 5 year restoration; Zona 3= 0 year restoration; Rs= Reference site

Light intensity in every zone has different value. Zone two and three has the highest light intencity because this zone has no three canopy, whereas in zone one and reference site has low light intensity. Light intensity has influence the distribution and activities of ground Arthropods. Light intencity is energy source for photoautotrophic component in soil habitat [21]. Altitude level on zone one and reference site is lower than on zone two and three. Physiography factors which influence distribution of organism are altitude and topography of the area. Altitudes has impact to distribution and abundance of soil fauna [22]. It was showed that zone two and three has lower abundance and diversity of ground Arthropods than zone one and reference site.

Humidity is an abiotic important factor that represent moisture content in the area. Excess or deficiency of moisture level will cause some disturbance or damage on some habitat. Based on Anggrainiet al. (2003) relative humidity are comparisons between actual air moisture with the capacity to accommodate water vapor [23]. Wet and dry humidity has the highest level in zone three which has no trees canopy. Zone three is represented with high of soil temperature rather than other site. Soil temperature is an abiotic factor which influence of presence and abundance of soil organism. Soil moisture play roles to level of soil organic matter composition. Soil temperature was affected by air temperature. Air temperature was fluctuatuative in night-day cycle and depend on actual season. The fluctuation of air temperature is also influenced by climate, topography, and soil condition [19].

Organic matters are combination of some organic compound that was composted with decomposition process and some anorganic matter from mineralisation product including heterotrophic and ototrophic microbial. Organic matter can produced from primer sources like organic tissue from flora and seconder source like tissues from fauna, microfauna, and from outside source like organic fertilizer, etc. [24].

CONCLUSION

Ground Arthropods diversity in zone one, two, three, and reference site is on medium level (1.90, 1.87, 1.71, 2.08). Community structure represented with importance values index (IVI) was dominated by Acrididae in zone two and three with value 67.2% and 53.5%. Myrmicidae is dominant in reference site with 67.2%, and Formicidae dominant in zone one with 48.6%. Ground Arthropod in zone one and reference site has close community structure which showed in same cluster, and zone two and three in another cluster.

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Vitality of Giri Kedaton Site as a Religious Tourism Attraction in Sidomukti Village, Kebomas, Gresik

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Abstract

Giri Kedaton site belongs to the legacy of cultural heritage that has numorous historical values, especially the history of the spread of Islam and the government in Gresik since the 14th century. Giri Kedaton Site was a kingdom founded by Sunan Giri and served as the Core City II Gresik in 1487 AD. Currently Giri Kedaton transforms to become cultural tourism object in religious or pilgrimage tourism sector. In 2002-2005, the local government conducted preservation and conservation activities at the Giri Kedaton site. The purpose of this study was to identify the characteristics as well as to measure the vitality of Giri Kedaton site, and determine the variables that may affect the vitality of the sites. The identification of the characteristics of the Giri Kedaton site is explained by researcher by using qualitative descriptive analysis, while the frequency distribution analysis was employed to assess the vitality, and the variable effect was analyzed by multivariate linear regression. Based on its mode value on analysis of distribution frequency, we obtained value vitality of Giri Kedaton site is low. The results of linear regression analysis multivariate obtained the best method. i.e. a enter method, with model: $Y = - 2.884 + 0.075\ X_1 + 0.039\ X_2 + 0.055\ X_3 + 0.,119\ X_4 + 0.174\ X_5 + 0.115\ X_6 + 0.108\ X_7 + 0.110\ X_8 + 0.071\ X_9 + 0.158\ X_{10} + 0.005\ X_{11} + 0.92\ X_{12} + 0.159\ X_{13} + 0.265\ X_{14} + 0.153\ X_{15}$. Based on the result analysis of the regression (t-test) variable influence significantly is government's support (0.002), sidewalks (0.005) and housings (0.047). The conclusion of this study showed that the Giri Kedaton site has supporting function as religious tourism but there is still lacks of adequate infrastructures and facilities including parking areas and economic facilities. In addition to the length of visit (1-3 hours) and the frequency of visits (first visit) have a low value which indicates that the Giri Kedaton site has limited tourism attraction; in other words, it has not been recognized by most visitors. The vitality of Giri Kedaton site is low as the travelers rated the infrastructure aspects not sufficient to support the site as a religious tourism attraction. The multivariate linear regression model used was the enter model and only three independent variables who is influential significantly to the site that is government's support (X_{14}), sidewalks (X_5), conditions of housing facilities (X_{10}).

Keywords: Giri Kedaton, multivariate linear regression, religious tourism, vitality

INTRODUCTION

Since the early development of Islam in Java, especially in Gresik has become prominent in the historical aspect. Islam was brought and distributed at the beginning of the 11th Century by Shaykh Maulana Malik Ibrahim and Siti Fatimah Binti Maimun. The early and development of Gresik in addition to the inclusion of the Islam teachings was closely related to the role of a rich harbormaster Nyai Gede Pinatih in Gresik, who was the adoptive mother of Sunan Giri. Sunan Giri is a Sunan or religious leader. Sunan Giri regarded as Sultan/King named Sultan Ainul Yaqin/King Satmoto in Javanese name. Sunan Giri coronation as king could be as a milestone of a new dinasty of government in the Giri Kedaton Kingdom [1].

Based on Regional Regulation of Gresik No. 8 of 2011 on Spatial Siteplan in Gresik 2010-2030 [2], the Tomb of Sunan Giri is included in the Cultural Heritage and Science Region, Tourism Attractions in Gresik Urban, as well as part of the provincial strategic area in terms social interests and culture. According to the Regulation Draft of District of Gresik in 2012 on the Implementation of Tourism, the Tomb of Sunan Giri and Petilasan (Monastery) of Giri Kedaton is included into the cultural tourism attractions that have religious tourism object [3].

In 2002-2005, Department of National Education of Gresik and Archaeological Center of Heritage Preservation "Trowulan" conducted preservation and conservation activities of Phases I-IV at the Giri Kedaton site [4]. The problems at the Giri Kedaton site were the minimum information for the travelers so they become less aware of the existence of Giri Kedaton. Worse, the infrastructures could not provide optimum support to the sites. The

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functioning objective in the study was to identify the characteristics and to know the vitality of the Giri Kedaton site. In addition, the objective of this research was to know the kinds of variables that may affect the vitality of the sites.

According to Indonesian Dictionary, vitality is the endurance or ability to survive. The vitality of one particular area is the quality of land use that may contribute to increase in activity as an attraction, thus increasing economic activity as a factor of regional growth [5]. In the Ministrial Regulation of Ministry of Public Working Number 18/PRT/M/2010, the vitality of the area is the quality of an area that can support the survival of its citizens, and supporting social productivity, culture, and economy while maintaining the quality of the physical environment, and/or prevent damage to legacy culture [6].

The elements of urban planning consist of six elements, namely land use, open space, shape and mass of the building, circulation and parking, supporting activities, and sidewalk area. In this study, the elements of urban planning focuse more on the elements related to the functions of the sites, including the land use, circulation and parking, supporting activities and sidewalk area [7].

Cultural heritage (Law No. 11 of 2010) is physical cultural heritage in the form of objects of cultural heritage buildings, Structures Heritage, World Heritage and Cultural Heritage Preservation on land and/or in the water that needs to be preserved because it has important value to the history, science, education, religion, and/or cultural heritage through the legal and decree process. Historical and cultural site is located on land and/or in the water consisting of objects of Cultural Heritage Buildings, and/or Cultural Heritage structure as the result of human activity or evidence of events in the past [8].

Tourism area is an aerial place or site visited or attended a lot of people (tourists) because the region has interesting and appealing attractions [9]. Touring is travel activities by a person or group of people to visit one particular place for the purpose of recreation, personal development, or to learn unique tourism attraction that is visited in a temporary period. Tourism attraction, described as everything that has a unique, convenience, and value diversity in the form of natural resources, culture, and the results were subjected to man-made or tourist visits [10]. Religious tourism or pilgrimage is known as journey away from the everyday, mundane world of work and home to specific sacred sites formalized, recognized, and maintained by the major religions [11]. To attract the visitors, tourism attractions should deal with the following aspects: what to see, what to do, what to buy, what to arrive, and what to stay [12].

Perception on the perceived quality of tourism destinations by the tourists or visitors during and after visiting the tourism destination is the quality of tourism and the effect on the tourist's satisfaction [13]. Perception is the sense of impression arising from the surrounding environment. Someone's perception can be strengthened by the knowledge and experience [14].

It is said that the reduced performance of particular place or building occurs when mis-match arises between the place and building's capabilities or purpose with the current needs, it may occur due to the changes in economic activities or other issue like degradation of the physical environment. Dimension of the reduct-ion in the performance of a city region may include some aspects aspects namely the structure or physical area, function, image area, legal and institutional, location and financially or economically [15]. There should be some strategies to improve the activity (vitality) consisting of five categories, namely human diversity, the functional diversity, detailed urban diversity, accessibility, as well as the manage-ment and regulation [16]. The objective of this study is to determine site's vitality and factors that influence site's vitality.

MATERIALS AND METHODS

Study Site

Giri kedaton is cultural heritage objects relic Sunan Giri. At the moment the site serves as a tourist attraction and has in conservation in 2002. With progress, the site has been one of tourism attractiveness in Gresik. However of infrastructures site is still not support its function as a place of religious tourism. In addition there are many travelers do not yet know about the site.

The coverage of the location in this study was in the Kedaton, Sidomukti Village, Sub-District of Kebomas. The borders of the location of this study are:

North : Sunan Giri Street West: Gang 15 (XV)
South : Sunan Giri Street, Gang XIII-K East : Gang 13 (XIII)

Respondents and Research Variables

There are various feedbacks from some tourist populations on the Giri Kedaton site; therefore, the right selection of samples in this study using the accidental sampling technique (non-probability) [18], namely the selection of samples by chance (tourists), the number of samples was ± 60 people. Research variables which refer to several previous studies were certainly not used in this study as a whole. Those variables should be filtered and compiled with theories related to tourism, the theories related to success of forming a place, as well as urban planning theory to match the objective of this study, in accordance with the formulation of the problem, as well as to reduce the subjectivity of researchers. Then the research variables are as follows in Table 1.

Table 1. Research Variables

Objectives	Variables	Subvariables	References
Identifying the characteristic and measuring the vitality of the sites	• Fuctional aspect	• Visitors • Number of parked vehicles	Strategy to improve vitality of trading sector in Johar, Semarang [17]
	• Supporting activities • Spatial aspect	• Activities inside and outside the sites • Signage • Sidewalks • Parking area	Spatial plan model of stalls as a strategy to increase vitality of trading area in Klampis Jaya Street, Surabaya [16]
	• Accessibility	• Lowerlanes (motorcycle and street vendors) • Sidewalks • Parking Area	Spatial concept to increase the quality of physical condition in trading area and services on Jenderal Sudirman Street, Salatiga [21]
	• Community's awareness • Government's support • Attractions	• Degraded local culture • Existence of entertainment • Level of public knowledge • Government's policies on cultural heritage • Supervision • Cultural heritage artifacts • Riverside housings • Trading activities	Direction on Revitalization of preservation area of Old Town Siak [22]
	• Accessibility • Attractivity • Amenity	• Transportation models • Interconnection of tourism area • Parking area • The diversity of activities in tourism area • Signage • Street Furniture • Intrastructures	Potentials on the Development of Oud Batavia Jakarta Area: Historical Perspective and Vitality of One Region [23]
	• Characteristics of the visitors	• Length of visit • Frequency of visit	Visitor's Preference on Tourism Infrastructures in Natural Tourism in Mount Merapi Eruption [14]
Factors that may affect the vitality of the sites	• Spatial plan sector	• Sidewalks • Parking area • Open public space • Supporting activities • Lighting • Traffic circulation • Condition of the roads • Tourism attraction • Trading activities	Strategy to improve vitality of trading sector in Johar, Semarang [17]
	• Interaction aspect	• Activities inside and outside the site	Spatial plan model of stalls as a strategy to increase vitality of trading area in Klampis Jaya Street, Surabaya [16]
	• Community's awareness • Government's support	• Law enforcement • Policies on cultural heritage	Direction on Revitalization of Preservation Area of Old Town Siak [22]

Data Collection

Questions regarding knowledge, attitude and behaviour was delivered to respondnets. The questions answers were arranged following Likert scale. Likert scale employs some questions to measure the response of the individual towards the conditions of the Giri Kedaton site by responding to five-point choice on each of the question, i.e. strongly agree, agree, do not take stance (neutral), disagree, and strongly disagree [19].

Data Analysis

After gaining the feedback to rate the conditions of the Giri Kedaton site, the results of the questionnaire were processed using the frequency distribution analysis. Frequency distribution analysis in the study was used to facilitate in analyzing or calculating the data and create tables and graphs [20].

The type of frequency distribution consists of three types, i.e. normal frequency distribution, relative frequency distribution, and cumulative frequency distribution. There is a measure of central tendency or central value in the frequency distribution which represent the data as a whole. The size frequency distribution has a concentration in the types of measure central value, which is the mean (mean statistics), median (middle value) and the mode (most frequent value). This study employed normal frequency distribution (categorical) to classify the vitality, where as to determine the vitality derived from the value of the mode of frequency distribution analysis results.

In addition to the frequency distribution, this study also amployed multivariate linear regression to determine the observed variables (independent) and their effects on the site. The researcher firstly conducted prerequisite test such as to intercept and slope of each independent variable, calculate the determinant coefficient (R-square), calculating the correlation coefficient (R), standard error estimate (f), Partial significance test (t-test), simultaneous significance test (F-test), and multicollinearity.

In addition, there was also a combination analysis that combines the results of linear regression analysis with distribution frequency analysis. The first method (distribution frequency) was used to support the second method (linear regression) which led to some recommendations of the study.

