



Landuse Changes And Policy Directions For Agriculture Due To Decreasing Agricultural Land In Mandalika Special Economic Zone

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ABSTRACT	ARTICLE INFO
<p>Agricultural land is still priority for Indonesian people, the majority of whom are farmers. Along with technological advances and rapid population growth, agricultural land began to experience a widespread decline. The Mandalika Special Economic Zone (SEZ) is experiencing land conversion in to built-up land due to the rapid development in the area. The purpose of this study is to determine changes in land use before and after the construction of the Mandalika Circuit and as a policy direction to increase agricultural land productivity. The research method uses GIS analysis and Focus Group Discussion (FGD). The results obtained are that it is known that there has been a change in land use in Kuta Village after the Designation of the Mandalika Special Economic Zone with the Mandalika Circuit Development, and increasing the construction of built-up land. Direction of agricultural policy is the establishment of sustainable agricultural land in Central Lombok Regency, apart from that there is a need to implement Sustainable Food Houses (RPL), the concept of agrosilvopastura agriculture, waste utilization and the need for the development of agriculture-based tourism.</p> <p>© 2023, FPIPS UPI. Open access article under the CC BY-SA license.</p>	<p>Article History: <i>Submitted/Received 30 May 2023</i> <i>First Revised 30 April 2023</i> <i>Accepted 30 May 2023</i> <i>First Available online 30 Oct 2023</i> <i>Publication Date 30 Oct 2023</i></p> <hr/> <p>Keywords: <i>Agriculture,</i> <i>Sustainability,</i> <i>Landuse change,</i> <i>Tourism</i></p>

1. INTRODUCTION

Indonesia is a country that has very large agricultural land. Most of the land in Indonesia has good soil fertility making it suitable for agriculture. The agricultural sector is one of the main activities in ensuring local and national food security (Rondhi et al., 2018; Fusco et al., 2023). As a country that has long been known as an agricultural country, Indonesia has agricultural land which is the land for the livelihood of rice cultivators with the main commodity being rice (Ridwana R et al., 2022). This is because rice is the staple food of Indonesian society. In addition to rice commodities, Indonesian people also cultivate vegetables and fruits. Agricultural commodities can be decreasing caused by regional development and increasing in built-up areas (Sasongko Wisnu et al., 2017; Khafagy and Vigani, 2022). Other case of the decreasing agricultural productivity is caused by climate change (Xu and Yang, 2022; Thomas et al., 2022). Farming needs water storage especially in dry season. Often drought is other case of harvest failed. Meanwhile the demand of agricultural product is increasing. (Larsson and Vik, 2023).

Agricultural land is still a priority for the livelihood of rural communities. People tend to use nature to earn a living through farming (Aini et al., 2019). Productive agricultural land is increasingly experiencing changes in land use which leads to a decrease in area (Mittenzwei et al., 2023; Nofita et al., 2016). The problem with the productivity of agricultural land is the decreasing area of agricultural land that is converted into other uses (Chadajah et al., 2020; Marini et al., 2023). These changes were influenced by population growth which was followed by the need for land for settlements and supporting facilities (Iemaaniah et al., 2023; Janah et al., 2017) resulting in regional expansion (Jaya et al., 2021).

Central Lombok Regency is one of the districts that has many changes in land use, especially with the construction of the Mandalika Circuit which is in the Mandalika Special Economic Zone (KEK) of Kuta Village. The construction of a facility will spread to the construction of other facilities that can support the continued benefits of the existence of the circuit. The relocation of evicted residents' settlements increases the amount of built-up land around the circuit, of course this development also changes the vacant land around it, including productive agricultural land.

Data obtained from BAPPEDA East Kalimantan Province states that one of the villages affected by the construction of the Mandalika circuit is Kuta Village. The people who were at the zero point of the Mandalika Circuit were relocated to another area which was empty land in the surrounding area. PT. ITDC Indonesia Tourism Development Corporation as a tourism developer in the Mandalika area which carries out community land acquisition projects, from residential areas to agricultural land. The development of tourism in the Mandalika area is accompanied by the construction of other supporting facilities, including hotel centers, souvenir centers, culinary, accessibility, and residential areas for people who were displaced by the construction of the Mandalika circuit.

