

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

**A STUDY ON THE EFFECTS OF ROAD IMPROVEMENT
ON PEOPLE IN RURAL AREA
(CASE STUDY: SEIK HPU (SOUTH) VILLAGE-TRACT IN
TAUNGOO TOWNSHIP)**

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EMPA – 1 (19th BATCH)**

JULY, 2024

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**A thesis submitted as partial fulfillment towards the requirements 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 EFFECTS OF ROAD IMPROVEMENT ON PEOPLE IN RURAL AREA (CASE STUDY: SEIK HPU (SOUTH) VILLAGE-TRACT IN TAUNGOO 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 progress of road infrastructure in Myanmar and the impact of road enhancements on the socioeconomic condition of rural families in the specified region. This study employs a combination of quantitative and qualitative methodologies, utilizing both primary and secondary data sources. Data is gathered directly from 300 household leaders residing in 6 communities situated along the Taungoo - Leiktho Road. Research has shown that the enhancement of rural roads has a significant impact on the transformation of revenue sources, social status, and living standards among rural populations. In order to enhance the socio-economic conditions of rural populations, it is imperative for the government to establish and execute priority programs aimed at long-term improvement of rural areas. These programs should focus on enhancing road infrastructure, increasing income levels, improving school attendance rates, facilitating access to healthcare services, and enhancing local transportation options.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
CRRN	Core Rural Road Network
DPBANRD	Department of Progress of Border Areas and National Races Development
DRD	Department of Rural Development
DRRD	Department of Rural Roads Development
IEF	International Energy Forum
MOALI	Ministries of Agriculture, Livestock and Irrigation
MOBA	Ministry of Border Affairs
MOC	Ministry of Construction
MOTC	Ministry of Transport and Communications
NRRSS	National Rural Road Standards and Specifications
OECD	Organization for Economic Cooperation and Development
RRAI	Rural Road Access Index
SDG	Sustainable Development Goals
TDCs	Town Development Committees

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

A nation's ability to prosper economically depends in large part on its infrastructure. Infrastructure includes both physical elements like utilities and transportation networks as well as intangible elements like institutional frameworks and communication networks. Road infrastructure is one of the many different forms of infrastructure that has been vital to almost every economy for many years.

The construction of roads greatly improves rural lives. Increased connection facilitates more effective agricultural product transportation, which lowers losses and increases farmers' revenue. Increased market accessibility enhances the realization of prices. Additionally, improved roads lower health hazards and promote the development of human capital by facilitating access to school and healthcare. Improved infrastructure draws capital, which diversifies the economy and lessens reliance on agriculture. Connectivity promotes social interaction and community involvement. The Asian Development Bank, or ADB (2020), estimates that about a billion people worldwide have restricted access to road infrastructure.

Due to the many ways that road infrastructure affects rural residents' lifestyle and means of subsistence, rural residents place a high value on it. In essence, road infrastructure promotes rural communities' social and economic growth. For rural residents, road infrastructure is a lifeline that transforms their socioeconomic circumstances by giving them access to opportunities, services, and connections that are critical to their advancement. Enhanced market connectedness, increased access to services, increased agricultural output, income diversification, and job creation are a few of these.

Good road infrastructure, in particular, helps rural communities become less isolated and more integrated with regional businesses and metropolitan centers. Improving agricultural returns requires strengthening relationships between remote rural people and markets. Not only may better road connection contribute to economic advancements, but it can also increase women's mobility in rural regions, social connectedness, access to healthcare and education, and quick emergency responses. The combined effects of better road infrastructure, particularly in emerging nations, raise living standards, lower poverty rates, and promote sustainable economic growth, all of which support rural development.

In Myanmar, a developing nation, almost two-thirds of the population lives in rural regions, or 70% of the total population (UNFPA, 2023). The central region of Myanmar is facing challenges related to poverty and food insecurity, among other things. In central Myanmar, over 43% of people live below the poverty line, and between 40% and 50% of the rural population is landless (WFP, 2013). Therefore, improving the standard of living for rural families in central Myanmar is essential.

