Effectiveness of Strategic Environmental Studies in Supporting Sustainable Development Goals

R V Aryani
Urban and Regional Planner, IAP Jawa Tengah, Indonesia
Corresponding e-mail: rosita.vitri.aryani@gmail.com

Abstract. Development is the process of optimizing all the resources for specific purposes and objectives so that it can be expected that all activities to be carried out by the community will be achieved. The problem is, development often causes a decrease in the quality of the environment resulting in environmental problems. The concept of Sustainable Development is a major concern in various development planning and implementation processes. With sustainable development, development is expected to have a minimum impact on the occurrence of environmental damage. Strategic Environmental Assessment is a study that evaluates policies, plans and programs contained in spatial plans and development plans. The purpose of this study is to identify the effectiveness of strategic environmental assessment activities in supporting sustainable development in Sumbawa Regency. This study uses a descriptive qualitative method by examining the substance of the strategic environmental assessment in Sumbawa Regency. The type of data obtained is primary data obtained from the results of focus group discussions with the community and related agencies. The results of the research are that the strategic environmental study has been quite effective in assessing the negative impacts of a policy, plan and program on the environment, but has not been effective in solving the problem of sustainable development.

Keywords: effectiveness, sustainable development, strategic environmental study

1. Introduction
In recent years, natural disasters and climate disasters often occur in Indonesia which cause many losses both lives and property. According to BNPB, in 2017, there were 2,372 disasters in Indonesia. In 2018 it increased to 2,426 times disaster events [1]. Unfortunately, some types of natural disasters can actually be predicted beforehand by studying the physical condition of nature by avoiding development in certain locations. As a result, despite spatial planning, natural disasters in regions throughout Indonesia continue to occur and cause losses that can actually be minimized by spatial planning that is adaptive to environmental conditions.

Any changes in the regional space in the form of development, will cause changes in the quality of the environment both positive and negative. Whereas the natural environment has limited carrying capacity and capacity. Therefore there needs to be an effort to integrate environmental components in the development aspects [2].

In order to minimize the negative impact of development on the environment, the government issued Law Number 32 of 2009 concerning Environmental Protection and Management (UUPPLH) [3] which under this law the government and local governments are required to make a Strategic
Environmental Assessment (KLHS). The implementation of this law was then followed up with the existence of Government Regulation No. 46 of 2007 concerning Procedures for Preparation of KLHS [4] and Ministerial Regulation No. 96 of 2017 concerning Procedures for Conducting Strategic Environmental Studies [5]. Through this study, the government wants to ensure that the principles of sustainable development have been used as a basis in the planning and preparation of policies, plans, and/or programs (KRP) in every planning, both development plans and spatial plans. In the SEA guidelines there are various steps and analysis variables that are expected to be used to determine the environmental impact of each policy, plan and program. Thus it is expected to predict what impacts might occur if a plan is implemented.

Sumbawa Regency is a regency located in the central part of Indonesia. In 2018 the Regional Government of Sumbawa Regency has prepared a regional spatial plan. The district is located close to the Indo-Australian plate so it has a high potential for disaster. In addition, Sumbawa Regency still has protected forests and has high biodiversity. With the preparation of the KLHS, it is expected that the regional spatial plan prepared can support sustainable development and can prevent the Sumbawa Regency from greater potential impacts from disasters.

**Figure 1.** Physical Condition and Location of Sumbawa on the Indo-Australian Plate (Source: a [6], b [7]).

2. **Aim**
   The aim of this study is to examine the effectiveness of strategic environmental studies in achieving sustainable development goals.

3. **Research Method**
   This study uses a descriptive qualitative method by examining the substance of the strategic environmental studies which are then compared with the sustainable development goals (SDGs). In conducting the research, each stage was conducted using FGD method with the community and local government. To achieve the objectives, the process of preparing a strategic environmental study and the results obtained from the study will be identified in advance based on guidelines issued by the government. The processes, criteria and results of activities are then compared with the sustainable development goals so that the effectiveness of strategic environmental studies in supporting sustainable development objectives can be identified.

