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Study of Agricultural Land Conversion on the Availability of Ocean Water in Maintaining Terrestial Ecosystems

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ABSTRACT

Land is a natural resource that has an important role in the development of a country. The purpose of this research is to find out how the study of agricultural land conversion and its relation to water availability in maintaining the land ecosystem. The method used in this research is a literature review or literature review of several previous studies. One of the problems faced in land development is the lack of water catchment areas due to land conversion. The lack of water availability triggered by the conversion of agricultural land areas certainly has a very diverse impact, such as a lack of food supply, and a decrease in soil quality. so it can be concluded that the conversion of agricultural land and the availability of water in maintaining terrestrial ecosystems are closely related.

KeyWords: Change of function, Land, Water Availability, Ecosystems.

INTRODUCTION

Indonesia, which is rich in agricultural land, has its charm, but the number of people with different frames of mind and desires makes land conversion in Indonesia very easy to do (Putri Anisah et al., 2021). Until now, many people in Indonesia's agricultural areas still consider selling rice fields as a long-term source of income, but over time, many rice fields have begun to dry up because farmers are unable to maintain their fields. The cause of the reduction in agricultural land area is due to rapid population growth, increasing food needs, and the large scale of development, so that the number of farms is decreasing (Achsanuddin et al., 2023).

Indonesia is one of the largest countries in the world and is ranked 15th (fifteen) with a population of 275,122,131 (two hundred seventy-five million one hundred twenty-two thousand one hundred thirty-one). Indonesia's land area is supported by thousands of islands stretching from Sabang to Merauke. In addition to the conditions above, Indonesia also has land and forests that are the lungs of the world and has abundant natural resources, causing the Indonesian government to think of other ways to balance it and create a sense of security and comfort for residents of 4,444 residential areas (Anitasari, 2020). One of the solutions obtained is to build settlements and fulfill the needs that need to be accepted by the community, with applicable terms and conditions. As a result of the obligation to implement this, the government is encouraged to change land functions in various regions to support and balance population growth (Putri Anisah et al., 2021).

Groundwater is water found in aquifers, which are layers of soil below the earth's surface that are composed of layers of rock and unconsolidated soil particles. The existence of groundwater depends on the amount of surface water that can enter the water catchment

zone to fill the soil or rock that holds water and groundwater that comes out of the water catchment site naturally through rivers or artesian water, as well as drilled and dug wells. The utilization of groundwater as a water source is possible for the limited supply and service of drinking water. Thus, to meet drinking water needs, some communities still use well water. The widespread and high use of groundwater and changes in land use for built-up areas can lead to reduced groundwater resources (Widodo, 2020). One of the solutions obtained is to build settlements and fulfill the needs that need to be accepted by the community, with applicable terms and conditions. As a result of the obligation to implement this, the government is encouraged to carry out land conversion in various regions to support and balance population growth (Putri Anisah et al., 2021).

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METHODS

The method used is to collect and review publications (articles, journals, proceedings, books, theses, dissertations, and theses) related to research related to the study of agricultural land conversion studies on clean water availability, and conduct searches using Google applications with keyword search engines: conversion studies, land, water, impact.

RESULTS

3.1 Agricultural land conversion

Land is a natural resource that plays an important role in the development of a country. In terms of development, almost 4,444 sectors require land, such as agriculture, industry, trade, and infrastructure. In the agricultural sector, land is a very important resource for farmers and agricultural development. This is considering that in Indonesia as an agrarian country, all agricultural activities still depend on land because land plays an important role in production. Activities can create enough nutritional needs that everyone needs (Nur Pratama & Silaswaty, 2023).

The importance of land for human life is undeniable because human life cannot be separated from the land. Earth is indispensable for everyone, not only in life but also after death, as a resting place. Moreover, the earth also has feelings for humans. If people can carry out the rights and obligations that have been determined according to the limits of their respective abilities, then the community will be able to live in peace (Ardani, 2020).

The definition of Sustainable Agricultural Land Conservation based on Law No. 41/2009 related to the Protection of Sustainable Food Agricultural Land is the change of function of sustainable food agricultural land to sustainable food agricultural land permanently or temporarily. Land conversion is the activity of changing land use from one

activity to another. Land conversion is a result of development and population growth. Population growth and the increasing need for land for development activities are constantly changing the structure of land ownership and use. The rapid development of industrial structures has led to massive conversion of agricultural land. In addition to meeting industrial needs, the conversion of agricultural land also occurs rapidly to meet the needs of a much larger number of housing.

