Widyakala Journal
p-ISSN 2337-7313
e-ISSN 2597-8624

Volume 12, Issue 01, March 2025
DOI: https://doi.org/10.36262/widyakala.v12i1.1203
https://ojs.upj.ac.id/index.php/journal_widya/

Riding the Waves: Farmer Resilience in Peri-Urban Area of Malang City

Adhinugraha Wirayudha Kusuma[1*], Ahmad Imron Rozuli[2]

[1,2] Sosiologi, Universitas Brawijaya
Malang, Indonesia
*Corresponding author: yudhaadhi715@student.ub.ac.id

Received 4 February 2025, Revised 12 March 2025, Accepted 18 March 2025

Abstract *— Rapid urbanization in Malang City's peri-urban areas has reduced agricultural land and increased economic pressure on farmers, leading to a decline in active farmers. To cope with these challenges, farmers develop resilience strategies to sustain their livelihoods. However, research on peri-urban farmer resilience remains limited, particularly in linking cultural and economic dimensions to survival strategies. This study analyzes farmer resilience patterns in response to land use changes and urbanization pressures. A qualitative approach was employed, using in-depth interviews and participatory observation with five landowner farmers and one key informant, a village official in Kedungrejo Village, Malang Regency. Findings identify five key resilience strategies: (1) perception of land as sacred ancestral heritage, (2) family solidarity, (3) financial adaptation through productive debt systems, (4) job diversification, and (5) Application of the life philosophy of Nrimo Ing Pandum values. These strategies are linear and flexible, allowing farmers to transition between resilience forms as needed. Theoretically, this study expands agrarian resilience discourse by integrating coping, adaptive, and transformative capacities in a dynamic peri-urban context. Practically, it offers policy recommendations, including incentives for farmland preservation and livelihood diversification programs within the agricultural sector, ensuring social and ecological stability in peri-urban areas.*
Keywords: *farmer resilience, peri-urban, urbanization, agriculture sustainability, local wisdom*

Abstrak — Urbanisasi yang pesat di wilayah peri-urban Kota Malang telah menyebabkan penurunan luas lahan pertanian serta tekanan ekonomi bagi petani, sehingga mendorong berkurangnya jumlah petani aktif. Untuk menghadapi tantangan ini, petani mengembangkan strategi resiliensi guna mempertahankan penghidupan mereka. Namun, penelitian mengenai resiliensi petani peri-urban masih terbatas, terutama dalam menghubungkan dimensi budaya dan ekonomi dalam strategi bertahan hidup mereka. Oleh karena itu, penelitian ini bertujuan untuk menganalisis pola resiliensi petani dalam menghadapi perubahan tata guna lahan dan tekanan urbanisasi. Penelitian ini menggunakan pendekatan kualitatif dengan teknik wawancara mendalam dan observasi partisipatif terhadap lima petani pemilik lahan serta satu informan kunci, yaitu perangkat desa di Desa Kedungrejo, Kabupaten Malang. Hasil penelitian mengidentifikasi lima strategi resiliensi utama: (1) persepsi tanah sebagai warisan leluhur yang sakral, (2) solidaritas keluarga, (3) adaptasi finansial melalui sistem utang-piutang produktif, (4) diversifikasi pekerjaan, dan (5) penerapan filosofi hidup *Nrimo Ing Pandum*. Kelima strategi ini bersifat linier dan fleksibel, memungkinkan petani berpindah dari satu bentuk resiliensi ke bentuk lainnya sesuai dengan tantangan yang dihadapi. Secara teoritis, penelitian ini memperluas kajian resiliensi agraris dengan menghubungkan strategi petani dengan *coping*, *adaptive*, dan *transformative capacities* dalam konteks peri-urban yang dinamis. Secara praktis, penelitian ini menawarkan rekomendasi kebijakan berbasis nilai lokal, seperti insentif perlindungan lahan pertanian dan program diversifikasi mata pencaharian yang tetap berorientasi pada sektor pertanian, guna mendukung stabilitas sosial dan ekologis di wilayah peri-urban.
Kata Kunci: resiliensi petani, peri-urban, urbanisasi, keberlanjutan pertanian, kearifan lokal

INTRODUCTION

The agricultural sector is the third largest contributor to economic growth, after Indonesia's processing industry and trade sectors. Based on the Central Statistics Agency, regarding GDP based on constant prices in 2021-2023, it can be seen that the agricultural sector contributed 11.82 percent in 2023. This figure tends to be lower compared to 2023 at 12.26 percent and 2022 at 12.62 percent. The agricultural sector in Indonesia continues to decline every year. The decline in the agricultural sector's contribution is directly proportional to the data on the area of agricultural land. The area of rice fields in Indonesia is based on data from the BSIP (2023), which shows 7.46 hectares. However, the Central Statistics Agency recorded an increase in farmland or

agricultural land left unmanaged in May 2024, which was 1.01 million hectares (Damiana, 2024). Nevertheless, agriculture remains a sector that absorbs many workers compared to other sectors, which is 29.36 percent of the total working population in Indonesia (Yani, 2024). The 2023 Agricultural Census shows that as many as 29.34 million people in Indonesia depend on the agricultural sector for their livelihoods (BPS, 2023).

The condition of the agricultural sector in Indonesia is in line with the development of discussions related to indications of structural economic transformation from the primary sector to other sectors, such as secondary and tertiary. Briones and Felipe (2013) assume that the structural shift of the economy from the agricultural sector to other sectors cannot be ignored and will continue. These structural shifts in the economy are also accompanied by new challenges and opportunities, such as pressure on environmental conditions, market instability, or even technological breakthroughs in the future. In line with the population growth in Indonesia, which is on an increasing trend, it can have implications for a significant reduction in agricultural land area due to the conversion of land for development.

The conversion of rice fields into housing or other infrastructure is a serious threat that cannot be reversed (irreversible), progressive, and cumulative (Mulyani & Agus, 2018). Data analysis from the Directorate of Land Control and Monitoring of the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) in 2019 illustrates that the average conversion of paddy fields to non-paddy fields in Indonesia has reached 100,000 hectares per year (Purwanti & Sidik, 2023). This condition has implications for the increase in the number of smallholder farmers in Indonesia, which 2023 will reach 17,248,181 farmers (BPS, 2023). In line with the high intensity of problems in developing countries related to the significant population growth and poverty problems, the conversion of agricultural land is uncontrollable. Furthermore, the rapid population growth is not accompanied by interest in working as farmers to manage rice fields or agricultural land. The results of the 2023 Agricultural Census illustrate that most farmers today are 43 to 58 years old, indicating that the condition of the agricultural sector in Indonesia has experienced a regeneration crisis (BPS, 2023).

The phenomenon of agricultural conditions is also predicted to have occurred in Malang City. In 2023, BPS projects that the population density in Malang City will reach 7,627 people/km2 (BPS Malang City, 2024). It creates friction between land needs and limitations, especially in suburban areas. Then, data from BPS (2024) shows that the number of people in Malang City has reached 847,182. The population explosion that occurred due to the dense urban area and the inability of the city to accommodate the flow of migration has impacted the surrounding buffer area. Access to land in urban areas is no longer accessible to specific groups; sanitization flows will move outside the city center. The limited space in the city has an impact on the increasing need for housing, which will take up spaces in suburban areas. The symptoms related to the conversion of non-urban land in suburban areas are called "Invasion" (Yunus, 2008). According to Yunus (2008), spreading an urban physical appearance to the outside is known as "Urban Sprawl." The implications for the gentrification process in the affected peri-urban areas.

One of the affected peri-urban areas is Malang Regency, the area with the second largest number of farmers in East Java (Figure 1). According to the results of the 2023 agricultural census conducted by BPS Malang Regency, it is known that the number of farmers using agricultural land is 365,282 people and gum farmers are 289,213. As many as 79 percent of farmers in Bumi Kanjuruhan are included in the group of farmers with less than 0.5 hectares of land (Yani, 2024). It is inseparable from the high number of people in Malang City, so it has implications for the expansion of the urbanization process and the conversion of agricultural land to areas in Malang Regency, especially the district administratively located east of Malang City. Although the government has made regulations regarding the Protection of Sustainable Food Agricultural Land (LP2B) contained in Law Number 41 of 2009 and followed up through the issuance of Government Regulation Number 1 of 2011 concerning the Determination and Transfer of Functions of Sustainable Food Agricultural Land, it is still not able to anticipate the phenomenon Urban Sprawl and gentrification in peri-urban areas (Purwanti & Sidik, 2023).

Figure 1. One Form of Conversion of Agricultural Land into Housing in Malang Regency
Source: Author, 2025

The uncontrolled expansion of urban areas into rural areas has been one of the problems until now. Anggit & Putri (2022) show that agricultural land continues to decrease every year due to the conversion of agricultural land into residential land, shops, and shopping centers. The implication is that an increase in air, water, and soil pollution accompanies a decline in land quality. Furthermore, urban sprawl has put pressure on the population, which has impacted the reduced availability of agricultural land and caused a

crisis in the farmer regeneration process (Anggit & Putri, 2022). The social and economic problems farmers face in the peri-urban area of Malang City impact farmers' cultivation, so it requires them to have resilience or resilience as an adaptation step to face challenges, namely in the form of reduced agricultural land. Although this phenomenon has made farmers enter the category of vulnerable groups, resilience to the phenomenon must still be carried out because of economic demands and to maintain their families' food supply (Izzah & Jazilah, 2022). Farmers live in food limitations (Finuliyah & Kadji, 2024). This condition can be referred to as farmer resilience. The resilience possessed by farmers can be interpreted as a strength in order to readjust the economic structure affected by the shock so that it can create progress on a broader scale (Drifanda *et al*., 2022).

Based on the problem of farmer resilience as one of the consequences of the urban sprawl phenomenon in Malang City, this study aims to analyze the pattern of farmer resilience descriptively based on fundamental phenomena in the field. Farmers are the main subjects threatened with land conversion due to urban sprawl in the near and far future. As for later looking at the patterned forms of farmer resilience, the dominant perspective is used through a socio-economic perspective. The condition of farmers who experience vulnerability to economic resources so that the social aspect becomes a supporting force to analyze the problems experienced by farmers. Thus, this research is hoped to create opportunities for local governments to adopt local value-based policies that are more adaptive to the needs of farmers, primarily those related to the spatial planning and land protection process. In the long term, these efforts are expected to support the sustainability of the agriculture system in peri-urban areas.

