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# **BARRIERS TO AGRICULTURAL PROSPERITY: A CASE STUDY OF** UNDERDEVELOPED ACCESS ROADS IN BARANGAY CARMEN, **BAGUIO DISTRICT**

Gebilaguin, Fevy Joy A.<sup>1</sup>, Pantujan, Mercedita T.<sup>2</sup>, Saniel, Jennylyn R.<sup>3</sup>

<sup>1,2,3</sup>Master of Science in Development Administration (MSDA), Graduate School of College of Development Management (CDM), University of Southeastern Philippines

https://orcid.org/0009-0002-0723-905X, ,https://orcid.org/0009-0002-1375-1308

https://orcid.org/0009-0009-9624-2664

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# ABSTRACT

Underdeveloped access roads in rural areas pose significant barriers to agricultural prosperity, adversely affecting productivity, transportation efficiency, and farmers' access to markets and essential services. This qualitative study looks into the impact of insufficient road infrastructure on agricultural activities in Barangay Carmen, Baguio District. The study identifies key challenges using Focus Group Discussions (FGD) and One-on-One Interviews with local farmers and agricultural stakeholders, including increased transportation costs, spoilage of perishable goods, and limited market access (Ali & Khan, 2020). Besides, the research discovers coping mechanisms farmers use, like alternative routes and forming cooperative arrangements to share transportation resources (Gomez & Castillo, 2022). Despite these adaptive strategies, the research calls for such interventions from the government and infrastructure revamping to handle these persistent threats (World Bank, 2019). The policy suggestions are improving investment in rural roads, promoting Public-Private Partnerships that facilitate rural infrastructure development, and engaging the rural community in planning and service delivery (Balasubramanian & Selvaraj, 2021). The findings emphasize the role of infrastructure in the growth of agriculture and the improvement of the economic livelihoods of rural communities, especially in sustainable development through strategic government and community action (DPWH, 2021; Arora, 2020). With the conducted interview transcriptions, analyses using coding, and thematic analysis methods, the research revealed several themes with subthemes. First, Logistical Challenges in Transportation with two subthemes - (1) Difficulty Navigating Poor Roads, and (2) Seasonal Variability in Road Conditions. The second theme identified is the Economic Consequences of Poor Road Conditions with two subthemes - (1) Loss of Income Due to Product Spoilage, and (2) Increased Transportation Costs. The third theme identified is the Coping Mechanisms Employed by Farmers with three subthemes - (1) Alternative Transportation Solutions, Adjusting Agricultural Practices, and (3) Community Cooperation through Bayanihan. Finally, the last identified theme is the Role of Stakeholders in Addressing Challenges with two subthemes - (1) Government Support and Policy Gaps, and (2) the Potential Impact of Infrastructure Improvements. Keywords: Underdeveloped access roads, agricultural prosperity, road infrastructure, transportation

# 1. INTRODUCTION

Agricultural development in rural areas is closely associated with infrastructure supporting efficient transportation of goods, services, and essential resources. In Barangay Carmen, Baguio District, the lack of well-developed access roads has created substantial barriers that hinder farmers' ability to transport their produce, access necessary farming supplies, and ultimately increase agricultural productivity. These are the more serious challenges for farmers whose survival depends on constant market access to sell their products and the timely availability of agricultural inputs such as seeds, fertilizers, and tools. Therefore, poor road infrastructure leads to local economic instability, underdeveloped agriculture, and limited rural economies. Past studies have demonstrated that infrastructure development is critical in increasing agricultural output and rural livelihoods (Ali & Khan, 2020; World Bank, 2019). However, there is still a lack of understanding of farmers' specific experiences dealing with these infrastructural inadequacies. While broader research has studied the impact of rural roads on agricultural productivity, Balasubramanian and Selvaraj, 2021, only a few have studied how farmers cope with such conditions through their coping strategies or what kind of systemic solutions could reduce such barriers. This study aims to fill the gap by closely examining the socioeconomic impacts of underdeveloped road infrastructure in Barangay Carmen and identifying potential strategies and solutions to address such challenges. Through qualitative case study research, the research will dig into challenges, coping mechanisms, and possible improvements based on in-depth interviews and focus group discussions to offer actionable insights to policymakers and community leaders (Gomez & Castillo, 2022). These road issues need to be addressed as bettering the infrastructure and as an integral part of promoting agricultural prosperity and economic stability among rural people.

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# 2. STATEMENT OF THE PROBLEM

This research investigates the barriers to agricultural prosperity posed by underdeveloped access roads in Barangay Carmen. Specifically, the study aims to address the following questions:

- 1. How do underdeveloped access roads affect the transport and delivery of agricultural produce?
- 2. How do underdeveloped access roads impact farmers' agricultural productivity and economic livelihoods in Barangay Carmen?
- 3. What are the economic impacts of these road conditions on the farmers' income and productivity?
- 4. What coping mechanisms and strategies have farmers and the community adopted to mitigate the challenges caused by underdeveloped access roads?
- 5. What role can government policies, community engagement, and infrastructure improvements play in addressing the challenges of underdeveloped roads in rural areas?

