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A Study on the Protection of Terraced Agricultural Land Based on Local Wisdom in Argapura, Majalengka Regency

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ABSTRACT
Currently, the role of local wisdom in agricultural land protection practices appears to be diminishing due to modernization, generational changes, and shifts in agricultural production orientation, posing a challenge to the sustainability of agriculture. This study aims to: (1) examine the types of land degradation occurring in terraced lands; (2) analyze the types of local wisdom-based land protection practices still applied by terraced land farmers; and (3) assess the influence of local wisdom-based land protection on the productivity of terraced agricultural land. From a population of 504 farmers, a sample of 100 was selected using Slovin's formula with a 10% margin of error through simple random sampling. Additionally, 10 key informants were included, comprising farmers, farmer group leaders, and village officials. Primary data were collected using semi-structured questionnaires and in-depth interviews with informants. Sensitivity tests were conducted to ensure data consistency and validity. Data were processed using SPSS 28, and the results were presented in graphs and analyzed using descriptive qualitative methods, supported by findings from in-depth interviews. The study found that soil erosion and micro-landslides on terrace embankments are the most dominant types of land degradation experienced by farmers, which significantly affect agricultural productivity. To address these issues, farmers implement local wisdom-based land protection practices, including constructing bench terraces, using organic fertilizers derived from agricultural waste, collaboratively repairing irrigation channels, and prohibiting the burning of waste. Empirically, these practices have been able to maintain and even improve agricultural productivity.

INTRODUCTION

Agricultural land is a crucial natural resource for agricultural production. Farmers cultivate productive agricultural land to grow food crops that meet human food needs (Spangler et al., 2020). However, continuously increasing food demand has driven agricultural practices that pay less attention to land protection, prioritising production increases (Lal, 2016). Therefore, land protection is crucial for maintaining agricultural land and sustaining agricultural production (Sher et al., 2024).

Agricultural land protection is a complex endeavour, as it must balance multiple competing interests, including industry, housing, transportation, and address environmental concerns. This protection serves two main functions: a production function (ensuring food supply, food rights, and food security) and an environmental function (preventing land degradation) through spatial planning legislation and specific local instruments (Lazíková et al., 2019). A complex land protection system, as described by Tarolli & Straffelini (2020) and Wang et al. (2018), encompasses measures to preserve land quality, safeguard natural resources both qualitatively (in terms of the physical condition of the land) and quantitatively (in terms of the economic value of land quality), and their interconnection with the broader natural resource base.

Nevertheless, one of the greatest threats to agricultural land is land degradation, which can reduce both the quality and productivity of farmland (Tumawu et al., 2025). Land degradation can be either temporary or permanent, characterised by declines in the physical, chemical, and biological properties of the soil (Gao et al., 2025; Tedila et al., 2025). The process of land degradation is significantly influenced by social, economic, and cultural practices, hydrogeological conditions, soil compaction, salinisation, land clearing, pollutant contamination, erosion, landslides, and reductions in soil organic matter resulting from unsustainable land management practices (Shrestha, 1994; Cano-Díaz et al., 2023; AbdelRahman, 2023).

Land protection plays a crucial role in ensuring the continuity of agricultural production activities. Agricultural land protection encompasses actions aimed at preserving natural resources and the environment to support sustainable agricultural production activities. Therefore, land protection requires specific strategies to enable sustainable agricultural production activities, thereby supporting long-term food production (Scherzinger et al., 2024). In this context, agricultural land protection concerns not only aspects of quality and fertility but also ecological and socio-economic aspects that support agricultural sustainability (Mouratiadou et al., 2024).

In the context of land protection, local wisdom plays a crucial role as a knowledge system passed down through generations and harmonised with the natural environment. Local wisdom, as implemented in agricultural practices, represents the accumulated experience of communities in maintaining a balance between farming activities and environmental sustainability (Nasruddin, 2011). Practices such as the use of traditional tools, intercropping, cover crops, terracing, water resource conservation, post-harvest traditional rituals, natural methods of pest and disease control, determination of planting and harvesting seasons, as well as, crop rotation systems, which represent tangible expressions of local wisdom values in agriculture. These values not only reflect social and cultural norms but also contribute to sustainable farming and productivity improvement, the preservation of traditional knowledge, the recognition of indigenous rights, and the strengthening of policies that support the implementation of local wisdom in agricultural management (Febriani et al., 2025; Adhim et al., 2025).

The phenomenon of agricultural land degradation observed in several regions of Indonesia is also evident in Sukasari Kaler Village, which is known for its terraced farming system and is highly vulnerable to threats such as erosion, declining soil fertility, and landslides. Farmers in Sukasari have long practised traditional land protection measures rooted in local wisdom. However, explicit scientific studies on local wisdom-based land protection against degradation, particularly in relation to agricultural productivity, remain very limited and have never been conducted in Sukasari Kaler. Previous research has primarily focused either on land degradation or on local wisdom in land conservation without linking it to farmland productivity. Therefore, this study aims to fill this empirical gap, providing a more holistic perspective on how local wisdom-based approaches to land degradation can serve as a sustainable model for protecting terraced agricultural land.

Accordingly, this study is unique because it explicitly integrates local wisdom-based land protection practices with empirical evidence on the types of land degradation and their relationship to agricultural productivity, which have not previously been examined in the context of terraced agricultural land. Based on this consideration, this study aims to: (1) examine the types of land degradation occurring in terraced land; (2) assess the types of local wisdom-based land protection still practiced by terraced land farmers; and (3) analyze the influence of local wisdom-based land protection on the productivity of terraced agricultural land in Sukasari Kaler Village, Argapura District, Majalengka Regency.

