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KNOWLEDGE AS A TOOL TOWARDS WELFARE: THEORY AND REALITY

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ABSTRACT
This paper aims to describe the theory and reality of welfare balance associated with population growth as well as its impact on the sustainability of development based on green growth. This paper also conveys the role of science to answer the "what, why and how" related to sustainability and green growth economy.

KEY WORDS
Welfare, economy, green growth, business.

Our population has grown significantly over the last decade affecting the balance of nature and ecosystems; it is not surprising then that disasters occur everywhere – landslides, oxygen depletion, world oil reserve depletion, and other forms of disasters that hinder human existence. Indonesia has long been known as a beautiful country, a paradise in the world. Indonesia is fertile and rich in natural resoures; yet, it cannot escape disasters, and many forms, from drought, floods, to landslide, take place in the country. Our natural balance has been disturbed by the large number of population. Social and humanity problems have also increased, as human beings compete to maintain their existence.

On the other hand, countries around the world are vying to increase their economic growth. Investment has been significant for all sectors because it contributes to growth. Investment in the field of oil palm plantations, as one of Indonesia's main commodities, has eroded millions of hectares of forests in Kalimantan, Sulawesi, Sumatra, and other islands the world has claimed as the world's lungs. For the sake of economic growth, Indonesia's forest resources have been sacrificed.

The above brief description has shown us that the growing population has led to ecosystem extinctions and increasing social and humanitarian problems; this is worse if all countries are oriented only to economic growth. In other words, GNP, which refers to the performance of a country, basically contains only the economic waste that excludes the welfare of society, the carrying capacity of the environment, and the balance of the ecosystem. This should not happen continuously; the state must have thoughts about growth that considers ecosystems and humanity, such is known as green growth (Anderson, 2016).

As scientists, Anderson, Kusters, Mc Carty and Obidzinski (2016) have tried to contribute to the maturation of the concept of green growth by articulating the theory and the reality of the countries in the world. Furthermore, we, graduate students, as the future scientists and scholars, are trying to understand the root of the error and reviewing and providing recommendations related to green growth in order to create sustainable economic development by reducing the damage to the ecosystem or set it to a minimum.

This study focuses on the role of science as well as its subjects, i.e. scientists as part of the academic community, to uphold the foundation of their life in the form of integrity, autonomy, and welfare in explaining the problems faced, why it happens and how to find solutions to the problems for a sustainable life without sacrificing the ecosystems.

Indonesia's economic growth to date has brought welfare to most Indonesian. However, the economic growth that currently focuses on the natural resource-based industry sector also raises ecosystem and social issues. To address these issues, this paper will point out what happened in connection with the green growth.

The problems associated with the ecosystem include increased levels of CO_2, floods, landslides, drought, forest and land fires, degradation of air quality, groundwater abrasion and subsidence, and decreased quality and quantity of water. Based on data released by the

Global Green Growth Institute (2015), Indonesia's CO_2 emissions from fossil fuel consumption are around 500 million tons per year, while CO_2 emissions from changes in land use and forestry could reach more than 1 billion tons per year. This emission provides an economic impact for future generations in Indonesia and around the world. The toxic gas and particles, including the smoke of forest fires and peatlands, have degraded the water quality in many cities in Indonesia. The latest estimate states the impact of death from air pollution in Indonesia is about 3% of GDP (Gross Domestic Product) in 2010.

Based on the data from the National Disaster Management Agency[1], during 2017, the recorded disasters were floods (737 incidents), landslides (577 incidents), forest and land fires (96 incidents), floods and landslides (67 events), drought (19 events), in addition to natural events.