   The effectiveness evaluation criteria are:

   a. Strategic environmental assessments are considered effective if the entire process, criteria and results of the study have included elements that need to be achieved in the sustainable development goals.

   b. Strategic environmental assessments are not considered effective if there are parts of the process, criteria or results of the study that have not included the elements that need to be achieved in the goals of sustainable development.
c. Strategic environmental studies are considered ineffective if all the processes, criteria and results of the study have not included the elements that need to be achieved in the goals of sustainable development. The steps taken are:
   a. Identify the problem of sustainable development,
   b. Identify policies, plans and programs that are expected to have an impact on the environment,
   c. Analysis of impacts on policies, plans and programs that have an impact on the environment.
   d. Drafting the alternatives and recommendations for improvement of the plan
   e. Identify the relationship of strategic environmental studies to solve sustainable development problems
   f. Identify the relationship of strategic environmental studies to meet the sustainable development goals.

4. Discussion

4.1. Identification of Sustainable Development Problems.
The basic principle of sustainability is the integration of environmental, social and economic awareness into effective decision making processes, community participation, prevention / mitigation measures against threats of environmental damage that are difficult to repair, balance of resource use between current and future generations, and environmental safety to protect biodiversity and maintain important environmental processes and systems [8]. Based on the results of the focus discussion group, it is known that there are 68 sustainable development issues consisting of economic issues, social issues, and environmental issues. After screening, it is known that there are 6 priority sustainable development issues that become the main problems. There are natural disaster vulnerability; the threat of environmental degradation; regional disparity; inadequate sanitation services, solid waste and infrastructure; and low levels of welfare and quality of life of the community.

4.2. Identification of policies, plans and programs that are expected to have an impact on the environment
In this stage an analysis of policies, plans and programs will be carried out using the criteria of the effect of their impacts on climate change, biodiversity degradation, disaster intensity, degradation of the quality of natural resources, improvement in the conversion of forest and land areas, increasing numbers of poor people and threats sustainability of community livelihoods, and increased risks to health and safety. In addition to these criteria, a cross-tab analysis was also conducted by giving an assessment / scoring of the relationship between the policies, plans and programs and the priority sustainable development issues in Sumbawa Regency.

Based on the results of a cross-tab analysis, it was found that the policy, plans, and programs considered to be able to have an impact on the environment included the construction of a road network, the construction of a electric steam power plant, residential designation areas, and mine designation areas.

4.3. Analysis of policies, plans and programs that are expected to have an impact on the environment
This analysis is carried out using the criteria of impacts on carrying capacity of the environment, impacts and risks to the environment, impacts on the performance of ecosystem services, impacts on the efficiency of natural resource utilization, impacts on vulnerability and climate change capacity, and impacts on resilience and potential biodiversity.

4.3.1 Road Network Development Plan. Infrastructure has an important role in the economic system. The better the state of infrastructure, the smoother the movement of the population, it can be expected that economic activity can run smoothly so that regional disparities can be reduced, and community welfare can be increased. The expected follow-up impact of the development of the road
network is expected to be the opening of employment opportunities and increasing people's economic activities. Even a study conducted by the Institute for Economic and Community Research at the University of Indonesia's Faculty of Economics on the Impact of Infrastructure Development on Economic Growth, shows the results which state that 1% increase in road stock will increase economic growth by 8.8% [9]. However, the development of road networks can have an impact on the environment. Based on the results of the analysis, it is known that from the 4 locations of the road network plan, the most land use that will be converted was the form of agricultural land wetlands and dry land, buildings, forests, mangroves, and green space. From the four planned locations, two locations have a carrying capacity of land that is safe to develop. One planned location is in a tsunami prone coastal area. One location plan, has a part of which is located on land that is safe to develop, and the other part was located in unsafety development area because it is on landslide and through protected forests. In general, the impact of the road network development plan is a decrease in agricultural production, more openness of the coastal area, a decrease in infiltration land and it is possible that there is a need to replace the houses that affected by road construction.

Ecosystem services are the ability of land to provide support to human life such as food, water, energy, climate, and so on [10]. With the use of space that is not in accordance with the services that can be provided by ecosystems, the utilization of the ability of ecosystem services will not be optimal. Ecosystem services that might be affected are food ecosystem services, water service ecosystem services, and ecosystem services that regulate water and flooding. Of the four locations, the road network plan, the land that will be used for development in Sumbawa Regency is land with the ability of medium class food providers, the ability of high class water providers, and flood control and medium class water management. This shows that the location of the road network plan has an average impact on the ability of the affected ecosystem services. But in terms of climate change, the road network development plan is located in an area with high-class climate regulating capability and is located on land with high-class biodiversity capability. This correlates with the location of the plan that will convert forest land. The conversion of forest land will reduce the ability of ecosystem services to manage climate and control biodiversity.

