

## Conference Paper

# The Green Economy Perspective of Batu City: Calculating Depletion in the Tourism Sector

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**Abstract**

The concept of sustainable development has begun to be developed, namely in line with current needs and without endangering future generations. In addition to focusing on environmental issues, this concept covers economic development, environmental protection and social development. However, this concept still tends to focus on short-term economic development. With the limitation of the State Revenue and Expenditure Budget (APBN) and the resources we have, it is not surprising that policymakers prefer shortcuts. As a result, the quality of economic growth has deteriorated. One of the efforts to harmonize the needs of economic growth and conservation of natural resources is the concept of a Green Economy. This article discusses how to calculate economic development as seen from the amount of Gross Domestic Product (GDP) from a Green Economy perspective. Batu City, as a tourism city that relies on natural conditions and its environment, needs to analyze its economic development from a Green Economy perspective in order to be sustainable. This article aimed to analyze the depletion of natural resources of the sub-sector "Provision of Accommodation and Food – Beverage" which supports tourism in Batu City. The results showed that in 2015-2019, natural resource depletion increased every year.

**Keywords:** Sustainable Development, Green Economy, Depletion, Natural Resources

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## 1. Introduction

The growth of the world population and urban population always shows an increase. The world population which is projected in 2030 will increase to 7.94 to 8.33 billion. Meanwhile, the projected urban population in 2030 will be 4.72 to 5 billion or an increase of 48.6 to 57.8%. Increasing urban population is also experienced by Southeast Asian countries (Zuhri, 2014). The growth of urban population in countries around the world is caused by three components: natural growth (natural increase), migration (migration) and change of status from rural to urban areas (reclassification of rural areas to urban areas), as well as in Indonesia. The third cause of urban growth, migration from rural

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to urban areas is the main cause (Rodgers, D., et.al, 2011; Comola & De Mello, 2010). Individual decisions to move from one place to another (migration) which causes urban growth are influenced by the physical environment and the social environment (Royuela, et.al., 2010; Dobs, et.al., 2011; Mori & Christodoulou, 2012; Clement, 2010; Huang, et.al., 2015). Physical environment and social environment such as differences in climate, city aesthetics, public goods and services, government policies (taxes or income), social interactions are important factors why cities can compete with other cities and grow faster.

Urban population growth is often blamed for environmental degradation (Panayotou, 2016). The impact of urban growth on environmental damage in the long term is when the city's population or population growth exceeds the carrying capacity of the environment. The denser the population, the lower the environmental quality of the city. This means there is a correlation between population density and environmental degradation. It is an environment in which the natural environment is part of the quality of life as defined by Lambiri et al. (2007) which consists of climate, land / area, water, air, plants /forests and others. This is supported by research McCarthy, et.al (2010), Ahmad & Choi (2010), Fan & Qi (2010), Cracolici, et.al (2010), Zheng, et.al (2010).

Apart from population growth and migration, a city also often has a heavier burden when the city is made a tourist destination, for example Batu City in East Java. The large number of tours in Batu City makes a lot of resource functions, especially land. To support tourism in Batu City, currently many new hotels are established which are even built on the slopes of the hills in Batu City. In addition, the number of tourist attractions also certainly makes the use of natural resources in Batu City to increase.

Batu City, which relies its economy on the tourism sector, must be careful in planning its economic development. If the city of Batu does not pay attention to its sustainability, then one day when its natural resources run out, Batu City will experience shocks from the economic side that will spread to other sectors. Therefore, it is necessary to implement sustainable economic development planning in Batu City so that in the future Batu City can still exist in the world of Indonesian tourism.

## 2. Literature Review

### 2.1. The Green Gross Regional Domestic Product (Green GRDP)

Green GRDP is the value of all goods and services produced by a region in a year period which includes depreciation of natural resources, pollution and / or environmental

damage. This means that the GRDP calculation currently used by Batu City is reduced by the depreciation of natural resources used for development capital as well as environmental damage caused by economic activity within one year (Reilly, 2012).

In Indonesia, it is expected that all levels of government can calculate the Environmental GRDP so that the total value of all national values will become the Green Regional Domestic (GDP) Calculation. GRDP itself is the sum of all value added created by an economy in a country which is calculated in a period of one year. This value added is the difference between all production value and all intermediate input costs. In other words, the value added reflects remuneration or income from each owner of the factors of production. So, by knowing the amount of value added or GRDP of a region, we can find out the progress of a region's economy.