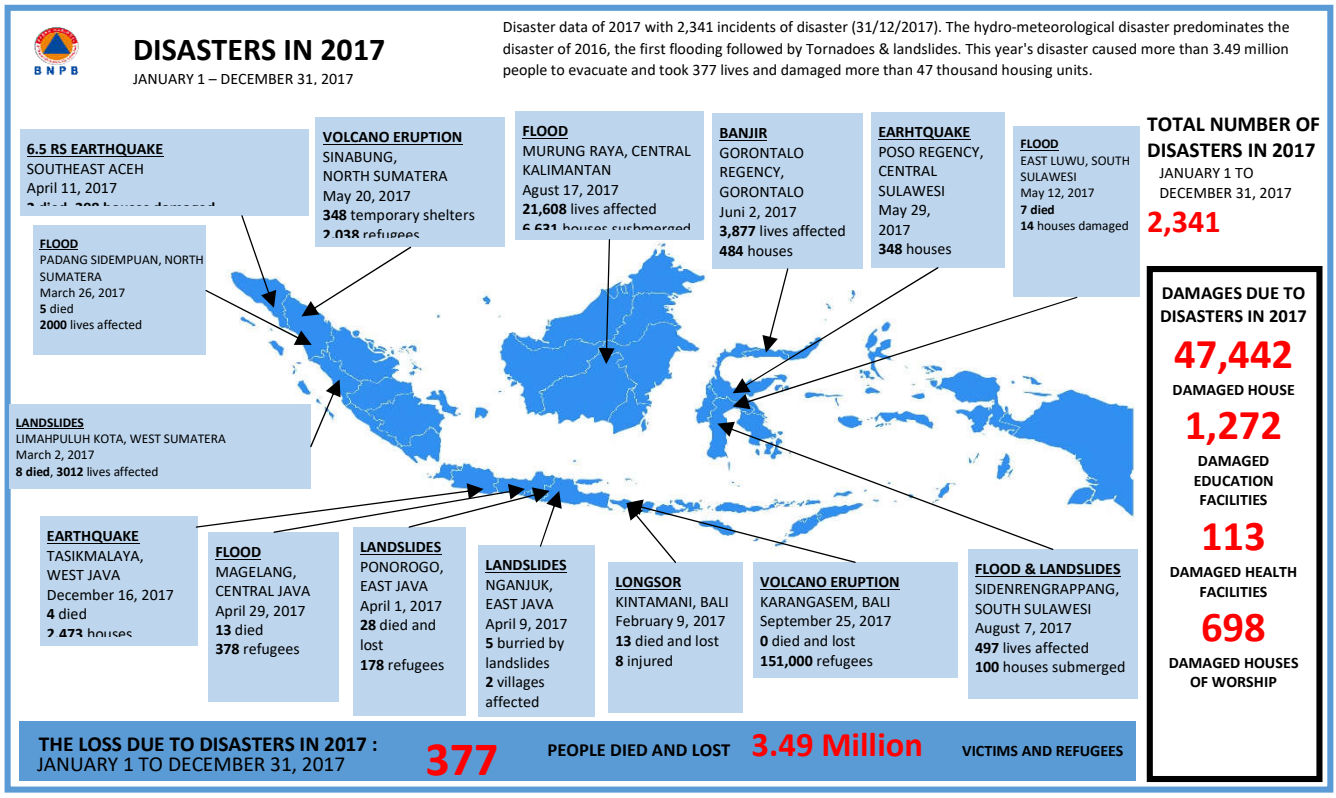

Figure 1 – Data of Disasters in Indonesia during the period of 2017 (Source: The National Disaster Management Agency, 2017)

Other important issues are social problems such as high crime rates, poverty, high unemployment, and increased hunger. From the data of the Central Bureau of Statistics, the number of poor people in Indonesia in 2017 was 26,582,900 people. This number is still quite high even though it has decreased from the previous year which was 27,771,220. Table 1 presents the data of poor people in Indonesia from 1970 until 2017.

Similar to the number of poor people in Indonesia, the number of unemployed in Indonesia is still quite high from 2012 to 2017; it was around seven million. The unemployment rate in Indonesia is presented in Table 2.

The high level of poverty and unemployment in Indonesia affects the level of crime either in the form of crime against life or physical. From the statistical data, Jakarta occupies the highest position for the crime rate although Jakarta is not included in the big 5 seen from the risk level of crime.

