

Community Satisfaction with Ecological Carrying Capacity and Services in an Integrated City of Lunang Silaut, Indonesia



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ABSTRACT

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The research aims to determine to what extent (1) ecological carrying capacity influences the Development of the Independent Integrated City of Lunang Silaut, (2) ecological carrying capacity influences community satisfaction, (3) ecological carrying capacity affects the service quality of Independent Integrated City of Lunang Silaut, (4) development of Independent Integrated City of Lunang Silaut has an effect on community satisfaction, (5) the service quality has an effect on community satisfaction. The environment's carrying capacity means a place's ability to optimally support the life of living things for a long time. The research was conducted using a quantitative approach, involving 100 respondents from the community, community leaders, local government officials, academics, NGOs, and professionals. The Likert scale five questionnaires comprise 20 questions distributed proportionally to respondents. The results showed that (1) ecological carrying capacity has a positive effect on the Development of the Independent Integrated City of Lunang Silaut, (2) ecological carrying capacity has a positive effect on community satisfaction, (3) ecological carrying capacity has a positive effect on Independent Integrated City of Lunang Silaut service quality, (4) the Development of Independent Integrated City of Lunang Silaut has a positive effect on community satisfaction, (5) Independent Integrated City of Lunang Silaut service quality has a positive effect on community satisfaction.

1. INTRODUCTION

In essence, the development of transmigration is an integral part of national and regional development as part of efforts to accelerate development, especially in areas still isolated from economic, social, and environmental aspects. UU no. 15 of 1997 concerning Transmigration and PP No. 2 of 1999 concerning the Implementation of Transmigration state that the objectives of developing transmigration are (a) improving people's welfare, (b) improving regional development, and (c) strengthening the unity and integrity of the nation and state.

The regulation also directs transmigration areas to be designed and built to develop new growth centres. Furthermore, accelerating the development of new growth centres through the concept of Transmigration Development Areas (WPT) and Transmigration Settlement Locations (LPT) is carried out through the Independent Integrated City (KTM) development approach. The KTM concept includes spatial planning towards the realization of cities, economic business planning, which prioritizes the involvement of various sectors, private sector planning, and community development, which prioritizes the participation of migrants and residents.

The Independent Integrated City of Lunang Silaut (KTM) is a transmigration area whose development is formed to become a new growth centre sustainably and has duties and functions

like a city. The urban transmigration functions conceptually include (a) agribusiness activity centres consisting of processing agricultural products, special agro-industry service centres, education and training centres, industry and services, and (b) regional trading centres, wholesale markets and warehousing [1].

The Development of the Mandiri Lunang Silaut Integrated City, Pesisir Selatan Regency includes the Lunang Silaut District. Meanwhile, the number of villages included in the Mandiri Lunang Silaut Integrated City Area is 25, consisting of 12 former UPT (Transmigration Settlement Unit) villages and 13 local villages. Former UPT villages in the Lunang Silaut area have developed into traditional villages; some have even expanded into sub-district towns. Tanjung Baringin Village (Lunang 1) is the capital of Lunang Silaut District. The former UPT villages in the Lunang Silaut area have become palm oil-producing centres in the Pesisir Selatan District.

In its report on "Independent Integrated City of Lunang Silaut Master Plan Review," the Office of Social Affairs, Labor and Transmigration of the South Pesisir Regency Government revealed that the Lunang Silaut Integrated City Master Plan document was compiled in 2008. Until now, not all of the document's contents have been implemented. Therefore, in 2015, the data contained in the document can be said to be out of date, in line with economic developments in

Indonesia, so it is necessary to review the Master Plan. With this review, it is hoped that it will be able to formulate and produce detailed spatial planning products for urban areas with technical details for certain areas so that they can provide development priority scales and development policy interventions. In this master plan review, the environment's carrying capacity is also mentioned regarding production and non-production spatial planning, availability of clean water, drainage channels, waste disposal, soil characteristics, topography, groundwater table, habitat, and environmental climate. This review of the Independent Integrated City of Lunang Silaut master plan is a *das solen*, which is the benchmark/expectation for developing the Independent Integrated City of Lunang Silaut.

The success of the Independent Integrated City of Lunang Silaut development program can not only be seen from the physical aspects of city facilities and infrastructure but also must be seen from the aspect of its duties and functions as KTM, aspects of ecological carrying capacity, and aspects of the satisfaction of the people who participate in the development process. These three perspectives are essential to understand to ensure integration and independence as centres of sustainable economic growth.

