



The Dynamics of Structural Change in Land Conversion and the Transformation of Farmers' Occupations Following Road Development in Karang Anyer Village, Gunung Maligas District, Simalungun Regency

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ARTICLE INFO

Keywords: Road Development, Land Conversion, Farmers' Occupational Transformation, Rural Structural Change, Development Sociology

Received : 20, May

Revised : 22, June

Accepted: 25, July

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ABSTRACT

This study examines the dynamics of structural change in land conversion and farmers' occupational transformation following road development in Karang Anyer Village, Gunung Maligas District, Simalungun Regency. Using a descriptive qualitative approach within development sociology, data were collected through observation, in-depth interviews, and documentation involving farmers who converted land, farmers who remained in agriculture, new business actors, family members, residents, and farm laborers. The findings show that road development improved accessibility and market connectivity, but also accelerated the conversion of paddy fields into housing, coffee stalls, grocery shops, chicken farms, charcoal factories, oil palm plots, and commercial settlements. Paddy fields declined from 220 hectares in 2022 to 205 hectares in 2025, while several farmers shifted to trade, livestock, and small enterprises. Road development therefore created dual effects: expanding rural economic opportunities while weakening the agrarian base and reshaping farmers' livelihoods. These changes reveal infrastructure-driven rural restructuring at the village level.

INTRODUCTION

Road development in rural areas cannot merely be understood as a physical project aimed at improving connectivity, but also as a trigger for socio-economic change that affects spatial structures, land values, and the livelihood orientation of rural communities (Do, 2026; Humaizi et al., 2024). In the context of Karang Anyer Village, Gunung Maligas District, Simalungun Regency, the road development completed in 2023 transformed the village, which had previously been dominated by paddy fields and limited access to economic centers, into a more open space for mobility, markets, and non-agricultural economic activities. Before the road was built, residents had to travel longer routes to reach the city; after the road construction, access became easier, vehicle traffic increased, and land along the road began to be converted into various non-agricultural functions (Dalimunthe et al., 2023; Guan et al., 2025). This change is reflected in the decline of paddy fields from 220 hectares in 2022 to 205 hectares in 2025, while residential areas increased from 85 hectares to 95 hectares, and other land-use categories increased from 5 hectares to 10 hectares. This condition indicates that road development has created a shift from agrarian production space to a new economic space that is more oriented toward non-agricultural activities (Dalimunthe et al., 2024; Zhang et al., 2025). This phenomenon is in line with the findings of Saragih et al. (2025), who explain that the quality and accessibility of village roads can drive rural economic transformation by improving village connectivity with centers of economic activity.

Empirical facts in Karang Anyer Village show that road development does not stop at improving accessibility, but is also related to processes of land conversion and occupational shifts from farming to non-agricultural sectors. Recent literature indicates that agricultural land conversion is a complex socio-economic process because it not only changes spatial functions but also affects household income, food security, labor structures, and the social sustainability of agrarian communities (Ohorella et al., 2024; Suganda & Setyono, 2026). Studies on land-use transitions in Indonesia also show that spatial changes caused by development often generate tensions among development needs, economic interests, ecological sustainability, and community rights to livelihood resources (Syaban & Appiah-Opoku, 2024). In terms of regulation and institutions, agricultural land conversion in Indonesia is still influenced by weak spatial planning supervision, the need for residential and industrial expansion, and the increasing economic value of land, which turns agricultural land into a speculative commodity (Kurnia et al., 2022; Saraan et al., 2024). However, these studies have not fully explained how district-level road development at the rural micro level can rapidly alter the relationship between land, occupation, and the socio-economic structure of farmers. Therefore, this study seeks to fill a gap in the literature regarding the relationship among village road development, paddy field conversion, and the transformation of farmers' occupations within a single analytical framework of development sociology.

