Measurement of sustainable development in Bangka Belitung Islands Province

A K Putri*, A Wulandari, and M F Akbar

Department of Economics, Faculty of Economics, Universitas Bangka Belitung, Kampus Terpadu UBB Balunijuk, Merawang, Bangka Regency, Bangka Belitung Province, 33172, Indonesia

*E-mail: aning@ubb.ac.id

Abstract. In this paper, the authors present a review about sustainable development in the Bangka Belitung Islands Province in 2016-2018. In sustainable development research is described as a balance of economic, social, and environmental development. The data used is the Times Series data from year 2009 to year 2018 in Bangka Belitung province which is in the form of GDP for constant price of 2010, Human Development Index, and environmental quality index. The results of the research showed that the development of several indicators of development has not been the construction of economic, social, and environmental development in Bangka Belitung Islands province. More development shows improvements from the economic side, while that for the social side has already shown a good figure. What needs to be a concern is the quality of the environment in the Bangka Belitung Islands province that shows that sustainable development in this province indicates the presence of pressure on the environment.

1. Introduction
In the last 3 years economic growth in Bangka Belitung province has fluctuated, year 2016 economic growth of 4.10 percent while year 2017 economic growth increased to 4.47 percent. Year 2018 economic growth slowed slightly compared to the previous year, from 4.47 percent to 4.45 percent. But economic activity shows increased production over the last 3 years. A measure of a country's economic growth, by measuring the amount of production of goods or services that have been produced by a production unit in a country at any given time, called gross domestic product (GDP).

Table 1. Gross Domestic product (GDP) with constant price and critical land of Bangka Belitung province 2016-2018

| Years | Gross Domestic product (GDP) (Billion of Rupiah) | Critical Land (Ha) |
|-------|-----------------------------------------------|-------------------|
| 2016  | 47,848.4                                      | 216,108           |
| 2017  | 49,986.8                                      | 216,108.66        |
| 2018  | 52,212.1                                      | 216,108.66        |

Source: Data processed, 2019
Table 1. tries to compare between building economic dimensions with environmental dimensions. From the economic side is explained by Gross Domestic Regional Product (GDRP) of Bangka Belitung Islands province. Meanwhile, for the environment side use critical land as the measuring indicator. Critical land is defined as a land that has been severely damaged due to the loss of its vegetal closure, thus losing or decreasing its function as a water-holder, erosion control, nutrient cycles, microclimate control and carbon retention [1],[2].

Gross Regional Domestic Product (GDRP) of Bangka Belitung Islands Province from 2016 to 2018 years increase annually. In the year 2016 GDRP Islands Bangka Belitung province amounted to 47,848.4 billion Rupiah. Year 2017 GDRP increased from the previous year, which amounted to 49,986.8 billion Rupiah. Year 2018 GDRP Islands Bangka Belitung Province has been increased by 52,212.1 billion Rupiah. The increase of GDRP from 2016 to year 2018 showed that there was an increase in production in Bangka Belitung archipelago and showed improved economic growth each year. Meanwhile, the number of critical land shows a stagnant number from the year 2016 until the year 2018 which is at 216,108 hectares.

The comparison between economic and social development and environmental development can be done using two available composite indices. The first most popular composite Index is the Human Development Index (HDI), and the second composite index is the Environmental Quality Index (EQI).

The HDI is a composite index of indicators to measure the basic dimensions of achievement status of a population consisting of long and healthy longevity, knowledge and skills, and accessibility to the resources needed to achieve a decent standard of living. It can be said that the HDI is a commonly used measure for measuring the level of economic and social buildings [1],[3],[4].
According to table 1.2, there can be seen that the Human Development Index (HDI) of Bangka Belitung Province from 2016 to year 2018 increased. Year 2016 HDI in Bangka Belitung Islands amounted to 69.55 percent. The year 2017 amounted to 69.99 percent, and year 2018 amounted to 70.67 percent. If compared with national HDI or Indonesia HDI in Bangka Belitung province is classified into high level of HDI. Meanwhile, Environmental Quality Index (EQI) shows a relatively lower number compared to HDI in Bangka Bangka Belitung province. However, this quality of life index also shows fluctuating numbers but tends to increase annually. In 2016, the year EQI in Bangka Belitung Islands is 66.88 percent, year 2017 EQI is increased by 67.85. And the year 2018 EQI decreased slightly by 67.68 percent.