Tourism development in the Mandalika Region converts agricultural land and vacant land into built-up land. Community agricultural land that was displaced had an impact on people's lives, especially farmers. Farmers' income from agricultural land products will decrease with a decrease in the area of agricultural land. Good agricultural policies are not only concerned with the level of productivity of agricultural land, but also need to consider natural environmental factors. In discussing sustainable agriculture, the goal of managing agricultural land is not only food security but also considering the sustainability of agricultural land productivity (Fusco et al., 2023). In addition, the direction of agricultural policy can be developed from the selection of commodities that are adjusted to the suitability of the land,

climatic conditions and seasons, selection of superior seed varieties, to marketing of agricultural products (Ikhsani et al., 2020).

The increasingly rapid development of technology has also influenced agricultural policy making, the preparation of agricultural policies can be packaged in integrated agriculture through digital media (Ehlers et al., 2021). Especially in agricultural product marketing policies can be developed digitally through online marketing. In preparing agricultural policy directions, it is also necessary to consider regional potential (Hendaka and Prabowo, 2013). Consideration of regional potential in preparing policy directions is intended so that the policies compiled can be properly implemented in certain areas according to the research location. The tourism development area in Mandalika has many land conversions built to support tourism facilities so that productive agricultural land such as rice fields, plantation, and farm areas has decreased in area. Therefore, this study is to determine changes in land use before and after the construction of the Mandalika Circuit and as a policy direction to increase agricultural land productivity of these area.

2. METHODS

This research will be conducted in Kuta Village, Pujut District, Central Lombok Regency with a research period of 6 months, starting from February 2023 to July 2023. The choice of Kuta Village as the research village was due to the conversion of large agricultural land due to the construction of the Mandalika Circuit. and construction of other supporting facilities such as hotels, restaurants, roads and others. So that a lot of productive agricultural land has turned into built-up land.

This study uses data variables, namely land use data (built and undeveloped land). Use of built-up land includes settlements, offices, hotels, villas, roads, stadiums and others, while non-built-up land use includes agricultural land, shrubs, water bodies, pastures, cultivated gardens, and mixed gardens (Campos-Taberner et al., 2023).

The tools used in this study include two devices, namely hardware consisting of a laptop, printer, GPS, camera, and a set of stationery. Software consisting of ArcGIS 10.3 software, Microsoft software for analysis and reporting. The data needed in this study are field data (ground check) physically, Iconos Imagery in 2012., Latest Iconos imagery for 2023, Administrative Boundary Map of Kuta Village, Pujut District, Data on the area of agricultural land in Kuta Village, agricultural production data for Kuta Village, and Data The Population Density of Kuta Village obtained from the Department of Agriculture and the Central Bureau of Statistics for Central Lombok Regency.

To find out changes in the area of productive agricultural land, land use analysis is needed using GIS (Juniyanti et al., 2020). Analysis of land use requires initial data in the form of Google Earth satellite images for 2012 and 2023. The selection of the year uses the time reference before the construction of the Mandalika Circuit, during the construction of the circuit and after the construction of the Mandalika Circuit is complete. The satellite image data obtained was then digitized using the ArcGIS 10.3 software. The results were then interpreted to determine the characteristics of land use in Kuta Village in 2012 and 2023.