Agricultural land according to Article 1 Point 2 of Law No. 41/2009 on Sustainable Food Protection. Agricultural land is land used for agricultural business. These agricultural lands also have a strategic role and function for the Indonesian people whose nature is agriculture because most of the Indonesian people depend on the agricultural sector for their livelihoods. Thus, land not only has economic value but also social value and even religious value. Thus, land not only has economic value but also social and even religious value. In the context of sustainable agricultural development, land is the main resource for agricultural businesses, especially since the majority of the business sector still relies on land-based agricultural models. Land is a scarce natural resource because the amount does not increase but the need for land continues to increase (Ardani, 2020). The factors that cause the conversion of agricultural land to non-agricultural land for housing consist of several factors. They are as follows: 1) External factors, which are caused by physical and spatial increases in land population; 2) Internal Factors, which are caused by the socio-economic conditions of landowning households; 3) Policy Factors, which cause the conversion of agricultural land to non-agricultural land for housing (Sari & Yuliani, 2022).

Land use is currently moving towards non-agricultural land use, particularly residential land and industrial uses. These changes have resulted in the loss of agricultural land and decreased agricultural productivity. Land use change often occurs around cities, which can support the development of industry and services. Changes in any type of land use on one parcel of land will affect the surrounding parcels (Wulan Indah, 2018). More specifically, the negative impacts of agricultural land conversion are: 1) Reduced rice cultivation area leads to reduced rice production, hindering the achievement of food self-sufficiency goals; 2) The reduction in the area of paddy fields leads to a shift in employment from the agricultural to the non-agricultural sector, which if the existing local labor force is not fully absorbed will increase the unemployment rate, this social impact will develop with increasing social jealousy of local communities towards migrants, which in turn risks increasing social conflict; 3) Government investment in the provision of irrigation infrastructure and facilities has not been optimally utilized; 4) Investors cannot carry out housing and industrial development due to the economic crisis or due to miscalculations that cause unused land, causing social conflicts such as land, seizure and damage to rice field ecosystems (Hafidah et al., 2017).

3.2 Clean water availability in maintaining land ecosystems

Clean water is generally defined as water that can be used as raw water for drinking, this suitability also includes being used for bathing, washing, and cleaning. Some types of drinking water do not mean clean water that can be drunk directly but still needs to be boiled until boiling (Syabil et al., 2022). Specifically, the Ministry of Health has a definition of clean water. Clean water is water that is used for household needs and will become drinking water after boiling. One of the limitations is that clean water is water that meets the requirements stated in the quality standards regarding water quality, including physical, chemical, biological, and radiological quality so that when used it does not cause side effects (Walujodjati et al., 2022).

Water is one of the natural resources that is rapidly becoming an increasingly scarce resource and there is no source of replacement. If there is water scarcity, living things will

not survive (Wardani et al., 2021). In terms of meeting their needs, humans need clean water sources for consumption. The problem of water scarcity stems from the acquisition of deteriorating clean water sources and also the availability of depleted water sources triggered by several factors, namely climate change and the increasing population. Therefore, in this case, the availability of water is not balanced with the needs of living things for water. The decline in the amount and quality of water in the community, especially in suburban (urban) communities, certainly requires prevention, handling, and renewal efforts. The issue of water scarcity is what attracts attention to be studied in the literature, which in the end is expected to obtain objective and applicable scientific proposals (Indah Lestari et al., 2021).

Agricultural land conversion can have a significant impact on the availability of clean water to sustain terrestrial ecosystems. The following are some of the impacts of agricultural land conversion on the ability to provide clean water in maintaining terrestrial ecosystems:

1. Reduced ability to provide clean water: Conversion of agricultural land can reduce the ability to provide clean water because agricultural land often suffers from a lack of water absorption function. When agricultural land is converted into non-agricultural land, the function of water absorption will be lost and lead to a reduction in clean water sources.
2. Water pollution: Conversion of agricultural land can lead to water pollution. Indeed, non-agricultural land is generally more active and has the potential to pollute water sources, such as industrial and residential areas. Water pollution can reduce water quality and negatively impact terrestrial ecosystems.
3. Soil quality degradation: Conversion of agricultural land can lead to a decline in soil quality. This is because non-agricultural land is often more active and has the potential to damage soil quality, such as industrial and residential areas. Declining soil quality can reduce land productivity and negatively impact terrestrial ecosystems.
4. Reduced food supply: Conversion of agricultural land can result in reduced food supply. Agricultural land converted into non-agricultural land can no longer be used for agricultural purposes. Reduced food availability can hurt terrestrial ecosystems and community welfare (Nofrizal & Saputra, 2021).

