YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF APPLIED ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME

A STUDY ON THE IMPACT OF RURAL ROAD DEVELOPMENT ON SOCIO-ECONOMIC CONDITION (CASE STUDY: THAYAWADDY TOWNSHIP)

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MPA - 44 (22nd BATCH)

JULY, 2025

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A STUDY ON THE IMPACT OF RURAL ROAD DEVELOPMENT ON SOCIO-ECONOMIC CONDITION (CASE STUDY: THAYAWADDY TOWNSHIP)

A thesis submitted as a partial fulfillment towards the requirement for the degree of Master of Public Administration (MPA)

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This is to certify that this thesis entitled "**A STUDY ON THE IMPACT OF RURAL ROAD DEVELOPMENT ON SOCIO-ECONOMIC CONDITIONS (CASE STUDY: THAYAWADDY TOWNSHIP)**", submitted as a partial fulfillment towards the requirements for the degree of Master of Public Administration has been accepted by the Board of Examiners.

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ABSTRACT

The study examines the development of rural road infrastructure in Thayawaddy Township and the effect of rural road network on socio economic condition in Thayawaddy Township, Bago Region. This study employs a quantitative methodology, utilizing both primary and secondary data sources. Data is gathered directly from 120 household residing in 3 village tracts situated along the Ywarma-Kyunkalay rural road. This study has shown that the enhancement of rural roads has a significant impact on the economic condition through an increase in income, reduction in transportation cost, establishment of new rural businesses or trading, more opportunities in new jobs, transformation of income sources. There is also impact on the service accessibility services such as agricultural extension, education, financial service, and emergency services. In order to enhance the socio-economic conditions of rural residents, road infrastructure development should be strategically integrated with complementary interventions such as provision of agricultural training, investment in rural health centers, expanding educational opportunities, financial literacy and inclusion.

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LIST OF ABBREVATIONS

ADB	=	Asian Development Bank
CRRN	=	Core Rural Road Network
DPBANRD	=	Department of Progress of Border Areas and National Races Development
DRRD	=	Department of Rural Roads Development
FAO	=	Food and Agricultural Organization'
FY	=	Fiscal Year
GOM	=	Government of Myanmar
GTZ	=	German Technical Cooperation
HH	=	Household
MOBA	=	Ministry of Border Affairs
MOC	=	Ministry of Construction
MOALI	=	Ministry of Agriculture Livestock and Irrigation
Nos./No.	=	Number
NSRRA	=	National Strategy for Rural Roads and Access
SDG	=	Sustainable Development Goals
TDC	=	Town Development Committees
Tsp.	=	Township
UN-ESCAP	=	United Nations Economic and Social Commission for Asia and the Pacific

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Most of Myanmar's population lives in rural regions and relies on agriculture and associated activities for their livelihoods, with 61.13 percent of the work force participating (DoP, 2023). However, rural infrastructure, particularly roads, has been underdeveloped due to underinvestment. A significant number of villages lack all-season road access, leading to isolation and limited opportunities for residents. Thus, rural accessibility remains a major challenge, and rural road development helps uplift rural areas by providing basic inputs for socio-economic development by increasing access to main agricultural inputs, markets, education, better health services, and improved social interaction and mobility.

Improved rural road networks facilitate access to markets for agricultural products and other goods, reduce transportation costs, and enable the flow of inputs, thereby boosting agricultural productivity and fostering trade. This can lead to increased income generation and economic diversification in rural areas. In addition, rural roads improve access to vital social services such as healthcare facilities, schools, and administrative centers. This is crucial for enhancing the well-being, health outcomes, and educational attainment of rural populations. Rural road development is a key strategy for poverty alleviation and reducing inequalities between rural and urban areas through connecting rural communities to economic opportunities and essential services. As social inclusion, improved connectivity can allow the rural people for greater participation in the broader socio-economic structure of the nation and access to government programs and private investments.

Thus, rural access is crucial to rural populations' socioeconomic growth and livelihoods. Basic road infrastructure improves rural livelihoods and revenue. Rural roads can boost rural revenue, consumption, infrastructure, and poverty reduction. Improved rural access reduces travel time and costs, improves resource utilization, boosts rural small companies, tertiary activities, and public sector jobs. Therefore, a functional rural road network drives sustained economic and social development. The

Myanmar government prioritizes rural road building for poverty alleviation and economic prosperity. International organizations are also actively involved to support rural road infrastructure projects in Myanmar, highlighting the recognized need for improvement. Moreover, the National Strategy for Rural Roads and Access plans a goal that is challenging and requires significant effort to achieve for connecting rural populations with all-season roads. Therefore, there is a need for evidence-based policy and planning to effectively allocate resources and design impactful implementation by understanding of the actual socio-economic impact of rural road development projects in Myanmar.

Among the townships in Myanmar, Thayawaddy Township situated in the western Bago Region had a population of 1.06 million relying on agriculture, small-scale commerce, and labor-intensive industries for livelihood. In the period from 2018 to 2024, concrete roads connecting villages were constructed to benefit villages of Thayawaddy Township. Despite these advancements, rural roads of this township are in poor condition, which requires improvement (upgrading, rehabilitation and maintenance). Poor road accessibility is increasing isolation, reduction in crop production and market activities. It hinders public services and aids technological transfer. Ad hoc road building decisions that waste resources slow road progress, harming Thayawaddy Township's socioeconomic growth. This shows that considerable rural road infrastructure upgrades in the township are still needed to connect and sustain all settlements. Thus, it must explore the research to reveal how rural roads improve livelihoods, access to services, and well-being.

1.2 Objectives of the Study

The objectives of the study are as follows.

(1) To study the development of rural road infrastructure in Thayawaddy Township

(2) To analyze the effect of rural road network on socio economic conditions in Thayawaddy Township, Bago Region.

1.3 Methods of Study

A quantitative technique was used for this descriptive investigation. The chosen Thayawaddy Township, Bago Region households provide the primary data. This home

survey uses structured questions. This study uses secondary data from the General Administration Department, Department of Rural Roads Development, relevant government departments, international organizations, and the internet.

1.4 Scope and Limitations of the Study

This study only focuses on rural road development in Thayawaddy Township, Bago Region within the period from 2018 to 2024. There are 48 village tracts in Thayawaddy Township. Among these village tracts, 3 villages with 384 households are purposively selected to analysis the effect of rural road infrastructure development on the condition of the households alongside of the Ywarma-Kyunkalay rural road that is the main road and connects to the riverside of Myitmakha River in Thayawaddy Township, Bago Region. There are 384 households alongside of this road and 120 households were selected as respondents for primary data collection to analyze the effect of rural road network on socio economic condition.

1.5. Organization of the Study

This research has 5 chapters. Chapter one introduces the study's premise, objectives, method, scope, constraints, and organization. Chapter two reviews theoretical literature on rural road impact, road access channels, rural road impacts, nation experiences on socio-economic implications of rural roads, and empirical material. Chapter three covers rural road infrastructure in Myanmar and Thayawaddy Township. Survey profile, design, and rural road development's consequences on homes are covered in chapter four. Chapter five ends with conclusions and suggestions.

CHAPTER II
LITERATURE REVIEW

2.1 Transport and Development: A Theoretical Overview

Transport investments dominate many emerging nations' governmental spending. This raises the question of how this spending affects national development. Many economists think that transit is essential to social wellbeing. However, it disagrees on how transport infrastructure investment affects development, therefore no universal theory exists to measure its economic and social effects. These are opinions on how transit investment affects development.

The Big Push Theory states that large-scale infrastructure improvements can increase economic growth by overcoming poverty traps. Improved rural roads alter transaction costs, connectivity, and access to markets and key services (Paul, 1967). This theoretical approach shows how rural road investments might promote sustainable development and reduce poverty by solving infrastructure gaps.

Heinze (1976) noted that Voigt Fritz compared transit to a Big Push in a stationary environment. This "Big Push" is attributable to an effective transit infrastructure that increases capital marginal productivity in core places, encouraging new investments and overcoming stagnation. The spill-over effects are stronger than the transport infrastructure itself since purchasing power in the cities increases demand, income, population growth, and rural emigration. Negative consequences from expanding geographical inequities were fewer than advantages. It was found that a transport system alone may boost economic growth, hence even unprofitable transport expenditure should be made.

Hirschman (1958) divided investment into directly productive and social overhead capital. Transport investment is social overhead. Two solutions emerge: invest in directly productive activities and use the current transport infrastructure more intensely until bottlenecks develop, then invest in social overhead capital. The second method promotes infrastructural investment to boost direct production. The study found that the first technique, development by scarcity, is more effective than the second, which is wasteful and unmanageable.

Wilson (1973) began to view transport investments as a necessary but insufficient development prerequisite. Creating and responding to economic opportunity are two aspects of transport investment. The first relies on resource quality and quantity, transit rate changes, service quality, and commodity prices. However, knowledge of potential, money availability, and prospective advantages related to alternative investment alternatives affect responsiveness to new economic prospects. Wilson also claims that economic impact spillover effects are stronger than user cost reductions. Access to transportation raises awareness and encourages more individuals to take advantage of economic opportunities. However, Wilson observes that roads can produce dis-equilibrium and even revenue decrease in markets protected by high travel costs.

2.2 Concept of Infrastructural Projects and Socio-Economic Development

Society rises socially and economically through socio-economic growth. Life outlook, knowledge, and involvement are indices of social adjustment/development. Changes in personality, freedom of expression and association, personal security and freedom from bodily injury, and societal actor participation are further markers. Infrastructural initiatives provide economic prospects for marginalized rural residents by providing access to social services, healthcare, and education (ADB, 2017). It increases rural people's access to local and international markets and livelihood activities, which boosts rural poor wages, particularly poor women and other disadvantaged groups. Infrastructure is formed of capital goods that are not disseminated and utilized directly by targeted community members to provide services using labor and other inputs (Prud'homme, 2005). Rural infrastructure initiatives typically have immediate and indirect social and economic effects. A rural road project will boost transportation, encourage business growth along the roadways, and reduce poverty. Innovative programs for marginal and smallholder farmers in rural areas also improve farming practices, repayment performance, output, employment, self-reliance, and family well-being (Limakamar, 2017).

Economic and social infrastructure projects are often separated. The differences stem from building process discrepancies. Economic infrastructure projects provide services essential to many economic operations. These include rural electrification,

road network systems, input-output marketplaces, storage and warehousing facilities, common property resources, and watershed development. However, social infrastructure initiatives include better schools, primary health facilities, clean piped drinking water, sanitation, street paving, and community centers. However, economic infrastructure investment largely boosts asset productivity, labor employment, and urban market access, especially labor markets. Social infrastructure investment creates a healthy workplace and helps rural regions develop human capital. (Bhalla 2002).

Infrastructure, particularly road networks, is a critical factor in economic growth, agricultural development, and poverty reduction. According to World Bank (2021), rural roads improve access to markets, healthcare, education, and financial institutions, thereby enhancing socioeconomic well-being. In many developing countries, poor road infrastructure limits farmers' productivity and market participation (Adebayo, 2020). Rural road development is essential in linking remote agricultural communities to urban centers, reducing post-harvest losses, and increasing farmers' incomes (Ogunleye, 2019). Studies by FAO (2018) indicated that well-constructed roads enhance farm mechanization, boost agricultural output, and encourage agribusiness investments.

2.3 Concept of Rural Road

Rural roads make up most of a nation's roadways. UN-ESCAP (1991) found that 71% of road length is rural. Different definitions of rural roads exist. Low-volume rural roads connect villages, farms, and small towns to freeways and cities. According to the Federal Ministry of Works and Housing of Nigeria (2020), rural roads are primarily unpaved, gravel, or earth roads, often facing challenges such as poor maintenance, seasonal washouts, and lack of proper drainage. FAO (2018) defined rural roads as essential infrastructure that enables farmers, traders, and rural dwellers to access markets, health services, and educational facilities. Their effectiveness directly impacts agricultural productivity, rural employment, and poverty reduction.

Metschies (2002) divided rural roads into two types based on GTZ experience in Asian and African nations. Rural transport has two ends: agricultural fields and the local market. The transport connection from the main highway network to the local market is also important. Both rural transport chains should be examined individually due to differences in ownership, accountability, road requirements, and division of

labor. Trajectories from farm to market non-motorized transport will dominate farm-to-market routes, which will have little daily traffic. Public ownership of this music is absent. The cargo owner, vehicle owner, and track owner did not yet divide labor. Highway-to-market routes: These high-traffic highways start at the nearby town or the national highway network. As their owners, government entities consider these highway-to-market highways rural (Metschies, 2002). Markets in rural access programs frequently match big communities. Village size determines rural road project priority. The first 20-year rural road initiative in India began in 1943 and covered all linkages to settlements exceeding 2,000 people. All settlements above 1,500 were covered by the second 20-year program. Villages with over 1,000 residents are on their third 20-year program. This practical technique may be an Asian solution. In certain nations, village-building did not begin and forced village-access programs failed (Metschies, 2002). Organization and administration of Asian rural roads are as follows. State governments create rural roads in India. Several agencies construct rural roads. Central rural highways are managed by the Ministry of Rural Development. In Indonesia, district governments create rural roads, and the Ministry of Home Affairs' Directorate of Regional Development manages them. For rural road design, construction, and maintenance, the Ministry of Public Works Directorate General of Highways provides technical guidance. The Philippines Department of Public Works and Highways develops rural roads. Rural road development in Sri Lanka is mostly delegated to provinces and districts. Procedures and organization are being developed. Provincial administrations manage rural roads in Thailand (Metschies, 2002).

