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Analysis of Environmental Carrying Capacity and Capacity in the Area Surrounding the New Port of Makassar

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ABSTRACT

In accelerating national strategic projects and central government investment, the Makassar New Port (MNP) area is being developed on the coast of Tallo District. The development of MNP has caused environmental degradation, which will have a negative impact on the carrying capacity of Tallo District. In terms of land capacity, the development will have an impact on the increased demand for land. This study uses ecological footprint analysis as a basis for examining the environmental carrying capacity and land carrying capacity of residential areas in Tallo District. Then, to analyze land capacity, a land capacity unit, analysis is carried out based on the Minister of Public Works Regulation No. 20 of 2007. The purpose of this study is to analyze the carrying capacity and land carrying capacity of residential areas in Tallo District, to analyze land capacity using a spatial method with land capacity unit. Based on research and spatial analysis, it was found that ecologically, Tallo District experienced a carrying capacity deficit of 1.06 gha/person, despite a surplus in industrial and residential areas of 114 gha/person. In terms of residential carrying capacity, most villages show a surplus with a total excess capacity of 357,958 people, while only one village shows a deficit. These findings indicate an imbalance between ecological capacity and regional capacity

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INTRODUCTION

Law No.(32) of 2009on environmental protection and management states that environmental carrying capacity and capacity are essential for maintaining environmental sustainability and preserving life within it. Studies on environmental carrying capacity and capacity are necessary to preserve the environment, both in terms of land use and surrounding natural resources. The ecological footprint refers to the amount of natural resources used by an activity compared to the capacity of the ecosystem to absorb its impact (Juan Cagiao Villar et al, 2019).

In the context of ports, the ecological footprint includes land consumption, energy use, waste generated, and impacts on coastal ecosystems. Research by (Andry Hizkia, 2024) shows that poorly managed ports can have an ecological footprint that exceeds the carrying capacity of the local environment, causing habitat degradation, water pollution, and changes in ecosystem structure. In addition to ecological footprint analysis, land capacity units are used to determine the capacity of an area to accept a certain amount of activity without experiencing a decline in environmental quality. According to the research and development agency of the Ministry of Environment and Forestry (2019), the main factors that determine land capacity units include soil texture and structure, water absorption capacity, land slope, and vegetation that plays a role in maintaining ecosystem stability.

In the context of regulation, the government has issued a policy through Minister of Environment and Forestry Regulation No. P.12/MENLHK/2018, which stipulates that every port development plan must undergo a comprehensive environmental assessment to ensure that the balance of the ecosystem is maintained. Research by (Nur Azisah, 2023) reveals that geomorphological stability, soil absorption capacity, and coastal vegetation sustainability are the main factors in determining land capacity around the Makassar New Port (MNP). Land conversion due to port expansion has the potential to increase the risk of coastal erosion and decline in water quality, which can impact marine ecosystems and coastal communities.

An evaluation of the land capacity around the port is crucial to determine safe limits for infrastructure development, so as not to exceed the available ecological capacity. Therefore, this study aims to measure the ecological footprint of port activities and analyze land capacity units to provide science-based recommendations for environmental management strategies around the port.

LITERATURE REVIEW

1. **Ecological Carrying Capacity**

Ecological footprint is the process of utilizing materials, energy, and information from nature that are needed in everyday life. As a standardized form of quantification, the ecological footprint is converted into units of bioproductive area required to support all these activities. Therefore, the ecological footprint can be considered a cumulative measure of human demand for natural resources to maintain their quality of life (Kustomo, 2020).

2. **Settlement Carrying Capacity**

Environmental carrying capacity is the ability of the environment to absorb substances, energy, and/or other components that enter or are introduced into it (Ministry of Environment and Forestry, 2019). Studies on the carrying capacity and carrying capacity of residential land are necessary to maintain environmental balance, both in terms of land use and the utilization of surrounding natural resources. This approach forms the basis for controlling spatial use to ensure it does not exceed available ecological capacity. Therefore, this study plays a crucial role in maintaining environmental quality and preventing damage due to human activity (I Kadek arcana dkk, 2021).

3. **Land Capability**

According to Minister of Environment Regulation Number 17 of 2009 concerning Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning, land capability is a land characteristic that includes soil properties, topography, drainage, and other environmental conditions to support life or activities on a given area of land (Rivaldo, Veronica & Fela, 2019). Land capability is based on consideration of biophysical factors in land management to prevent land degradation during use. The more complex the management required, the lower the land capability for the planned use (Dagasou, Kumurur, & Lahamendu, 2019).