# 3. RELATED LITERATURE

# The Importance of Rural Roads in Agricultural Supply Chains

Rural roads are crucial for effectively functioning agricultural supply chains, connecting farmers to markets and other necessary services. Research shows that poor road infrastructure causes agricultural products to be delivered late, leading to post-harvest losses and economic inefficiencies (World Bank, 2021). Alam and Rahman (2014) noted that the inaccessibility of roads raises logistics and transportation costs, reducing farmers' competitiveness and profitability.

In developing countries, rural road development has proven to impact poverty reduction and growth in the rural economy significantly. Improved roads enhance transportation and provide access to inputs like seeds, fertilizers, and agricultural extension services. As such, road infrastructure is often considered the backbone of rural economies (Drolet et al., 2015).

## Impact on Farmer Decision-Making

Poor road conditions influence farmers' decision-making processes, from the type of crops they plant to the timing of their harvests. Enarson and Morrow (1998) noted that farmers often adjust their agricultural practices based on the reliability of transport routes, prioritizing crops with more extended shelf lives to mitigate the risks of spoilage.

Such adaptive strategies, although resourceful, tend to limit crop diversity for farmers and their innovative abilities. Reyes and Lu (2016) also argued that the infrastructure gaps affected small-scale farmers disproportionately since they lacked sufficient finances to invest in special equipment or alternative modes of transport.

## **Economic Disparities and Inequalities**

Infrastructure deficits aggravate economic disparities within rural communities. According to Hemachandra et al. (2018), areas with better road access experience faster economic growth and higher agricultural productivity than those with poor infrastructure. This cycle of inequality causes the communities without good roads to be unable to escape poverty.

Agricultural products have significant economic disparities in pricing. Alam and Rahman (2014) discovered that poor road access leads to delayed production, which decreases product quality. As a result, farmers are paid less, thus exacerbating existing economic vulnerabilities that make it harder for them to invest in their operations and improve their livelihoods.

## Sustainability and Maintenance of Infrastructure

Sustainability is a constant concern for the development of rural road projects. Many road improvements cannot benefit the long term since these are not well-maintained and funded. Drolet et al. (2015) mentioned that community-led initiatives such as Bayanihan may respond to the immediate need for repair. However, the project lacks the resources and technical skills to produce sustainable solutions.

In the Philippines, road maintenance in rural areas is neglected because budget allocation and priority are mainly on urban infrastructure. Reyes and Lu (2016) argued that participatory governance models, which involve local communities in the planning and maintaining infrastructure projects, are essential for ensuring sustainability and alignment with local needs.

## Social Dimensions of Infrastructure Development

The roads are not only of economic importance but also for social well-being in the rural community. Better roads facilitate easier access to education, healthcare, and social networking. Thus, improved quality of life is ensured. Moser (1993) pointed out that such infrastructure development should not forget the social aspects as these are necessary to solve the overall problems of rural communities.

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#### **Policy Interventions and Governance**

Effective policy interventions are critical to the issue of systemic problems related to rural infrastructure. According to Hemachandra et al. (2018), integrating rural infrastructure into overall development frameworks and allocating roads in national and local planning are also very important. However, implementation delays and resource mismanagement, as observed in the City Infrastructure Development Office Report (2023), constantly impede such efforts.

The participatory development framework by Moser in 1993 focuses on governance in providing inclusive and effective infrastructure policies. With the involvement of local communities in decision-making, projects can be implemented to best suit the unique needs and challenges of the rural area, thus allowing for sustainable and long-term impact.

# 4. METHODOLOGY

This study employs a qualitative research design using Focus Group Discussions (FGD) and One-on-One Interviews to gather in-depth insights.

## **Research Setting**

The research is conducted in Barangay Carmen, a rural area in Baguio District, where the underdevelopment of access roads significantly affects agricultural practices and overall community life. The area is characterized by small-scale farms and a local economy highly dependent on agriculture. Poor road conditions hinder the transportation of goods, restrict access to markets, and limit access to essential farming inputs and services, directly influencing farmers' productivity and economic outcomes.

#### **Participants**

The study targets a variety of participants, including farmers, local agricultural stakeholders, and community leaders, all of whom are directly impacted by road infrastructure challenges. A purposive sampling method is used to select 15 participants for FGDs and 8 for individual interviews. This selection criteria ensures that all participants have firsthand experience with transportation issues and a reliance on agriculture as their primary livelihood. The goal is to collect multiple viewpoints about the effects of inadequate infrastructure and the adjustments made by the community.