This study aims to examine the process of paddy field conversion following road development in Karang Anyer Village, Gunung Maligas District, Simalungun Regency. This objective is important because land conversion in this

village is not only marked by the physical transformation of paddy fields into housing, coffee stalls, grocery shops, chicken farming businesses, charcoal factories, workshops, and other new economic activities, but also reflects changes in how the community interprets land as both a source of production and an economic asset. This study also aims to examine the dynamics of farmers' occupational transformation after road development, particularly because village data show that the number of farmers decreased from 476 in 2022 to 447 in 2025, while the number of traders increased from 148 to 168 and entrepreneurs increased from 101 to 110. In addition, this study aims to analyze changes in the socio-economic structure of the community as a result of road development, especially in relation to increasing business opportunities, shifting income orientations, and the declining dependence of some residents on the agricultural sector. With these objectives, this study does not only explain the physical impact of road development but also interprets development as a process of social transformation that changes the relationship among infrastructure, land, employment, and the livelihood strategies of rural communities.

The importance of this study lies in the argument that village road development can generate dual impacts: opening economic access while simultaneously accelerating changes in the agrarian structure of society. Kaiser & Barstow (2022), study shows that rural road infrastructure can influence agricultural production decisions, investment patterns, and farmers' connectivity with markets, meaning that roads cannot be understood merely as transportation facilities. Systematic studies on the impact of toll roads on agricultural land conversion also show that transportation infrastructure is often associated with changes in land value, development pressure, and the reduction of productive agricultural space, although most studies still focus on large-scale infrastructure such as toll roads. In the case of Karang Anyer Village, district road development demonstrates that micro-scale infrastructure can produce rapid changes, especially because paddy fields located along new mobility routes become more strategic for non-agricultural economic activities. If these changes are not examined seriously, road development may only be interpreted as a success in connectivity without considering its social consequences, such as the reduction of paddy fields, the weakening of farmer regeneration, and the shifting occupational orientation of rural communities. Therefore, this study is important for expanding the understanding of development sociology regarding how local infrastructure reshapes economic structures, social relations, and the agrarian future of rural communities.

LITERATURE REVIEW

Road development in development sociology can be understood as the provision of transportation infrastructure that connects production spaces, consumption spaces, and social service spaces in rural community life. Roads do not only function as a means of physical movement, but also as a structural prerequisite that expands rural communities' access to markets, education, health services, employment opportunities, and broader economic networks (Kyeyune & Ntayi, 2025). Rural road infrastructure is also associated with

increased accessibility, as road surface quality and vehicle passability are important indicators for measuring the connectivity of villages with economic centers (Kaiser & Barstow, 2022). In an agrarian context, roads serve as a medium that enables farmers to transport production inputs, sell agricultural products, reduce transportation costs, and improve the efficiency of agricultural activities (Ugwu et al., 2025). Therefore, the concept of road development cannot be limited to a technical project, as its impacts extend into the social, economic, institutional, and spatial dimensions of rural areas (Adugbila et al., 2023). Thus, road development is a multidimensional concept that links the physical dimension of infrastructure with the socio-economic transformation of rural communities.

The manifestations of road development can be observed through several forms of change that emerge after an area experiences improved connectivity. The first manifestation is increased community mobility, as better roads shorten travel time, facilitate the flow of goods, and expand village access to urban economic centers (Purba et al., 2025). The second manifestation is increased market integration, because roads enable farmers and rural business actors to sell products, obtain production inputs, and access buyers with lower transaction costs (Ma et al., 2024). The third manifestation is the emergence of diversified economic activities, as roads encourage the creation of new business opportunities such as small trade, services, transportation, food stalls, workshops, and other economic activities that follow the flow of community mobility. The fourth manifestation is the transformation of village spatial arrangements, as areas that previously functioned as agrarian spaces may shift into residential, commercial, or mixed-use spaces after their strategic land value increases (Putra et al., 2025). Thus, road development is not only manifested in the form of more adequate roads, but also in changes in mobility patterns, economic opportunities, and the utilization of rural space.

