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SURAT KETERANGAN
HASIL PEMERIKSAAN TINGKAT PLAGIARISME
Nomor : 127 / UN63.3/ TU.PLAGIASI/IV/2023

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Judul Karya Tulis	: Sustainability Index of Benoa Bay Beach Reclamation
Jenis Publikasi	: Jurnal
Penulis	: Dr. Ir. Munawar Ali, MT.
Tingkat Kesamaan (%)	: 19 %

Demikian Surat Keterangan ini dibuat dengan sebenarnya, agar dapat digunakan sebagaimana mestinya.

Surabaya, 10 April 2023
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Sustainability Index of Benoa Bay Beach Reclamation

by Munawar Ali

Submission date: 26-Apr-2023 10:21AM (UTC+0700)
Submission ID: 2007047315
File name: 5.Sustainability_Index_of_Benoa_Bay_Beach_Reclamation.pdf (634.61K)
Word count: 8954
Character count: 49862

International Journal Publishing
INFLUENCE: International Journal of Science Review
Volume 5, No. 2, 2023
https://influence-journal.net/index.php/influence/index

Research Article

Sustainability Index of Benoa Bay Beach Reclamation Against National Resistance

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Academic Editor: Nguyen Ngoc Anh

Abstract. This study aims to analyze systematically and thoroughly about how the impact of coastal reclamation on National Resilience. The activity starts from a thorough understanding of the system that occurs in the reclamation and variable processes that affect national security. The research method used analysis Multi-Dimensional Scaling Method. The Benoa Bay reclamation activity plan, multi-dimensional analysis is not or less sustainable, with an index of 42.93 %. The most sensitive attribute influences the dimensions of the environment, is the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13. The most sensitive attribute affecting the economic dimension is an increase in regional revenue. In the sensitivity test of the socio-cultural dimension, the most sensitive and influential attribute obtained is the perception of the community shop. The most sensitive attribute influencing the legal dimension is the formal rules, there must be formal rules, indeed administratively the formal rules are legal products that are approved by the institutions governed by the law, but usually what is forgotten is the process of realizing formal rules.

Keywords: *Systemic Analysis, Coastal Reclamation, National Resilience*.

A. INTRODUCTION

The Benoa Bay reclamation project in Bali apparently still holds controversy and conflict that is prolonged and never ends. The problem is se the increasing potential for conflict due to conflicts between the voice and the will of the people who supported the provincial administration with the will of the central government, which wants to keep building and developing Benoa Bay area into a tourist area, complete with various facilities and modern infrastructure. Although it has received many rejections from various elements of society and is now beginning to get strong support from the Provincial Government of Bali, the reclamation project will continue to take place in view of Republic of Indonesia's Presidential Regulation No. 51 of 2014 concerning Amendment to Presidential Regulation No. 45 of 2011 concerning Denpasar Urban Spatial Planning, Badung, Gianyar and Tabanan, are still valid and have not been revoked.

Based on the Presidential Decree, the Benoa Bay Area will be designed as a potential area for developing economic, social, cultural and religious activities, without neglecting the function of preserving the Ngurah Rai Grand Forest Park and preserving the surrounding ecosystem, as well as the existence of infrastructure. and infrastructure in the Benoa Bay area. In the Benoa Bay Area, a new reclamation island with an area of 838 hectares will be built, with all the facilities, such as Disneyland, Art Center, Golf Course, and a luxury star hotel (For the BALI Newspaper, 22 March 2014).

Some community members who reject the reclamation project consider that the development of the Benoa Bay Area through reclamation can have a negative impact on aspects of national resilience, especially on the sub-aspects of social, cultural, economic, defense and security resilience. The impact on sub-aspects of social and cultural resilience,

the reclamation project is predicted to cause negative changes in the social and cultural life of the Balinese people. P there are sub- economic, the reclamation project is predicted to turn off the economy of the fishermen in the poor category, and vice versa instead of raising the economy of the investor who has been established. Impacts on the national defense and security sub- aspects, the reclamation project, along with social, cultural and economic changes, can have a systemic impact on the decline in national defense, and the high threat of maritime security.

Predictions in the form of perceptions that develop among the community are a reflection of the hypothesis that must be proven correct, so that more in-depth research is needed to assess whether there is indeed a systemic impact on the development of the Benoa Bay reclamation on national security.

To determine the originality and novelty of this dissertation research, there are at least two approaches taken, namely (1) the object of research and the methods used and (2) the results of research in the form of variable relationship formulations or reconstructions of previous theories. Academically, this research has never been done by researchers before, both object and method. The object of this research is directed at how the systemic analysis of the impact of the Coastal Reclamation from Legal, Economic and Socio-cultural aspects on National Resilience, using methods which are the development of Dynamic System concepts and models . The objects, concepts and methods of this research have been partially used by researchers and scientists beforehand, however, the use together and integrated into a system that interacts between aspects has never been done, both in terms of Law, Economy, Social and Culture and aspects of Reclamation and National Defense.

B. LITERATURE REVIEW

1. Coastal Reclamation

According to his understanding in language, reclamation comes from English, *to reclaim* which means to repair something that is broken. Specifically in the English-Indonesian Dictionary the meaning of *reclaim is* referred to as making land (*from the sea*). Still in the same dictionary, the meaning of the word *reclamation is* translated as the work of acquiring land. Not many experts have defined or provided an understanding of coastal reclamation.

Coastal reclamation activities are technological efforts by humans to change a natural environment into an artificial environment, a typology of estuary ecosystems, mangroves and coral reefs into a landform. Reclamation is an activity carried out by people in order to increase the benefits of land resources in terms of environmental and socioeconomic point of view by means of land subsidence, drainage or drainage (Law No 27 of 2007).

Another notion of reclamation is a work / business utilizing areas or land that are relatively useless or still empty and watery into useful land by draining. For example, in coastal areas, swampy areas, offshore/in the sea, in the middle of a wide river, or in a lake. Basically, reclamation is an activity to change the coastal waters into the mainland. Reclamation is intended to change the low land surface (usually affected by standing water) to be higher (usually not affected by standing water).

By definition, the main goal is to make the region an aqueous reclamation of damaged or useless become better and more useful. The new area, usually used for residential areas, industry, business and shopping, agriculture, and tourist attractions. In city planning, coastal reclamation is one of the steps to expand the city. Reclamation is practiced by countries or big cities whose growth rates and land requirements are increasing so rapidly but are experiencing problems with the increasingly narrow land area (limited land). Under these conditions, the expansion of the city towards the mainland is no longer possible, so a new

land is needed. Reclamation methods provide benefits and can help the state/city in the framework of providing land for various purposes (city expansion), structuring coastal areas, developing marine tourism, and other things.

Reclamation of water areas is an effort to form a new land area both in the coastal area or in the middle of the ocean. The main purpose of this reclamation is to turn a damaged or untapped watery area into a new area that is better and useful for various economic needs as well as for other strategic purposes. The new land area can be used for residential, industrial, business and shopping areas, airports, urban areas, agriculture, alternative transportation routes, coastal freshwater reservoirs, integrated waste management and environmental areas, and as an embankment protecting old land from abrasion threat and to become an integrated tourism area. This reclamation activity is usually carried out by an authority (state, big city, area manager) which has a high growth rate and land needs are increasing rapidly, but experiencing constraints of limited or available space and land to support the existing growth rate, so it is necessary to develop an area new land.

In the context of regional development, the reclamation of this coastal area is expected to be able to increase the overall *carrying capacity and environmental carrying capacity* of the region. Reclamation is carried out in the context of increasing the benefits of land resources in terms of environmental and socio-economic perspectives by irrigation, drainage or drainage (Law 27, 2007). This generally occurs due to the high level of human population, especially in coastal areas, so it is necessary to find a solution (Indonesian National Encyclopedia, 1990).

2. National Defense

Indonesia's National Resilience is a dynamic condition of the Indonesian nation that includes all aspects of national life that are integrated, containing resilience and resilience which contain the ability to develop national power, in facing and overcoming all challenges, threats, obstacles and disturbances both coming from outside or from in, to guarantee the identity, integrity, survival of the nation and state and the struggle to achieve its national goals, (RI Defense White Paper, 2015).

In organizing and organizing their lives, the Indonesian nation is inseparable from the influence of interaction with its environment, both in national, regional and global scope. To develop their lives and realize their various national interests, the Indonesian people have a perspective, a way of reviewing, a sense of responsiveness, which is called Archipelago Insight as a national insight. Archipelago's insight which serves as a guide, guide, and guide, so that all efforts of the nation continue to lead to the realization of national ideals and the achievement of national goals. A goal that has been a pledge or agreement with all the people of Indonesia, to form a state government that protects all the people of Indonesia and all of Indonesia's blood, promotes public welfare, educates the life of the nation, and participates in implementing world order based on independence, eternal peace, and social justice (Marsetio, 2015).

In an effort to achieve its national goals, the Indonesian people are always faced with various forms of challenges, threats, obstacles and disturbances, both directly and indirectly that can endanger the integrity, identity, survival of the nation and state. For this reason, resilience and resilience are needed which contain the ability to develop national strength in aspects and dimensions of national life called National Resilience. Nusantara insight has a geographical meaning that pays attention to marine affairs.

The National Resilience Conception of Indonesia is the concept of National Resilience or the development of national strength through the regulation and implementation of welfare, security that is balanced, harmonious and harmonious in all aspects of life as a

whole and integrated based on Pancasila, the 1945 Constitution and Archipelago Insight. The concept of Indonesia's National Resilience is a guideline (means) to improve (the method) the resilience and resilience of the nation which contains the ability to develop national power, with a welfare and security approach. National living conditions are a reflection of national resilience based on the idiomatic foundation of the Pancasila, the constitutional foundation of the 1945 Constitution, and the conceptual foundation of the Archipelago's Insight. The essence of Indonesia's national resilience is the resilience and resilience of the nation which contains the ability to develop national power, to be able to guarantee the survival of the nation and state in achieving national goals. While the essence of the conception of Indonesia's national resilience is the regulation and implementation of welfare and security in a balanced, harmonious, and harmonious manner in all aspects of national life (RI Defense White Paper, 2015).

C. METHODS

This study aims to evaluate, identify and systemically analyze the Coastal Reclamation policy by the Government and its influence on the National Resilience of the Indonesian Nation which as a *case study* is a Coastal Reclamation project in Indonesia (for example such as the Reclamation of the Benoa Bay of Bali, the Reclamation of Lamongan Beach and Kenjeran Beach, Surabaya, selected one *case study*).

Retrieval of data in the form of open questionnaires and in-depth interviews conducted during this period. For variable data and Beach Reclamation policy criteria that are qualitative and have a preference value, taken from the *Expert Judgment*. The *expert judgments* as research subjects were chosen because they are very knowledgeable about the problems of beach reclamation and are competent in their fields. Validation of the results of interviews and questionnaires also need to be done in this dissertation research with the aim of obtaining valid and objective data on the thoughts of the *Expert Judgments*. The list of *experts* as resource persons and research respondents is in accordance with Table 1. Research Resources/Informant Plan as follows:

Table 1. Research Resources/Informant Plans

No	Expert Judgment Speaker/Position of Respondent	Work Unit	Amount
1	Regional Development Institution Expert Staff	Regional Government/Provincial Government	2
2	Expert Staff of the Tourism Institution	Regional Government/Provincial Government	2
3	Expert Staff of the Environmental Institution	Regional Government/Provincial Government	2
4	Expert Staff from the Navy	Lantamal/Lanal	2
5	Academics (Lecturer)	University of Higher Education	2
6	Reporters	Post newspaper	2
7	Indigenous Peoples	Local Area	2
TOTAL			**1 4**

Source: Processed Researcher Data (2020)

1. Research Design

The design model of this research can be presented in the form of input, process and output diagrams that illustrate the research process from obtaining data, processing data to analyzing and evaluating the results/output of research data. Broadly speaking, Research Model Design in the form of *Input, Process* and *Output*

Research Design-Output Diagram, *input* and identification of data variables that affect the coastal reclamation system both in the environmental, economic and socio-cultural aspects, which are broadly divided into 2 types, namely qualitative data and quantitative data. Qualitative data is data in the form of *linguistic* that has not been measured quantitatively, whereas quantitative data is data that has been measured in the form of numbers. This data grouping needs to be done because the two types of data require different data processing.

Furthermore, at the stage of the process an investigation is carried out on how to analyze and evaluate coastal reclamation policies, which is the integration and development of the concept of policy evaluation theory with the dynamic system method into a model of policy evaluation in determining coastal reclamation. In this process all elements and variables as a system are included as variables that interact with each other. The integration of both theoretical concepts and methods applied to the assessment criteria for reclamation covering the aspects of environment, aspects of economy and aspects of the Socio-Cultural. Finally, the *output* stage *is* carried out in the formulation of a model for policy evaluation and the determination of policy scenarios, which are then simulated in the model and the results analyzed and evaluated to obtain the best and sustainable policies.