2.4 Channels of Road Access Impact

Rural development relies on transport infrastructure. Rural roads are crucial public infrastructure; thus they must stress how road access advantages are achieved. Policymakers and development practitioners must understand how road access decreases poverty and boosts economic growth. Rural families benefit from roads in several ways (Binswanger et al., 1993). Roads affect poverty through human capital, market access, and labor activity. As a first transmission route, roads help the poor get health and education. Poor individuals often lack access to human capital facilities needed to escape poverty. Davis and Njenga (2003) noted that poverty eradication requires more than economic methods. To be efficient, human capital formation

facilities need roads (Gannon & Liu, 1997). Market access increases productivity by increasing input availability and lowering input prices owing to decreased transit costs. Improved access to output markets increases sales and prices, raising revenue (Gachassin et al., 2010). Most agree that transport infrastructure reduces poverty by producing jobs (Jacobs & Greaves, 2003). First, road building and maintenance are labor-intensive and can provide local jobs. These rare endeavors cannot reduce poverty long-term. As highways are built, labor markets become more accessible and cheaper. Road access also affects income diversification. Remote places diversify to meet local demand for diverse commodities and services (Barrett et al., 2001). Due to high transaction costs, poorly connected families are better off diversifying their activities to meet their own need. Market connectivity increases diversification options, fostering multi-activities. Road and labor contribute to diversification outside agriculture. This method is commonly considered effective for escaping poverty. The bulk of the poor reside in rural regions where agriculture is the principal activity, but there is strong evidence that nonfarm enterprises provide income and employment for the extremely poor in developing nations (Smith et al., 2001).

2.5 Benefits of Rural Roads Access

Rural roads are essential for rural socioeconomic development. Construction of highways and road linkages improves rural communities and strengthens the agro-based economy. Parashar and Singh (2023) noted that rural road building may alter socio-economic growth.

Enhanced Mobility and Connectivity: Improved roads have significantly eased travel to nearby towns and cities. This fosters greater connectivity, opening up a world of opportunities for villagers. The communities can now access essential services like healthcare and education more conveniently. Additionally, easier travel to markets expands their reach, potentially boosting agricultural productivity and incomes through better marketing opportunities for their produce.

Boosted Economic Activity: The improved transportation network likely translates to increased crop sales due to easier access to markets. This can incentivize farmers to adopt more efficient practices and potentially diversify their crops. The observed rise in the number of shops and businesses suggests a nascent economic transformation in these villages. Improved rural connectivity can create a more vibrant

marketplace, attract entrepreneurs and foster the growth of local businesses. This diversification can lead to a more resilient rural economy, less dependent on agriculture.

Improved Access to Services: Residents now experience significantly better access to healthcare facilities, signifying a positive step towards improved well-being. Easier travel paves the way for villagers to access a wider range of services, including education, administrative offices, and financial institutions. This improves their overall quality of life and empowers them to participate more actively in the social and economic spheres.

Sama and Aggarwal (2021) state that rural roads have many economic and social advantages, both direct and indirect. Breaking isolation, changing travel and living habits, education, health care, agriculture, industrial benefits, access to administrative equipment, employment opportunity, and cultural transformation are some of these advantages and changes.

Disadvantages include road traffic accidents and hazy atmosphere by automobiles, air and noise pollution, loss of scenic beauty, loss of sentimental attachment, loss of land ownership due to road construction, highway crimes and robberies, and increased road traffic risk. Road construction increases oil/diesel use, which depends on foreign exchange. Rural roads change travel patterns and boost the economy. Rural roads promote mobility, mechanized transportation, passenger and cargo movement, social and educational travel, and travel cost reduction (Sama & Aggarwal, 2021).

Access to economic and social services through rural roads boosts agricultural revenue and employment. Access roads connect rural areas to the mainstream. A solid road network reduces transport costs, speeds farm input delivery, and improves special agricultural production and distribution. A robust road network will increase agricultural distribution and trade (Lokesha & Mahesha, 2017).

2.6 Governance Issues Surrounding Rural Roads

(i) Roads as Political Capital

Roads are important political capital. The political climate greatly influences road construction, upgrade, and maintenance decisions. For instance, Matara and Bengkulu people urged authorities and politicians to include their routes in road reconstruction plans. Community political power appears to be crucial to this

achievement. Road repair, maintenance, and work prioritizing decisions are typically opaque. This system is likely to hurt poorer communities since they lack the contacts and power to push for better roads (ADB, 2002).

(ii) Neglect of Maintenance

Maintaining rural roads is essential to maintaining their benefits to rural areas. Minor maintenance is often overlooked due to a lack of cash and political capital or maybe because the effects are not evident (ADB, 1998). Politicians prefer to allow extensive restoration or reconstruction once the road has severely damaged. Politicians typically win elections by promising to repair roads, and they take credit when they do. All study nations implement this to some level. Establishing regular and transparent maintenance regimens and rehabilitation criteria is tough. Thus, roads are restored, let to decay, then reconstructed again every 10 years, causing communities to experience peaks and troughs in accessibility (ADB, 2002).

(iii) Institutional Responsibility for Roads

When institutional responsibility for rural roads is unclear or the funding source is not clearly identified, maintenance problems due to financial shortages are compounded. Who would maintain the project roads and where the cash would come from were unclear. This was especially true for integrated gravel road rehabilitation projects. For transport sector asphalt road rehabilitation, the public works or roads/highways department was normally responsible. The agricultural department executed integrated projects, and roads were sometimes merely a subcomponent (ADB, 2002).

2.7 Review on Previous Studies

Mie Mie Tun (2019) examined how rural roads affect Ywa-Ngan Township's socioeconomic circumstances (income, education, health, and tourism). This study uses qualitative and quantitative data from home surveys and focus groups. The outcome reveals that rural road building and improvement have pros and drawbacks. Positive effects include improved income, school attendance, health care accessibility, and local tourism. Negative effects include increased drug availability, sickness, and environmental degradation.

Kubendran (2020) examined how roads and road building affect a Tamil Nadu community's socioeconomic position. Qualitative data came from key informants, focus group interviews, and participant observations. Structured questionnaires collected quantitative data. Various metrics were used to study and assess community pre- and post-construction circumstances. The study found that road building enhances community livelihoods and increases educational and health centers. Better roads allow more people to import and export items, which boosts carpentry and handloom employment.

Naw Sandi Htun (2021) examined current rural road infrastructure development in Twantay Township and its effects on home living circumstances. This study used descriptive methods. Many rural roads were built in Twantay between 2000 and 2019. The research regions' households' living circumstances improved with rural road construction. Twantay Township rural roads require improvement.

Su Mon Mon Phuu (2022) examined Gyopinkauk Township rural road infrastructure development. The study examines rural road infrastructure development in Gyopinkauk Township and its social and economic impacts. The study found that rural road building indirectly affects each study area's economic development. Since most people reside in rural regions, promoting their benefits is vital.

In 2023, Nseobot et al. examined how rural road networks affect Nigerian local government economic development. The mixed-methods study examines rural road networks and economic development indicators in chosen locations using quantitative analysis and qualitative interviews. Statistics on road infrastructure, socioeconomic characteristics, and development indicators came from official records, satellite photography, and surveys. Well-developed rural road networks boost agricultural output, market access, job development, and poverty alleviation, according to the report. It also highlighted critical impediments and restrictions, such as poor maintenance, finance, and governance, that limit rural road infrastructure use.

Callanta and Moreno (2024) examined farmer-to-market road infrastructure's socioeconomic effects on rural development in Zamboanga Sibugay Province, Philippines. Surveys, key informant interviews, and focus group discussions are used to examine how increased road infrastructure affects agricultural productivity, market access, and household incomes. Road infrastructure improvements promote agricultural output, market access, and household incomes. Political favoritism and bureaucratic inefficiency hinder project success.

Tiwari and Shukla (2024) examined how road construction affects rural lives and everyday living and economic activities. This research examined how improving road infrastructure affected rural lives in Raisen District, Madhya Pradesh, India. Using a semi-structured questionnaire and interview guide, 110 respondents and 10 key informants provided data. The findings show that Raisen people had to travel 44 kilometers to the state capital for essential social services. Before road improvements, residents suffered. After improvement, people might get social services elsewhere. The report also shows that the government neglected these upgraded roads, resulting in inadequate maintenance by the responsible department and a shortage of public transit to reach social services.

Adamu and Kawugana (2025) examined how rural roads affect life and agricultural growth in Bauchi State, Nigeria. This study examined the impact of rural road infrastructure on economic activities, food production, market access, and overall welfare in rural communities. Using a mixed-method approach, data was collected from farmers, traders, transport operators, and government officials to assess the significance of rural roads in boosting agricultural productivity and improving rural living standards. The findings indicate that road construction has significantly reduced transportation costs, increased farmers' access to markets, and improved the availability of agricultural inputs such as fertilizers and seeds. Additionally, better road networks have facilitated faster movement of goods, expanded trade opportunities, and enhanced rural employment prospects. Socially, improved roads have led to better access to healthcare, education, and other essential services, thereby contributing to overall rural development.

CHAPTER III
OVERVIEW OF RURAL ROAD INFRASTRUCTURE IN MYANMAR

3.1 Background of Rural Road in Myanmar

Myanmar's extended era of seclusion, starting from the 1960s, and the severe economic penalties that came with it, greatly impeded the country's progress. Prolonged isolation for around thirty years is strongly linked to poverty in Myanmar. Isolation refers to a state in which individuals or communities have restricted access to essential services, markets, health facilities, job possibilities, and are also constrained in their capacity to benefit from government programs and private investments. Consequently, Myanmar surpassed its surrounding nations. Following an extended period of isolation, the first elected administration assumed power and began a sequence of political reforms with the aim of transforming the nation into a modern, democratic, and developed country by the year 2030.

The Department of Rural Development was created in 2012 to focus on rural development. These initiatives include (1) people-centered rural development, (2) creating rural infrastructure, (3) enhancing rural inhabitants' socioeconomic situations, and (4) reducing poverty. Rural roads and bridges provide access to vital services and amenities, helping rural residents better their lives and contribute to the economy. Many rural Myanmar residents are still disconnected from the road network, and even more are physically isolated when roads that are open in the dry season become impassable due to high rains and floods.

The 2024 census found 51.3 million inhabitants in Myanmar, with 69% residing in rural regions. These rural regions are connected by a 55,000-km rural road network across 64,000 villages. Myanmar's rural roads include concrete, bituminous, gravel, laterite, dirt, and motorbike and ox cart routes. Rural roads omit advanced roads regulated by the Ministry of Construction's Department of Highway. Additionally, they exclude urban roadways maintained by City and Town Development Councils.

Rural roads are the least developed roads managed by the Department of Rural

Roads Development (DRRD) under the Ministry of Construction and the Ministry of Border Affairs since 2017. The DRRD oversees most rural roads with the goals of (1) upgrading rural roads and bridges and (2) transporting agricultural commodities to market quickly and cheaply. (3) Rural socio-economic development depends on timely access to the Core Rural Road Network (CRRN). (4) All rural roads must be improved for year-round access by 2030 (Lwin, 2024).

Access and poverty in Myanmar are linked by poor agricultural yield in places lacking roads. Since inputs and outputs must be carried by foot or animal, agriculture is essentially subsistence oriented. (ii) Regular or urgent medical patients must go long distances on foot or via poor transit, wasting time. (iii) Remote rural children receive elementary education. Due to the long drive to the next village tract or township, up to 90% drop out. In the absence of access, household members must travel a lot, which disproportionately affects women. Rural transportation in Myanmar is hampered by poor road connectivity. Thus, the GOM prioritizes rural development and accelerates program execution.

3.2 Development of Rural Road Infrastructure in Myanmar

Rural roads have been important in Myanmar for a decade. About 15% of Myanmar's communities remain unconnected by road. Over 40% of settlements are connected by dry-season country roads that become inaccessible in the rainy season. Lack of all-season rural road connectivity isolates half of the recognized communities, affecting nearly 14 million rural inhabitants. Lack of all-season rural roads limits rural people's access to health, education, employment, markets, and other services and amenities, impeding their growth (MOALI & MOBA, 2017).

Rural communities have significant challenges in accessing important services and resources to improve their lives and contribute to the national economy owing to inadequate road networks. Enhancing rural roads is crucial for rural development and poverty reduction, according to the GOM. Myanmar has committed to the 2030 Sustainable Development Goals (SDGs). Rural road improvements and enhanced service and amenity provision are expected to boost SDG progress.