RESEARCH METHODS

This research was conducted in Argapura District, Majalengka Regency, West Java, with Sukasari Kaler Village selected as the study site. The considerations for choosing Sukasari Kaler Village include: (1) most of the community in Sukasari Kaler Village are horticultural farmers who utilize terraced land; (2) the types of horticultural crops cultivated are pretty diverse, such as shallots, spring onions, carrots, and other horticultural plants; and (3) most farmers manage agricultural land ranging from ≥ 0.5-1 ha (Monograph Data, 2024). The administrative location of Sukasari Kaler Village is shown in Figure 1.

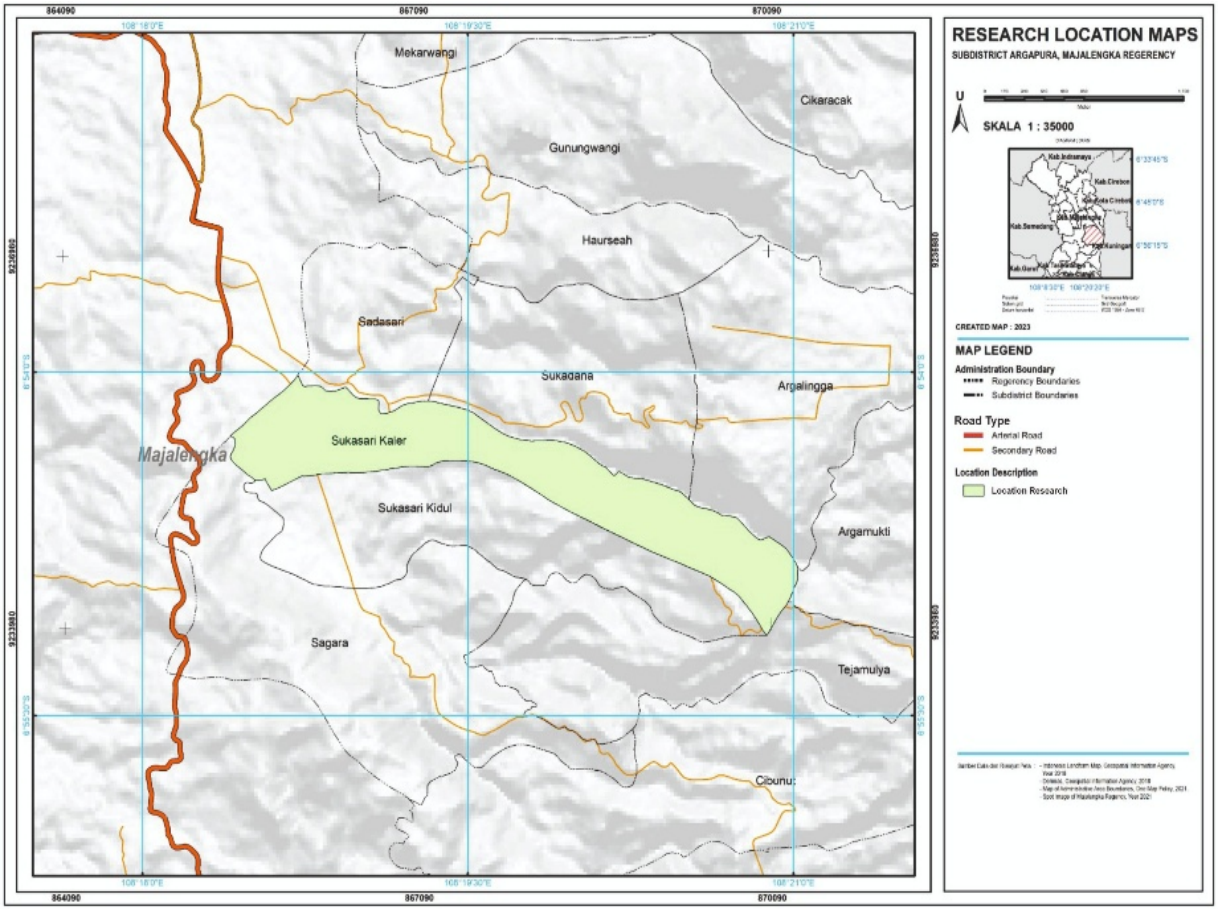

Figure 1. Map of Research Location in Sukasari Kaler Village, Argapura District, Majalengka, 2025 (Source: Data Processing, 2025)

The population of this study comprised all land-owning and tenant farmers residing in Sukasari Kaler Village. In 2023, the total number of farmers in Sukasari Kaler Village was recorded at 504. Using Slovin's formula with a 10% margin of error, the calculated sample size was 83.44 farmers, which was subsequently rounded up to 100 farmers. Field sampling employed simple random sampling. In addition, the study included 10 key informants: 4 farmers, 4 heads of farmer groups, and 2 village officials.

Primary data were collected from farmers through semi-structured interviews using a questionnaire. In addition, primary data were obtained through in-depth interviews with informants, and secondary data were obtained from the Sukasari Kaler Village monograph and other relevant sources.