2. Identification of Aspect Variables and Criteria

Variable aspects and criteria in this study obtained from the initial observation and understanding of the system of reclamation, the initial discussion with the *expert*, were followed by *literature review* and critical assessment of previous studies. These are the main underlying factors in the preparation of variable aspects, criteria and components that have a systemic influence on the system of coastal reclamation. Until the end can be composed of 4 (four) variable main aspects and sub-criteria, which affects national security:

a. Aspects Environment/*Environmental*
   1). Environmental Impact Analysis
   2). Regional Layout
   3). Coral reefs
   4). Waste
   5). Mangrove Rehabilitation
   6). Sedimentation
   7). Flood
b. Economic aspects
   1). Community income
   2). Economic value of land
   3). Locally-generated revenue
   4). Business predictions
   5). Employment
   6). Community income
c. Socio-Cultural Aspects
   1). Frequency of Conflict
   2). Relocation
   3). Citizen's awareness

4). Community Figure Perception
5). The Role of Community Social
6). Culture.

d. Legal Aspects
1). Legal counseling
2). Formal Rules
3). Availability of law enforcement personnel
4). Compliance with the law
5). Land Status
6). Central policy synchronization
7). Availability of community organizations

3. Data Analysis Technique: ***Multi-Dimensional Scaling (MDS)***

Sustainability is the key to development that exploits natural resources, however, sustainability is difficult to measure when it concerns ecological, economic, social, technological and legal factors simultaneously. Therefore, an alternative to calculating the sustainability of natural resources, the assessment uses MDS, which is a modification of Rapfish. Rapfish is a multi-disciplinary rapid appraisal technique for evaluating the sustainability of fisheries (Hartrisari, 2005). In Indonesia, MDS has been used by Fauzi & Anna (2005) to assess aspects of ecological sustainability, socioeconomic sustainability, socio-cultural sustainability and cultural sustainability, and institutional sustainability. Benoa bay

The sustainability analysis of the post-coal mining land in this study is supplemented by legal aspects, because this aspect is the highest value of obedience of a person or community in the institutional system. Another dimension that needs to be analyzed is from the technological aspect, it is necessary to know to what extent groups or communities around the mine understand about efforts to address post-mining land with knowledge and technology.

The sustainability assessment method uses MDS through three stages, namely: The first stage, determining the attributes of the object being studied against the sustainability status of each dimension (ecology, economy, socio-culture, institutions and technology). To determine: attributes, the number of ranks for each attribute, the determination of scores, based on the availability of literature that can be used. Empirical experiences that have been outlined in research journals, or determined from the results of in-depth discussions between researchers and experts, and the results of questionnaires from respondents can be used as attributes and ranking. Index values with the status of sustainability in specific categories as shown in Table 2.

Table 2. Index Values and Sustainability Categories

No	Index Value	Category
1	0% to 25%	Bad
2	26% to 50%	Less
3	51% to 75%	Enough
4	76% to 100%	Good

To find out which dimensions are most influential on the object being studied, then after each dimension the index value is obtained, the next step is to do a comparison between dimensions, which is visualized in the form of a kite diagram as shown in Figure 1 below

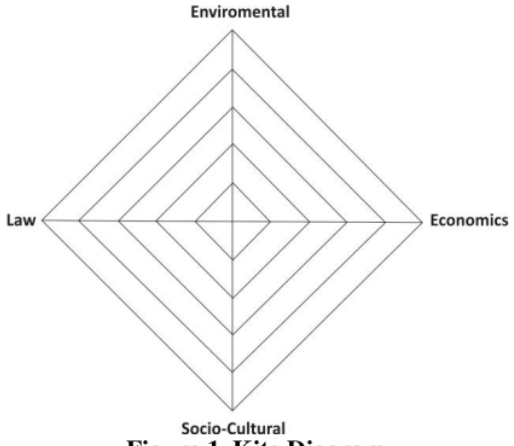

Figure 1. Kite Diagram

From a number of attributes in each dimension will be analyzed (*sensitivity analysis*) how sensitive or sensitive the object is being studied, to the sustainability index in the reclamation model in accordance with the aims and objectives of this study

D. RESULTS AND DISCUSSION

1. Sustainability of Reclamation from the Environmental Dimension

The value of the sustainability index from the environmental dimension is 29.17. Based on the rating scale as in Table 1, it is categorized as less sustainable. The value of this dimension is in line with the results of the questionnaire from the field. In this environmental dimension, it is expected to find out the right intervention in accordance with the conditions of Benoa Bay. Following are the results of the environmental dimension sustainability index.

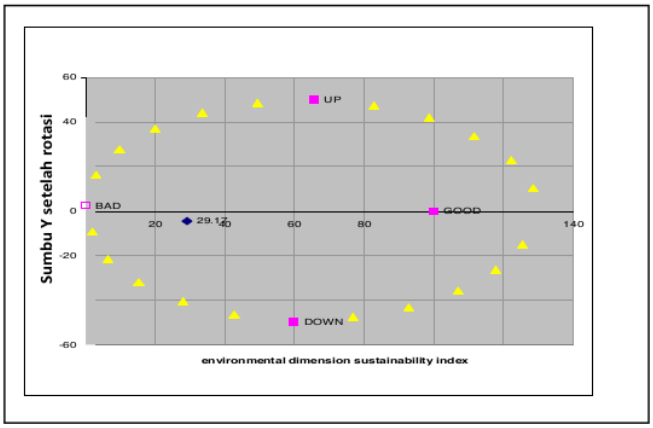

Figure 2. Sustainability index of the environmental dimension of 29.17

In the MDS analysis for the environmental dimension, there are seven attributes that are most sensitive in influencing the value of the sustainability index, namely AMDAL, spatial planning, coral reefs, waste, mangrove rehabilitation, sedimentation and flooding. To find the most sensitive factors that can be used as triggers in this environment, *leverage* analysis is needed. The results of the *leverage* analysis of each attribute are as shown in Figure 3.

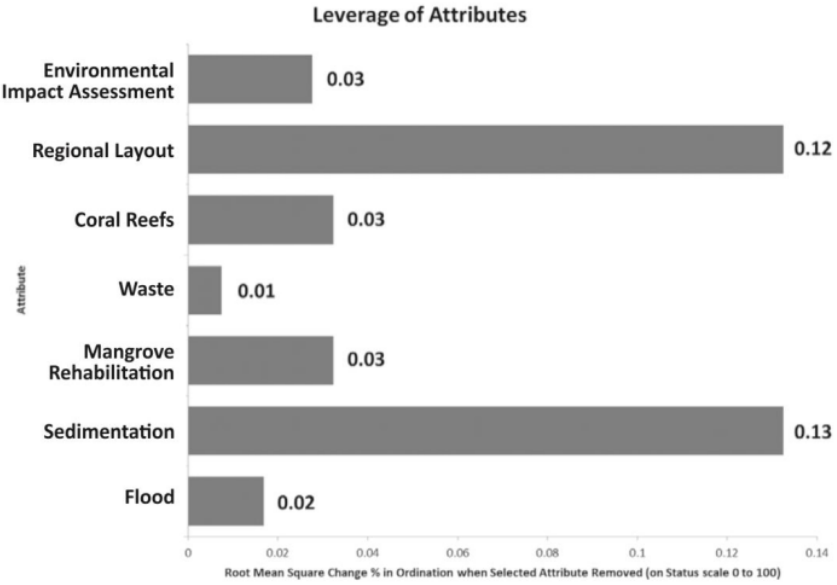

Figure 3. *Leverage* Analysis of Each Environmental Dimension Attribute

Based on the results of the questionnaire scoring, obtained the distribution of respondent data on environmental dimensions spread in the middle area of the range of sustainability. The sustainability index value from the environmental dimension is 29.17 %, included in the less sustainable category. This can be interpreted that the environmental conditions of the Benoa Bay will be less sustainable if carried out reclamation. Management interventions to increase the value of sustainability can provide attributes with high sensitivity, namely sedimentation and spatial planning. The most sensitive attributes that affect the dimensions of the environment, based on the results of the leverage analysis of 7 attributes seen from the value of Root Mean Square (RMS), indicate the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13, followed by the attributes of fish resources (0, 12). This can be interpreted that the sedimentation conditions in Benoa Bay play an important role in environmental sustainability in Benoa Bay. Sedimentation handling engineering must be carried out as an intervention for the sustainability of the environmental dimension if reclamation is carried out in Benoa Bay, so as not to have an impact on fish resources. Reclamation activities in waters have high potential to cause sedimentation. This is similar to the results of a study by Wisha et al. (2018) which predicts the hydrodynamic balance will decrease which causes the sedimentation rate to increase if reclamation is conducted in Benoa Bay. Increased sedimentation will directly affect the condition of the aquatic ecosystem in Benoa Bay. Coral ecosystems are very sensitive to turbidity, one of which is caused by sedimentation in a waters

Reclamation activities in a waters can potentially cause sedimentation, because new islands resulting from reclamation can inhibit the flow of sediment material and cause sedimentation. Sediment material is carried by the flow of currents originating from large rivers which empties into Benoa Bay, including Tukad Badung, Tukad Mati, Tukad Sama, and Tukad Bualu. Sediment flow will follow the movement of the current pattern. Therefore, it is necessary to conduct a hydrodynamic study to determine the hydrodynamic conditions in a waters, especially the condition of current patterns and sediment distribution

patterns. Sediment distribution patterns can be used to determine the level of sedimentation that occurs.

K egiatan Coastal Reclamation Benoa is expected to have an impact on changes in the coastline around Turkish Benoa due to erosion and sedimentation processes. Changes in the pattern of *longshore currents* can lead to acceleration of currents from the side of the Reclamation island that leads to the coast of Benoa bay . This causes the abrasion of beaches affected by the acceleration of currents, and sedimentation in other areas. A major threat arises in the weakening of currents around Tanjung Priok for all tidal conditions in the west and east seasons which can result in siltation in Tanjung Priok due to sedimentation. Finally, there is a threat of water quality degradation during the Reclamation island construction period as indicated by turbidity of the water due to disturbed water circulation and sedimentation. Ecology In terms of ecology, there are several potential problems to occur. First, when the reclamation process at the reclamation site (making land) will change turbidity so that the penetration of sunlight for the photosynthesis process carried out by phytoplankton decreases. As a result, the distribution of plankton as a source of fish food will be affected. Soil material for retrieval also has the potential to damage the ecosystem, if the land does not originate from around the Benoa Bay. Third, the entry of material from terrestrial ecosystems, organic, non-organic waste and mud will greatly disrupt the process that occurs in the Benoa Bay ecosystem.

2. Sustainability of Reclamation from the Economic Dimension

Sustainability index value of the dimension of Economics at 18.82. The value of the economic dimension of sustainability index of that size is the lowest value of the sustainability scale and is classified in the bad category referring to Table 1 of the Index Value and Sustainability Category. The value of this dimension is in line with the results of the questionnaire from the field. Following are the results of the Sustainability Index of Economic dimensions.

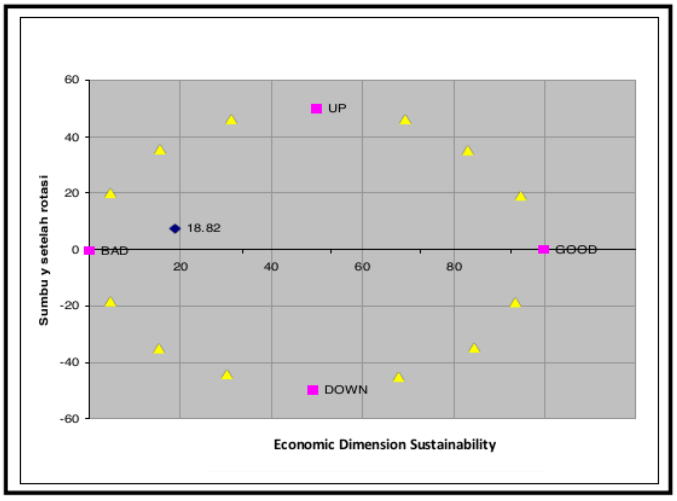

Figure 4. index is 18.82

In the MDS Analysis of the environmental dimension, there are five attributes that are most sensitive in influencing the value of the sustainability index, namely the economic value of land, local own-source revenue, business predictions, employment and community income. To find the most sensitive factors that can be used as triggers in

this environment, *leverage* analysis is needed. The results of the *leverage* analysis of each attribute are as shown in Figure 5.