#### **Data Collection**

- Focus Group Discussions (FGD): FGDs aim to capture the collective experiences of farmers in the community. Semi-structured discussions enable participants to express their views on the problems they face because of bad road conditions. Key issues are transportation problems, seasonal fluctuations in agricultural activities, and coping mechanisms currently being used. The discussions also elicit participants' views on possible solutions to the problem.
- One-on-one interviews provide a more personal account of participants' experiences to complement the FGDs. These one-on-one interviews focus on obtaining detailed narratives from participants concerning road conditions' direct and indirect effects on productivity, income, and quality of life. Interviewing also permits further prodding about specific coping mechanisms and personal recommendations about policy change or infrastructure improvement.

#### Data Analysis

The data collected from the FGDs and interviews were transcribed and analyzed using thematic analysis. This involves coding the patterns and themes that emerged recurrently in the data into categories such as barriers to agricultural productivity, impacts on farmers' livelihoods, coping mechanisms, and proposed solutions. The thematic analysis will provide an overarching understanding of the factors leading to the challenges for the farmers. It will pinpoint key themes to inform policy recommendations and improvements in infrastructure. This allows for a nuanced understanding of the intricate relationship between road infrastructure and agricultural productivity.

# 5. RESULTS AND DISCUSSION

The findings of this study reveal the significant challenges faced by farmers in Barangay Carmen due to underdeveloped access roads, which impact both their livelihoods and agricultural productivity. Poor road conditions, especially during the rainy season, hinder transportation, leading to delays, increased costs, and spoilage of agricultural produce. These logistical barriers often translate into economic hardships, as farmers are forced to sell damaged or delayed products at lower prices, reducing their overall income. The lack of accessible infrastructure is a common issue in rural farming communities, as highlighted in previous studies, which link underdeveloped roads to limited market access and increased transportation costs (Alam & Rahman, 2014; World Bank, 2021).

To cope with these challenges, farmers employ various strategies, including adjusting their agricultural practices, using alternative transport methods, and engaging in community-led initiatives such as bayanihan to temporarily repair road damage. However, these measures are often insufficient to address long-term issues, highlighting the need for

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sustainable infrastructure development. The role of government and other stakeholders is critical in this context, as evidenced by studies emphasizing the importance of public investment and participatory governance in rural development (Drolet et al., 2015; Reyes & Lu, 2016).

This section organizes the findings into key themes that reflect the interconnected nature of logistical, economic, and systemic challenges, as well as the resilience demonstrated by farmers. These themes are supported by direct quotes from participants, providing authentic insights into their lived experiences and aligning with the Participatory Development Theory that underscores community involvement in addressing local challenges (Moser, 1993).

## Theme 1: Logistical Challenges in Transportation

Transportation is a critical component of agricultural operations, enabling farmers to deliver their produce to markets on time and in good condition. However, poor road conditions in Barangay Carmen, particularly during the rainy season, present significant logistical challenges. These difficulties hinder the timely transportation of agricultural products, leading to delays, increased costs, and reduced product quality. The following findings illustrate the severity of these logistical barriers.

## Sub-theme 1.1: Difficulty Navigating Poor Roads

Farmers consistently reported challenges in navigating the poor road conditions in Barangay Carmen, particularly during the rainy season. These difficulties often resulted in delays and increased risks of produce damage. One vegetable farmer noted, "Ang mga daot nga kalsada lisod kaayo agian, labi na inig ting-ulan kay malubog ug madanlog. Mas dugay mi makaabot sa merkado, ug ang risgo nga maguba ang among produkto taas kaayo" (The poor road conditions are very difficult to navigate, especially when they become muddy and slippery during the rainy season. It takes longer to reach the market, and the risk of damage to our produce is very high).

## Sub-theme 1.2: Seasonal Variability in Road Conditions

Farmers observed that road usability drastically worsened during the rainy season, with mud and flooding rendering some routes impassable. A participant stated, "Inig ting-ulan, halos dili na magamit ang kalsada tungod sa lapok ug baha" (During the rainy season, roads are almost unusable due to mud and flooding)

. These seasonal challenges forced farmers to adjust their schedules to minimize transport delays.

## Theme 2: Economic Consequences of Poor Road Conditions

Beyond logistical challenges, poor road conditions have significant economic repercussions for farmers. The financial strain comes from both direct costs, such as vehicle maintenance and fuel, and indirect costs, such as reduced income from damaged or spoiled produce. These economic burdens limit farmers' ability to invest in their farms and improve their livelihoods.