The construction and modernization of road infrastructure across the whole of Myanmar has been a component of rural infrastructure development initiatives carried out in the last ten years. Taungoo-Leiktho Road is one of these road systems that links Kayin State with Taungoo Township. This research looks at how villages in Taungoo Township's Seik Hpu (South) Village-Tract have enhanced their social and economic activities as a result of building and maintaining the rural road.

1.2 Objectives of the Study

The objectives of the study are

1. To examine the development of road infrastructure in Myanmar
2. To analyze the effect of road improvement on socioeconomic of rural households in the study area.

1.3 Method of Study

Based on primary and secondary data, this research included both quantitative and qualitative methodologies. On the Taungoo-Leiktho Road, 300 heads of families from six of the nine communities provided primary data. Primary data were gathered using the quota sampling approach and a well-designed, all-inclusive questionnaire. Related departments' websites and online resources provide secondary data. There are

two parts in the survey questionnaire. Section two analyzes the impact of households' socioeconomic status, whereas Section I covers the respondents' demographic circumstances.

1.4 Scope and Limitations of the Study

The impact of developing road infrastructure on rural families' socioeconomic status in the research region is the main focus of this investigation. Included in this research were the heads of 300 families spread across six chosen villages along the Taungoo-Leiktho Road in Seik Hpu (South) Village-Tract. Nine settlements make up this tract, and there were 2235 households living there. Fifty heads of families from each community were polled on their progress in social and economic activities from the road. This research does not include the whole township; rather, it only looks at one village tract.

1.5 Organization of the Study

There are five chapters in this work. The first chapter serves as an introduction, outlining the goals, methodology, scope, constraints, and structure of the research. The literature reviews in Chapter 2 include the idea of infrastructure, its significance, the function of road infrastructure in rural areas, and evaluations of earlier research. The third chapter provides a summary of Myanmar's rural road infrastructure, including the Taungoo-Leiktho Road's development and the country's rural roads plan. Chapter Four analyzes the impact of road development on rural socioeconomic factors, including study area profile, survey profile, respondent sociodemographics, and impact of road improvement on rural livelihoods. Chapter 5 concludes with recommendations and conclusions.

CHAPTER II

LITERATURE REVIEW

2.1 Concept of Infrastructure

Infrastructures are crucial for guaranteeing the supply of commodities and services that support economic development and prosperity. Historically, railroad engineering terms have borrowed the word "infrastructure" from French. Infrastructure—derived from French *infra-* meaning underground and *structure* meaning construction—emerged in the late 1880s. Infrastructure may be an economy's foundation. Although the importance of infrastructure for economic growth has been acknowledged since the late 1970s, its relationship to the reduction of poverty was first investigated in the 1990s (Tirado, 2011).

The term "infrastructure" describes the essential organizational and physical structures and facilities required for a society, economy, or area to operate and grow. It serves as the foundation for the operations of a country or community, enabling a range of activities and promoting social, cultural, and economic exchanges. Infrastructure includes both physical elements like utilities and transportation networks as well as intangible elements like institutional frameworks and communication networks. An infrastructure is a facility that facilitates the production and exchange of commodities and services in the economy. Infrastructure includes public utilities, information technology, formal and informal communication routes, software development tools, and economic-sustaining social and political networks.

Hard and soft infrastructures are two categories for infrastructure. **Hard infrastructure** refers to the physical infrastructure required to realize a modern country. The first priority is the provision of basic utilities, such as waste management and access to roads, trains, and airplanes, since they enable a community to conduct economic, social, and environmental activities within a framework. Subsequently, it comprises public structures and communal amenities that are vital to the upkeep of community life. They provide for the social, cultural, recreational, and developmental

requirements of the community's residents. This table displays the main categories of hard infrastructures (Lecki, 2023).