The quality of the environment in Bangka is relatively low that is marked by the abundance of the remaining tin mines that are left abandoned and many damaging the environment. Despite efforts to improve the environment by conducting conservation efforts such as, tree-making, nutrient enhancement, and the creation of tourist spots from the former mining. But the pressure on the environment is still large. The conservation effort is not maximal and not evenly done in all places of land of former tin mines. Based on background, the problem in this research is how sustainable development achievement in Bangka Belitung Islands is measured using two different approaches: partial and composite indicators.

2. Theory Review

2.1. The Sustainable development indicators
Related to the four pillars of supporting sustainable development, the development indicators also cover the four pillars. Háč, Moldan and Dahl (2007) mention the description of the four pillars as follows:

a. Environmental aspects of biophysical, including access to land, natural resources, clean water, housing and energy, therein related to the availability of infrastructure and information technology;

b. Economic aspects, for an individual level related to the minimum income to be able to live worthy, access in socio-economic activity, the right to obtain a decent job. It includes market access, barriers to market entry as well as access to credit markets (financial aspect);

c. Social aspects, including access to knowledge, information and experience (no discrimination of education, training, information technology, HDI and others);

d. Institutional aspects, including access to information (mass media, Internet, phone access), information exchange, decision making, participation in public activities, politics, democracy, justice and so on.

2.2. Gross Domestic Product
To measure economic activity, gross domestic product (GDP) is often regarded as the best measure of economic performance. The purpose of GDP is to summarize economic activity in a single monetary value over a specified period of time [6]. A thorough picture of the economic condition of an area can be obtained from gross Regional domestic product (GDRP). As one of the macro indicators of economists, GDRP is essentially the amount of added value arising from all the economic sectors in a particular region, or is the amount of the final value of goods and services produced by the economy unit [7].

Calculation of GDRP used two kinds of prices, namely GDRP on the basis of prevailing prices and GDRP on the basis of constant price. The applicable GDRP price represents the added value of goods and services calculated using the prevailing price per year, while the GDRP on the basis of the constant price is calculated using the price on one particular year as the base year. GDRP on the basis of applicable prices can be used to view the economic structures while the GDRP price is constant to see economic growth. GDRP classified into 9 sectors namely agriculture sector, industrial processing, mining & excavation, electricity, gas & clean water, building, trade, hotel & restaurants, Transportation & Transport, finance, company and services, and the last sector services.

2.3. Human Development Index (HDI)
HDI was developed in order to answer the need for an alternative GDRP per capita used to measure both
the economic dimension and social dimension. HDI is more focused on the achievement indicator than
the input indicator [8]. HDI measures the overall achievement of a province according to the three-
dimensional human development: (i) age length measured by life expectancy at birth; (ii) knowledge is
measured based on the adult literacy rate and the combination of the school participation at the basic,
intermediate, and tertiary level (with the same netting on both indicators); (iii) standard living deserves
to be measured by real income per capita.

2.4. Environmental Quality Index
Development indicators on the previous description; Economic growth, critical land growth, poverty
and Gini ratios; is a single indicator and not a composite indicator. The interpretation obtained from the
value of each indicator of course only represents the size of the indicator, it is not yet able to represent
each dimension of development as a whole. To be able to measure more complex achievements, of
course, a composite indicator is required. There are two composite indices that can be used to measure
development performance. First, and the most popular, is the Human Development Index (HDI), and
the second is the Environmental Quality Index (EQI) [2][9].

The HDI is a composite index of indicators to measure the underlying dimensions of the basic
population's ability status: longevity and healthy, knowledgeable and skill, and accessibility to the
resources needed to achieve decent standards of living. So the HDI is a common measure to measure
the achievement level of economic and social development. However the HDI still escapes measuring
the environmental dimensions. The composite index that measures the achievement of development in
the environmental sector is the Environmental Quality Index (EQI) [10].

3. Methodology
3.1. Data types and sources
The data used in this research is secondary data. Secondary data is data obtained indirectly, researchers
must meet third parties or contribute through documents. The secondary data used in this study was
obtained from BPS and to add analysis of this research was used as well as the research-litellature of
similar studies. The data in this study included GDRP, HDI and EQI data [11].

Sustainable development achievements are measured by two different approaches, partial indicators
and composites. Composite index is a collection of indicators or sub indicators that do not have a
measurement unit. The determination of a bobotdone using two scenarios, first is the same weight
between indicators, and the second is the same weight between dimensions. Aggregation uses linear
express trade-offs between indicators [12].