The instruments used to collect primary data included structured questionnaires and an in-depth interview guide. The questionnaire addressed farmer characteristics, land tenure, agricultural production, land conditions, types of

degradation experienced by farmers, local wisdom-based land protection efforts, and the influence of local wisdom on the sustainability of the agricultural output. An example of the questionnaire is available at the following link: https://simpan.ugm.ac.id/s/GZjLoUk8FZwzVr5.

Statistically, the research instrument was not subjected to validity or reliability testing because all questions were single-category choices and did not constitute complex composite variables. The resulting data were descriptive and categorical. Nevertheless, to ensure instrument validity, it was reviewed by an expert in agricultural geography and pilot-tested with several farmers. This process was closely related to the instrument's sensitivity, aiming to ensure that the questionnaire items were easy to understand, did not cause discomfort to respondents, did not lead to misinterpretation, and were free from biased questions, thereby ensuring that the data obtained were accurate and valid.

To ensure compliance with research ethics, respondents provided consent before interviews by signing a consent form. Respondents who agreed to sign the form were interviewed, while those who declined were excluded from the interview process. An example of the consent form is available at: https://simpan.ugm.ac.id/s/dXvyRJ1zEDSt7AX.

Regarding data availability, confidentiality was strictly observed. Therefore, to maintain confidentiality, the anonymised questionnaire and in-depth interview datasets are not publicly available; however, they can be accessed by contacting the corresponding author. Meanwhile, the village monograph is available at the village office, and statistical data from the Central Statistics Agency (BPS) can be accessed via https://majalengkakab.bps.go.id/id.

Field data were processed using SPSS 28, and results were presented graphically to illustrate the distribution of percentages and trends in respondents' answers. In-depth interview data were presented as narrative quotations to complement the quantitative data analysis and to provide a deeper understanding of the phenomena under study. Furthermore, a sensitivity analysis was conducted to strengthen the data analysis. This involved comparing the distribution of respondents' answers with 5% and 10% margins of error, removing outlier responses, and examining trends across respondent groups. The results showed that variations in sample size or removal of outlier responses did not significantly alter the distribution of respondents' answers, indicating that the study's findings are consistent and reliable.

RESULTS AND DISCUSSION

Land Degradation in Terraced Agriculture

Agricultural land degradation is the decline in the quality of agricultural land, whether temporary or permanent, thereby impairing its capacity to support agricultural production. This degradation is characterised by a reduction in the physical, chemical, and biological quality of the soil (Shrestha, 1994). Land degradation can manifest as landslides, erosion, and soil compaction. Chemically, it may involve acidification and salinisation of agricultural land. Biologically, the land experiences a decrease in nutrient content and soil microbiological activity. Generally, degraded agrarian land no longer functions effectively as a growing medium, thereby hindering agricultural production of food and other crops.

Similarly, Gomiero (2016) note that physically degraded land is characterised by soil compaction, soil movement, water imbalance, and damage to soil structure. Chemically, land degradation is identified by acidification, nutrient leaching, nutrient imbalance, and pollution. Biologically, land degradation is characterized by a decline in soil organic matter quality and biodiversity loss. The research findings on the types of degradation experienced by farmers on terraced agricultural land are presented in Figure 2.

