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To cite this article: D Pangemanan *et al* 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1134** 012051

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Literature Review and Conceptual Framework: Sustainability Construction of Implementation in Development of Special Economic Zone (SEZ) Likupang

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Abstract. Likupang is one of the national tourism development areas and has been designated as a special economic zone (SEZ). It makes Likupang as the central development of infrastructure such as: Hotels, Resorts and Private Docks. In the SEZ development, several obstacles were found, including the implementation of sustainable construction regulations based on the Minister of Public Works and Public Housing Number 05/PRT/M/2015. These development activities will certainly cause problems in both economic and environmental aspects when sustainable development management is not carried out. This study is an effort to create infrastructure development by using Sustainable Development Construction Approach that supports the development of the Likupang SEZ. This paper is one of the stages of research that will report the results of literature review and conceptual framework as well as the stages that will be carried out from the research. The research result descriptionis the formulation of the application of model concept of sustainable development which will be input to all stakeholders, both government and private sector, in the development of the Likupang SEZ.

1. Introduction

The development of construction projects in Indonesia is considered very rapid, this can be seen from so many development projects carried out in various regions with the main focus on infrastructure development. The infrastructure built covers 2 (two) main areas, namely technical infrastructure and social infrastructure. Technical infrastructure such as construction of facilities in the form of roads, bridges, dams, airports and ports, while social infrastructure such as the construction of school buildings and hospitals.

Along with the development of this construction project, there has been a change in the condition of the environment and the surrounding environment including patterns of utilization of natural resources which are increasingly being explored so that the availability of natural resources is increasingly limited. One of the impacts on the environment is global warming. Green construction is one aspect which by means supports the concept of sustainable construction. Green construction is part of sustainable construction with the main objective of reducing negative impacts on the environment during the development process [1]. Therefore, the implementation of construction work needs to be managed properly by involving various parties involved in the project as a form of mutual responsibility in maintaining the ecosystem.

The Government since 2015 has been regulating the implementation of sustainable construction through Minister of Public Works and Public Housing Regulation No. 05 / PRT / M / 2015 concerning

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General Guidelines for the Implementation of Sustainable Construction in the Implementation of Infrastructure in Public Works and Settlements (Sustainable Infrastructure). According to the World Commission on Environmental Development (WCED) in 1987 defined sustainable development as the development that seeks to meet the needs of today without reducing the ability of future generations to meet their needs [2]. The concept of sustainable construction has 3 (three) main focus areas namely environment, social life, and economic welfare [3]. With the support of active participation by various parties, the realization of the implementation of sustainable construction can be realized as part of supporting Indonesia's overall development.

North Sulawesi Province is the gateway to the northern part of the island of Sulawesi for foreign and local investors and tourists. One of the tourist destination locations is located in North Minahasa Regency. To support the industrial, economic, educational and tourism sectors, the Regional Government continues to program infrastructure development in a gradual and sustainable manner. Even this is stated in the Long-term Regional Development Plan of North Sulawesi Province. The main program is the inclusion of Likupang in the National tourism development master plan and has been designated a Tourism Special Economic Zone (SEZ) as one of the National Tourism Development Areas, with the name Likupang SEZ. The main components of the infrastructure that will be built at the SEZ Likupang are hotels, resorts and private jetties which are named the golden triangle pier which includes Likupang, Wakatobi and Raja Ampat.

With the government regulation, through the Minister of Public Works and Public Housing Regulation number 05/PRT/M/2015 concerning General Guidelines for the Implementation of Sustainable Construction in the Implementation of Infrastructure in the Field of Public Works and Settlements (Sustainable Infrastructure), it is of course highly expected that the stakeholders in the implementation of construction projects can implement well and structure about sustainable construction. Infrastructure Development based on Sustainable construction has become a National issue among service providers namely Contractors and Consultants. But in reality, there are still various obstacles found from various parties of the project stakeholders (owner, contractor, consultant) in terms of implementing Sustainable Construction in the implementation of infrastructure projects in North Sulawesi.