4. **Land Capability Unit**

Land capability units are used to determine an area's capacity to withstand the load of certain activities without experiencing environmental degradation. According to the Research and Development Agency of the Ministry of Environment and Forestry, the main factors determining land capability units include soil texture and structure, water absorption capacity, land slope, and vegetation, which plays a role in maintaining ecosystem stability. (Regulation of the Minister of State for the Environment, 2009).

Research Location

A research location is the place or object of a study. This research location is in Tallo District, Makassar City. Tallo District is divided into 15 sub-districts. For more details, see map 3.1 below:

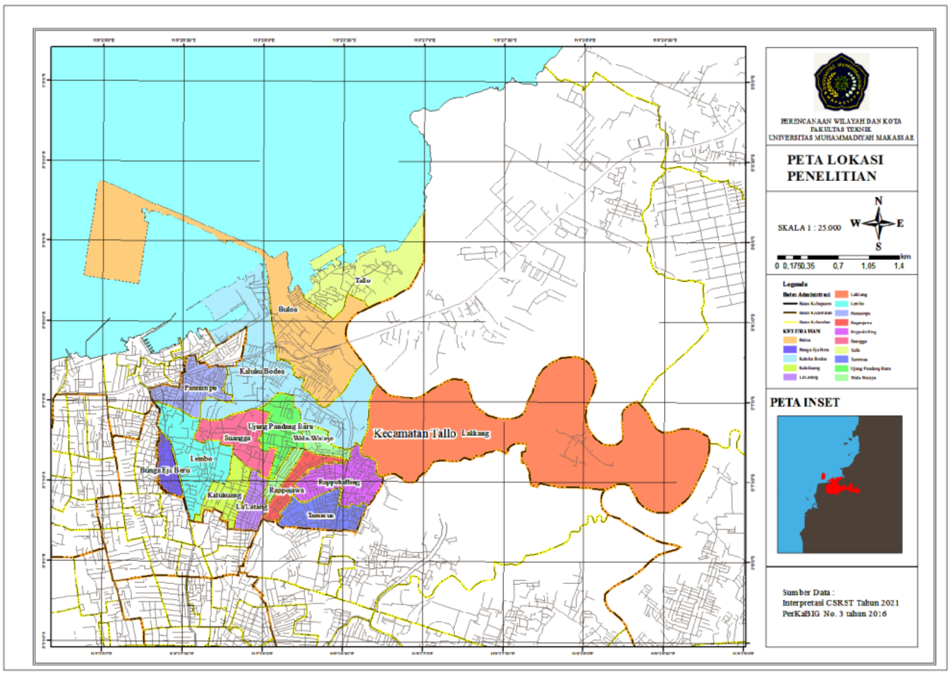

Figure 1. Map of the Research Location
Source: Researcher 2025

METHODOLOGY

The research approach used was quantitative descriptive analysis techniques to process and interpret the data obtained and spatial analysis methods to examine land capability (Dagasou, Kumurur, & Lahamendu, 2019).

1. **Land Requirements**

Land carrying capacity can be analyzed based on land availability and needs, taking into account the principles stipulated in Minister of Environment Regulation Number 17 (2009) concerning guidelines for determining environmental carrying capacity in regional spatial planning. This regulation provides guidance for assessing an area's capacity to support human activities without exceeding the ecosystem's regenerative limits.

$$\boldsymbol{KHLL}\ \frac{\textbf{(Rice needs per person per year)}}{\textbf{local rice productivity every year}} \quad (1)$$

$$\textbf{DL=N x KHLL} \quad (2)$$

Description:
DL = Total land requirement equivalent to rice (ha)
N = Population (people)
KHLL = Land area required for a decent standard of living per resident (Wahid, 2021)

2. **Ecological Carrying Capacity (Ecological Footprint)**

The concept and scope of environmental carrying capacity, according to Law Number (32) of 2009 concerning Environmental Protection and Management, defines the environment as a spatial entity with all objects, forces, conditions, and living creatures, including humans and their behavior, that impact nature itself, the continuity of life, and the well-being of humans and other living creatures. The Ecological Footprint formula is as follows:

Table 1. Ecological Footprint Formula

No.	Formulation	Abbreviation	Description
1	DDE = BK/JE	DDE = Ecological Carrying Capacity BK = Biocapacity (ha/person)	DDE > 1, where the ecosystem is able to support the population living within it (ecological debt) DDE < 1, where the ecosystem is unable to support the population living within it (ecological deficit)
2	BKt $=\sum_{i=1}^{k} = BKi$	BKi = (0.88 x LPLi x FPi) /JP BKi = Land use biocapacity (ha/capita) LPLi = Land use area (ha) 0.88 = 12% constant to ensure sustainable biodiversity FPi = Production factor -i JP = Population (people)	Biocapacity is the initial step in determining the impact of human activities on the environment. Therefore, the factor measured is the resource in units of land consumed by a certain population and the capacity to absorb the waste produced. The unit commonly used is hectares (ha) (Widhi, 2019).
3	JEi = JP x Ki x Efi JEt $=\sum_{i=1}^{k} = JEi$	JE = Ecological Footprint (ha/person) JEi = Ecological footprint value of land use 1 (ha) JEt = Total ecological footprint value JP = Population Ki = Value of land requirement i, to meet the consumption needs of the population per capita (ha/person) EF = Equivalence factor	The value of Ki x EFi has been calculated, resulting in a coefficient value that can be directly applied. The ecological footprint is calculated by knowing the total consumption of required resources and the waste (emissions) produced (Kustomo, 2020).

Source: (Guidelines for Determining Environmental Carrying Capacity and Accommodation Capacity(2014))

3. Settlement Capacity

Settlement capacity is the ability of an area or piece of land to provide sufficient space to accommodate a certain number of residents so they can live comfortably. More specifically, settlement capacity refers to the number of residents a settlement area can accommodate based on the available land area and the standard per capita space requirement. (Nurul Pertiwi et al, 2021).

Table 2. Settlement Capacity Formula

No.	Formulation	Description
1	DTL = $\frac{LPm}{JP\ X\ a}$	DTL = Land Capacity (number of people) LPm = Area of land suitable for settlement (m^2) α = Coefficient of land requirement per capita (m^2/person), for example, according to SNI 03-1733-2004, it is 26 m^2/person.
2	LPm =LW-(LKL+LKRB)	LW = Area LKL = Protected area LKRB = Disaster-prone area

Source: (Guidelines for Determining Environmental Carrying Capacity and Accommodation Capacity, (2019))

4. Land Capability Unit

Land Capability Unit Analysis is used to determine the land capability and suitability of a region. This analysis allows for understanding of land limitations and potential, allowing for optimal land use planning. (Ministerial Regulation of Public Works and Housing No. 20, 2007) Land Capability Unit Analysis is used to determine the land capability and suitability of a region. This analysis allows for understanding of land limitations and potential, allowing for optimal land use planning. (Ministerial Regulation of Public Works and Housing No. 20, 2007) This analysis covers several important aspects such as morphology, ease of construction, slope stability, foundation stability, water availability, drainage, and erosion potential. The following is the weighting for the analysis:

Table 3. Analysis of land capability units

No.	Land Capability Unit
1	Morphology
2	Workability
3	Slope Stability
4	Water Availability
5	Erosion Resistance
6	Drainage
7	Waste Disposal
8	Natural Disaster Resistance

Source: (Minister of Public Works and Public Housing Regulation Number 20, (2007))

5. Land Capability

According to the Minister of State for the Environment Regulation (Regulation of the Minister of State for the Environment, 2009) Number 17 concerning Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning, land capability is defined as land characteristics encompassing soil properties, topography, drainage, and other environmental conditions that support life or activities on a given area of land (Rivaldo, veronica & fela, 2019). Land capability is based on consideration of the land's biophysical factors in its management to prevent land degradation during use. The more complex the management required, the lower the land's capability for the planned use (Dagasou, Kumurur, & Lahamendu, 2019).

Table 4. Land development classes

No.	Land Capability Class	Development Classification
1	Class A	Very low development capability
2	Class B	Low development capability
3	Class C	Moderate development capability
4	Class D	High development capability
5	Class E	Very high development capability

Source: (Minister of Public Works and Public Housing Regulation Number 20, (2007))

RESULTS AND DISCUSSION

1. Land Requirements

Land requirements are a quantitative measure of the productive space required to meet human consumption and activities, including food, energy, housing, and waste. In an ecological approach, land requirements are not only calculated based on physical function but also converted into ecological footprint units, which are the total area of land and water required to support a population's lifestyle. (Febriyanto, 2017). The following are the calculations in (**1**) and (**2**) for land requirements:

Table 5. Land requirements

No.	Type Of Land Use	Area Of Land Use (Ha)	KHLL	Land Requirement (Ha/Person)
1	Forests	3,4	6.622	0,001
2	Industry	164,8		0,025
3	Roads	17,42		0,003
4	Canals	1,94		0,0003
5	Mixed Gardens	3,69		0,001
6	Empty Land	24,12		0,004
7	Education	16,31		0,002
8	Trade and Services	12,91		0,002
9	Offices	2,01		0,0003
10	Settlements	387,4		0,06
11	Green Open Spaces	9,41		0,001
12	Rivers	86,88		0,013
13	Mountains	22,02		0,003
Total		752,31		3,363