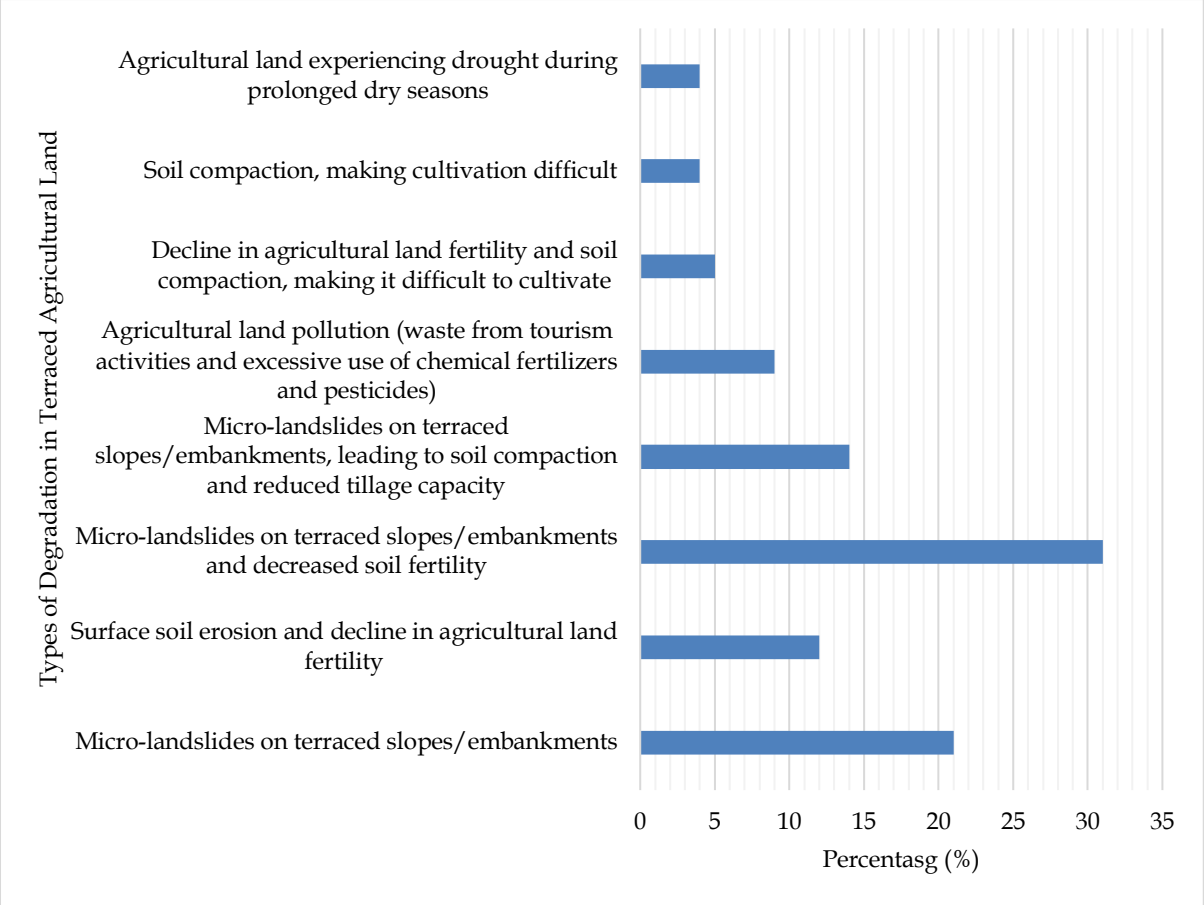

Figure 2. Graph of Land Degradation Types Experienced by Terraced Agricultural Land Farmers in Sukasari Kaler Village, Argapura District, Majalengka, 2025
(Source: Primary Data, 2025)

The research findings presented in Figure 2 indicate a diverse range of land degradation types experienced by farmers on terraced agricultural land. The most prevalent kind of degradation reported by terraced land farmers is micro-landslides on terracing embankments. Notably, micro-landslides on terracing embankments appear in various combinations, both as a single issue (21%) and in conjunction with other forms of degradation.

For instance, a combination of micro-landslides on terracing embankments and a decrease in agricultural land fertility due to intensive land use was reported by 31% of farmers. A combination of landslides on terracing embankments with hardened soil made it difficult to cultivate for 14% of farmers. Furthermore, a combination of erosion with reduced agricultural land fertility due to nutrient depletion was reported by 12% of farmers. This phenomenon suggests that land degradation on terraced land is predominantly caused by physical degradation, specifically surface erosion and micro-landslides, on the terracing embankments.

Meanwhile, a decline in agricultural production on terraced land is also attributed to chemical degradation. For example, 9% of farmers reported agricultural land contamination from waste/trash generated by tourist activities and from excessive use of chemical fertilisers and pesticides. A combination of decreased agricultural land fertility due to intensive land use and hardened soil, which made cultivation difficult, was experienced by 5% of farmers. Additionally, 4% of farmers experienced hardened soil that was difficult to cultivate. External factors, such as climate change causing drought during the dry season due to insufficient irrigation water,

were reported by 5% of farmers. The findings indicate that the most commonly experienced form of land degradation among farmers is physical degradation, specifically micro-landslides on terraced slopes. In contrast, chemical degradation and climate-related changes are relatively rare.

These findings are further supported by an in-depth interview with a farmer group leader, identified by the initials DS (52 years old), who stated that.

> "…...*My agricultural land often experiences landslides along its embankments, and when it rains heavily, I observe topsoil being carried into the ditches surrounding the land. Subsequently, I must repair the collapsed embankment because it affects the plants below. I also repeatedly apply fertilizers because the plants seem to lack nutrients...*"

A similar statement was made by a farmer identified by the initials W (48 years old), who stated that:

> "*...Because there are now many tourists visiting the terraces, my agricultural land is contaminated with plastic bottles, plastic, and other waste that tourists might discard onto the agricultural land. I also experienced a decrease in my land's fertility, so I have to apply a lot of fertilizer frequently. However, if there's too much chemical fertilizer, my land becomes somewhat hard and difficult to cultivate...*"

Based on these two informants, it is evident that farmers indeed perceive agricultural land degradation, which can lead to a decline in agricultural production.

These findings align with Bayata (2024) those Blicharska et al. (2024) who suggest that the persistent degradation of terraced agricultural land is inextricably linked to highly intensive anthropogenic processes. According to Lal (2016), land degradation occurs because farmers use excessive and continuously increasing amounts of chemical fertilisers, leading to physical damage to agricultural land, making it prone to cracking quickly during dry seasons and becoming saturated rapidly during rainy periods. Moreover, Parenja et al. (2025) highlight that sloping and terraced agrarian land in tropical climates is highly vulnerable and consistently problematic due to soil erosion and landslides. Such degradation arises from non-conservative human factors in agricultural land utilisation, driven primarily by the pursuit of economic gains from increased agricultural production.

According to Gomiero (2016), agricultural land experiencing physical degradation is characterised by soil movement triggering landslides, erosion, disrupted soil water balance, and damaged soil structure. Chemically, it can be observed through acidification, nutrient leaching, disturbed nutrient imbalance, and soil contamination. Biologically, land degradation can manifest as a decrease in soil organic carbon content and a loss of soil and vegetation biodiversity. Thus, it can be concluded that intensive anthropogenic activities not only cause land degradation on terraced fields but also constitute a multidimensional process in which physical, chemical, and biological degradation are interrelated, thereby posing long-term risks to agricultural sustainability.

This phenomenon of land degradation ultimately affects agricultural production, as illustrated by the experiences of farmers in Figure 3.