## Sub-theme 2.1: Loss of Income Due to Product Spoilage

Transportation delays frequently resulted in product spoilage, forcing farmers to sell their goods at reduced prices or dispose of unsellable produce. One farmer explained, "Kung ma-late ang pag-abot sa merkado tungod sa mga daot nga kalsada, usahay mapugos ko nga ibaligya ug mas ubos nga presyo" (If goods arrive late at the market due to poor roads, I sometimes have to sell them at a lower price)

## Sub-theme 2.2: Increased Transportation Costs

Poor road conditions led to higher transportation costs due to vehicle wear and tear and inefficiency. A participant shared, "Ang gasto sa transportasyon taas kaayo tungod sa kalisod agian sa dalan ug ang mga sakyanan kanunay maguba" (Transportation costs are very high because of the difficulty navigating the roads and frequent vehicle breakdowns). This compounded the financial strain on farming households.

## Theme 3: Coping Mechanisms Employed by Farmers

Despite the challenges, farmers have developed innovative coping strategies to mitigate the impact of poor road conditions. These include using alternative transportation methods, adjusting agricultural practices, and participating in community-led initiatives. These strategies reflect the resilience and adaptability of farmers in Barangay Carmen.

## Sub-theme 3.1: Alternative Transportation Solutions

Farmers often relied on alternative methods of transport when roads were impassable. One farmer noted, "Kung dili magamit ang trak, mogamit ko og motorsiklo nga naay sidecar para sa mas gamay nga karga" (If the truck cannot be used, I use a motorcycle with a sidecar for smaller loads). Others resorted to manually carrying goods or using animals for transport.

## Sub-theme 3.2: Adjusting Agricultural Practices

Farmers adapted their planting and harvesting schedules to mitigate the effects of poor road conditions. A vegetable farmer shared, "Magtanom ko og mga tanom nga maani ug dali sa wala pa mag-ulan" (I plant crops that can be harvested

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quickly before the rains start). This strategy reduced the risk of spoilage but limited the range of crops that could be cultivated.

#### Sub-theme 3.3: Community Cooperation through Bayanihan

Community-led initiatives, such as bayanihan, were employed to address immediate road issues. One participant explained, "Usahay maghimo mi og bayanihan aron pun-an ang mga buslot sa kalsada" (Sometimes we organize bayanihan to fill the potholes on the road). While effective in the short term, these efforts were often insufficient without external support.

#### Theme 4: Role of Stakeholders in Addressing Challenges

The role of government and other stakeholders is critical in addressing the systemic issues caused by underdeveloped roads. While farmers in Barangay Carmen have taken steps to cope with these challenges, long-term solutions require support from local government units and institutional stakeholders. This theme explores the interaction between farmers and stakeholders, highlighting both gaps and opportunities for improvement.

#### Sub-theme 4.1: Government Support and Policy Gaps

Farmers expressed frustration with delayed or unfulfilled government projects aimed at improving rural infrastructure. One participant remarked, "Nasulti na namo kini sa mga lokal nga opisyal, ug ang ilang tubag mao nga aduna daw plano, pero wala pay konkreto nga aksyon hangtod karon" (We have raised this issue with local officials, and they said there are plans, but no concrete action has been taken yet).

#### Sub-theme 4.2: Potential Impact of Infrastructure Improvements

Farmers emphasized the transformative potential of improved roads. One participant stated, "Kung maayo ang kondisyon ang kalsada, mas dali ug mas barato ang pagdala sa produkto sa merkado" (If the roads are in good condition, it would be faster and cheaper to transport products to the market). Improved infrastructure would reduce costs, increase incomes, and enhance the overall quality of life in the community.

## 6. CONCLUSION

This study highlights the profound impact of undeveloped access roads on farm productivity and the economic status of farmers in Barangay Carmen, Baguio District. The findings illustrate four interconnected themes: logistics, economic impacts, response strategies, and the engagement of stakeholders. Farmers would experience significant delays and hikes in costs due to terrible road conditions, especially at the onset of the rainy season, which usually causes impassability of roads during such periods. Logistical barriers lead to product spoilage and reduced market prices, which worsens economic vulnerabilities.

Despite these difficulties, farmers have shown resilience in adapting alternative means of transportation, adjusting their agricultural practices, and participating in community-led initiatives like Bayanihan to repair roads immediately. These efforts, however, are not sustainable in the long run. The farmers are frustrated that government action has not been forthcoming, and they have expressed a need for improvement in infrastructure, reducing transport costs, enhancing market access, and increasing their income. The study underscores the fundamental need for the involvement of both governmental and institutional stakeholders, ensuring systemic deficiencies are fixed to prevent future decay or inefficiencies. Therefore, this improvement requires appropriate and sustainable funding mechanisms that integrate elements of participatory governance to enhance the living conditions and productivity of farm-related livelihoods.

Finally, the infrastructure issue in Barangay Carmen is critical for the farmers' economic prosperity and the overall goal of rural development. Improved roads can change lives by enabling access to markets, education, healthcare, and other essential services, leading to a better community life and well-being.

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