The programming stage, the government must have a strategy to lead the sustainability agenda including providing indicators that can be used to evaluate proposed projects that meet sustainability criteria [4]. The next phase is project planning, which must be based on procurement and the green construction process. After that, the construction must be built by trained and competent contractors taking into account not only the technical aspects but also the environmental, social, and economic point of view. Finally, the transfer of knowledge about sustainable principles including knowledge of sustainable construction materials among all project participants will support the implementation of the utilization and demolition phase. In applying the concept of sustainable development it should be understood in advance about the various ecological elements that want to be preserved. In addition, the application of sustainable construction found constraints, such as cost factors and internal organizational factors [5]. On the other hand, sustainable procurement indicators are also still an obstacle to be implemented for the government and contractors [6].

Based on the existing background and the findings of previous studies, the information obtained about the current situation including the application of sustainable construction. Stages of the implementation of sustainable construction, including 5 (five) stages in accordance with the contents of the Minister of Public Works and Public Housing Regulation No. 05 / PRT / M / 2015 concerning General Guidelines for the Implementation of Sustainable Construction in the Implementation of Infrastructure in the Field of Public Works and Settlements (Sustainable Infrastructure). In general, the concept of sustainable construction has become a national issue in the field of construction, but is still relatively new among construction service providers, more specifically in regions, including in North Sulawesi. In fact, sustainable construction has not been fully implemented in accordance with the guidelines contained in the Minister of Public Works and Public Housing Regulation. The application also varies according to regional conditions, the level of shared understanding about sustainable

construction by construction project stakeholders, the availability of various existing resources in the form of natural resources (building materials and materials), human resources (construction experts, workers, technicians, laboratory assistant), the availability of other resources such as heavy equipment, implementation methods, and also adequate financial support.

Given these facts, in realizing effective and efficient SEZ development, it is necessary to study the implementation of sustainable construction so as to minimize the various obstacles that exist, and even improve the performance of construction projects in applying the concept of sustainable construction in accordance with regional needs. Therefore based on these thoughts, the author wants to conduct research on the Study of the Implementation of Sustainable Construction in the Development of Tanjung Pulisan Special Economic Zone (SEZ) Infrastructure, Likupang, which is one of the Central Government's Super Priority Areas in developing Tourism in Indonesia.

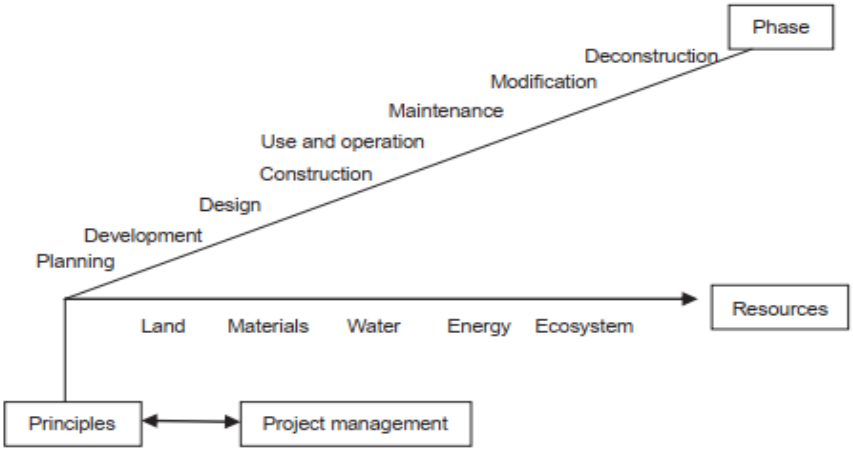
2. Literature Review

2.1 General Concept of Sustainable Construction

Sustainable construction is a concept developed to explain the responsibility of the construction industry in realizing sustainable development [7]. The emphasis of the concept of sustainable construction is focused on three main pillars namely environmentally friendly, social life, and economic prosperity [8]. Sustainable construction is a series of development processes that serve to improve the quality of life and provide satisfaction to project customers, provide possibilities and potential for changes in building functions in the future, and provide maximum social environment in the use of resources [9]. With this concept, many benefits can be obtained in the context of sustainable development. In a paper reported by The Brundtland Commission's 1987 entitled Our Common Future defined sustainable development as a way of meeting the needs of the present without compromising the ability of future generations to meet their needs [2]. The report implies that the scope of sustainable construction includes economic, social and environmental aspects. The concept of sustainable construction can apply to stakeholders of the construction industry who have a strategic role in providing input and ideas in the design process in order to improve construction design efficiency as well as in the procurement process and the construction process [10]. This shows that the starting point for implementing sustainable construction starts at the pre-construction stage, as an important step that must be considered.