[1] *Badan Nasional Penanggulangan Bencana (BNPB).*

Table 1 – The Number of Poor People in Indonesia

Year	The Number of Poor People (in Millions)			The Percentage of Poor People			Poverty Line (IDR/Capita/Month)	
	Urban Areas	Villages	Urban Areas + Villages	Urban Areas	Villages	Urban Areas + Villages	Urban Areas	Villages
1970	n.a	n.a	70	n.a	n.a	60	n.a	n.a
1976	10	44.2	54.2	38.8	40.4	40.1	4,522	2,849
1978	8.3	38.9	47.2	30.8	33.4	33.3	4,969	2,981
1980	9.5	32.8	42.3	29	28.4	28.6	6,831	4,449
1981	9.3	31.3	40.6	28.1	26.5	26.9	9,777	5,877
1984	9.3	25.7	35	23.1	21.2	21.6	13,731	7,746
1987	9.7	20.3	30	20.1	16.1	17.4	17,381	10,294
1990	9.4	17.8	27.2	16.8	14.3	15.1	20,614	13,295
1993	8.7	17.2	25.9	13.4	13.8	13.7	27,905	18,244
1996	7.2	15.3	22.5	9.7	12.3	11.3	38,246	27,413
1996	9.42	24.59	34.01	13.39	19.78	17.47	42,032	31,366
1998	17.6	31.9	49.5	21.92	25.72	24.2	96,959	72,780
1999	15.64	32.33	47.97	19.41	26.03	23.43	92,409	74,272
2000	12.31	26.43	38.74	14.6	22.38	19.14	91,632	73,648
2001	8.6	29.27	37.87	9.79	24.84	18.41	100,011	80,382
2002	13.32	25.08	38.39	14.46	21.1	18.2	130,499	96,512
2003	12.26	25.08	37.34	13.57	20.23	17.42	138,803	105,888
2004	11.37	24.78	36.15	12.13	20.11	16.66	143,455	108,725
2005	12.4	22.7	35.1	11.68	19.98	15.97	165,565	117,365
2006	14.49	24.81	39.3	13.47	21.81	17.75	174,290	130,584
2007	13.56	23.61	37.17	12.52	20.37	16.58	187,942	146,837
2008	12.77	22.19	34.96	11.65	18.93	15.42	204,896	161,831
2009	11.91	20.62	32.53	10.72	17.35	14.15	222,123	179,835
2010	11.1	19.93	31.02	9.87	16.56	13.33	232,989	192,354
2011	10.95	18.94	29.89	9.09	15.59	12.36	263,594	223,181
2012	10.51	18.09	28.59	8.6	14.7	11.66	277,382	240,441
2013	10.63	17.92	28.55	8.52	14.42	11.47	308,826	275,779
2014	10.36	17.37	27.73	8.16	13.76	10.96	326,853	296,681
2015	10.62	17.89	28.51	8.22	14.09	11.13	356,378	333,034
2016	10.49	17.28	27.76	7.73	13.96	10.7	372,114	350,420
Sep-17	10.27	16.31	26.58	7.26	13.47	10.12	400,995	370,910

Source: The Central Bureau of Statistics, 2017.

Table 2 – The Unemployment Rate in Indonesia

Year	Not educated/ Has never attended school	Not/ Has Never Graduated Elementary School	Elementary School	Junior High School	Senior High School	Senior Vocational School	Academy	University	Total
2005	264,458	673,527	2,729,915	3,151,231	3,069,305	1,306,770	308,522	395,538	11,899,266
2006	170,666	611,254	2,589,699	2,730,045	2,851,518	1,305,190	278,074	395,554	10,932,000
2007	94,301	438,519	2,179,792	2,264,198	2,532,204	1,538,349	397,191	566,588	10,011,142
2008	103,206	443,832	2,099,968	1,973,986	2,403,394	1,409,128	362,683	598,318	9,394,515
2009	90,471	547,430	1,531,671	1,770,823	2,472,245	1,407,226	441,100	701,651	8,962,617
2010	157,586	600,221	1,402,858	1,661,449	2,149,123	1,195,192	443,222	710,128	8,319,779
2011	205,388	737,610	1,241,882	2,138,864	2,376,254	1,161,362	276,816	543,216	8,681,392
2012	85,374	512,041	1,452,047	1,714,776	1,867,755	1,067,009	200,028	445,836	7,344,866
2013	81,432	489,152	1,347,555	1,689,643	1,925,660	1,258,201	185,103	434,185	7,410,931
2014	74,898	389,550	1,229,652	1,566,838	1,962,786	1,332,521	193,517	495,143	7,244,905
2015	55,554	371,542	1,004,961	1,373,919	2,280,029	1,569,690	251,541	653,586	7,560,822
2016	59,346	384,069	1,035,731	1,294,483	1,950,626	1,520,549	219,736	567,235	7,031,775
2017	62,984	404,435	904,561	1,274,417	1,910,829	1,621,402	242,937	618,758	7,005,262

Source: The Central Bureau of Statistics, 2017.