Image interpretation for land use uses elements of interpretation including hue/color, site, shape, size, shadow, association, texture (Nahari, R et al., 2018). So in interpreting the map must follow the directions in accordance with the elements of image interpretation (Septiani et al., 2019). To find out the accuracy of image interpretation, a calculation of the kappa accuracy matrix confusion test is carried out so that the truth in the image interpretation is obtained. To formulate agricultural policy directives, a SWOT analysis is needed including Strength. Weaknesses, Opportunities, Threats through Focus Group

Discussion (FGD) activities conducted with the Agriculture Office, Village Government and Farmer Groups in Kuta Village which were then analyzed with descriptive qualitative results from the Focus Group Discussion (FGD) with relevant stakeholders. Relevant stakeholders invited to the focus group discussion activities were representatives of farmers, village government, and the Central Lombok Agriculture Service. Representatives of these stakeholders were taken by purposive sampling. Samples based on research objectives to obtain agricultural policy directions so that the research samples were communities related to agricultural policy making.

3. RESULTS AND DISCUSSION

Based on BPS, (2022) data, Kuta Village in the 2021 population census recorded a total population of 9615 people with an area of 2366 hectares. The population density in this village is relatively very low, it is 406 people/hectare in the area of Kuta Village. This village has agricultural land with the main commodity of fruit and vegetable horticulture. Kuta Village is part of the Mandalika Special Economic Zone (SEZ) which focuses on tourism development. As a tourism area in Central Lombok Regency, Kuta Village has a large number of hotel accommodations, namely 25 and more than 99 inns. The development of this tourism resulted in land conversion in Kuta Village.

3.1. Decreasing of Agricultural Land

Changes in land use that occurred in the Mandalika Area can be seen through the results of imagery and land use maps in 2012 before the construction of the Mandalika Circuit, and in 2023 after the Mandalika Circuit and the opening of various tourism attractions in the Mandalika Area. Changes in land use in the Mandalika area can be monitoring using remote sensing (Ridwana R & Himayah S, 2020) e.g on the 2012 and 2023 image maps as follows

Figure1:

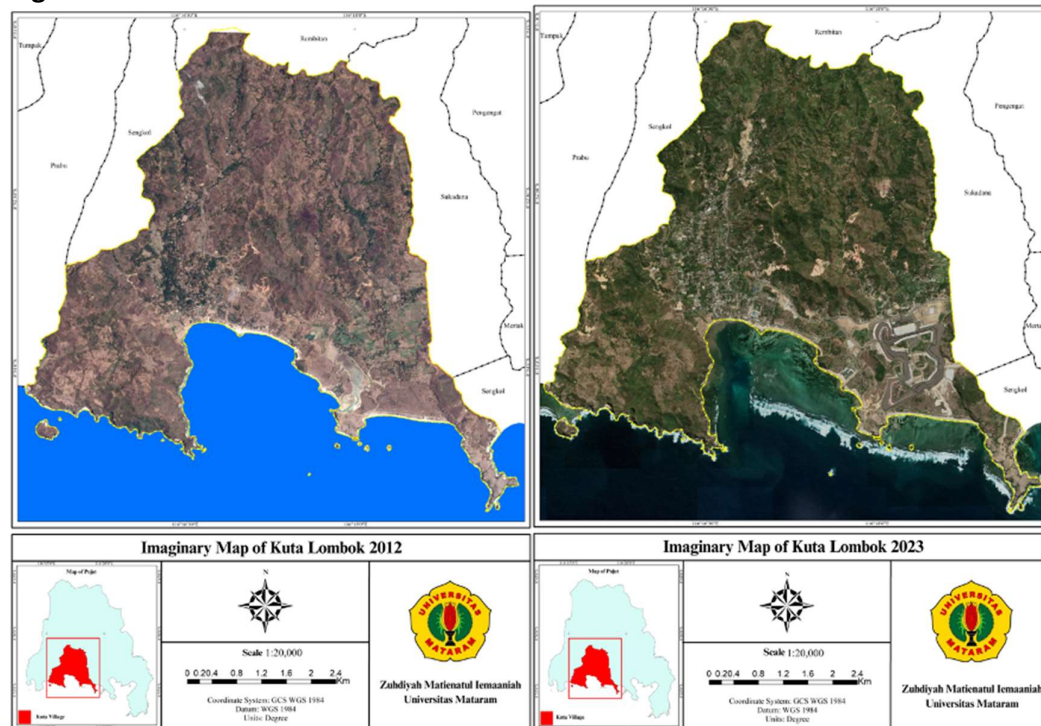


Figure 1. Imaginary of Kuta Village 2012 (left), Imaginary of Kuta Village 2023 (Right)