Transport infrastructure, energy infrastructure, public utility infrastructure, and communication infrastructure are the four categories of hard infrastructures, as shown in Table (2.1).

Table (2.1) Types of Hard Infrastructure

Sr.	Transport Infrastructure	Energy Infrastructure	Public Utility Infrastructure	Communication Infrastructure
1	Road and highway networks, signage and markings, electrical systems specialized facilities	Electrical power network, - generation plants, electrical grid, substations and local distribution	Drinking water supply	Postal service
2	Mass transit systems – commuter rail systems, subways, tramways, roads and highways, bus transportation	Natural gas - pipelines, storage and distribution terminals, local distribution network	Sewage collection, and disposal of <u>waste water</u>	Telephone networks-land lines telephone exchange systems and mobile phone networks
3	Railways, train stations, signaling and communications systems	Petroleum pipelines-storage and distribution terminals	Major irrigation systems	Cable television physical networks
4	Canals and navigable waterways	Coal handling facilities	Major flood control systems	Internet
5	Seaports and lighthouses	Networks for public heating systems	Coastal management,	Communications satellites
6	Airports, air navigational systems		Waste management	Undersea cables

Source: Casey (2005)

Road, mass transit, rail, water, and aviation transportation infrastructure are all examples of transport infrastructure. Signage and markings, electrical systems, road and highway networks, and specialized facilities include mass transit systems, while commuter rail systems, subways, tramways, roads, and bus transportation comprise commuter rail systems. Water transport infrastructure comprises seaports, canals, navigable waterways, and lighthouses, whereas rail transport infrastructure consists of railroads, train stations, signaling, and communications systems. Airports, along with air navigation systems, are examples of air transport facilities.

The term "energy infrastructure" refers to the coal handling facilities, public heating systems, gas and petroleum pipelines, and electrical power networks. Substations, local distribution, electrical grid, power producing facilities, and electrical power network, among other things. The energy infrastructure includes local distribution networks, storage and distribution terminals, and pipelines for natural gas. In addition, energy infrastructures include networks for public heating systems, coal handling facilities, and petroleum pipelines, storage, and distribution terminals.

A few examples of public utility infrastructure include the provision of drinking water, the collection and disposal of sewage, large-scale irrigation, significant flood control, coastal management, and waste management systems. Postal services, landline and mobile phone networks, cable television physical networks, internet, and communications satellites and underwater cables are examples of communication infrastructure.

The term "**soft infrastructure**" refers to the establishments required to maintain and improve societal advancements in the areas of health, education, and culture. According to Bhattacharyay (2008), non-tangibles including policies, institutional and regulatory frameworks, governance processes, protocols and procedures, social networks, and procurement systems are examples of soft infrastructure that enable the creation and functioning of hard infrastructure.

Table (2.2) Types of Soft Infrastructure

Sr.	Governance Infrastructure	Economic Infrastructure	Social Infrastructure	Cultural, sports and recreational Infrastructure
1	Government and law enforcement system	The financial system-banking, financial institutions, regulations, etc.	Education and research system – schools, universities, colleges, research institutions	Sports and recreational infrastructure- parks, sports facilities, the system of sports leagues, etc.
2	Police, fire protection, and ambulances - specialized vehicles, buildings and dispatching systems	Major business logistics facilities and systems-warehouses, shipping management systems	Health system- hospitals, financing of health care, system for training and professional discipline of medical professionals	Cultural infrastructure-concert halls, museums, libraries, theatres, studios, and specialized training facilities
3	Military infrastructure-military bases, training and communication facilities	Manufacturing infrastructure, including industrial parks and special economic zones,	Social welfare systems-government support and private charity for the poor	Travel and tourism infrastructure, systems for informing and attracting tourists and travel insurance
4		Agricultural, forestry and fisheries infrastructure, - specialized food and livestock transportation and storage facilities		

Source: Casey (2005)

As stated by Casey (2005), soft infrastructures consist of governance, economic, social, cultural, sports, and recreational infrastructures together with other types of infrastructure.