This study aims to determine to what extent (1) ecological carrying capacity affects the Development of the Independent Integrated City of Lunang Silaut, (2) the carrying capacity of the environment influences community satisfaction, (3) the carrying capacity of the environment influences the service quality of Independent Integrated City of Lunang Silaut: (4) development of Independent Integrated City of Lunang Silaut affects community satisfaction; (5) the service quality of Independent Integrated City of Lunang Silaut has an effect on community satisfaction. This article is expected to provide recommendations for interested parties and answer the problems studied and the importance of community responses to implementing the Independent Integrated City of Lunang Silaut development.

1.1 Literature review

The conceptual framework for sustainable development began to be discussed in the late 1980s as a response to the previous concept of development, which focused more on high economic growth, which caused a decrease in production capacity and environmental quality due to excessive use of resources [2]. At the city level, integrated urban development policies can prioritize investment aspects and increase synergies and interactions between different urban areas. On the environmental aspect, plans and designs to develop public facilities can improve urban quality, social cohesion and inclusion, and protection of local resources.

Nurdin [3], in his writing on "Development of Transmigration Areas: A More Independent Integrated City," stated that the environment's carrying capacity is the environment's ability to support human life and other living things. The environment's carrying capacity is selected by studying the carrying capacity and natural resources to assist residents' activities that utilize space for survival. Its resources' conditions and characteristics influence a place's capacity. Environmental and resource capacities will be the dividing factors in determining the appropriate use of space.

Parasuraman et al. [4] said that service quality is a measure of a comprehensive assessment of the level of service and

service quality resulting from a comparison between customer expectations and service performance. According to Kotler, customer satisfaction is the level of one's feelings after comparing performance or results with the expectations that exist in customers. In this study, what is meant by service quality is KTM service quality as a growth centre in supporting the business development of several Development Area Units (SKP) consisting of several Settlement Units (SP) or Transmigration Settlement Units (UPT) or villages. Meanwhile, what is meant by customer satisfaction (response) is the satisfaction (response) of the Independent Integrated City of Lunang Silaut community.

1.2 Sustainable development

In their research, Mensah and Casadevall [5] revealed that sustainable development has become popular in contemporary development discourse. However, this concept still seems biased for several years because many have questioned its meaning and impact on development theory and practice. As an evolutionary process, development should increase human capacity to overcome problems, design new structures, and adapt to dealing with changes sustainably. Reyes [6] stated that development could be interpreted as a social condition in which the use of natural resources and the rational application of a system to meet the community's needs. Todaro and Smith [7] convey that development is a multi-aspect process that focuses on significant changes in structure, behaviour, and social institutions, economic development, reduction of welfare inequality, and absolute poverty alleviation.

Sustainability means focusing on the capacity to maintain several points, results, or processes from time to time [8]. However, in several studies on development, according to some experts and research, it is needed to improve and develop economic, environmental, and social systems in human life. Stoddart [9] further explains the concept of sustainability as a form of sharing resources efficiently and fairly between generations with limited socio-economic activities. On the other hand, Ben-Eli [10] sees sustainability as a dynamic balance that focuses on the interaction process between the population and the environment's carrying capacity. In the following procedure, the community population develops to strengthen its potential by minimizing negative environmental impacts that are difficult to avoid. Furthermore, Thomas [11] explains that sustainability is a human activity that enables them to fulfil their wants and needs wisely without destroying the available productive resources. Therefore, this concept raises discussions about how humans should live their economic and social lives.

Sustainable development has become a priority in the development concept, related to various meanings, meanings, and interpretations. Sustainable development can be explained as development efforts that can be continued continuously or within a limited time. Although there are many definitions of sustainable development, the Brundtland Commission [12] explains that sustainable development focuses on providing benefits to the current generation by considering the ability of future generations to provide for their own needs. Porter and van der Linde [13] in their writings explain that the best choice tends to remain focused on meeting the needs of society wisely both on environmental, economic, and social aspects, as described in Figure 1 below:

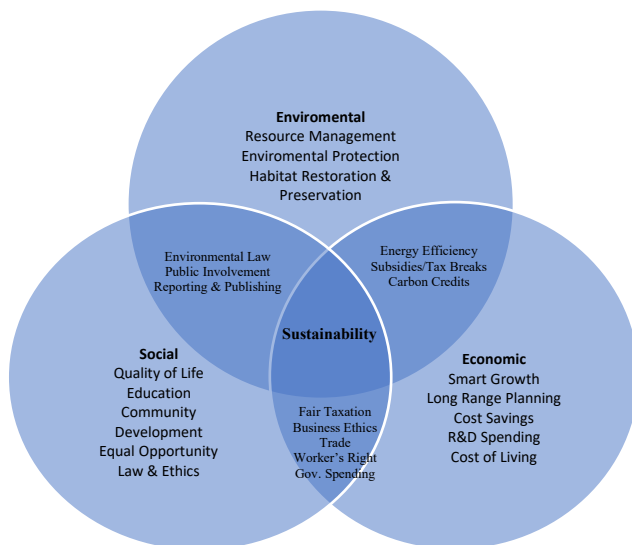


Figure 1. Social, environmental, and economic sustainability relationships
Source: Wanamaker [14]

As a creative and forward-looking development, Sustainable Development focuses on positive paths of change based on social, economic, and environmental factors. Taylor [15] further explained three priority issues in sustainable development: increasing economic growth, environmental preservation, and social justice. The concept of sustainable development is principally based on three pillars, namely: "economic sustainability," "social sustainability and benefit," and "environmental protection." Even so, the concept of sustainable development has been voiced for a long time and is increasingly relevant to an increasing population, but the available resources are increasingly limited.