Source: Researcher 2025

2. Ecological Footprint

The ecological footprint is closely related to the Earth's environmental carrying capacity or biocapacity, which provides natural resources for human needs (Kustomo, 2020). This tool can be used to measure resource use and waste capacity from both human populations and businesses, linked to land carrying capacity, usually expressed in hectares. The following formula is shown in Table (**1**):

Table 6. Ecological footprint analysis

Land Use Type	Land Requirement (Hectar/Person)	Equivalent Factor	Population	Ecological Footprint
Forests	0,001	1,4	146.566	104
Industry	0,025	2,2		8.024
Roads	0,003	2,2		848
Canals	0,0003	0,4		17

Mixed gardens	0,001	2,1		172
Empty land	0,004	2,2		1.175
Education	0,002	2,2		794
Trade and services	0,002	2,2		628
Offices	0,0003	2,2		98
Settlements	0,06	2,2		18.865
Green open spaces	0,001	1,4		292
Rivers	0,013	0,4		769
Mountains	0,003	0,5		244
Total	3,363			32.030

Source: Researcher 2025

The total ecological footprint value in Tallo District is 32,030 ha/person, which means that each person in Tallo District has their own use of natural resources of 32,030 ha.

3. **Biocapacity**

Biocapacity is the first step in assessing the impact of human activities on the environment. The measurement of biocapacity is how much of the resources from bioproductive land are used to produce goods or services consumed by a given population. Furthermore, biocapacity also considers the land's ability to absorb or assimilate waste generated using common technologies. The formula for biocapacity is shown in Table 1:

Table 7. Biocapacity Analysis

Land Use Type	Constant	Area (hectar)	Equivalent Factor	Population	Biocapacity (Hectar/Person)
Forests	0,88	3,37	1,4	146.566	35.286
Industry		165	2,2		459
Roads		17,42	2,2		4.346
Canals		1,94	0,4		214.167
Mixed gardens	0,88	3,69	2,1	146.566	21.470
Empty land		24,12	2,2		3.139
Education		16,31	2,2		4.642
Trade and services		12,91	2,2		5.865
Offices		2,01	2,2		37.571
Settlements		387	2,2		195
Green open spaces		9,41	1,4		12.646
Rivers		86,88	0,4		4.793

Land Use Type	Constant	Area (hectar)	Equivalent Factor	Population	Biocapacity (Hectar/Person)
Mountains		22,02	0,5		15.126
Total		752,31			359.704

Source: Researcher 2025

4. **Ecological Carrying Capacity (Ecological Footprint)**

In our ecological footprint analysis, we compare the ecological footprint with biocapacity. The comparison between biocapacity (supply) and the ecological footprint (demand) can reflect the carrying capacity (CC) of a region. The concept of Carrying Capacity (CC) is based on the idea that the environment has a maximum capacity to support population growth that is directly proportional to its utility (Runtukahu, Sangkertadi, & Supardjo, 2018). The following formula is shown in Table 1:

Table 8. Results of Ecological Carrying Capacity

No.	Land Use Type	Biocapacity	Ecological Footprint	Ecological Carrying Capacity	Description
1	Forests	35.286	104	0,003	Deficit
2	Industry	459	8.024	17,467	**Surplus**
3	Roads	4.346	848	0,195	Deficit
4	Canals	214.167	17	0,0001	Deficit
5	Mixed gardens	21.470	172	0,008	Deficit
6	Empty land	3.139	1.175	0,374	Deficit
7	Education	4.642	794	0,171	Deficit
8	Trade and services	5.865	628	0,107	Deficit
9	Offices	37.571	98	0,003	Deficit
10	Settlements	195	18.865	96,54	**Surplus**
11	Green open spaces	12.646	292	0,023	Deficit
12	Rivers	4.793	769	0,160	Deficit
13	Mountains	15.126	244	0,016	Deficit
	Total	359.704	32.030	115,068	

Source: Researcher 2025

If the DDE > 1, the ecosystem is in a surplus, meaning the environmental carrying capacity is greater than the population's needs. This situation indicates that natural resources are sufficient to support the community's livelihoods without exceeding the available ecological capacity (ecological debt).

Conversely, if the DDE < 1, an overshoot occurs, meaning the ecosystem is unable to optimally meet the population's needs. This imbalance leads to overexploitation of natural resources, creating an ecological deficit, where human needs exceed the environment's regenerative capacity.