In addition to man-made infrastructure, the idea of "green infrastructure" was first proposed in the middle of the 1990s. The idea of "green infrastructure," which originated in the US, emphasizes the value of the natural world and carefully planned and maintained networks of working landscapes, natural lands, and other open spaces that preserve ecosystem values and functions and benefit human populations. Focusing on interconnection for long-term sustainability, natural ecosystems' life support functions are prioritized.

There is a planned network of natural and semi-natural zones that include environmental elements in order to increase biodiversity and provide ecosystem services. This network is known as green infrastructure. These services include the purification of water, the enhancement of air quality, recreational activities, and the adaptation and mitigation of climate change. This network of green (land) and blue (water) places improves the environment, natural regions, and public health. Green infrastructure supports a green economy and creates green employment (European Commission, 2023).

The growth of a sustainable economy depends on green infrastructure. The idea of "green infrastructure" has proven effective in fusing strategies for economic growth with green space preservation in several recent studies of affluent nations. Green infrastructure, as opposed to man-made infrastructure, influences economic growth indirectly. It is crucial for both reducing the effects of climate change and adjusting to it. This allows for the maintenance of economic development while improving social welfare and the environment and preventing more severe economic cycles in the future. The physical and social infrastructures may both benefit from green infrastructure. The adaptation and mitigation of climate change, the reduction of flooding, the enhancement of water management, the quality of the environment, health and well-being, economic growth and investment, labor productivity, tourism, leisure, and recreation, the preservation of land and biodiversity, and the upgrading of land-based products are some of the major economic benefits that result from investments in green infrastructure. Rather than improving it on its own, green infrastructure development will be more successful when it integrates with conventional physical infrastructure

(gray infrastructure, transportation, drainage, etc.) (NRDC, 2019).

2.2 Importance of Infrastructure in Economy

Building a sustainable future and attaining long-term growth that benefits society as a whole depend heavily on infrastructure. But in a large portion of the developing world, infrastructure is still insufficient. 450 million people reside outside of the coverage area of a broadband signal, 1 billion people live more than two kilometers away from an all-season road, and 675 million people do not have access to energy at home. The poorest and most vulnerable nations have the most costly internet, power, and transportation services globally (World Bank, 2023).

Infrastructure has an impact on emerging nations' economy both directly and indirectly. Infrastructure has a vital role in mitigating poverty and is considered a tool for encouraging economic prosperity. Because infrastructure does not exclude anybody from using public goods and services, it will benefit the affluent and the poor equally. They support improvements in people's social well-being, educational attainment, health, safety, and general environmental quality, among other aspects of their quality of life. The availability of sufficient infrastructure to support economic and social development is a prerequisite for an economy's long-term success (Straub and Terada-Hagiwara, 2010).

2.2.1 Importance of Hard Infrastructure

There are two benefits to investing in this kind of infrastructure: direct and indirect. The demand for labor and raw materials will rise in the invested region as a direct result of economic infrastructure investments. Infrastructure improvement may indirectly lower manufacturing and transportation costs, increase worker productivity, and cut labor expenses. In particular, the following highlights how the advancement or enhancement of hard infrastructure contributes;

Transport Infrastructure

Since transportation infrastructure may directly support production and manufacturing activities in an economy, it is commonly believed that the development of transportation infrastructure, including roads, airports, and seaports, is essential for economic growth (Hasselgren, 2018). Socioeconomic development and transportation infrastructure are strongly related. The primary factors influencing

development are the movement of people and things as well as the accessibility of different territories. Economic possibilities and access to markets and necessary resources are expected to develop with an improved transportation network. The transportation industry also contributes to improved market accessibility, particularly for rural residents. Economic growth is largely dependent on regional, municipal, and international transportation networks. Trade and distribution account for an increasing portion of the wealth.