Land conversion refers to the change in land function from one form of use to another, with social, economic, ecological, and institutional consequences. In an agricultural context, land conversion usually refers to the transformation of productive land, such as paddy fields, plantations, or food-crop land, into non-agricultural functions such as housing, industry, trade, roads, or public facilities (Prokopowicz, 2020). Land conversion occurs because land is positioned not only as a factor of agricultural production, but also as an economic asset whose value can increase when an area experiences infrastructure development and market pressure (Suhendar et al., 2024). Recent studies show that agricultural land conversion is closely related to changes in economic structure, urbanization, the expansion of built-up areas, and the increasing demand for non-agrarian space (Acharyya et al., 2025). From the perspective of development sociology, land conversion reflects a shift in the relationship between communities and land, from land as the basis of agrarian livelihood to land as an economic commodity that can be exchanged or functionally transformed. Thus, land conversion is a process of spatial functional change that simultaneously represents changes in values, economic orientation, and the social structure of society.

The categorization of land conversion can be viewed based on the form of change, the actors involved, the driving factors, and the consequences produced.

Based on the form of change, land conversion may involve the transformation of paddy fields into residential areas, industrial zones, commercial areas, road networks, public facilities, or informal business spaces that develop in response to local economic opportunities. Based on the actors involved, land conversion may be carried out by landowners themselves, farming households, investors, developers, local business actors, or government institutions requiring space for development (Ustaoglu & Williams, 2022). Based on its driving factors, land conversion is often influenced by household economic pressure, rising land prices, low agricultural profitability, population growth, infrastructure expansion, and the weak effectiveness of agricultural land protection policies (Li et al., 2024). Based on its consequences, land conversion can reduce food production, alter livelihood structures, increase the economic value of land, and create unequal access to agrarian resources (Chen et al., 2023). Therefore, the manifestation of land conversion needs to be understood not merely as a physical change in land use, but also as a socio-economic process that affects the sustainability of agrarian communities.

The occupational shift of farmers refers to the process of changing livelihoods from primary work in the agricultural sector to other occupations outside the agricultural sector. This concept is related to rural livelihood transformation, namely changes in household strategies for combining resources, assets, skills, and economic opportunities to maintain or improve welfare (Cui et al., 2025). In agrarian rural contexts, the occupational shift of farmers often occurs when agriculture is no longer considered sufficiently profitable, when productive land decreases, or when non-agricultural sectors offer faster and more stable income. Studies on livelihood transitions show that changes in farmers' occupations are influenced by household assets, economic risks, land limitations, access to non-agricultural employment, education, and shifting aspirations among younger generations (Zhang & Zhao, 2025). Occupational shifts can also be understood as a form of adaptation to changes in the rural economic structure, particularly when infrastructure, markets, and the service sector begin to develop more strongly than traditional agriculture. Thus, the occupational shift of farmers is a social phenomenon that indicates changes in work orientation, livelihood strategies, and rural communities' relationship with the agricultural sector.

The manifestations of farmers' occupational shifts can be categorized into several different forms of livelihood change. The first form is occupational diversification, in which farmers continue to maintain some agricultural activities while beginning to add sources of income from trade, services, wage labor, transportation, or household-based enterprises (Liu et al., 2024). The second form is a full transition to the non-agricultural sector, in which farmers leave farming activities and make other occupations the main source of household income. The third form is multiple employment or semi-farming, in which household members divide labor between agriculture and non-agricultural work to reduce family economic risks. The fourth form is asset-based transformation, in which land is no longer managed as a space for agricultural production, but is instead used as capital for business, rental purposes, buildings,

or new economic activities. In the context of rural change, these various manifestations show that the occupational shift of farmers is not merely an individual job transition, but a collective process of adaptation to changes in land, markets, infrastructure, and local economic opportunities.

METHODOLOGY

The object of this study is the dynamics of structural change that occurred after road development in Karang Anyer Village, Gunung Maligas District, Simalungun Regency. The observed phenomena include changes in the function of paddy fields, the increasing strategic value of land surrounding the road, and the occupational shift of some farmers from the agricultural sector to the non-agricultural sector. This focus was selected because road development does not only bring physical change in the form of improved transportation access, but also creates a new socio-economic space that influences how communities utilize land and determine their occupations. In qualitative research, the object of study may be directed toward complex social phenomena, particularly when researchers seek to understand experiences, meanings, and the context of community social actions in depth (Creswell, 2021). Therefore, the phenomena of land conversion and farmers' occupational shifts in this study are positioned as social symptoms arising from the intersection of infrastructure development, changing accessibility, economic opportunities, and the adaptive strategies of farming households. This study does not separate road development from the social changes that follow it, because the road is understood as an entry point for examining changes in rural communities' relationships with land, work, and markets. Thus, the object of this study is directed toward explaining how road development shapes the process of land conversion and the transformation of farmers' occupations in the life of rural agrarian communities.