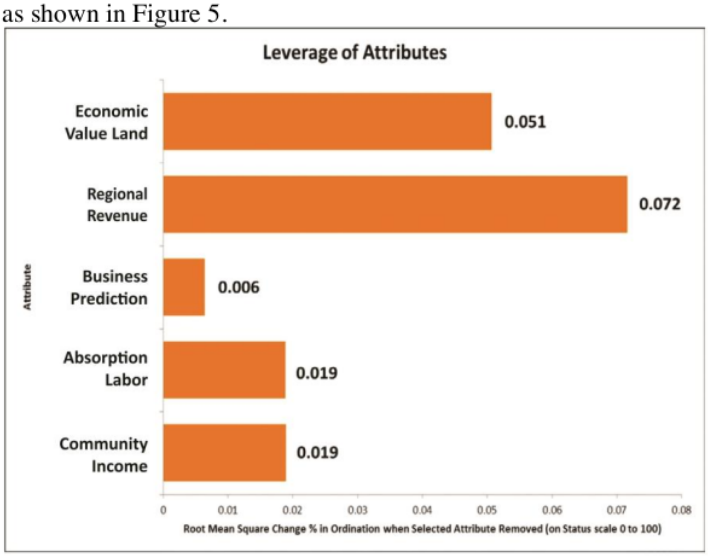

Figure 5. *Leverage* Analysis of Every Economic Dimension Attribute

Reclamation which is targeted to improve the macro economy, is expected to provide micro-economic benefits to the community to achieve prosperity, while still paying attention to environmental quality. The sustainability of the social dimension is analyzed based on 5 attributes, namely the economic value of the land, local original income, business predictions, employment and community income. However, the results of the ordinance analysis for the economic dimension obtained the sustainability value index was 18.82%. This value is in the Poor category. This is considered to be a lack of sustainability due to the uncertainty of reclamation that can improve the welfare of the people around Benoa Bay.

This can be interpreted that the uncertainty of reclamation land management and the design of policies for the regulation of reclamation land contributions have not been clearly regulated. This becomes sensitive because the community still considers that the effort to prosper the community with the reclamation land is not yet certain. Reclamation of land initiated by the private sector is considered by the community to occur. If this development plan can be proven in detail that it is also beneficial to the income of PAD and increase in community income, then the value of sustainability from the economic dimension can get better value. High-intensity reclamation is closely correlated with an increase in per capita gross domestic product (Tian et al., 2016). Policy makers must calculate and analyze in detail the value of trade-offs that will arise with changes in function and land, between short-term investment by granting permission to change land with long-term investment for environmental sustainability (Peng et al., 2013). The tourism industry will undoubtedly increase the income of local people, but if it must be pursued by reclamation, it must continue to consider the sustainability of the biogekimia cycle in Benoa Bay which will later have an impact on the survival of the biota in the ecosystem (Wisha et al., 2018). This is necessary so that policy makers do not only take into account current or short-term economic benefits, without calculating future or long-term losses. It is hoped that the government can

regulate the distribution of economic development in other areas of Bali, so that all Balinese people have the opportunity to improve their welfare.

3. Sustainability of Reclamation from the Socio-Cultural Dimensions

Sustainability index value of dimension Socio-Cultural amounted to 31.70. The value of the sustainability index of the Socio-cultural dimension according to the sustainability index scale as in Table 1 is included in the category of lack of sustainability. The value of this dimension is in line with the results of the questionnaire from the field. The social dimension is the social system and the existing condition of the community which reflects the community's willingness to develop land in the territorial waters that they normally use as a livelihood and living area. The sustainability of the social dimension is analyzed based on 6 attributes, namely the Frequency of Conflict, Relocation, Public Awareness, Public Figure Perception, Role of NGOs and Customs.

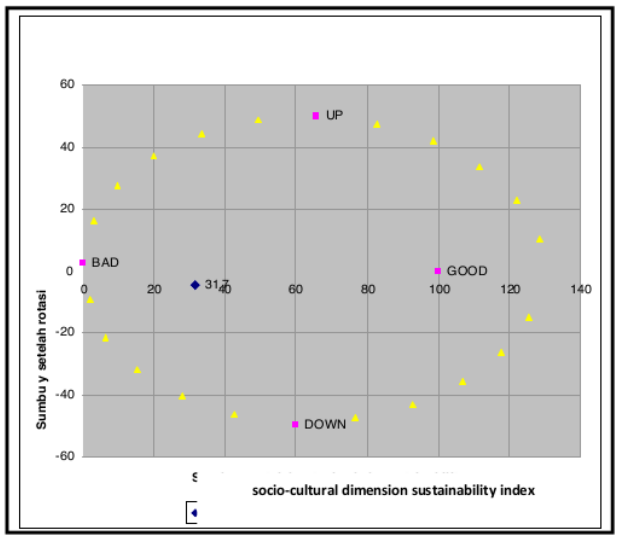

Figure 6. The socio-cultural dimension sustainability index is 31.70

To find the most sensitive factors that can be used as triggers in the socio-cultural dimension, leverage analysis is needed. The results of the leverage analysis of each attribute are as shown in:

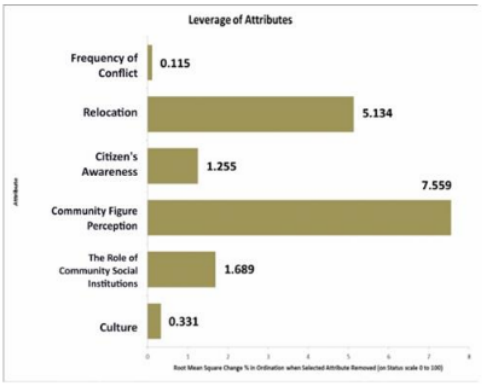

Figure 7. *Leverage* Analysis of Every Attribute of Socio-Cultural Dimensions

In the attribute sensitivity test, the most sensitive and influential attribute was obtained from community shop perception. This attribute has a high sensitivity value when compared to other attributes. perception of community shop occupies the most sensitive attribute and has the highest influence for reclamation sustainability on the social dimension. This is in accordance with the conditions that occur in the communities around Benoa Bay today

The community has an important role in a development plan. Society is not only an object, but a subject in development. As a condition of sustainable development, it is also marked by the acceptance of the development by the community (Socially Acceptable). Community perception is important in a system of development and environmental management. This is reinforced by the results of research conducted by Bennet & Dearden (2013), that the condition of the community rejects an environmental management because it is considered not to support the welfare of the community.

The perception of the Balinese, both the pros and cons of reclamation activities, has been developed. Community perceptions which are more resistant will significantly influence the sustainability of the social dimension of the reclamation plan. Land development carried out by the Private Sector is less accepted among the social community of Bali. The community feels that reclamation is an activity that has a negative impact on the environment and affects the socio-economic conditions of the community. Communities on the coast of Benoa Bay conveyed that their objections to the reclamation plan were demonstrated by various delivery methods, some of which were frontal (demonstrations, installation of billboards at every crossroads, and others), and others expressed aspirations to community leaders or traditional leaders. The reclamation plan was not fully rejected, there are still some community groups who consider that reclamation for the revitalization of the bay is indeed necessary to see the condition of Benoa Bay which is less productive and has decreased the quality of its environment.

This condition must be addressed properly if the planned reclamation plan is scheduled to continue. Community perceptions must be intervened through a social approach so that the initially bad/contra perceptions can slowly change towards being more objective in exposing land development plans in the gulf waters and not causing social conflicts. This might be done by accommodating the socio-economic needs of the community in detail in the development of Benoa Bay. So that the development plan can be accepted by the community and can further increase the value of sustainability in the social dimension which in this analysis is less sustainable.

4. Sustainability of Reclamation from the Legal Dimension

Sustainability index value of the dimensions of the Law of 37.20. The value of the sustainability index of the legal dimension according to the sustainability index scale as in Table 1 is included in the category of lack of sustainability. The value of this dimension is in line with the results of the questionnaire from the field. Sustainability of the legal and institutional dimensions is analyzed based on 7 attributes, namely legal counseling, formal rules, availability of law enforcement personnel, compliance with law, land status, synchronization of central policies, availability of community organizations.

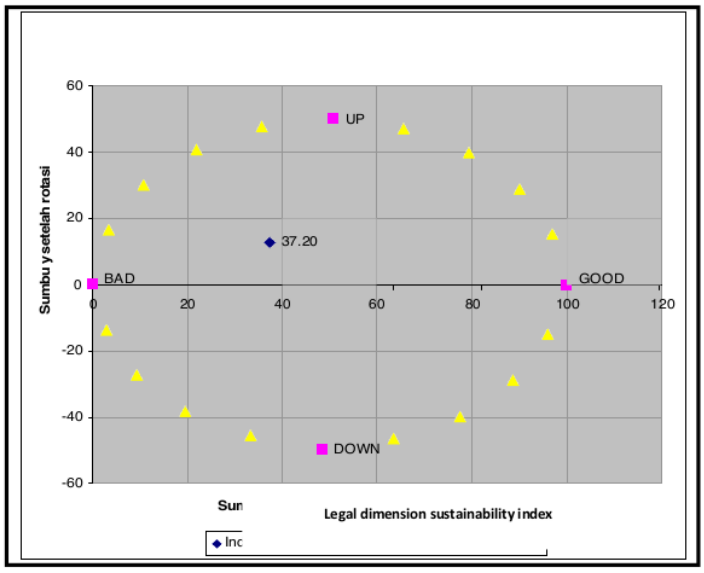

Figure 8. The legal dimension sustainability index is 37.20

To find the most sensitive factor and can be used as a trigger in the legal dimension, leverage analysis is needed. The results of the leverage analysis of each attribute are as shown in Figure 9.

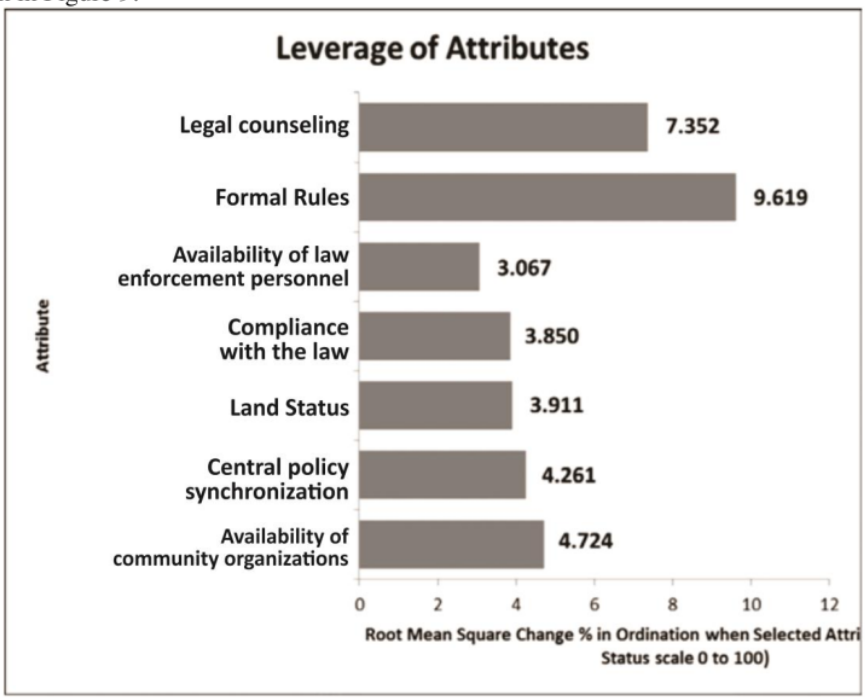

Figure 9. *Leverage* Analysis of Every Legal Dimension Attribute

In the sensitivity test, the attributes of the legal dimension are legal counseling, formal rules, availability of law enforcement personnel, compliance with law, land status, synchronization of central policies, availability of community organizations, obtained by the most sensitive and influential attributes are formal rules. There must be formal rules, administratively formal rules are legal products that are approved by institutions governed by the Act, but usually what is forgotten is the process of realizing these formal rules. A good mechanism in the process of obtaining formal rules is one that absorbs the aspirations of all stakeholders. This is necessary so that the intended formal rules are guarded jointly by stakeholders, not just the authorities. Therefore, the emphasis is on the process of establishing formal rules, it is necessary to make a mechanism together between stakeholders and local authorities. Every analysis carried out as described above, starting from the ecological, economic, socio-cultural, technological dimensions up to the legal dimension shows the different values of the sustainability index. This happens because every attribute in each dimension has a different value too.

The concept of sustainable development also implies that there must be a balance in the index value of each dimension, although in certain conditions in a development sector in an area the sustainability index value of one dimension must still have a high priority scale. For example, the physical construction of a dam in the middle of a watershed from a large area. The dam is for irrigation purposes in the downstream sub-region which is required to have a high economic dimension in the development index. So, in the upstream sub-region the ecological dimension value must be high. That does not mean sacrificing the value of the other dimension index is low, all dimensions that support the implementation of the priority dimension must also have a high sustainability index value. For example, the supporting dimension is the legal dimension. The legal dimension in the upstream region must have a high value of sustainability index, because this dimension has the task of guarding the law and implementing law (*law enforcement*). What will happen if the law is not enforced in the upstream area, the ecological system in the upstream area is overgrown with forest vegetation as a source of regulating springs, the people must obey the laws and regulations, both the unwritten laws such as the rules that apply in the community such as customary law, or the law written what comes from the government

5. Multi-dimensional Recapitulation of Benoa Bay Reclamation Sustainability

Each analysis conducted as described above, starting from the ecological, economic, socio-cultural dimensions, to the legal dimension shows the different values of the sustainability index. This happens because every attribute in each dimension has a different value too.