Research indicated that the development of transportation infrastructure has four main effects on economic growth: it accelerates industrial agglomeration, changes aggregate market demand, and expands labor and capital productivity as direct input cost savings. But there are drawbacks to infrastructure development as well. There are traffic jams, collisions, and gaps in movement. Another economic activity that is based on operational characteristics including cost, capacity, efficiency, dependability, and speed is transportation (OECD, 2020).

Energy Infrastructure

In today's advanced society, energy plays a vital role in influencing the economic progress of any country. It has consistently played a crucial role in both economic expansion and social progress. As economies progress, there is a corresponding increase in energy demand. A sufficient and cost-effective energy supply is required to effectively fulfill the needs of industry, businesses, household users, and the transportation of people and products.

Energy infrastructures play a pivotal role in fostering economic growth and development via three primary channels. Electricity plays a crucial role in the manufacturing process for enterprises and is not easily replaced by other variables of production. This might limit the output if it is not accessible. Furthermore, the state utilizes energy resources to efficiently provide essential public services like as healthcare and education. Furthermore, the use of energy may directly enhance the overall quality of life in households and lead to increased efficiency, resulting in time savings, improved communication, and investments in education. (Source: World Bank, 2022)

Energy is not only associated with economic progress, but also correlated with the alleviation of poverty. It is fundamental to almost all elements of poverty, including issues such as inadequate healthcare, limited availability of clean water and

sanitation, and lack of access to education. Countries must tackle the significant problem of improving access to energy services in order to alleviate poverty and foster sustainable economic development. Hence, it is necessary to establish and expand the electrical power network, including generating plants, electrical grid, substations, and local distribution, along with other energy infrastructure, in accordance with the requirements of the population.

Currently, there is a focus on enhancing the security, sustainability, and resilience of energy infrastructure. expenditures in infrastructure that are made at the right time rely heavily on a market climate that allows for such expenditures. Enhanced policy coherence and regulatory predictability contribute to the equitable treatment of different energy sources and promote the integration of regional markets by establishing cross-border networks that minimize obstacles to trade and investment. By providing incentives and reducing regulatory constraints, there will be an increase in the amount of private-sector capital invested in energy sector infrastructure (International Energy Forum IEF, 2020).

Public Utility Infrastructure

The primary classifications of public utility infrastructure include potable water supply, sewage collection and wastewater disposal, waste management, irrigation systems, flood control systems, and coastal management.

Ensuring the availability of uncontaminated drinking water and implementing effective methods for managing and eliminating human waste may significantly improve human well-being, protect the environment, and promote economic progress. Water and sanitation-related illnesses may be spread by several paths and can be categorized into four types: waterborne diseases, water-washed diseases, water-based diseases, and water-related diseases. Efficient waste management infrastructure has comparable impacts on the economy. By providing enough irrigation infrastructure, farmers and rural communities may access water for agricultural purposes, leading to increased productivity and revenue. Additionally, the presence of other public utility infrastructure, such as coastal management, is necessary. Coastal areas are susceptible to several coastal hazards, including cyclones, tsunamis, landslides, erosion, and floods.