Rapid urbanization in Malang City has led to significant changes in land use in peri-urban areas, including converting agricultural land into residential and commercial areas. This transformation impacts the agrarian ecosystem and poses challenges for farmers in maintaining their economic and social resilience. Previous research has discussed the resilience of farmers in the face of structural changes in the agricultural sector. However, there is still a gap in understanding how their adaptation strategies are formed as a patterned and systematic pattern (Ahmadzai et al., 2021). In addition, existing agricultural policies often do not fully support the sustainability of smallholder livelihoods, especially in suburban areas affected by urbanization (Manevska-Tasevska et al., 2021).

In this context, the study aims to analyze the resilience patterns of farmers in the peri-urban area of Malang City by identifying the adaptation strategies they apply to maintain agricultural land. Unlike previous studies that focused on the economic and technical aspects of agricultural resilience, this study integrates social, cultural, and policy factors to understand how farmers holistically adapt in the face of urbanization pressures (Ahmadzai et al., 2021). With this approach, this study seeks to uncover how social capital, local traditions, and spatial planning policies shape farmers' resilience to land conversion and socio-economic changes around them.

Furthermore, the study is based on an adaptation and resilience framework that includes coping, adaptive, and transformative capacities, which allows for a more comprehensive understanding of farmers' resilience to external stresses (Manevska-Tasevska et al., 2021). In addition, this study also considers the policy implications for spatial planning and agricultural land protection as an effort to maintain a balance between urban development and the sustainability of agricultural systems (Ahmadzai et al., 2021). Thus, the results of this study are expected to contribute to the development of more inclusive policy strategies to support the resilience of farmers in peri-urban areas.

LITERATURE REVIEW

The transformation of land functions from rural to urban is a phenomenon that continues to develop along with the expansion of urban areas. This phenomenon not only affects land use patterns but also significantly impacts social, economic, and environmental aspects. To understand the dynamics of this change, the concept of urban sprawl is one of the important and relevant. Harvey & Clarck defined urban sprawl as a process that refers to the continued expansion of the area around a large city to land that is converting from a rural to urban use function (Saleh et al., 2023). The expansion is interpreted through the physical increase in the area of the city due to the high flow of urbanization and population development. As a result, the community's need for housing and other economic support facilities has also increased. Meanwhile, productive agricultural land or fertile land that maintains food supply for the city is decreasing because agricultural land has been converted into built land (Saleh et al., 2023).

In order to face the threat of the urban sprawl phenomenon and the conversion of agricultural land followed by the gentrification process, the concept of Resilience is fundamental for farmers in peri-urban areas to maintain their agricultural land, not only as a way to survive but also to maintain the sustainability of the agricultural sector on a broader scale. The survival ability of farmers in keeping their land productive can have implications for the safety of people's lives regarding food security and food security. In this context, Resilience can be in the form of all forms of socio-economic efforts made by farmers in maintaining their land ownership and work as farmers in facing various forms of derivative threats from the process of land conversion, such as the increasing difficulty of agricultural irrigation, soil fertility, and pollution due to human activities.

Urban sprawl in major cities in Indonesia is linked to gentrification, which is rooted in the inequality of spatial production in urban areas (Pratiyudha, 2019). Clark, Davidson, Lees, and Mitchell explained that gentrification is not only interpreted as the removal or eviction of the working class from its territory but has developed into a problem related to the commodification of space, the polarization of power relations, and the sovereignty possessed by the marginalized (Pratiyudha, 2019). The entry of the middle and upper classes to fill the empty spaces in the urban peri-area is also indicated as a gentrification process. Gentrification is interpreted as transforming social classes or empty areas in the central city area into middle-class group areas or for commercial purposes (Lees et al., 2013). The concentration of development on the needs of the middle and upper-class groups makes the existence of marginalized groups increasingly eliminated and brings the problem of injustice in the formation of the city space itself (Pratiyudha, 2019). Furthermore, economic activities oriented towards non-agrarian areas will gradually become more dominant in Peri-urban areas.

Rakodi and Adell define peri-urban areas as "*... Transition zones between cities (fully urbanized) and areas dominated by agricultural land (predominantly agricultural use). The characteristics of this area are a mixture of land use and confusion of inner and outer boundaries, and are generally a combination of several administratively separate areas*" (Kurnianingsih & Rudiarto, 2014). Based on this explanation, it can be understood that the peri-urban area is a border zone between two administratively different regions. In this case, it can be understood that peri-urban area refers to the administrative area of a village that geographically and administratively intersects or borders directly with the city area. The peri-urban area at least has a unique characteristic: it is dominated by agricultural land and has the potential to experience land conversion due to uncontrollable urban growth.

The urban sprawl and gentrification phenomenon in peri-urban areas presents challenges in land conversion and emphasizes the importance of farmer resilience in maintaining agrarian sustainability. As a transition zone between urban and rural areas, peri-urban areas strategically maintain food security amid massive urbanization pressures. Through various adaptive efforts, such as maintaining land ownership and agricultural productivity, farmers can face the negative impacts of urban development that often marginalize marginalized groups. Thus, the Resilience of farmers in this region ensures the agricultural sector's sustainability and becomes an important key to realizing spatial justice and broader ecosystem balance.

In the face of complex challenges due to urbanization, gentrification, and land conversion, the concept of Resilience is an important foundation for understanding how individuals, communities, or systems can survive and adapt. Resilience focuses on Resilience and the potential to rise, innovate, and create sustainable change. Therefore, the resilience approach offers a relevant framework of thinking to explore adaptation strategies undertaken by communities, including farmers in peri-urban areas, to maintain economic, social, and environmental sustainability amid ongoing dynamics of change. In general, Moberg and Simonsen (2014) define Resilience as follows: "Resilience is the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about the capacity to use shocks and disturbances like a financial crises or climate change to spur renewal and innovative thinking". That is, the definition seeks to emphasize the capacity or ability of a system to face problems by not distinguishing what dimensions of the system are. In addition, a similar definition of Resilience can mean the ability of a system, community, or even a disaster-facing society to be able to resist, adapt, accommodate, and recover from the consequences of a hazard quickly and efficiently, including the ability to restore important basic structures and functions (Madina & Santoso Budi, 2019).

According to Cote & Nightingale (2012), Resilience is a form of people's ability to face external pressures and disturbances caused by social, political, and environmental changes in their homes. This definition means that a community or community group can be resilient if it can adapt to the aspects mentioned through the emergence of new adaptation patterns in carrying out their daily activities based on knowledge in decision-making. Furthermore, Suryawati (2012) states that Resilience is a condition in which entities can tolerate all forms of change without having to cause a reduction in their qualitative value. This ability is born and can be controlled by a series of processes so that it can withstand sudden changes and improve its own situation.

According to Forster et al. (2014), Resilience can be affected by several key components, namely a capacity or ability to adapt specifically to the circumstances that are occurring, such as doing a variety of work in order to increase their Resilience. In addition, the diversification of livelihood systems aims to reduce vulnerability (vulnerability) and threats (stressors) due to the changes that occur. Ifejika Speranza et al. (2014) explains that Resilience is a concept that refers to a series of actions related to the capacity possessed by individuals, groups, or social systems of society to withstand pressure (Pressure) and increase capacity through various approaches as a form of response to social change.

Resilience is the ability to withstand any impact or pressure (Drifanda *et al*., 2022). In an economic context, Resilience is interpreted as the ability to recover or adapt to adverse impacts of shocks that are considered detrimental (Briguglio *et al*., 2009). In this context, Resilience is the power to return economic

conditions to normal levels after experiencing pressure. Briguglio *et al*. (2009), concluded that in the economic literature, the term resilience is used in three contexts: the ability to recover quickly from shocks, the ability to withstand the impact of shocks, and the ability to avoid shocks. In order to integrate the socio-economic context, it is necessary to make efforts to understand the concept of Resilience in its entirety. Keck & Sakdapolrak (2013), mention three types of the capacity of Resilience, namely (1) coping capacities or the capacity to cope with the disorder that arises; (2) adaptive capacities or the capacity to adapt and (3) transformative capacities or capacity changes and transforms. These three types of capacities apply generally to any entity for research to see the patterns of Resilience formed in farmers in peri-urban areas.

Resilience is the ability of individuals or communities to survive, adapt, and transform amid ever-changing environmental pressures. Keck and Sakdapolrak (2013) explained that social resilience can be understood through three main capacities: coping, adaptive, and transformative. Coping capacities refer to short-term strategies to cope with immediate stress or disruption. In the context of peri-urban farmers, this strategy can be in the form of using savings, support from families, or informal loan systems to maintain the sustainability of their livelihoods when facing difficult conditions, such as crop failure or changes in commodity prices (Keck & Sakdapolrak, 2013).

Adaptive capacities reflect farmers' ability to make medium—to long-term changes in the face of structural challenges. This capacity can be seen in farmers' efforts to adapt their agricultural systems to existing conditions, such as adopting more efficient farming methods, switching to commodities with higher economic value, or seeking additional sources of income through job diversification (Keck & Sakdapolrak, 2013). Farmers can increase their economic resilience by making the right adaptations without leaving the agricultural sector entirely.

Meanwhile, transformative capacities refer to the ability of farming communities to create deeper structural changes to increase their resilience sustainably. This transformation can occur through policy changes, institutional innovation, and strengthening social solidarity in the community. For example, in some areas, farmers seek to defend farmland through local regulations or policy advocacy for sustainable farmland protection (Keck & Sakdapolrak, 2013). With this transformative capacity, farmers not only survive in the face of pressure but can also create more favourable conditions for the sustainability of their agrarian systems.