In the implementation of sustainable construction requires a thorough understanding of all stages so that in the implementation of construction practices, sustainable infrastructure that provides an important contribution to the progress of the construction industry in a country can be created. Sustainable construction is a concept that focuses on improving economic standards, so that sustainable construction sees a more comprehensive integration of issues related to the environment, social and economy [11]. In general, the definitions and principles of the concept of sustainable construction are closely related to environmental issues, because some of the construction process uses and utilizes natural resources as the main material in building the construction. The availability of natural resources for the future must be preserved, and also the waste generated in the processing of natural resources for the construction process must be processed properly so that it can be minimized wasted and useless and has a negative impact on human survival. Sustainable construction as the development and maintenance responsible for environmental health that is built based on ecological principles and the efficient use of resources [12]. The development of sustainable construction trends tends to focus on the relations of stakeholders in construction, human development and environmental aspects. This is very relevant to the current condition of Indonesia in the development of the construction industry which is increasingly rapid, focusing on environmentally sound development.

Sustainable construction framework, and developed it into a framework for sustainable construction implementation that combines the stages of construction implementation and the required material resources [13] see figure 1



Source: Adapted from Kibert (2008)

Figure 1. Framework for sustainable construction

Looking at the above framework, implied the contribution of sustainable construction to sustainable development [13] sustainable development is more than just material selection, carbon emission reduction or resource management, but there needs to be a collective approach to achieve 4 (four) important criteria which include 4E (Ethics, Economy, Effectiveness and Efficiency). This further emphasizes that the understanding of operationally sustainable construction not only meets conventional project targets, cost, quality and time, but also takes into account matters related to ecological quality levels that focus on social and economic quality [14]. In general, the stages of implementing sustainable construction in the administration of infrastructure in the field of public works and settlements also adopt the framework in Figure 2.2 with the division of stages: (1) Programming, (2) Technical Planning, (3) Construction Implementation, (4) Utilization, and (5) Demolition.

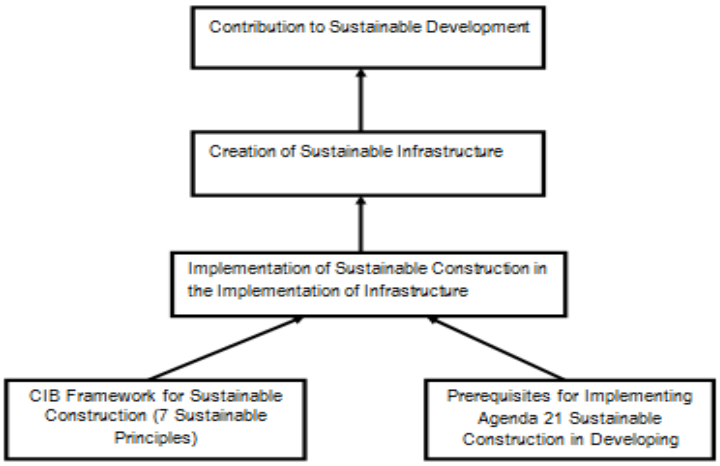


Figure 2. Framework for Application of Sustainable Construction in the Implementation of PUPR Infrastructure