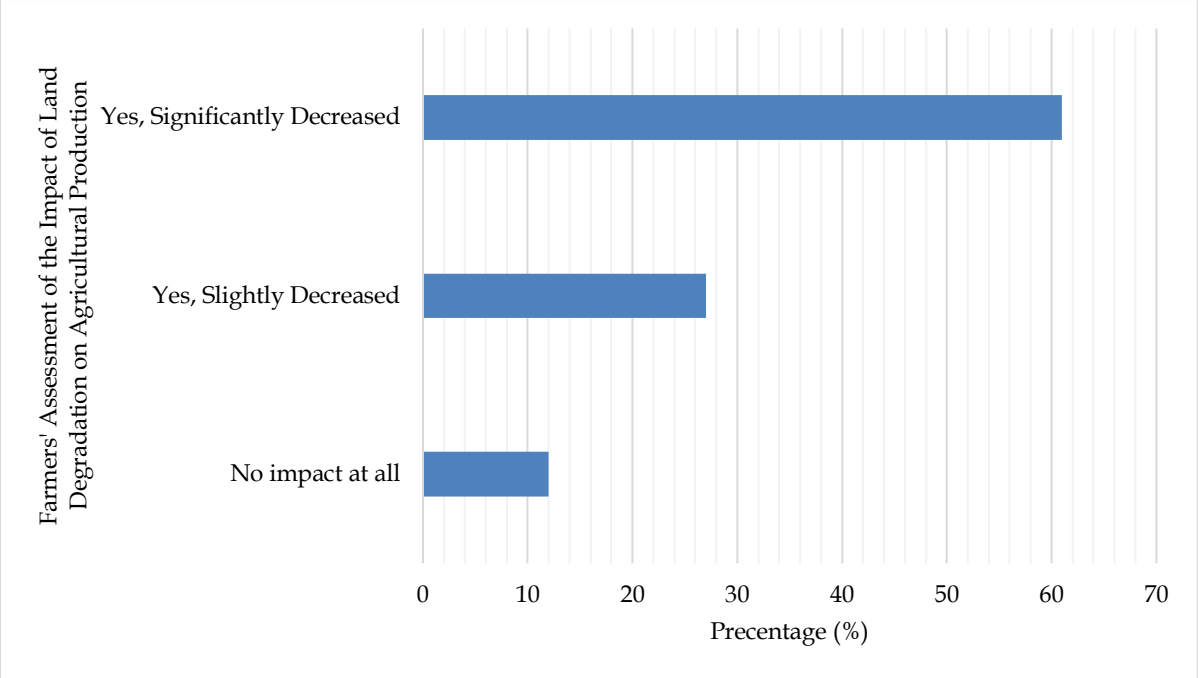

Figure 3. Graph of Farmers' Assessment of the Impact of Land Degradation on Agricultural Production in Sukasari Kaler Village, Argapura Sub-district, Majalengka, 2025 (Source: Primary Data, 2025)

Based on the farmers' assessment presented in Figure 3, it is evident that the majority of farmers believe that land degradation has significantly affected agricultural production. Specifically, 61% of farmers reported that land degradation had a very significant effect on agricultural production, and 27% reported a slight decrease. Only 12% reported being unaffected. These findings suggest that land degradation is an essential contributor to reduced agricultural land productivity in terraced areas. This finding is further supported by the results of an in-depth interview with a farmer group leader, identified by the initials MS (55 years old), who stated that...":

> "*...Because my agricultural land is on a fairly steep slope, when there's heavy rain, it seems like the topsoil washes away, making the soil infertile. My shallot yield has significantly decreased from its usual output, perhaps because of this loss of topsoil, which reduces its fertility. To overcome this, in the second planting season, I apply a lot of manure combined with chemical fertilizers...*"

Similarly, farmer TW (62 years old) stated:

> "*...Several years ago, my agricultural production significantly declined because, at that time, there wasn't enough water, and perhaps the soil was less fertile from being used too frequently without rotation. To restore it, I had to apply fertilizer and find better seeds...*"

These findings are consistent with the research of Putri (2024), which revealed that land degradation, including surface soil erosion, soil infertility due to nutrient depletion, and irrigation-induced salinity negatively affect agricultural production, particularly rice. Sitorus et al. (2011) also noted that land degradation can reduce land productivity, ultimately leading to critical land conditions and a decline in agricultural output. Nevertheless, these impacts can be temporary or permanent if conservation measures are not implemented to restore or protect agrarian land from degradation. Gao et al. (2025) further emphasised that wind erosion in the Horqin Sandy Land of northeast China has led to reduced soil organic carbon (SOC) and microbial biomass carbon (MBC), alongside increased bulk density (BD), thereby decreasing soil fertility

and adversely impacting agricultural productivity. Based on these findings, land protection efforts are crucial to maintaining soil fertility and sustaining agricultural productivity.

This statement aligns with the findings of Paz et al. (2020) & Ogieriakhi & Woodward (2022), who reported that intensive agricultural land use, without accompanying conservation measures, leads to land degradation, whether temporary or permanent. Similarly Hategekimana et al. (2025), in their study in Rwanda, they found that highly intensive land use on steep slopes without soil conservation led to land degradation, thereby reducing horticultural crop yields. Studies by (Wagner et al., 2021) & Evizal et al. (2020) also reported that climate change, which leads to droughts or extreme wet conditions, significantly affects coffee productivity.