The results of the analysis of the comparison between demand and availability of natural resources in Tallo District show that the ecological carrying capacity has a value indicating a surplus condition is the use of industrial and residential areas, which means the ecosystem in the area is still able to support the needs of its population without experiencing excessive pressure. Conversely, other land uses experience a deficit, which means that the availability of land is insufficient to meet existing needs, potentially causing pressure on environmental carrying capacity and less than optimal use of space within it. The following is a map for ecological carrying capacity:

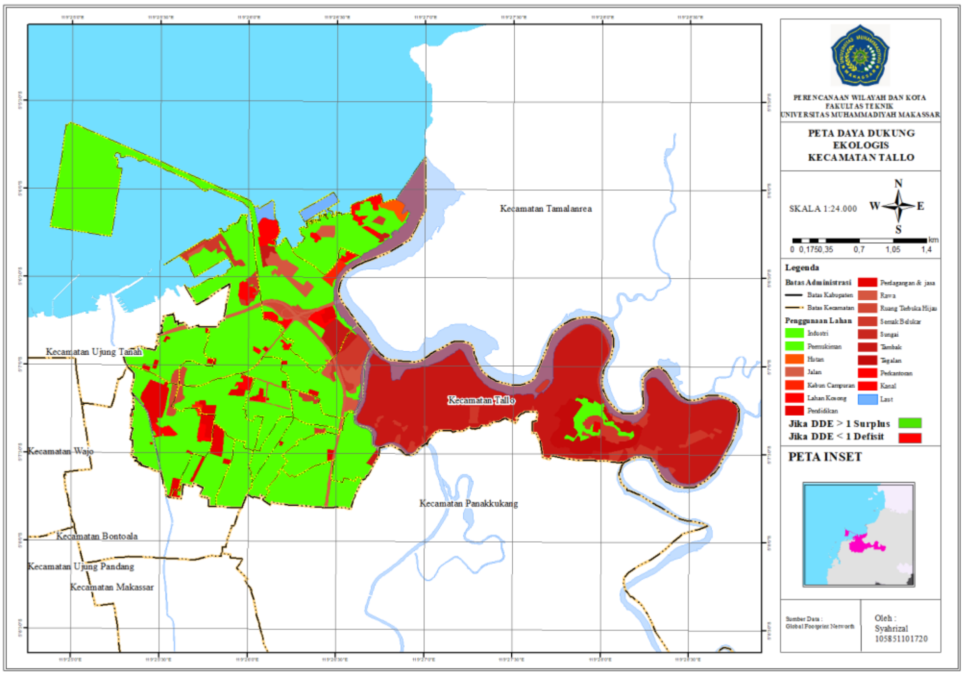

Figure 2. Ecological Carrying Capacity
Source: Researcher 2025

5. Settlement Capacity

Settlement capacity is the ability of an area or piece of land to provide sufficient space to accommodate a certain number of residents so they can live comfortably. More specifically, settlement capacity refers to the number of residents a settlement area can accommodate based on the available land area and the standard per capita space requirement. (Nurul Pertiwi et al, 2021). The formula for calculating settlement capacity is shown in Table 2 below:

Table 9. Results of Settlement Capacity

No.	Sub-district/Village	LPM (m²)	Total population	kebutuhan lahan per kapita (m²/jiwa)	Number (of people)	Description
1	Buloa	633.643	8.709	26	1.892	Surplus
2	Bunga Eja Beru	112.826	10.135		289	Surplus
3	Kaluku Bodoa	377.687	23.195		423	Surplus
4	Kalukuang	13.391	5.108		68	Surplus
5	Lakkang	3.236.848	240	26	350.659	Surplus
6	La'Latang	1.063	4.595		6	Surplus
7	Lembo	763.248	11.281		1.759	Surplus
8	Pannampu	338.477	17.848		493	Surplus
9	Rappojawa	2.148	7.074		8	Surplus
10	Rappokalling	100.060	16.005		163	Surplus
11	Suangga	-19.555	9.968		-51	Deficit
12	Tallo	351.904	9.433		970	Surplus
13	Tammua	1.063	10.235		3	Surplus
14	Ujung Pandang Baru	178.546	4.266		1.088	Surplus
15	Wala-walaya	61.348	8.474		188	Surplus
Total			146.566		357.958	

Source: Researcher 2025

One sub-district, Suangga, is experiencing a deficit, with a capacity shortfall of 51 people. This shortage indicates pressure on available space and requires an evaluation of land use.