Overall, Resilience can be defined as the capacity of an individual, community, or system to survive, adapt, and recover from sudden pressures, changes, or disruptions. In a social and economic context, Resilience includes responding to various challenges, such as social, political, environmental, or economic crises, by restoring initial conditions, reducing vulnerability, and creating innovative new adaptation patterns. This concept involves coping, adaptive, and transformative capacities relevant to understanding the adaptation strategies of communities, including farmers in peri-urban areas, facing sustainable change dynamics. Several previous studies have discussed the concept of Resilience, especially farmer resilience.

Previous research on the Resilience of Indonesian farmers has shown interesting forms of adaptation in the face of contemporary challenges (Izzah & Jazilah, 2022). It is reflected in the response of the farming community to the impact of the COVID-19 pandemic phenomenon, where they have developed strategies to increase the added value of production, both within the scope of the local market and between regions. At the community level, adaptation is realized through implementing strict health protocols, developing a digital marketing system, and efforts to maintain productivity amid constraints in the distribution of agricultural products. However, in other phenomena, the Resilience to the conversion of agricultural land for the benefit of the non-agricultural sector in some regions negatively impacts farmers' income. It has the potential to create food insecurity. Overall, these findings indicate that farmer resilience is a complex form of adaptive response to the dynamics of social, economic, and environmental change, which is integrated locally and globally. This adaptation pattern reflects the ability of farmers to build sustainable survival strategies amid various changes.

Izzah & Jazilah (2022) examine the lives of farmers, the challenges faced, and the forms of Resilience carried out to maintain their agricultural productivity during the threat of the COVID-19 pandemic. The research was conducted in Dadapan Village, Solokuro District, Lamongan Regency, East Java, because farmers in the village are known to continue carrying out agricultural activities even in pandemic conditions. Farmers experience challenges in the form of losses due to the difficulty of marketing agricultural products. Meanwhile, there are three forms of farmer resilience during the pandemic, namely (1) continuing to farm by paying attention to health protocols; (2) creating a marketing strategy for agricultural products based Online; (3) maintaining the spirit to continue carrying out agricultural activities.

Drifanda *et al*. (2022), through their research entitled Resilience of Vegetable Agriculture in Central Java Province Based on Regional Excellence, tried to explain that farmers could survive and adapt in facing threats, especially during the COVID-19 pandemic. The research is based on the big concept of Resilience in the form of the economy's ability to survive and rise from shocks that have hit the economic structure. The study seeks to analyze the strength of resistance to vegetable farming in Central

Java Province, which can survive and grow again during the pandemic. The results explain that amid economic uncertainty due to the pandemic, many agricultural commodities can survive through the added value of interregional and intraregional production.

Rozci & Roidah (2023), conducted a study to analyze and determine the impact caused by the conversion of agricultural land into non-agricultural land in East Java. Two factors cause the transition. First, direct or micro factors are education level, income, economic capacity, land tax, land price, and land location. Second, indirect or macro factors related to land conversion at the regional level do not directly affect farmers' decisions. Economic growth was positively impacted by fulfilling settlements, industries, and other supporting facilities. Meanwhile, the negative impact felt is a decrease in farmers' income, which indirectly has implications for the loss of farm workers' livelihoods, so they have the potential to face a food crisis.

The conversion of agricultural land to non-agricultural areas has significantly impacted farmers' income in peri-urban areas. Research by Abu et al. (2017) shows that an integrated agricultural system between paddy fields and poultry livestock in peri-urban areas can increase farmers' income compared to single agricultural enterprises. The study found that farmers with integrated agricultural businesses earned a net income of IDR 14,464,495.58 per year. In contrast, farmers who only relied on paddy fields earned a lower income, namely IDR 7,716,295.58 per year (Abu et al., 2017). These findings show that diversification of agricultural businesses is one of the adaptation strategies of farmers facing economic pressure due to land conversion.

On the other hand, research by Christyani & Widiyanto (2016) shows that although there are still rice fields in some peri-urban villages, the area is shrinking yearly, impacting farmers' economic resilience. This study found that farmers in Bantul who lost their agricultural land were forced to look for alternative jobs, such as trading or becoming brick industry workers. It shows a link between land loss and economic diversification strategies carried out by farmers to survive.

In the study of resilience capacity, Manevska-Tasevska et al. (2021) explained that adaptive capacity is very important for farmers in dealing with structural changes in the agricultural sector. They stated that farmers' decisions to adapt to job diversification and upskilling are a response to changing economic and environmental pressures. In the context of peri-urbanism, farmer adaptation strategies will be more effective if they are supported by policies that focus on sustainable agricultural land protection, such as the implementation of productive land zoning, incentives for farmers who maintain agricultural land, and more flexible access to financing to support agricultural business diversification.

Meanwhile, research by Kurnianingsih et al. (2021) in the peri-urban area of Sukoharjo shows that population growth in suburban areas impacts changes in farmers' livelihood patterns. This study found that in several sub-districts, most farmers experienced a change in their profession due to land limitations, leading to a transition from the agricultural sector to the service and industrial sectors. These findings confirm that farmers' adaptation capacity is highly dependent on access to economic resources and policies, such as regional spatial plans that support the sustainability of the agricultural sector.

In analyzing sustainable agricultural policies, Ahmadzai et al. (2021) highlight that investments in regenerative agricultural technologies and community-based policies can increase farmers' resilience to environmental and economic pressures. The study emphasizes that an inclusive and locally based approach, through values and norms in the community, is very important in supporting sustainable agricultural systems, especially in areas that experience stresses due to urbanization.

Research conducted by Dewi and Rudiarto, (2013) in Semarang also revealed that the conversion of agricultural land has caused significant socio-economic changes in peri-urban areas by the rate of conversion of agricultural land into non-agricultural land for 10 years in Gunungpati District, which averages 56.9 ha per year. The study found that most farmers who lost their farmland experienced a decreased income due to limited skills in accessing jobs in other sectors. This condition is further exacerbated by the influx of urban residents who increase land prices and the cost of living in the area.

Previous research related to the phenomenon of urban sprawl, the concept of Resilience, and the framework of this research can be seen in **Figure 2.** The research framework contains two things that are the background of this research. First, the dynamics of demographic growth triggered by migration flows have actualized the phenomenon of Urban Sprawl to peri-urban areas, a manifestation of spatial expansion inherent in contemporary urbanization. This phenomenon is a direct consequence of the increase in demand for residential land, which is directly proportional to the growth of the urban population. The transformation of this peri-urban area presents significant multidimensional implications, including restructuring the social order, reconfiguring the economic system, and substantial modifications to the environmental ecosystem. Urbanization is closely correlated with transforming space utilization patterns in peri-urban areas.

Second, the agricultural sector, historically instrumental in accelerating economic growth, faces complex structural challenges due to shifting economic paradigms. The systematic transition from the dominance of the primary sector to the prevalence

of the secondary and tertiary sectors has redefined the economic landscape in peri-urban areas. Consequently, the conversion of agricultural land into residential zones not only impacts the degradation of agrarian production capacity but also has significant implications for the socio-economic dimension of the farming community in the region.

In the context of this spatial transformation, the analysis of the adaptive mechanisms of farmers in peri-urban areas is an essential focus. The conceptualization of Resilience is a fundamental theoretical framework for understanding the adaptive response of farmers to the dynamics of multidimensional changes that occur. The manifestation of farmer resilience in peri-urban areas shows an extensive spectrum of variation, ranging from modifying cultivation strategies to diversifying livelihood bases that are adaptive to urban contexts. Further elaboration of farmer resilience patterns is constructed through the Sustainability Livelihood Framework (SLF) perspective, which emphasizes the agrarian system's sustainability aspect. This integrative approach facilitates a comprehensive evaluation of farmer capital, institutional infrastructure, and adaptation strategies implemented to maintain socio-economic sustainability amid the dynamics of contemporary transformation. The framework presents an analytical perspective that allows for a deep understanding of how farming communities develop and consolidate resilience patterns that are not only conservative but also transformative to the sustainability of agrarian systems in peri-urban areas.

The Sustainable Livelihood Framework (SLF) approach provides a comprehensive perspective in understanding the resilience strategies of farmers in the peri-urban area of Malang City. SLF emphasizes five main capitals that contribute to livelihood security: human capital, social capital, natural capital, physical capital, and financial capital (Meuwissen et al., 2019). In the context of this study, farmers utilize social capital through family and community solidarity as the main mechanism in dealing with urbanization pressures. In addition, limited financial capital forces farmers to develop coping strategies, such as going into debt in the face of unstable economic conditions. The dwindling natural capital due to land conversion is a big challenge. However, the sustainability of agriculture is maintained with cultural values inherited from generation to generation, such as the belief in land as a sacred heritage.

SLF can also identify farmers' adaptive and transformative capacities to sustain their livelihoods. Adaptive capacity is reflected in the diversification of work carried out by farmers to reduce dependence on agricultural products alone. In this case, farmers not only rely on agriculture as the main source of income but also work in other sectors that are more stable, such as construction workers or crop transportation services (Meuwissen et al., 2019). Meanwhile, the transformative capacity of farmers is demonstrated through the *Nrimo Ing Pandum* philosophy, which provides psychological resilience and encourages them to survive despite severe economic and social challenges.

By integrating SLF into farmer resilience analysis, this study provides a more systematic understanding of how peri-urban farmers can survive amid land-use change and economic pressures. Implementing SLF-based policies that support the sustainability of the agrarian system in peri-urban areas can be a strategic step in maintaining a balance between urban development and agricultural land protection (Meuwissen et al., 2019).

In the context of the resilience of farmers in the peri-urban area of Malang City, the utilization of various capital in the Sustainable Livelihood Framework (SLF), as well as resilience capacity (coping, adaptive, and transformative capacities), plays an important role in maintaining the sustainability of the agrarian system. Limited financial capital and reduced natural capital due to agricultural land conversion impact agricultural productivity and farmers' economic stability. To face this challenge, coping strategies that are often applied include borrowing capital from families or communities and reducing production costs to maintain agricultural products. In the medium term, the adaptive capacity of farmers is reflected in the diversification of work, both by working in the non-agricultural sector and adopting more efficient agricultural techniques to increase crop yields. Meanwhile, transformative capacity can be seen in farmers' collective efforts to maintain land ownership through family agreements, such as not selling inherited land to outsiders and maintaining land by relying on more stable agricultural products, such as horticultural crops with higher selling value.