## 2.2. Economic Valuation

Economics is a social science that deals with humans and places assessments based on human use and perceptions of natural resources (Gómez-Baggethun & Ruiz-Pérez, 2011). A person, as an individual or as a community (society), will take action if he thinks that such action will benefit him. Economic reasoning concludes that a government or society will conserve a resource and the environment, only if the conservation provides benefits or at least provides the same or higher level of income from all types of utilization.

Excessive exploitation of natural resources as previously described (the result of undervaluing natural resources) will result in externalities. This is a failure to give the resource an appropriate value, resulting in inefficient use. By calculating the total economic value of natural resources, it is a response to the understanding that the problem of externalities that arise is rooted in human error in assessing the resource and its ecosystem as a whole and as a whole, as well as the failure of humans to interpret natural resources as an economic and social asset for the present and future generation of society. front. Assigning value to resources (resource valuation) by giving monetary value (monetization) to all natural resources and the environment and their functions, provides an opportunity for humans to understand all the impacts of their activities in utilizing natural resources and the environment. This also allows decision-making to determine policies for the use of natural resources that are not in conflict with the use of other natural resources, efficient allocation, and determine the level of use of a resource with the aim that the resource is sustainable.

De Groot, et al. (2010) states that in assessing an ecosystem economically, namely: (1) identification of benefits and functions of the ecosystem, (2) Quantification of all benefits

into monetary values and, (3) choice and evaluation of policies on the use of natural resources contained in the ecosystem. According to Gómez-Baggethun & Ruiz-Pérez (2011), Total Economic Value is a simple concept that is assigned to the total value of several natural resources, composed of different components and some of these components are easy to identify and assess, and which others are unknown or very inconceivable. Meanwhile, Barton (1994) argues that the total economic value of the environment as an asset is the sum of the use value (UV) and the non-use value (NUV). Benefit value is a value arising from the actual use of a function or resource contained in an ecosystem, consisting of direct use values (DUV), indirect use values (IUV), and option value (OV). The non-benefit value usually consists of the bequest value (BV) and the existence value (EV).

Some of the goods and / or services produced by Natural Resources and the Environment (NRE), such as clean water and air quality, ecotourism, and wildlife (flora and fauna) have no market value. Economic valuation is a technique to obtain an overview of the economic value of goods and / or services produced by NRE themselves, especially those that have no market value. Economic valuation can also be defined as an effort to provide quantitative value to goods and / or services provided by NRE, regardless of whether the market price is available or not (Triyanti & Susilowati, 2018).

In the total economic assessment of NRE, it is very important to know how to obtain these values. In general, the NRE value consists of tangible and intangible values. In determining the economic value of NRE, emphasis is placed on customer satisfaction. If at no cost is required to obtain environmental goods / services, the individual willingness to pay (WTP) value reflects the value of the NRE itself, regardless of whether we pay or not to get the goods / services. WTP in this case is the maximum amount a person wants / is willing / wants / does not mind sacrificing goods and services to obtain other goods and services. WTP can be called a 'translator' of the ecological value of NRE against economic language by measuring the monetary value of each economic and ecological function of the NRE. Therefore, estimating the value obtained from the ecosystem will make it possible for all related parties to take advantage of NRE while simultaneously carrying out conservation efforts directly.

### 3. Method

### 3.1. Data Collecting

The most important data used in this study are secondary data. Secondary data is obtained by collecting data from related Agencies, and economic actors (businesses), especially from the Central Bureau of Statistics in Batu City. Because our aim is to analyze the depletion of tourism sector, The data we take is the data of Batu City in numbers for the sub-chapter "Transportation, Communication and Tourism" which consists of the number of hotels in Batu City, the number of restaurants in Batu City, and so on. The period we use in this study is 2015 to 2019. We also use primary data to obtain the data of production (extraction) cost of natural resource.