To test the accuracy of image interpretation, an accuracy test was carried out with kappa accuracy which resulted in an accuracy of interpretation after conducting a ground check of 95.6%, which means that the accuracy of image interpretation can be trusted. Details of the results of the image accuracy test were carried out with kappa accuracy as follows:

$$\begin{aligned}
 \text{Kappa Accuracy} &= \frac{(203 \times 211) - 6482}{(211)^2 - 6482} \times 100\% \\
 &= \frac{(42.833) - 6482}{44.521 - 6482} \times 100\% \\
 &= \frac{36.351}{38.039} \times 100\% \\
 &= 95,6\%
 \end{aligned}$$

Based on the results of the image map above, it can be seen that changes in land use occurred in the village before the construction of the Mandalika Circuit and after the existence of the Mandalika Circuit. Kuta Village is the village that has experienced the most increase in built-up land compared to other villages in Pujut District, Central Lombok. Built-up land is increasing, especially on land around the zero point of the Mandalika Circuit. Changes in Land Use in Kuta Village can be seen in **Figure 2** below:

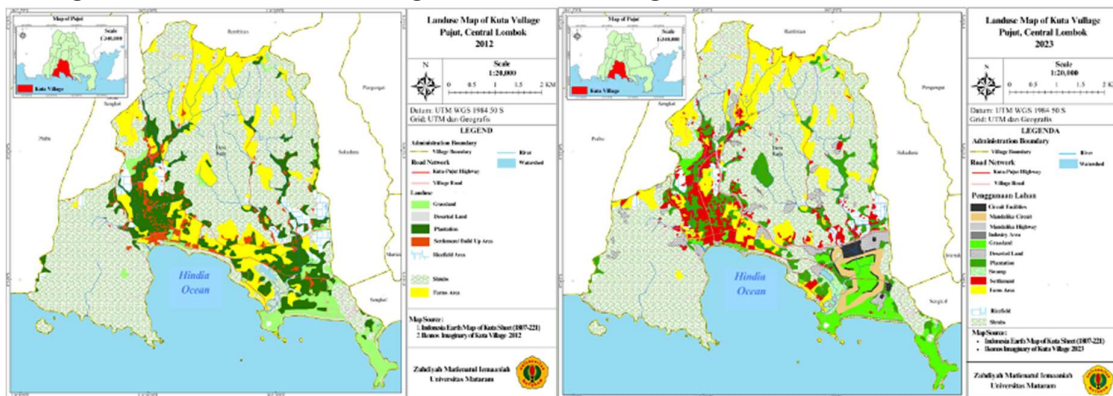


Figure 2. Landuse Map of Kuta Village 2012 (left); Landuse Map of Kuta Village 2023 (right)

The map image above is a map of land use change. Agricultural land in the Kuta Village area is divided into rain-fed rice fields, fields/moors, and also plantations which are dominated by fruit and vegetable horticultural crops. The following **Table 1** presents changes in agricultural land before and after the construction of the Mandalika Circuit.

Table 1. Landuse Changes in Kuta Village

Landuse (Ha)		2023				
		Others	Farm	Plantation	Ricefield	Total of changes
2012	Others	1623,31-1849,2	0	0	0	516,8
	Farm	359,44	273,38	0	0	86,06
	Plantation	302,38	0	188,4	0	113,98
	Ricefield	80,87	0	0	55,1	25,77

	Total of changes	516,8	86,06	113,98	25,77	742,61
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Other uses include the use of built-up land such as settlements, circuits, industrial areas and tourism support, bodies of water, roads, and most of which are still in the form of shrubs. Meanwhile, those categorized as productive agricultural land include paddy fields, fields/fields, and plantations. In a period of approximately 10 years, it is known that the change in the area of agricultural land into non-agricultural land was around 742.61 hectares so that agricultural land has decreased, while the change in non-agricultural land has increased by 516.8 hectares.