This study employs a descriptive qualitative research design with a Development Sociology approach. The descriptive qualitative design is used because this study is not intended to statistically test relationships between variables, but rather to understand the processes, experiences, reasons, and social meanings that emerge from changes in land and community occupations after road development. A qualitative approach is relevant when researchers need an in-depth understanding of social phenomena that cannot be adequately explained through numbers, but must instead be interpreted through narratives, experiences, and the life contexts of research subjects. Development Sociology is used as an analytical approach because this study positions road development as a social process that affects economic structures, occupational structures, and community relations with agrarian space. The types of data used consist of primary and secondary data. Primary data were obtained through field observation, in-depth interviews, and documentation directly related to informants' experiences in dealing with post-road-development changes. Secondary data were obtained from village documents, land area data, population occupation data, policy documentation, and academic literature relevant to road development, land conversion, and the transformation of farmers' occupations. Through this division, the study combines the empirical

experiences of the community with supporting documents so that the analytical process can be conducted more contextually.

The sources of information in this study were determined through purposive sampling, namely the selection of informants based on certain considerations according to their relevance to the research focus. Purposive sampling is widely used in qualitative research because researchers require subjects who truly understand the experiences, events, and social contexts being studied (Ahmad & Wilkins, 2025). This study divides information sources into three categories: key informants, main informants, and supporting informants. The key informants consist of the Head of Karang Anyer Village and the Agricultural Extension Officer of Karang Anyer Village because both possess institutional knowledge, regional data, and general information regarding changes in land and community activities in the village. The main informants are farmers who converted their paddy fields and experienced occupational shifts to the non-agricultural sector, because this group represents the direct actors who experienced changes in land function and livelihood transformation. Supporting informants consist of new business actors, farmers who continue farming, farm laborers, family members of farmers, and surrounding community members because these groups provide additional information regarding the social, economic, and environmental impacts of road development. This composition of informants enables the study to obtain a layered understanding, ranging from institutional perspectives and the experiences of key actors to the views of communities indirectly affected by the changes.

The research process was carried out through several complementary stages of data collection, namely observation, in-depth interviews, and documentation. Observation was conducted along the road development area to examine changes in spatial arrangements, forms of land conversion, new economic activities, the condition of paddy fields whose functions had changed, and patterns of community mobility after the road was built. Observation is important in qualitative research because it allows researchers to understand the social context directly, rather than relying solely on informants' statements. In-depth interviews were conducted with key informants, main informants, and supporting informants to explore the experiences, reasons, perceptions, and impacts felt by the community regarding road development, paddy field conversion, and farmers' occupational shifts. The in-depth interview technique is relevant in qualitative studies because it can reveal understandings of subjective experiences and decision-making processes that are not always visible through documentary data (Pu et al., 2025). Documentation was carried out by collecting village data, photographs of field conditions, interview recordings, observation notes, and documents showing changes in land area and residents' occupations. These three techniques were then examined through source triangulation, technique triangulation, and time triangulation so that the data obtained would not depend on only one type of information. Through these stages, the research process was directed toward producing in-depth and accountable empirical data.

The data analysis technique in this study was carried out in stages through data reduction, data display, conclusion drawing, and verification. Data reduction was conducted by selecting relevant information from observations, interviews, documentation, and field notes, particularly information related to the process of land conversion, the driving factors of occupational shifts, and the impact of road development on the socio-economic structure of the community. Data display was carried out in the form of descriptive narratives, supporting tables, informant categorization, and thematic grouping so that the relationship among road development, land-use change, and occupational transformation could be seen systematically. Qualitative analysis requires a structured process of data organization because field data generally take the form of long narratives, subjective experiences, and fragments of information that must be interpreted through certain patterns (Lim, 2025). Conclusion drawing was conducted after major patterns had been identified, such as changes in the function of paddy fields, increasing non-agricultural business opportunities, the declining dependence of some residents on the agricultural sector, and the persistence of some farmers due to factors such as age, inheritance, or attachment to land. Verification was carried out by comparing interview results, observations, and documents so that the conclusions would not be one-sided. Through this analytical technique, this study seeks to ensure that the findings regarding structural change in the community of Karang Anyer Village truly originate from consistent empirical data.