Based on these findings, it can be concluded that the degradation of terraced fields at the study site has affected agricultural productivity, as both farmers' perceptions and in-depth interview results indicate. The impacts of land degradation include the loss of topsoil due to surface erosion, decreased soil fertility resulting from intensive land management, and water shortages during the dry season. These phenomena indicate that degradation on terraced fields can be either permanent or temporary, depending on the land protection or restoration efforts that farmers sustainably undertake.

Types of Local Wisdom in Terraced Agricultural Land Protection Efforts

Local wisdom, passed down from one generation to the next, has become an integral part of efforts to protect agricultural land. Essentially, local wisdom-based land protection aims to preserve, restore, and sustainably enhance land productivity (Tamalene et al., 2019). Similarly, Tsuchiya et al. (2021) it was stated that local wisdom practices, reflected in behaviours, actions, values, and norms that govern farmers' relationships with their natural environment, are intended to protect land from degradation and ensure the sustainable productivity of agricultural land. The diversity of local wisdom types practised by farmers in Sukasari Kaler Village, Argapura, for agricultural land protection is evident in Figure 4 below.

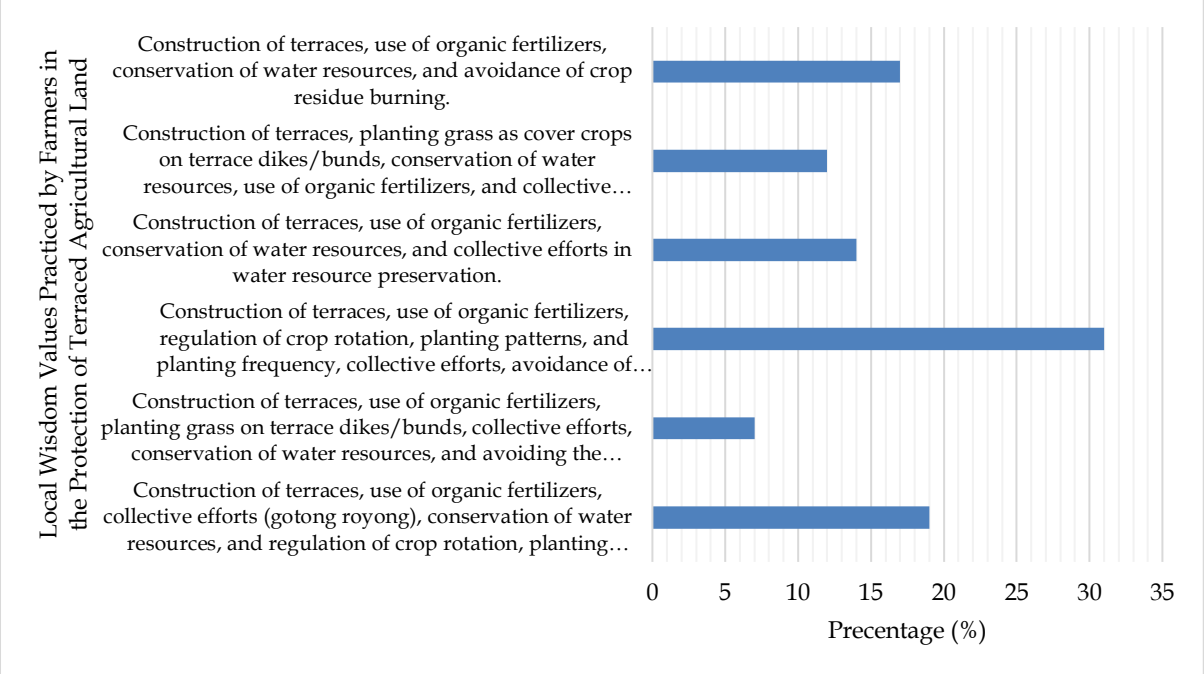

Figure 4. Graph of Local Wisdom Practices in Agricultural Land Protection Among Terraced Land Farmers in Sukasari Kaler Village, Argapura Sub-district, Majalengka, 2025 (Source: Primary Data, 2025)

The research findings in Figure 4 indicate that terraced farmers in Sukasari Kaler Village, Argapura District, Majalengka, continue to practice local wisdom values in land protection activities aimed at addressing or preventing agricultural land degradation. The most prevalent forms of local wisdom practised by farmers, passed down through generations, include terracing construction, the use of organic fertiliser derived from agricultural waste, communal work (gotong royong) to repair irrigation channels, and the sanctification of water sources used for both farming and non-agricultural purposes. Specifically, 31% of farmers combine terracing practices with the use of organic fertilisers derived from agricultural waste, crop rotation, planting patterns and frequencies, communal efforts to repair irrigation channels, avoidance of burning crop residues, and the protection of water sources. Additionally, 19% of farmers combine terracing construction with the use of organic fertilisers derived from agricultural waste, communal efforts to repair irrigation channels, the protection of water sources, and the implementation of crop rotation, planting patterns, and frequencies. Meanwhile, farmers who combine the practice of planting cover crops on terraced embankments with other types of local wisdom represent only 7-12% of farmers.