Related to this phenomenon, the concern of all parties must be prioritized for the wise use of available resources. This concern is formulated into policies on the millennium development goals and sustainable development goals where there are calls and calls from the United Nations to protect the environment and improve human welfare in a balanced way. Sheikhejad and Yigitcanlar [16] stated that urban and rural areas, which in detail consist of all settlement forms, such as urban, urban, and rural development, are considered an essential part of economic growth, impact on the environment, and social welfare.

Good knowledge of urban and rural characteristics is a priority for sustainably designing and formulating future policies. Van der Zwet [17] explains that urban areas drive regional development and are also a vehicle for and a driving force for innovation and creativity. Nonetheless, the metropolitan area is a location that is characterized by many problems, such as poverty, slums, social inequality, and indifference to the environment. And it becomes a shared understanding that urbanization in cities is often associated with negative environmental impacts.

1.3 Urban and regional planning

Nuryanti [18] revealed that the carrying capacity and capacity of the environment must be considered in spatial planning as contained in Law Number 26 of 2007 concerning Spatial Planning to ensure the sustainability of human life today and for future generations. According to Mohamed et al. [19], the notion of complex systems in the context of urban

development areas is related to socio-spatial theory. This theory upholds the recognition of systemic polymorphs, the organization of socio-spatial relations in several forms. The approach explicitly suggests relational components or dimensions such as region, place, scale, and network. In addition, this theory also describes the debate about the spatiality of social relations and the problems of social-spatial processes in the current capitalist system.

On the other hand, the essence of the regional definition of the urban system is again seen concerning the concept of space economy, which attempts to address spatial and locational inequalities. Haqi [20] states that social sustainability and sustainable urban development are significant global challenges in developed and developing countries. Generally, there is a conflict between the sustainable development approach and social sustainability in the urban context. The concept of sustainability provides a fundamental framework for the extensive literature on design, architecture, and urban planning. However, there is a lot of overlap between the social dimension of sustainability and theories or ideas; for example, 'sustainable society' is highlighted amidst other aspects: fairness and social justice. Such societies are widely expected to offer long-term situations of social relations and activities that are sustainable, inclusive, and equitable in the broader perception of the term (environmentally, socially, and economically).

1.4 Strategic Environmental Assessment (KLHS)

Nuryanti [18] revealed that the Detailed Spatial Plan (RDTR) as a detailed regional spatial plan would play a key role in permitting spatial use in supporting Online Single Submission (OSS). Therefore, the consideration of environmental carrying capacity and capacity must be strengthened through the Strategic Environmental Assessment (KLHS) in preparing the RDTR. According to Muta'ali [21], the Policy Plan and Program (KRP) for controlling environmental damage and pollution launched by the Government three decades ago seems meaningless or losing pace with the speed of ecological damage and pollution. One strategic factor that causes this to happen is the KRP portfolio for controlling environmental damage and pollution launched by the Government (Environmental Studies (KLH) at the Center, or Environmental Impact Management (HLH) at provinces/districts/cities)) tends to "detach" or "separate" from regional and sector development PPPs, not embedded or integrated.

The speed of damage to natural resources and environmental pollution occasionally increases and exceeds the ability to prevent and control it. Ecological degradation is causal, cross-sectoral, cross-regional, and cross-agency, so it isn't easy to overcome. Strategic actions are needed to guide, direct, and guarantee the birth of KRP, which inherently considers adverse effects on the environment and ensures sustainability. The Brundtland Report [22] on the Environment has sparked the idea that national governments in various countries incorporate environmental considerations at all levels of decision-making. The instrument is the Strategic Environmental Assessment (SEA) or Strategic Environmental Assessment (KLHS).

A Strategic Environmental Assessment is needed as a self-assessment tool to see the extent to which the PPP proposed by the Government and the Regional Government has considered sustainable development principles. It is hoped that

the PPP produced and determined will be better. In the context of mainstreaming sustainable development as mandated in Law Number 20 of 2004 concerning the National Development Planning System (UU SPPN), KLHS becomes an integrative framework.