Recapitulation of the results of the analysis of sustainability values from 4 dimensions, for the reclamation plan in Benoa Bay, it was found that the dimensions with the highest to lowest sustainability values are the environmental dimension, economic dimension, social dimension, and legal dimension. The 4 dimension index values are within the range of values for the Less Sustainable and Poor categories. The lowest sustainability value, the economic dimension, will be estimated to have the highest impact on the reclamation plan, so it must be intervened on target so that the value of sustainability can increase. When the sustainability index is high both before and after an intervention, it does not mean that it does not need intervention anymore but it is still needed and an intervention is carried out with the priority scale at the lowest value

The stress value of the test results in each dimension < 25%, and the coefficient of determination R2 ranging from 93.73 to 95.08 indicates that the quality of the analysis in this study can be generally assessed as good. Furthermore, the sustainability analysis

recapitulation of marine and coastal resources in Benoa Bay reclamation area with a 4-dimensional relationship can be visually seen in the kite diagram.

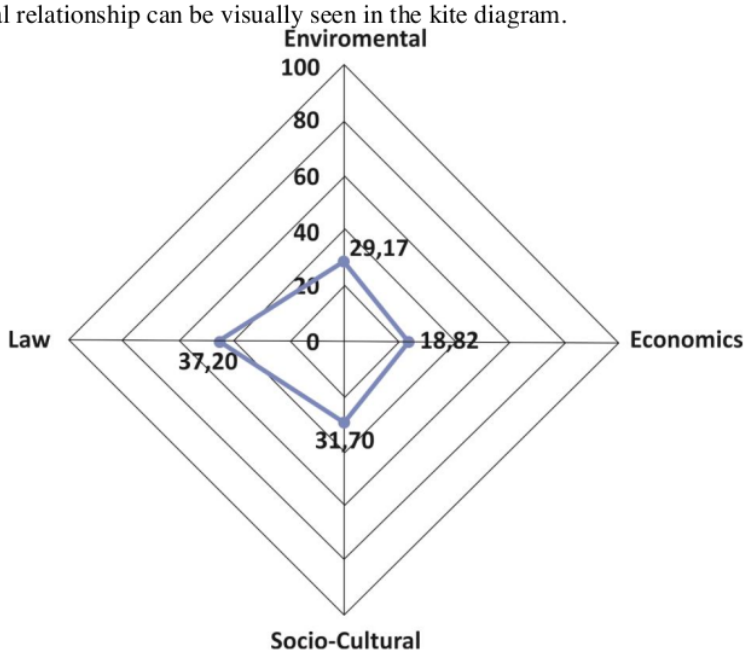

Figure 10. Attribute4-Dimensional Relationship

The elevated diagram is expected to be a general reference in proposing improvements to the status of sustainability of marine and coastal resources at the Benoa Bay reclamation site. In general, the results of the MDS analysis only determine the status or condition of sustainability of each of the 4 dimensions. Specifically, in more detail, the results of this MDS analysis have not been able to determine the sustainability status of the overall dimensions, or more complex dimensions, because the weights of each dimension are considered to be the same.

Based on the results of the analysis of the sustainability index values in each dimension, we then carry out a weighting based on *expert judgment* to assess the total sustainability of marine and coastal resources at the whole Benoa Bay reclamation site. Through this method of analysis, we will get the priority dimension that most influences the sustainability status of marine and coastal resources at the Benoa Bay reclamation site. The results of this analysis are based on primary data through in-depth interviews with experts. Experts in weighting this dimension are practitioners and academics who are respondents for the MDS analysis, which is as many as 5 people. *This expert judgment* is needed as a weighting objectivity of each dimension based on priorities and conditions that are appropriate to describe the level of sustainability of a reclamation activity in Indonesia. Based on the percentage of priority, then calculated with the sustainability index value on each dimension.

Table 3. Calculation of Multi-Dimensional Sustainability Index

No	Dimension	Weight (%)	Sustainability Index (%)	Index Value Weighting Results (%)
1	Environment	22	29.17	9,72
2	The economy	18	18.82	6.17
3	Social	27	31.70	13,21
4	Law	30	37.20	13,83
Total				**42.93**

Source. Analysis results (2018)

Calculation of the weighting results obtained a multidimensional sustainability value of marine and coastal resources at the Benoa Bay reclamation location of 42.93 %. This value is included in the Less Sustainable category. This value is consistent with the results of the analysis in each of the dimensions of sustainability which shows that marine and coastal resources at the Benoa Bay reclamation site will be less sustainable if the reclamation is carried out. In the calculation results obtained by the value of multi-dimensional sustainability for marine and coastal resources at the Benoa Bay reclamation location obtained 42.93 % results. This index value is in the value of 25.01-5050 in the Less Sustainable category. The lack of sustainability of the Benoa Bay reclamation plan given the four dimensions of sustainability analyzed shows less sustainable results.

Interventions to change the level of sustainability for the better in this activity must be carried out holistically and cannot be done in only one dimension. This is because of all 4 dimensions analyzed included in the Less Sustainable category. Possible interventions to improve the sustainability of marine and coastal resources include:

a. On the environmental dimension, technology is needed that can manipulate the condition of Benoa Bay waters which is influenced by tidal conditions, sedimentation, and flow from polluted inland waters. This engineering is needed to be able to maintain the quality of Benoa Bay waters in good condition. Reclamation has the potential to increase the level of turbidity of the waters that will spread beyond the Gulf. This has the potential to damage ecosystems that are outside Benoa which is considered to be able to recover after previous activities, so development must be carried out sustainably and based on ecosystems.
b. In the social dimension needed intervention from a social approach to Balinese society. This effort will be able to change people's perception of reclamation activities that have become synonymous with environmental destruction activities. Socializing the design of regional development and agreeing on the aspirations that the community expects not just from a few groups of people. This situation must be considered by the thick Balinese culture and close kinship.
c. On the economic dimension, clear regulatory intervention is needed in regulating the agreement that the community will get opportunities and increase income with the reclamation in Benoa Bay. Local Revenue Receipts will increase but this increase must be directly felt by the community through development for welfare.
d. On the dimension of the law required regulatory intervention det a il in pass protection laws. Make more strict formal rules in regulating Reclamation activities in Benoa Bay.

6. Influence of Environmental, Economic, Social and Cultural Dimensions on National Security

The effect of reclamation on national security is related to four aspects, namely environmental, economic, social and defense and security. Reclamation is a project that large at the door entrance lane sea. The strategic position of the bay will be affected by the reclamation and can have a major influence especially on economic conditions, defense and security.

Talking about national security means talking about security threats. The national security threat is complex and broad. By knowing the types of threats, anticipation steps and solutions can be taken. National security here is related to safe conditions, free from all threats, disturbances or problems that originate from / through sea waters or use the sea as a medium of crime and lawlessness resulting in material or non-material losses. Based on data that has been collected that maritime security problems in the Benoa Bay in general are sea accidents, pollution and smuggling.

In the maritime security threat matrix at Benoa Bay, it can be seen that the influential aspects are environmental aspects and economic aspects. Pollution and marine accidents tend to be closer to environmental aspects. This is because pollution directly impacts and has a major impact on the environment and accidents too. For example, an oil tanker carrying oil collides with another ship and the oil will leak and spill into the sea, causing pollution. Pollution originating from land or oil spills will damage the environment ecosystem and the biota therein.

In the matrix, smuggling crime is close to economic aspects. Smuggling is an illegal activity. For example, drug smuggling. Drugs are illegal drugs, but because of their addictive nature, the demand for drugs is always there. This has become a business field for the party supplying. Drugs is an international business and involves inter-countries which are mostly smuggled by sea. Because of its nature involving many countries, drugs are included in transnational crime. Transnational crime in its response requires cooperation between countries. Indonesia is a destination country for drug smuggling because there are many drug users / requests in Indonesia. Moreover, Indonesia is an archipelago country that is open so that it will be easily accessed. Handling through surveillance and security in the sea.

With regard to national security, reclamation can potentially be a trigger for social conflict. Reclamation which is used as an elite and exclusive area that is not fair will cause frictions in the social class of the community. Low social class people will feel jealous of high social class people. Generally fishing communities are low social communities that have lived and settled in the Bali region so that if the area changes and becomes a new area inhabited by people other than them it will cause social conflicts

"Homeland security" can reach a broad spectrum, ranging from poverty, epidemics and natural disasters, social unrest, class disputes, crime, armed insurgency to armed separatist movements. Disturbances arising from social inequalities have the potential to become a serious threat to human security, without having to pose a threat to the functioning of state government institutions and are not at all related to the issue of territorial integrity. Meanwhile, disputes between groups can be a serious threat to the functioning of the governmental functions, although not included as a threat to the territorial integrity. Separatist movements are threats that are directly related to the territorial integrity and functioning of government. The reclamation problem also has the potential to threaten national security because even if it does not threaten sovereign territory, it could potentially threaten the functioning of the state government. Reclamation can threaten the function of the government of the country through activities that cannot be monitored and monitored in the

area of reclamation islands. Residents of the reclaimed island with minimal supervision will have the potential to infiltrate foreign immigrants who reside without being recorded

Local government has an important position in security. Local government has an important role in realizing national security. Local government can be the frontline in the implementation of national security because it deals directly with the public and comes into direct contact with problems on the ground. The role of local government related to national security that includes public security, human security and internal security (internal security)

E. CONCLUSION

Based on the results of the analysis by the Multi Dimentional Scaling Method. The Benoa Bay reclamation activity plan, multi-dimensional analysis is not or less sustainable, with an index of 42.93 %. The most sensitive attribute influences the dimensions of the environment, is the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13. The most sensitive attribute affecting the economic dimension is an increase in regional revenue. In the sensitivity test of the socio-cultural dimension, the most sensitive and influential attribute obtained is the perception of the community shop. The most sensitive attribute influencing the legal dimension is the formal rules, there must be formal rules, indeed administratively the formal rules are legal products that are approved by the institutions governed by the law, but usually what is forgotten is the process of realizing formal rules.

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Research Article

Sustainability Index of Benoa Bay Beach Reclamation Against National Resistance

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Abstract. This study aims to analyze systematically and thoroughly about how the impact of coastal reclamation on National Resilience. The activity starts from a thorough understanding of the system that occurs in the reclamation and variable processes that affect national security. The research method used analysis Multi-Dimensional Scaling Method. The Benoa Bay reclamation activity plan, multi-dimensional analysis is not or less sustainable, with an index of 42.93 %. The most sensitive attribute influences the dimensions of the environment, is the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13. The most sensitive attribute affecting the economic dimension is an increase in regional revenue. In the sensitivity test of the socio-cultural dimension, the most sensitive and influential attribute obtained is the perception of the community shop. The most sensitive attribute influencing the legal dimension is the formal rules, there must be formal rules, indeed administratively the formal rules are legal products that are approved by the institutions governed by the law, but usually what is forgotten is the process of realizing formal rules.

Keywords: *Systemic Analysis, Coastal Reclamation, National Resilience*.

A. INTRODUCTION

The Benoa Bay reclamation project in Bali apparently still holds controversy and conflict that is prolonged and never ends. The problem is se the increasing potential for conflict due to conflicts between the voice and the will of the people who supported the provincial administration with the will of the central government, which wants to keep building and developing Benoa Bay area into a tourist area, complete with various facilities and modern infrastructure. Although it has received many rejections from various elements of society and is now beginning to get strong support from the Provincial Government of Bali, the reclamation project will continue to take place in view of Republic of Indonesia's Presidential Regulation No. 51 of 2014 concerning Amendment to Presidential Regulation No. 45 of 2011 concerning Denpasar Urban Spatial Planning, Badung, Gianyar and Tabanan, are still valid and have not been revoked.

Based on the Presidential Decree, the Benoa Bay Area will be designed as a potential area for developing economic, social, cultural and religious activities, without neglecting the function of preserving the Ngurah Rai Grand Forest Park and preserving the surrounding ecosystem, as well as the existence of infrastructure. and infrastructure in the Benoa Bay area. In the Benoa Bay Area, a new reclamation island with an area of 838 hectares will be built, with all the facilities, such as Disneyland, Art Center, Golf Course, and a luxury star hotel (For the BALI Newspaper, 22 March 2014).