Sustainable construction (Sustainable Construction) is an approach that is realized that starts in the construction sector towards the importance of implementing sustainable development in the construction sector in creating organized infrastructure. The definition of sustainable construction is described by CIB (Conseil International du Batiment or International Council for Building), as shown in the mindset in Figure 2. Based on this framework, the definition of sustainable construction is all

activities carried out at each stage of the life cycle of sustainable infrastructure, from planning to deconstruction which always considers the use of resources, both land, materials, water, energy and ecosystems, with apply 7 (seven) sustainable principles, namely reduce, reuse, recycle, protect nature, eliminate toxic, life-cycle costing, and quality. In this framework, the scope of sustainable construction covers all stages of the infrastructure cycle, including the stages of construction implementation. Sustainable construction is fundamentally different from traditional construction because it requires all system thinking, initial cross-stakeholder collaboration, and core principles such as reducing resource consumption and implementing life cycle costing [15]. One developing country, Malaysia temporarily focuses on issues of sustainability and green construction by establishing the following policies [12]

a. Establish indicators as one of the sustainability improvements used for evaluation or assessment
b. Establish assessment tools to identify current performance that can be used for corrective actions.
c. The 3R issue (reduce, reuse, recycle) is seen as the way forward for the construction industry to achieve sustainable development on various environmental, social, economic and even cultural factors.
d. Government support to promote the sustainability agenda at all levels.
e. Research and innovation to improve and expand knowledge and technology.
f. Introducing and adopting whole life-cycle costing (WLCC) and green procurement in the construction industry.
g. Develop eco-labeling for construction materials
h. Carry out the benchmarks and technology transfer from developed countries in implementing the agenda of sustainable development and green construction.

2.2 Sustainable Construction Regulations in Indonesia

The Government of Indonesia through the Ministry of Public Works and People's Settlements (PUPR) has established the steps and techniques for implementing sustainable infrastructure, including the programming, technical planning, construction, utilization and demolition stages. Each stage is carried out with steps and management techniques that take into account sustainable principles, which are contained in through the Ministry of Public Works and People's Settlements (PUPR) No.5/PRT/M/2015 summarized as follows [16] :

1. The Programming Phase is a series of initial planning activities to set goals, strategies, steps to be taken, schedules, and resource requirements, especially funding, to achieve sustainable infrastructure. Programming of sustainable infrastructure must be carried out from the beginning by the technical organizational unit at the Ministry of Public Works and Human Settlements to ensure the availability, sustainability and sustainability of resource fulfillment in achieving the objectives in the next stage.
2. The Technical Planning Phase is defined as a series of activities in the form of thought, creation and engineering processes in order to realize the expected sustainable infrastructure.
3. Construction Implementation Stage, this stage is expected to contribute well to the achievement of sustainable infrastructure so that its implementation must be carried out with a green construction approach and pay attention to social and economic aspects at the site.
4. Utilization Phase, this stage is intended to use sustainable infrastructure in accordance with its functions and maintain the performance of sustainable infrastructure based on actual conditions that are permitted compared to targets and technical planning criteria.
5. Phase Demolition, sustainable infrastructure can be dismantled at the end of the service period with a deconstruction approach in order to achieve the objective of carrying out sustainable infrastructure in its entirety. Deconstruction is the demolition of buildings that aim to get building materials or components that can still be reused (reuse) and to get new material through the process of re-cycle (recycle).

One of the real benefits of deconstruction is to obtain infrastructure components that can still be used and reduce the amount of waste discharged into the environment / nature so that a closed cycle is formed in the use of material. In general, deconstruction work is carried out manually by artisans or using heavy equipment that is done carefully. Compared to demolition, deconstruction requires more time because the purpose of this process is to release infrastructure components and materials for reuse in other development processes. In the implementation of sustainable construction in Indonesia, there are several soft-skills factors that are considered to support the success of the regulation in question, namely leadership and competence, and other technical factors such as training, measurement and evaluation instruments, and the commitment of all parties. These factors need to be owned by every element of construction stakeholders, both service users and service providers of construction providers, so that they can work together in establishing sustainable principles in every stage of the implementation of sustainable construction. The most important role in an organization's leadership in promoting sustainable development practices is to formulate policies, implement procedures and disseminate good practices at all levels of the organization [17] and are supported by support mechanisms such as information, training , software, and assessment tools [18].