This dynamic also impacts farmers' economic aspects, especially land income and productivity. The decline in agricultural land area due to settlement expansion leads to decreased crop yields, ultimately affecting farmers' income levels. Many farmers are implementing economic diversification strategies to address these challenges, such as utilizing remaining land with intensive farming systems or switching to commodities with higher selling values. In addition, some farmers have also adopted community-based practices, such as a gotong royong system in land management, to reduce production costs and improve agricultural efficiency. Therefore, understanding farmers' income and land productivity is an important aspect in analyzing farmers' resilience amid urbanization and land conversion in the peri-urban area of Malang City.

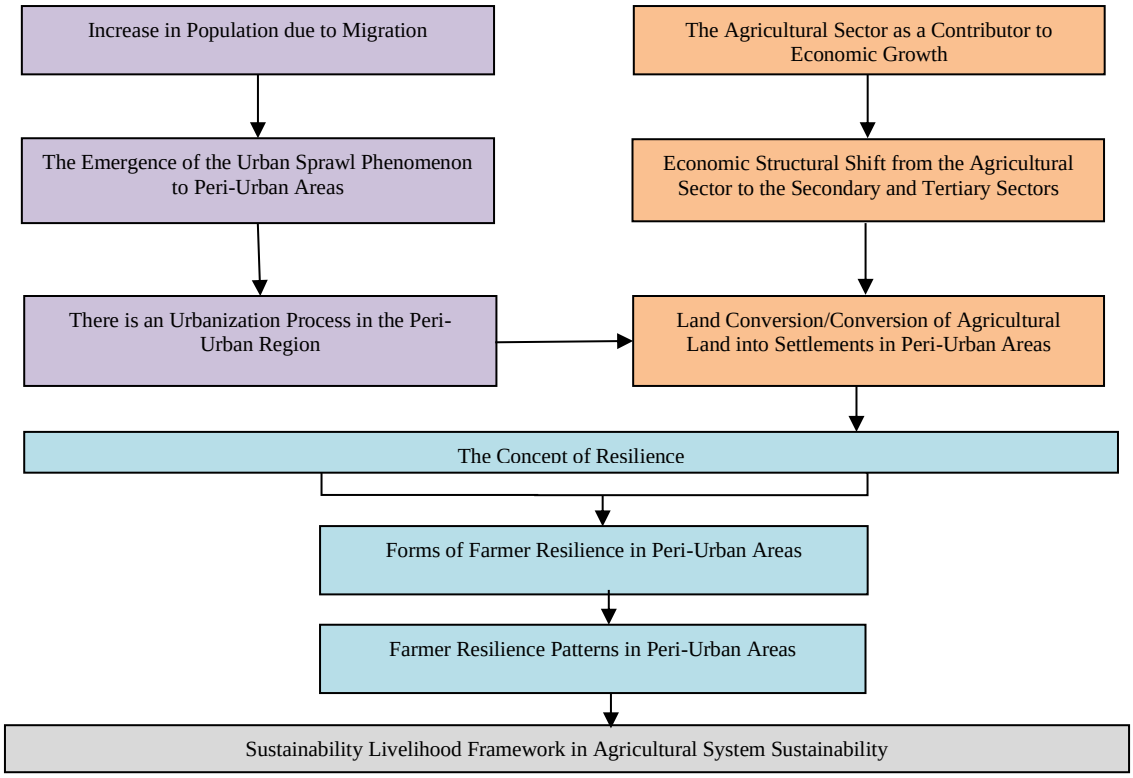


Figure 2. Research Framework
Source: Author, 2025

Based on previous research, conceptual definitions, and explanations related to the research framework can be a comparison and inspiration for researchers in conducting research by identifying differences and novelties. First, this research will focus on the resilience patterns formed by farmers who live and/or own land in rural-urban border areas. Second, although the conceptualization presented is similar regarding resilience, the primary stressor or threat faced is the occurrence of land conversion and social dynamics due to the urban sprawl phenomenon, not a natural phenomenon in the form of climate change or natural disasters. Third, the novelty of the locus: This research was carried out in the urban fairy area of Malang City, namely Kedungrejo Village in the District, an area that administratively borders Malang City directly as the second most populous city in East Java.

METHOD

This study aims to analyze the resilience pattern of farmers in the peri-urban area of Malang City using a qualitative method with a descriptive approach. This approach explores farmers' adaptation strategies in facing social, economic, and spatial challenges due to urbanization. Qualitative methods allow researchers to understand farmers' subjective experiences, such as their responses to land conversion, economic pressures, and social change. Meanwhile, a descriptive approach maps and explains farmers' resilience patterns in detail. This research involves a clear depiction of the local context, including the geographical, socio-cultural, and economic conditions that cover the peri-urban area of Malang City. This approach is relevant enough to explain how farmers adapt to their complex and dynamic environment.

This research was conducted in Kedungrejo Village, District, Malang Regency. The location was chosen because Kedungrejo Village is a village that administratively borders the Malang City area, namely Kedung Kandang District. In addition, the large number of residents in Kedung Kandang District, which is the largest among other sub-districts in Malang City, has correlated that this fact will have implications for increasing the need for residential land and other supporting infrastructure to trigger the phenomenon of agricultural land conversion in the peri-urban area of the city, namely the surrounding supporting villages.

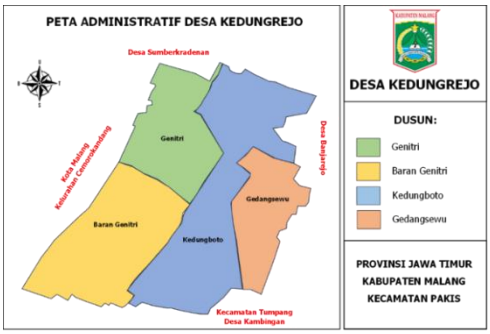


Figure 3. Administrative Map of Kedungrejo Village
Source: Author, 2025.

This study uses a qualitative approach to explore in-depth information related to the resilience of

farmers in the peri-urban area of Malang City. In qualitative research, the concept of population samples is not used because this study does not aim to generalize but to understand the phenomenon contextually and deeply through the experience of the research subject. Therefore, this study selected informants based on a purposive sampling technique with predetermined criteria.

The number of informants interviewed was five people. The main informants in this study are farmers who own land, not farm labourers because the research focuses on resilience strategies for maintaining agricultural land. There is no age limit when selecting the main informant, considering the agricultural sector is experiencing a regeneration crisis. So, if there are young farmers, the data obtained can be used to compare the viewpoints of different generations of farmers. In addition, this research also involved a key informant, a village official with the position of Head of Village Service. The selection of key informants was based on several considerations, including their young age, accessibility to information about the agricultural situation in the village, and their active role in assisting researchers during the data collection process. Of the five informants interviewed, most were over 40, while one was classified as a young farmer. All informants are male farmers who own and manage their land. This is due to the role of women in agriculture, which is generally participatory, especially in the harvest phase or indirectly supporting agricultural work, such as preparing logistics for male farmers on agricultural land.

This research was conducted by considering research ethics so that informants feel comfortable sharing information. An emotional and communicative approach is applied in the interview so that the interaction with the informant takes place naturally and is not rigid. Before the interviews, the researcher introduced himself and asked the informants for permission, ensuring they would participate in the study. The interview technique used is semi-structured, which allows for flexibility in exploring the informant's perspective without limiting their answers to an overly rigid format.

In maintaining the confidentiality of information, the informant's identity is not included in the publication of the research results, and the data collected is only used for academic purposes. In addition, the researcher used a semi-verbatim recording technique to record the key points of the interview directly without having to copy the entire content of the conversation in full. This study uses the source triangulation technique described by Sugiyono (2013) in his book *Quantitative, Qualitative, and R&D Research Methods*. Triangulation combines various data sources, namely direct observation (observation), in-depth interviews, and documentation and literature studies.

In addition, the member-checking process involves reconfirming the interview results with the informant. This step aims to minimize misinterpretation and reduce the researcher's subjectivity during the interview. Furthermore, peer debriefing discussions were conducted with supervisors with expertise in agricultural sociology to ensure that data interpretation has been carried out objectively and in the field context.

This study uses data analysis techniques developed by Miles et al. (2014), which consist of three main stages: data condensation, data display, and drawing and verifying conclusions. This approach is used to process and analyze qualitative data systematically, producing more structured and in-depth findings. The first stage, data condensation, is selecting, focusing, simplifying, and transforming data from the results of in-depth interviews, observations, and documentation studies. In this study, the data obtained from the peri-urban farmers of Malang City are categorized into several main themes, such as land use change, forms of farmer resilience, and adaptation patterns to urbanization pressures. This process aims to reduce complex data into more systematic information and make it easy to analyze further.

The second stage, data presentation, involves compiling information condensed into descriptive narratives, tables, and diagrams that support the understanding of the relationship between variables in this study. The systematic presentation of data allows researchers to identify patterns and relationships between factors influencing farmer resilience, including the economic and social strategies they apply in the face of land conversion.

The last stage, drawing and verifying conclusions, is a process of in-depth analysis of the data that has been compiled to identify consistent patterns and draw valid conclusions. Data triangulation was carried out to ensure the credibility of the research findings, namely comparing the results of interviews with secondary data and observations in the field. In addition, this study implements member checking, which is reconfirming the results of interviews with informants to ensure the accuracy of data interpretation. Data verification is also carried out through peer debriefing, which is a discussion with experts or supervisors who have competence in the field of agricultural sociology to minimize subjectivity in the analysis.

Using the data analysis approach developed by Miles et al. (2014), this research can produce a more systematic understanding of the resilience of peri-urban farmers amid increasing urbanization. This technique also ensures that the analysis process is carried out academically and can be accounted for methodologically.