Some community members who reject the reclamation project consider that the development of the Benoa Bay Area through reclamation can have a negative impact on aspects of national resilience, especially on the sub-aspects of social, cultural, economic, defense and security resilience. The impact on sub-aspects of social and cultural resilience,

the reclamation project is predicted to cause negative changes in the social and cultural life of the Balinese people. P there are sub- economic, the reclamation project is predicted to turn off the economy of the fishermen in the poor category, and vice versa instead of raising the economy of the investor who has been established. Impacts on the national defense and security sub- aspects, the reclamation project, along with social, cultural and economic changes, can have a systemic impact on the decline in national defense, and the high threat of maritime security.

Predictions in the form of perceptions that develop among the community are a reflection of the hypothesis that must be proven correct, so that more in-depth research is needed to assess whether there is indeed a systemic impact on the development of the Benoa Bay reclamation on national security.

To determine the originality and novelty of this dissertation research, there are at least two approaches taken, namely (1) the object of research and the methods used and (2) the results of research in the form of variable relationship formulations or reconstructions of previous theories. Academically, this research has never been done by researchers before, both object and method. The object of this research is directed at how the systemic analysis of the impact of the Coastal Reclamation from Legal, Economic and Socio-cultural aspects on National Resilience, using methods which are the development of Dynamic System concepts and models . The objects, concepts and methods of this research have been partially used by researchers and scientists beforehand, however, the use together and integrated into a system that interacts between aspects has never been done, both in terms of Law, Economy, Social and Culture and aspects of Reclamation and National Defense.

B. LITERATURE REVIEW

1. Coastal Reclamation

According to his understanding in language, reclamation comes from English, *to reclaim* which means to repair something that is broken. Specifically in the English-Indonesian Dictionary the meaning of *reclaim is* referred to as making land (*from the sea*). Still in the same dictionary, the meaning of the word *reclamation is* translated as the work of acquiring land. Not many experts have defined or provided an understanding of coastal reclamation.

Coastal reclamation activities are technological efforts by humans to change a natural environment into an artificial environment, a typology of estuary ecosystems, mangroves and coral reefs into a landform. Reclamation is an activity carried out by people in order to increase the benefits of land resources in terms of environmental and socioeconomic point of view by means of land subsidence, drainage or drainage (Law No 27 of 2007).

Another notion of reclamation is a work / business utilizing areas or land that are relatively useless or still empty and watery into useful land by draining. For example, in coastal areas, swampy areas, offshore/in the sea, in the middle of a wide river, or in a lake. Basically, reclamation is an activity to change the coastal waters into the mainland. Reclamation is intended to change the low land surface (usually affected by standing water) to be higher (usually not affected by standing water).

By definition, the main goal is to make the region an aqueous reclamation of damaged or useless become better and more useful. The new area, usually used for residential areas, industry, business and shopping, agriculture, and tourist attractions. In city planning, coastal reclamation is one of the steps to expand the city. Reclamation is practiced by countries or big cities whose growth rates and land requirements are increasing so rapidly but are experiencing problems with the increasingly narrow land area (limited land). Under these conditions, the expansion of the city towards the mainland is no longer possible, so a new

land is needed. Reclamation methods provide benefits and can help the state/city in the framework of providing land for various purposes (city expansion), structuring coastal areas, developing marine tourism, and other things.

Reclamation of water areas is an effort to form a new land area both in the coastal area or in the middle of the ocean. The main purpose of this reclamation is to turn a damaged or untapped watery area into a new area that is better and useful for various economic needs as well as for other strategic purposes. The new land area can be used for residential, industrial, business and shopping areas, airports, urban areas, agriculture, alternative transportation routes, coastal freshwater reservoirs, integrated waste management and environmental areas, and as an embankment protecting old land from abrasion threat and to become an integrated tourism area. This reclamation activity is usually carried out by an authority (state, big city, area manager) which has a high growth rate and land needs are increasing rapidly, but experiencing constraints of limited or available space and land to support the existing growth rate, so it is necessary to develop an area new land.

In the context of regional development, the reclamation of this coastal area is expected to be able to increase the overall *carrying capacity and environmental carrying capacity* of the region. Reclamation is carried out in the context of increasing the benefits of land resources in terms of environmental and socio-economic perspectives by irrigation, drainage or drainage (Law 27, 2007). This generally occurs due to the high level of human population, especially in coastal areas, so it is necessary to find a solution (Indonesian National Encyclopedia, 1990).

2. National Defense

Indonesia's National Resilience is a dynamic condition of the Indonesian nation that includes all aspects of national life that are integrated, containing resilience and resilience which contain the ability to develop national power, in facing and overcoming all challenges, threats, obstacles and disturbances both coming from outside or from in, to guarantee the identity, integrity, survival of the nation and state and the struggle to achieve its national goals, (RI Defense White Paper, 2015).

In organizing and organizing their lives, the Indonesian nation is inseparable from the influence of interaction with its environment, both in national, regional and global scope. To develop their lives and realize their various national interests, the Indonesian people have a perspective, a way of reviewing, a sense of responsiveness, which is called Archipelago Insight as a national insight. Archipelago's insight which serves as a guide, guide, and guide, so that all efforts of the nation continue to lead to the realization of national ideals and the achievement of national goals. A goal that has been a pledge or agreement with all the people of Indonesia, to form a state government that protects all the people of Indonesia and all of Indonesia's blood, promotes public welfare, educates the life of the nation, and participates in implementing world order based on independence, eternal peace, and social justice (Marsetio, 2015).

In an effort to achieve its national goals, the Indonesian people are always faced with various forms of challenges, threats, obstacles and disturbances, both directly and indirectly that can endanger the integrity, identity, survival of the nation and state. For this reason, resilience and resilience are needed which contain the ability to develop national strength in aspects and dimensions of national life called National Resilience. Nusantara insight has a geographical meaning that pays attention to marine affairs.

The National Resilience Conception of Indonesia is the concept of National Resilience or the development of national strength through the regulation and implementation of welfare, security that is balanced, harmonious and harmonious in all aspects of life as a

whole and integrated based on Pancasila, the 1945 Constitution and Archipelago Insight. The concept of Indonesia's National Resilience is a guideline (means) to improve (the method) the resilience and resilience of the nation which contains the ability to develop national power, with a welfare and security approach. National living conditions are a reflection of national resilience based on the idiomatic foundation of the Pancasila, the constitutional foundation of the 1945 Constitution, and the conceptual foundation of the Archipelago's Insight. The essence of Indonesia's national resilience is the resilience and resilience of the nation which contains the ability to develop national power, to be able to guarantee the survival of the nation and state in achieving national goals. While the essence of the conception of Indonesia's national resilience is the regulation and implementation of welfare and security in a balanced, harmonious, and harmonious manner in all aspects of national life (RI Defense White Paper, 2015).

C. METHODS

This study aims to evaluate, identify and systemically analyze the Coastal Reclamation policy by the Government and its influence on the National Resilience of the Indonesian Nation which as a *case study* is a Coastal Reclamation project in Indonesia (for example such as the Reclamation of the Benoa Bay of Bali, the Reclamation of Lamongan Beach and Kenjeran Beach, Surabaya, selected one *case study*).

Retrieval of data in the form of open questionnaires and in-depth interviews conducted during this period. For variable data and Beach Reclamation policy criteria that are qualitative and have a preference value, taken from the *Expert Judgment*. The *expert judgments* as research subjects were chosen because they are very knowledgeable about the problems of beach reclamation and are competent in their fields. Validation of the results of interviews and questionnaires also need to be done in this dissertation research with the aim of obtaining valid and objective data on the thoughts of the *Expert Judgments*. The list of *experts* as resource persons and research respondents is in accordance with Table 1. Research Resources/Informant Plan as follows:

Table 1. Research Resources/Informant Plans

No	Expert Judgment Speaker/Position of Respondent	Work Unit	Amount
1	Regional Development Institution Expert Staff	Regional Government/Provincial Government	2
2	Expert Staff of the Tourism Institution	Regional Government/Provincial Government	2
3	Expert Staff of the Environmental Institution	Regional Government/Provincial Government	2
4	Expert Staff from the Navy	Lantamal/Lanal	2
5	Academics (Lecturer)	University of Higher Education	2
6	Reporters	Post newspaper	2
7	Indigenous Peoples	Local Area	2
TOTAL			**1 4**

Source: Processed Researcher Data (2020)

1. Research Design

The design model of this research can be presented in the form of input, process and output diagrams that illustrate the research process from obtaining data, processing data to analyzing and evaluating the results/output of research data. Broadly speaking, Research Model Design in the form of *Input*, *Process* and *Output*

Research Design-Output Diagram, *input* and identification of data variables that affect the coastal reclamation system both in the environmental, economic and socio-cultural aspects, which are broadly divided into 2 types, namely qualitative data and quantitative data. Qualitative data is data in the form of *linguistic* that has not been measured quantitatively, whereas quantitative data is data that has been measured in the form of numbers. This data grouping needs to be done because the two types of data require different data processing.

Furthermore, at the stage of the process an investigation is carried out on how to analyze and evaluate coastal reclamation policies, which is the integration and development of the concept of policy evaluation theory with the dynamic system method into a model of policy evaluation in determining coastal reclamation. In this process all elements and variables as a system are included as variables that interact with each other. The integration of both theoretical concepts and methods applied to the assessment criteria for reclamation covering the aspects of environment, aspects of economy and aspects of the Socio-Cultural. Finally, the *output* stage *is* carried out in the formulation of a model for policy evaluation and the determination of policy scenarios, which are then simulated in the model and the results analyzed and evaluated to obtain the best and sustainable policies.

2. Identification of Aspect Variables and Criteria

Variable aspects and criteria in this study obtained from the initial observation and understanding of the system of reclamation, the initial discussion with the *expert*, were followed by *literature review* and critical assessment of previous studies. These are the main underlying factors in the preparation of variable aspects, criteria and components that have a systemic influence on the system of coastal reclamation. Until the end can be composed of 4 (four) variable main aspects and sub-criteria, which affects national security:

a. Aspects Environment/*Environmental*
   1). Environmental Impact Analysis
   2). Regional Layout
   3). Coral reefs
   4). Waste
   5). Mangrove Rehabilitation
   6). Sedimentation
   7). Flood
b. Economic aspects
   1). Community income
   2). Economic value of land
   3). Locally-generated revenue
   4). Business predictions
   5). Employment
   6). Community income
c. Socio-Cultural Aspects
   1). Frequency of Conflict
   2). Relocation
   3). Citizen's awareness

4). Community Figure Perception
5). The Role of Community Social
6). Culture.

d. Legal Aspects
1). Legal counseling
2). Formal Rules
3). Availability of law enforcement personnel
4). Compliance with the law
5). Land Status
6). Central policy synchronization
7). Availability of community organizations

3. Data Analysis Technique: ***Multi-Dimensional Scaling (MDS)***

Sustainability is the key to development that exploits natural resources, however, sustainability is difficult to measure when it concerns ecological, economic, social, technological and legal factors simultaneously. Therefore, an alternative to calculating the sustainability of natural resources, the assessment uses MDS, which is a modification of Rapfish. Rapfish is a multi-disciplinary rapid appraisal technique for evaluating the sustainability of fisheries (Hartrisari, 2005). In Indonesia, MDS has been used by Fauzi & Anna (2005) to assess aspects of ecological sustainability, socioeconomic sustainability, socio-cultural sustainability and cultural sustainability, and institutional sustainability. Benoa bay

The sustainability analysis of the post-coal mining land in this study is supplemented by legal aspects, because this aspect is the highest value of obedience of a person or community in the institutional system. Another dimension that needs to be analyzed is from the technological aspect, it is necessary to know to what extent groups or communities around the mine understand about efforts to address post-mining land with knowledge and technology.

The sustainability assessment method uses MDS through three stages, namely: The first stage, determining the attributes of the object being studied against the sustainability status of each dimension (ecology, economy, socio-culture, institutions and technology). To determine: attributes, the number of ranks for each attribute, the determination of scores, based on the availability of literature that can be used. Empirical experiences that have been outlined in research journals, or determined from the results of in-depth discussions between researchers and experts, and the results of questionnaires from respondents can be used as attributes and ranking. Index values with the status of sustainability in specific categories as shown in Table 2.