The form of relationship in the analysis of multivariate linear regression was some independent variables on one dependent variable. The equation for multiple regression model as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + ..+ b_nX_n + e$$

Description:
Dependent variable (Y): vitality of Giri Kedaton site
Independent variables (X):

X_1	: physical condition of buildings	X_9	: social infrastructure services
X_2	: condition of maintenance	X_{10}	: housing facility
X_3	: length of visits	X_{11}	: condition of infrastructure
X_4	: frequency of visits	X_{12}	: tourism attractions
X_5	: sidewalk	X_{13}	: condition of recreational facilities
X_6	: condition of the roads	X_{14}	: government's support
X_7	: parking area	X_{15}	: public participation
X_8	: economical infrastructure service		

RESULTS AND DISCUSSION

Distribution Frequency

Vitality of Giri Kedaton site as a religious tourism object is measured based on the observed variables. Internal factors to be assessed by the visitors are physical condition of the site which had a balanced frequency value 3 and 4 (Fig. 1). It means that the value is in good condition to quite good condition.

The condition of maintainence was 4, the length of the visit was 1-3 hours (1). The frequency of visits for the first time was 1, adequate infrastructure at the sites was 3, the attractiveness of the tourism attractions was 5, and adequate recreational facilities were 4. The assessment on the external factors indi-cate that the sidewalks were in good condition (4) supported with good roads (4). However, the parking area is inadequate (2), and economic infrastructure is insufficient (2) (Fig. 2). Conversely, social facilities perceived adequate (3), housings were adequate to very adequate (3 and 4), concern from the government and the community's awareness had the highest frequency value of 4.

Vitality of Giri Kedaton site

Based on the previous references about the vitality, the vital region area is divided into two types, i.e. vital and very vital. The next step in this research was to determine the vitality of the Giri Kedaton site by categorizing the total results from the frequency distribution analysis into two categories of vitality : low and high vitality.

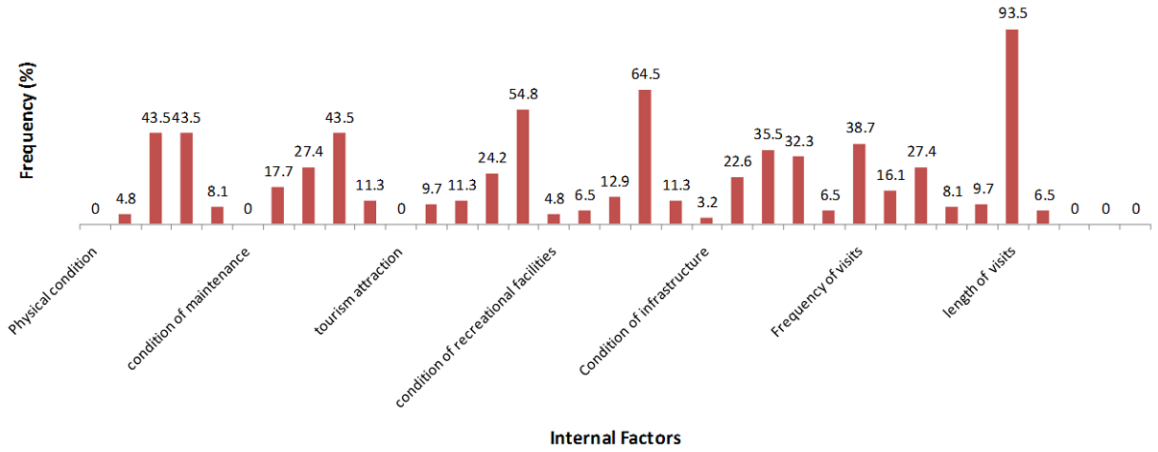

Figure 1. Visitor's Assessment on Internal Factors

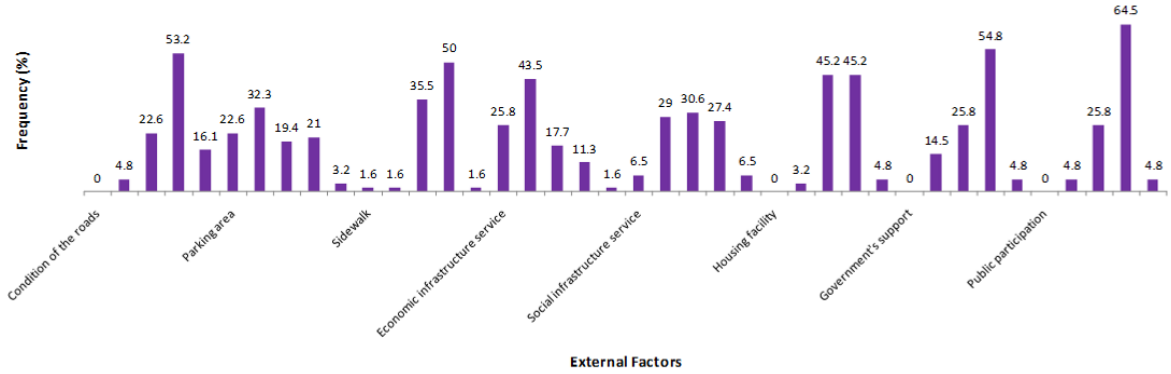

Figure 2. Visitor's Assessment on External Factors

Based on the calculation of a frequency distribution, then vitality of the Giri Kedaton site was categorized into low vitality since the value of the mode on the table is 44 (Table 2). This is because there is still a lack of adequate infrastructures and facilities to support the tourism attractions of the Giri Kedaton: such as the lack of adequate parking areas, no economic infrastructures to support the tourism object. In addition, there are several visitors have limited information about the tourism attractions at the Giri Kedaton site. While the analysis of previous research based on the value of mode shows that vitality of the research object is high (Table 3). However there are a symptom of a decrease in vitality area [17]. Similarly on the site of Giri Kedaton, there are a variable showing to be a decrease in vitality area. Variables causing the appearance of symptoms of a decrease in vitality in this research includes the frequency of visit, visit length, parking area and economic means.

Table 2. Frequency of Independent Variables

Vitality		F	Percent	Valid Percent
Validity	32	1	1.61	1.61
	33	1	1.61	1.61
	36	1	1.61	1.61
	37	1	1.61	1.61
	38	1	1.61	1.61
	39	2	3.23	3.23
	40	2	3.23	3.23
	41	2	3.23	3.23
	42	4	6.45	6.45
	43	4	6.45	6.45
	44	6	9.68	9.68
	45	4	6.45	6.45
	47	4	6.45	6.45
	48	4	6.45	6.45
	49	6	9.68	9.68
	50	4	6.45	6.45
	51	1	1.61	1.61
	53	6	9.68	9.68
	54	2	3.23	3.23
	56	2	3.23	3.23
	57	1	1.61	1.61
	59	2	3.23	3.23
	61	1	1.61	1.61
	Total	62	100	100

Table 3. Vitality of GiriKedaton site

Vitality	Range	Visitor's Assessment		
		Frequency	FR	FP
Low	32 – 47	33	0.53	53%
High	48 – 53	29	0.13	47%
Total		62	1.00	100%

Correlation between Variables X and Y

The correlation test employed Pearson's Corellation with one-tailed significance (0.05). The results of the correlation test were presented in Table 4.

Table 4. One-Tailed Correlation Test (0.05)

Const.	Variables	Pearson's Corelation	Sig. (1-tailed)
Y	Vitality	1.000	.
X_1	Physical condition	.459	.000
X_2	Condition of maintainence	.383	.001
X_3	Length of visit	.197	.062
X_4	Frequency of visit	.370	.002
X_5	Sidewalks	.487	.000
X_6	Condition of the roads	.189	.070
X_7	Parking area	.327	.005
X_8	Economic infrastructure	.378	.001
X_9	Social infrastructure	.453	.000
X_{10}	Housings	.266	.018
X_{11}	Condition of infrastructure	.341	.003
X_{12}	Tourism attractions	.409	.000
X_{13}	Recreational infrastructure	.484	.000
X_{14}	Government's support	.253	.024
X_{15}	Community's awareness	.329	.004

The independents variable which has a very close correlation with the dependent variables include the condition of sidewalks, recreational infrastructure, physical condition of the buildings, condition of social infrastructure, tourism attractions, condition of maintenance, condition of economic infrastructure, frequency of visits, condition of infrastructure, community's awareness, condition of parking area, condition of housing facilities, and government's support. The independent variable which is not closely related with the dependent variable is length of visits and the condition of roads.

***Enter Method* (Multivariate Linear Regression)**

Multivariate linear regression analysis in this study was processed by using enter method. The determinant coefficient on the results enter method was 0.726 or 72.6%. It means that the model explains the variation the independent variables on the dependent variables.

F test on multivariate linear regression analysis with the largest value was 8.131 with level of sig. 0.000 ($p < 0.05$). It means that independent variables may affect the dependent variable (vitality). In other words, the regression model can be used to predict the dependent variables (y).

At the normality test known through graphic Normal P-P plot of Regression Standardized Residual, in the enter method of the dots of the independent variables approach the diagonal line z. It measn that the independent variables are normally distributed.

In addition, this study also conducted t-test and multicollinearity. t-test function was to determine the variables that may affect the dependent variables, while multicollinearity was used to determine the perfect linear relationship among independent variables. The results of t-test and multicolinearity test can be seen in Table 5.

Table 5. T-test and Multicollinearity Test (*Enter Method*)

Variable	B	Enter			
		T -test		Colinierity	
		t	Sig.	Tol.	VIP
Vitality (Y)	-2.884	-5.816	.000		
X_1	.075	.800	.428	.523	1.912
X_2	.039	.391	.697	.447	2.237
X_3	.055	.426	.672	.757	1.321
X_4	.119	1.518	.136	.720	1.389
X_5	.174	2.964	.005	.635	1.574
X_6	.115	1.659	.104	.710	1.408
X_7	.108	1.378	.175	.640	1.563
X_8	.110	1.299	.200	.598	1.673
X_9	.071	.796	.430	.527	1.899
X_{10}	.158	2.045	.047	.668	1.497
X_{11}	.005	.058	.954	.471	2.121
X_{12}	.092	1.056	.296	.656	1.524
X_{13}	.159	1.672	.101	.525	1.903
X_{14}	.265	3.266	.002	.703	1.423
X_{15}	.153	1.884	.066	.753	1.327

Based on table 5, the multivariate linear regression model to be used in this research was enter method model with the following formulation:

$$Y = -2.884 + 0.075\,X_1 + 0.039\,X_2 + 0.055\,X_3 + 0.119\,X_4 + 0.174\,X_5 + 0.115\,X_6 + 0.108\,X_7 + 0.110\,X_8 + 0.071\,X_9 + 0.158\,X_{10} + 0.005\,X_{11} + 0.92\,X_{12} + 0.159\,X_{13} + 0.265\,X_{14} + 0.153\,X_{15}$$

According to F test, there is conclusion that the independent variables positively and signifi-

cantly affect the vitality of the site, where the independent variables F count> F table (1.89) or it could also see significant value of 0.000 which is smaller than the real rate of 5% (0.05). If the value of the independent variable in the formula improved, it will have a positive influence on the vitality of the site. On the other words, the vitality of the site increases, and vice versa.

Table 5 showed variable influence significantly to the vitality of covering government's support (X_{14}), sidewalks (X_5) and housings (X_{10}). While variables that has no significant impact on vitality are physical condition (X_1), condition of maintenance (X_2), length of visit (X_3), frequency of visit (X_4), condition of the roads (X_6), parking area (X_7), economic infrastructure (X_8), social infrastructure (X_9), condition of infrastructure (X_{11}), tourism attractions (X_{12}), recreational infrastructure (X_{13}) and community's awareness (X_{15}).

Combination Analysis of Distribution Frequency and Linear Regression

There are independent variables that have low scores, i.e. the length of visits, frequency of visits, parking area and economic infrastructure. These independent variables, however, may still have the effect on the the vitality, so that according to the results of the combination, researcher may provide some recommendations on those variables to be better.

Table 6. Combination of Analysis

Variable	Analysis of Frequency Distribution			LRM Analysis	
	Tourist Answer	Description	(%)	t	Sig
X_1	3 and 4	Quite well and well	43.5	.800	.428
X_2	4	Maintained	43.5	.391	.697
X_3	1	1 – 3 hours	93.5	.426	.672
X_4	1	First vast	38.7	1.518	.136
X_5	4	Good	50.0	2.964	.005
X_6	4	Good	53.2	1.659	.104
X_7	2	Inadequate	32.3	1.378	.175
X_8	2	Inadequate	43.5	1.299	.200
X_9	3	Is quite Sufficient	30.6	.796	.430
X_{10}	3 and 4	Adequate and is quite sufficient	45.2	2.045	.047
X_{11}	3	Is quite sufficient	35.5	.058	.954
X_{12}	5	Very interesting	54.8	1.056	.296
X_{13}	4	Adequate	64.5	1.672	.101
X_{14}	4	Care	54.8	3.266	.002
X_{15}	4	Care	64.5	1.884	.066

Recommendations for Vitality of Giri Kedaton

Based on the initial function of the Giri Kedaton site as a tourism attraction, there are some recommendations on the vitality of the site such as:

1. Recommendations for the physical condition of the site is to minimize such activities that threatens the condition or loss of ancient heritage artifacts at the site.
2. Recommendation for condition maintenance of the Giri Kedaton site that there should be acts of rescuing, security, maintenance and restoration of the site of damage and loss due to natural reasons and irresponsible human behaviors.
3. Recommendations for the frequency of visits that there should be more options of activities and attractions for the visitors to stimulate economic growth and increase the frequency of visits, such as:
   - Activity memorizing the Qur'an on the Giri Kedaton site, in cooperation with related agencies or boarding schools
   - Shopping activity (what to buy), the development of mixed function which may promote entreprenurship economic and social activities of the local people.
   - Cultural activities by providing information on the cultural heritage of Sunan Giri as well as the the role of spreading Islam in Java and Indonesia.
4. Recommendations for the condition of the sidewalks which needs more plan to design and manage the sidewalks such as dividing line for sidewalk as well as designing a safe sidewalk to increase the convenience, continuous (straight), comfortable and attractive (Fig. 8).
5. Recommendations on the condition of the road that maintaince should be done regularly to keep the existing condition good.
6. Recommendation on economic services includes adding functions of the designated housing around the site into a more integrated function, namely as residential, commercial as well as parking area (mixed used) as shown in Fig. 9.
7. Recommendation on socio-cultural services: there should be improvement of the physical condition of the existing social facilities and encourage the local poele to participate in the preservation of the sites such as healthy life socialization, fostering religious activities such as special garden for reciting the Qur'an.