1.5 Environmental carrying capacity

Muta'ali [21], in the book "Guidelines for Determining Environmental Support and Carrying Capacity (DDDTLH)," published by the Ministry of Environment (2014), states that it is imperative to study environmental aspects and integrate the results into development. Planning. For this reason, the implementation of studies on ecological aspects that pay attention to environmental capability limits and livelihood standards needs to be understood by policy, planning, program makers, and stakeholders. The DDDTLH determination includes, among others, nine aspects, namely: (1) demographic capacity and (2) regional resources and economy, (3) food balance, (4) food self-sufficiency, (5) ability to support the basic needs of the population, (6) residential areas, (7) protection function, (8) population pressure, and (9) water-carrying capacity.

Spatial planning is intended to prepare spatial use based on not exceeding the threshold of environmental capability and capacity to facilitate human activities by minimizing environmental damage, which is part of the environment's carrying capacity and carrying capacity. These capabilities include reducing space and natural resources and providing a quality environment without disturbing the ecosystem. Damage and degradation of environmental quality will occur if spatial planning ignores the environment's carrying capacity, which can lead to disasters.

The concept and method of measuring environmental carrying capacity have many definitions. Still, the similarity is that carrying capacity always considers the comparison and balance between supply and demand, and everything is adjusted to the desired goals. The environment's carrying capacity means a place's ability to optimally support the life of living things for a long time. The environment's carrying capacity can also be interpreted as the ability of the environment to provide a prosperous and sustainable life for people living in an area. The State Ministry of Environment issued Regulation of the State Minister for the environment Number 17 of 2009 concerning Guidelines for Determining Environmental Supporting Capacity in Regional Spatial Plans, based on three methods: allocation of space use based on land capability, the balance of land resources, and water resources.

Land capability is a land characteristic that includes soil properties (physical and chemical), topography, drainage, and other environmental conditions. Based on the features of the land, land capability can be classified into class levels, subclasses, and management units. Land capability classification is carried out to assist in using and interpreting soil maps. Land capability is closely related to the level of damage hazards and obstacles in land management.

According to Suganda et al. [23], the ability of the environment to support human life and living things is the main instrument for environmental carrying capacity; knowing the carrying capacity of the environment and natural resources to facilitate human activities, especially in the use of space. Environmental and resource capacities will be the limiting factors in determining the appropriate use of space.

1.6 Independent Integrated City (KTM)

Pardede et al. [24] explained that transmigration is independent and individual because humans with different characteristics usually respond to and perceive the attractive aspects of migration differently and have various capacities to overcome obstacles. Age also influences migration because it is related to the life cycle stage when humans evaluate migration's push and pull factors. The determination of sex in the migration process has long been implemented. However, the calculation of the ratio of male to female migrants may differ according to the type of migration (e.g., rural to urban areas). Gender differences in migration can be integrated into the structure of economic opportunities.

On the other hand, factors such as the age structure and family life cycle of a household may reflect different ties to society, influencing migration from the family aspect. Families classified based on the presence or absence of children in a home and the age of the leading partner are stages that transmigrants must pass. In particular, young adults and single or those without children tend to be less grateful for not having a good society.

Conversely, barriers to migration will arise when there are children present (for example, through school) and can be seen from socio-economic status, income, and level of education. Education is generally considered to have a positive relationship with migration because increased education raises awareness in other areas sought more broadly. Those with higher education tend to be less attached to family, traditions, and the new regions.

Kalsum and Caesariadi [25] explained that the Independent Integrated City (KTM) is an area that develops as a centre for collection, product processing, distribution, and service and is designed as a structured development target. The purpose of developing KTM is to increase ease of use. Fulfilling various basic needs will facilitate socio-economic growth opportunities and create economic activity centres that can attract investment to build transmigration areas and their surroundings—local communities. The main goal of the Development of the Independent Integrated City is the existence of social, economic, and government facilities and infrastructure to provide services to meet basic/living needs as well as facilities to support the business activities of transmigrants and surrounding villages. Furthermore, KTM is a place to live and carry out agriculture-related activities to meet city residents' needs. The location of post-harvest economic activities and other relevant service activities is a function of the Independent Integrated City. Business development in transmigration areas is carried out using an agribusiness system approach. Namely, agricultural development that is carried out in an integrated manner, not only in cultivation (on-farm) but also includes off-farm businesses, namely the development of upstream agribusiness (agricultural facility providers), downstream agribusiness (processing and marketing of farm products) and support services. Agribusiness development relies on the agricultural sector and involves cross-sectoral activities and the overall macro-order of agribusiness actors. Suganda et al. [23] explained that the ability of the environment to support human life and other living things is part of the environment's carrying capacity. The selection of environmental carrying capacity is made by determining the carrying ability and resources of the natural environment to support the activities of residents who use space for life. The expanse of freedom meant to affect a

place's capacity is a condition and characteristic of the resources needed.