Table 2. Index Values and Sustainability Categories

No	Index Value	Category
1	0% to 25%	Bad
2	26% to 50%	Less
3	51% to 75%	Enough
4	76% to 100%	Good

To find out which dimensions are most influential on the object being studied, then after each dimension the index value is obtained, the next step is to do a comparison between dimensions, which is visualized in the form of a kite diagram as shown in Figure 1 below

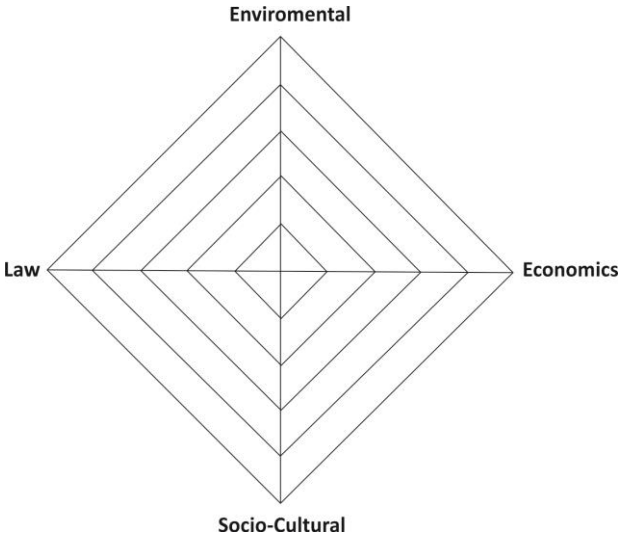

Figure 1. Kite Diagram

From a number of attributes in each dimension will be analyzed (*sensitivity analysis*) how sensitive or sensitive the object is being studied, to the sustainability index in the reclamation model in accordance with the aims and objectives of this study

D. RESULTS AND DISCUSSION

1. Sustainability of Reclamation from the Environmental Dimension

The value of the sustainability index from the environmental dimension is 29.17. Based on the rating scale as in Table 1, it is categorized as less sustainable. The value of this dimension is in line with the results of the questionnaire from the field. In this environmental dimension, it is expected to find out the right intervention in accordance with the conditions of Benoa Bay. Following are the results of the environmental dimension sustainability index.

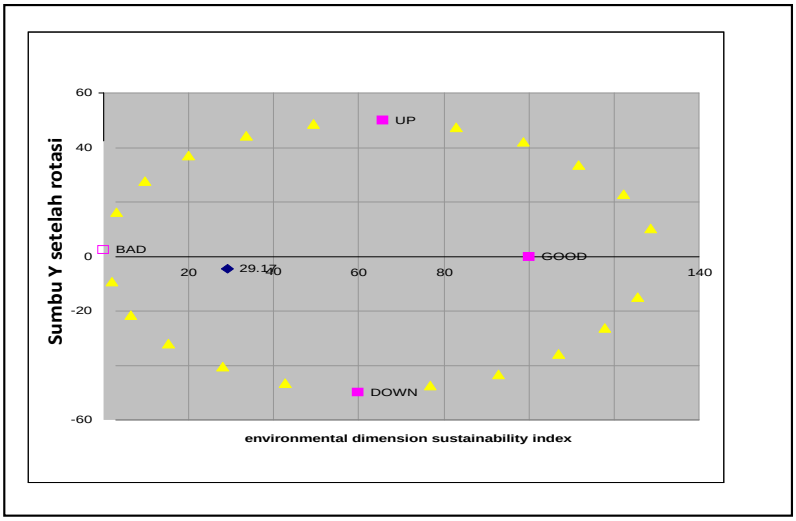

Figure 2. Sustainability index of the environmental dimension of 29.17

In the MDS analysis for the environmental dimension, there are seven attributes that are most sensitive in influencing the value of the sustainability index, namely AMDAL, spatial planning, coral reefs, waste, mangrove rehabilitation, sedimentation and flooding. To find the most sensitive factors that can be used as triggers in this environment, *leverage* analysis is needed. The results of the *leverage* analysis of each attribute are as shown in Figure 3.

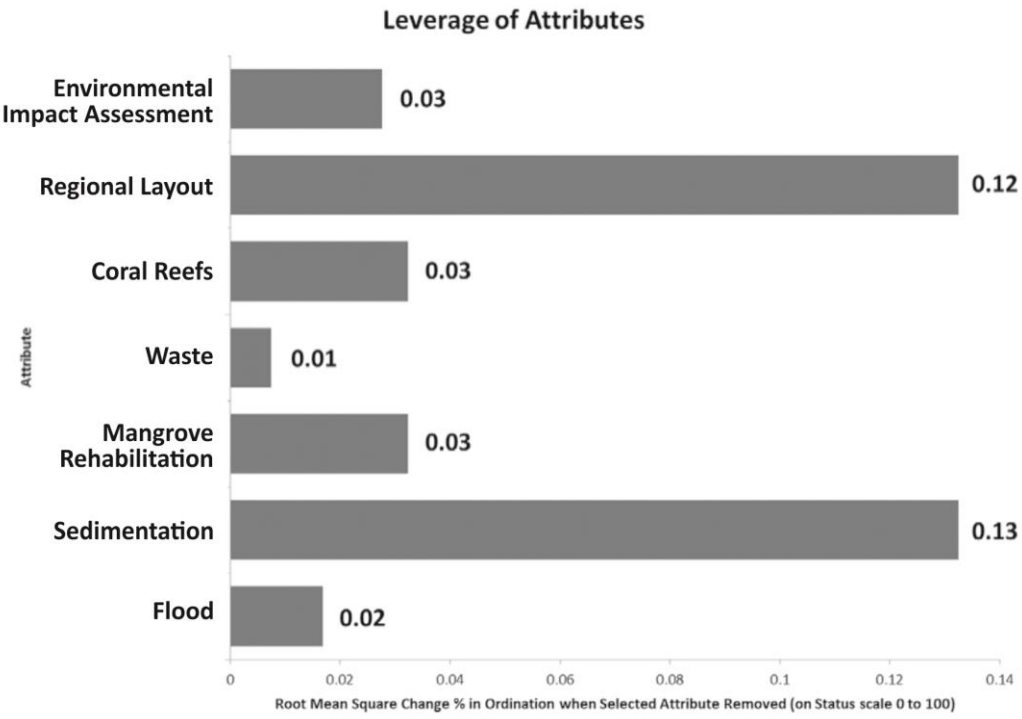

Figure 3. *Leverage* Analysis of Each Environmental Dimension Attribute

Based on the results of the questionnaire scoring, obtained the distribution of respondent data on environmental dimensions spread in the middle area of the range of sustainability. The sustainability index value from the environmental dimension is 29.17 %, included in the less sustainable category. This can be interpreted that the environmental conditions of the Benoa Bay will be less sustainable if carried out reclamation. Management interventions to increase the value of sustainability can provide attributes with high sensitivity, namely sedimentation and spatial planning. The most sensitive attributes that affect the dimensions of the environment, based on the results of the leverage analysis of 7 attributes seen from the value of Root Mean Square (RMS), indicate the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13, followed by the attributes of fish resources (0, 12). This can be interpreted that the sedimentation conditions in Benoa Bay play an important role in environmental sustainability in Benoa Bay. Sedimentation handling engineering must be carried out as an intervention for the sustainability of the environmental dimension if reclamation is carried out in Benoa Bay, so as not to have an impact on fish resources. Reclamation activities in waters have high potential to cause sedimentation. This is similar to the results of a study by Wisha et al. (2018) which predicts the hydrodynamic balance will decrease which causes the sedimentation rate to increase if reclamation is conducted in Benoa Bay. Increased sedimentation will directly affect the condition of the aquatic ecosystem in Benoa Bay. Coral ecosystems are very sensitive to turbidity, one of which is caused by sedimentation in a waters

Reclamation activities in a waters can potentially cause sedimentation, because new islands resulting from reclamation can inhibit the flow of sediment material and cause sedimentation. Sediment material is carried by the flow of currents originating from large rivers which empties into Benoa Bay, including Tukad Badung, Tukad Mati, Tukad Sama, and Tukad Bualu. Sediment flow will follow the movement of the current pattern. Therefore, it is necessary to conduct a hydrodynamic study to determine the hydrodynamic conditions in a waters, especially the condition of current patterns and sediment distribution

patterns. Sediment distribution patterns can be used to determine the level of sedimentation that occurs.

K egiatan Coastal Reclamation Benoa is expected to have an impact on changes in the coastline around Turkish Benoa due to erosion and sedimentation processes. Changes in the pattern of *longshore currents* can lead to acceleration of currents from the side of the Reclamation island that leads to the coast of Benoa bay . This causes the abrasion of beaches affected by the acceleration of currents, and sedimentation in other areas. A major threat arises in the weakening of currents around Tanjung Priok for all tidal conditions in the west and east seasons which can result in siltation in Tanjung Priok due to sedimentation. Finally, there is a threat of water quality degradation during the Reclamation island construction period as indicated by turbidity of the water due to disturbed water circulation and sedimentation. Ecology In terms of ecology, there are several potential problems to occur. First, when the reclamation process at the reclamation site (making land) will change turbidity so that the penetration of sunlight for the photosynthesis process carried out by phytoplankton decreases. As a result, the distribution of plankton as a source of fish food will be affected. Soil material for retrieval also has the potential to damage the ecosystem, if the land does not originate from around the Benoa Bay. Third, the entry of material from terrestrial ecosystems, organic, non-organic waste and mud will greatly disrupt the process that occurs in the Benoa Bay ecosystem.

2. Sustainability of Reclamation from the Economic Dimension

Sustainability index value of the dimension of Economics at 18.82. The value of the economic dimension of sustainability index of that size is the lowest value of the sustainability scale and is classified in the bad category referring to Table 1 of the Index Value and Sustainability Category. The value of this dimension is in line with the results of the questionnaire from the field. Following are the results of the Sustainability Index of Economic dimensions.

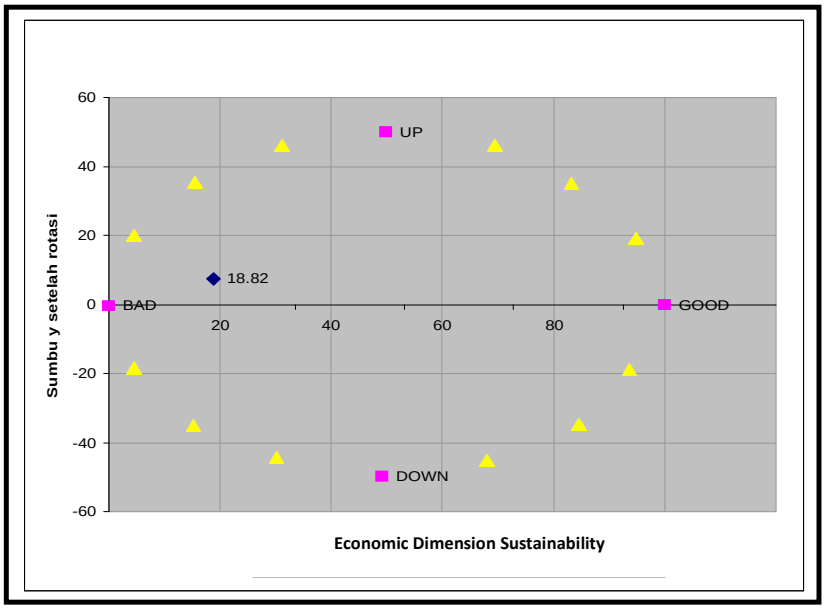

Figure 4. index is 18.82

In the MDS Analysis of the environmental dimension, there are five attributes that are most sensitive in influencing the value of the sustainability index, namely the economic value of land, local own-source revenue, business predictions, employment and community income. To find the most sensitive factors that can be used as triggers in

this environment, *leverage* analysis is needed. The results of the *leverage* analysis of each attribute are as shown in Figure 5.

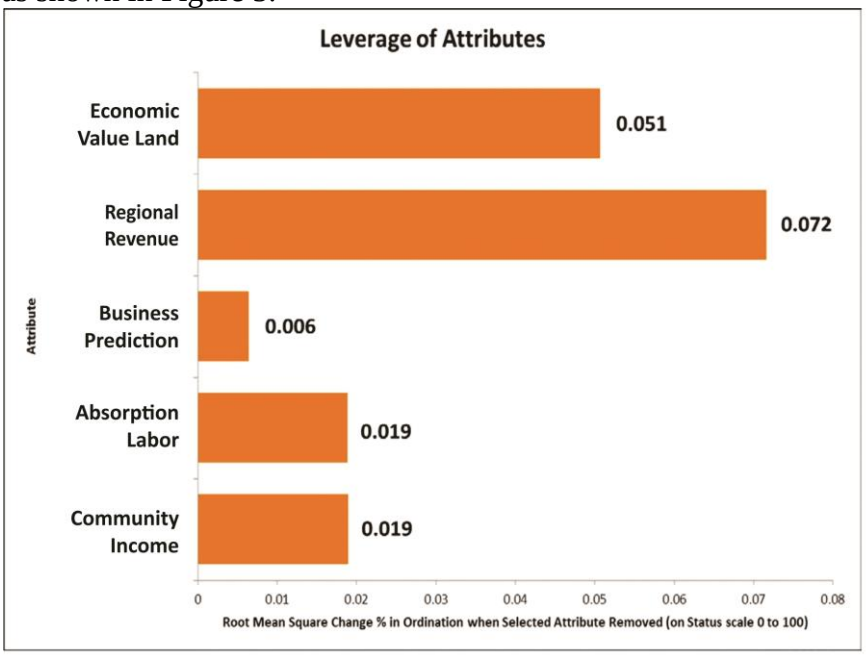

Figure 5. *Leverage* Analysis of Every Economic Dimension Attribute

Reclamation which is targeted to improve the macro economy, is expected to provide micro-economic benefits to the community to achieve prosperity, while still paying attention to environmental quality. The sustainability of the social dimension is analyzed based on 5 attributes, namely the economic value of the land, local original income, business predictions, employment and community income. However, the results of the ordinance analysis for the economic dimension obtained the sustainability value index was 18.82%. This value is in the Poor category. This is considered to be a lack of sustainability due to the uncertainty of reclamation that can improve the welfare of the people around Benoa Bay.