8. Recommndations for parking area:
   - Constructing and designing safe, comfortable and accessible parking area around the site.
   - Adding the function of designated parking space around the residentials of the local people.
9. Recommendations to improve the condition of public facilities inside and outside the site:
   - Hygine infrastructure, e.g. trash provision at some points,
   - Lighting infrastructure, e.g. adding more lighting at the site especially at night,
   - Clean water infrastructure, e.g. improving the flow of clean water for the visitors,
   - Sanitation infrastructure, e.g. providing more public toilets for the visitors and supporting infrastructure, e.g. septic tanks
   - Drainage infrastructure, improvement of drainage channels inside and outside the site is important.



Figure 8. Recommendation for Sidewalk Design



Figure 9. Recommendation for Mixed Use

10. Recommendation on the tourism attractions of the Giri Kedaton site:
    - The design of the building decoration should be appropriate with the historical and cultural values contained in the sites.
    - The effective design of the signage (Fig. 10) for the visitors such as directions to the site at the alleys around the site, especially direct alleys to the site : Gang 13 and Gang 15.
    - There should be broader plan to connect with other tourism attractions around Giri Kedaton, especially which are located in Sub-district Kebomas (Fig. 11).

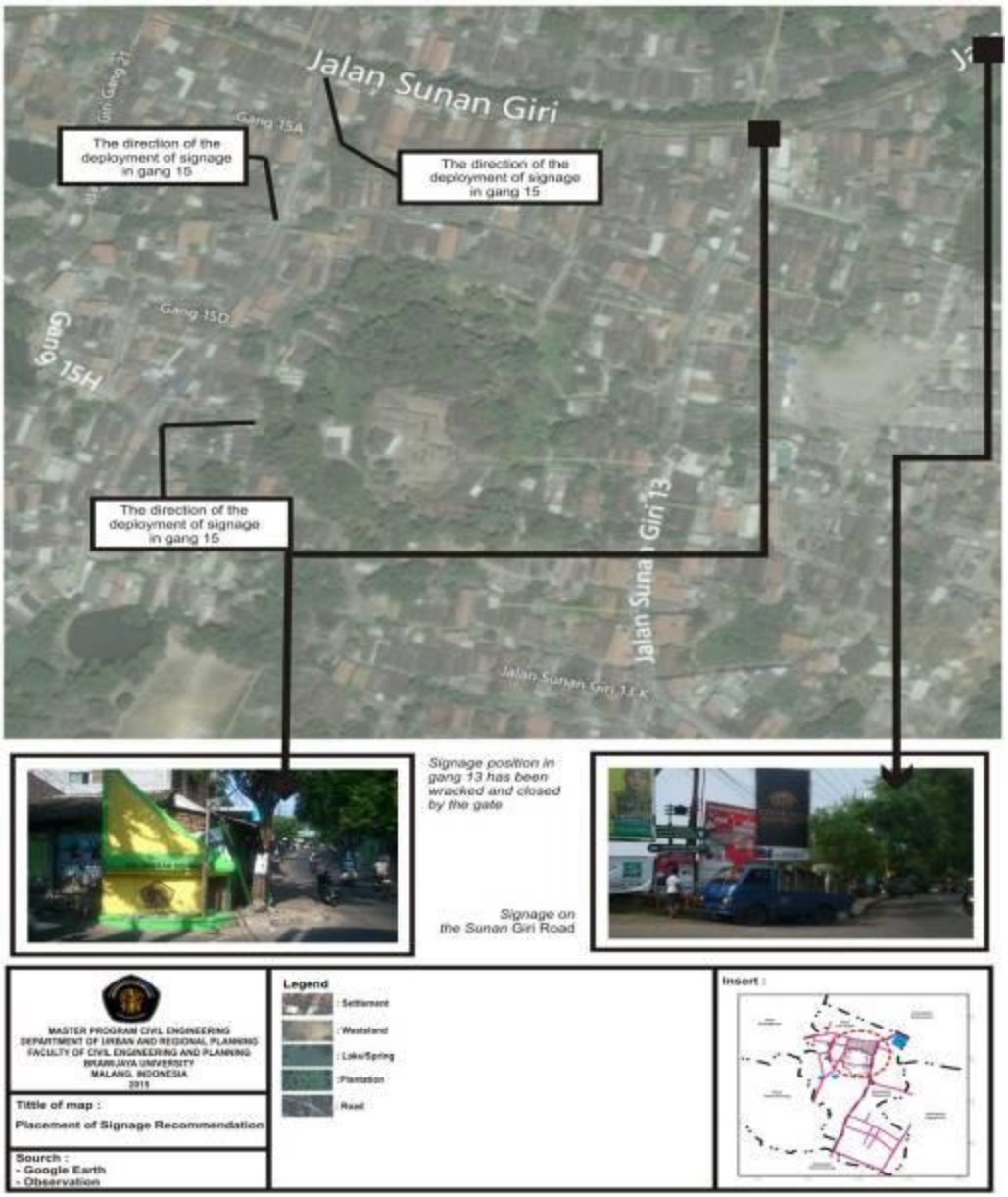

Figure 10. Recommendation for the position of signages

11. Community's awareness:
    - Recommendations for better management and regulation of promotion and adaptive re-use (repair and maintenance).
    - Recommendations on public participation program to provide a good quality of life for the community (concept of corprorate social responsibility).
12. Recommendation to rearrange the RTBL (spatial plan) in Giri Kedaton region or to develop new master plan of the Old Town around Giri Kedaton.

CONCLUSION

The vitality of the Giri Kedaton site is categorized into low level of vitality. According to the visitors, the main reason is due to the insufficient variables to support the functions of the site as a tourism attraction. On the other side, a lot of visitors from outside the District of Gresik have small information about it. While according to the result of the multivariate linear regression, the preferable model is enter model as follows:

$$Y = - 2.884 + 0.075\ X_1 + 0.039\ X_2 + 0.055\ X_3 + 0.119\ X_4 + 0.174\ X_5 + 0.115\ X^6 + 0.108\ X_7 + 0.110\ X_8 + 0.071\ X_9 + 0.158\ X_{10} + 0.005\ X_{11} + 0.92\ X_{12} + 0.159\ X_{13} + 0.265\ X_{14} + 0.153\ X_{15}$$

Based on the result analysis of the regression (enter method) variable influence significantly is government's support (X_{14}), sidewalks (X_5) and housings (X_{10}). If the value of the independent variable (X) increases, the vitality will increase, and vice versa.

Recommendations

1. For the local governments, especially Gresik, need to provide socialization and should work together with the community to develop the tourism attractions at the Giri Kedaton site.

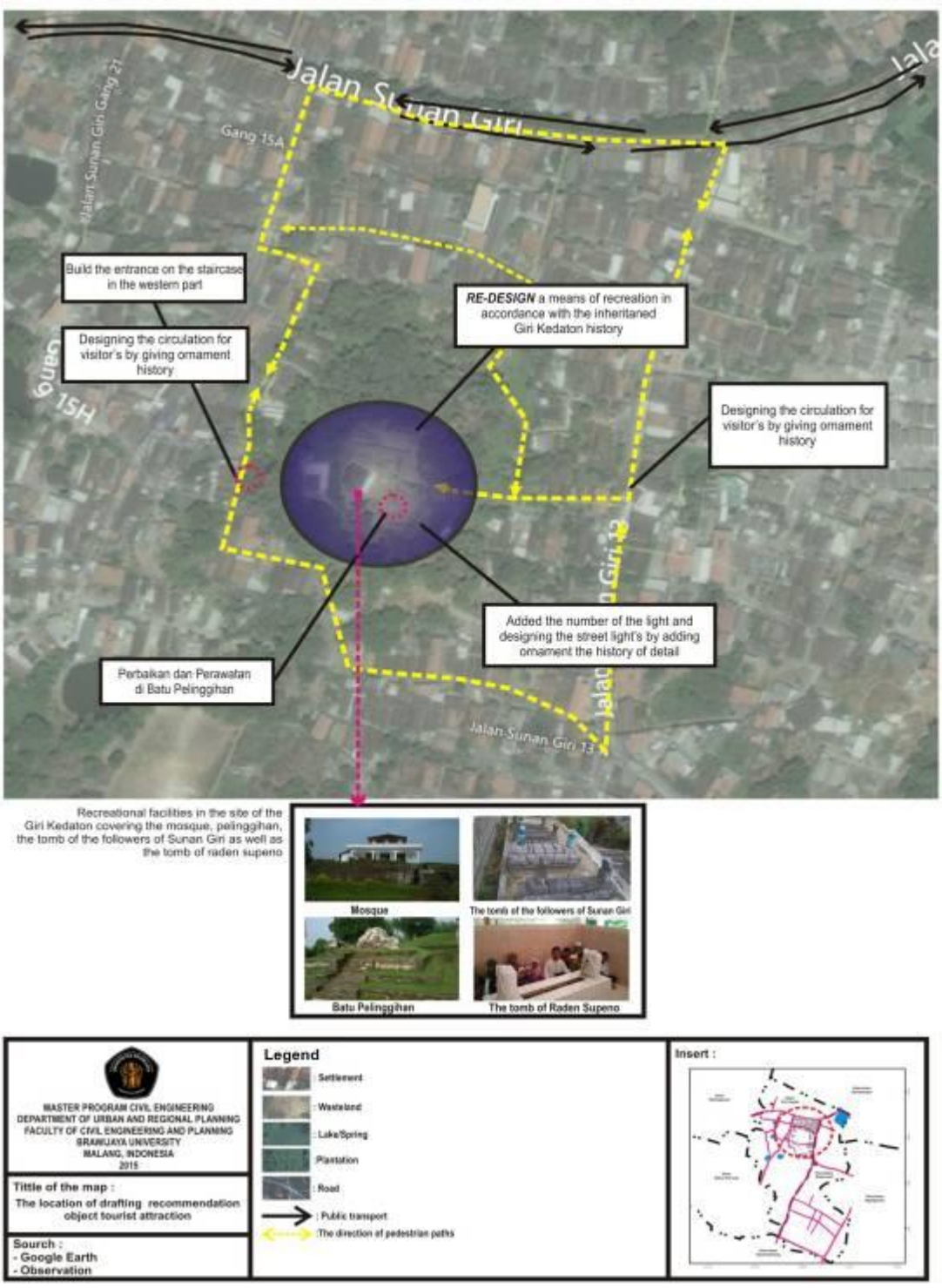

Figure 11. Recommendation for tourist attraction

2. For the local people in Sidomukti Village, the study was expected to provide positive input in the development planning of the Giri Kedaton site.
3. For project developers and planners, this research was expected to provide input in the planning and spatial design of the tourism area as well as the location of the buildings.
4. For further research, the study was expected to provide basic theory as well as to broaden the target area, especially in the aspect of regional vitality.

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Analysis of Bird Diversity for Supporting Ecotourism Development in Rajegwesi, Meru Betiri National Park

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Abstract

Potential ecotourism attraction in Rajegwesi Village, Meru Betiri National Park is high due to its high biodiversity, especially bird diversity, in the form of *bird watching* activity. This study was aimed to determine the species, level of abundance, and diversity of birds found in the Rajegwesi area. Further, this basic information is important to develop the bird watching track at Rajegwesi. We used Quantum-GIS to create the land classification and observation mapping. Bird observation used point count method in the morning and evening with three periods of hour and three repetitions. The study confirmed about 76 species of 39 bird families was found in Rajegwesi. The highest abundance was *Pygnonotus goiavier* (E:Yellow-vented Bulbul), at the meadows, village, and rehabilitation land. The diversity index showed that the highest diversity was found at the heterogeneous forest (H' index 3.745), followed by homogenous forest (H' index 3.150), rehabilitation land (H' index 2.845), village (H' index 2.693), paddy fields (H' index 2.529), and savanna (H' index 1.880). The observation track was divided into 3 lines based on the bird's distribution, the Village – Rehabilitation Land track (6.5 Km), Village track (2.3 Km), and Village – *Rafflessia* Park track (7.5 Km). Total of 25 bird species were found at the Village – Rehabilitation Land track, 22 species were found at the Village track, and 29 bird species were found at the Village – *Rafflessia* Park track. For the future of ecotourism development through birding development program, there are several issues that should be promoted: promoting birds conservation in the community through bird watching and birds observation competition (Bird race), training on conservation and ecotourism for the community, and strengthening the capacity and capability of Rajegwesi Ecotourism Society (RES) on the ecotourism program management.

Keywords: bird watching, conservation, ecotourism development, RES

INTRODUCTION

Bird watching are one of the ecotourism activities that rapidly growing in Indonesia. As tourism activities, bird watching has both positive and negative impact [1,2]. It is encourage the research activities in planning and management model of ecotourism –particularly bird watching activities– is necessary [3,4]. Mekonnen and Aticho [5] suggested that bird watching is an activity that should be encouraged in conservation because it has an important role as a source of income for local communities and promoting environmental conservation.

One spot of conservation activities attraction with high biodiversity in East Java is the Rajegwesi area, which include in Meru Betiri National Park (MB NP). As bird watching becomes popular and well developed in Indonesia, Rajegwesi (represent by Rajegwesi Ecotourism Society–RES) is also encouraged to develop their attraction of bird diversity. However, there are vast agroforestry developments in the area, which affect the activities of MB NP conservation.

Social aspects have been identified important in the development of bird watching activity in national park. It is encompasses the assessment of the existed bird species, area topology as the birds' habitat, and appropriate land use for the establishment of bird watching activity. Bird watching attraction as part of ecotourism was expected to build the conservation awareness [6] and further reduce the impact of agroforestry activities [7] by the local community of Rajegwesi area [8].