The discussion related to the analysis of the resilience pattern of farmers in the peri-urban area of Malang City began with the identification of changes

in the geospatial landscape in Kedungrejo Village and its surroundings from year to year which seeks to show the impact of *the urban sprawl* phenomenon so that the urbanization process occurs in the buffer village. Based on data obtained through *Google Earth* satellite imagery and then analyzed for differences over the past few years. Furthermore, forms of farmer resilience in the peri-urban area of Malang City are a way or strategy for farmers to adapt to threats. These forms of resilience are obtained based on direct statements from farmers through the interview process. Then, the farmer resilience pattern displays the dynamic relationship between forms of resilience in a social system. Thus, the identified resilience patterns are the basis for explaining the implications of the various possibilities farmers face regarding the sustainability of agricultural systems in various regions. It is also seen from the Sustainable *Livelihood Framework* (SLF) perspective.

RESULT AND DISCUSSION

Land use change in Kedungrejo Village as an impact *of the Malang City Urban Sprawl*

Geospatial transformation related to land use in peri-urban areas often presents inevitable consequences from urbanization dynamics that encourage urban areas' expansion. Kedungrejo Village, as part of the peri-urban landscape of Malang City, has undergone significant changes in its land use over the past two decades. This change is mainly marked by converting productive agricultural land into residential areas intended for the urban population, which continues to increase yearly. This phenomenon reflects the pressure of urbanization on peripheral areas and highlights the challenges of socio-economic system sustainability among local communities. Based on Figure 4, related to geospatial satellite images of Kedungrejo Village in 2003, 2006, 2014, 2019, 2024, and 2025, this sub-section aims to identify in advance the pattern of geospatial change in Kedungrejo Village and evaluate its impact on the spatial structure and local livelihood system. This approach provides a relevant empirical foundation for understanding land use change's spatial and social implications in peri-urban areas.

2003 was an important period for many major cities in Indonesia that were in the stage of economic recovery after the 1997-1998 monetary crisis. This recovery process encourages economic growth in strategic areas, including Malang City, which has begun to shift to the service business sector (Franciska Christiana *et al*., 2023). As one of the centers of education and culture in East Java since the Dutch East Indies colonial period, Malang City showed a significant increase in the development of urban areas. Infrastructure and housing development are beginning to support growing economic, educational, and tourism activities. However, Kedungrejo Village, primarily wet and rainfed farmland, has not fully felt the impact of the development. This region still tends to depend on the agricultural sector as the primary driver of its economy. However, the increasing need for housing in urban areas accompanied by high migration every year began to put pressure on peri-urban areas to provide land for housing development. 2003 was chosen because it reflects the initial conditions of land use transformation that will continue in the following years.

In 2006, Malang City began to feel the impact of national economic growth triggered by macroeconomic stability policies and infrastructure development in President Susilo Bambang Yudhoyono's administration (Aswicahyono & David, 2017). The policy focuses on increasing investment, building transportation networks, and modernizing economic infrastructure, which has significantly boosted regional development, including Greater Malang. As an educational and economic center in East Java, Malang City continues to attract immigrants, both students and workers. This migration flow increases the demand for housing and triggers the growth of the property or building sector in the area, which can be seen from the increase in the GDP of Malang City from 2002 to 2007 (Nuraini, 2010). However, based on the analysis of satellite images, the land conversion in Kedungrejo Village in 2006 still does not show significant changes compared to 2003. Agricultural land still dominates land use, although the pressure on space is beginning to be felt in some areas close to the center of urban activity, precisely west of the village administrative boundary. This change is not yet massive, but it is an early indicator of the transformation process, which will become more accurate in the coming years. The existence of Kedungrejo Village as a peri-urban area began to attract the attention of residential plot investors. However, the actual impact on the landscape and the pattern of farmers' lives was only seen more pronounced in the following years.

The year 2014 marked the acceleration of spatial changes in the peri-urban area of Malang City, including Kedungrejo Village. In this period, implementing the decentralization policy that has been running for more than two decades has given greater autonomy to local governments in planning and managing development. In East Java, including Malang Raya, steady economic growth, driven by the education, tourism, and trade sectors, increased the need for new settlements (Finuliyah *et al*., 2023).

Satellite images in 2014 show increased land use conversion in Kedungrejo Village, especially around the main access point to the center of Malang City. Housing projects began to develop significantly in the area, replacing farmland that had previously been the economic base of the local community. This surge in housing demand is caused by population growth in Malang City and migration from the surrounding area.

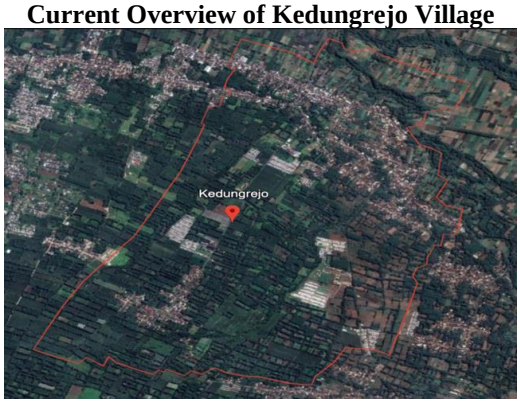
Year 2003:
Economic Recovery and the Beginning of Urbanization

Year 2006:
The Beginning of the Acceleration of Land Use Transfer

Year 2014:
Acceleration of Urbanization and Transformation of Peri-Urban Areas

Year 2019:
The Pressure of Urbanization and the Transformation of Per-Urban Areas

Year 2024:
Current Overview of Kedungrejo Village



Year 2025:
Residential Location Point

Figure 4. Geospatial Satellite Images of Kedungrejo Village in 2003, 2006, 2014, 2019, 2024, and 2025
Source: Google Earth, 2025

An increase in community mobility also drives this change due to the development of transportation infrastructure in the Greater Malang area, which facilitates access to peri-urban areas such as Kedungrejo. However, on the one hand, this dynamic also has consequences for the sustainability of local agricultural activities. Economic and social pressures due to rising land prices and changes in land use orientation are beginning to be felt by the people in the village, reflecting the complexity of the relationship between urbanization and the sustainability of peri-urban areas.

In 2019, urbanization in Malang City and its surroundings reached a fairly intensive phase, marked by the development of strategic infrastructure and new residential areas (Yunita & Nurindah Sari, 2019). This growth is driven by development programs prioritized by President Joko Widodo through local governments that align with increasing economic activity, education sectors, and community mobility. Kedungrejo Village, as part of the peri-urban area, certainly experiences significant urbanization pressure from urban areas. Based on satellite images, changes in land use in Kedungrejo Village show a significant reduction in productive agricultural land.

The land conversion for housing is increasingly dominant, especially in areas that have direct access to the leading road network to Malang City. The main factor driving this change is the increase in housing demand from the growing population, including immigrants dominated by the middle class who choose to live in suburban areas due to housing prices in urban areas. In addition to pressure from the property sector, national policies related to infrastructure development also have an impact on this region. The development of road infrastructure and public facilities makes accessibility easier, making Kedungrejo Village more attractive to housing developers. This transformation reflects an urbanization pattern that shifts the orientation of land use in peri-urban areas, presenting a significant challenge to the sustainability of agricultural activities and the socio-economic balance of local communities.

The year 2024 describes the peak of spatial changes that have taken place in Kedungrejo Village due to urbanization that continues to grow. Based on the latest satellite images, the area of agricultural land in this region has decreased significantly, leaving an area still used for agricultural activities. Massive housing development is one of the leading causes, driven by the increasing demand for housing in peri-urban areas that are increasingly integrated with the center of Malang City. Meanwhile, the development of toll gate access infrastructure that is quite close to Kedungrejo Village is accelerating the flow of urbanization in urban areas and pushing it towards peri-urban areas. This transformation not only impacts the decline in the area of productive agricultural land but also changes the socio-economic structure of the local community (Saleh *et al*., 2023). Farmers in Kedungrejo Village face increasingly complex challenges, including economic pressure due to land competition with housing developers, increasing prices of living necessities, and limited agricultural resources such as clean water for irrigation. This condition is an important basis for analyzing the pattern of farmers' resilience in responding to urbanization dynamics that have lasted for more than two decades. The year 2024 has become a mirror of the cumulative impact of changes in peri-urban areas on the sustainability of the agrarian system and the welfare of the community in Kedungrejo Village.

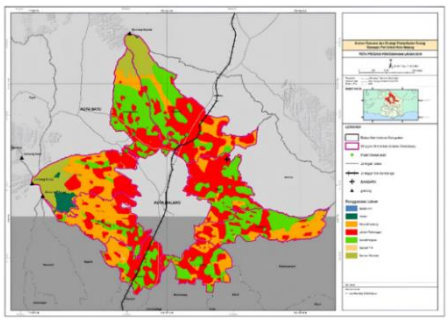


Figure 5. Land Use Prediction Map for Peri-Urban Areas in 2030
Source: Permana *et al*., (2021)

Analysis of geospatial satellite images of Kedungrejo Village revealed a significant spatial transformation pattern, which is indicated through several demarcated zones (marked by yellow areas) that represent the locations of agricultural land conversion into residential areas. This phenomenon of land conversion is a manifestation of the ongoing urbanization dynamics, reflecting the complexity of the interaction between the needs of settlements and the preservation of agrarian land. Increasing demographic and economic pressures have resulted in a shift in the function of productive land to residential areas. This transformation has implications for the socio-economic structure of the Kedungrejo Village community, which has historically relied on the agricultural sector. The degradation of agricultural capacity due to land conversion not only impacts agricultural productivity but also has the potential to have long-term ecological consequences, including changes in hydrological patterns, reduction of green space, and modification of local environmental characteristics. Furthermore, this phenomenon presents challenges in sustainable spatial planning, considering the urgency of balancing development needs with preserving natural resources and resilience in the agricultural sector.

The phenomenon of urban sprawl in Malang City has significantly impacted land use change in peri-urban areas. In the last ten years, the built-up land area has increased significantly and is projected to continue to increase until 2030 (Figure 5). Based on research data conducted by Permana *et al*. (2021), land developed in peri-urban areas has increased by 33.6% since 2018. This change mainly occurs in sub-districts directly adjacent to Malang City, such as Singosari and Karangploso. The impact is decreased productive agricultural land, especially irrigated rice fields that have changed their function into residential areas. This conversion reduces food production capacity and increases the risk of food insecurity and environmental degradation.