This can be interpreted that the uncertainty of reclamation land management and the design of policies for the regulation of reclamation land contributions have not been clearly regulated. This becomes sensitive because the community still considers that the effort to prosper the community with the reclamation land is not yet certain. Reclamation of land initiated by the private sector is considered by the community to occur. If this development plan can be proven in detail that it is also beneficial to the income of PAD and increase in community income, then the value of sustainability from the economic dimension can get better value. High-intensity reclamation is closely correlated with an increase in per capita gross domestic product (Tian et al., 2016). Policy makers must calculate and analyze in detail the value of trade-offs that will arise with changes in function and land, between short-term investment by granting permission to change land with long-term investment for environmental sustainability (Peng et al., 2013). The tourism industry will undoubtedly increase the income of local people, but if it must be pursued by reclamation, it must continue to consider the sustainability of the biogekimia cycle in Benoa Bay which will later have an impact on the survival of the biota in the ecosystem (Wisha et al., 2018). This is necessary so that policy makers do not only take into account current or short-term economic benefits, without calculating future or long-term losses. It is hoped that the government can

regulate the distribution of economic development in other areas of Bali, so that all Balinese people have the opportunity to improve their welfare.

3. Sustainability of Reclamation from the Socio-Cultural Dimensions

Sustainability index value of dimension Socio-Cultural amounted to 31.70. The value of the sustainability index of the Socio-cultural dimension according to the sustainability index scale as in Table 1 is included in the category of lack of sustainability. The value of this dimension is in line with the results of the questionnaire from the field. The social dimension is the social system and the existing condition of the community which reflects the community's willingness to develop land in the territorial waters that they normally use as a livelihood and living area. The sustainability of the social dimension is analyzed based on 6 attributes, namely the Frequency of Conflict, Relocation, Public Awareness, Public Figure Perception, Role of NGOs and Customs.

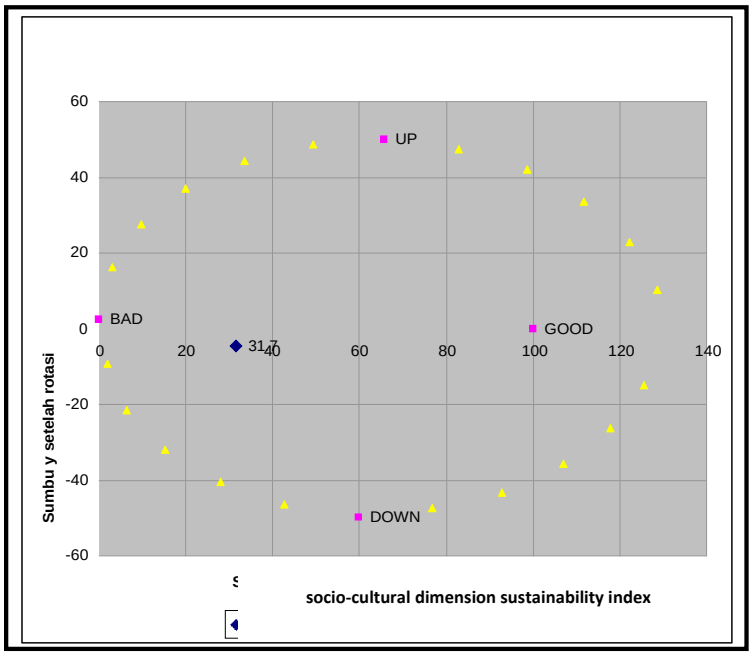

Figure 6. The socio-cultural dimension sustainability index is 31.70

To find the most sensitive factors that can be used as triggers in the socio-cultural dimension, leverage analysis is needed. The results of the leverage analysis of each attribute are as shown in:

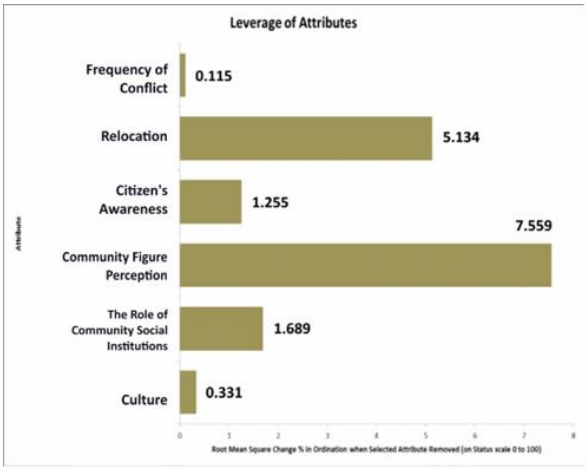

Figure 7. *Leverage* Analysis of Every Attribute of Socio-Cultural Dimensions

In the attribute sensitivity test, the most sensitive and influential attribute was obtained from community shop perception. This attribute has a high sensitivity value when compared to other attributes. perception of community shop occupies the most sensitive attribute and has the highest influence for reclamation sustainability on the social dimension. This is in accordance with the conditions that occur in the communities around Benoa Bay today

The community has an important role in a development plan. Society is not only an object, but a subject in development. As a condition of sustainable development, it is also marked by the acceptance of the development by the community (Socially Acceptable). Community perception is important in a system of development and environmental management. This is reinforced by the results of research conducted by Bennet & Dearden (2013), that the condition of the community rejects an environmental management because it is considered not to support the welfare of the community.

The perception of the Balinese, both the pros and cons of reclamation activities, has been developed. Community perceptions which are more resistant will significantly influence the sustainability of the social dimension of the reclamation plan. Land development carried out by the Private Sector is less accepted among the social community of Bali. The community feels that reclamation is an activity that has a negative impact on the environment and affects the socio-economic conditions of the community. Communities on the coast of Benoa Bay conveyed that their objections to the reclamation plan were demonstrated by various delivery methods, some of which were frontal (demonstrations, installation of billboards at every crossroads, and others), and others expressed aspirations to community leaders or traditional leaders. The reclamation plan was not fully rejected, there are still some community groups who consider that reclamation for the revitalization of the bay is indeed necessary to see the condition of Benoa Bay which is less productive and has decreased the quality of its environment.

This condition must be addressed properly if the planned reclamation plan is scheduled to continue. Community perceptions must be intervened through a social approach so that the initially bad/contra perceptions can slowly change towards being more objective in exposing land development plans in the gulf waters and not causing social conflicts. This might be done by accommodating the socio-economic needs of the community in detail in the development of Benoa Bay. So that the development plan can be accepted by the community and can further increase the value of sustainability in the social dimension which in this analysis is less sustainable.

4. Sustainability of Reclamation from the Legal Dimension

Sustainability index value of the dimensions of the Law of 37.20. The value of the sustainability index of the legal dimension according to the sustainability index scale as in Table 1 is included in the category of lack of sustainability. The value of this dimension is in line with the results of the questionnaire from the field. Sustainability of the legal and institutional dimensions is analyzed based on 7 attributes, namely legal counseling, formal rules, availability of law enforcement personnel, compliance with law, land status, synchronization of central policies, availability of community organizations.

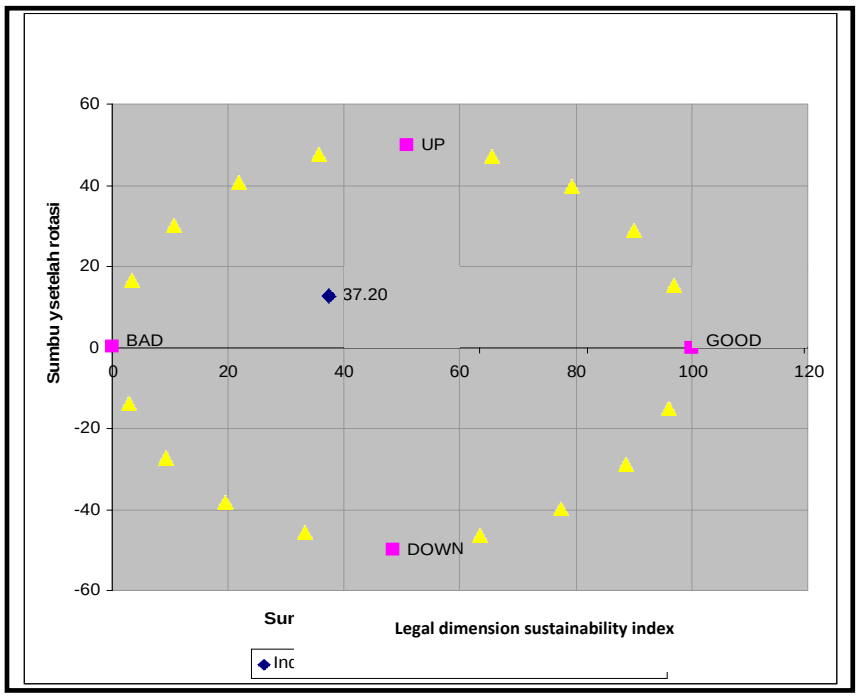

Figure 8. The legal dimension sustainability index is 37.20

To find the most sensitive factor and can be used as a trigger in the legal dimension, leverage analysis is needed. The results of the leverage analysis of each attribute are as shown in Figure 9.

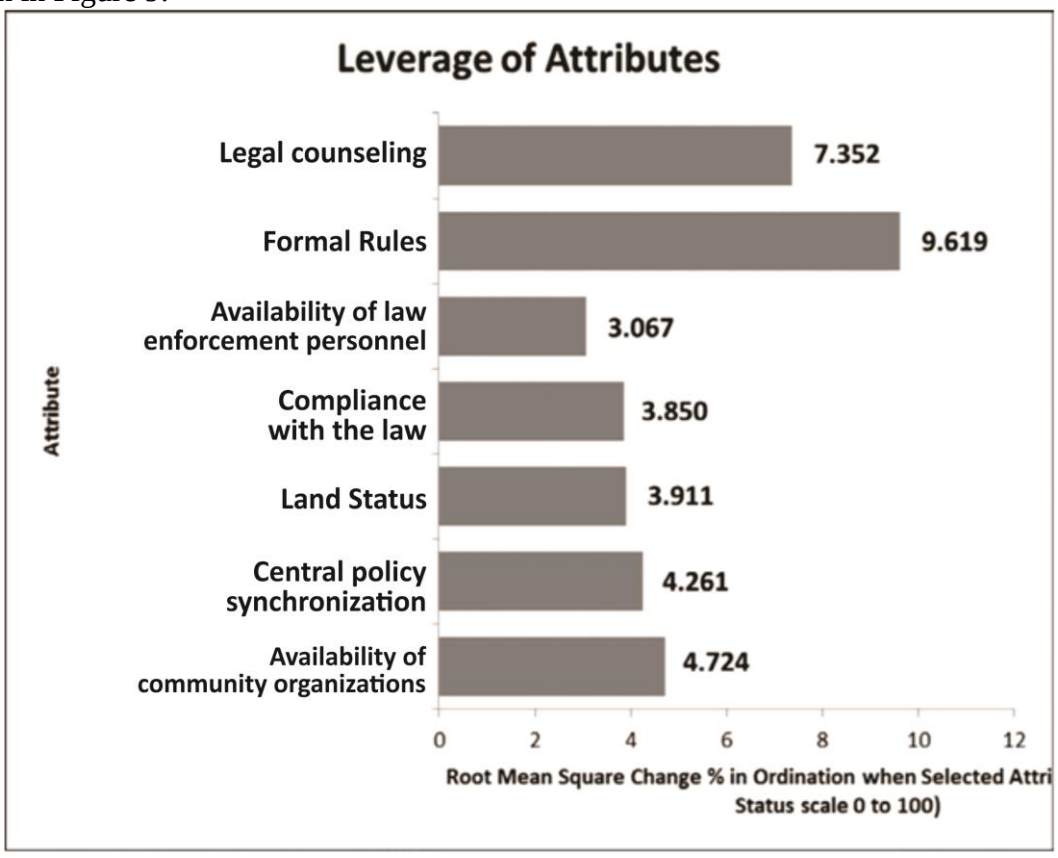

Figure 9. *Leverage* Analysis of Every Legal Dimension Attribute

In the sensitivity test, the attributes of the legal dimension are legal counseling, formal rules, availability of law enforcement personnel, compliance with law, land status, synchronization of central policies, availability of community organizations, obtained by the most sensitive and influential attributes are formal rules. There must be formal rules, administratively formal rules are legal products that are approved by institutions governed by the Act, but usually what is forgotten is the process of realizing these formal rules. A good mechanism in the process of obtaining formal rules is one that absorbs the aspirations of all stakeholders. This is necessary so that the intended formal rules are guarded jointly by stakeholders, not just the authorities. Therefore, the emphasis is on the process of establishing formal rules, it is necessary to make a mechanism together between stakeholders and local authorities. Every analysis carried out as described above, starting from the ecological, economic, socio-cultural, technological dimensions up to the legal dimension shows the different values of the sustainability index. This happens because every attribute in each dimension has a different value too.