3.2. Policy Directions For Agriculture

Agricultural policy directions are carried out using swot analysis on the potentials of the village. Activities to explore the village's agricultural potential were carried out through Focus Group Discussions (FGD) with the Central Lombok Agriculture Service, the Kuta Village Government, and Farmer Representatives in Kuta Village. SWOT analysis includes Strength. Weaknesses, Opportunities, Threats. The SWOT analysis matrix based on the results of the Focus Group Discussion (FGD) with the Agriculture Office of Central Lombok Regency, Kuta Village Government and Farmers in Kuta Village is obtained as follows:

(Internal Factor Strategic Analysis Summary = IFAS)

<i>(Strength)</i>	<i>(Weakness)</i>
The potential for agricultural land is as large as that includes rainfed paddy fields, plantation lands, and dry fields	Agricultural land is getting narrower with the development of tourism in this village.
Main commodities are rice, corn, beans, vegetables and fruits	Farming activities are felt to be difficult and disproportionate to income, so farmers switch to livestock and tourism which are more profitable
There is seed assistance and fertilizer subsidies from the agriculture service and the food security service	Farming motivation and the next generation is decreasing
Abundant agricultural products, especially horticulture (corn, peanuts)	There is a lot of agricultural waste but farmers cannot use it, and there has never been any counseling regarding the use of agricultural waste
There are groups of farmers and women farmers	Farmer groups have not utilized the surrounding yards as a medium for planting horticultural crops
There are rainfed wells in the agricultural land area	There is no agricultural irrigation system, the rice fields only use rainfed water

Source: Data Analysis, 2023

External Factor Strategic Analysis Summary = EFAS

<i>Opportunities</i>	<i>Threats</i>
Application of Agrosilvopastura (agricultural concept that combines farming, forestry and community livestock activities)	Drought in agricultural land due to low rainfall and vertisol soil type with a slow drainage system
Utilization of agricultural waste as biochar and organic compost to increase the fertility of agricultural land	Environmental pollution, especially agricultural land from agricultural products and livestock manure around farm land due to waste that is not utilized
The application of agro-tourism, as a tourism potential area that is growing rapidly, tourism development based on agricultural activities is very suitable to be applied to agricultural lands as a tourist attraction with the concept of learning agriculture.	Vacant land that can be used to add agricultural land will be difficult to realize because the Kuta Village area is included as a Tourism Development Area that supports tourism around the Mandalika Circuit
Supplier of food (agriculture and livestock) hotels, restaurants	Decreasing of farming motivation from the next generation
Proposed sustainable agricultural land in Central Lombok Regency, including Kuta Village.	Most of the land has been turned into built-up land to support tourism in Mandalika area, only small amount of land is designated for agriculture.

Source: Data Analysis, 2023

Agricultural policy in a region refers to the goal of increasing agricultural productivity. In Europe agricultural policy is develop by Common Agricultural Policy (CAP). The agricultural policy to increasing productivity is considered by measuring in physical, quantities, between outputs produced and inputs required in the production process (Khafagy and Vigani, 2022). For the same reason the policy of agriculture will increase of the productivity so it can be sustainable and support local and national food needs. The Mandalika Special Economic Zone, one of which is Kuta Village, has been designated as a Special Economic Zone for tourism development. Physically agricultural land has decreased in area, but making the right decisions can provide direction to increase the productivity of existing land.