4.3.2 Electric Steam Power Plant Development Plan. Based on the results of the analysis it is known that the most land use that will be converted is forest land located on the coast and prone to tsunami disasters. Land carrying capacity is generally safe to develop but has the potential to be affected by a tsunami. The impact of the development of the power plant is air pollution, noise pollution, pollution due to coal waste, and coastal pollution due to liquid waste in the form of death of coral reefs and other coastal biota, and climate change. [11,12]. Natural resources that will be affected are the decline in non-rice agricultural products, forest products in the form of wood and decreased pond production. Ecosystem services, food providers, water providers, and regulators of water and flood systems that will be affected are mostly in the medium and high classes. Climate control ecosystem services and biodiversity ecosystem services that are affected are in the middle class. This shows that the PLTU development plan has a moderate impact on the ability of affected ecosystem services.

4.3.3 Planned Residential Area. Based on the analysis it is known that the most land use that will be converted is wet agricultural land in the form of rice fields and dry land. Land carrying capacity is generally safe, but there are several locations of residential areas located in areas with land carrying capacity with high vulnerability and high landslide threats. The impact of the development of the allotment of settlements is garbage that can pollute the environment both land, water and air when burned.

Ecosystem services that will be affected for food service ecosystem services are mostly in the high class, water supply ecosystem services are mostly in the middle class, and water and flood regulating services are mostly in the medium and low classes. Development on land with the ability of high-class food service ecosystem services will have an impact on the area of land capable of providing high-
class food. This correlates to the most area of land to be converted into agricultural land. The final effect is a decrease in the amount of agricultural production. The planned residential areas are mostly on land with medium class climate control ecosystem service capability, and most land with biodiversity capability is in medium and low class. This shows that the planned residential areas have more impact on the reduction of land area with the ability of high-class food service ecosystem services which are mostly agricultural land and can have a significant impact on the decline in agricultural production, especially rice.

4.3.4 Planned Mining Area. Analysis of the planned mining area is difficult to do because in order to determine a true land that has potential for mines it is necessary to do more in-depth research while the designation area map is only based on conjecture. Therefore the analysis of mine designation area plans cannot be done thoroughly. The analysis conducted is only in the form of impacts on the environment where the impacts that may occur are in the form of environmental damage and critical land due to mining activities.

4.4. Drafting alternatives and recommendations for improvement of the plan
Drafting alternatives is use to find alternatives for improvement or improvement of the plan. With the preparation of alternatives, it is hoped that the best recommendations can be given for improvement or improvement of the plan. The recommendations given only relate to plans deemed to have an impact on the environment described above.

For the road network development plan, the recommendations given are in the form of a change in the way of avoiding irrigated paddy fields, protected forests and landslide areas and the development of mangrove areas in the planned road network located in the coastal area.

For the PLTU development plan, the recommendations given are in the form of providing waste treatment system, providing green belt space, and limiting the development of the area around the PLTU. For the residential areas, it is recommended to develop the scope of solid waste services, to restrain the rate of development of settlements on land and to limit the development of settlements on paddy land with a high-rise development efficiency in the downtown area.

For the mining area, it is recommended that the development of WWTPs, the prohibition of mining activities on agricultural and forest lands, and the rehabilitation of former mining areas.

4.5. Identify the relationship of strategic environmental studies to solving sustainable development problems
Looking at the substance of the analysis, the components analyzed are only the policies, plans, and / or programs of the plan that are considered to have environmental impacts. However, the issue of sustainable development that was identified earlier was not analyzed further. The issue of sustainable development is only used to identify policies, plans, or programs that can impact the environment. As a result, there is no solution to the issues of sustainable development that occur.

4.6. Identify the relationship of strategic environmental studies to meet the objectives of sustainable development.
There are seventeen sustainable development goals, there are poverty alleviation; ending hunger with efforts to achieve food security and promote sustainable agriculture; promote healthy living and support welfare for all ages; ensuring quality education for everyone; achieving gender equality and empowering all women; guarantee access to clean water and proper sanitation; ensure access to clean and affordable energy; decent work, economic growth and decent work for everyone; building industry, innovation and infrastructure; reduced gap; make cities safer and more sustainable; handling climate change; protecting marine ecosystems; protection of terrestrial ecosystems; fostering a peaceful and resilient fair society; and foster a global partnership for sustainable development.
The seventeen sustainable development objectives are then compared to the identified sustainable development issues, the results of the analysis with the environmental impact analysis criteria, as well as the results of the analysis carried out, the following results are obtained:

a. The analysis criteria have accommodated the principles in the goals of sustainable development
b. The results of the analysis have accommodated the principles in the goals of sustainable development
c. Most of the objectives of sustainable development are sustainable development issues which are also a problem in Sumbawa Regency. But in a strategic environmental study, analysis is only done for policies, plans and / or programs that are considered to have an impact on the environment. While the issue of sustainable development that has been identified at the outset is not analyzed further so that no solution can be formulated for the problem of sustainable development that occurs.