3.2. Data Analysis
The constituent elements of SDI itself can be distinguished in two respects: first, from the side of the
constituent indicators (index GDRP, HDI and EQI) and the second from the dimension of development
(economic, social, and environmental). Therefore, the calculation of SDI is done using two scenarios,
weighting the same between indicators (scenario 1) and weighting the same between dimensions
(scenario 2). In Scenario 1, the compiler indicators (index GDRP, HDI and EQI) are each given the
same weight, which is a third (1/3), so that the formulation of SDI calculation is as follows [13]:

$$SDI = \frac{\text{Index GDRP} + \text{HDI} + \text{EQI}}{3} \times 100\%$$ (1)

In Scenario 2, the focus is not on the constituent indicators, but in the development dimension
(economic, social, and environmental). GDRP and EQI each represent the economic and environmental
dimensions, while the HDI represents two dimensions at once, social and economic. For interdimensional weights to be the same, each indicator is given different weights, 1/6 for the GDRP
index, 3/6 for HDI and 2/6 for the EQI [14].

$$SDI = \frac{\text{Index GDRP} + (3 \times \text{HDI}) + (2 \times \text{EQI})}{6} \times 100\%$$ (2)

4. Results and Discussions
4.1. Gross Regional Domestic Product index standardization
The next step in the preparation of SDI after the selection of indicators is to standardized the entire
indicator into an index form, especially for the GDRP because two other indicators are already shaped index (HDI and EQI).

**Table 2. Development Index GDRP on constant price basis of growth index**

| Year | GDRP (percent) |
|------|----------------|
| 2016 | 172,12         |
| 2017 | 176,38         |
| 2018 | 187,40         |

Source: BPS Province of Bangka Belitung, 2019

The GDRP value used in this research was GDRP by Business field on the basis of the constant price of year 2010. The adherence to this indicator is based on the consideration that the value of GDRP on the basis of constant pricing illustrates macro welfare developments that have eliminated inflation. To standardize the entire indicator, the GDRP development index used on the basis of constant price.

**4.2. Calculation of sustainable Development index**

The element of the formulation of SDI itself can be distinguished in two respects. First, from the side of the indicator (index Perkebangan GDRP, HDI, and EQI) and the second from the dimensions of its development (economic, social, environmental). Therefore, the calculation of SDI is done using two scenarios. Scenario 1 uses the same boycott between indicators and scenario 2 uses the same weighted weight between dimensions.

**4.2.1. First Scenario**

The following is the result of the calculation of scenario 1 of the sustainable development index (SDI) in Bangka Belitung Islands province. From Table 3, shows that the sustainable development index in Bangka Belitung province annually increases. Compared to the development of 3 indicators, all three indicators of SDI's compilers each year also increased.

**Table 3. Scenario 1 of SDI calculation**

| Year | SDI  |
|------|------|
| 2016 | 102,85|
| 2017 | 104,74|
| 2018 | 108,58|

**4.2.2. Second Scenario**

The following is the result of the calculation of scenario 2 of the sustainable Development Index in Bangka Belitung Islands province. If viewed based on Table 3, the calculation of SDI in Scenario 2 is smaller compared with scenario 1. But the results of the calculation still shows the increase in SDI in Bangka Belitung province from 2016-2018. Special attention to the enhancement of EQI becomes very important, considering the two other indicators GDRP and HDI relative have been better. There must be a future improvement for the handling of this EQI so that the sustainable development index in the Bangka Belitung Islands province can be better.

**Table 4. Second Scenario of SDI Calculation**

| Year | SDI  |
|------|------|
| 2016 | 85,76 |
| 2017 | 87,09 |
| 2018 | 89,13 |
The development of several indicators of development has not been the construction of economic, social, and environmental development in Bangka Belitung Islands province. More development shows improvements from the economic side, while that for the social side has already shown a good figure. To be considerate is the quality of the environment in the Bangka Belitung Islands province that shows that sustainable development in this province indicates the presence of pressure on the environment.

5. Conclusion
Development in Bangka Belitung Islands province which leads to economic and social improvement. But the increase in the economic and social living levels are inversely proportional to the environmental and natural damage caused by it. For example, many natural damage caused by tin mining such as the rest of the tin pit that is left abandoned so as to make a lot of land is not worth it anymore and many formed under heaven or river basin experiencing the consequences of the remaining mud of land that was thrown into the next river will be one of the trigger flooding, and not a few also resulted in the loss of tributaries because it has been dammed and closed as one of the efforts in mining activities.

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