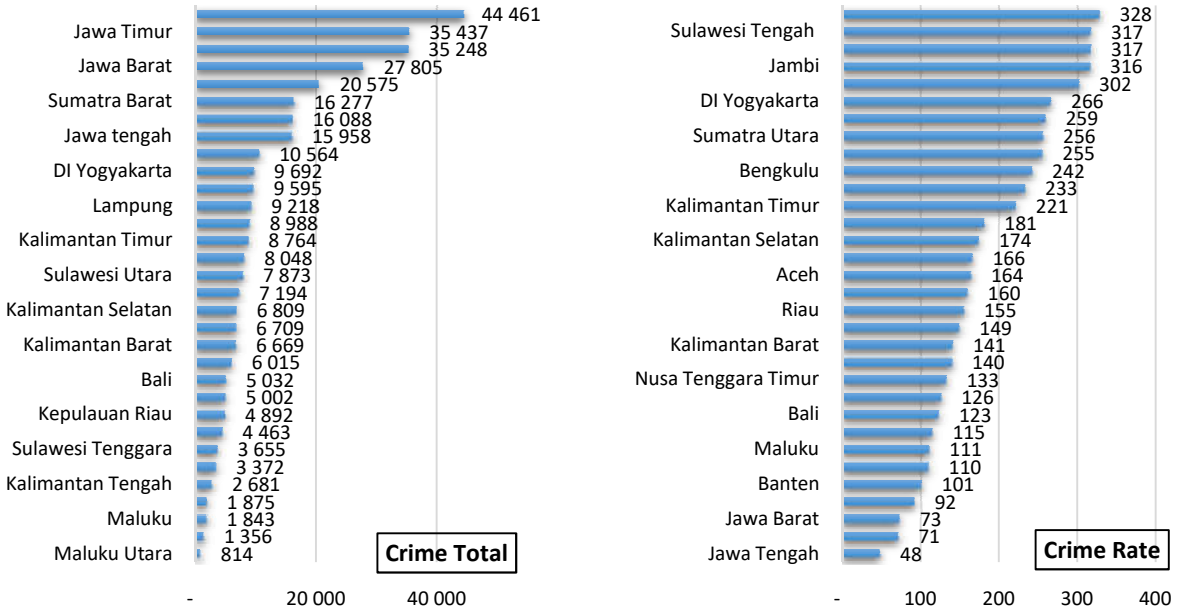

Figure 2 – Total Crime Total Reported and the Risk to Crime Rate Acording to the Regional Police Office 2015 (Source: The Crime Statistics, 2016)

The ecosystem and social problems occurring as described are caused by several factors, such as population increase, land conversion, development activities including rapid population growth and bad resource management. Nature has a limit of ability to accommodate all human activities. The increase in population and the increase in population activity all requires land as a basic means; it often leads to land conversion, such as agricultural land into settlements or industries or forests into plantations.

The conversion of forests into plantation land can lead to the increase of CO_2 levels, as proven by Anderson (2016) in East Kalimantan Province. There has been a significant conversion of forests into palm oil plantation. In 2000, the number of plantations has increased significantly, from the 116,888 ha allocated, 49,085 ha of plantation was planted. In 2013, the number started from 456,145 ha to turn into 1,115,415 ha of land allocated for palm oil plantations. From the data, in the period of approximately 10 years, the increase in palm oil plantations has reached almost 10 times. From the existing data, during 2000 to 2010, there was 19.9% land conversion occurred from forests to palm oil plantations or an increase of carbon emission to 20.6% (Anderson, 2016). The same issue is happening in all areas in Kalimantan as well as in other parts of Indonesia.