Communication Infrastructure

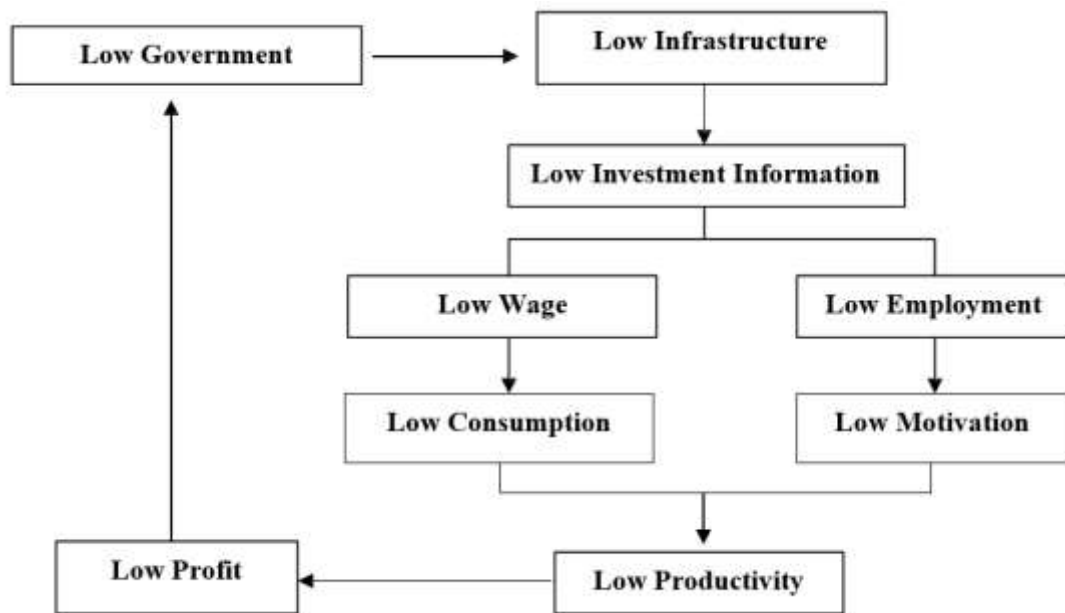
Communication infrastructure includes equipment, methods, and concepts that enable efficient information sharing. Groupware, email, project management software, fax, phone, teleconferencing, document management, and word processing are the tools. Investing in communications infrastructure initially results in a surge in demand for its goods, such as cables and switches.

Investing in communication infrastructure immediately boosts economic activity by generating demand for expensive items required for expanding the network. Additionally, telecommunications has an indirect influence since it serves as an input for other services. If delivered with efficiency, it has the capacity to decrease the expenses associated with transactions between companies and consumers. Expanding infrastructure has a favorable impact on the economy by increasing productivity via improved information collection and replacing activities that have high transaction costs with communication (Röller and Waverma, 2000).

Enhanced communication infrastructure might result in increased market reachability for businesses. The transaction costs associated with ordering, information collecting, and service finding are minimal, and communication may be conducted swiftly. Consequently, there will be a rise in production, leading to increased earnings and overall advancement for enterprises across all sectors of the economy. Improved communication infrastructure may enhance the acquisition of accurate information and mitigate potential hazards (Grace, et.al, 2001).

Role of hard infrastructure in poverty of a country is illustrated in figure (2.1).

Figure (2.1) Vicious Circle of Poverty and Backwardness



Source: Kotlar (1997)

The diagram above illustrates the self-perpetuating cycle experienced by emerging nations due to insufficient infrastructure. Inadequate infrastructure results in reduced investment inflow. Consequently, it leads to a reduction in both salaries and job prospects. Insufficient money and limited work prospects will result in reduced consumption and motivation among individuals, ultimately leading to decreased production. Insufficient productivity leads to reduced profits, which in turn hinders the ability to invest in infrastructure. Due to inadequate infrastructure, the circle returns to its prior state.

Importance of Soft Infrastructure

Soft infrastructure improves the health and education of individuals and communities by developing fair, accessible, and suitable community services, individual skills, knowledge, and capacities, as well as local networks, connections, and joint efforts. Soft infrastructures have several limitations, including their ethereal character and challenges in quantitative measurement. They are often characterized using subjective and qualitative language. Soft infrastructure is more than just the supply of physical assets; it also involves improving skills and knowledge, as well as ensuring access to suitable services and answers. The significance of governance infrastructure, economic infrastructure, social infrastructure, and cultural, sports, and recreational infrastructure is outlined below.

Governance Infrastructure

The government, law enforcement, police, fire protection, ambulances, specialized vehicles, buildings, dispatching systems, military infrastructure, military bases, arms depots, training facilities, and communication facilities are essential to daily transactions and economic growth.