In total, Tallo District has a population surplus of 357,958, demonstrating the region's significant potential for population growth and residential development. However, attention to capacity distribution across sub-districts remains crucial to maintaining balance and equitable living conditions for the community. The following map shows residential capacity:

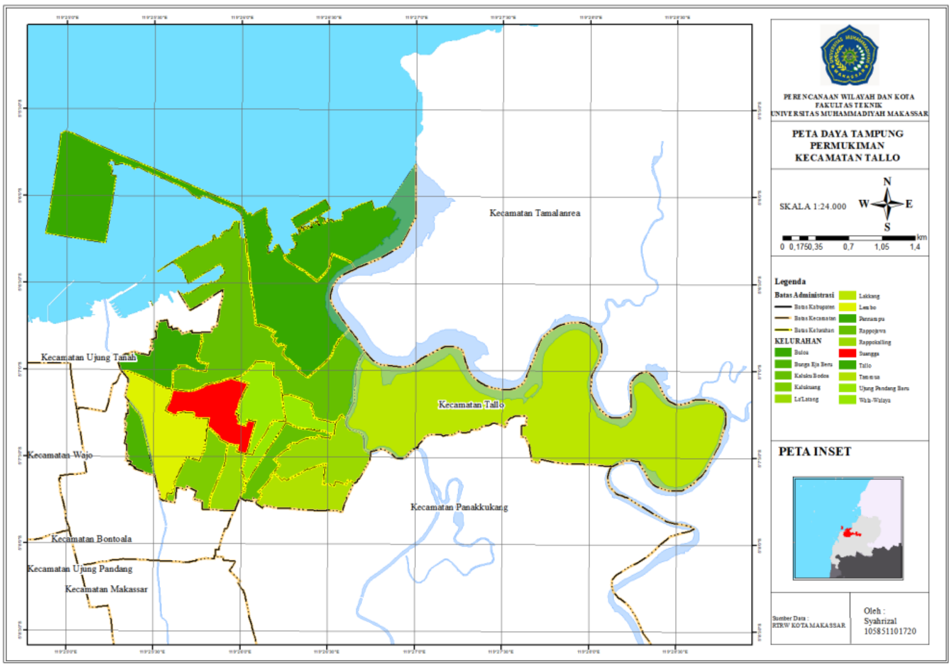

Figure 3. Settlement Capacity
Source: Researcher 2025

6. Land Capability

Administrative Land Capability

Land capability classification in Tallo District is performed by overlaying each land capability unit obtained from multiplying the final values (land capability levels for each Land Capability Unit/Land Capability Unit) based on their respective weights. This results in a map showing the total final values multiplied by the cumulative weights of all Land Capability Units.

In this analysis, the result of multiplying the final value by the weight of each unit is referred to as a score, which is calculated using a formula. Based on the overlay of spatial data on land capability and village administration, the distribution pattern of land capability in Tallo District can be interpreted, taking into account the assessed land capability levels.

Table 10. Land capability results for each village

Sub-district/Village	Development capacity (hectares)			Area (hectares)	Area (%)
	Medium	High	Very high		
Buloa	62,97	24,06	88,23	175,26	17%
Bunga Eja beru	13,62	0,13	0,033	13,78	1%
Kaluku bodoa	113,39	21,98	9,266	144,64	14%
Kalukuang	23,87	0,07	-	23,94	2%
Lakkang	50,89	149,44	140,44	340,77	32%
La'latang	17,11	-	-	17,11	2%
Lembo	46,99	2,36	5,227	54,57	5%
Pannampu	33,61	0,09	-	33,71	3%
Rappojawa	18,95	0,01	-	18,96	2%

Sub-district/Village	Development capacity (hectares)			Area (hectares)	Area (%)
	Medium	High	Very high		
Rappokalling	34,25	4,96	1,475	40,68	4%
Suangga	37,21	0,03	-	37,24	4%
Tallo	37,15	15,48	23,22	75,85	7%
Tammua	31,56	0,43	0,005	31,99	3%
Ujung pandang baru	29,02	0,10	-	29,12	3%
Wala-walaya	20,88	0,23	-	21,11	2%
Total	571,47	219,35	267,88	1.059	100%

Source: Researcher 2025

Based on the results of the land capability analysis in Tallo District, class C represents medium land capability, class D represents high development capability, and class E represents very high development capability. Moderate development capability is divided into sub-districts. Kaluku Bodoa Sub-district, with an area of 113.39 hectares, is the largest. Bunga Eja Beru Sub-district, with an area of 13.62 hectares, is the smallest.

High development capability is divided into sub-districts. Lakkang Sub-district, with an area of 149.44 hectares, is the largest. Rappojawa Sub-district, with an area of 0.01 hectares, is the smallest. Very high development capability is divided into sub-districts. Lakkang Sub-district, with an area of 140.44 hectares, is the largest. Tammua Sub-district, with an area of 0.005 hectares, is the smallest.