The aims of this study were to determine the birds' species, the level of abundance and the diversity of birds found in the Rajegwesi area. The information will be used as the consideration of bird watching track mapping in developing the strategy of ecotourism in Rajegwesi.

MATERIALS AND METHODS

The study was conducted in May to August 2012 in Rajegwesi, Meru Betiri National Park (MB NP)-Banyuwangi, East Java. The study area includes residential areas, fields, rice fields, beaches, estuaries and wilderness zone. The

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analysis was conducted at the Laboratory of Ecology and Laboratory of Bio-computing in Department of Biology, University of Brawijaya.

Land Classification Map

Land classification maps used in the study was taken from the Indonesian Earth map from Bakosurtanal for Sarongan Area in scale of 1: 25,000. The digitization of maps was conducted using Quantum-GIS software. Map classification based on the landscape condition. The study area including; a) heterogeneous forest area of 73.39 ha; b) homogeneous forest area of 26.49 ha planted with Sengon, Teak and coffee; c) rehabilitation area of MB NP and Perhutani used for agricultural activities by local community for 76.46 ha; d) the village area for 18.84 ha; e) rice field area for 16.52 ha which is used by community around the village; and f) savanna area that is located on the waterfront, commonly used for herding buffalos by the community for 5.16 ha. The observation points were chosen within observation as seen in the map (Fig.1).

Observation Spots

Observation used point count method [9] to calculate the relative abundance, as follows. Observations were conducted in the morning and in the evening. Observation divided into three (3) periods, first hour, second hour and third hour. Morning observation is starting at 5:00 - 8:00 pm, while the evening observation starting at 15:00 - 18:00 pm. Observations in accordance with such procedures performed in each unit area (observation spots), with three replications.

Observation on the bird watching tracks

In this stage, researchers observed by following bird watching tracks. Based on the previous observations, there are three main tracks: the track trough the Village, the track trough Village-Forest Rehabilitation, and the track trough Village-Rafflesia Park. The tracks were determined based on the packet tourist planning for future bird watching activities. The condition of the track and traveling time also considered to determine the track observations [10].

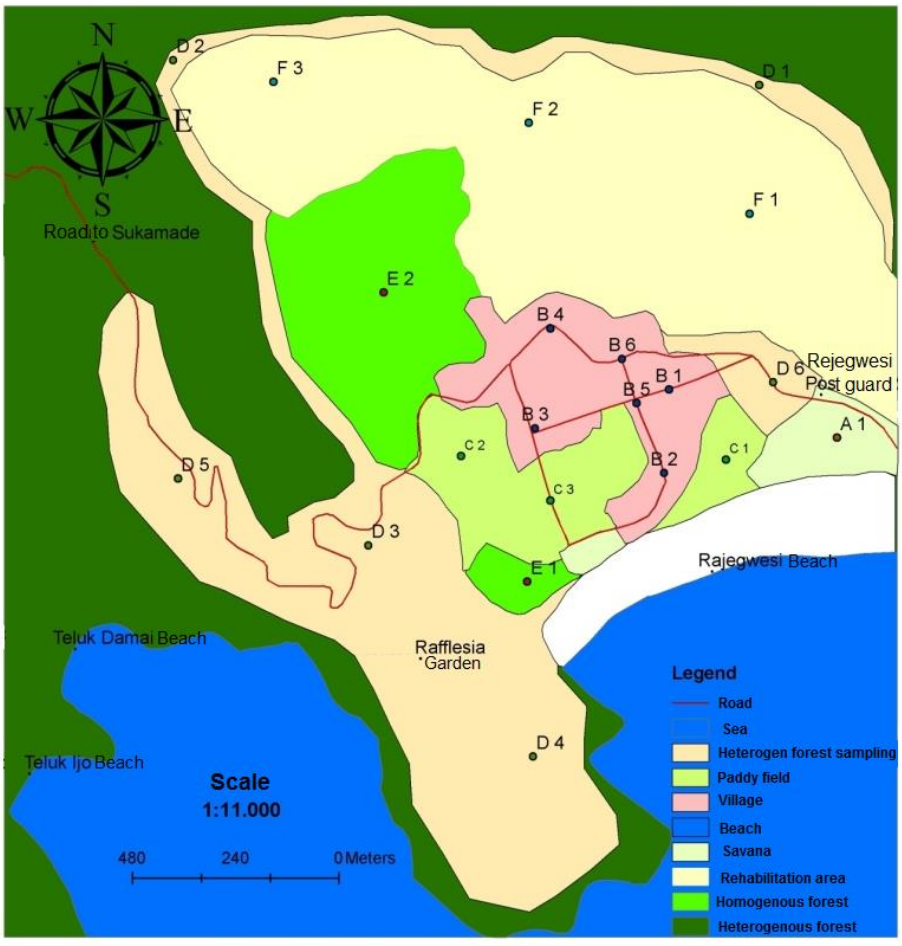

Figure 1. The map of observation area: taken and modified from the Office of Geospatial Information [11]

Data Analysis

Bird Diversity

Birds' diversity on each observation area was analyzed by the index of Shannon-Wiener (H') with following formula [12]:

$$H' = \sum_{i=1}^{s} (p_i)(\ln p_i)$$

$$p_i = \frac{n_i}{N}$$

Description:
H' = Diversity index of Shannon-Wiener
s = number of species
Pi = Proportion of species no. *i* toward total number
ni = number of individu species no. *n*
N = total number of individu
Value of H' range are [13,14]:
< 1 : low diversity
2-3 : medium diversity
> 3 : high diversity

Bird Species Similarity

Species similarity was analyzed by Bray Kurtis index [13]. This index shows the species composition difference of the bird on compared community in the form of dendogram graph. The formula for the species similarity index is:

$$IS_J = \frac{a}{a+b+c}$$

Description:
a = number of species found in both location
b = number of species found in location 1
c = number of species found in location 2

RESULT AND DISCUSSION

Bird species

Total of 76 bird species were found and belong to 39 Families. Those species includes 20 protected species, which were two species of the Alcedinidae, two species of the Bucerotidae, two species of the Falconidae, four species of the Nectariniidae, four species of Pandionidae, and each one species of Ardeidae, Campephagidae, Oriolidae, Pittidae and Rhipiduridae.

Based on the IUCN's risk status and BirdLife International [15], there is one species of the family Pandionidae with *Endangered* status, i.e. *Spizaetus bartelsi* (Java Eagles), and four species by status *Near Threatened* (NT), i.e. *Collocalia vulcanorum* (mountain Swallow) belong to the family Apodidae, *Megalaima haemacephala* (*Takur Ungkut-ungkut*) belong to Capitonidae, *Oriolus xanthonotus* (forest *Kepudang*) belong to Oriolidae and *Loriculus pusillus* (Java *Serindit*) belong to Psittacidae [16]. The distribution of the birds found during the study presented in Table 1.

Table 1. Distribution of the birds at the observation area

Area	Σ Family	Σ Species
Heterogeneous Forest	34	68
Homogenous forest	25	44
Rehabilitation area	27	40
Village	15	22
Rice field	15	20
Savanna	9	10

Abundance and diversity of the birds

Based on the observation area (heterogeneous forest, homogeneous forest, rehabilitation, village, rice fields and savanna), the analysis showed that the highest species diversity is heterogeneous forests (Fig. 2). Highest diversity in the forest was caused by the complexity of heterogeneous vegetation in the heterogeneous forest, which had 72 species of trees. In accordance with the statement of Wong [17] and Anderson *et al.* [18] that plant diversity is also an important factor to the diversity of bird species. It is also supported by Barlow [19] who mentioned that the diversity of bird species is highly correlated with basal area and the opening level of forest canopy. Areas with a large basal area and dense canopy have a greater diversity of bird species.

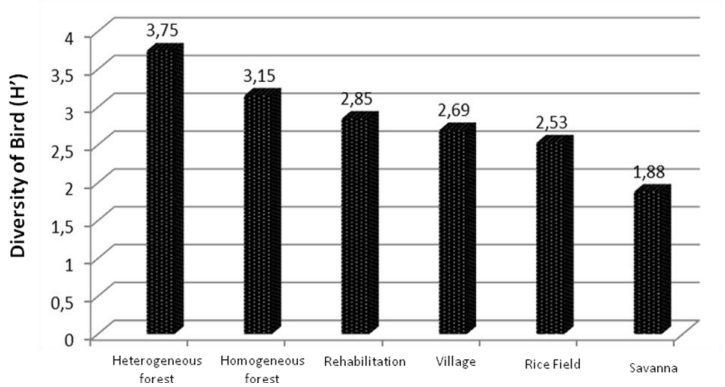

Figure 2. Diversity index of the birds at the observation area

The same result was also obtained by Raman [20] from his research on bird communities in India. Keast [21,22] wrote that a high diversity of bird species in tropical jungle was caused by tropical climate conditions which are relatively stable and friendly which allows the ecological niches and *species packing* being formed, diverse habitats that provided by the structure of the vegetation, the high diversity of plants, various types of food is available and the high number of rare bird species and specialists bird species.

Species Similarity

The analysis of the similarity index of bird species in each area using the Bray-Curtis index showed four (4) groups, with over 45% similarity level (Fig. 3). The first group is the birds in the rice fields, the pastures, and the village (similarity reaches 47.87%), the second group is homogenous forests, the third group is rehabilitation land and the fourth group is heterogeneous forest.

The similarity of number and types of the birds that were found in the rice fields, pastures and villages were higher than the others (47.87%). The similarity level was caused by several factors. First the intensity of human activity in the three areas was similar. Some birds are not too disturbed by the high human activity, such as Eurasian Tree Sparrow (*Passer montanus*), Yellow-vented Bulbul (*Pycnonotus goiavier*), Sooty-headed Bulbul (*Pycnonotus aurigaster*), weaver bird (Ploceus manyar), Spotted-Dove (*Streptopelia chinensis*), and Scaly-breasted Munia (*Lonchura punctulata*). Those bird species are quite adaptive to the high intensity of human activity [23].

The second factor is the type of the plants in all three areas. A further factor is the guild. The guild is a group of birds that feeding on the same type of food resources and having the same habitat [24]. Change of the landscape types in Rajegwesi leads to the changes of the specific resources that affect the populations of the birds. Sixth bird species that found in all three areas were in group in feeding and nesting. These kinds of birds used the similar resources for food and nesting.

The second group is the Rehabilitation area. Rehabilitation area was initially a heterogeneous forest, but due to the changing on its landscape by agricultural activity, the composition and the abundance of bird were changed. The existence of crops that grown by the people live nearby and the presence of some forest plants made the bird species in this area were quite different [25]. The condition in rehabilitation area was different than the homogeneous forest area and heterogeneous forest area. The different types of trees in the three areas (the homogeneous forest, heterogeneous forest and the rehabilitation area) caused the differences on bird species that inhabit on the area [26,27]. Those three areas also have different landscape, that makes the distribution of bird is quite varied [25,28].

This condition was mentioned before by Adhikerana that the distribution of birds in an area was closely related to the types of habitat [29,30]. The change in the landscape was a result of the human management that always had consequences on the composition and the abundance of the birds types [31,32].

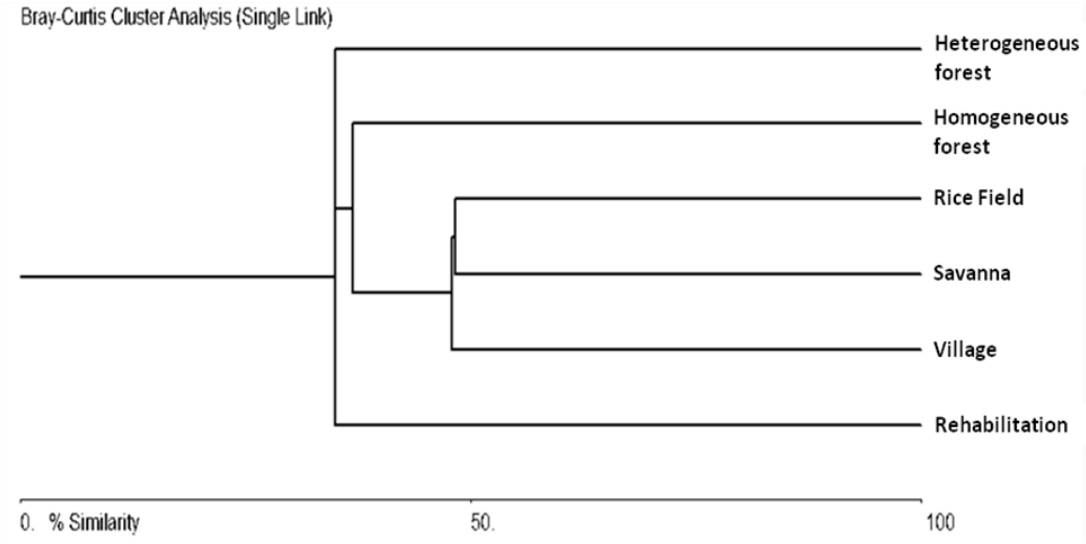

Figure 3. Dendogram of Bray-Curtis similarity index for the birds at Rajegwesi

Conclusion

High diversity of birds' species in Rajegwesi show potential attraction to be developed for ecotourism; besides other natural attraction such as beach and forest. Development strategy of ecotourism activity, especially bird watching, is in the form of bird watching race) or group bird watching, as well as training on conservation and ecotourism for the community.

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The Development of Physiological Growth Model of Beef Cattle in Semi Arid Environment to Meet Beef Demands for Tourism Sectors in East Nusa Tenggara

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Abstract

This research was conducted at Raknamo and Tuatuka Villages, Amabi Oefeto Sub-District, Kupang Regency from September until November 2013. The aim of the research was to (1) build a growth model of beef cattle under extensive management system, and (2) formulate an adaptive model to estimate body weight of local beef cattle that will provide more accurate guessing and also give more benefit to farmer. Results of the research found that (1) beef cattle farming are viewed as an economic activity that uses of resources with low opportunity costs such as family labours and marginal land, (2) The model built showed a positive and very strongh relationship between body weight and girth for both male and female with determinant coefficients of 0.94 and 0.96 respectivelly. It means that body weight variable can be explained well by girth variable. The same condition applied to the relationship between body weight and age for male and female. Where the relationship between the two variables was also positive and and strong enough with determinant coefficients of 0.78 and 0.86 respectively.