RESEARCH RESULT AND DISCUSSION

Socio-Spatial Context of Karang Anyer Village

The findings show that Karang Anyer Village is a rural area whose socio-economic structure is strongly shaped by its geographical position, agricultural land, and road connectivity. The village has a total area of 380 hectares, with 205 hectares still recorded as rice fields, 95 hectares as residential land, 25 hectares as dry fields, 45 hectares as yard land, and 10 hectares as other land uses. These figures indicate that agricultural land remains the largest spatial component of the village, although non-agricultural land uses have begun to expand after road construction. The village is located only 3 km from the subdistrict capital, 45 km from the regency capital, and 128.1 km from the provincial capital, making it relatively open to mobility and market interaction. Improved rural road access is important because road quality and vehicle accessibility can increase the probability of rural economic transformation (Kamaludin & Qibthiyyah, 2022). The strategic location of Karang Anyer also makes land around the road more attractive for housing, trade, and service activities, as transport infrastructure often affects spatial patterns and land-use change (Hutauruk et al., 2025). Thus, the geographical condition of the village explains why road construction became a key trigger for socio-spatial change.

Table 1. Area of Karang Anyer Village as of August 2025

No.	Object	Area
1	Total area of Karang Anyer Village	380 hectares
2	Rice fields	205 hectares
3	Residential land	95 hectares
4	Dry fields	25 hectares
5	Yard land	45 hectares
6	Other land	10 hectares

Table 2. Geographical Distance of Karang Anyer Village

Destination	Distance
Subdistrict capital	3 km
Regency capital	45 km
Provincial capital	128.1 km
National capital	1,832.0 km