The Ministry of Environment states that an ecological city is an approach to urban development based on ecological principles. This approach was chosen in response to the deteriorating environmental conditions of the city because a development approach that is more oriented towards the short-term economic interests of the ecological city has similarities with the concept of a sustainable city, which emphasizes the importance of balancing economic, social and environmental interests in urban development. The ecological city also has the foresight that urban development must consider the sustainability or future of the city. A sustainable city is a city that is based on a just, healthy, and productive community supported by a conducive environment. According to the Ministry of Environment, indicators of an ecological city are as follows:

a. Land use, including (1) Percentage of the built-up area; (2) Percentage of Green Open Space (RTH); and (3) Percentage of slum houses.

b. Transportation, including (1) Percentage of public transportation users; (2) Percentage of non-motorized vehicle users; and (3) Area/length of pedestrian.

c. Buildings, including (1) The Density of buildings; (2) The number of historical buildings that are maintained; and (3) The number of slum buildings.

d. Open space, including (1) The percentage of city open space; (2) The percentage of open space capable of absorbing water; and (3) the percentage of urban green open space.

e. Infrastructure network, including (1) The amount of waste transported; (2) Number/area of stagnant water during the rainy season; (3) Flood area and frequency; and (4) Percentage of urban sanitation networks.

f. Energy, including (1) The amount of water consumption per person; and (2) The amount of gasoline consumption per person.

g. Hydrology, including (1) The percentage of drinking water service by PDAM; (2) The area of standing water in the rainy season; (3) City river water quality; and (4) City well water quality.

h. Air sunshine includes (1) City air quality and (2) Microclimate.

Pakurár et al. [26] explained in their paper that service quality is part of a customer's overall evaluation of a particular service. Quality will be related to satisfaction: the highest quality means the best satisfaction of consumer preferences, which is a user-based approach. Some experts agree with the definition of service quality, which explains that service delivery can be done by matching or ignoring the community's wishes. Parasuraman et al. [4] promote the SERVQUAL model as a service quality model that aims to measure the difference between what people expect and their perceptions. Service quality has ten dimensions: tangible, reliability, responsiveness, competence, courtesy, credibility, security, access, communication, and customer understanding. Service quality is designed as a multidimensional construction, and some experts have utilized the SERVQUAL model to view service quality and community satisfaction. Service quality has five dimensions: reliability, responsiveness, assurance, empathy, and tangible.

Asriati [27], in her paper, explains that the development of the Independent Integrated Area model uses the One Village One Product (OVOP) approach, which aims to empower and improve the economy of the people in the transmigration area

so that they can be self-sufficient by developing superior products and services that are competitive at the local, national and international levels. Data collection techniques through direct observation, questionnaires, and in-depth interviews. This research was conducted using a qualitative approach that is exploratory and evaluative. Through three stages, namely the development and design stage, the trial stage in a limited scope, and the validation stage in the form of a more comprehensive experiment. The results showed that the application of the OVOP model with QFD was not one hundred per cent successful because it did not have many national or international networks; efforts to develop OVOP product centres are carried out in the form of training, expert assistance, assistance with business facilities, promotions, exhibitions, marketing, facilitation of capital, and awarding OVOP awards; the Development of OVOP product centres in Rasau Jaya is an economic activity that supports the realization of KTM; and the formation of KTM fostered the behaviour of transmigration entrepreneurs who always developed OVOP.

Moeins [28] conducted research to carry out accelerated development of the growth centre of the KTM Telang area, with the outcome being the performance potential of the Telang KTM area; these results were able to provide a basis for carrying out the accelerated growth of the Telang KTM economic business so that the methods and dimensions and indicators used as measuring tools This evaluation is helpful for stakeholders related to the Development of the Transmigration Area in realizing a new development centre. Quantitative analysis was carried out in two stages. The first stage was to measure descriptive classification (using descriptive analysis) from the growth of KTM Telang, employing the value for each indicator as $\text{deal} = \text{weight} (\%) \times \text{score}$. The total score for the Growth Area = $\sum \text{weight} (\%) \times \text{score}$, likewise for the value of the KTM Growth Center = $\sum \text{weight} (\%) \times \text{score}$. The final result of the two discounts will be converted to the KTM Telang growth area classification. The results of the study found indicators for the development of the centre of economic growth for KTM Telang, South Sumatra Province, with the following criteria: a) Basic Services score $2225 < X < 4510$; b) Medium Service $4510 < X < 0765$; c) First Independent score $675 < X < 9020$; d) Fully Independent score $9020 < X < 11275$ and e) Competitiveness score > 11275 .