Land use predictions in 2030 show inconsistencies with the Regional Spatial Plan (RTRW) of Malang Regency. Protected areas that should be maintained are in danger of changing their function to built land, with a non-conformity rate of 22.7% (Permana *et al*., 2021). It indicates weak control over the rate of land use change in the region. In addition, spatial transformation in the peri-urban area of Malang City shows uneven development. Districts in the northern region, such as Lowokwaru, have experienced significant growth with a concentric pattern due to good accessibility and educational centers (Mahendra & Pradoto, 2016). The same thing also happens in Lesanpuro, Madyapuro, and Cemorokandang, which will experience an increase in population density due to new activity centers, ease of accessibility, and role development, such as the Sawojajar area.

Urban sprawl in peri-urban areas is caused by population growth (Figure 6) and spatial planning policies that have not been adaptive to regional changes. The peri-urban area is now a transition zone between rural and urban, changing social, economic, and physical characteristics. The high rate of population growth in this region also affects the increase in land prices, thus encouraging the role of developers to change the function of land into residential areas. On the other hand, the strong interaction between Malang City and the peri-urban area through the primary transportation network further accelerates the urbanization process in this region (Mahendra & Pradoto, 2016). In the context of sustainability, land use change in the peri-urban area of Malang City requires better management to reduce negative impacts on the environment and the economy of local communities. In the future, mitigation efforts are significant to maintain productive agricultural land, control the expansion of built-up areas, and encourage more adaptive and responsive spatial planning policies to the pressures of urbanization (Mahendra & Pradoto, 2016; Permana *et al*., 2021).

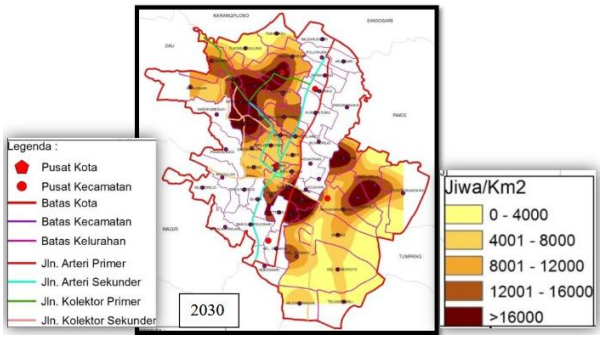


Figure 6. Prediction of Population Density Distribution Patterns in 2030
Source: Mahendra & Pradoto, (2016).

Forms of Farmer Resilience

In facing the challenges of urbanization and economic pressure, farmers in Kedungrejo Village, District, Malang Regency, show unique forms of resilience. These forms at least reflect how they maintain the sustainability of agricultural land, which is the primary source of livelihood for themselves and their families. Although this seems simple, this form of resilience has profound social, economic, and cultural dimensions. Based on the results of interviews with informants (Figure 7), it can be seen that there are five forms of farmer resilience, namely (i) belief in the land as a sacred inheritance, (ii) family solidarity, (iii) debt as a survival strategy; (iv) diversification of work; and (v) application of the life philosophy of *Nrimo Ing Pandum*. The following explains some forms of resilience as a step for farmers to maintain their land ownership.

Figure 7. Interview with Farmers in Kedungrejo
Source: Author, 2025

Belief in Land as a Sacred Heritage

Land has a deep spiritual and cultural dimension for farmers in peri-urban areas. This belief reflects what Cote & Nightingale (2012) put forward regarding resilience as the ability of society to face social and political pressures. In this context, the pressure arising from land conversion due to urbanization is faced by maintaining land as a sacred heritage beyond economic value alone. Land is considered not only a source of livelihood but also a cultural identity that must be preserved for generational sustainability. Farmers in Kedungrejo believe that agricultural land inherited by ancestors is sacred property and should not be sold to parties outside the family. This belief is based on the belief that selling land to others can have adverse effects, such as *Kualat* or an inadequate life. This kind of trust is a form of respect for ancestors and a way to maintain the sustainability of family assets. According to Moberg & Simonsen (2014), resilience includes maintaining sustainability in the face of change. Belief in the land as a sacred heritage is a form of the adaptive capacity of farmers through utilizing traditional norms and values to resist gentrification pressure. This value provides moral resilience, the foundation for surviving amid rapid social change. This trust strengthens family cohesion and creates a protection mechanism against land conversion. Land remains within the sphere of the extended family, which strengthens the collective economy's resilience. In addition, this belief is also a shield against the temptation to sell land to housing developers, even though the prices offered are very high. Thus, belief in the land as a heritage treasure is part of the culture and an adaptive strategy in the face of pressures of urbanization.

Previous research has discussed farmers' beliefs about land as a sacred heritage. Keck & Sakdapolrak (2013), explained that adaptive capacity involves culture-based innovation to sustain sustainability. In this case, belief in land is not only a defensive measure but also a social transformation strategy that strengthens the community's collective identity. Land considered sacred encourages creating a sense of solidarity between generations, where this heritage

becomes a symbol of the everyday struggle to face environmental dynamics. Madina & Santoso Budi (2019), add that resilience involves the capacity to restore essential basic functions. Farmers maintain social stability and community structure by retaining the land as a sacred heritage. It allows them to face external pressures without compromising the qualitative values passed down from generation to generation. While it looks traditional, this belief has relevance in the modern context. Amid globalization and land capitalization, this principle is a reminder of the importance of maintaining productive assets for future generations. Therefore, this belief demonstrates not only individual resilience but also the sustainability of the community more broadly.

Family Solidarity as a Form of Resilience

Family solidarity is the main foundation for farmers in facing economic and social pressures. According to Keck & Sakdapolrak (2013), capacity Coping reflects the ability to overcome disruption through collective action. In the context of farmer families, solidarity is realized through the division of roles, mutual assistance, and sharing of limited resources. It shows that the family is the first unit of resilience in facing the dynamics of the peri-urban environment. Family solidarity is a prominent form of resilience among Kedungrejo farmers. The principle of helping family members is considered not only a moral obligation but also a strategy to keep family assets intact. When one family member needs funds, for example, for urgent needs, the extended family often chooses to help rather than sell the land to an outside party.

Other previous research also discusses the form of resilience using family social capital. Cote & Nightingale (2012), emphasize that community adaptation to external pressures depends on local knowledge-based decision-making patterns. Family solidarity allows farmers to create new patterns of adaptation in land management, division of household duties, and diversification of work. In crises, the family is a reliable resource to maintain economic and social stability. This form of solidarity shows the value of cooperation that is still present in rural communities. Farmers believe that helping families is a long-term investment, both emotionally and economically. In some cases, this solidarity also helps prevent land conversion, a real threat due to urbanization.

Forster et al. (2014), mentioned that diversification of livelihood systems is an important strategy to increase resilience. In farming families, solidarity is central in supporting family members seeking additional work in the informal sector or temporary migration to cities. It allows families to reduce their vulnerability to fluctuations in agricultural income. This practice shows that traditional values can function as a support for a family-based economic system. More than that, family solidarity also demonstrates the ability of farmers to create compelling social protection mechanisms, even in challenging economic conditions. Solidarity is also a social capital that strengthens relationships between communities. Ifejika Speranza et al. (2014) affirms that the capacity to withstand pressure depends on a strong social network. Family solidarity serves to meet basic needs and creates mutual trust, which is the basis for cooperation between community members.

Productive Debt as a Survival Strategy

Farmers often rely on loans to survive in difficult situations, such as crop failures due to pest attacks, bad weather, or plummeting commodity prices. Debt is usually obtained from neighbors or relatives with more stable jobs. This practice is a form of resilience that reflects the economic flexibility of farmers. Debt is a familiar survival strategy farmers use when facing financial crises. Briguglio *et al*. (2009), state that economic resilience involves recovering financial conditions after experiencing stress. In this context, going into debt is a way to avoid more significant losses, although it increases the risk of future vulnerability. According to Madina and Santoso Budi (2019), resilience includes restoring basic economic structures. Farmers who owe money to neighbors or fellow farmers show a collective effort to maintain the sustainability of the family economy.

In the short term, debt becomes a solution to meet urgent needs, such as production costs or daily consumption. Although risky, debt strategies allow farmers to meet urgent needs without selling productive assets like land or agricultural equipment. Debt is also often given without interest or with light terms and guarantees, thus demonstrating solidarity at the community level. Keck & Sakdapolrak (2013), describe adaptive capacity as adapting to changing conditions. In this case, debt is a form of adaptation to economic pressures arising from fluctuations in crop prices or crop failures. This strategy allows farmers to continue their productive activities without losing access to resources. However, debt and receivables activities also have certain limitations. Ifejika Speranza et al. (2014), reminded us that continued economic pressures could increase the risk of default and worsen financial conditions. Therefore, farmers must manage debt wisely by considering their repayment capacity and potential future income. In the long term, this practice allows farmers to continue operating in the agricultural sector. However, dependence on debt also poses challenges, such as the potential for a financial crisis if debts cannot be repaid on time. Therefore, this strategy needs to be supported by more systematic interventions, such as access to farmer-friendly formal financial services.

Job Diversification as Economic Resilience

Job diversification is a strategy carried out by farmers to reduce economic risks due to dependence

on the agricultural sector. Forster et al. (2014), explained that livelihood diversification reduces vulnerability to environmental and economic changes. In the context of peri-urban farmers, job diversification includes activities in the service sector, trade, or other informal work. Farmers in Kedungrejo do not entirely depend on agricultural products as a source of income. They often diversify their work to overcome the uncertainty inherent in the agricultural sector. Side jobs such as being a farm worker on other land, a construction worker, or a worker transporting crops are the main choices. This diversification shows the ability of farmers to adapt to dynamic economic conditions. Farmers can reduce the risk of total failure due to fluctuations in agricultural yields by having several sources of income. This strategy also reflects the high resilience of individuals in the face of socio-economic pressures. Briguglio *et al*., (2009), mentioned that recovering from economic pressures involves adapting to new opportunities. Job diversification allows farmers to take advantage of opportunities outside the agricultural sector. It increases family income and creates additional resources to deal with crises.