The findings indicate that some farmers in Sukasari Kaler Village still maintain and practice local wisdom in terraced farming activities, such as constructing terraces on sloped or hilly land, using organic fertilizers, collectively repairing irrigation channels, preserving water springs, and so forth, as a form of protection to prevent and mitigate agricultural land degradation. These findings are further supported by an in-depth interview with a farmer identified by the initials BS (48 years old), who stated that:

> "…….*The community here still has a powerful sense of communal work, especially when there's an instruction from the village. We work together to repair the water channels to ensure a smooth flow of water from the sacred spring and other springs. However, during the dry season, water levels sometimes decrease. In addition, many people here still use agricultural waste spread on the land as fertiliser, along with occasional manure…*"

A village official (initial A) also confirmed this, stating:

> "*...In my opinion, the residents of Sukasari Kaler Village are consistently engaged in various activities, including communal work, terracing construction, manure production, and compliance with the prohibition on burning crop residues on agricultural land. Furthermore, Sukasari Kaler villagers have tried actively planting grass on terracing embankments to prevent erosion and provide feed for livestock, though sometimes the grass can interfere with crops if not trimmed...*"

These research results align with the findings of Parenja et al. (2025), who state that land protection practices such as terracing construction have been extensively proven to control soil erosion, increase water infiltration into the soil, maintain better soil structure, and ultimately sustain agricultural land productivity, particularly in sloping areas. Similarly, Lal (2020) emphasises that land protection through the use of organic fertilisers derived from agricultural waste can maintain soil fertility and even reduce farmers' dependence on chemical fertilisers. The practice of communal work (gotong royong) in repairing irrigation channels was highlighted by Kusumastuti (2019), who found that active communal efforts by farming communities to maintain and repair irrigation channels facilitate irrigation water flow, thereby continuously increasing agricultural productivity.

Other local wisdom practices in agricultural land protection, such as the sanctification of water sources, have been discussed by Latifundia (2016), who noted that the Kuningan community sanctifies springs to preserve water resources, as water

is essential for daily domestic needs, agriculture, and religious rituals. Tsuchiya et al. (2021) further highlighted that the construction of terracing and the role of social capital (values, norms, and kinship relations) among farmers in Malasari Village, Bogor Regency, have significantly influenced the quality of the physical structure of agricultural land. Meanwhile, land protection practices, such as prohibiting the burning of agricultural waste, are consistent with findings by Husin et al. (2022), who reported that most farmers, aware of the negative impacts of burning agricultural waste, have ceased such practices. Thus, local wisdom–based agricultural land protection practices that are preserved and maintained in farming activities are not merely cultural symbols inherited from ancestors; they also play an essential role in sustaining and enhancing the long-term productivity of terraced agriculture.

Based on these findings, it is evident that local wisdom-based land protection practices implemented by terraced farmers in Sukasari Kaler Village not only preserve the cultural heritage values of their ancestors but have also been empirically and perceptually proven by the farmers to enhance and sustain agricultural land productivity over the long term.

Influence of Local Wisdom-Based Protection Practices on Agricultural Production Yields

Agricultural land protection encompasses multifaceted functions that serve industrial, housing, transportation, and environmental interests (Lazíková et al., 2019). Lazikova further explains that the primary functions of land protection, ensuring food production, food rights, and food security (production function), and safeguarding land resources from environmental degradation (environmental function)are implemented using general instruments like spatial planning laws and specific (local) instruments to combat land degradation. A complex and integrated agricultural land protection system comprises four components: (i) protection and preservation of land quality, (ii) protection of natural resources, (iii) qualitative (physical) and quantitative (economic value) status of land, and (iv) overall land-related natural resources (Sharapova, 2018). Agricultural land protection is crucial for ensuring food security and sustainable socio-economic development (Wang et al., 2018).

Local wisdom-based agricultural land protection implemented by farmers to prevent or rehabilitate agrarian land has had significant positive impacts on agricultural production. The positive effects of these protection practices for farmers have enabled them to maintain and even increase the productivity of their agricultural land. This occurs because agricultural land protected from various degradation threats can stabilise or improve land quality, regulate water management, maintain fertility and biodiversity, and protect the land from landslides and erosion. Protecting agricultural land from such degradation threats ultimately supports sustainable agricultural productivity.

The research findings on farmers' perceptions of the impact of local wisdom-based agricultural land protection practices on agrarian production are presented in Figure 5.