In order to provide all-year road access to as many rural inhabitants as possible, the GOM has developed a priority system. The main objective is to provide transportation links between smaller villages and bigger urban centers. The goal is to

ensure that by 2022, all communities with a population over 1,000 persons have the ability to use roads that are usable throughout the year. Subsequently, settlements with populations beyond 500 individuals will be given secondary importance, with the objective of establishing all-season roads to link at least 95 percent of them by 2025. The third priority will focus on communities having a population of more than 250 people, aiming to achieve a connection rate of 75 percent via roads that can be used all year round by the year 2030. By 2030, the government wants to link at least 50% of villages under 250 people to all-season roads.

The GOM promises all-season road connectivity to 80% of registered settlements in each state and area. This is done to distribute resources and advantages fairly and equally throughout all states and regions, regardless of population. The Myanmar Transport Sector Policy Statement on Rural Roads and Access addresses several rural mobility and accessibility issues:

(a) Approximately two-thirds of rural residents in Myanmar face physical isolation during certain periods throughout the year.

(b) An estimated 20 million people reside in villages without access to year-round, all-season roads.

(c) To put it differently, around 24 million individuals are likely to live more than two km away from an all-season road.

A considerable proportion of the road network in Myanmar's villages is comprised of unpaved roads, making it unusable during the rainy season. Concurrently, funds are being allocated to enhance village roads to asphalt standards, even if they already provide access throughout the year (without necessarily warranting such an improvement based on traffic levels). To achieve all season status for a greater length of the village road network within the same budget constraints, it is advisable to implement additional basic improvement standards. These standards should include enhancing drainage systems, establish fundamental water crossings (such as causeways and drifts), and implement protective measures (like retaining walls). Additionally, cost-effective surfacing should be applied where necessary.

Three government bodies in Myanmar are legally tasked with building and maintaining rural roads. The primary organization responsible for constructing village roads is the DRRD of the Ministry of Cooperatives and Rural Development. The Department of Progress of Border Areas and National Races Development (DPBANRD) of the Ministry of Border Affairs, is responsible for carrying out similar

activities in 32 percent of Myanmar's townships. The term "town development committees" (TDCs) refers to the 285 local executive organizations that are under the jurisdiction of the GAD of the Ministry of Home Affairs. These committees may levy taxes and provide financial assistance for rural development and infrastructure.

Table (3.1) shows the development of rural road infrastructure in Myanmar based on State and Region in 2024-2024. The total length of rural road constructed by DRRD is 43977 miles and 4.04 furlong. Among the types of rural road, earth type is the most with 53% of total length. It implies that there are many rural roads that are not all season and need to upgrade to be all weather roads. According to State and Region, Shan State has the most rural road constructed (18% of total length) followed by Sagaing (15% of total length), and Magway (12% of total length).

3.3 Myanmar Rural Road Strategy and Documentation

With ADB technical assistance, Myanmar's Ministry of Agriculture, Livestock, and Irrigation (MOALI) and Ministry of Border Affairs (MOBA) developed a rural road strategy and supporting papers. It guides rural road sector investments over the next 15 years to optimally address constrained access and provide all-season access to as many rural people as feasible by 2030. The National Strategy for Rural Roads and Access (NSRRA) defines the government's goal of providing registered villages with all-season road access and provides guidance on the classification and prioritization of the Core Rural Road Network. The CRRN is the minimal rural road network a township needs to link all villages to the higher-level road network. These connection rules apply:

- A single rural road, categorized as a CRRN road, will connect villages without direct access to higher-level roadways.
- A community with only one rural road will be included in the CRRN.
- When a community has many rural roads, the best one will be chosen for the CRRN based on length, surface type, condition, and traffic volumes.
- If possible, a preliminary path will be chosen for the CRRN for new construction in villages without roads.

Table (3.1) Development of Rural Roads by Types in State/Region of Myanmar in 2023-2024 (Mile/Furlong)

Sr. No.	State/Region	Concrete	Asphalt	Gravel	Laterite	Earth	Motorcycle	Total	Percent
1	Naypyitaw	121/6,64	93/5.73	148/3.22	422/4.09	421/2.12	300/4.13	1508/1.93	3
2	Kachin	230/6.27	73/5.36	237/0.64	237/0.44	842/6.49	5/5.00	1627/3.27	4
3	Kayah	4/3.93	90/7.75	115/0.69	-	61/5.84	46/1.97	318/4.18	1
4	Kayin	148/6.93	114/2.00	63/2.50	51/1.50	330/7.71	-	708/4.64	2
5	Chin	1/2.00	14/2.00	38/2.00	11/4.00	1768/0.00	680/3.00	2513/5.00	6
6	Sagaing	121/5.13	162/3.63	752/5.36	950/7.79	4484/6.45	-	6472/4.36	15
7	Thaninthayi	319/0.32	51/0.61	271/2.64	234/0.52	279/3.29	-	1154/7.38	3
8	Bago	181/1.60	74/5.74	531/1.06	1127/0.05	1858/1.32	-	3772/2.15	9
9	Magway	20/3.10	89/6.41	270/2.05	2557/6.99	1730/5.15	677/3.04	5346/2.74	12
10	Mandalay	77/3.00	289/3.44	721/2.74	742/3.74	2486/4.96	-	4317/1.88	10
11	Mon	110/7.95	333/6.73	37/2.96	52/7.55	319/5.61	-	854/6.80	2
12	Rakhine	148/0.47	8/1.50	362/5.22	146/6.61	642/5.19	187/0.04	1495/3.03	3
13	Yangon	800/0.54	21/0.46	176/4.31	170/0.21	608/1.89	109/6.43	1885/7.33	4
14	Shan	26/0.98	699/0.29	862/0.38	68/7.35	4437/0.41	1814/4.93	7909/0.59	18
15	Ayeyarwaddy	310/3.11	42/4.81	594/6.99	149/4.39	2872/6.75	121/6.57	4092/0.62	9
	Total	**2623/2.83**	**2159/2.46**	**5182/5.43**	**6923/0.52**	**23145/2.04**	**3943/3.11**	**43977/4.04**	**100**
	Percent	**6**	**5**	**12**	**16**	**53**	**9**	**6**	**100**

The CRRN will include each village's sole road access and proposed alignments for new development joining disconnected communities. Considering single-road access, the CRRN may connect temples, tourist attractions, agricultural districts, and other important economic or cultural locations. GOM rural road policy aims to create regional roads and bridges for rural socio-economic development. And the goals are:

1. Sustainable rural development.
2. Cheap transit will get rural agricultural and animal products to market rapidly.
3. Effective utilization of rural road networks for rural education, health, and social services.
4. Improve rural roads annually for all seasons.

The NRRSS detailed Myanmar's minimal general all-season criteria. This plan requires standards and specifications to match present and future rural road use. First, standards and specifications must match road function and traffic (people and vehicles). Standards and specifications must also be compatible with the engineers and technicians who will design the roads, the materials available for building them, the contractors and laborers who will build them, and the skill levels of the villagers and local contractors who will maintain them.

Further, the standards and specifications aim to strike a balance between road construction or upgrading costs and road maintenance costs, avoiding excessive maintenance burdens on local budgets or communities and avoiding unnecessarily expensive designs that quickly use up investment budgets. Because climate, topography, soil types, construction materials, traffic volumes, and other factors affect the best design and maintenance, states/regions may apply different all-season standards.

3.3.1 Rural Road Classification

Myanmar has three administrative types of rural roads. The first two administrative classifications involve core rural road network (CRRN) routes, while the third covers other rural roads. All essential rural roads that connect village tracts or rural populations above 1,000 with the higher-level road network are Class A. This will include a route linking a big community and numerous villages with more than 1,000 inhabitants. Class A rural roads will have higher criteria and specifications due to their bigger populations and the need of connection for village development committees and village tract services and facilities.

All other important rural roads linking communities with populations under 1,000 are Class B. Class B rural roads serve smaller settlements and have less requirements and specifications than Class A roads, although they will be built and renovated to all-season standards. Class B rural roads usually link to Class A rural roads, although they may connect smaller settlements to higher-level routes or towns.

Class C rural roads are all other rural roads that are not part of the core rural road network or a village's principal link. Class C country roads connect distant habitations and agricultural areas, although they do not support this strategy's principal goal. Thus, upgrading to an all-season standard is not prioritized.

Road surface type, carriageway width, drainage system, bridges, and slope protection are further specified by the categorization. Road surface: Class A and Class B country roads will be built and upgraded to enhance their unsealed surface. This usually requires a dry- or water-bound macadam surface. NRRSS allows gravel and other appropriate materials in select regions. This only applies in specific districts. An enhanced unsealed road surface will allow year-round usage, save for brief periods of impassability during strong rains and flooding. Based on importance and predicted traffic volumes, Class A roads will be paved with cement concrete or bituminous material. This regulation states that rural roads categorized as Class C will have a dirt surface and will not be prioritized for surface upgrading.

Minimum carriageway width for Class A and B roadways is 12 feet. Class A and B rural roads with high traffic volumes and carriageway widths exceeding the NRRSS minimum may be upgraded to 18 feet or more using a progressive upgrading approach. In areas with difficult topography that require extensive excavation and filling to achieve the desired road width, and in flood-prone areas where the road requires more expensive flood-resistant designs, a narrower carriageway width with single lane access of 6 or 9 feet may be preferable. This design guarantees enough passing space. Class C roads may have carriageways under 12 feet, depending on local conditions.

The Drainage System and Bridges Side and cross drains would be installed on Class A and B rural roads. In regions where slopes surpass 6% and they pass through communities; soil side drains must be lined up to prevent erosion. Bridges and other cross drainage structures will employ cement concrete or steel to carry 20 tons. Class A country roads and Class B rural roads with traffic volumes over the NRRSS minimum level for bridge strengthening will have their load bearing capability altered. Timber

structures shall be replaced by concrete or steel on Class A and Class B rural roads after temporary use. Timber bridges are allowed on Class C roadways.

Slope Protection: Cut and fill slopes and embankments must be protected on Class A and Class B roadways to prevent serious damage. Vegetation as protection (bioengineering) and concrete, masonry, or gabion barriers are two possible alternatives. Slope protection will be used during construction and upgrading. Rural roads will be classified into three administrative groups for easier classification. The first two administrative categories cover country roads in the core rural road network (CRRN), while the third covers rural roads beyond the CRRN.

3.3.2 Climate Resilience and Sustainability

It will have climate-resilient designs that account for regional climatic sensitivity (flood risk, erosion risk, rainfall, drought, etc.). Appropriate designs will balance climatic hazards and repair and maintenance expenses with building prices. various places will apply various criteria based on their predicted climate impacts, decreasing lifespan costs and improving access sustainability.

Climate-resilient designs will focus on carriageway levels, construction materials (to withstand flooding and erosion), drainage structure types and dimensions (to handle increased rain volumes and intensities and peak runoff flows), and slope and embankment protection. In creating the National Rural Road Standards and Specifications, appropriate design standards for each region will be tested. Climate back strengthening will target susceptible road sections through a spot enhancement program and linked to planned periodic maintenance. To mitigate climate impacts and maintain access improvements, maintenance will be improved.

3.4 Maintenance of Rural Road Infrastructure in Myanmar

Several developing countries are becoming more worried about the degradation of rural roads due to insufficient maintenance. Myanmar utilizes a labor-intensive traditional approach to maintain its rural roads due to the availability of inexpensive labor, unlike other emerging countries. Different types of roads, such as bituminous, metal, gravel, or dirt, each have their own unique characteristics that determine how much money is allocated for routine maintenance. Regular repairs to potholes, the application of one furlong of seat coating for every mile, the dressing of shoulders, the

leaning of drains, and the painting of mileposts are all part of the maintenance of the bituminous road.

External factors like as weather, terrain, traffic, and soil types have an impact on the frequency and intensity of maintenance activities. Two important factors that have a considerable influence on the need for maintenance are the original technical principles that are used in the construction of roads and the quality of the work that is done during construction. For the purpose of lowering the costs and the amount of effort that are involved with maintenance, these criteria may be used to build maintenance plans and management systems that correspond to them. Before urgent repairs and maintenance are required, it is necessary to secure funds to guarantee prompt and regular maintenance. Optimal maintenance occurs when a corporation is capable and prepared to perform essential interventions at an early stage of degradation, hence minimizing the degree of harm. Implementing damage control measures is essential for establishing an effective maintenance strategy. Efficiently and expeditiously diverting water away from the road structure is a crucial element of road repair operations.

Road design and construction must start with efficient procedures. Maintenance on a well-built road focuses on drainage system efficiency. Location might divide maintenance tasks into two categories. First, off-carriageway work focuses on drainage system maintenance and road surface repairs. Drains and cross drainage systems are carefully maintained to minimize road precipitation flow.