Effective governance is crucial for attaining investment and, therefore, economic development by establishing a stable and favorable business climate. Effective governance will reduce the recurring instances of flawed policy and, therefore, improve policy execution. Effective governance at every level is essential for fostering economic progress, ensuring political stability, and maintaining security. Effective governance fosters enhanced economic advantages in an interconnected world and expedites economic transformations. Effective governance is advanced by tight collaboration with government institutions, appropriate national structures, regional and international organizations, as well as partnering with the business sector and civil society (Azam and Emirullah, 2014).

Economic Infrastructure

Within this particular area, economic infrastructure refers to the act of providing services. These include components such as the banking system, financial institutions, laws, and other related factors. In addition, significant aspects of company logistics management and systems, warehouses, and shipping management systems are also involved.

The banking system plays a crucial role in the contemporary era of an economy. The tertiary sector is responsible for offering services to both the general people and corporations. The banking sector plays a crucial role in the economic development of a country by facilitating capital formation, encouraging investment in new businesses, promoting trade and industry, supporting agricultural and primary sectors, achieving balanced development across regions, influencing economic activity through credit provision and interest rates, implementing monetary policy, monetizing the economy, and boosting exports (Constant, 2019).

Logistics are of utmost importance in the contemporary economy. Logistics refers to the efficient coordination and oversight of the transportation of commodities from their starting point to their final destination, with the goal of satisfying consumer demands. Logistics is the process of efficiently and effectively moving the correct

product, in the appropriate amount and quality, to the designated consumer, at the specified location and time, while minimizing costs. The success of any firm or the overall economy of a nation in global markets is contingent upon the significance of trade logistics solutions. An effective logistical infrastructure facilitates the creation of demand, lowers production costs, ensures quick economic expansion, and enhances global integration (Kherbach and Mocan, 2016).

Social Infrastructure

The components of social infrastructure include the education and research system, which encompasses schools, universities, colleges, and research institutions. Additionally, the health system, which comprises hospitals and the financing of healthcare, is another crucial component. Social infrastructure also includes the system for training and professional discipline of medical professionals, as well as the social welfare systems that include both public assistance and private charity for the destitute. Both of these systems are essential components of social infrastructure. Enhancements in health, education, arts and culture, information, sport and leisure, employment and training, legal and public safety, emergency services, and other areas may contribute to the enhancement of both physical and mental well-being among individuals. By improving their health, education, and contentment, individuals are able to enhance their productivity and increase their income.

The education system encompasses the economic, political, and social frameworks that influence the availability and quality of education within a certain nation or state. The patterns of organization of education supply are often tackled at the country or national level, which is the primary level where formal education is governed. The multidisciplinary study of comparative education describes, compares, and analyzes education system evolution. It evolved from education sciences, history, economics, and philosophy. A successful education system addresses population needs and trains qualified workers for the labor market and innovation. (2014) Hatos.

Health care is universally recognized as a crucial factor in enhancing the overall physical and mental health and well-being of individuals in all economies. A health system refers to the overall structure and organization through which all healthcare services are delivered. A robust healthcare system encompasses several aspects such as funding mechanisms, staff capacity, and availability of facilities and

supplies. Its primary objective is to enable equitable access to high-quality healthcare services, eliminating any financial barriers. High-quality health systems enhance healthcare by consistently providing care that enhances or preserves health, by being respected and trusted by all individuals, and by adapting to evolving population demands. A well-functioning healthcare system may make a substantial contribution to a country's economy, growth, and industrialization (Kruk et. al., 2018).

Cultural, Sports and Recreational Infrastructure

The term "soft infrastructure" refers to the athletic facilities, parks, and leagues that are present in any economy. Additionally, music halls, museums, libraries, theaters, studios, and specialized training facilities are examples of soft infrastructures. Additionally, travel and tourism infrastructure, such as tourist information and insurance systems, are also included in this category. By improving these infrastructures, the economy may strengthen its service sectors and achieve economic growth.