The increase in CO_2 levels, in addition to the conversion of forests, in which forests function as an absorber of CO_2 (1 hectare of forest can absorb 250-300 tons of CO_2 (Kyoto Protocol, 1997)), is also due to CO_2 resulting from forest fires. This is because to ease the process of opening oil palm plantatiosn, the company burns the forests; not infrequently, it even causes a national disaster disrupting both local residents and neighboring countries.

In addition to land conversion, ecosystem problems are also caused by population explosions and increased human activities. The increase in population is estimated to reach 11 billion in this century where the largest population growth occurs in developing countries. This increase in population will increase the per capita consumption of the population, thus increasing the need for food and fuel or biofuel (Laurance, 2014). Population growth places additional burdens on natural resource capabilities and waste disposal, lowering environmental quality. The issues that cause ecosystem and social problems come from the same source, i.e. urban development, urban transport, lifestyle, and economy that only emphasize the structure of production and the dependence on the consumption of natural resources and energy in mass (Inoguchi, 2015).

Table 3 – World Energy Consumption

No	Negara	Oil	Natural Gas	Coal	Nuclear Energy	Hydro Electric	Total	%
1	USA	937.6	582.0	564.3	187.9	59.8	2331.6	22.80%
2	China	308.6	35.1	956.9	11.3	74.2	1386.6	13.60%
3	Federal Rusia	128.5	361.8	105.9	32.4	40.0	668.6	6.50%
4	Japan	241.5	64.9	120.8	64.8	22.6	514.6	5.00%
5	India	119.3	28.9	204.8	3.8	19.0	375.8	3.70%
6	Germany	123.6	77.3	85.7	37.8	6.1	330.4	3.20%
7	Canada	99.6	80.5	30.5	20.5	76.4	307.5	3%
8	France	94.0	40.2	12.5	101.4	14.8	262.9	2.60%
9	United Kingdom	80.8	88.2	38.1	18.1	1.7	226.9	2.20%
10	South Korea	104.8	28.4	53.1	29.6	1.3	217.2	2.10%
20	Indonesia	54.7	30.3	22.2	-	2.5	109.6	1.10%

Source: Word Energy Outlook, 2008.

The high consumption of the world community on the existing resources is also one of the causes of these problems. The existing data confirms that the world energy consumption is controlled by industrialized countries; US energy consumption reaches 22.80% of the world's energy consumption followed by China, Russia and Japan, while Indonesia ranks 20. The need for energy in Indonesia continues to increase; the need for fossil fuel is still the highest requirement in Indonesia followed by electricity and coal. Indonesia's energy needs by type and scenario can be seen in Figure 2.

Increased human activities (development) have also been a cause of increased emissions and global warming. As an example, the CO_2 emission in Jakarta reaches 206

million tons per year. The largest contribution comes from the transportation sector which reached 182.5 tons per year, while the household and industry sectors contribute 23.9 million and 350.3 thousand tons of carbon emissions per year (databoks.katadata.co.id).