### 3.2. Data Analysis

In calculating the depletion of natural resources in the tourism sector, what must be identified first is the type and volume of natural resources used directly from nature (extractive use) for the sector. This information can be obtained from the Office of the Regional Statistics Agency and related agencies. The depletion value is obtained by multiplying the volume of extraction of each type of natural resource by the unit rent or unit net price. This statement can be stated in the following equation:

$$D_x = (Q_x)(r_x) \tag{1}$$

Whereby,

$D_x$  = Depletion value of x

$Q_x$  = The quantity of resource x exploited

$r_x$  = Unit rent of x

The method of calculating the unit rent is by subtracting all costs of extraction from the selling value of natural resources including the value of profit (remuneration for investment expenditures) which is feasible to receive. The feasible profit value is considered to be the same as the loan interest rate at the bank as an alternative cost of capital invested to exploit natural resources in the area concerned.

$$r_x = R - C - \pi_i \tag{2}$$

Whereby,

R = Gross revenue

C = Production cost

$\pi_i$  = feasible profit (production cost multiplied by interest rate)

The calculation of the economic value of natural resources taken from nature is called the depletion value. Economic valuation can be assessed using the market value for products that are marketed, or using the value of substitute and complementary goods, or the contingent valuation method with willingness to accept payment. Price data can be obtained from companies involved in the production and use of natural resources (primary data), or from secondary data.

## 4. Result and Discussion

### 4.1. Overview of Tourism in Batu City

With an area of about 202.30 km<sup>2</sup>, most of the topography of Batu city is dominated by highlands and hills with valleys located on the slopes of two large mountains, namely Arjuno-Welirang and Butak-Kawi-Panderman. In Batu city area, which is located north of the city center, there is a dense forest which is a protected forest area, namely the Raden Soerjo Forest Park. As a fertile mountainous region, Batu and its surroundings also have a beautiful natural panorama and cool air, of course this will attract the interest of other people to visit and enjoy Batu as a mountainous area that has its own charm. For this reason, in the early 19th century, Batu developed into a tourist destination, especially for the Dutch, so that the Dutch helped build resting places (villas) and even lived in Batu. Batu City has become one of the national tourist destinations and has now begun to expand to the international level. With the support of road and bridge infrastructure, as well as facilities and infrastructure accommodation of more than 900 hotels of various classes, a strong supporting capacity in the City to develop tourism. Even Batu City has issued Regional Regulation No.1 of 2013 concerning Tourism, in which various tourism businesses are provided with legality service providers in supporting the tourism mission of Batu City. As a result, in 2016, tourist visits in Batu City reached 2.9 million visits.

Selecta recreation park is the oldest tourist attraction in Batu City and is a tourist attraction most visited by tourists, especially domestic tourists. Other tourist objects that are the main destination for tourists to go to Batu City are tourist attractions owned by the Jatim Park Group (Jatim Park I, II, and III).

### 4.2. Depletion of Tourism Sector

The identification results show that the natural resources used by the tourism sector in relation to the number of hotels and the number of tourists are water resources. For

tourism sector, our evaluated activity units include the number of hotels and tourist visiting Batu. The assumption of water use by tourists at tourism objects is based on the Directorate General of Human Settlements: 30 liters per day per visitor while the assumption of water use in hotel is 150 liters per bed per day. Table 1 shows the data about the number of bed in hospitality and its depletion calculation.

TABLE 1: The Depletion Value of Water Resources from Hospitality in Batu City, 2015 – 2019

Components	Year				
	2015	2016	2017	2018	2019
Number of Bed	11,292	11,292	15,888	16,238	16,672
Water Use (liter/unit)	150	150	150	150	150
Total Water Use (M <sup>3</sup> )	618,237	618,237	869,868	889,031	912,792
Price of Water (Rp/M <sup>3</sup> )	4,500	4,500	4,500	4,500	4,500
Value of Water (Rp million)	2,782,066,500	2,782,066,500	3,914,406,000	4,000,637,250	4,107,564,000
Cost of Producing Water (Rp/M <sup>3</sup> )	2,500	2,500	2,500	2,500	2,500
Operational Cost (Rp)	1,545,592,500	1,545,592,500	2,174,670,000	2,222,576,250	2,281,980,000
Interest Rate	7.50%	4.75%	6.50%	4.25%	5.00%
Feasible Profit	115,919,438	73,415,644	141,353,550	94,459,491	114,099,000
<b>Depletion (Rp)</b>	<b>1,120,554,563</b>	<b>1,163,058,356</b>	<b>1,598,382,450</b>	<b>1,683,601,509</b>	<b>1,711,485,000</b>

Components in the hotel sector analyzed in this study are the number of beds available in all hotels and inns in Batu City. After conducting a field survey by means of direct interviews, it was found that the price of water per M<sup>3</sup> was IDR 4,500 while the production cost per M<sup>3</sup> was IDR 2,500. Table 1 shows the results of the calculation of the depletion value of water resources used for hotels increasing from year to year for the last five years (2015 - 2019). This is due to the increasing number of hotels in Batu City. The Central Bureau of Statistics for Batu City reported that in 2015 the number of hotels and inns in Batu City was 550, while in 2019 it reached 967.