Widiatmaka et al. [29] researched to analyze regional aspects (commodity land suitability, superiority, land cover, land characteristics, geology, and regional hierarchy) and integrate them for land use planning and KTM spatial planning. Existing conditions were identified using secondary data and field surveys, including map surveys, physical resource data (geology, soil, land systems, land coverage), and regional socio-economic surveys. The data is integrated into the land use and spatial planning system using the Geographic Information System. The study results show that the area can be developed into an urban area with the KTM model. The primary commodities worth developing are rice and corn for food crops and rubber and oil palm for plantation crops. The spatial allocation for developing agricultural land is given while maintaining the large plantations currently developing. Regional spatial planning supporting the Development of KTM is presented through the arrangement of city and regional development centres based on the existing regional hierarchy and economic development plans for superior commodities. Tanjung Mas Makmur village was designated the KTM centre, supported by the current secondary growth

centre. The strategic location of the area helps the Development of KTM.

Ibrahim et al. [30] conducted a study to identify a suitable location for relocating flood victims in Lokoja, Nigeria, using the NigeriaSat1 remote sensor to determine suitable suitability for environmental carrying capacity. Relocation considerations include land use/land cover, slope, elevation, and road proximity. The results showed that about ¾ of the investigated sites were unsuitable for relocation. At the same time, only 10.62% were suitable for an area of 2564.44 hectares, whereas 5 were flat areas of more than 100 hectares. Therefore, environmental suitability, ecological carrying capacity, and area sustainability must be thoroughly analyzed before planning and implementing a population relocation program.

Taiwo and Feyisara [31], in their research, stated that increased urbanization and rapid population growth caused significant changes on the surface of the earth, not only triggering cultural improvements and modernization but also growing global challenges, including floods, global warming, loss of biodiversity, as well as the housing crisis and hunger; this is not only a source of concern but also a big task for planners and professionals to build the environment, facing the 21st century. These challenges indicate that the earth's carrying capacity has been reached. If these problems are not addressed, even bigger disasters will occur and make the earth uninhabitable and unsustainable for the foreseeable future. Suppose the focus of planning is to improve the quality of life of present people and care for future generations through the social and physical design of the human environment. In that case, it is reasonable to examine the engineering, economic, social, political, and legal acceptability and the degree of relevance of planning physiology and function of ecological systems for resource supply and assimilation of residues. This study aims to document the authenticity of the concept of environmental carrying capacity to re-examine the dimensions related to understanding urban and regional planning as something humane. Identifying and setting limits or capacities of urban activity systems along with carrying capacities provides decision-makers with a practical approach to assessing the natural and human feasibility of urban and regional planning proposals. There is a need for all stakeholders, urban analysts, and operating environmental professionals to rebuild the alignment of the earth's wealth capital to the goals and potential goals and aspirations of humanity in the 21st century.

Qian et al. [32] explained that soil carrying capacity (LCC) focusing on local land resources could effectively support economic activity. LCC is usually evaluated through two methods, namely, ecological footprint analysis (EFA) and index system method (ISM). EFA analyzes the influence of various soil categories, while ISM can be utilized to analyze the contribution of social, environmental, and economic factors. The study's results explain that the study of soil carrying capacity with EFA and ISM has complementary and mutually supportive characteristics. Both of these methods explain that a decrease in land area and an increase in energy consumption significantly harm the carrying capacity of the soil and threaten the sustainability of development. Stakeholders at every level need to minimize ecological deficits by managing fossil energy consumption, preserving land and forests, reducing urbanization, and recommending sustainable development.

In his research, Wijaya et al. [33] revealed that urbanization in many countries, such as Indonesia, is generally a population dynamic in a developing region. A reduction usually follows them in rural areas because they are used for urban development, such as the housing industry, infrastructure, and others, to respond to population growth. One that urban planners and decision-makers may not consider sufficiently is that urbanization also means an increase in the consumption of natural resources, which the natural capacity of the region should support. In this situation, a balanced approach to calculating the carrying capacity of the environment in spatial planning is needed for the continuation of development; the Indonesian spatial law number 26/2007 has stated the approach to the balance of the intended carrying capacity. The law regulates access and permit systems in controlling developments, especially those requiring land conversion.

Even so, the reduction of rural land, primarily agricultural land, continues. This study aims to reduce the habit of inadequate consideration of environmental carrying capacity in spatial planning practices in Indonesia. This study describes the general weakness of calculations in projecting the area of urban development by recalculating the spatial planning of the Development of Kutai Kartanegara Regency as an example of discussion. The study results show that 1) there is a deficit in the area of agricultural land to meet the needs of agricultural production for the existing population, and 2) some calculations of agricultural production may be misinterpreted due to insufficient explanation regarding the productivity of each agricultural commodity.