Keywords: Model, beef cattle, girth, weight, age

INTRODUCTION

The development of tourism in Indonesia, especially in East Nusa Tenggara, needs the sufficient supplay of beef. The quantity and quality of beef is crucial to support restourant and traditional food business. In tourism sectors, the recent issues of sustainable livestock by involving local farmers were important. The demand of beef cattle not only merely meets the quantity, but also the quality of beef. There are also increasing issues related to livestock development. It is especially crucial because recent tourist was sensitive to food health and security. There also potential competition between beef daily consumption and hotel needs.

Livestock is an integral part of the farming systems in developing countries. Livestock is vital to the household economy in developing countries. The role of local farmer in beef cattle enterprise was important.The role of this sub sector has been recognized important in poverty reduction, especially in rural areas. In Indonesia, the statistical data record there is about 1.5 millions people are currently working in cattle farming. This activity is able to increase national beef production by 4.01 % per year [1]. Many of these activities were found in rural area with interesting natural setting, such as rural in the perifer of forest, mountain, and coastal regions which endowed by spectacular landscapes. The cattle farm agribusinesssystem, however, can be integrated to the other rural economic subsystem such as rural tourism. It is partiulalry important in areas where agriculture and tourism are able to complement to build competitive rural tourism destination.

Meat consumption in Indonesia reach 5.5 gram per day, or equal to 2 kg per year [2]. Compared to other countries in the word, consumption pattern of Indonesian people were low. In Iran for instance, meat consumptions reach 10 kg per capita per year, while in Uruguai meat consumptions reach 60 kg per capita per year. With the number of total population about 200 million, Indonesia need more beef product-ion.

The productivity of cattle in East Nusa Tenggara was stagnant. There are, however, decrease phenomena of cattle productivity. In the incrase of tourist arrivals which is flowed by increasing of beef consumption, the increasing of cattle productivity in East Nusa Tenggara becomes important. In 2013, number of tourist arrivals in East Nusa Tenggara reached 363.765 persons [3]. In responses of tourist increase, number of restaurant and hotels grows signifi-cantly. In 2013, number of restaurant was about 10.727 and number of hotels and other tourist accommodations were recorded about 285 buah [3]. Compared to the hotel and accommodation in 2009, the number of accommodation increased about 17.28% [4]. The above fact

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shows that beef demand will increase in the near future as a consequence of tourism growth in East Nusa Tenggara Province. This situation obligatelly depend of the beef farm productivity which is generated by local farmer.

The aims of the research were to build models of the cattle growth in extensive cattle farm systems based on the physiological characterits, encompasess age, girth, and body weight of cattle which is able to use to estimates cattle body weight. The second objective of the research was to draw models of which are adaptive to assist farmer to estimate cattle beef which is important in cattke farm agribusniness. These were addressed to support more efficient and more susutainable cattle beef agribusiness subsystems.

MATERIALS AND METHODS

Study area

The study was done in the semi arid area in West Timor. Two areas were sellected as study sites for field survey, namely Raknamo Village and Tuatuka Village in Amabi Oefeto Sub District, Kupang Regency, East Nusa Tenggara. The physical agroecosystem aspects indicate that these villages were classified into village with low to medium potential agriculculture productivity. Soils of these villages were dominated by lime sediments and corals lime stone.

Rainfall data from Metereological and Geophysical office in Kupang shows that rainfall occurs during November to March yearly. In some area however, experienced long dry periods with dry month of about 6-8 years. In such area, number of rainy days were calculated about 80-90 days with rain intensity was high to very high. Water as a crucial resource for agriculture was, therefore, limited in such area.

The temperature was relatively constant in a year. The maximum temperature was about 35oC (recorded in October) while the minimum temperature was recorded about 23oC (in July). The high temperature was followed by high humidity (about 60 – 80 %). The highest humidity was recorded during December to March while the lowest humidity was found in July to September.

Research Method

Field work was conducted by interviewing 20 farmers. The interview questions focus on respondents social atributes and cattle physiological characteristics. The cattle morphological characterss was implemneted by measuring body of 134 heads of Bali cattle. It consisted of 65 males and 69 females. Some morphological characteristics which were measured encompases body weight (kg), girth (cm) and cattle age (years). Cattle body weight was collected by measuring cattle using portable electronic balance RUDDWEIGH' Type KM-IE. Girth was measured using tape meter to 134 individual cattle. Data of cattle age was estimated following farmer estimation and also based on the cattle teeth examination by field extension worker.

Data analysis

The models of the relationship between age and body weight, and girth and body weight of male and female bali cattle were analized descriptevely using statistical package Data were analized using linear regression analysis which were transformed into logaritmic equation.

RESULT AND DISCUSSION

Farm Management Profile

The observed parameter of farmer respondents in this research encompasess ages of household head, education level, number of family members, farm size, number and kind of livestock. Based on the profile of 40 farmers, it is calculated that the average of farmer ages was about 41.3 years while the youngest farmer was 26 years and the oldest was about 50 years. The averages of famility member of farmer housheould were about 6 persons. Number of family is ranging from 4-8 persons.

Based on the education level data, it is found that the majority of farmers have low education. There are no farmers finished high schools. About 90 % have elementary education levels, 0.5% has completed junior high school education. The illiterate respondents were calculated about 0.5 %. This demography figure has been similar with many agricultural-based regions in Indonesia [5]. In the perpectives of age generation, it can be said that the farmer in study area were classified as productive labour. However, without adequate education levels, these will become the not productive labour. Education has significant impact to improve human resources in villages [6]. Government should be increasing the capacity and knowledge of farmer through numerous programs. Many of the respondents have been trained by local government in various farming activities, but it seems the programs not sufficient to increase

farmer skill in agribusiness. Therefore, increasing eduation aspect is crucial [6].

All of the managed farm land in East Nusa Tenggara was dryland. Number of productive land and paddy field were limited. Some of the land was classified as homegardens. All of the respondens reported that they have private lands which are adequate to facilitate cattle farm extensive system. In this study, farmland size was used as an important indicator since land size is the important aspect in cattle farm, especially in extensive systems. The average size of land was 4.3 ha. About 50% of such land area was used in corn cultivation or other crops which was tolerant to dry environment.

Farmer manages land for numerous purposes, encompasess rainfed rice cultivation, dryland fields, and home gardens. The cultivated crop was diverse. Rice cultivation in rice field was done one time in year due to lack of water and poor water infrastructure. In home garden, kind of plant planted consists of medical plant, ornamental plants and corn. In the dryland field, farmer cultivates numerous secondary crops, such as corn, beans, cassava, pumpkin, kacang turis (local beans). In the forest garden, the common cultivated plants encompase coconut, areca nut, betel, banana, candlenut and other fuit plants. The crop profiles in both observed villages were summarized in Table 1.

Table 1. Crops production in research area

No.	Crops	Production (kg)
1.	Corn	752
2.	Kacang Nasi (local bean)	52.2
3.	Cassava	437
4.	Peanuts	21.4
5	Upland rice	218

The numbers in the table were generated from repondent information. There are several limitations the production measurement because farmers often neglected the quantity of agri-cultural product. This is because the orientation of farmer was to meet households need on food. The role of homegarden to provide basic family need in rural area has been reported important. People often cultivate numerous edible plants in home garden as an adaptive strategy to live in remote area [7].

Livestock Management

Diversity and number of livestock in both observed villages were numerous. The livestock varies from big animals (i.e. cattle) to small animals, such as goats, pigs and chicken. The average number of cattle was about 94 heads. The data of livestock were presented in Table 2.

Table 2. The livestock of farmer household in study area

No.	Live stock	Number (individual)
1.	Cattle	94
2.	Goats	4
3.	Pigs	4
4.	Chicken	16

Beef caltle in East Nusa Tenggara orriganaly was derived from Banteng (*Bos Sondaicus*). This cattle becomes famous and preferred by small farmer due to several reasons namely high fertility and has high adaptability to dry environments [8,9]. These cattle also preferred because it's high percentage of carcass. Bali cattle adapted well to the low quality of feed and therefore suitable in dry environment. These cattle are also can utilize low quality feed.

Based on the farmer experience in livestock management, about 59% of respondents have experience more than 15 years, while 41% has experience less than 15 years. Their experiences were varying from 5 to 14 years. This data show that cattle farming are not the new activity to the respondent in East Nusa Tenggara.

Beef Cattle Production Systems

Based on the field observation, there four dominat aspect of the background from beef cattle farming. The main reson for beef cattle farming is relted to the direct household revenue. Catlle is the important savings systems which area able to withdrawn in anytime farmer need cash money. Beef cattle farming is the main economic activity, especially for farmier without owned lands. Beef cattle farmeing is also done to meet social and cultural needs for beef. Socially, farmer with large numner of catlle has special status in community.

Based on the field observation, there are two systems for beef production, namely extensive systems and fattening systems. The majority of production, however, is extensive system. This system refers to the cattle farming in large area with abundance grasess.

Beef Cattle Management

This study shows that there are two management of Beef cattle management. This management was influenced by several factors, namely food stock sources, number of cattle, and available of labour. The limitaton of grass lead

farmer to release cattle in savanna. It is especially faound in farmer community with large number of cattle, of farmer with large some number of cattle. The grazing area can be very large to increase opportunities of cattle to found fresh and edible grasesses.

Economically, it is important to reduce cost. For farmer with few cattle, there are opportunities for semi intensive systems. During the rainy season, grass was abundan-ce. There are opportunities to shepherded cattle in farmlands or grassland near settlement. Gra-zing area can be reach 4-6 km from house [10,11].

Labours

Labours is important input aspect in livestock production systems. Mainly in the dry season where fodder, grass and other feeds are very limited, the owner have to spend more time to shepperd their cattle and to find other source of fodder. As a comparison, the workdays of farmer during rainy season was about 107.142 man-days, while in the dry season it was calculated about 240 man-days.

Cattle Physiological Models Assessment in Semi Arid Areas

Previous research shows that hearth girth is the valuable variable to predict cattle body weight [12]. Therefore the reasons to measure relationship between girth and body weight was to generate equation model relationship between two mentioned variable in Bali cattle under extensive farm system in dry land in West Timor, East Nusa Tenggara. This equation models was expected to guide field extension worker to assist farmer in cattle body weight estimation.

Algoritmic model was used to tranform two variables which were representing the typical relationship of both linear curves. The regression equation of the relationship between girth and body weight of the Bali cattle was presented in Table 3.

Based on the regression equation above, it is clear that girth has significant relationship to the value of body weight variable ($\alpha_{0,01}$). This means that increase of girth contributes significantly to body weight. The regression coefficient value of 2.873 shows that increase of 1 units of girth contributes significantly in the increasing of 2.873 unit weight of male cattle. Similary occurs in female cattle. Increase of 1 unit of girth will contributes about 2.597 unit increase of body weight.

The determinant coefficient value (R^2) of male and female cattle was 0.94 and 0.96 respectively. It shows the variation of cattle body weight can be described by the girth variable. Therefore the models can be used to assess both female and male bali cattle body weight. The F test support that body weight variable was significantly determined by girth variable.

The Relationsip of Age and Body Weight

Teoritically, the relationship between individual ages and body weigh was clear. Ideally, increase of individual age will be significantly followed by increase of body weight. The production function teory argues that the increase of individual age will be followed by increasing body weight. In the beginning, the increase of body weight relatively fast and growth slowly. In some periods, age continuous but body weight stagnant. In some case, however, body weight decrease. This function following economic law called: *The low of diminishing return*. Result of the regression of the relationship between ages and body weight was summarized in Table 4.

Table 4 indicates that all of the regression coefiicients of both male and female cattle have positive values. These calculations show signifi-cant relationship ($\alpha_{0,01}$) between two variables. In the first model, the regression coeficient has positive value (0.432), it means that if cattle age increase by one unit, it will be foolowed by icreasing of cattle body weight about 0.432 units.

The similar calculation was found in male Bali cattle. Increase of one unit level of ages contributes to the increase of cattle body weight about 0.46 units. The determinat coefficient (R^2) of both sex shows that the fluctuation of decrease and increase of body weight about 70% can be explained by age variables, while 86 % of body weight variable can be explained by independent variable (age).

Table 3. The regression equation between hearth girth and body weight of the Bali Timor cattle in extensive system of the semi arid environments

Sex	Regresion equation	n	R^2	s	F
Female	LogBW= -8.421+2.873 log G	69	0.94	0.05	5495.80**
Male	LogBW= -8.503+2.579 log G	65	0.96	0.04	8491.06**

Notes: ** Significant in level 99%. BW = body weight, G = Girth

Table 4. The regression equation between ages and body weight of the Bali cattle in extensive system of the semi arid environments

Sex	Regression	n	R^2	s	F
Female	Log BW= 3.722+0.432 log AG	69	0.70	0.05	4353.80**
Male	Log BW= 3.587+0.46 log AG	65	0.86	0.04	4375.12**

Notes: ** Significant in level 99%. BW = body weight, AG = Ages

The limits of this study related to the limited number of cattle samples and ages estimation by farmer. However, using extrapolation approach it is possible to assess the daily increase of body weight of both male and female cattle. Extrapolation Result of the above regression equation was given in Table 5.

Table 5. Estimation of body weight of Bali Cattle in extensive systems

Age (Months)	Average of body weight increase ($g.day^{-1}$)	
	Male	Female
0-3	593	560
4-6	275	209
7-9	198	143
10-12	165	121
13-18	132	93
19-24	104	71
25-30	99	66
31-36	88	49
37-48	78	47
49-60	69	41

Based on the data in Table 5, it is clear that male and female catlle with ages under 10 months has similar growth trend. After 10 months of ages, the male cattle tend to grow faster than female cattle. Data above also explain that daily gain for both male and female becomes low and when they reach 5 years of age their daily gain will drop below 0.5 kg. This is the common condition in rural area, especially in extensive system cattle farming.