The impact of agricultural land conversion on the availability of drinking water to sustain terrestrial ecosystems can cause many environmental and social problems. Therefore, efforts are needed to maintain agricultural land and maintain clean water sources as part of maintaining terrestrial ecosystems (Dadiraka, 2019).

3.3 Efforts to maintain clean water availability in maintaining land ecosystems

One of the environmental protection policies related to water resources conservation in Indonesia is Law No. 17/2019 concerning Water Resources, commonly known as the Water Resources Law. Considerations for the enactment of Law No. 17/2019 on Water Resources include that water as part of water resources is one of the important branches of production and controls the livelihood of many people, controlled by the state to be utilized for social interests. This country is getting more prosperous. Society according to the provisions of the 1945 Constitution of the Republic of Indonesia. In Article 1 Paragraph 14 of the Water Resources Law, conservation of water resources is understood as an effort to maintain the existence and sustainability of the country's water, the quality and function of water resources so that they are always available in sufficient quality and quantity to meet the needs of humans and other living things, at this time and in the future. The objectives of the enactment of the Water Resources Law are: 1) Protect and guarantee the implementation of people's right to return to their hometowns; 2) Ensure the preservation

of water resources and resources to provide fair benefits for the community; 3) Ensure the preservation of the function of water and water resources to support sustainable development; 4) Guaranteeing legal security for community participation in monitoring the use of water resources starting from planning, implementation, and evaluation of use; 5) Guaranteeing the protection and empowerment of communities, including indigenous communities, in water and resource conservation efforts; and 6) Comprehensive water damage control including prevention, mitigation and recovery efforts (Ikhsan et al., 2021).

The purpose of water resources conservation according to Article 24 of the Water Resources Law is to maintain the existence, capacity, and function of water resources. Water resources conservation is a water resources management plan through activities (Permatasari et al., 2018): 1) Protecting and preserving water resources; 2) Preserving water; 3) Managing water quality; and 4) Controlling water pollution. Community participation places the ultimate decision-making power on all aspects related to water management in the hands of community members, from the initial stage of identifying water needs to planning the desired services, from technical planning, and implementation to management. In this process, they may receive assistance from outside parties, but the final decision remains in the hands of the community itself (Nanda et al., 2023).

Respondents also emphasized the importance of the community's active role in accessing clean water when needed. Communities are expected to use water wisely and efficiently, reduce water waste, and implement water-saving measures in their daily lives. With awareness and concern for water use, sustainability can be created through the provision of clean water and meeting community water needs.

Several technologies can be used to ensure the availability of clean water: 1) Clean water treatment technology: These technologies can clean water from contaminants and make it safe for use. With technologies such as mechanical filtration, coagulation-flocculation, activated carbon filtration, and ultraviolet sterilization, previously polluted water can be turned into clean and safe water for use; 2) Desalination technology: This technique can be used to convert seawater into fresh water. This technology can be an inventive solution to ensure the availability of clean water, especially in areas that do not have clean water; 3) Water-saving technology: Can help reduce inefficient and wasteful water use. Spray systems and other water-saving technologies are some of the technologies that can be used to save water; 4) Digital technology and sensors: Can monitor and manage water usage in real time. This data can be used to make better water management decisions and spot possible wastages; 5) Green technology: Can be a creative solution to the problem of clean water availability. The use of environmentally friendly water treatment and purification technologies can help solve this problem. The creation of urban parks and water catchment areas are examples. These technologies can maintain the availability of clean water and be used to meet the needs of humans and other living things. In addition, these technologies help the environment and increasingly limited water resources become more sustainable (Hardiansyah & Ramadhan, 2023).

CONCLUSIONS

The availability of clean water is essential for maintaining terrestrial ecosystems. Agricultural land conversion can affect the availability of clean water in maintaining terrestrial ecosystems, with consequences such as decreased availability of clean water, water pollution, decreased soil quality, and decreased food availability. Therefore, efforts need to be made to preserve agricultural land and maintain the availability of clean water.

Technologies such as clean water treatment, desalination, water saving, digital and sensing technologies, and green technologies can be used to maintain the availability of clean water so that it can be used to meet the needs of humans and other living things. In addition, because these technologies support environmental sustainability and increasingly limited water resources, efforts are needed to maintain agricultural land and maintain the availability of clean water to maintain terrestrial ecosystems.

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