Keck & Sakdapolrak (2013) emphasize the importance of transformational capacity in resilience. Work diversification reflects farmers' structural transformation to anticipate unexpected changes. By developing skills in other sectors, farmers demonstrate the ability to innovate and create more sustainable livelihood patterns. However, job diversification also presents challenges like time and resource constraints. Moberg and Simonsen (2014), highlight that resilience involves managing stress without sacrificing essential functions. Therefore, farmers need to balance additional work and agricultural activities. This diversification of work often requires significant sacrifices of time and effort. Therefore, policy support is needed to improve the agricultural sector's efficiency so that farmers do not need to rely too much on additional work. It means that farmers have a high level of confidence in being able to depend on the agricultural sector for their livelihood.

Application of the Life Philosophy of *Nrimo Ing Pandum*

In Javanese agrarian society, the *Nrimo Ing Pandum* philosophy is one of the cultural values shaping how farmers think and act when facing life challenges. This philosophy emphasizes accepting everything God has determined with sincerity but is still accompanied by maximum effort (Rian Sari et al., 2021). This concept does not mean surrendering to the situation but rather teaches a balance between effort and acceptance, where humans are expected to continue to struggle without losing their inner peace when facing results that are not as expected. In the context of peri-urban farmers in Malang City, this value plays an important role in helping them survive amid economic pressures and land use changes.

As part of resilience capacity, *Nrimo Ing Pandum's* philosophy can be categorized into coping capacities and transformative capacities, according to Keck & Sakdapolrak (2013). From the perspective of coping capacities, this philosophy helps farmers maintain their psychological stability in the face of challenges, such as fluctuations in commodity prices, crop failures due to climate change, and increasing pressures from urbanization that threaten the sustainability of agricultural land. One farmer stated, "*Even if I fail to harvest now, I am sure there will be a replacement. However, what is called* legowo *or gratitude is that we cannot give up on what we cannot do, mas. It means the business is still running, and prayers must continue regardless of the results*" (Interview with Farmer Yudi, 2025). This statement shows that *Nrimo Ing Pandum* is a psychological protection mechanism that prevents farmers from experiencing despair in difficult situations.

From the perspective of transformative capacities, this philosophy allows farmers to develop new, more sustainable social and economic strategies. In research by Putra et al. (2023), the philosophy of *Nrimo Ing Pandum* is understood as a passive attitude and a value that encourages innovation and adaptation to life's challenges. Farmers who internalize this philosophy tend to be more flexible in finding alternative solutions to improve their economic resilience, such as adopting organic farming systems, reducing dependence on middlemen by forming distribution networks or switching to commodities with higher selling values. This shows that cultural values can be social capital that supports farmers' economic resilience, not just a form of acceptance of the situation.

Furthermore, this philosophy is also related to social solidarity, which is one of the important factors in the resilience of farming communities. Concept *Nrimo Ing Pandum* it is often associated with cooperation in agrarian communities, where farmers help each other when experiencing economic difficulties, either through labour assistance in the fields, sharing crops, or providing loans in the form of goods or money. Research by Rian Sari et al. (2021) shows that in Javanese agrarian society, this value forms a strong pattern of social relations and becomes a fortress for farmers facing crises.

In the context of rapid urbanization in Malang City, this philosophy also functions as a mechanism of resistance to external pressure. When farmers are faced with a high price offer to sell their land, the value of *Nrimo Ing Pandum* is often a consideration in decision-making. Farmers who still hold fast to this value tend to defend their farmland rather than be tempted by short-term gains from land sales. In the long term, this contributes to the sustainability of peri-urban agriculture and local food security, although the

scale of agriculture continues to shrink due to urban expansion.

Thus, the philosophy of *Nrimo Ing Pandum* not only plays a role as a cultural value but is also part of the farmer's resilience strategy in facing socio-economic pressures. This philosophy allows them to stay afloat by adopting psychological, social, and economic mechanisms oriented toward adaptation and sustainability. Therefore, in the resilience analysis of peri-urban farmers, it is important to not only look at economic and policy factors but also consider the role of cultural values that can be collective resilience in the face of environmental and social change dynamics.

Philosophy *Nrimo Ing Pandum*, which means to accept what is given sincerely, has become the main foundation in shaping the resilience attitude of farmers. This philosophy strengthens farmers' optimism despite facing various dynamics and challenges. Philosophy *Nrimo Ing Pandum* Reflecting Capacity Coping is explained by Keck & Sakdapolrak (2013). In this view, accepting conditions is a form of psychological resilience that helps farmers face pressure without losing hope. This philosophy provides inner peace, an important capital for survival amid unexpected changes. *Nrimo ing Pandum: It does not mean giving up on the situation but accepting reality by continuing to try.:* It does not mean giving up on the situation but accepting reality by continuing to try. These values help farmers maintain mental and emotional balance, essential for survival.

In the context of resilience, this philosophy is an effective coping mechanism, especially in unpredictable situations such as climate change or economic pressures. Meanwhile, according to Ifejika Speranza et al. (2014), resilience involves actions to withstand pressure and increase adaptive capacity. In the context of farmers, the philosophy *of Nrimo ing Pandum* encourages them to accept the harvest while still trying to increase productivity in the next season. This attitude reflects a balance between accepting reality and taking adaptive action. Madina and Santoso Budi (2019), emphasize that resilience includes recovering essential functions. This philosophy provides a psychological calm and maintains social stability within the farming community. By accepting the situation, farmers create a harmonious environment, thus strengthening community solidarity. This philosophy is also relevant to the view of Briguglio *et al*. (2009) about the ability to withstand the impact of shocks. In the face of economic or environmental challenges, *Nrimo's Ing Pandum* attitude provides emotional resilience that helps farmers not to give up easily. This attitude is the foundation for the sustainability of life amid the dynamics of continuous change. This philosophy is also a reminder that resilience is a matter of survival and how to interpret life with wisdom. By internalizing the value of *Nrimo Ing Pandum*, farmers can survive physically, mentally, and spiritually.

Table 1. Summary of Farmer's Resilience

No.	Resilience Strategy	Description	Interview Quotes
1	Belief in Land as a Sacred Heritage	Farmers firmly believe that heritage land must be preserved and should not be sold to outsiders, as it is believed to bring difficulties in life.	"Yes, the land I am working on now has been passed down through generations. For me, inherited land must always be maintained; it should not be sold. If I try to sell it, I fear I will suffer the consequences or be punished for daring to go against this belief..." (Interview with farmer Yudi, 2025).
2	Family Solidarity	Close kinship encourages farmers to help one another, especially in difficult economic conditions, to prevent the sale of land to outsiders.	"For us, whether they are close family or distant relatives, if they are in need or struggling, they must be helped as much as possible. Especially if they are fellow farmers..." (Interview with farmer Rokhim, 2025).
3	Productive Debt as a Survival Strategy	Farmers rely on their social networks to obtain loans from family or neighbors to cover basic needs and farming costs during economic hardships.	"If the situation becomes truly difficult—whether due to a failed harvest, low prices, or bad weather—we at least try to borrow money first..." (Interview with farmer Solikhin, 2025).

No.	Resilience Strategy	Description	Interview Quotes
4	Job Diversification	To cope with economic uncertainty, farmers take on additional work in other sectors, such as farm labor, construction, or transporting agricultural products, to earn extra income.	"I don't think it's possible to survive by relying solely on farming. At the very least, you should work on someone else's land..." (Interview with farmer Rokhim, 2025).
5	Application of the life philosophy of *Nrimo Ing Pandum*	Farmers internalize the values of patience and acceptance in the face of difficulties but continue to make efforts and do not give up on their situation.	"As a Javanese, mas, I have been taught the importance of gratitude and legowo, especially when you have faith in God. Even if I fail to harvest now, I am sure there will be a replacement..." (Interview with farmer Yudi, 2025).

Source: Author, 2025

Based on the results of the research, there are five forms of resilience strategies implemented by peri-urban farmers in facing economic pressures and land conversion, namely belief in the land as a sacred inheritance, family solidarity, productive debt, job diversification, and the application of philosophy *Nrimo ing Pandum*. These strategies are interrelated and play a role in building the farmers' economic and social resilience amid urbanization dynamics.

Resilience strategies implemented by farmers in the peri-urban area of Malang City can be categorized into the resilience framework developed by Keck and Sakdapolrak, (2013), namely coping capacities, adaptive capacities, and transformative capacities. Coping capacities can be seen in how farmers survive in the face of short-term economic pressures, such as through productive debt strategies used to meet urgent needs in the face of crop failures or low selling prices of agricultural products. In addition, belief in land as an inheritance is also part of this capacity, as it helps farmers maintain their assets by avoiding land sales that could threaten the sustainability of agriculture in the long term.

In addition to survival strategies, farmers exhibit adaptive capacities, allowing them to adapt to changing social and economic environments. Family solidarity also plays a role in this adaptive capacity. The assistance system between family members allows farmers to survive without having to sell their land. This solidarity creates a social network that provides economic support for farmers in the face of uncertainty.

Furthermore, transformative capacities are also seen in farmer resilience practices that are more in-depth and based on cultural values. The philosophy of *Nrimo Ing Pandum* plays a role in shaping the mindset of farmers who remain optimistic in facing economic and social challenges. This philosophy is a psychological mechanism for accepting the situation and encourages farmers to keep working hard and overcome various difficulties without losing hope. With this transformative capacity, farmers cannot only survive but also create new mechanisms that are more adaptive and oriented towards the sustainability of their agricultural systems.

Thus, the resilience strategies of farmers in the peri-urban areas of Malang City show that their resilience is not only limited to short-term responses but also includes adaptation and transformation in the face of external pressures. This combination of coping, adaptation, and transformation is an important factor in maintaining farmers' social and economic stability amid rapid land use changes due to urbanization.