Road surface rehabilitation was the second maintenance category. This work mostly comprises keeping the road's running surface clean, clear of impediments, and sloped for drainage. The majority of the drainage system outside the highway must be protected to preserve rural roads. High-traffic freeways require expensive road maintenance. Rural roads need fewer road surface repairs than highways due to lower traffic numbers. Rural road maintenance priority depends on drainage system maintenance. Road network damage must be considered while planning road growth. Emergency maintenance includes repairing or rebuilding cross-drainage structures damaged by floods or overloaded vehicles, road sections damaged by washouts, erosion, or floods, erosion protection damaged by excessive water or landslides, and road carriageway clearing. Myanmar has built rural roads to improve transportation and land links, promote regional development, and achieve national goals. Myanmar is implementing different policies and programs. The DRRD is focusing on rural road improvement projects to meet rural road and transportation development goals. DRRD

maintains, improves, and builds rural roads that connect villages, cities, and communities. Annually, DRRD builds new rural roads and speeds up their upgrades.

3.5 Rural Road Infrastructure Development by Region, District and Township

Since 2017, the DRRD has assumed all central and regional rural-road functions of the DRD under MOALI. Since this year, DRRD has been in charge of the implementation of rural roads for interconnecting road networks that extended from village to village in Bago throughout the whole country.

(i) Rural Road and Bridge Implementation in Bago Region from FY 2017-18 to 2023-24

The DRRD as the implementing agency will have the overall responsibility for rural roads and bridges development. DRRD has built new earth roads and improved them from dirt to gravel to asphalt to connect villages to metropolitan centers nationwide except in border areas. Government budgets (Central and Regional), road funds (from existing tolls and vehicle fees, as well as new road user charges), and development partner funding finance rural road and bridge construction. In Bago Region, rural roads and bridges have been constructed and improved by financing government budget from the central and regional level. The length of total constructed road by types in Bago is in Table (3.2).

According to Table (3.2), the total length of registered rural road was 1,762 mile and 2.603 furlong in which there are 274 mile and 0.409 furlong of concrete road (15.87% of the total length), 108 mile and 0.534 furlong of asphalt road (6.26% of the total length), 464 mile and 0.128 furlong of gravel road (26.88% of the total length, 738 mile and 0.572 furlong of laterite road (42.76% of the total length) and 142 mile and 0.96 furlong of earth road (8.23% of the total length).

Table (3.2) Rural Road Infrastructure Development in Bago Region

Sr. No.	Fiscal Year	Types of Rural Road (Mile/Furlong)					
		Concrete	**Asphalt**	**Gravel**	**Laterite**	**Earth**	**Total**
1	2017-18	16/4.033	11/0.19	31/0.25	108/0.73	16/0.55	182/5.75
2	2018 (mini)	18/6.963	3/0.6	38/0.03	67/1.87	10/2.84	137/0.53
3	2018-19	16/0.28	13/6.7	53/0.45	86/1.852	35/7.48	205/0.10
4	2019-20	102/0.64	18/4.78	93/4.2	195/6.35	28/6.62	438/0.82
5	2020-21	82/1.4	46/0.33	91/0.19	146/0.08	26/6.5	392/0.06
6	2021-22	6/5.43	10/6.62	30/3.903	23/5.385	7/2.4	78/0.967
7	2022-23	27/0.268	3/1.4	57/7.84	46/3.595	16/2.99	151/0.01
8	2023-24	5/0.254	1/7.65	69/0.171	65/0.721	1/2.3	142/0.39
	Total	**274/0.41**	**108/0.53**	**464/0.13**	**738/0.57**	**142/0.96**	**1726/2.6**
	Percent	**15.87**	**6.26**	**26.88**	**42.76**	**8.23**	**100**

Source: Department of Rural Road Development (2025)

Table (3.3) shows that the rural road network has over 748 recognized bridges, totaling 29,749 feet. Of the total, 56% are concrete bridges and 80% are long. Box/Pipe Culvert bridges make up 40% of the number but only 5.71% of the length, while timber, submersible, and bailey bridges make up 1.60%, 1.47%, and 0.13% of the number and 4.08%, 1.68%, and 0.40% of the length.

Table (3.4) describes rural road classes such as Class A, Class B and Class C for all rural roads that are registered and unregistered constructed by DRRD and other organizations in Bago Region. Among four districts, Pyay District has the most rural road classes by 28% followed by Thayawaddy District with 28% of total rural roads, Taungoo District with 23%, Pyay District with 20% of total rural roads. Based on classes of rural road, Class A rural road is 44%, Class B is 31% and Class C is 25% of total rural roads.

Table (3.3) Bridge Infrastructure Development by Types in Bago Region

Sr. No.	FY	Type of Bridge											
		Concrete		Timber		Balley		Submersible		Box/Pipe Culvert		Total	
		Nos.	ft	Nos.	ft	Nos.	ft	Nos.	ft	Nos.	ft	Nos.	ft
1	2017-18	54	2380	1	18	-	-	4	170	34	285	93	2853
2	2018 (mini)	17	580	4	680	-	-	0	0	35	188	56	1448
3	2018-19	55	3506	5	217	1	120	6	231	27	126	94	4200
4	2019-20	97	7428	-		-	-	-	-	50	293	147	7721
5	2020-21	130	8363	1	180	-	-	1	100	52	245	184	8888
6	2021-22	23	2205	-		-	-	-	-	31	161	54	2366
7	2022-23	19	755	-		-	-	-	-	29	158	48	913
8	2023-24	28	996	1	120	-	-	-	-	43	244	72	1360
	Total	**423**	**26213**	**12**	**1215**	**1**	**120**	**11**	**501**	**301**	**1700**	**748**	**29749**
	Percent	**56.55**	**88.11**	**1.60**	**4.08**	**0.13**	**0.40**	**1.47**	**1.68**	**40.24**	**5.71**	**100**	**100**

Source: Department of Rural Road Development (2025)

Table (3.4) Rural Road Classes in Bago Region (2024-2025)

Sr. No.	District	Rural Road Classes (Mile/Furlong)			Total	Percentage of total rural roads
		Class A	Class B	Class C		
1	Bago	367/7.5	200/5.65	168/0.59	736/5.74	20
2	Taungoo	452/7.67	233/4.22	185/1.89	871/5.78	23
3	Pyay	388/6.14	345/6.22	364/2.21	1098/6.57	29
4	Thayawaddy	463/1.78	375/6.33	225/7.95	1065/0.06	28
	Total	**1672/7.09**	**1155/6.42**	**943/4.64**	**3772/2.15**	**100**
	Percentage	**44**	**31**	**25**	**100**	

Source: Department of Rural Road Development (2025)

(ii) Rural Road Implementation in Thayawaddy District from FY 2017-18 to 2023-24

Although there are six townships under Thayawaddy District through expansion of new district by the Ministry of Home Affairs, DRRD implements and manages eight townships for rural road network. The implemented rural road infrastructure is described in Table (3.5). During the period from FY 2017-18 to 2023-24, rural road was implemented totally 631 mile and 3.741 furlong long involving concrete road measuring 64 mile and 0.952 furlong long (0.14% of the total length), asphalt road with a measurement of 29 and 0.808-furlong (4.60% of the total length), gravel road with 147 and 0.380 furlong long (23.30% of the total length), laterite road measuring 374 and 0.487 furlong (59.27% of the total length), and earth road that is long for 18 mile and 0.112 furlong (2.85% of the total length). The road will benefit local people from the villages and also farmland, helping to transport rural products to the markets in a timely manner.

A very large portion of the village road network in this district is laterite and these roads are generally not considered all-season roads. While these laterite roads can be functional in dry weather, it can susceptible to damage and becoming impassable during heavy rains and flooding. It can be improved by unsealed surfaces, like dry-bound or water-bound macadam, likely to be all-weather. Also, funds can be invested to upgrade laterite roads to asphalt roads and/or concrete roads standard where these already provide all-season access.

According to earth road length by year after year from FY 2017-18 to 2023-24

the available information shows a mix of trends. Overall, the development of earth roads in Myanmar seems to have fluctuated with some years showing increases and others showing decreases. Actually, earth roads are consistently decreasing year by year because earth roads in Myanmar are indeed being upgraded year by year, with a focus on improving rural connectivity and all-season access according to National Strategy for Rural Roads and Access.

In Thayawaddy District, except submersible type, 4 types of bridge such as concrete, timber, balley and box/pipe culvert are constructed as shown in Table (3.6). There were 179 bridges with the length of 7,127 feet. Like Bago Region, concrete bridge contributed the highest in the number and length followed by box/pipe culvert bridge. Timber bridge contributed 2.79% and 3.04% of the total number and length, respectively while there was only a balley bridge with the length of 120 feet (1.58% of the length).

Table (3.7) presents rural road classes for all roads by Township DRRD and other departments in Thayawaddy District. Oakpho Township has the highest rural roads in this district by 17%; the second highest (15%) by Nattalin Township followed by each 14% of Thayawaddy, Minhla and Gyopinkauk Township; 11% of Latpatan Township; 8% of Moenyo Township and 5% of Zeekone Township. Among rural road classes, there are 43% of Class A, 35% of Class B, and 22% of Class C in this District.

Table (3.5) Rural Road Infrastructure Development in Thayawaddy District

Sr. No.	Fiscal Year	Types of Rural Road (Mile/Furlong)					
		Concrete	Asphalt	Gravel	Laterite	Earth	Total
1	2017-2018	0/7.976	3/0.328	5/0.228	45/0.585	0/3.00	54/0.515
2	2018 (mini)	4/3.80	1/0.30	4/7.18	54/5.37	5/5.40	70/0.756
3	2018-2019	3/0.22	5/0.25	6/0.00	28/7.43	0/3.00	43/0.363
4	2019-2020	24/2.15	5/4.00	18/0.375	79/5.69	1/4.00	129/0.02
5	2020-2021	25/0.285	9/0.30	11/2.96	66/7.96	4/0.00	116/0.44
6	2021-2022	-	1/0.00	21/0.151	16/0.11	1/1.44	39/0.00
7	2022-2023	4/0.00	3/1.4	15/3.82	24/1.565	3/5.758	50/0.567
8	2023-2024	2/5.65	1/7.65	65/7.04	59/0.289	1/2.30	130/0.87
	Total	**64/0.952**	**29/0.80**	**147/0.38**	**374/0.48**	**18/0.11**	**631/3.74**
	Percentage	**0.14**	**4.60**	**23.30**	**59.27**	**2.85**	**100**

Source: Department of Rural Road Development (2025)

Table (3.6) Bridge Infrastructure Development by Types in Thayawaddy District

Sr. No.	FY.	Type of Bridge									
		Concrete		Timber		Balley		Box/Pipe Culvert		Total	
		Nos.	ft	Nos.	ft	Nos.	ft	Nos.	ft	Nos.	ft
1	2017-18	12	660	-	-	-	-	12	134	24	794
2	2018 (mini)	5	175	-	-	-	-	1	12	6	187
3	2018-19	10	740	5	217	1	120	5	30	21	1107
4	2019-20	30	2205	-	-	-	-	16	78	46	2283
5	2020-21	31	2065	-	-	-	-	19	75	50	2140
6	2021-22	3	70	-	-	-	-	6	11	9	81
7	2022-23	6	220	-	-	-	-	-	-	6	220
8	2023-24	11	265	-	-	-	-	6	50	17	315
	Total	**108**	**6400**	**5**	**217**	**1**	**120**	**65**	**390**	**179**	**7127**
	Percent	**60.3**	**89.8**	**2.8**	**3.1**	**0.5**	**1.7**	**36.3**	**5.5**	**100**	**100**

Source: Department of Rural Road Development (2025)

Table (3.7) Rural Road Classes in Thayawaddy District (2024-2025)

Sr. No.	Township	Rural Road Classes (Mile/Furlong)			Total	Percentage of total rural roads
		Class A	Class B	Class C		
1	Thayawaddy	66/4.10	30/5.09	54/2.62	151/3.81	14
2	Zeekone	23/6.00	30/4.16	3/5.54	57/7.70	5
3	Nattalin	47/5.50	75/7.00	38/4.00	162/0.50	15
4	Minhla	83/2.27	34/6.11	36/0.23	154/0.61	14
5	Moenyo	38/4.65	38/1.41	12/4.06	89/2.12	8
6	Latpatan	62/5.70	35/4.11	23/4.79	121/6.60	11
7	Gyopinkauk	86/2.46	50/4.12	8/1.40	144/7.98	14
8	Oakpho	54/3.10	79/6.33	49/1.31	183/2.74	17
	Total	**463/1.78**	**375/6.33**	**225/7.95**	**1065/0.06**	**100**
	Percent	**43**	**35**	**22**	**100**	

Source: Department of Rural Road Development (2025)

(iii) Rural Road Implementation in Thayawaddy Township from FY 2017-18 to 2023-24

The rural roads in Thayawaddy Township let rural residents access services and amenities to enhance their lives and participate in the local economy. Table (3.8) exhibits the implemented rural road by Township DRRD within the period of 2017-18 and 2023-24. Of the total 65 miles and 3.741 furlong of rural roads in the whole township, there are 12 miles and 6.41 furlong of concrete roads, 1 mile and 6.880 furlong of asphalt road, 11 miles and 0.833 furlong of gravel road, and 40 mile and 0.091 furlong of laterite roads.