Physiological aspect of animals is important aspect in production management. In the recent fast growing of tourism, the production of cattle beef was important. Farmer has important contribution to mainatain and increase beef cattle production. The important of this finding is able to help livestock owners to estimate their cattle body weight as fas as the age of the animal is available.

CONCLUSION

The beef farm in Kupang regency, East Nusa Tenggarara province, was implemented in traditional ways with low capital and labours. In order to decrease farm cost, the family member was involved in livestoct systems and management. Lives toct was done in marginalized land with limiting reasources. Among the local people, numer of beef which are owned by hoes hold family was viewed family capital, social status, and a food buffer in failure crop harvest.

This research shows that there are close relationship among girth and cattle body weight. This means girth data is able to use to estimate cattle body weight, especially in remotes area where balance instrument difficult to find. There are also close relationship among ages and cattle body weight. Age varable can be used to estimates cattle body weight. This research support previous research that states extensive cattle enterprise in semi arid area has low body weight gain. There are however, opportunities to increase body weight through proper feeding system management.

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Moving Towards Eco Cultural Tourism Village (A Case Study of Pondok Cabe Village)

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Abstract

This study identifies some eco-cultural tourism attraction potentials that exist in Pondok Cabe Udik Village Tangerang Selatan Indonesia. In addition, it investigates local people's opinion on tourism development. The objective is to provide a preliminary overview of eco-tourism development. This study is a descriptive study that uses three types of instrument in data collection method, including questionnaire, interview and field observation. The data is then analyzed using SWOT analysis. The result indicated that natural potential include farming, lake and fish pond, and chicken hatchery. Cultural potentials include cultural diversity that depicted in praying houses and culinary. 194 respondents involved are the locals. The result showed thatthere is positive view from the local community on the availability of tourism potentials and development in the future. It is proposed that environmental awareness, education, ecotourism development, and consensus buildingare needed to implement eco cultural tourism concept.

Keywords: Tourism, Eco-Cultural, Village, Planning and Development

INTRODUCTION

Indonesia tourism industry has an important role in Indonesia economy. It has placed itself on the 4th rank in industry contribution to national GDP after oil and gas. During the last 10 years there is positive growth in terms of international tourism [1]. The sector has contributed US$ 10 billion to national economy in the end of 2013. Tourist arrival is also predicted to grow in the future as economy continues to rise. The government of Indonesia is targeting 20 million of visitors by 2020. Although tourism industry is growing, however tourism development distribution is imbalance among provinces. Indonesia tourism mainly concentrates in Java and Bali, in which the infrastructure and the economy activities are there [2].

As a developing country, Indonesia is still moving forward from villages to modernization. Development in the infrastructures occur; such as transportation, roads, railways, airport, and public facilities. As development is on progress, there are some challengesfaced which include of deforestation, pollution, floods and increasing population.

One suggested alternative to achieve sustainability especially in tourism is by implementing the local wisdom [3]. Local wisdom is said to have been the concept that is able to up bring the local values for welfare and spiritual balance; a balance between People – God – Nature. This concept has been applied in Bali that is known as Hita Karana. The concept applied in managing its island. Local wisdom is a positive form for creative tourism that can be significant for tourism promotion [4]. Similarly the concept of sustainable tourism encourages the balance between social, economy and the environment. As tourism not only bring positive, but negative impacts on the world such as the destruction of the environment and probably to social lives. The word sustainable is the master key for a better future.

Another concept that supports sustainable development in the area of tourism is the concept of eco-cultural tourism. Russell [5] applies the concept of eco-cultural tourism as means for the sustainable development of culturally marginal and environmentally sensitive region. Other studies also had a similar view that sustainable development is achieved through eco cultural Tourism [6,7].

In regional level, there have been efforts in promoting sustainable development, for example ASEAN have cooperation in sustainable environmental practices among its members. Awards are given to cities that apply sustainable practice. In micro level, the concept now rises at some parts in Indonesia that have started such practices. One of the examples is Solo city that have incorporated the eco-cultural city concept, giving balance between environment, cultural and economic growth. It used to be a rural city. Following is Tangerang city, the city has grown

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from an ordinary sub urban city to ASEAN award winner in environment sustainable city.

In other smaller area in South Tangerang City lays a small village – Pondok Cabe Udik, a sub urbandistrict that is neighborhood to the capital city Jakarta, west of South Jakarta. Its strategic location is close to the capital city makes the village favorable place to settle. The village is filled with people with different cultural backgrounds. The village is in the stage of development in the sense that it is moving forward from village to modernization. In order to have a sustainable living, which is to create balance between our economic, nature, and social system; meeting the needs today without compromising the ability for the future to meet their needs. Eco cultural tourism is one viable option.

The aim of this study is to collect information in support to the development planning in the area. This study allso find out whether tourism is a desirable option for the community. It also identifies and explores tourism potentials in the village.

MATERIALS AND METHODS

Study area

Pondok Cabe Udik is including in the area of Pamulang – Tangerang Selatan. It has an area of 5.142 km^2 has a population density that is relatively small compared with the other villages. With the broad population density in Kelurahan Pondok Cabe Udik with a population of 20.202 inhabitants is around 3.93 per km^2. The industries in the area mostly consist of housing/ real estate, social services, and food and beverages business [8].

Data Colection and Analysis

Data collection used questionnaire, interview, and field observations. For the questionnaire is divided into three parts. The first part of the questionnaire is about socio demographic of the respondents. The second part is opinion on tourism planning; the last part is about development issues. The questionnaire utilizes nominal and Likertscale. The questionnaire is to find out the perspectives of local people towards tourism development. The total respondents of this research are 194 people who are local residents. The sample is taken or pooled based on random sampling techniques. The data is analyzed descriptively.

The unit analysis is the local community which is taken from the total population of 20.202 residents. In identifying tourism potencies, we involved tourism components which include tourist attractions, amenities, accessibilities, and supporting organization.

RESULT AND DISCUSSION

Tourism Potential Attraction

Pondok Cabe Udik village is a sub-urban areas neighboring south Jakarta, which native is relatively similar to Jakarta city. However there have been new comers to the area, making the place as a multi-cultural village. The village has several local tourism attractions.

Natural Attractions

a. Farming

   There is a spot of garden and plantations that produces fruits and flowers. The products include orchid flowers, Cambodia flowers, banana trees, melon, and cucumber.

b. Fishing pond and lake

   Pondok Cabe Village has a lake that is one of important spot in the area to hold water from rain and gutters. The lake is also used by local as a spot for fishing. Outsiders may rent the place for fishing session or fishing competition.

c. Hatchery

   The local has a chicken hatchery. It not an ordinary chicken being hatched, but fighter chicken in which the local can use the chicken in chicken fighting competition.

Cultural Attractions

a. Praying houses

   As the area consists of people from different religions, such as Moslem, Christian, konghu cu, and Budhist temple. There are various praying houses in there. The most interesting pray houses which have unique buildings are the Budhist temple 'the Vihara Avalokitesvara'.

b. Culinary Icon

   The culinary that is prominent in the area is Dodol (sort of sweets), sweets that are normally made during holy day.

Despite there are more prominent attractions outside Pondok Cabe village, the tourism attractions in there have interesting, simple and unique tourism potentials with beautiful village environment (Fig. 1).



Figure 1. Illustration of Pondok Cabe Village, South Tangerang as Sub Urban Eco Cultural Village
Description: 1) Fishing pond and lake; 2) Green area and cycling track; 3) Orchid garden; 4) College

Local People's Perception on Tourism Development

To know the aspirations of the people, a survey using questionaire and interview are carried out to communities around the village PondokCabeUdik. Out of the total population of 20,000 people, a sample of 194 people is taken. From interviews recorded that there are 50% of male respondents and 50% of women. From the interviews conducted the majority of respondents aged over 25 years. Half of the respondents were born in the village Pondok Cabe and the other half of the respondents were born outside of the village PondokCabe. Most respondents' Javanese ethnicity and others are from other ethnic groups. Most respondents had a job as self-employed and do not have a second job. Owned a large part of the income is below Rp.1 million per month or less than US$100. The majority of respondents lived above five years, while others live between 1-15 years. Most respondents have high school educations; most of the others have a minimum education junior high and elementary school (Table 1).

In terms of knowledge and interaction with tourists, it is known that respondents feel they have no knowledge of a lot of tourists, but the majority of respondents claimed to have interacted with tourists. Most states also have never seen tourists in Pondok Cabe. Overall respondents have a positive attitude about the presence of tourists or tourists encounter.From interviews it can be concluded that the views of the tourists still looked at the stranger who called tourists. However, respondents positive attitude towards tourists provide opportunities for the development of village tourism potential in Pondok Cabe.

From the questionnaire, it is also known that the respondents have a positive opinion regarding the planning and development of tourism and village tourism in Pondok Cabe Udik. The respondents stated that the presence of tourism will be able to preserve the living environment they live in, they also realize that the cultural and green environment can be a tourist attraction to attract tourists to come to their area.

Table 1. Demographic Characteristics of Respondents

Variabel		N	% Sample
Sex	Male	96	49.50
	Female	98	50.50
Age	Below 17 years	6	3.10
	17-24 year	28	14.40
	25-34 year	44	22.70
	35-44 year	49	25.30
	45-54 year	40	20.60
	Above 55 year	27	13.90
Place of Birth	Pd. Cabe Village	97	50.00
	Other	96	49.50
Ethnicity	Javanese	73	37.60
	Sundanese	35	18.00
	Malay	21	10.80
	Dayak	3	1.50
	Buginese	3	1.50
	Bataknese	4	2.10
	Others	55	28.40
Marital Status	Unmarried	44	22.70
	Married	141	72.70
	Widow/ Widower	7	3.60
Education	Master/Doctor	1	0.50
	Bachelor	14	7.20
	Diploma	8	4.10
	Highschool	71	36.60
	Junior Highschool	58	29.90
	Elementary	39	20.10
	Non-education	2	1.00
Occupation	Students	17	8.80
	Permanent Private workers	14	7.20
	Contracted private workers	12	6.20
	State Employee	5	2.60
	Entrepreneur	74	38.10
	Retirement	2	1.00
	Others	70	36.10
Other Occupation	Yes	37	19.10
	No	154	79.40
Income per month	Below Rp.1 million	116	59.80
	Rp. 1-3 million	56	28.90
	Rp. 3-5 million	20	10.30
	Above Rp. 5 million	2	1.00
Length of Residential	Below 4 years	38	19.60
	4-9 years	15	7.70
	9-15 years	28	14.40
	Above 15 years	113	58.20
Familiarity for tourists	Familiar	71	36.60
	Unfamiliar	122	62.90
Tourist Interactions	Yes	146	75.30
	No	48	24.70
Tourists in Pd. Cabe	Yes	43	22.20
	No	151	77.80
Favorable to tourists	Yes	176	90.70
	No	16	8.20

The respondents believe that tourism can boost the economy, investment, and give them the opportunity to do business and trade. In addition, respondents felt the government needs to do the planning and development of tourism in the area. Respondents also want to be involved in the planning and development of tourism in the area (Table 2).

Table 2. Respondents' Views on Tourism Development

No	Variable	Average Score	Standard Deviation
1	Tourism improves investment	3.92	0.647
2	.. encourages other industry	3.82	0.658
3	.. improves economy	3.63	0.758
4	.. creates new entrepreneur	3.78	0.753
5	.. gives opportunity to meet new people	4.02	0.598
6	..sustains the environment	3.91	0.696
7	..removes local tradition	2.16	1.023
8	Infrastructure destroys green areas	2.49	1.009
9	Culture as tourism attractions	3.84	0.782
10	Green areas as tourism attractions	3.80	0.799
11	Local needs government support	4.07	0.589
12	Local is willing to participate in tourism activity	3.62	0.869
13	There is no necessity in tourism development	2.33	1.020
14	Local people do not care on waste issues	3.84	1.232
15	Waste destroys the natural beauty	4.32	0.713
16	Land conservation training is needed	4.21	0.637
17	Creative economy training is needed	4.16	0.614
18	Government has socialized tourism planning	2.87	1.064
19	Community should not be limited in land use	3.71	0.852
20	Ecotourism is needed	4.21	0.604

Likert scale: (1) very disagree, (2) disagree, (3)neutral, (4) agree, (5)very agree.

SWOT Analysis

On the third part, respondents were asked about the problems of development in their area and their expectations (Table 3). The answers' of respondents reported are as follows:

a. Major problems, the first priority is rubbish, the second is the improvement of the road, the third is education, unemployment and the fourth is the lack of government attention and the fifth is the lack of cooperation between government and society.
b. The respondents agree and believe that with the development of tourism in this region can resolve the existing problems.

Table 3. SWOT Analysis on Tourism Potentials

Internal Factor / External Factor	**Strengths**	**Weaknesses**
	• Closer to capital city • Have good basic infrastructure (transport, hospital, school) • Availability of green areas and lakes • Availability of potential eco-cultural tourism attractions	• Increase of population • Minimum people's awareness on sustainable tourism development • Various ownership of the land (government, private)
Opportunities • Political and economy stability • Improvement of commuter transportation to capital city • Increasing of housing and real estate property investment	**Strengths-Opportunities Strategy (SO)** • Improving easy information access of local tourism attractions potentials • Provide and encourage eco-friendly transportation (pedestrian, cycling track)	**Weaknesses-Opportunities Strategy (WO)** • Establish group discussion forum among stakeholders • Establish Local Tourism Management organization • Training and development of tourism
Threats • Loss of local identity and proudness due to globalization • Destruction of land dueto disasters such as floods and pollutions • Traffic jams	**Strengths-Threats Strategy (ST)** • Establishing cultural conservation program through education and training • Infrastructure management	**Weaknesses-Threats Strategy (WT)** • Enforcement of the local policy planning, such as waste management.

c. Expectation for the development in the area is to become more advanced, cleaner, neat and beautiful, rising incomes, more safe and secure.
d. Type of tourist attraction to be developed in Pondok Cabe Udik is first is the art and culture (Lenong Betawi, dangdut, dance), the second is fishing, the third is a playground, swimming pool fourth, and five are martial arts.