In terms of promoting sustainable construction practices, a comprehensive understanding is needed by the leadership of the organization and each stakeholder element, because stakeholder awareness and knowledge are the main driving factors for implementing sustainable construction [19]. Another factor that also supports the successful implementation of sustainable construction in the construction industry is the mentality of the stakeholders of the construction service provider. Each stakeholder involved must unite and act as a team not as an individual. The government and its partners need to understand and support the principles of sustainable construction into aspects of policies, regulations and governance, and the capacity to implement sustainable construction initiatives is developed through developing the necessary basic skills, funding mechanisms and partnerships. The government as regulator of regulations needs to be thoroughly socialized to all stakeholder components because the common understanding between the government and service providers on sustainable construction is very important to support the implementation of the principles of sustainable construction.

3. Research methodology

This research framework focuses on identifying influential factors in the development of the Development Concept with the Sustainable Construction approach, with a case study in the Likupang Special Economic Zone Project. The development of this influential factor will be seen from every stage of the project starting from the initiation / concept (programming) stage, the planning stage, the construction stage, the project closure stage, the utilization stage to the demolition stage. Identification of influential factors is done through literary review and expert testing. Furthermore, the factors at each stage of the Likupang SEZ development project will be analyzed by the parties involved by conducting stakeholder analysis.

4. Result and Discussion

Based on the results of a literature review study regarding the factors that influence the implementation of sustainable construction, an input can be obtained which can be used as a reference to further analyze the application of sustainable construction. The level of education and awareness, effective management of natural resources and environment, integrated development planning and implementation, prevention and control of environmental pollution and degradation, strengthening administrative and institutional mechanisms, proactive approaches to regional and global environmental problems, and the formulation and implementation of the action plan are strategic factors in supporting the implementation of sustainable construction [20]. It is realized that implementing a new pattern in the implementation of construction requires hard work and focus, as well as positive encouragement such as a legal framework that includes standards, guidelines or policies, designs that meet sustainability criteria, procurement mechanisms, sustainable technology, sustainable processes and innovations, as well as source support human resources and organizational

structure that understands sustainable principles supported by education and training, as well as the measurement and reporting of the results of sustainable construction work [21] . Other driving factors in the application of sustainable construction is the existence of environmental support for the development of the construction market, the economic value of green construction, the level of social participation of elements of society, as well as the ecological value [22]. The concept of sustainable construction is still considered a model of development that is high cost and exclusive in value so that there is still a perception that thinks that only certain buildings or certain locations can implement sustainable principles, so that in this condition the role of government is needed in developing strategies to lead the sustainability agenda by evaluating various Project proposals in meeting the sustainability criteria, in the project planning phase, must be based on procurement and the green construction process, then for the construction implementation must be built by trained and competent contractors taking into account the technical aspects of sustainability [4]

In the implementation of sustainable construction in the development of the Likupang Special Economic Zone, it certainly becomes an important note regarding the level of involvement and concern of the government in leading and motivating all elements or parties interested in the development of the Likupang SEZ, to support government programs in promoting tourism and the economy of the North Sulawesi region. Local government concern in achieving successful implementation of sustainable construction must consistently implement sustainable principles-based construction starting from the procurement stage, by establishing criteria in the selection of service providers that emphasize green construction throughout the product life cycle procurement process [6].

5. Conclusions

This paper presents the results of the literature review regarding the factors that influence the application of sustainable construction. Some summaries that can be presented that support factors of the central government and regional governments play a very important role in the application of sustainable principles, because the government as a regulator must provide motivation to support reinforcement and direction in the form of socialization of rules regarding sustainable construction practices in the implementation of construction projects which of course can be a guide for service providers (contractors and consultants) even all stakeholders in the implementation of sustainable construction. Furthermore, factors in the level of education and training, environmental awareness, and the level of understanding of green construction practices provide added value to service providers in implementing sustainable construction which certainly has a positive impact in efforts to civilize sustainable construction practices. Other components that contribute to the implementation of sustainable construction are environmental support for the development of the construction market, the economic value of green buildings, and the level of social participation as service users.

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