In their research, Cirman and Ograjenšek [34], in their research, identified and empirically verified the factors that influence community satisfaction in post-socialist urban settlements. They used the post-socialist Slovene cities of Nova Gorica and Velenje as illustrative examples and the average Slovene satisfaction in urban settlements as benchmarks. This unique combination of data allows them to draw vital lessons for community residents, community planners, and local policymakers. This study attempts to describe the Development of the Independent Integrated City of Lunang Silaut and determine the influence of the ecological carrying capacity of KTM, the function and level of Development of KTM, and the quality of KTM services on community responses (satisfaction). This research model can be seen in Figure 2 below:

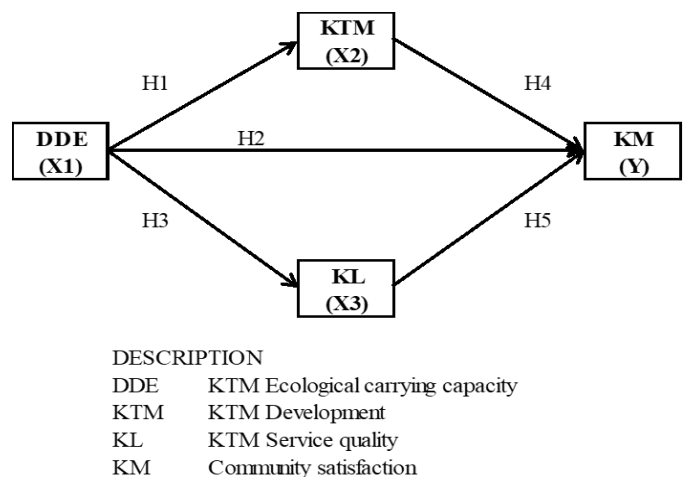


Figure 2. Research model

Based on the research framework, the following research hypotheses can be identified:

- H1: Ecological carrying capacity (X1) influences the development of KTM (X2)
- H2: Ecological carrying capacity influences community satisfaction (Y)
- H3: Ecological carrying capacity affects KTM service quality (X3)
- H4: Development of KTM (X2) affects community satisfaction (Y)
- H5: KTM service quality (X3) influences community satisfaction (Y)

As mentioned in the abstract section, following these rules will be easy if you replace the "content" here without modifying the "form".

2. METHODOLOGY

Determining the environment's carrying capacity and carrying capacity is done through an indicative approach based on the analysis unit, parameters, indicators and benchmarks in each analysis unit. Bearing in mind that carrying and tamping capacity are dynamic and complex and very dependent on a region's geographical characteristics, population size and the existing conditions of natural resources in each area.

The research method used is a survey with a descriptive analysis design. The unit of analysis in this study is the stakeholders of the Mandiri Lunang Silaut Integrated City Area, Pesisir Selatan Regency, West Sumatra province, which consists of the community, community leaders, local government authorities, academics, non-governmental organizations (NGOs), and professionals. The unit of analysis is a unit of study for measuring regional capacity at the national, island/archipelago, provincial, cross-regency/city, district/city and ecoregions in district/city areas as well as thematic environments in the context of environmental carrying capacity and capacity. In determining carrying capacity, this analysis unit can be divided into administrative and ecoregional units with different data requirements. The types of data needed are administrative data and spatial data.

In this study, the number of research samples was determined based on the criteria of Hair et al., which states that the recommended sample size for use with a Maximum Likelihood estimate of 100-200 [35]. The sample size was set at 100 respondents. Sampling was done utilizing Convenience Random Sampling. The questionnaire consisted of 20 questions (8 questions for DDE, 4 for KTM, 5 for KL, and 3 for KM) with an alternative Likert answer scale of 5 (five). Hypothesis testing was carried out with the PLS-SEM program.

3. RESULTS AND DISCUSSION

The research respondents comprised 100 members of the public, 20 community leaders, 20 local government employees, 20 academics, 20 NGOs, and 20 professionals. The results of the analysis show in the Figure 3.

Based on Table 1, it can be explained as follows:

(1) In the path coefficient parameter, it can be explained that the relationship between ecological carrying capacity (DDE) to Development (KTM), service quality (KL), and community satisfaction (KM) has a significant value compared to the

value of the relationship to Development (KTM) to community satisfaction (KM) and service quality (KL) to community satisfaction (KM) which received a less significant value.

(2) In the indirect effect parameter, the relationship between ecological carrying capacity (DDE) and community satisfaction (KM) gets a significant value.

(3) The determinant coefficient parameters show the relationship between ecological carrying capacity (DDE) and Development (KTM) with high-influence achievements. Ecological carrying capacity (DDE), Development (KTM), and service quality (KL) on community satisfaction (KM) obtained highly influential results. The relationship between ecological carrying capacity (DDE) and service quality (KL) also greatly influences outcomes.

(4) In the outer loading parameters, it can be explained that ecological carrying capacity (DDE), Development (KTM), service quality (KL) and community satisfaction (KM) can get satisfactory conclusions.