Table 2 shows that the depletion value of resources used for the benefit of the tourism sector, especially in relation to tourist activity in Batu City from 2015 to 2019, shows an increasing trend. This is due to the increasing number of tourists visiting tourist attractions in Batu City. Data on the number of tourists visiting Batu City is obtained from visitor data from 30 tourist attractions and souvenir shops. The most visited tourist attractions are Jatim Park I, Jatim Park II, Jatim Park III, Selecta Recreational Park, and Museum Angkut. In 2019, based on data from the Central Bureau of Statistics of Batu

TABLE 2: The Depletion Value of Water Resources from Tourist Activity in Batu City, 2015 – 2019

Components	Year				
	2015	2016	2017	2018	2019
Number of Tourist	2,249,201	2,917,591	4,188,910	5,644,168	6,047,640
Water Use (liter/unit)	30	30	30	30	30
Total Water Use (M <sup>3</sup> )	67,476,030	87,527,730	125,667,300	169,325,040	181,429,200
Price of Water (Rp/M <sup>3</sup> )	4,500	4,500	4,500	4,500	4,500
Value of Water (Rp million)	303,642,135,000	393,874,785,000	565,502,850,000	761,962,680,000	816,431,400,000
Cost of Producing Water (Rp/M <sup>3</sup> )	2,500	2,500	2,500	2,500	2,500
Operational Cost (Rp)	168,690,075,000	218,819,325,000	314,168,250,000	423,312,600,000	453,573,000,000
Interest Rate	7.50%	4.75%	6.50%	4.25%	5.00%
Feasible Profit	12,651,755,625	10,393,917,938	20,420,936,250	17,990,785,500	22,678,650,000
<b>Depletion (Rp)</b>	<b>122,300,304,375</b>	<b>164,661,542,063</b>	<b>230,913,663,750</b>	<b>320,659,294,500</b>	<b>340,179,750,000</b>

City, Selecta Recreation Park is the most visited tourist spot with 1,394,270 visitors, followed by Jatim Park III with 803,124 visitors.

The next table shows the results of the calculation of the total depletion value of water resources used for the tourism sector in Batu City for the period 2015 – 2019.

TABLE 3: Total Depletion of Tourism Sector in Batu City, 2015 – 2019

Components	Year				
	2015	2016	2017	2018	2019
Depletion of Hospitality (Rp)	1,120,554,563	1,163,058,356	1,598,382,450	1,683,601,509	1,711,485,000
Depletion of Tourist Activity (Rp)	122,300,304,375	164,661,542,063	230,913,663,750	320,659,294,500	340,179,750,000
<b>Total Depletion</b>	<b>123,420,858,938</b>	<b>165,824,600,419</b>	<b>232,512,046,200</b>	<b>322,342,896,009</b>	<b>341,891,235,000</b>

Table 3 indicates that in total, the depletion of water resources in the tourism sector in Batu City in the past five years has increased quite significantly. In 2015, the depletion value was 'only' 125 billion, then in 2019 the number increased by almost 3 times that of 350 billion. For the Batu City government, this may not be a problem because Batu City is known for its many water sources. Even the water they have is also sold to surrounding areas such as Malang Regency. However, it is not impossible in the future, if the Batu city government does not have a careful and coherent plan related to the exploration of water resources, the water resources in Batu City will be depleted.

## 5. Conclusion

Based on the calculation of the depletion of Batu City in the tourism sector, it can be concluded that the depletion of natural resources used is getting bigger every year.

This is due to the increasing number of tourists visiting Batu City every year. The large number of tourists who come encourages investors to invest their funds in Batu City and then build various tourism supporting sectors such as hotels and inns. The increasing number of hotels and inns in Batu City also contributed to the increase in resource depletion in Batu City. In the short term, this is very good for the economy because it encourages economic activity. However, in the long term if this is done continuously without any development planning that prioritizes the aspect of resource sustainability, it is very likely that the resources that are owned will be exhausted.

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