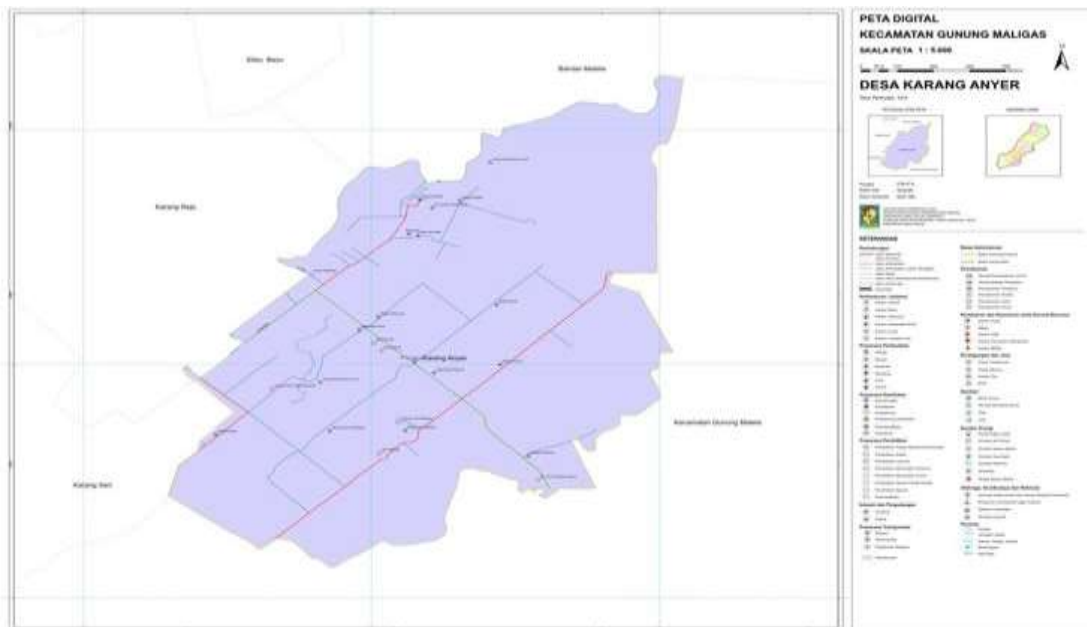


Figure 1. Location Map and Symbol of Karang Anyer Village

Demographic and Economic Structure of the Research Site

The demographic and occupational data show that Karang Anyer Village remains an agrarian community, but its employment structure has begun to move toward non-agricultural activities. The village has 5,842 residents, consisting of 2,947 males, 2,896 females, 1,722 households, and 101 poor households. The occupational structure shows that farmers remain the largest group, with 447 people or 43.61% of the working population, followed by traders with 168 people or 16.39%, entrepreneurs with 110 people or 10.73%, and laborers with 98 people or 9.56%. These data indicate that agriculture still functions as the main economic base, but trade and entrepreneurship have become visible alternatives after road construction. This pattern is consistent with studies showing that rural infrastructure can improve mobility, reduce access

constraints, and stimulate rural economic diversification (Kaiser & Barstow, 2022). At the same time, the decline of 29 farmers who shifted to non-agricultural work indicates that road construction did not merely improve transportation, but also encouraged occupational restructuring. Therefore, the village's economic profile reflects a transitional condition between agrarian dependence and emerging non-agricultural livelihood strategies.

Table 3. Population Data of Karang Anyer Village in 2025

Indicator	Number
Total population	5,842 people
Male population	2,947 people
Female population	2,896 people
Total households	1,722 households
Poor households	101 households

Table 4. Occupational Structure of Karang Anyer Village in 2025

No.	Occupation	Number	Percentage
1	Civil servant/TNI/POLRI	33	3.22%
2	Lecturer/teacher/honorary teacher	36	3.51%
3	Doctor/midwife/nurse	5	0.49%
4	Private employee	39	3.80%
5	Trader	168	16.39%
6	Farmer	447	43.61%
7	Construction worker	63	6.15%
8	Driver	26	2.54%
9	Laborer	98	9.56%
10	Entrepreneur	110	10.73%
Total		1,025	100%

Informant Profile and Empirical Basis of the Findings

The empirical findings were constructed from several groups of informants who represented different positions in the process of land conversion and occupational transformation. The main informants were farmers who converted their rice fields and shifted occupations, including KM, WS, LM, SY, and DN, whose land was converted into coffee shops, houses, chicken farms, grocery stalls, snack stalls, and oil palm plots. Supporting informants included farmers who continued farming, new business actors, family members of converting farmers, local residents, and agricultural laborers. This composition is important because land conversion is not experienced only by landowners, but also by family members, surrounding residents, entrepreneurs, and workers whose livelihoods are connected to agricultural land. Qualitative research on livelihood change needs to capture multiple actor perspectives because rural transformation involves household assets, labor allocation, economic opportunities, and social relations (Manlosa, 2022; Ritonga et al., 2024). The informants show that road construction created different responses among villagers: some used land as business capital, some maintained farming because

of age or attachment to land, and others entered the village as investors. Thus, the informant profile confirms that post-road development change in Karang Anyer is a multi-actor rural transformation process.

Initial Agrarian Condition Before Road Construction

Before road construction, the area along the present road corridor was dominated by productive rice fields, while road access was damaged, rocky, muddy during rain, and difficult for vehicles. Informants explained that before the road was built, agricultural activities were central to household income, and rice fields functioned as the “heart” of family livelihood. Some harvests were sold to middlemen, while some were stored for household food needs, showing that rice fields had both economic and subsistence functions. Limited access made the area less attractive for commercial use, and land prices remained relatively low at around Rp25–30 million per rante. Studies on rural infrastructure show that poor roads increase mobility barriers, limit access to agricultural inputs and markets, and reduce the efficiency of rural economic activities (Kaiser & Barstow, 2022). In Karang Anyer, this condition made villagers remain dependent on rice farming because non-agricultural opportunities were still limited. Therefore, the pre-road condition can be interpreted as an agrarian structure in which land, family labor, harvest use, and limited mobility formed the main basis of rural survival.