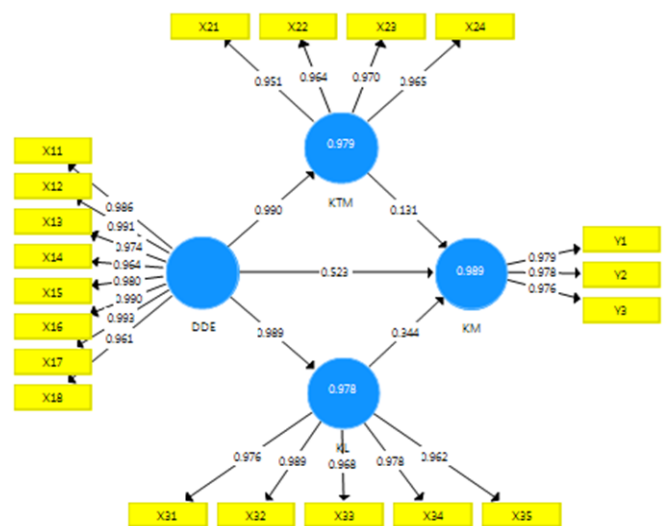


Figure 3. Results of data analysis

Table 1. Summary of analysis results

Parameter	Relationship	Result	Conclusion
Path coefficient	DDE to KL	0.989	Significant
	DDE to KTM	0.990	Significant
	DDE to KM	0.523	Significant
	KTM to KM	0.131	Less significant
	KL to KM	0.344	Less significant
Indirect effect	DDE to KM	0.470	Significant
	DDE to KTM	0.979	High influence
Koefisien determinasi (R ²)	DDE, KTM, KL to KM	0.989	High influence
	DDE to KL	0.978	High influence
Outer loading	DDE	0.961 – 0.993	Satisfying
	KTM	0.951 – 0.970	Satisfying
	KL	0.962 – 0.989	Satisfying
	KM	0.976 – 0.979	Satisfying

The satisfactory results of factor loading indicate that the indicators used for each research variable can adequately measure the variables in question. The high coefficient of determination indicates that DDE, KTM, and KL can explain the community's response (satisfaction) well, so other factors can be ignored. The path coefficient results show that the path coefficients from KTM to KM and KL to KM are less significant than those from DDE to all endogenous variables. These results indicate that the community's response to the ecological carrying capacity of KTM is more satisfying than the function and quality of KTM services. In other words, the function and quality of KTM services have not satisfied the public and need to be improved.

The carrying capacity and capacity of the environment in spatial planning is intended so that the use of space based on spatial planning does not exceed the limits of the environment's ability to support and accommodate human activities without causing environmental damage. This capability includes the ability to provide space, the ability to provide natural resources and the ability to improve ecological quality if there are impacts that disrupt the balance of the ecosystem. Spatial planning that ignores the environment's carrying capacity will cause problems and environmental quality degradation, such as floods, landslides and droughts, pollution and so on.

The concept and method of measuring ecological carrying capacity have many definitions, but what they have in common is that carrying capacity always takes into account the comparison and balance between supply and demand and all of them are adjusted to the desired goals. Ecological carrying capacity means the ability of a place to support the life of living creatures optimally over a long period. Ecological carrying capacity can also be defined as the ability of the environment to provide a prosperous and sustainable life for organisms for the people who inhabit an area.

4. CONCLUSIONS

Referring to the formulation of the research problem and the results of data analysis, it can be concluded that: First, ecological carrying capacity positively affects the Development of the Independent Integrated City of Lunang Silaut. Second, ecological carrying capacity has a positive effect on community satisfaction. Third, ecological carrying capacity positively affects the quality of the Independent Integrated City of Lunang Silaut services. Fourth, the Development of the Independent Integrated City of Lunang Silaut positively affects community satisfaction. Fifth, the Independent Integrated City of Lunang Silaut's service quality positively affects community satisfaction.

Overall, the community's response to the ecological carrying capacity, existence, and function of KTM, as well as the quality of KTM services in the Lunang Silaut sub-district, are felt to be positive and good; however, of all the factors that influence the response (satisfaction) of the community, the presence and function of KTM and the KTM service quality factor are still less significant than the ecological carrying capacity factor. Based on the findings of this study, it is suggested that the Pesisir Selatan District Government evaluate the function and quality of KTM services to specify which functions and service quality need to be improved so that community response (satisfaction) can be increased.

The limitation of this research is not looking at the environmental carrying capacity to see the sustainability of the Lunang Silaut independent city project in the future, both from a physical and social perspective. So it is hoped that future research can comprehensively find findings and analysis that have implications for policy-making regarding the development of independent cities in Indonesia and even in the world.

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