In rural areas of Thayawaddy Township, laterite roads are likely the most, as they are the most economical and practical choice for connecting villages and accessing remote areas. These road type can be rough and dusty, require regular maintenance including patching potholes and clearing drainage ditches, to prevent them from deteriorating., and may not be ideal for high-volume traffic or extreme weather conditions. There is no earth road due to being upgraded to proper advanced type of road. Asphalt road is with the measurement of 1 mile and 6.88 furlong that will benefit local people from the coverage villages through accessing all-season road, in general, for getting rural products to the market as soon as possible, and for the education, health and social matters of the rural people.

Table (3.8) Rural Road Infrastructure Development in Thayawaddy Township

Sr. No.	Fiscal Year	Types of Rural Road (Mile/Furlong)				
		Concrete	Asphalt	Gravel	Laterite	Total
1	2017-2018	-	0/3.13	1/2.50	1/5.77	3/0.425
2	2018 (mini)	-	-	0/4.00	7/2.00	7/6.000
3	2018-2019	0/3.21	0/3.75	0/2.20	5/8.50	7/0.208
4	2019-2020	6/3.20	-	1/5.00	10/3.00	18/0.400
5	2020-2021	6/0.00	1/0.00	2/3.46	6/1.60	15/5.06
6	2021-2022	-	-	1/3.00	1/0.00	2/3.000
7	2022-2023	-	-	3/0.50	2/4.00	5/4.50
8	2023-2024	-	-	1/2.00	4/7.86	6/0.233
	Total	**12/6.41**	**1/6.880**	**11/0.833**	**40/0.091**	**65/3.741**
	Percent	**18**	**2**	**17**	**63**	**100**

Source: Department of Rural Road Development (2025)

According to Table (3.9), totally 36 bridges including 26 concrete bridges, 9 box/pipe culvert and only a timber bridge are registered in the rural road network distancing a total length of 885 feet that is comprised of 830 feet, 40 feet, and 15 feet of concrete bridge, box/pipe culvert and timber bridge, respectively. In rural road network of Thayawaddy Township, concrete bridges are mostly built and upgraded to natural disaster-resistant and sustainability.

Table (3.9) Bridge Infrastructure Development by Types in Thayawaddy Tsp.

Sr. No.	FY	Type of Bridge							
		Concrete		Timber		Box/Pipe Culvert		Total	
		Nos.	Feet	Nos.	Feet	Nos.	Feet	Nos.	Feet
1	2017-2018	3	110	-	-	-	-	3	110
2	2018 (mini)	2	100	-	-	-	-	2	100
3	2018-2019	3	110	1	15	-	-	4	125
4	2019-2020	9	290	-	-	7	35	16	325
5	2020-2021	6	175	-	-	-	-	6	175
6	2021-2022	1	10	-	-	2	5	3	15
7	2022-2023	0	0	-	-	-	-	0	0
8	2023-2024	2	35	-	-	-	-	2	35
	Total	**26**	**830**	**1**	**15**	**9**	**40**	**36**	**885**
	Percent	**72**	**94**	**3**	**2**	**25**	**4**	**100**	**100**

Source: Department of Rural Road Development (2025)

CHAPTER IV
ANALYSIS ON SURVEY DATA

4.1 Profile of Study Area

Thayawaddy Township located in western Bago Region's Thayawaddy District. The Bago Region governs Thayawaddy Township, one of six townships in the district. Thayawaddy Township has 22 yards and 48 village tracts with 36,626 houses and 151,104 people. Most township residents live in rural settings, with 23.7% in urban areas. Thayawaddy Township has a 6.4 percent unemployment rate for 15-64-year-olds and 96.5 percent literacy for 15-24-year-olds At 62.6 percent, agriculture, forestry, and fishing employs the most people in Thayawaddy Township, followed by wholesale and retail commerce and motor vehicle and motorbike maintenance at 8.1 percent.

The rural road network in Thayawaddy Township is being actively developed and improved through the rural roads and access project aiming to connect villages to the higher-level road network and improve accessibility for rural communities. Among three types (Class A, B and C) of rural roads, there are 27 rural roads with the length of 66 miles and 4.10 furlong under Class A type. As a rural road grading, 12 rural roads are good, 10 rural roads are fair and 5 rural roads are poor. These Class A rural roads benefit to 139 villages with 11,567 households for the accessibility of 52,029 residents. In Class B type, 25 rural roads which have totally length of 30 miles and 5.09 furlong were constructed. There are only 1 rural road that is good; 3 rural roads are fair while 21 rural roads are poor. The beneficiaries are 23,681 residents of 6,234 households in 55 villages. Class C rural roads are totally length of 54 miles and 2.62 furlong for 21 rural roads that are 1 rural road with good condition, 5 rural roads with fair condition and 15 rural roads with poor condition. These rural roads cover 88 villages, 10,351 households and 41,655 residents as benefitted.

Thayawaddy Township has 48 village tracts. A purposive sampling method is used to select three village tracts, located alongside Ywarma-Kyunkalay rural road and access this road. This study examines how rural road affects sample village socio-economic conditions. The home sample is 120. The sampling units include Ywarma,

Nyaung Kauk Kway, and Kyunkalay village tract houses along the rural road. Table (4.1) lists village tracts, families, and gender.

Table (4.1) Households and Population of Selected Village Tracts in Thayawaddy Township (2024-2025)

Sr. No.	Village Tract	No. of Village	Conducted Villages	House -holds	Population		
					Male	Female	Total
1	Ywarma	6	1	160	298	322	620
2	Nyaung Kauk Kway	5	1	131	233	259	492
3	Kyunkalay	2	1	93	193	207	400
	Total	**13**	**3**	**384**	**724**	**788**	**1512**

Source: General Administration Department, Thayawaddy Township (2025)

Table (4.1) shows that the sample villages tracts are along the Ywarma-Kyunkalay rural road and contain 1,512 people, 724 men and 788 women. In Thayawaddy Township, 3 village tracts with 13 villages are selected purposively, and quota sampling is used to choose sample families from 3 villages. Taro Yamane calculated 195 homes as the sample size. Due to questionnaires and other issues, only 120 families participated in this research. Thus, 120 questionnaires were distributed in Thayawaddy Township's selected village tracts.

4.2 Survey Design

This study uses descriptive and quantitative methods. The examined Thayawaddy Township village tracts had 120 households provide primary data. Secondary data comes from the General Administration Department, Rural Roads Development Department, and websites. After studying the literature, the questionnaire was created. The survey questionnaire was meant to measure rural road development's social and economic consequences on families. From 19 to 25 May, survey data was collected. Face-to-face interviews using well-prepared questionnaires were the main data gathering strategy. Four sections comprise the questionnaire. Part I covers sample household demographics. Part II covers rural road accessibility and utilization, including road quality, method of conveyance, and usage pattern. Part III of this study examines rural roads' socioeconomic effects. Part III covers agricultural, economic,

basic service, and other implications. Part IV measures sample families' agreement on rural road improvements using the five-point Likert scale.

4.3 Survey Results

In this part, the results are presented based on the data analysis for the socio-economic conditions and impact on agriculture, socio-economic, and service.

4.3.1 Socio-demographic Characteristics of Respondents

The general socioeconomic situations of 120 sample respondents are shown below. These include gender, age, marital status, relationship with household (HH) head, education, occupation, monthly income, landholding, and HH members' job. Table 4.2 provides respondent demographics.

Table (4.2) Demographic Characteristics of Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Gender		
	Male	68	57
	Female	52	43
	Total	**120**	**100**
2	Age Group (Years)		
	25-35	13	11
	36-45	28	23
	46-55	34	28
	56-65	30	25
	>65	15	13
	Total	**120**	**100**
3	Marital Status		
	Single	21	18
	Married	99	83
	Total	**120**	**100**
4	Respondents		
	Household Head	77	64
	Relationship with HH Head	43	36

Sr. No.	Items	No. of Respondents	Percentage
	Total	**120**	**100**
5	Education Level		
	Primary	45	38
	Middle	60	49
	High	11	9
	University	1	1
	Graduate	3	3
	Total	**120**	**100**
6	HH Head Occupation		
	Farming	57	48
	Daily Wage Labor	45	37
	Governmental Staff	3	2
	Causal Labor	6	5
	Others	9	8
	Total	**120**	**100**
7	Monthly Income		
	150,000-300,000	28	23
	300,001-450,000	35	30
	450,001-600,000	34	28
	>600,000	23	19
	Total	**120**	**100**
8	Employed Household Members		
	One	65	55
	Two	41	36
	Three	9	8
	Four	2	1
	Total	**117**	**100**

Source: Survey Data (May, 2025)

According to the gender in Table (4.2), it is categorized into two: male and female. The results presented in this table reveal that 57 % of the respondents are male while 43% are female. Therefore, the male is more participated than the female in this

survey. In accordance with age of household head, the respondents are categorized into five groups and the maximum age range is 46-55 years, by 28% followed by 25% of age group between 56 and 65 years, 23% of age group between 36 and 45 years, and 13% of age group above 65 years. The minimum age range is 25-35 years, by 11%. Therefore, the majority of the household head are between 46 and 55 years. Regarding the marital status of respondents, there are two categories and most of the respondents are married by 83% while the single respondents are 18% of the total respondents. In this study, there are 43 respondents who are not household heads.

In accordance with household head education, the respondents are grouped into primary, middle, high, university and graduate level and 45 respondents are primary education level by 38%, 60 respondents are middle education level by 49%, 11 respondents are high school level by 9%, only 1 respondent is university level and 3 respondents attain graduate. Based on the results, it can be said that most of the respondents are the middle level in education. According to household head occupation, the respondents are grouped into farming, daily wage labor, governmental staff, causal labor and others that are carpenter, masonry, vendor and fishing. The respondents (48%) work in farming, 37% of the respondents are daily wage labor, 2% of the respondents are governmental staff, 5% of the respondents are causal labor and 8% of the respondents are others (carpenter, masonry, vendor and fishing). Therefore, it can be concluded that most of the respondents are farmers followed by daily wage labor.

With regard to household monthly income in average, 28 respondents (23%) have the monthly income between 150,000 and 300,000 Kyats, 35 respondents (30%) earn the income between 300,001 Kyats and 450,000 Kyats per month, 34 respondents (28%) have the earning between 450,001 and 600,000 Kyats for a month while 23 respondents (19%) are with the monthly income in average above 600,000 Kyats. Therefore, it can be seen that the respondents who earn 300,001 and 450,000 Kyats are the most. According to the households by employed household members, there are 117 households with having employed members and others 3 households have not any employed members. The respondents are classified into 1 member, 2 members, 3 members, and 4 members based on the employed household members, 65 respondents have an employed member in their respective households by 55%, 41 respondents have two employed members by 36%, 9 respondents have three employed members by 8%, and 2 respondents have four employed members by 1%. Therefore, most of the respondents have the employed member in household with one member.

Regarding to the occupation of the respondents, 57 respondents are farmers. Therefore, these respondents by landholding area are grouped into between 1 and 5 acres, 6 and 10 acres, and above 10 acres, and Table (4.3) is the results.

Table (4.3) Percentage of Respondents by Landholding Area

Sr. No.	Landholding Area (ac)	No. of Respondents	Percentage
1	1-5	33	58
2	6-10	20	35
3	>10	4	7
	Total	**57**	**100**

Source: Survey Data (May, 2025)

As shown in Table (4.3), the respondents (58%) have the landholdings between 1 and 5 acres, 35% possess the cultivated land between 6 and 10 acres and only 7% have above 10 acres for their farming activities. And thus, the respondents are marginal farmers with 1-5 acres of cultivated land.

Subsequently, the respondents who are the farmers grows the crops as indicated in Table (4.4). Most of the respondents are paddy farmers (96%) in monsoon season while each 2% of the total respondents are farmers growing roselle and jackfruit, respectively. In summer season, most of the respondents are pulses farmers (92%) while each 4% of the total respondents are paddy farmers and roselle farmers, respectively.

Table (4.4) Percentage of Respondents by Growing Crops

Sr. No.	Monsoon Season			Summer Season		
	Crop	**Frequency**	**Percentage**	**Crop**	**Frequency**	**Percentage**
1	Paddy	55	96	Paddy	2	4
2	Roselle	1	2	Pulses	53	92
3	Jackfruit	1	2	Roselle	2	4
	Total	**57**	**100**	**Total**	**57**	**100**

Source: Survey Data (May, 2025)

4.3.2 Rural Road Accessibility and Usage

In this part, rural road condition, duration of accessibility, vehicle types for mode of transportation in this road and road utilization are described in Table (4.5).