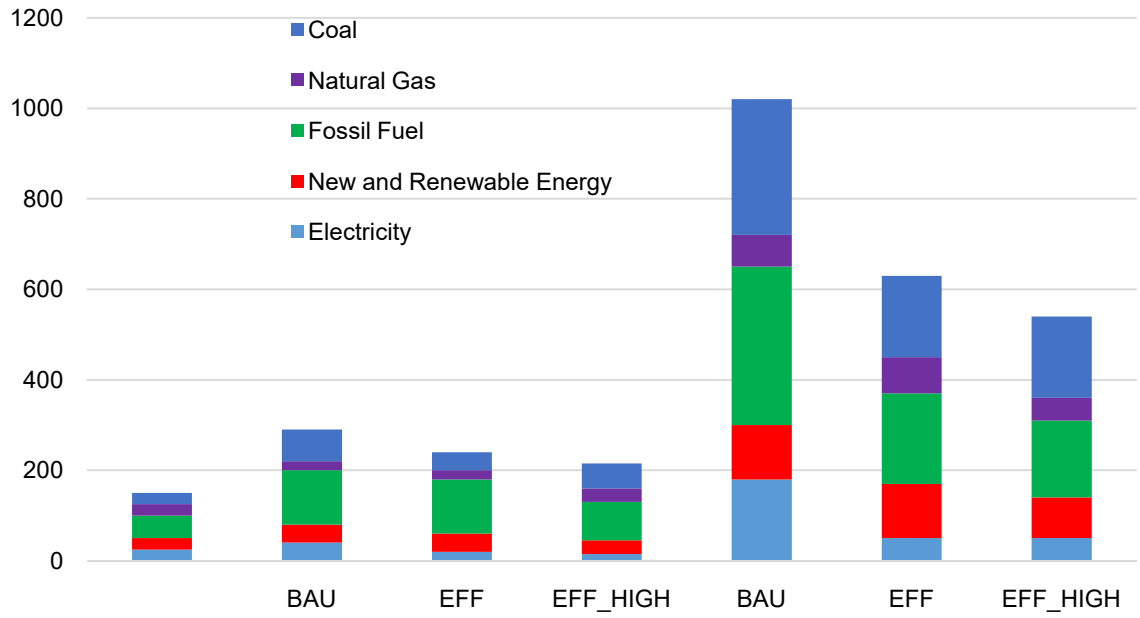

Figure 3 – Energy Requirements by Types and Scenarios (Source: Outlook Energi Indonesia, 2015)

In addition to ecosystem problems, the social problems that arise are also caused by population explosions. Population explosions not accompanied by the increase in employment would lead to an increase in poverty, especially in urban areas, as well as rising unemployment rates as described above.

The ecosystem and social problems because of land conversion, population growth, increased human activities and the development process are related to the carrying capacity of the earth. According to the Law Number 32 of 2009 on Environmental Protection and Management, the carrying capacity is the ability of the environment to support human life, other living things, and the balance between the two; capacity is the ability of the environment to absorb substances, energy, and/or other components in it.

When we review ecosystem and social issues around the world in general are caused by the use of excessive resources leaving the sustainability concept behind. Speaking of green growth, we are talking about economic growth that must be able to reduce or avoid environmental damage. Sustainability and green growth needs cooperation of government (central and local) as well as community and private (NGOs). In this case, the scientists play a role in finding new concepts or models in the application of sustainability and seeking renewable resources.

The study by Motesharrei (2014) has resulted in a Human and Nature Dymanics (HANDY) model based on the utilization and use of limited natural resources and human sustainability, as population growth and the utilization of existing resources do not concern sustainability. The rationale of the HANDY model is the predator-prey model in which population growth is as a ‘predator’ and resources are as ‘prey’ to be finished by humans. The human tendency is to enrich themselves by accumulating capital and savings over the carring capacity of the nature. This causes the existing resources to no longer meet human consumption. This study also examines the different things that allow the occurrence of more complex dynamics that can fundamentally change the behavior and output of the model, namely the accumulation of surplus, which in this study is called the accumulation of surplus wealth.

The results of this study indicate one of the causes of damage in the community (both ecosystem and social), i.e. excessive exploitation of natural resources and excessive economic stratification where the economy is only oriented to the achievement of high economic growth that exceeds the production capacity (overload) to exclude environmental quality. To overcome these problems, a policy is required related to reducing the level of inequality and controlling population growth. The results also mention that although there is no stratification of the economy, the damage can still occur if there is a sharp decline in the value of capital goods. Both of these can be avoided by directing economic growth to sustainable economic growth by utilizing natural resources as wisely as possible.