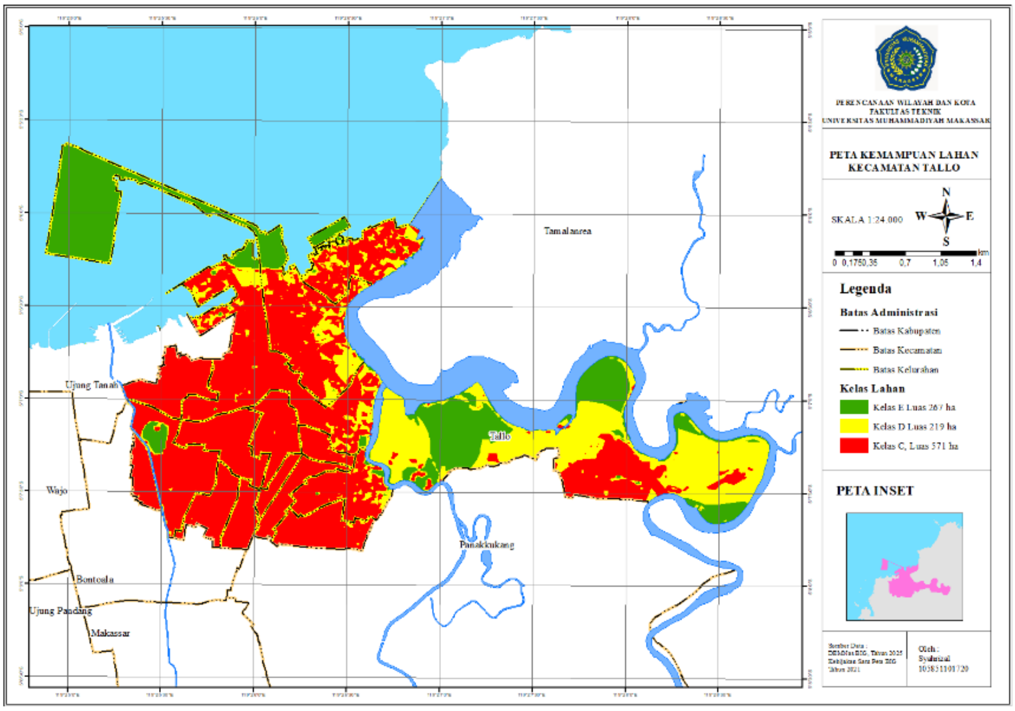

Figure 4. Land Capability Units
Source: Researcher 2025

Land Capability in Land Use

To analyze the capability of highland areas for land use in Tallo District, an overlay was used in ArcGIS. A comprehensive land capability assessment was conducted to determine the suitability of ecological functions to the area's land use and to ensure that the carrying capacity and settlement capacity were not exceeded. The following are the land capabilities for land use:

Table 1. Land Capability Results for Each Land Use

No.	Land Use	Area (hectares)	Area (%)
1	Forest	1,82	0,4%
2	Industry	95,4	20%
3	Roads	1,52	0,3%
4	Canals	0,48	0,1%
5	Mixed Gardens	0,83	0,2%
6	Empty Land	6,63	1,4%
7	Sea	8,19	1,7%
8	Education	0,15	0,0%
9	Trade and Services	6,99	1,4%
10	Offices	0,04	0,0%
11	Settlements	30,2	6,2%
12	Swamps	5,60	1,1%
13	Green Open Spaces	0,10	0,0%
14	Shrubs	15,0	3,1%
15	Rivers	84,3	17%
16	Fish Ponds	222	46%
17	Mountains	7,58	1,6%
18	Total	487	100%

Source: Researcher 2025

The overlay results in Tallo District total 487 hectares, dominated by land use for fish ponds of 222 hectares or 46%, followed by industry at 95.4 hectares or 20%. Land use for rivers covers 84.3 hectares or 17%, playing an important role in the hydrological system and environmental conservation potential. Meanwhile, residential land occupies 30.2 hectares or around 6.2%. Other uses are spread across the service and trade sectors 1.4%, vacant land 1.4%, and dry fields and shrubs that can be utilized ecologically more optimally. The education, office, and green open space sectors have not developed significantly, each less than 0.1%.