Table (4.5) Rural Road Accessibility and Usage of Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Construction Status		
	Upgrading to Laterite Type	80	67
	Upgrading to Gravel Type	40	33
	Total	**120**	**100**
2	Duration of Accessibility		
	1-3 years	40	33
	> 3 years	80	67
	Total	**120**	**100**
3	Condition of Rural Road		
	Good	5	4
	Fair	115	96
	Total	**120**	**100**
4	Vehicle Types		
	Motorbike	95	79
	Bicycle	14	13
	Motorcar	5	4
	Light Truck	4	3
	Tricycle	2	1
	Total	**120**	**100**
5	Road Utilization		
	Daily	57	47
	Weekly	43	36
	Sometimes	20	17
	Total	**120**	**100**

Source: Survey Data (May, 2025)

As shown in Table (4.5), 80 respondents (67%) know that the rural road is upgraded from earth type to laterite type while 40 respondents (33%) express that rural road is upgraded from laterite type to gravel type. Therefore, it can be said that rural road is improved step by step from earth to gravel. As duration of accessibility, most of the respondents (67%) have access the rural road more than 3 years ago while 33% of

the respondents have the accessibility of rural roads during the period of 1 to 3 years. This figure indicates that the studied village tracts have the rural road facilities with year around since more than 3 years ago. According to condition of rural roads, it is fair by 115 respondents (96%) while it is good by 5 respondents (4%). This result is harmony with the information that it is fair condition of Ywarma-Kyunkalay rural road by the Department of Rural Road Development.

Most of the respondents (79%) use motorbike for their mode of transportation in this rural road; 13% of the respondents apply bicycle, 4% of the respondents use motorcar, 3% of the respondents apply light truck and only 1% of the respondents use tricycle. Therefore, it can be said that the villagers are utilizing mostly motorbike for mode of transportation to respective purposes and this vehicle type is in line with the load of vehicle type to be used in rural roads. Based on road utilization, 47% of the respondents have access the rural road in daily, 36% of the respondent use in weekly, and 17% of the respondents apply the rural road in sometimes. It can be concluded that this rural road is all-year-around road that is one of the targets in National Strategy.

4.3.3 Impact of Rural Road Development

Rural road development has the effects on respective sectors such as agriculture, economic condition, social condition, basic service access and others. The followings are the impact of rural road development.

(i) Impact on Agricultural Sector

The agricultural sector is most vulnerable sector compared with other sectors such as service and industry. The rural road network can provide to address some limitations in the agricultural production. Table (4.6) shows the impact of rural road development on agricultural inputs accessibility, crop yield and loss by the respondents (57 farmers).

Table (4.6) Impact on Agricultural Inputs Accessibility, Crop Yield and Loss by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Accessibility of agri-inputs		
	Easy	57	100
	Total	**57**	**100**
2	Situation of agri-inputs access		
	Increased	57	100
	Total	**57**	**100**
3	Price of agri-inputs		
	Low	2	4
	Normal	55	96
	Total	**57**	**100**
4	Crop Yield		
	Increased	46	81
	Normal yield	7	12
	Not sure	4	7
	Total	**57**	**100**
5	Reduction in crop loss or post-harvest loss		
	Yes	45	79
	No	12	21
	Total	**57**	**100**

Source: Survey Data (May, 2025)

As the results in Table (4.6), all respondents access the agricultural inputs especially quality seeds, fertilizers (organic fertilizer, inorganic fertilizer, foliar fertilizer), agro-chemicals such as pesticide, insecticide, herbicide in easier way compared with the situation before the rural road development. In addition, all respondents answered that the supply of agricultural inputs is increased. It can be seen that all respondents can purchase and utilize more agricultural inputs due to the abundant of input retails as village level agents with convenience transportation for the agricultural companies and agent. With direct procurement of the agents, the agricultural inputs can be bought with normal market price by 55 respondents (96%)

while only 2 respondents (4%) can purchase with low market price and in this case, these two farmers may be key farmers of Department of Agriculture. Having the opportunities of application of quality agricultural inputs, most of the farmers (81%) have the increased yield in the respective crops, 12% of the respondents have the normal yield as yield before the rural road development. However, 7% of the respondents are neither increased nor decreased yield. Despite increased yield, the crop loss in harvesting or post-harvest loss is one of the factors to increase productivity. In this regard, 45 respondents (79%) can reduce the crop loss or post-harvest loss together with the improvement of rural road and however, 12 respondents (21%) cannot reduce.

In regard to marketing of agricultural products, Table (4.7) exhibits the impact of rural road development on market accessibility by the respondents (57 farmers).

Table (4.7) Impact on Market Accessibility of Agricultural Products by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Market accessibility in villages or township		
	Increased	57	100
	Total	**57**	**100**
2	Marketplace for agri-products after rural road upgrading		
	Broker/Retail/Wholesale in the village		
	Unchanged	55	96
	Change	2	4
	Total	**57**	**100**
	Broker/Retail/Wholesale in other villages		
	Unchanged	57	100
	Total	**57**	**100**
	Rice miller/Retail/Wholesale in Thayawaddy Township		
	Changed	57	100
	Total	**57**	**100**
	Rice miller/Retail/Wholesale in other townships		
	Unchanged	57	100
	Total	**57**	**100**
3	Current Specific Marketplace		

Sr. No.	Items	No. of Respondents	Percentage
	Market in Thayawaddy Tsp.	57	100
	Total	**57**	**100**
4	Agri-product transportation		
	Easy	57	100
	Total	**57**	**100**
5	Time consumption to reach local market		
	Reduction in travel time	57	100
	Total	**57**	**100**

Source: Survey Data (May, 2025)

Concerning the agricultural product marketing, all respondents have market accessibility for their products to the ease and ability to reach and connect with buyers in either villages or township. As marketplace for agricultural products after rural road upgrading, most of the respondents (96%) are unchanged in brokers, retailers, and or wholesalers in the village while only 2% are changed in buyers. All respondents have also unchanged experience in brokers, retailers, and or wholesalers in other villages. However, there is changed in marketplace such as rice miller, retail, and or wholesale market in Thayawaddy Township. This changed marketplace happens due to the improved rural road access that is able to connect by the farmers to township. Also, all respondents have unchanged marketplace in rice miller, retailer, and or wholesaler in other townships. Based on the marketplace in respective areas, there is only changed marketplace in Thayawaddy Township as a specific marketplace by all respondents. All respondents can transport agricultural products easily to the local market with reduction in travel time to reach.

Rural road development can also affect farmers' use of agricultural technologies and information. Agricultural technology improves fieldwork efficiency and convenience. Each year brings new agricultural advancements. The respondents' usage of agricultural technology is also evaluated. Table (4.8) shows the assessment findings.

Table (4.8) Impact on Adoption of Agricultural Technology or Information by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Adoption of agri-technologies or information		
	Yes	57	100
	Total	**57**	**100**
2	Agri-technologies or information adopted by farmers		
	New crop varieties	55	96
	Systematic fertilizer application	48	84
	Mechanization	53	93
	Crop diversification	36	63
	Market information	12	21
3	More application of agri-machinery through hired service		
	Yes	57	100
	Total	**57**	**100**

Source: Survey Data (May, 2025)

According to the results in Table (4.8), all respondents adopt and apply the agricultural technologies or information. The adopted technologies are application of new crop varieties by 55 respondents (96%), systematic fertilizer application by 48 respondents (84%), mechanization by 53 respondents (93%), crop diversification by 36 respondents (63%) and market information by 12 respondents (21%). To operate the farming activities in time regarding the agricultural labor scarcity, all respondents (100%) apply more agricultural machineries such as hand tractor and tractor for land preparation and combine harvester for harvesting. Therefore, it can be concluded that most of the farmers are reachable especially in terms of new crop varieties, fertilizers application, and mechanization.

(ii) Impact on Economic Condition

Generally, rural road development significantly impacts economic conditions by enhancing accessibility, reducing transportation costs, and increasing the potential for economic growth in rural areas. And thus, it is evaluated the impact of rural road on economic condition and the results are described in Table (4.9).

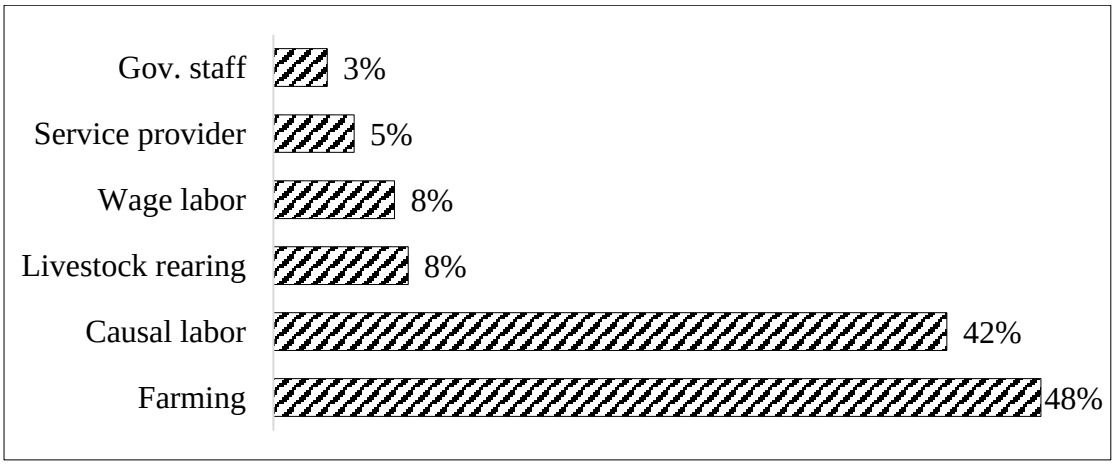
Table (4.9) Impact on Economic Condition by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Change in Household Income		
	Significantly increased	77	64
	Slightly increased	41	35
	Unchanged	2	1
	Total	**120**	**100**
2	Reduction in transportation cost of crops/products		
	Yes	108	90
	No	12	10
	Total	**120**	**100**
3	New rural business or trading in the village communities		
	Increased	120	100
	Total	**120**	**100**
4	New job or economic opportunities		
	Yes	119	99
	No	1	1
	Total	**120**	**100**

Source: Survey Data (May, 2025)

After implementation of improved rural road, whether a household's income will change or not. In the study village tracts, 119 respondents have changed in their households' income and among these respondents, 77 respondents (64%) have changed significantly and increasingly in households' income while 41 respondents (35%) have changed slightly to increase their households' income. However, there is only 2 respondents have not changed in households' income. Transportation cost is one of the benefits of rural road development. According to this transportation cost of crops or products, there is reduction in transportation cost by 108 respondents (90%) and not reduction by 12 respondents (10%). Along with the positive effect of rural road accessibility, there is new entry of rural business or trading in the village communities and all respondents (100%) encounter that it is increased number of new rural business or trading in their respective villages. The 99% of the respondents have new job or economic opportunities after rural road development while only one has not.

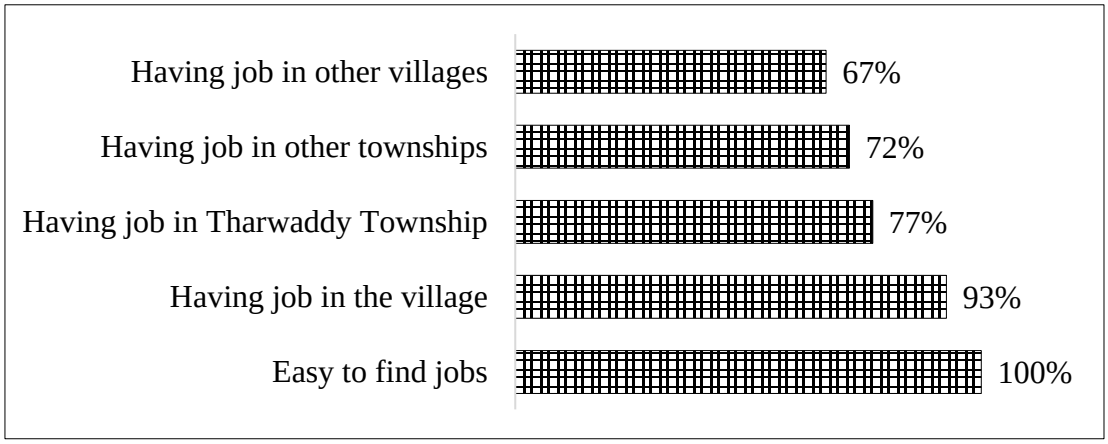
Figure (4.1) Sources of Household Income by Respondents



Source: Survey Data (May, 2025)

As presented in Figure (4.1), household income sources after rural road improvement are farming by 48% of the total respondents, livestock rearing by 9%, wage labor by 8%, causal labor by 42%, government staff by 3% and service provider such as driver, motorbike taxi, etc. by 5% of the total respondents. These results reveals that there are some households that have more than one income source in the study areas.