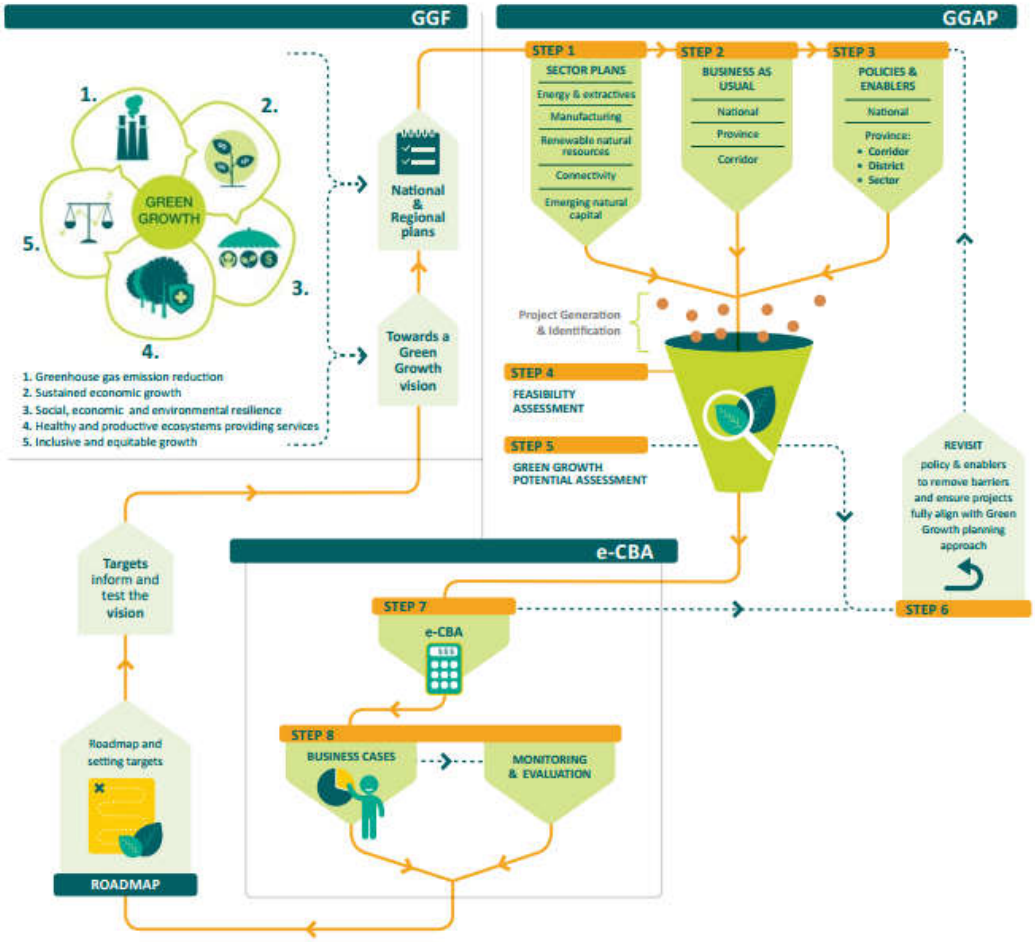

Figure 4 – Assessing and Designing Activities and Investments to Achieve Green Economy and Green Growth (Source: The National Planning Agency, 2017)

Other solutions related to environmental issues caused by the environmental carrying capacity that has been exceeded are planning according to the carrying capacity and environmental capacity. One effort to balance the utilization of resources and the environment is through the process of spatial arrangement based on the achievement of environmental preservation (Wirosoedarmo, 2014). In the preparation of Regional Spatial Plans, both national, provincial, and city levels, and spatial evaluation should have considered the environment as well as the carrying capacity of the environment.

In addition, the study conducted by the National Planning Agency related to green growth states that green economic growth depends on the complex relationship between various investments and field interventions. The process of assessing and designing activities and investments to achieve Green Growth Assessment Process (GGAP) uses indicators at various projects and sectors as well as city, provincial and national levels—to prioritize and assess green growth and green economy projects and policies. By assessing

the performance of green economic growth from projects and policies in the field, GGAP can improve the design of the planning process and improve the quality of investment (Bappenas, 2017).

Conclusion. Based on the above description, the following conclusions are given:

- Knowledge and science is a tool and at the same time is a common sense that can be directed to improve the welfare of mankind through the creation of models of economic development that pay attention to the ecosystem and the carrying capacity of the environment.
- As scientists, human can think and analyze of what happened, why it happened and how to solve it; a model or prototype can be made or compiled related to the solution of problems faced by humanity.
- Development planning must not only pay attention to achievements related to economic growth but also pay attention to the ecosystem and the carrying capacity of the environment so the desired economic growth can take place continuously (sustainable). As outlined in the HANDY model, sustainable economic development can occur when we utilize natural resources as wisely as possible.
- Indonesia as a developing country must be oriented to high economic growth.
- Indonesia as a developing country oriented to high economic growth should already implement sustainable economic growth and use natural resources wisely.
- Findings/concepts/models found and produced by scientists associated with sustainability to realize the green growth should be further poured in the form of policies so government and society can implement it.

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