Thus it can be concluded that a strategic environmental study despite conducting a study of the environment using criteria related to the objectives of sustainable development and producing results of studies that adhere to the goals of sustainable development, but the ultimate goal is to ensure that the principles of sustainable development have been used as a basis in planning and compilation of policies, plans, and / or programs in each plan have not been achieved.

5. Conclusion
Based on the results of the study it can be concluded that:

a. In the process of preparing a strategic environmental study, identification of sustainable development issues has been carried out
b. The analysis process has used criteria that meet the elements in the goals of sustainable development so that the results have also met the principles of sustainable development
c. Sustainable development issues that were identified at the beginning were not carried out further analysis so that no recommendations were obtained to resolve sustainable development issues
d. There is a process that has been missed so that the ultimate goal of a sustainable environmental study is to ensure that the principles of sustainable development have been used as a basis in planning and formulating policies, plans, and / or programs in each plan that has not yet been fully achieved.
e. It can be concluded that the strategic environmental study has not been effectively achieving sustainable development goals.

6. Recommendations
Recommendations that can be given so that a sustainable environmental study can be effectively supporting sustainable development goals is to conduct a further analysis of the sustainable development issues that have been produced to find solutions to problems. The criteria used can be different from the criteria used for the analysis of policies, plans, and / or programs that have an impact on the environment but still accommodate the principles of sustainable development.

References
[1] Badan Nasional Penanggulangan Bencana 2019 Infografis
[2] Muta‘ali L 2012 Daya Dukung Lingkungan untuk Perencanaan Pengembangan Wilayah (Yogyakarta: Badan Penerbit Fakultas Geografi, Universitas Gadjah Mada)
[3] Anon 2009 Law of the Republic of Indonesia Number 32 Year 2009 Concerning Protection and Management of Environment (Jakarta)
[4] Anon 2016 Government Regulation and Number 46 of 2016 concerning Procedures How to Carry Out an Environmental Study (Jakarta)
[5] Minister of Environment Regulation 2017 Number 69 of 2017 concerning Implementation of Government Regulation and Number 46 of 2016 concerning Procedures How to Carry Out an Environmental Study. (Jakarta)
[6] Pemerintah Daerah Kabupaten Sumbawa 2018 *Kajian Lingkungan Hidup Strategis RTRW Kabupaten Sumbawa*

[7] Pusat Litbang Perumahan dan Permukiman. Badan Penelitian dan Pengembangan Kementerian Pekerjaan Umum dan Perumahan Rakyat 2018 *Pusat Studi Gempa Nasional* (Jakarta)

[8] Hameed A A 2019 *Smart City Planning and Sustainable Development* *IOP Conference Series: Materials Science and Engineering* vol 518 p 22042 [crossref]

[9] Sumaryoto 2010 Dampak Keberadaan Jalan Tol Terhadap Kondisi Fisik, Sosial, dan Ekonomi Lingkungannya *J. Rural Dev.* 1 161–8

[10] Julianti S A, Jamaluddin and Amiruddin 2018 Dampak Keberadaan Pembangkit Listrik Tenaga Uap (Pltu) Terhadap Kondisi Sosial Ekonomi *J. Pendidik. Geogr.* 6 35–43

[11] Muta'ali L 2019 *Daya Dukung dan Daya Tampung Lingkungan Hidup Berbasis Jasa Ekosistem untuk Perencanaan Lingkungan Hidup* (Yogyakarta: Badan Penerbit Fakultas Geografi UGM)

[12] Prakoso B A, Rostyaningsih D, Sundarso S and Marom A 2016 Evaluasi Dampak Pembangunan Pembangkit Listrik Tenaga Uap (Pltu) Tanjung Jati B Di Desa Tubanan Kecamatan Kembang Kabupaten Jepara *J. Public Policy Manag. Rev.* 5 208–22