Figure (4.2) Job Opportunities by Respondents



Source: Survey Data (May, 2025)

In regard to job opportunities for household members after rural road development, all respondents have the experience in finding jobs easily. Therefore, 93% of the respondents have job in the village, 67% have job in other villages, 77% have job in Thayawaddy Township and 72% of the respondents have job in other

townships. These results imply that most of the respondents have experienced for their household's members who are working or worked in their village, other villages, and townships.

(iii) Impact on Service Access

All publicly owned roadways that connect rural towns and communities to economic and social services are rural roads. Table (4.10) shows how rural roads affect agricultural extension services in the research locations. This table compares 57 farmers' access to agricultural extension services before and after rural road construction. Before rural road development, 88% of respondents were rare to access in agricultural extension services for crop production technologies and market information. On the other hand, 79% of respondents often access of agricultural extension services through various channels after rural road development. Therefore, it can be concluded that the rural roads can facilitate to have knowledge on agricultural technologies by accessing extension services.

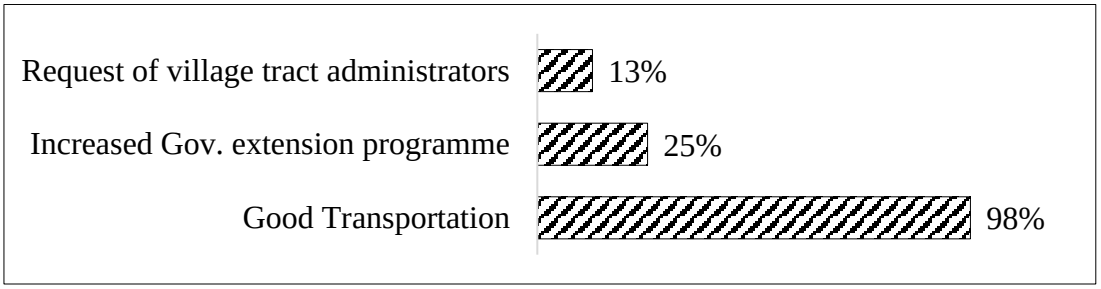
Table (4.10) Impact on Agricultural Extension Service Access by Respondents

Sr. No.	Items	Before		After	
		No. of Respondents	Percentage	No. of Respondents	Percentage
1	Often (monthly)	2	3	45	79
2	Sometimes (2 times/season)	5	9	12	21
3	Rare	50	88	-	-
	Total	**57**	**100**	**57**	**100**

Source: Survey Data (May, 2025)

Figure (4.3) exhibits the respondents' perception according to the reasons for accessing agricultural extension services. As shown in this figure, there are agricultural extension services due to good transportation by 98% of respondents; increased government extension program by 25% of respondents; and request of village tract administrators by 13% of respondents.

Figure (4.3) Reasons for Accessing Agricultural Extension Services by Respondents



Source: Survey Data (May, 2025)

According to the access of educational service by the respondents, Table (4.11) shows the effect of rural road development on this service in the study village tracts.

Table (4.11) Impact on Educational Service by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Educational service		
	Increased	120	100
	Total	**120**	**100**
2	School completion rate		
	Increased	117	98
	Constant	3	2
	Total	**120**	**100**
3	Attendees by students		
	Increased	120	100
	Total	**120**	**100**
4	Attendees by teachers		
	High	118	99
	Unknown	2	1
	Total	**120**	**100**
5	Recruitment of teachers		
	More	117	98
	Unknown	3	2
	Total	**120**	**100**

Source: Survey Data (May, 2025)

Regarding to the results in Table (4.11), all respondents (100%) have the agreement on increased access in educational service in their villages. As school completion rate, particularly primary level, 117 respondents (98%) have experienced in increased primary school completion rate while 3 respondents (3%) agree with constant rate in primary school completion. All respondents recognize the effect of rural road on student attendance in school that the attendees by students increased. Also, there are high teacher attendance in school according to 99% of respondents. In the primary school of the villages, teachers are more recruited in accordance with 98% of respondents.

Concerning the access of health, financial and other services, Table (4.12) exhibits the impact of rural road development on the health, financial service and other service accessibility by the respondents.

Table (4.12) Impact on Health, Financial, and Other Services by Respondents

Sr. No.	Items	No. of Respondents	Percentage
1	Health service		
	Fair	78	65
	Good	42	35
	Total	**120**	**100**
2	Visit of community health workers		
	Regular	108	90
	Sometimes	12	10
	Total	**120**	**100**
3	Reason for access of health services		
	Rural road accessibility	102	85
	Quality health care of community health workers	7	6
	Gov. priority on health sector	11	9
	Total	**120**	**100**
4	Financial service		
	Increased	116	97
	Not increased	4	3
	Total	**120**	**100**

Sr. No.	Items	No. of Respondents	Percentage
5	Governmental and administrative services		
	Increased	120	100
	Total	**120**	**100**
6	Transportation of emergency services		
	Easy	118	98
	Difficult	2	2
	Total	**120**	**100**
7	Travelling of women and girl for social activities		
	Freely	119	99
	Restriction	1	1
	Total	**120**	**100**

Source: Survey Data (May, 2025)

The results indicated in Table (4.12) show the impact of rural road development on health, financial and other services by the respondents. Regard to the health service, 65% of respondents receive the health service in fair condition while 35% of respondents access this service in good condition. And, 90% of respondents agree that community health workers visit regularly and however, 10% agree on sometimes visiting by community health workers. Community health workers can contribute to the villages due to rural road accessibility by 85% of respondents, quality health care of community health workers by 6% of respondents and government priority on health sector by 9% of respondents. As financial service access, there is increasing access by 97% of respondents and constant access by 3% of respondents. Moreover, the studied villages have the increased governmental and administrative services by all respondents (100%). To be gender equality, the access of rural roads can support to participate in social activities and thus, 99% of the respondents agree that women or girl can travel freely to nearby villages while only 1% cannot travel due to restriction.

4.3.4 Respondent Perception on Impact of Rural Road Development on Socio-Economic Condition

Participants rate 12 items on a 5-point Likert scale to determine how rural road construction affects their socioeconomic status. Best (1977) defines the mean value of

five-point Likert scale items as strongly disagree (1.00-1.80), disagree (1.81-2.60), neither agree nor disagree (2.61-3.40), agree (3.41-4.20), and strongly agree (4.21-5.00).

Table 4.13 displays respondents' socioeconomic effect perceptions. The mean score, 4.22, shows that respondents strongly believe that rural road construction affects socioeconomic conditions. Among the assertions, higher land and property prices had the greatest mean, 4.51, followed by regular school attendance (4.37), and greater work prospects in communities (4.34). The assertion of influence on local economy has the lowest mean value, 4.03, yet respondents concur. Thus, rural road construction affects education by increasing student attendance, employment possibilities, market travel time, social cohesion, and quality of life in the study communities.

Standard deviation measures data dispersion. Statisticians often use the standard deviation to assess confidence. According to Bland and Altman (1996), Table (4.13)'s standard deviation is 0.48, indicating that data points are near to the mean

Table (4.13) Respondent Perception on Impact of Rural Road on Socio-Economic Condition

Sr. No.	Statements	Mean	Std. Dev.
1	Not taking more time to reach local market	4.12	0.48
2	More access of health service for households	4.16	0.49
3	Regular attending to the school easily	4.37	0.49
4	More job opportunities in the villages	4.34	0.49
5	Access of stable market for agri-products	4.13	0.49
6	Affordable transportation cost of product	4.15	0.49
7	Increased public service	4.06	0.51
8	Effect on local economy	4.03	0.51
9	Increased social connection with other villages	4.29	0.52
10	Increased prices of land, and property	4.51	0.53
11	Increased women participation in social activities	4.22	0.53
12	Increased quality of life in the village	4.28	0.49
	Overall Mean and Standard Deviation	**4.22**	**0.48**

Source: Survey Data (May, 2025)

CHAPTER V
CONCLUSION

5.1 Findings

This study's objectives are to study the development of rural road infrastructure in Thayawaddy Township and to analyze the effect of rural road network on socio economic conditions in the study areas. Up to 2023-2024 FY, there are four types of rural road infrastructure such as concrete, asphalt, gravel and laterite rural roads in the rural road network of Tharyarwady Township. These types of rural roads are totally length of 65 miles and 3.741 furlong in which 18% of concrete rural roads, 2% of asphalt rural roads, 17% of gravel rural roads, and 63% of laterite rural roads. Therefore, the laterite type of rural roads is the most in the study township. Bridge is one of the activities in rural road infrastructure development. There are 36 bridges with totally 885 feet. Among these bridges, 26 bridges in concrete type, 1 bridge in timber type, and 9 bridges in box/pipe culvert type were built. Accordingly, the most bridges are concrete type in Thayawaddy Township.

To achieve the objective of the study, primary data were collected from 120 respondents in three village alongside of the Ywarma-Kyunkalay rural road and these data were analyzed by descriptive method. With regard to the results of analysis for demographic characteristics of sample respondents, male residents were more participation in this study; age range between 46 and 55 years was the most; most of respondents were married and are household heads themselves; household heads attained the education mostly in middle school; the respondents were farmers with 1-5 acres of cultivated land at most; paddy farmers in monsoon season, and pulses farmers in summer season was mostly, most of respondents had the monthly income between 450,001 and 600,000 Kyats; most of the household had one member employed.

As rural road accessibility and usage, the rural roads were mostly improved from earth type to laterite type more than 3 years ago and fair in condition. The most type of vehicle used in rural road was motorbike and most of respondents utilize the rural road in daily. Rual roads effect on agricultural sector through easy accessibility of agricultural inputs with increasing access by normal price. Most of the respondents had

increased crop yield and more productivity by crop loss or post-harvest loss reduction after implementation of rural road. As market accessibility for crops, there are more buyers and change in buyers in Thayawaddy Township. Currently, most of the farmers have specific marketplace in Thayawaddy Township after rural road development. The farmers can transport their agri-products easily and reduce the travel time to reach local market. Most of the respondents can adopt the agricultural technologies or information such as new crop varieties, systematic fertilizer application, mechanization, crop diversification and market information.

Rural roads also effect on economic condition of the residents. Most of respondents had increased significantly as changed in household income. Most respondents had reduction in transportation cost of crops or products. Most of the respondents noticed that new rural businesses or trading were set up in the villages and there were more opportunities in new jobs or economy. Due to rural road development, the sources of household income were farming, causal labor, livestock rearing, wage labor, service provider and government staff. All respondents were easy in finding jobs and having job in the village was the most.

As impact of rural roads on service access of agricultural extension, education, health, financial and others, the respondents had access of agricultural extension monthly due to good transportation, increased government extension programmes and request of village tract administrators; the respondents had also increased access of educational service and high school completion rate, attendees by students, attendees by teachers, and more recruitment of teachers encountered by most of respondents; the health service was also delivered in fair condition due to regular visits of community health workers for having all-season-road, and government priority on health sector. In addition, most of the respondents received the financial service increasingly with increased access of governmental and administrative services. There were also easy in transportation of emergency services and as gender equality, women and girl can travel freely for social activities. Generally, most of the respondents agree that the rural roads impact on socio-economic condition according to the results of respondent's perception.

5.2 Suggestions

Based on the positive effects of rural road development in villages, some suggestions are drawn. It needs to prioritized in investment for all-season rural roads that are a fundamental step towards holistic rural development. To maximize the socio-economic impact, road infrastructure development should be strategically integrated with complementary interventions. These interventions should be provision of training on improved farming techniques, market linkages, and access to affordable inputs to fully leverage the benefits of improved market access. In addition, it needs to invest in rural health centers, train healthcare professionals, and ensure consistent supply chains for medicines, so that improved access to facilities translates into quality healthcare. To expand educational opportunities, it needs to support the establishment of more schools in remote areas, and provide incentives for qualified teachers. Moreover, it should promote financial literacy and inclusion through implementing programs to educate villagers on financial services, encourage savings, and facilitate access to appropriate credit products, especially for smallholder farmers and women entrepreneurs.

To ensure the sustainability and relevance to local needs, the residents should involve in the planning, construction, and maintenance of rural roads and this can also lead to create employment opportunities. If the GOM and other related stakeholders adopt a comprehensive approach considering the interconnectedness of these respective sectors, the rural road access can act as a catalyst for sustainable socio-economic development and poverty reduction in the villages of Thayawaddy Township.

REFERENCES

Adamu, Y., & Kawugana, A. (2025). Impact of constructing roads in rural areas on livelihood and agricultural development in Bauchi State. *International Journal of Agriculture and Earth Science (IJAES), 11*(2), 125-138.

Asian Development Bank (ADB). (2002). *Impact evaluation study of rural roads on poverty reduction*. Manila.

Asian Development Bank (ADB). (2017). *Programme for Infrastructure Development in Africa*. African Development Bank Group.

Adebayo, A. D. (2020). Community empowerment in Nigeria's tourism industry: an analysis of stakeholders' perceptions. *Tour Plan Development*.