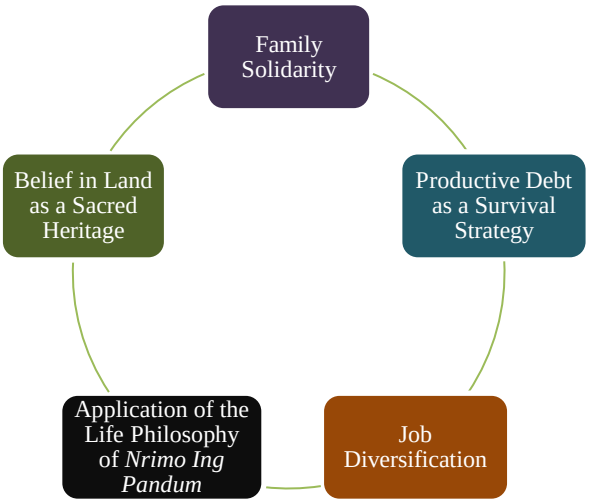


Figure 8. Forms of Resilience of Peri-Urban Farmers
Source: Researcher Illustration, 2025

Farmer Resilience Patterns in Peri-Urban Areas

The pattern of farmer resilience in peri-urban areas can be further known based on the five forms of farmer resilience. Resilience is the capacity of an individual, community, or system to survive, adapt, and transform amid pressure and change (Madina & Santoso Budi, 2019; Moberg & Simonsen, 2014). Farmers in Malang City's peri-urban area face significant challenges due to rapid urbanization, pressure to change land use, and social and economic

changes. These peri-urban areas, a transition between rural and urban areas, bring their complexities as changes often occur rapidly and affect various aspects of life experienced by farmers (Cote & Nightingale, 2012). Understanding the resilience patterns of farmers in these regions is important to maintain agrarian functions and as a model of sustainability that can be applied in other regions with similar challenges (Forster *et al*., 2014).

The resilience pattern as a system refers to the dynamic relationship between various strategies carried out by farmers to survive and adapt amid challenges. In the peri-urban area of Malang City, this pattern consists of five primary forms, namely belief in the land as a sacred inheritance, family solidarity, debt strategy, job diversification, and philosophy *Nrimo Ing Pandum*. These five forms do not stand alone but are interconnected to form a dynamic system. This pattern describes farmers collectively utilizing social, human, and financial capital to create resilient livelihood strategies. With this approach, resilience patterns help farmers survive in the face of pressure and make it possible to adapt and create changes that support sustainability (Bertolozzi-Caredio *et al*., 2021; Meuwissen *et al*., 2019).

Strengthening factors in this resilience pattern include cultural values, agricultural land protection policies, and high social capital. However, the main obstacles are urbanization pressures, economic inequality between villages and cities, and rising living costs due to migration to peri-urban areas (Bertolozzi-Caredio *et al*., 2021; Forster *et al*., 2014). The pattern of farmer resilience in the peri-urban area of Malang City provides important insights into how agrarian communities can survive and thrive amid global and local pressures. This pattern is relevant in local contexts and can be a broader adaptation model. By strengthening these forms of resilience through local value-based policies, the sustainability of the agrarian system can be maintained in the future (Meuwissen *et al*., 2019; Moberg & Simonsen, 2014).

In the other side, the analysis of agricultural land valuation in peri-urban areas shows a variation in farmers' income, which is influenced by the land area, the type of commodity planted, and the production costs incurred. Data obtained from field research shows that farmers who plant spinach in an area of 700 m² with a rental system incur production costs of IDR 1,454,000 and earn an income of IDR 3,000,000, resulting in a net profit of IDR 1,546,000 per growing season (Researcher, 2024). Meanwhile, farmers with a larger land area, for example, 1,000 m², can earn higher profits with more efficient cost management strategies. In some cases, farmers using organic fertilizers and sustainable farming systems can reduce production costs, increasing their profit margins.

However, not all commodities have favourable economic valuations. Data shows that some farmers who plant basil in an area of 300 m² have suffered losses due to low selling prices. With a production cost of IDR 560,000, farmers can only earn an income of IDR 300,000, resulting in a loss of IDR 260,000 per planting season (Author, 2023). This shows that although the agricultural sector in peri-urban areas is still the main source of livelihood, price fluctuations and high operating costs can be serious obstacles to the economic sustainability of farmers.

On the other hand, diversification is the main strategy farmers use to overcome income uncertainty. Some farmers depend on agricultural products and work as farm labourers or in the construction sector to supplement their income. This strategy aligns with the theory of resilience, which emphasizes adaptive and transformational capacity in the face of socio-economic change. Thus, although the agricultural sector in peri-urban areas continues to experience pressure due to land conversion and market changes, flexible economic strategies allow farmers to survive and maintain the sustainability of their livelihoods.

Implications of Resilience Patterns on Agricultural System Sustainability

The resilience pattern applied by farmers in the peri-urban area of Malang City has a significant impact on the sustainability of the agrarian system. This implication can be seen from the social, economic, and environmental aspects, which support each other in maintaining the stability of the agrarian system amid urbanization challenges. These findings are also relevant to the literature on Sustainable Livelihood Framework (SLF) by (Meuwissen *et al*., 2019), emphasizing the importance of social, human, and financial capital management in creating resilient livelihoods. Therefore, the government needs to adopt a participation-based policy involving farmers in spatial planning and land protection. This policy should consider local values to create a more responsive approach to the needs of farmers and agrarian sustainability in peri-urban areas (Cote & Nightingale, 2012).

This research makes a significant contribution both theoretically and practically in understanding the resilience patterns of farmers in the peri-urban area of Malang City. Theoretically, this study expands the application of resilience (coping, adaptive, and transformative capacities) in the context of agrarian sustainability in peri-urban areas. The five forms of resilience identified are interconnected, forming a dynamic pattern. This pattern is not hierarchical but relatively linear and flexible, providing a new perspective on resilience and being able to operate in complex and changing environments. The findings also highlight that the dimensions of local values, such as *Nrimo Ing Pandum*, have an important role in shaping transformative capacities often overlooked in conventional resilience studies. This philosophy provides emotional stability and becomes the foundation for creating harmony between humans, the environment, and agrarian practices. This research encourages the expansion of the definition of

resilience to include contextual, cultural, and local dimensions.

Practically, this study offers concrete strategies to support the sustainability of agrarian systems in peri-urban areas. This strategy is formulated based on the analysis of resilience patterns applied by farmers in the face of urbanization pressures and land conversion. Some practical recommendations included (1) strengthening land protection policies; the government needs to improve the implementation of policies such as Law No. 41 of 2009 concerning the Protection of Sustainable Food Agricultural Land through a more participatory approach. (2) empowerment of farmer communities, training programs focusing on job diversification can increase farmers' adaptive capacity and reduce economic dependence on a single agricultural sector. (3) education of local values, integrating philosophies such as *Nrimo Ing Pandum* in formal and informal education programs can strengthen collective awareness of agrarian sustainability. (4) increasing social capital, support for family solidarity through financial incentives or community cooperation programs can strengthen farmers' social networks, which is one of the main capitals in maintaining sustainability; and (5) community-based resource management, this approach can be applied to encourage farmers to collectively manage their land sustainably, taking into account local needs and environmental potential. Another practical contribution is to create opportunities for local governments to adopt local value-based policies that are more adaptive to the needs of farmers. It includes the development of stricter regulations on land conversion in peri-urban areas and the provision of tax incentives or subsidies for farmers who retain their land. By integrating a participation-based approach and local values, this agrarian sustainability strategy benefits farmers directly and supports the peri-urban area's social and ecological stability.

CONCLUSION

This study examined the resilience pattern of farmers in the peri-urban area of Malang City in facing the challenges of urbanization and land conversion. Based on the study's findings, farmer resilience strategies can be categorized into coping, adaptive, and transformative capacities, each showing survival mechanisms, adjustments, and structural changes in the agricultural sector. The five main strategies found were belief in the land as an inheritance, family solidarity, productive debt, job diversification, and the application of philosophy *Nrimo Ing Pandum*. It shows that farmers are not only able to survive in difficult conditions but also develop adaptation patterns that allow them to continue carrying out agricultural activities amid economic and social pressures.

In particular, this study has succeeded in answering the main objective, which is to analyze the resilience patterns of farmers in the face of land use change. The findings show that the sustainability of the agricultural sector in peri-urban areas depends not only on economic factors but also on cultural values, social networks, and flexibility in livelihood strategies. Thus, the results of this study reinforce the concept that farmer resilience is a multidimensional phenomenon which involves social, economic, and cultural aspects in creating a mechanism to withstand external pressure.

Based on the study's findings, several policy recommendations can be applied to increase farmers' resilience in peri-urban areas. First, local governments must implement sustainable agricultural land protection policies by establishing permanent agricultural land zoning, incentives for farmers who defend their land, and strict supervision of land conversion. This policy can be strengthened with a community-based approach, where farmers and the government work together to develop more sustainable land protection strategies.

Second, the diversification of farmers' work must be facilitated without sacrificing the agricultural sector. The government can provide skills training programs for farmers in fields still related to agriculture, such as post-harvest agricultural product management, agribusiness, or agriculture-based ecotourism. In addition, access to capital and agricultural technology assistance is also needed so that farmers can still increase their land productivity without having to leave the agricultural sector completely.

Although this study has provided comprehensive insights into farmers' resilience patterns, some limitations need to be considered. First, this study uses self-reported interview data, so there is a possibility of bias in the answers given by the informants. Future studies may use longitudinal observations to measure how farmers' resilience patterns develop over a longer period.

Second, the study focuses on farmers' social and economic dimensions, while environmental factors, such as climate change and land degradation, have not been studied in depth. Further studies can explore how ecological resilience plays a role in maintaining agricultural productivity in peri-urban areas. In addition, further research can also examine the impact of land protection policies on agricultural sustainability to understand the extent to which regulations can increase or even hinder farmers' resilience.

This study emphasizes that farmers' resilience is not only determined by economic factors alone but also by social support, job flexibility, and cultural values passed down from generation to generation. Therefore, efforts to maintain the sustainability of the agricultural sector in peri-urban areas cannot be carried out partially; rather, they require a holistic and community-based approach so that the resilience

strategies that farmers have implemented can continue to evolve and adapt to future changes.

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