The concept of sustainable development also implies that there must be a balance in the index value of each dimension, although in certain conditions in a development sector in an area the sustainability index value of one dimension must still have a high priority scale. For example, the physical construction of a dam in the middle of a watershed from a large area. The dam is for irrigation purposes in the downstream sub-region which is required to have a high economic dimension in the development index. So, in the upstream sub-region the ecological dimension value must be high. That does not mean sacrificing the value of the other dimension index is low, all dimensions that support the implementation of the priority dimension must also have a high sustainability index value. For example, the supporting dimension is the legal dimension. The legal dimension in the upstream region must have a high value of sustainability index, because this dimension has the task of guarding the law and implementing law (*law enforcement*). What will happen if the law is not enforced in the upstream area, the ecological system in the upstream area is overgrown with forest vegetation as a source of regulating springs, the people must obey the laws and regulations, both the unwritten laws such as the rules that apply in the community such as customary law, or the law written what comes from the government

5. Multi-dimensional Recapitulation of Benoa Bay Reclamation Sustainability

Each analysis conducted as described above, starting from the ecological, economic, socio-cultural dimensions, to the legal dimension shows the different values of the sustainability index. This happens because every attribute in each dimension has a different value too.

Recapitulation of the results of the analysis of sustainability values from 4 dimensions, for the reclamation plan in Benoa Bay, it was found that the dimensions with the highest to lowest sustainability values are the environmental dimension, economic dimension, social dimension, and legal dimension. The 4 dimension index values are within the range of values for the Less Sustainable and Poor categories. The lowest sustainability value, the economic dimension, will be estimated to have the highest impact on the reclamation plan, so it must be intervened on target so that the value of sustainability can increase. When the sustainability index is high both before and after an intervention, it does not mean that it does not need intervention anymore but it is still needed and an intervention is carried out with the priority scale at the lowest value

The stress value of the test results in each dimension < 25%, and the coefficient of determination R2 ranging from 93.73 to 95.08 indicates that the quality of the analysis in this study can be generally assessed as good. Furthermore, the sustainability analysis

recapitulation of marine and coastal resources in Benoa Bay reclamation area with a 4-dimensional relationship can be visually seen in the kite diagram.

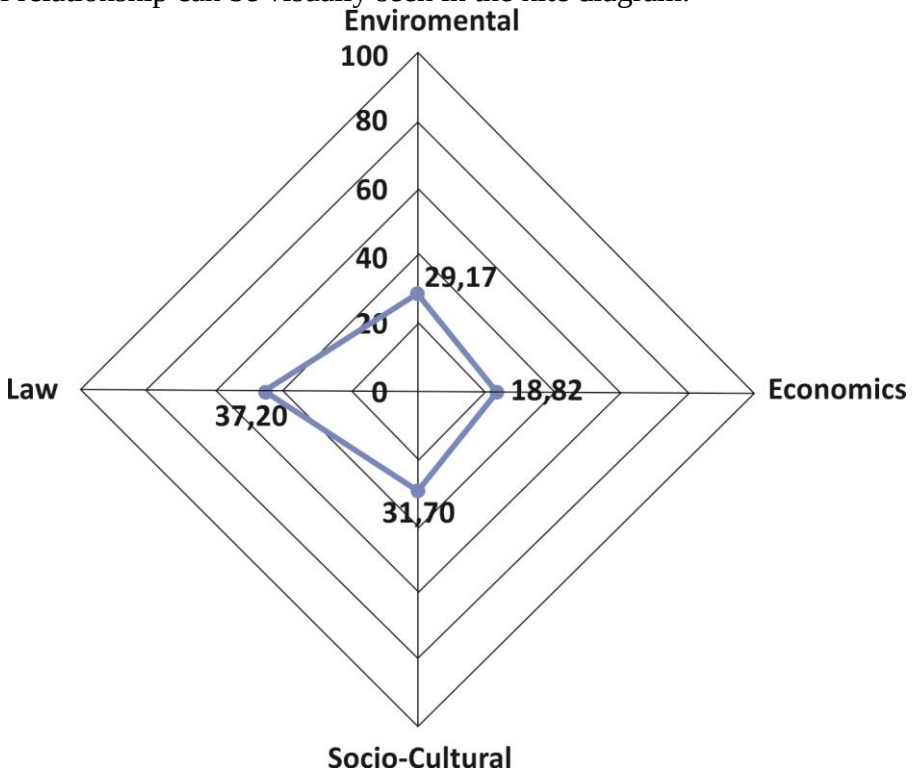

Figure 10. Attribute4-Dimensional Relationship

The elevated diagram is expected to be a general reference in proposing improvements to the status of sustainability of marine and coastal resources at the Benoa Bay reclamation site. In general, the results of the MDS analysis only determine the status or condition of sustainability of each of the 4 dimensions. Specifically, in more detail, the results of this MDS analysis have not been able to determine the sustainability status of the overall dimensions, or more complex dimensions, because the weights of each dimension are considered to be the same.

Based on the results of the analysis of the sustainability index values in each dimension, we then carry out a weighting based on *expert judgment* to assess the total sustainability of marine and coastal resources at the whole Benoa Bay reclamation site. Through this method of analysis, we will get the priority dimension that most influences the sustainability status of marine and coastal resources at the Benoa Bay reclamation site. The results of this analysis are based on primary data through in-depth interviews with experts. Experts in weighting this dimension are practitioners and academics who are respondents for the MDS analysis, which is as many as 5 people. *This expert judgment* is needed as a weighting objectivity of each dimension based on priorities and conditions that are appropriate to describe the level of sustainability of a reclamation activity in Indonesia. Based on the percentage of priority, then calculated with the sustainability index value on each dimension.

Table 3. Calculation of Multi-Dimensional Sustainability Index

No	Dimension	Weight (%)	Sustainability Index (%)	Index Value Weighting Results (%)
1	Environment	22	29.17	9,72
2	The economy	18	18.82	6.17
3	Social	27	31.70	13,21
4	Law	30	37.20	13,83
Total				**42.93**

Source. Analysis results (2018)

Calculation of the weighting results obtained a multidimensional sustainability value of marine and coastal resources at the Benoa Bay reclamation location of 42.93 %. This value is included in the Less Sustainable category. This value is consistent with the results of the analysis in each of the dimensions of sustainability which shows that marine and coastal resources at the Benoa Bay reclamation site will be less sustainable if the reclamation is carried out. In the calculation results obtained by the value of multi-dimensional sustainability for marine and coastal resources at the Benoa Bay reclamation location obtained 42.93 % results. This index value is in the value of 25.01-5050 in the Less Sustainable category. The lack of sustainability of the Benoa Bay reclamation plan given the four dimensions of sustainability analyzed shows less sustainable results.

Interventions to change the level of sustainability for the better in this activity must be carried out holistically and cannot be done in only one dimension. This is because of all 4 dimensions analyzed included in the Less Sustainable category. Possible interventions to improve the sustainability of marine and coastal resources include:

a. On the environmental dimension, technology is needed that can manipulate the condition of Benoa Bay waters which is influenced by tidal conditions, sedimentation, and flow from polluted inland waters. This engineering is needed to be able to maintain the quality of Benoa Bay waters in good condition. Reclamation has the potential to increase the level of turbidity of the waters that will spread beyond the Gulf. This has the potential to damage ecosystems that are outside Benoa which is considered to be able to recover after previous activities, so development must be carried out sustainably and based on ecosystems.
b. In the social dimension needed intervention from a social approach to Balinese society. This effort will be able to change people's perception of reclamation activities that have become synonymous with environmental destruction activities. Socializing the design of regional development and agreeing on the aspirations that the community expects not just from a few groups of people. This situation must be considered by the thick Balinese culture and close kinship.
c. On the economic dimension, clear regulatory intervention is needed in regulating the agreement that the community will get opportunities and increase income with the reclamation in Benoa Bay. Local Revenue Receipts will increase but this increase must be directly felt by the community through development for welfare.
d. On the dimension of the law required regulatory intervention det a il in pass protection laws. Make more strict formal rules in regulating Reclamation activities in Benoa Bay.

6. Influence of Environmental, Economic, Social and Cultural Dimensions on National Security

The effect of reclamation on national security is related to four aspects, namely environmental, economic, social and defense and security. Reclamation is a project that large at the door entrance lane sea. The strategic position of the bay will be affected by the reclamation and can have a major influence especially on economic conditions, defense and security.

Talking about national security means talking about security threats. The national security threat is complex and broad. By knowing the types of threats, anticipation steps and solutions can be taken. National security here is related to safe conditions, free from all threats, disturbances or problems that originate from / through sea waters or use the sea as a medium of crime and lawlessness resulting in material or non-material losses. Based on data that has been collected that maritime security problems in the Benoa Bay in general are sea accidents, pollution and smuggling.

In the maritime security threat matrix at Benoa Bay, it can be seen that the influential aspects are environmental aspects and economic aspects. Pollution and marine accidents tend to be closer to environmental aspects. This is because pollution directly impacts and has a major impact on the environment and accidents too. For example, an oil tanker carrying oil collides with another ship and the oil will leak and spill into the sea, causing pollution. Pollution originating from land or oil spills will damage the environment ecosystem and the biota therein.

In the matrix, smuggling crime is close to economic aspects. Smuggling is an illegal activity. For example, drug smuggling. Drugs are illegal drugs, but because of their addictive nature, the demand for drugs is always there. This has become a business field for the party supplying. Drugs is an international business and involves inter-countries which are mostly smuggled by sea. Because of its nature involving many countries, drugs are included in transnational crime. Transnational crime in its response requires cooperation between countries. Indonesia is a destination country for drug smuggling because there are many drug users / requests in Indonesia. Moreover, Indonesia is an archipelago country that is open so that it will be easily accessed. Handling through surveillance and security in the sea.

With regard to national security, reclamation can potentially be a trigger for social conflict. Reclamation which is used as an elite and exclusive area that is not fair will cause frictions in the social class of the community. Low social class people will feel jealous of high social class people. Generally fishing communities are low social communities that have lived and settled in the Bali region so that if the area changes and becomes a new area inhabited by people other than them it will cause social conflicts

"Homeland security" can reach a broad spectrum, ranging from poverty, epidemics and natural disasters, social unrest, class disputes, crime, armed insurgency to armed separatist movements. Disturbances arising from social inequalities have the potential to become a serious threat to human security, without having to pose a threat to the functioning of state government institutions and are not at all related to the issue of territorial integrity. Meanwhile, disputes between groups can be a serious threat to the functioning of the governmental functions, although not included as a threat to the territorial integrity. Separatist movements are threats that are directly related to the territorial integrity and functioning of government. The reclamation problem also has the potential to threaten national security because even if it does not threaten sovereign territory, it could potentially threaten the functioning of the state government. Reclamation can threaten the function of the government of the country through activities that cannot be monitored and monitored in the

area of reclamation islands. Residents of the reclaimed island with minimal supervision will have the potential to infiltrate foreign immigrants who reside without being recorded

Local government has an important position in security. Local government has an important role in realizing national security. Local government can be the frontline in the implementation of national security because it deals directly with the public and comes into direct contact with problems on the ground. The role of local government related to national security that includes public security, human security and internal security (internal security)

E. CONCLUSION

Based on the results of the analysis by the Multi Dimentional Scaling Method. The Benoa Bay reclamation activity plan, multi-dimensional analysis is not or less sustainable, with an index of 42.93 %. The most sensitive attribute influences the dimensions of the environment, is the attribute of potential sedimentation is the most sensitive attribute with a value of 0.13. The most sensitive attribute affecting the economic dimension is an increase in regional revenue. In the sensitivity test of the socio-cultural dimension, the most sensitive and influential attribute obtained is the perception of the community shop. The most sensitive attribute influencing the legal dimension is the formal rules, there must be formal rules, indeed administratively the formal rules are legal products that are approved by the institutions governed by the law, but usually what is forgotten is the process of realizing formal rules.

With regard to national security, reclamation can potentially be a trigger for social conflict. Reclamation which is used as an elite and exclusive area that is not fair will cause frictions in the social class of the community. Low social class people will feel jealous of high social class people. Generally fishing communities are low social communities that have lived and settled in the Bali region so that if the area changes and becomes a new area inhabited by people other than them it will cause social conflict.

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