Aggarwal, S. (2018). Do rural roads create pathways out of poverty? Evidence from India. *J. Dev. Econ. 133*, 375-395.

Asian Development Bank (ADB). (1998). *project performance audit report on the farm-to-market roads project in Pakistan*. Manila.

Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy*, *26*, 315-331.

Bell, C., & Dillen, S. V. (2012). How does India's rural roads program affect the grassroots? Findings from a survey in Orissa. *Policy Research Working Paper 6167*, World Bank.

Best, A. (1977). Consumer Response to Unsatisfactory Purchases: A Survey of Perceiving Defects, Voicing Complaints, and Obtaining Redress. *Law & Society Review, 11*, 701-742.

Bhalla, G. S. (2002). *Evaluation of infrastructural interventions for rural poverty alleviation*. New Delhi (UNs): Asian Institute of Transport Development.

Binswanger, H. P., Khandker, S. R. & Rosenzweig, M. R. (1993). How infrastructure and financial institutions affect agricultural output and investment in India. *Journal of Development Economics, 41*(2), 337-366.

Callanta, D. S. A. & Moreno, F. (2024). The socioeconomic implications of farm-to-market road infrastructure on rural development in Zamboanga Sibugay Province, Philippines: An analysis of policy and community outcomes. *Munich Personal RePEc Archive (MPRA) Paper No. 122793*.

Davis, A. & Njenga, P. (2003). Drawing the road map to rural poverty reduction. *Transport Reviews, 23*(2), 217-241.

Department of Planning (DoP). (2023). *Myanmar agriculture in brief*. Ministry of Agriculture, Livestock, and Irrigation, Naypyitaw, Myanmar.

FAO (2018). *Sustainable agricultural mechanization: A framework for Africa*. Addis Ababa.

FAO (2018). *The future of food and agriculture: Trends and challenges*. Food and Agriculture Organization of the United Nations, Rome, Italy.

Federal Ministry of Works and Housing. (2020). *Nigeria's rural road network: Development strategies and challenges*. Abuja: Government Press.

Gachassin, M., Najman, B., & Raballand, G. (2010). The impact of roads on poverty reduction: A case study of cameroon. *World Bank Policy Research Working Paper No. 5209.*

Gannon, C., & Liu, Z. (1997). *Poverty and transport. TWU discussion papers, TWU-30*. Washington, DC: World Bank.

Heinze, G. W. (1976). Toward a theory of transport and regional development: a critical appraisal of Voigt's theory. *Int. Journal of Transport Economics,3*(1), 3-36.

Hirschman, A. O. (1958). *Rural transport and regional development: The case of Makete District, Tanzania*. Baden Baden. Nomograph.

Jacobs, G. D. & Greaves, N. (2003). Transport in developing and emerging nations. *Transport Reviews, 23*, 133-138.

Kubendran, C. (2020). Impact of roads and road construction on the socioeconomic status of a community. *Webology (ISSN: 1735-188X) 17*(3), 221-225.

Limkamar, J. K. (2017). *Influence of infrastructural projects on socio-economic development among the rural dwellers of Pokot South sub-County, West Pokot County, Kenya.* Master of Art in Project Planning and Management, University of Nairobi.

Lokesha, M. N. & Mahesha, M. (2017). Impact of road infrastructure on agricultural development and rural road infrastructure development programmes in India. *Int. J. Humanit. Soc. Sci. Invent.*, *5*, 1-7.

Lwin, A. A. (2024). *A study on the effects of road improvement on people in rural area (Case study: Seik Hpu (South) Village-Tract in Taungoo Township*). Unpublished thesis for Master of Development Studies. Yangon University of Economics.

Metschies, G. P. (2002). *Finance, organization and participation: Country- specific solutions for rural road networks, the GTZ experience*. AIPCR /PIARC - World Road Association C3 and C20 Technical Committee Meetings, Cambodia.

Mie Mie Tun (2019). *Analysis on the impacts of road infrastructure network in rural area of Myanmar (A case study on Ywa Ngan township, Southern Shan State).* Unpublished thesis for Master of Development Studies. Yangon University of Economics.

MoALI & MOBA (2017). National strategy for rural roads and access. Nay Pyi Taw, Myanmar.

Molesworth, K. (2006). *Mobility and health: The impact of transport provision on direct and indirect determinants of access to health services*. Mobility and Health Project Paper.

Naw Sandi Htun (2021). *A study on the effect of rural road infrastructure improvement on rural development (A case study in Twantay Township).* Unpublished thesis for Master of Development Studies. Yangon University of Economics.

Nseobot, I. R., Bassey, C., & Kanwal, N. D. S. (2023). Assessment of rural road network on economic development of local government areas in Nigeria. *Int'l J. of Org. Bus. Excellence, 6*(1), 1-18.

Ogunleye, B. O. (2019). Some determinants of visibility boost for research publications among early career educational researchers in Southwest, Nigeria. *African Journal of Pedagogy, 8*(1), 93-111.

Parashar, J. & Singh, S. (2023). Socio economic impact of rural roads in Agra District. *Educational Administration: Theory and Practice, 29*(4), 2797-2803

Paul, R. (1967). *The geography of transport systems*. London and New York: Routledge and Taylor & Francis Group.

Prud' homme, R. (2005). Infrastructure and development: Lessons of experience. *Proceedings of the 2004 Annual Bank Conference on Development Economics.*

Sama, A. C. & Aggarwal, I. C. (2021). *Socio-economic impact of rural road and parameters for evaluation*. National Rural Infrastructure Development Agency (NRIDA), India.

Sieber, N. & Allen, H. (2016). *Impacts of rural roads on poverty & equity*. UN-ESCAP.

Smith, D. R., Gordon, A., Meadows, K., Zwick, K. (2001). Livelihood diversification in Uganda: Patterns and determinants of change across two rural districts. *Food Policy, 26*(4), 421-435.

Su Mon Mon Phuu (2022). *A study on rural road infrastructure development in Gyopinkauk Township*. Unpublished thesis for Master of Development Studies. Yangon University of Economics.

Tiwari, A. & Shukla, B. C. (2024). The impact of road development on livelihoods in rural communities: A case study of Raisen District. *International Journal of Research Publication and Reviews, 5*(9), 1153-1159.

UN-ESCAP (1991). *Study on the determination of technical standards of rural road transport*. United Nations, New York.

Wilson, G. W. (1973). *Towards a theory of transportation and development*. Hoyle B.S Transport and Development, London.

World Bank (2021). *Well maintained: economic benefits from more reliable and resilient infrastructure*. Washington, DC, USA.

APPENDIX

SURVEY QUESTIONNAIRE

Section A: Demographic Information

1. Respondent's Name: _____
2. Gender: ☐ Male ☐ Female
3. Age: _____ years
4. Marital Status: ☐ Single ☐ Married ☐ Widowed ☐ Divorced
5. Education Level of Head of Household:

   ☐ Primary ☐ Secondary ☐ High School ☐ University Level ☐ Graduate
6. Main Occupation of Head of Household:

   ☐ Farmer ☐ Laborer ☐ Trader ☐ Government Employee ☐ Other: _____
7. Monthly Household Income: _____ Kyats
8. Landholding Size (if any): _____ acres
9. If there are landholdings, main crops cultivated:

   In monsoon _____; In summer _____
10. Number of employed members in the household: _____ persons

Section B: Rural Road Access and Usage

11. Has a rural road been constructed or upgraded in your area? ☐ Yes ☐ No
12. When was the rural road constructed or improved in your area?

    ☐ Within last 1 year ☐ 1-3 years ago ☐ More than 3 years ago
13. What is the condition of the road currently?

    ☐ Good ☐ Fair ☐ Poor ☐ Very Poor
14. What types of vehicles use the road most frequently?

    ☐ Motorcycles ☐ Bicycles ☐ Cars ☐ Trucks ☐ Bus ☐ Other: _____
15. How often do you use the road?

    ☐ Daily ☐ Weekly ☐ Occasionally ☐ Rarely

Section C: Impact of Rural Road Accessibility

(a) Agricultural Sector

16. Availability of agricultural inputs (e.g., seeds, fertilizers, pesticides)

    Before: ☐ Easy ☐ Moderate ☐ Difficult

    After: ☐ Easy ☐ Moderate ☐ Difficult

17. Has road access improved the availability of inputs (e.g., seeds, fertilizer, pesticides) in time? ☐ Yes ☐ No

18. Are input prices lower or more stable due to better road connectivity?
☐ Lower ☐ No Change ☐ Higher

19. Has your crop yield improved since the road construction?
☐ Yes ☐ No ☐ Not Sure

20. Do you be ease of transporting agri-products to market improved?
☐ Yes ☐ No

21. Time taken to reach the nearest market (in minutes):
Before: _____
After: _____

19. Has access to local or urban markets increased? ☐ Yes ☐ No

20. Changes in Market for your agri-products before and after the road improvement

Item	Before	After
Broker/Retailer in the village/		
Broker/Retailer in other villages		
Wholesaler in Tharwaddy Township		
Wholesaler in other townships		

21. Has spoilage or post-harvest loss reduced due to better roads?
☐ Yes ☐ No

22. Were new agricultural techniques or information adopted after the road improvement? ☐ Yes ☐ No
If yes, specify: _____

23. Are agricultural machines (tractors, combine harvester) more available or usable due to road access? ☐ Yes ☐ No

24. Has the use of mechanized farming methods increased?
☐ Yes ☐ No

25. Are you able to transport machinery or hire mechanized services more easily?
☐ Yes ☐ No

(b) Economic Impact

26. Source of Income of your household before and after the road Improvement

Item	Before	After
Farming		
Livestock rearing		
Wage labor		
Causal labor		
Own Business		
Government Staff		
Private Staff		
Driver/ Transportation		

27. Has your household income changed after the road improvement?

☐ Increased Significantly ☐ Increased Slightly

☐ No Change ☐ Decreased

28. Job Opportunities of youths from respondents' households before and after the road improvement.

Item	Before	After
Difficult to find jobs		
Work in the village		
Work in other villages		
Work in urban		
Work in other townships		
Work in abroad		

29. Have you gained new employment or business opportunities due to better road access? ☐ Yes ☐ No

30. Has the road helped in reducing transportation costs for your goods or produce?

☐ Yes ☐ No

31. Have new businesses or trade activities emerged in your village?

☐ Yes ☐ No

(c) Impact on Access to Services

32. Were agricultural extension services available in your village before road improvement? ☐ Yes ☐ No

33. If yes, how often did you or your household access the agricultural extension service?

    Before: ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Never

    After: ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Never

34. Has access to education improved due to better roads? ☐ Yes ☐ No

35. Are school attendance and completion rates in your village increasing? ☐ Yes ☐ No

36. Do children attend school more regularly after road improvement? ☐ Yes ☐ No ☐ No Change

37. Has teacher attendance improved after road improvement? ☐ Yes ☐ No ☐ Don't Know

38. Are more teachers or staff available in schools after the road improvement? ☐ Yes ☐ No ☐ Don't Know

39. Has access to financial services (e.g., credit, microfinance) improved? ☐ Yes ☐ No

40. Has the road improved access to social services (health, education, government)? ☐ Yes ☐ No

41. How would you rate access to health services?

    Before: ☐ Very Poor ☐ Poor ☐ Average ☐ Good ☐ Excellent

    After: ☐ Very Poor ☐ Poor ☐ Average ☐ Good ☐ Excellent

42. Frequency of visits by community health workers (doctors, nurse or midwives)

    Before: ☐ Regular ☐ Occasional ☐ Rare ☐ Never

    After: ☐ Regular ☐ Occasional ☐ Rare ☐ Never

43. Are emergency services (e.g., ambulance, fire truck) able to reach your village more easily? ☐ Yes ☐ No

(d) Other Impacts

44. Are people relocating to/from your village due to better road access?
☐ In-migration ☐ Out-migration ☐ No Change

45. Has contact with other villages or towns increased since the road construction?
☐ Yes ☐ No

46. Has the road increased participation in community events, festivals, or meetings?
☐ Yes ☐ No

47. Has road development encouraged other infrastructure growth?
☐ Electricity ☐ Water supply ☐ Internet
☐ Shops ☐ Schools ☐ Health centers

Section D: Perception on Socio-Economic Impact Statements

Please indicate the level of agreement with each statement after rural road improvement.

(1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Sr. No.	Statement	1	2	3	4	5
1	Travel time to markets is reasonable.					
2	My household has better access to healthcare facilities.					
3	Children in the village can easily attend school regularly.					
4	Employment opportunities in the village have increased.					
5	Agricultural produce reaches the market in good condition.					
6	Transportation cost for goods and people is affordable.					
7	Access to government services has improved.					
8	The road improvement has positively impacted the local economy.					

Sr. No.	Statement	1	2	3	4	5
9	Social interaction with nearby communities has increased.					
10	Property and land values in the village have increased.					
11	Women's mobility and participation in public life has improved.					
12	Quality of life in the village has improved overall.					

Thank you very much for your available time and response.