Process and Forms of Rice Field Conversion

The conversion of rice fields in Karang Anyer occurred gradually rather than instantly, beginning with a shift from rice fields to oil palm plots before expanding into more diverse non-agricultural uses after road construction. Informants stated that some rice fields were first converted into oil palm because oil palm was considered more profitable than rice, while after the road was built the conversion expanded into houses, coffee shops, grocery stalls, snack stalls, chicken farms, charcoal factories, and commercial housing. This pattern shows that road construction changed not only the physical accessibility of land, but also the economic imagination of landowners. Transport infrastructure has been shown to influence land-use change because improved connectivity increases the attractiveness of land for built-up and commercial functions (Sukri & Harini, 2023). A systematic literature review on road infrastructure and agricultural land conversion also found that transport development can encourage agricultural land to be converted into settlements and other non-agricultural purposes (Makbul et al., 2024). In this study, the road acted as an accelerator that transformed rice fields from production spaces into strategic assets for business and investment.

Driving Factors of Land Conversion

The findings identify five main factors that encouraged farmers to convert rice fields: the desire to increase household income, the strategic location of land after road construction, rising land prices, the perception that farming was less profitable, and the reluctance of young people to continue farming. Informants explained that livestock, trading, coffee shops, and small businesses were

considered more profitable and less physically exhausting than rice farming. Land prices also increased sharply after the road was built, reaching around Rp100 million per rante, making land more attractive as an economic asset than as a rice production base. Recent studies show that economic pressure, infrastructure factors, and spatial attractiveness are important drivers of agricultural land conversion (Ustaoglu & Williams, 2022). Land conversion in rural areas near growth centers is also often driven by the attractiveness of land for residential and commercial development. In Karang Anyer, the decision to convert land was therefore not merely individual preference, but a rational response to changing market access, land value, and household livelihood expectations.

Impacts of Rice Field Conversion

Rice field conversion in Karang Anyer produced several direct impacts: farmers shifted occupations, household income sources changed, agricultural production declined, the surrounding environment changed, and the future of village agriculture became uncertain. Informants stated that after rice fields were converted into chicken farms, coffee shops, stalls, and housing, their social identity also changed from farmers to entrepreneurs or traders. The conversion also reduced agricultural activity because productive rice fields were transformed into non-agricultural spaces. This finding is consistent with studies showing that agricultural land conversion threatens food security, farmer livelihoods, and environmental sustainability (Dalimunthe et al., 2020; Ustaoglu & Williams, 2022). Similar research also notes that the transformation of agricultural land into residential and commercial areas can reduce agricultural productivity and affect farmers who depend on land for income. However, the impact was not entirely negative for converting households, because several informants reported more stable income after entering non-agricultural businesses. Thus, land conversion created a dual effect: it improved income opportunities for some households, but weakened the agrarian base of the village.

Dynamics of Farmer Occupational Transformation

The occupational transformation of farmers occurred through a process in which agricultural work was gradually replaced by trade, livestock business, food stalls, coffee shops, property-related activities, and other non-farm occupations. Before road construction, farming was inherited across generations and functioned as the main occupation for many households. After road construction, some farmers perceived that the new road would increase traffic flow, customer access, and business opportunities, making non-agricultural work more attractive. Livelihood transition studies show that movement from farming to non-farming activities is shaped by age, education, household labor, land loss, and changing economic opportunities (Yang et al., 2022). In Karang Anyer, the shift was also driven by the heavy physical burden of farming, high production costs, unstable agricultural returns, and the desire to improve family welfare. This transformation affected not only income, but also social status, because former farmers began to be recognized as business owners, livestock

entrepreneurs, or traders. Therefore, the road created a new livelihood structure in which landowners could transform agricultural assets into commercial livelihood capital.