Figure 3. Focus Group Discussion with stakeholder

Based on the results of the Focus Group Discussion (FGD) with relevant stakeholders (**Figure 3**), it can be concluded that the direction of agricultural policy in Kuta Village is as follows **Table 2**:

Table 2. Policy Directions of Agriculture in Kuta Village

No	Policy Directions of Agriculture in Kuta Village
1	Increasing agricultural activities based on Sustainable Food Houses (RPL).
2	Determination of sustainable agricultural land based on the Decree of the Central Lombok Regent, namely land that is only designated as agricultural land.
3	There are many vacant lands, grasslands, and shrub areas that can be used as agricultural land.
4	The application of Agrosilvopastura is due to the high livestock potential and the need to increase it as a supplier of meat in various areas on the Lombok Island.
5	There needs to be utilization of agricultural and livestock waste that is around the community.
6	As part of a tourism development area, agro-tourism can be used as an alternative to educational tourism in this area.

Source : Data Analysis 2023

Kuta Village is indeed a prioritized village to become a tourist area. This village has many very interesting natural attractions which are then also added to by the construction of the Mandalika Circuit, an international standard circuit so that in the future this area will be more designated as a tourist area. The development of tourism in this area will clearly increase developments such as hotels, homestays, resettlement areas for circuit zero point settlements, restaurants and other supporting facilities (**Figure 4**) which result in land conversion being unavoidable.

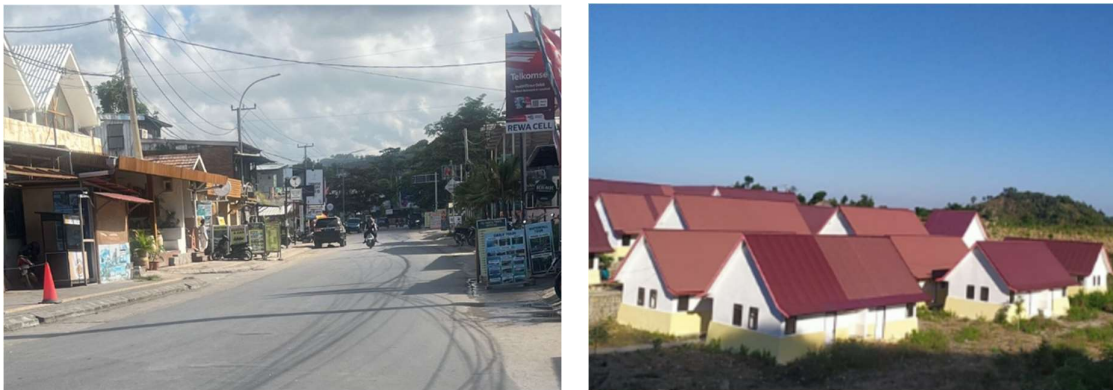


Figure 4. Build Up Area

4. CONCLUSION

The conclusion that can be drawn from this study is that the determination of the Mandalika Special Economic Area has an impact on land change. Based on the latest land use, it is known that the largest land conversion is built-up land. Built-up land includes hotels,

homestays, restaurants, the Mandalika circuit area, places of worship and settlements. Landuse changes in Kuta Village are ricefields decreased by 25.77 hectares, gardens 113.98 hectares, moor/field decreased by 86.06 hectares, while other lands experienced an increase of 516.8 hectares. In addition, with the establishment of the Mandalika SEZ, agriculture in Kuta Village is not a top priority.

Agricultural land that is still wide and unutilized is expected to be an alternative to developing agriculture-based tourism such as agro-tourism for fruit horticulture. In addition, the use of the yard for Sustainable Food Home activities also needs to be improved, especially for women farmers who are mostly at home. The Central Lombok District Agriculture Service also stipulates sustainable agricultural land which in the future cannot be designated other than agricultural land and gives farmers the freedom to turn vacant land into agricultural land.

5. RECOMMENDATIONS

Recommendations need to be followed up of these research is a strategy to increase farmer motivation and income through agro-tourism on sustainable agricultural land determined by the district head of Central Lombok. This is based on the district head's decree regarding sustainable agricultural land as well as government regulations regarding the establishment of the Mandalika area as a special economic zone for agricultural development.

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