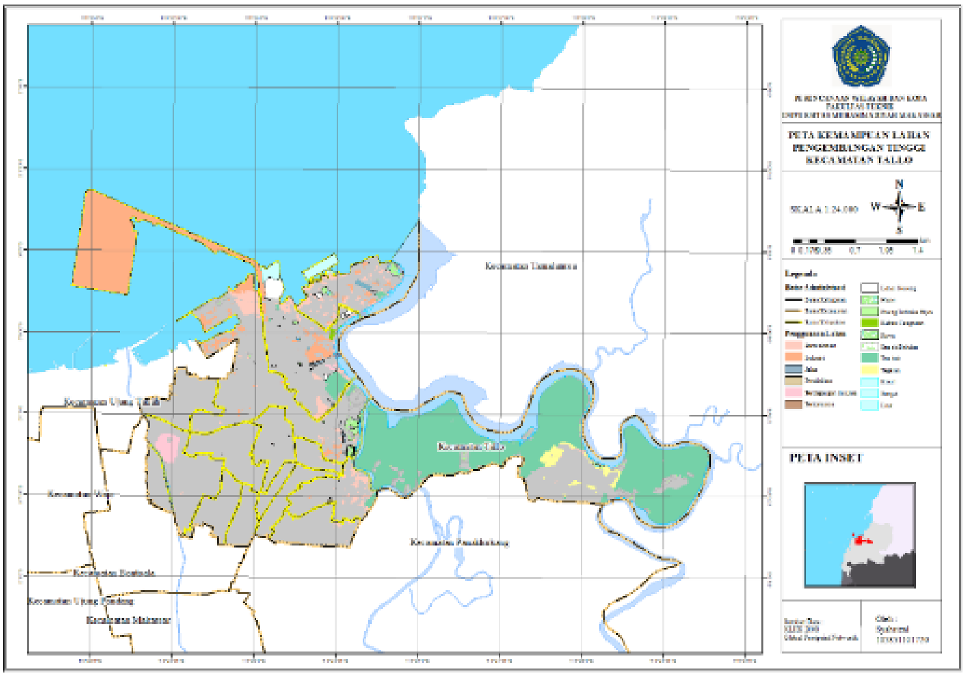

Figure 5. Land Capability Map on Land Use
Source: Researcher 2025

CONCLUSION AND RECOMMENDATION

The results of field observations and analysis of the carrying capacity and capacity of the Tallo District, Makassar, using the ecological footprint and land capability approaches, show the following results:

1. **Ecological Footprint:** Conclusions from the analysis of ecological carrying capacity using the calculation of Tallo District's ecological footprint based on land use. Surplus: industry and settlements with a total of 114 gha/person. Deficit: Forests, Canals, Roads, gardens, vacant land, education, trade and services, offices, green open spaces, rivers, and dry fields. The total value of the surplus ecological carrying capacity in Tallo District is 114 gha/person and the Deficit is 1.06 gha/person.
2. **Settlement Capacity:** The majority of sub-districts (Buloa, Bungaeja beru, Kaluku bodoa, Kalukuang, Lakkang, La'latang, Lembo, Pannampu, Rappojawa, Rappokalling, Tallo, Tammua, Ujung Pandang Baru, and Wala-walaya) are in surplus condition, with a total of 23,864 m². Suangga sub-district shows a Deficit condition of -51. Overall, the studied area is in a surplus condition of settlement capacity of 357,958 people.
3. **Land Capability Class:** Divided into 3 classes: Class C 54%, Class D 21%, and Class E 25%. Class E land (very high potential) covering 267 hectares, 25% of the total land is spread across the sub-districts of Buloa, Bunga Eja Beru, Lakkang, Kaluku Bodoa, Lembo, Rappokalling, Tammua, and Tallo. The overlay results show that some of this Class E land has been converted to: Residential 30 hectares, Education 0.15 hectares, Office 0.04 hectares, Trade and Services 7 hectares, and Vacant Land 6.63 hectares.
4. **Recommendations for Further Research:** This research is expected to deepen our understanding of the complexity of the relationship between humans, the environment, and development.

5. **Recommendations for the Government:** The Makassar City Government plays a crucial role in directing spatial development. This research will help the government make data-driven decisions. The analysis of carrying capacity-based spatial planning policies uses an evaluation of the effectiveness of the existing Regional Spatial Plan and Detailed Spatial Plan.
6. **Recommendations for the Community:** Communities need to be empowered through environmental education and active involvement in local planning, such as village development planning meetings (Musrenbang) or neighborhood association forums. Collective awareness of the importance of maintaining balanced land use is a key factor in reducing environmental impacts in residential areas.

FUTHER STUDY

This research still has delays, so it is necessary to conduct further research related to the topic Analysis of Environmental Carrying Capacity and Capacity in the Area Surrounding the New Port of Makassar in order to improve this research and add insight for readers.

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