Farmers Who Remain in Agriculture

Not all farmers responded to road construction by converting their rice fields or leaving agriculture. Several informants continued farming because of dependence on agriculture, older age, inherited land, farming skills, personal pride, and emotional attachment to family land. These farmers viewed agriculture not only as an income source, but also as a life practice, identity, and family legacy. Some continued to farm because they lacked sufficient skills or capital to move into non-agricultural businesses, while others deliberately maintained farming because they believed agricultural land should not disappear from the village. This finding shows that rural transformation is not uniform, because households respond differently depending on assets, age, labor capacity, experience, and cultural attachment to land. Studies on livelihood adaptation explain that rural households choose different livelihood strategies depending on household characteristics, available assets, and the extent of land change they experience (Yang et al., 2022). In Karang Anyer, farmers who remain in agriculture represent the persistence of agrarian identity amid expanding market-oriented land use. Their position is important because it shows that structural change does not fully erase agricultural life, but creates tension between continuity and transformation.

Broader Impact of Road Development and Theoretical Synthesis

The broader impact of road development in Karang Anyer can be understood as a structural change in which infrastructure transformed land value, land use, livelihood choices, and social relations. The road improved mobility and opened economic opportunities, but it also accelerated land conversion and weakened the dominance of rice farming. From the perspective of structural transformation, this finding shows a gradual movement from an agrarian economy toward more diversified non-agricultural activities. From the perspective of market expansion, road construction integrated village land into wider market logic, making rice fields increasingly valued as strategic assets for housing, trade, and investment. From the perspective of capital, land functioned not only as agricultural production space, but also as economic capital that could be converted into business, housing, and social status. Recent land-use transition studies emphasize that rapid development can produce economic diversification while also creating socio-economic and environmental pressures (Long, 2022). Therefore, the main contribution of this study is to show that village-scale road development can trigger rapid rural restructuring, where improved access simultaneously creates opportunity, land commodification, occupational transition, and uncertainty for the future of agriculture.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that road development in Karang Anyer Village has become a major trigger for structural change in the rural community. The

construction of the district road improved accessibility, shortened mobility routes, and opened wider economic connections between the village and surrounding economic centers. However, these improvements also encouraged a rapid shift in the use of agricultural land, particularly rice fields located along the road corridor. The decline of paddy fields from 220 hectares in 2022 to 205 hectares in 2025 shows that road development did not only produce physical connectivity, but also changed the economic value and social meaning of land. Rice fields that previously functioned as productive agricultural spaces and sources of household livelihood began to be transformed into houses, coffee stalls, grocery shops, chicken farms, charcoal factories, oil palm plots, and commercial housing areas. Therefore, the development of road infrastructure in Karang Anyer Village has created a dual effect: it has expanded economic opportunities while simultaneously weakening the agrarian base of the village.

The study also concludes that the conversion of paddy fields is closely related to the occupational transformation of farmers. Some farmers chose to leave rice farming because farming was considered physically demanding, less profitable, costly, and increasingly unattractive to the younger generation. The improved road access encouraged farmers and landowners to view their land as a strategic economic asset that could generate higher income through non-agricultural activities. This process changed the livelihood structure of several households, as former farmers became traders, livestock entrepreneurs, coffee shop owners, snack sellers, or small business actors. Nevertheless, the transformation was not uniform, because some farmers continued to maintain agricultural activities due to age, farming skills, inherited land, emotional attachment to agriculture, and limited capacity to enter non-agricultural sectors. These findings show that road development has produced a transitional rural structure in which agrarian persistence and non-agricultural diversification occur simultaneously.

ADVANCED RESEARCH

Based on these findings, this study recommends that village and regional governments formulate more balanced rural development policies that integrate infrastructure development with agricultural land protection. Road development should be accompanied by spatial planning, land-use control, and community-based regulations to prevent uncontrolled conversion of productive rice fields. The government also needs to support farmers who continue to work in agriculture through irrigation improvement, agricultural assistance, access to markets, production subsidies, and regeneration programs for young farmers. At the same time, residents who shift to non-agricultural occupations need to be supported through entrepreneurship training, business legality assistance, and access to microfinance so that economic diversification can improve welfare without eliminating the agricultural identity of the village. Future studies are recommended to examine the long-term impact of road development on food security, land ownership patterns, intergenerational livelihood change, and rural social inequality in Karang Anyer and other villages experiencing similar infrastructure-driven transformations.

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