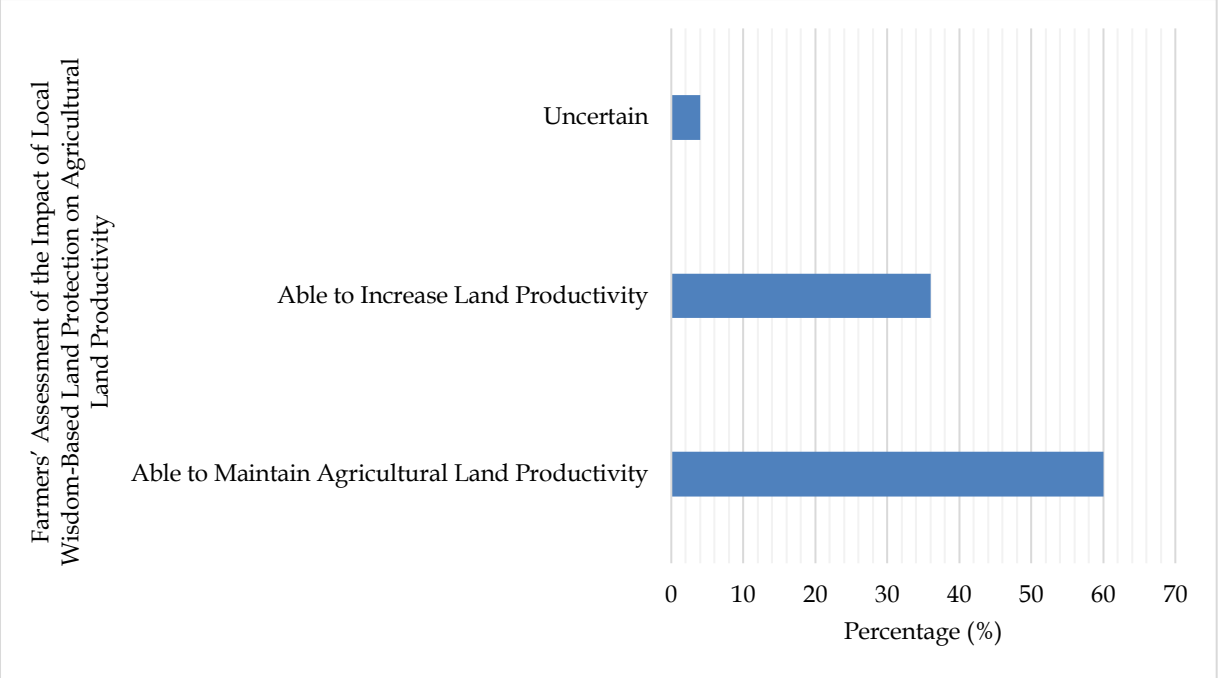

Figure 5. Graph of Farmers' Assessment of the Impact of Local Wisdom-Based Land Protection on Agricultural Land Productivity in Sukasari Kaler Village, Argapura Sub-district, Majalengka, 2025 (Source: Primary Data, 2025)

The results presented in Figure 5 indicate that 60% of farmers believe local wisdom-based land protection is adequate for maintaining land productivity, while 36% report that it has increased productivity. Meanwhile, only 4% expressed uncertainty, which may be due to inconsistent harvests, lack of information on changes in land productivity, or the influence of other external factors. This phenomenon highlights the vital role of locally wisdom-based land protection in sustaining and enhancing agricultural productivity.

These findings are consistent with studies by Lal (2020) & Fadhilah & Hunowu (2025), which found that conservation practices rooted in local wisdom passed down from ancestors and applied in farming activities have been key to maintaining ecosystem balance and increasing food production, thereby ensuring future food security. The findings of Prasetyo et al. (2025) Kampung Naga and Febriani et al. (2025) Batu City revealed similar results, showing that local wisdom practices in traditional agriculture, such as maintaining soil fertility through the use of organic fertilizers, implementing crop rotation and intercropping systems, applying ground cover plants, constructing terraces, and utilising natural resources wisely, have successfully enhanced agricultural productivity.

Thus, local wisdom–based land protection practices in Sukasari Kaler Village can serve as a model for agricultural land conservation with the potential to be applied in other terraced areas, in line with global initiatives that integrate indigenous knowledge into sustainable agrarian development to support global food security. As emphasized Abas et al. (2022), local wisdom practices in nature conservation, implemented in various parts of the world, including Malaysia and India, have proven practical and effective in supporting agricultural sustainability.

Furthermore, Olawuyi et al. (2024) 86% of communities in Southwestern Nigeria reportedly hold positive perceptions of indigenous knowledge as a means of enhancing agricultural production. Therefore, indigenous knowledge can be systematically integrated into scientific and technological approaches to improve farm sustainability and contribute to achieving global food security.

However, the sustainability of local wisdom practices in land protection in Sukasari Kaler faces significant challenges in the era of globalisation. Limpo et al. (2022) found that modernisation among the younger generation of the Bugis-Makassar community has eroded local wisdom values in rice cultivation practices and similarly, Irmayani et al. (2025) reported that in Sabangparu, Wajo Regency, traditional local wisdom practices in rice farming have increasingly been abandoned by the younger generation, except for practices such as *Mattanra Esso* (determining auspicious days) and *Mappadendang* (harvest festival), which remain preserved by farmers.

Jessen et al. (2022) further noted that the erosion of local wisdom occurs due to the dominance of Western scientific epistemology with its emphasis on empirical proof, exploitation of local knowledge or indigenous practices, tensions and conflicts in collaborative efforts, and reduced sustained interactions between indigenous communities and regional ecosystems. Consequently, in the era of globalisation, local wisdom is increasingly threatened. It is fading among younger generations due to modernisation, the perceived superiority of Western science, the exploitation of indigenous knowledge, and reduced youth interaction with local ecosystems.

CONCLUSION

The types of land degradation experienced by most terraced farmers are diverse. The most commonly observed forms of degradation are surface soil erosion and small landslides on terrace embankments, both of which have affected agricultural productivity.

To mitigate the adverse effects of land degradation, farmers have implemented local wisdom-based land protection practices. The dominant local wisdom practices include constructing bench-type terraces, using organic fertilisers derived from agricultural waste, collaborating in the repair of irrigation channels, prohibiting the burning of garbage, and other related practices.

According to the farmers, these local wisdom-based land protection methods are effective in maintaining and improving agricultural productivity. This indicates that the preservation and practice of local wisdom in land protection play a crucial role in sustaining and enhancing agricultural productivity in terraced farming areas.

Scientifically, these findings contribute to the body of knowledge on local wisdom-based agricultural land protection in terraced areas and can serve as a methodological reference for similar research. In practice, the results can inform government policymaking to promote sustainable land protection in terraced farming regions.

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