The concept of development of eco-cultural sub urban areas is not something new. Eco sub urban case study indicate the urgency and important to give consideration to sub urban area planning and development [9]. The study previously conducted has implemented greener environment and communities for making livable neighborhood. Compared to the other sub urban area, Pondok Cabe Village is still in its earliest stage of development.

This study also affirms that in implementing eco-cultural tourism village include sustainable in the environment, respect socio-cultural authenticity and long term economic benefit. Environmental awareness, education, ecotourism development as well as strong political leadership are important to ensure wide participation and consensus building [10].

CONCLUSION

PondokCabe village is one out of the hundreds sub-urban area in Indonesia. The location which is neighboring to the capital city makes it easy access for jobs, foods, houses, education, and business. Just like any other sub urban area, it has become good place for residential. In addition, modernization has come to place. Increase of population, housing, and infrastructure is inevitable, so is the degradation of the environment and local culture.

At the same time, there are some potential for saving what the local has. There are still some villages' cultural and natural attractions that make the village identity worth conserving for the future. In addition, the locals also need and want to have more developed areas and economy. They have positive view on tourism development, that tourism will have positive impact on economy and sustainability of the environment.

With the positive view and some potential towards eco cultural village, therefore there is an opportunity to implement the concept of eco cultural tourism to reality.

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Strategic Management of Nature-Based Tourism in Ijen Crater in the Context of Sustainable Tourism Development

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Abstract

The aim of the study is to define the strategic management of nature based tourism in Ijen crater, East Java. From the perspectives of accessibility, problems facing by accessibility are related to the travel distance and forest road quality. Ijen craters have three important aspect in competitiveness tourism aspect, namely something to see (mountain landscape), something to do (trekking, hiking, bird watching), and something to buy (meals). The future development of such attraction should be meets ecotourism principles. This study found that improving tourism facility and infrastructure were important aspects. The development and improvement of tourism facility and infrastructure, however, should be incorporates ecotourism principles. In such a case, the conservation, local people and community development becomes crucial issue. Involvement of stakeholder and local community in facility and infrastructure will increase the quality and sustainability of infrastructure and tourism facility.

Keywords: ecotourism strategy, tourism management.

INTRODUCTION

Recently the development of strategic planning and implementation of tourism has been considered important. It is especially important in many cases where tourist visitation to natural ecosystems and environment grows significantly. Are with abundance resources, such as forest, waterfall, rivers, crater, grasslands, caldera, lake have a significant role in tourism destination development. Scholars point out that numerous natural ecosystems have been suffered from mass tourism which is to decrease biodiversity level. Tourism in natural environment therefore needs to be managed properly, especially in order to protect biodiversity and enhance the sustainable uses of natural resources [1-3].

Recent issues in sustainable tourism argue that comprehensive destination management is important. Destination management should be embraced cultural integrity, ecological process, biodiversity and other related systems which are contribute to sustainable living systems in harmony. Many destination however lack of the ability to maintain sustainable issues and therefore vulnerable to degradations. Scholars point out that many fragile ecosystems such as mountain, forest and beach are suffered from tourism activity. One of the crucial threats to the sustainability of the mountain ecosystem is related to the increasing number of tourism beyond carrying capacity. Increasing number of tourism often responded by rapid and massive physical development of tourism infrastructure. There are intensive land uses changes and wildlife habitat clearing to provides adequate spaces for tourism infrastructure development. The infrastructure development often ignored ecotourism principles which are important to ensure ecosystem sustainability [2,4].

In many nature-based tourism destinations, practicing sustainable tourism development tourism is one of the principal problems. There are lacks of basic tourism philosophy which are important to drive tourism into sustainable practices. Infrastructure has been build without considering local characteristics and local wisdoms. Many nature-based tourism destinations are lack of the integrative tourism strategic planning which is suitable for local environments and meets the ecotourism principles. These aspects are leading to the poor of destination competitiveness [4].

Ijen crater is one of the important tourism destinations in East Java. The geological attraction of Ijen craters is actives crates and sulfur lakes with blue-green waters. The mountainous landscapes were beautiful. Tourism grows significantly. In 20014, about 6.722 domestic tourism recorded in Ijen Craters while international tourism was recorded about 28.668

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[5]. Effort to increase tourism performance in Ijen crater has been implemented by local government and related agencies, i.e Banyuwangi dan Bondowoso Regency. As far, the comprehensive evaluation of destination sustainability was absent. The objective of the research is to evaluate the recent condition of tourism implementation and build the strategic management of nature-based tourism development in Ijen crater.

MATERIALS AND METHODS

Study Area

Ijen Crater located at the border of Banyuwangi and Bondowoso Regency (Fig.1). Ijen Crater is one of the famous mountain based tourism attraction in East Java. Administratively, Ijen Crater belong to the protected area system, namely Ijen Strict Nature Reserve. Ijen Crater is the recreation area with 92 hectares. The area divided into two area management, namely intensive uses zone (23.85 ha) and protection area (62.58 ha). In the intensive uses zone, there are official buildings, tourism infrastructure, parking area, shelter, toilet, and restaurant and camping ground area [6]. The natural attraction of Ijen craters is active volcanic and sulfur lake with green colors. The Biodiversity of Ijen Crater was considered high. Forest fire and vandalism is one of the important threat to Ijen Craters. Recently, however, scholar identify that invasion of exotic plant species become the important threats to the Ijen crater ecosystems [7].

Data Collection and Analysis

Research consists of secondary data collection, questionnaires and field observation. Secondary data collection was done through official visitation in office of Tourism of Banyuwangi Regency, office of tourism in Bondowoso Regency, Nature conservation Agency (BKSDA) and regional office of National Statistic Office in Banyuwangi. Focus of the research was data and information regarding regional planning policy and implementation, regency policy regarding tourism development, and tourism statistics.

Four aspect namely tourism accessibility, attraction, facility and the contribution of stakeholder in tourism development was evaluated descriptively. The assessment was implemented based on direct observation and interviews with respondents in the field. Focus of the assessments the basic feature of tourism accessibility, attraction, facility and the contribution of stakeholder. Mainly, it is encompasses internal factor of the destination, i.e. strengths and weaknesses.

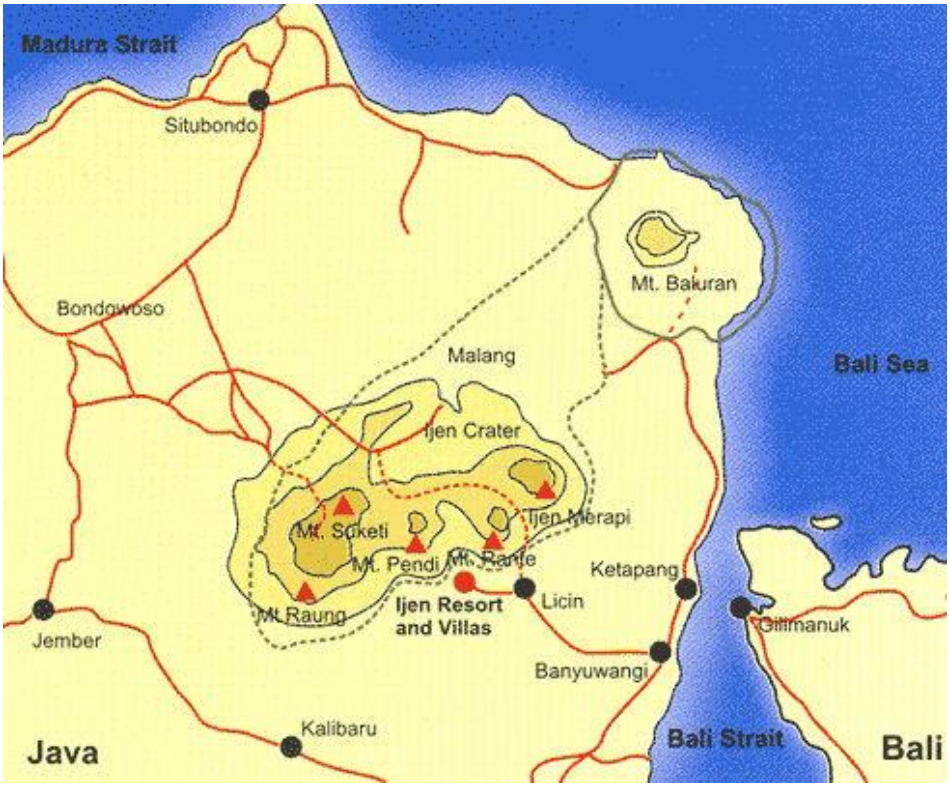

Figure 1. Ijen Crater tourism area is part of important biodiversity area in the eastern part of East Java Province [8]

In this study, management performance of tourism in Ijen crater was implemented to identify the scenario for sustainable tourism development and biodiversity conservation. Tree aspects, namely physical, economical and social aspects were evaluated using questionnaire instruments. The questionnaire was distributed to the both local and domestic tourist in October 2014. Respondents sampling was done through accidental sampling. Totally, the questionnaire was distributes to the 60 tourist. Each important aspect of such factors was assessed using Sturgest interval criteria using calculation formula of Nazir [9]:

$K = 1+3.3 \log n$ $K = 1+3.3\ (1{,}079)$

$K = 1+3.3\ (\log 12)$ $K = 4.56 \approx 4$

From these calculation, intervals of respondens's answer related to physical, economical and social aspecs were classified as poor (interval value 12-21), moderates (interval value 21-30), Good (interval value 30-39), and Excellence (interval value 39-48).

In order to describe the strategy of Ijen crater, the Internal Strategic Factors Analysis and External Strategic Factors Analysis was implemented. The strength, weaknesses, opportunities and threats of tourism implementation and development in Ijen was assessed comprehensively.

RESULTS AND DISCUSSION

Acessibility

Access to Ijen carter can be reach from Banyuwangi and Bondowoso. Tourist from Surabaya (the capital city of East Java) and its surrounding area can reach Ijen Crater from Bondowoso. Tourist from Bali can reach Ijen crater from Banyuwangi. There are road to connect Bondowoso and Banyuwangi where Ijen crater can reach easily.

Problems facing by accessibility are related to the travel distance and forest road quality. In some place, the condition of road was poor and need to be improved. Safety concern was poor and this is can be crucial issues in tourism destination competitiveness. Access from Bondowoso relatively flat, but there are many road holes and gravels. Access from Banyuwangi is relatively hard because physically tourist vehicle is passing the hard roads in undulating humid tropical forest. In some point, there are steepest slopes.

Attention to the forest road quality was important due to the number of both international and domestic tourism to Ijen Craters grows significantly (Table 1). In Indonesia, poor accessibility was common in tourism destination. Effort to increase accessibility therefore important. Tourist trend to natural environments recently recognized as a new lifestyle for numerous developed countries, especially among European and American countries. In the future, it is predicted that tourism grows in natural environment in East Asia and Oceania grows significantly [10]. In such a case, however, infrastructure was important to facilitate tourist moving.

Table 1. Tourist profile in Ijen Crater from 2011 to 2014

No.	Years	International tourist	Domestic tourist
1.	2014	28,668	6,722
2.	2013	21,579	4,315
3.	2012	1,412	2,218
4.	2011	7,643	8,785

Source : Office of Tourism and Culture, Banyuwangi [5]

The commitment of local government in Banyuwangi Regency to improve road quality was good. It is showed by the project of forest road improvement from Banyuwangi to Ijen craters. These improvements are also important to increase the quality of the international cycling tournament called Tour de Ijen. Scholar point out that response of local government to build systems which was able to allow tourism destination accessible is important. It is become the basic strategy among government and society to increase number of tourist [3]. Recent data about tourism in Banyuwangi show significant increase in tourism, including visitation to Ijen which are recoded from Banyuwangi.

Tourism attractions

Tourism attraction in Ijen craters can be identified into tree aspect, namely something to see, and something to do, something to buy (Table 2). This research found such aspect in Ijen crater, but the future development of such attraction should be meets ecotourism principles. The impelementation of ecotourism principles is improtant in order to ensure the protection of natural and cultural resources.

Tourism facility

Tourism facility is important aspect in visitor satisfaction [11]. Tourism vafility has psycologiacl consequences at a visitors satisfaction aspect. The availability and quality of tourism facility will

affect tourist satisfaction to particular destinations. In Ijen Craters, however, these facility needs to be impproved. This resources found and draws several important aspect of facility improvement as shown in Table 3.

Table 2. Management strategic to improve tourism attraction in Ijen Crater

Aspects	Object and activity	Development concept to meet ecotourism
something to see	Ijen crater	- Enhancing conservation effort of crater and its surrounding area by monitoring human activities which are potentially disturb crater ecosystem
	Mountainous landscapes	- Monitoring human activities which are potentially disturb mountain ecosystem, including illegal logging, vandalism, exotic plant species invasion, and forest fire. In Ijen forest, fire is one of the crucial agent of mountain vegetation disturbance.
	Flora and Fauna	- Increasing integrated conservation effort, compiling biodiversity data base, and designing proper integrative conservation planning - Increasing protection and law enforcement
something to do	Trekking	- Increasing trekking corridors, establishing fence in some dangerous point, re-vegetation activity in some point to minimize and countermeasure land slide along tourist corridors.
	Cultural and social events	- Exploring potential activity which are able to satisfy tourism - Increasing tourist participation in the community development in an area surrounding Ijen Crater, - Promoting tourism involvement in peasant activity i.e. coffee harvest festival.
	Out bond	- Development sustainable outbound program, including sustainable equipment for out bond and camping ground
Something to buy	Accommodations	- Providing sustainable eco-lodge following ecotourism standard and environmental safety
	Souvenir	- Educating local people to produce local souvenir using local material and reduce-cycling process
	Food and culinary	- Promoting local culinary and education local people to establish restaurant according to proper standard

Table 3. Strategy for tourism facility management

Facility	Management concept
Main facility	
Accomodation	- Increasing number and quality of homestay - Improvement of accomodation facility - Management and maintanace of accomodation facility
Camping ground	- Managging camping ground in susutainable manner, including visitor number management - Incresing outbond facility, including *flying fox, tree top walk*, bridge trees, *painball*
Rest building (Gazebo)	- Incresing number of rest house (Gazebo)
facility	- Improving park arrangement and landscaping using indigenous plants. Reduce artificial ornaments, including exotic plant species
Information mark and direction	- Number of information mark and direction should be improved to allow tourist found the road to access main destination safely
Corridors network	- Tourism corridors improvement from Paltuding to craters - Phisical building to countermeasure land slide in some points
Fresh waters availability	- Establishing fresh water instalation properly, especialy to support tourism needs
Electricity	- Establishing electricity in Paltuding
Secondary facility	
Information centre	- Maintannace of information facility
Parking area	- Enlargement of parking area without clearing vegetation - Site management for parking area. Management should be able to minimize erosion risk
Toilet	- Increasing number and capacity of toilet in Paltuding post - Increasing cleaness of toilet. Intaling water system and drainage to ensure environmental health
Roads	- Increasing safety, especialy along treeking corridors from Paltuding to crater - Increasing number of forest ranger to control tourist behaviour
Waste box	- Increasing number and maintaining waste baskets and waste management in Ijen crater
Praying room	- Increasing quality of paying rooms in Paltuding Post

Stakeholder analisys

Stakeholder plays an important role in tourism planning, iplementation and monitoring. Tourism stakeholders has been reported contributes to tourism development. According Bolnick [12], the strategic and interesting role of tourism in local economic developments should be considered as one of the reasons to integrate society and tourism in development issues. From numerous aspect of stakeholder contribution in tourism development in Ijen crater, the contribution of stakeholder can be focused to the two crucial aspect, namelly funding support and collaborations (Table 4). These two aspect were identified important to enhance the competitiveness of Ijen cater as nature-based tourism destination in East Java.

The performance of Ijen Crater management

The performance of tourism development was summarized in Table 5. From the perspective of physical, economic and social aspects, the evaluation grade were ranging from moderates to good, except for respecting local culture aspect. In order to increase destination competitiveness and tourist satisfaction, some improvements need to be implemented. It is especially crucial in the perspective of destination marketing and competitiveness [11].

Table 4. Stakeholder management in the development of ijen craters as a competitive tourism destination

Aspects	Notes
Funding	- Transparency in funding policy, equal sharing benefits, increasing involvement of CSR support to ensure the sustainability of community development and completing tourism facility
Collaboration	- Increasing collaboration between stakeholders. The role government to facilitate collaboration as important.
Tourism program	- Increasing tourism programs which are meet to ecotourism principles, including education and involving community development

Table 5. The performance of tourism in Ijen crater based on economic, social and cultural aspect

Variables	Grade value				Result of asessment	Notes
	(1)	(2)	(3)	(4)		
Phisical aspects						
Considering carring capacity activity planning and sustainable growth			√		3	Development has meet sustainability principles, but the usage was inefficient. In high season of tourist visitation, however, visitor number and its activity should be controled.
Protecting biodiversity and environments		√			2	The comprehensive planning of biodiversity and its implementation needs to be improved
Minimum impact to environment				√		The environmental protection has been implemented, but the practices should be improved
Meets the cultural and physical value of environment			√		3	Local values has accommodate in some building architecture; but there are need integration strategy with other facility
Reduce water consumption		√			2	Fresh water conservation and management should be improved
Waste management		√			2	Waste management should be improved to minimize tourism impact to enviroment
Economic						
Research program in the contribution of tourism to local economic		√			2	Lack of research program in economic impact of tourism contributes to the less appreciation of community to active participation in tourism sectors
Tourism contributes to the local economic			√		3	Tourism has contributes to some local people, but there should be enlage to ther community
Funding allocation for forest conservation		√			2	As far, funding support for biodiversity conservation was less. Another sources of funding shoild be explored.
Social						
Cooperation with local people		√			2	The cooperation with stakeholder is important but in some case it was neglected
Tourism contributes socially to local community			√		3	The contribution of tourism to social welfare seems to be important, but still need to be improved
Respecting local culture	√				1	The tourism managament should be paid a lot of attention to local culture
Total					31	

Strengh, weakness, opportunities and threats

Identifing destination sthrenghs, opportunities, weaknesess, threats were important in tourism stratgy development. SWOT technique provides excelent tools to describe the internal and external aspect of tourism destinations and therefore contributes significantly in drawing planning and strategic management. In case of Ijen crater, the destination strengths, opportunities, weaknesess and threats were given in Table 6 and 7.

In order to map the recent position of Ijen crater based on the SWOT analysis, the x and y coordinate was evaluated as follows:

x = Strengths + Weaknesses
= 2.64 + (-1.65)
= 0.99

y = Opportunities + threats
= 2.97+ (-2.64)
= 0.33

Based on the IFAS and EFAS matrix evvaluation, the possition of tourism in Ijen crater was located at first quadrat (X = 0.99 ; Y = 0.33). These means that tourism in Ijen crater has great strenghts and opportunities for further development. The ecotourism priciples, however, should be incorporated ino future development. The position of Ijen crater in quadrat first offer opportunites for further development. The proper strategy for further tourism development in Ijen crater should be "Rapid Growth Strategy". This is relevan with the recent tourist arrival data to Ijen crater, especially international tourist.In such strategy, however, the management authority of Ijen crater should be improved several aspect related to the facility.

The natural conservation aspect become important in the tourism development in Ijen. Nature as the main attraction in Ijen craters should be protected from numerous potential factors of disturbance, especialy anthropogenic aspect which are related to tourist activities. Tourism from numerous countries come to Ijen to observe active volcanous. Beyond Ijen crater, however, there are numerous potential tourism attraction which are potential to be involved in tourism program. The contribution of stakeholder need to be improved.There are also increasing issues in community involvement and development. There are three important aspect to support tourism development, namely market promotion, infrastructure and management [13].

Table 6. Internal Strategic Factors Analysis Matriks for tourism development in ijen craters

Factors	Internal factors	Weight	Rating	Score
Strengths				
Physical	Ijen crater has numerous flora-fauna which are protected by govermnetal law and numerous nature-based tourism attraction	0.33	3	0.99
Economy	Support of numerous economical instrument and abundance resources to drive new economic opportunities	0.33	2	0.66
Social	Support of community surrounding Ijen crater area	0.33	3	0.99
	Total strengths			2.64
Weakness				
Physical	Limited transportation, facility and infrastructure	0.33	1	0.33
Economy	Number of economic activity was limited	0.33	2	0.66
Social	Poor of government and stakeholder support to enhance community development program	0.33	2	0.66
	Total weaknesses			1.65

Table 7. External Strategic Factors Analysis Matriks for tourism development in Ijen craters

Factors	External factors	Weight	Rating	Score
Opportunity				
Phisical	Increasing demand of qualified infrstructure and good quality of nature-based tourism attraction	0.33	2	0.66
Economy	Increase of tourist arrivals in Ijen crater	0.33	4	1.32
Social	Cultural and social capital of local community to support tourism development in Ijen	0.33	3	0.99
	Total opportunities			2.97
Threats				
Phisical	Increasing number of tourism contributes to environmental degradation	0.33	4	1.32
Economy	The fluctuation of tourism, increasing number of tourism providers and seller contributes to the high competition and decrease of service quality	0.33	2	0.66
Social	Poor of community participation, there are another interested aspect to be developed besides tourism sectors	0.33	2	0.66
	Total threats			2.64

Principally, government plays an important role to build and maintain infrastructure. This is similar with case of Ijen craters. As a protected area, however, the establishment of infrastructure need to consider environmental aspect. In such a case government should be able to coordinate and make communication with protected forest authority to drawn the proper scenarios of infrastructure development [3].

In Ijen crater, several important aspect of tourism in area with high biodiversity and cultural value need to incorporated several issues bellow:

1. Enhance the regulation to decrease and minimize illegal logging, human disturbance to conservation area, illegal hunting, and illegal collection of biodiversity from protected area.
2. Increase effort to countermeasure forest fire, especially control tourism potential to triger forest fire;
3. Increasing management strategy of conservation program;
4. Protenting key species and increasing capaicty of biodiversity conservation;
5. Increasing tourism revenue, number of labour and local community revenue from tourism bisniss;
6. Incresing organization management capacity of Protection Management Office and incresing coordination among conservation body and agency to enhance the optimal and efficnet conservation planning, programs and implemenattaion.

CONCLUSION

The proper management and ecotourism principles application in Ijen Crater need to be implemented to enhance the sustainability and competitiveness Ijen crater as sustainable and competitive tourism destination. Improving tourism facility and infrastructure was important aspect. The ecotourism principles is important as a key to increase tourist interest to visit Ijen crater. The development and improvement of tourism facility and infrastructure, however, should be incorporates ecotourism principles. The conservation, local people and community development is crucial aspect. Involvement of stakeholder and local community in facility and infrastructure will increase the quality and sustainability of infrastructure and tourism facility.

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Competitiveness of destinations, products and Indonesian tourism business; Diversification of tourim products; Incentive system of business and investment in tourism; Information, promotion and communication in tourism; Tourism supporting infrastructure; Security and convenience in tourism; Tourism policy; Unique tourism community life (living culture); Local knowledge, traditions, and cultural diversity; Diversity and attractions in ecotourism; Diversity of natural attractions in ecotourism; Pluralistic diversity of ecotourism society; Diversity of ecotourism activities; Hospitality of the local resident; The quality of torism services; Quality of HR in tourism (Standard, accreditation and competence certification); The market share of tourism and integrated marketing system; Package of tourism attraction; Development of tourism regions; Community based Eco-Toutirsm.

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- Combination Halftone, combine figure and text (image containing text) and coloured graphic or in grayscale format. Resolution 600-900 dpi.
- Halftone, coloured figure or grayscale format without text. Resolution 300 dpi.
- Black and white figure should be in the grayscale mode, while coloured figures should be in RGB mode.
- Figure should not exceed the width of 8 cm (one column), 12.5 cm (1.5 columns) or 17 cm (two columns).
- Figures title typed clearly below the figure.
- Figure with pointing arrow should be grouped (grouping).
- Figures were recommended in black and white.
- Legend or figure description should be clear and complete. If compressed, the figure should be readable.
- Statistic graphic should be supplemented with data sources.
- If the figures come from the third party, it should have the copyright transfer from the sources.

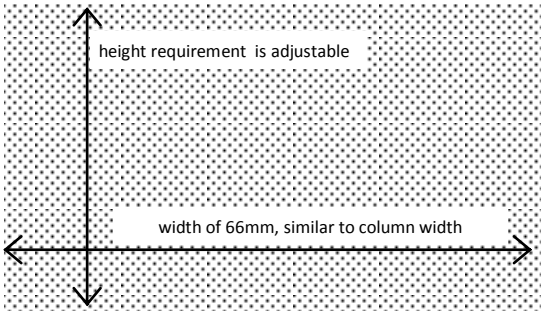

Figure 1. Illustration of Dimensional Figure of one column width. Figure dimension adjusted to the width of one column. Name the figure (diagram) written below the image. (Calibri 8.5 Justify)

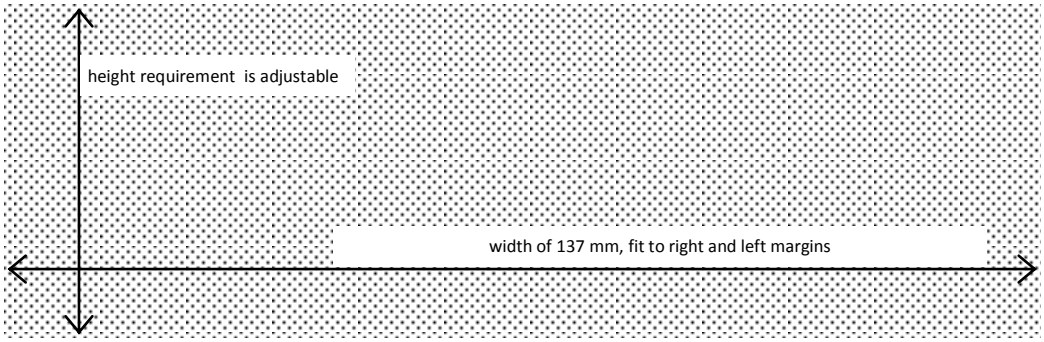

Figure 2. . Illustration of Dimensional Figure of two column width. Figure dimension adjusted to the width of two columns (137 mm). Figure were align top or bottom of the page. (Calibri 8.5 Justify)

References

1. Primary references include journal, patent, dissertation, thesis, paper in proceeding and text book.
2. Avoid self citation.
3. Author should avoid reference in reference, popular book, and internet reference except journal and private ana state institution.
4. Author was not allowed to use abstract as references.
5. References should been published (book, research journal or proceeding). Unpublished references or not displayed data can not be used as references.
6. References typed in numbering list (format number 1,2,3,…), ordered sequentially as they appear in the text (system of Vancouver or author-number style).
7. Citation in the manuscript typed only the references number (not the author and year), example: Obesity is an accumulation of fat in large quantities which would cause excessive body weight (overweight) [1]. Obesity is a risk factor of diabetic, hypertension dan atherosclerosis [2].

CONCLUSION (Calibri 10 Bold, Left, Capslock)

Conclusion of the study's findings are written in brief, concise and solid, without more additional new interpretation. This section can also be written on research novelty, advantages and disadvantages of the research, as well as recommendations for future research. (Calibri 10 Justify)

ACKNOWLEDGEMENT (Calibri 10 Bold, Left, Capslock)

This section describes gratitude to those who have helped in substance as well as financially. (Calibri 10 Justify)

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Cover :

Sarangan Lake, Magetan
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