As stated before, a well-developed infrastructure enhances productivity and well-being, reduces production expenses, aids in poverty reduction, and promotes environmental sustainability. However, these benefits are only realized when the infrastructure offers services that meet the actual need effectively. In addition, the current infrastructure might be damaged or destroyed as a result of natural catastrophes and civil unrest. Deficiencies and insufficiencies in infrastructure have the potential to diminish the quality of life and productivity of communities. Several of these facilities are now being constructed or developed, indicating that the nation is making progress towards being competitive in the global market for business. As a nation's economy expands, it is imperative that the infrastructure also expands to accommodate and facilitate the growth of the economy. The source cited is Sullivan (1999).

Consequently, ensuring a sufficient provision of infrastructure services has been recognized as crucial for promoting economic growth and alleviating poverty. According to Delmon (2006), inadequate infrastructure hinders a country's economic development and global competitiveness. The absence of contemporary infrastructure poses a hindrance to the advancement of the economy and the alleviation of poverty in the majority of Least Developed Countries (LDCs).

In the present day, the quality of infrastructure plays a crucial role in determining a country's standing in the international arena. The World Economic

Forum considers it the second pillar when evaluating a nation's competitiveness. In addition, infrastructure has an allure for foreign investors, including the necessary services and facilities for enterprises to develop and expand. Infrastructure is essential for the functioning of a firm, and inadequate infrastructure development may impede corporate growth.

2.3 Importance of Road Infrastructure in Economy

A road is a discernible thoroughfare that connects two or more locations. Roads are often made smooth, paved, or otherwise modified to facilitate convenient travel. However, it is not necessary for roads to be prepared in this way, and in the past, many roads were just identifiable paths without any official building or upkeep. According to Tirado (2011), roads may serve a dual purpose in a city or village by functioning as both urban space easements and routes. They may also be referred to as streets.

The road infrastructure encompasses all categories of roadways within a certain region, including diverse constructions, and functions to facilitate the transportation of people and commodities. According to Ben (2020), road infrastructure is a complex set of physical components and organizational processes that enable the movement of vehicles and connection in a certain geographical region. Civil engineering is the process of designing, building, upkeeping, and overseeing the operation of transportation infrastructure such as roads, highways, streets, and related facilities. Road infrastructure plays a crucial role in transportation networks, making a considerable contribution to economic growth, social cohesion, and overall welfare (Hasselgren, 2018).

Efficient road infrastructure is crucial for economic growth. An efficient road network is essential infrastructure that promotes the development process by facilitating connection and enabling commerce and investment in underdeveloped areas. Roads are crucial for the growth of intermodal transportation since they connect airports, railway stations, and ports. The road infrastructure is a complex system that includes the road network, building, and maintenance. The road network consists of a network of linked routes, which include highways, expressways, arterial roads, and local streets. These roadways accommodate a variety of traffic types, including autos, trucks, buses, and pedestrians. Road construction operations include many tasks such as excavating, leveling the ground, laying pavement, and installing drainage systems

and road signs. The durability and lifetime of a product heavily rely on the quality of materials used and the building processes applied. Regular repair of road infrastructure is crucial to guarantee road safety and operational efficiency. Activities include a wide variety of duties, including basic maintenance like fixing potholes and repainting road markings, as well as more extensive projects such as resurfacing roads and maintaining bridges (Adler, et. al., 2020).

The road infrastructure is a fundamental component of contemporary society, facilitating movement, economic advancement, and social engagement. The design, building, and maintenance of transportation networks need careful planning, technical knowledge, and continuous investment to satisfy changing demands and support sustainable growth. Enhancing road infrastructure in an economy may increase connectivity, provide economic benefit, promote social inclusion, prioritize environmental concern, and facilitate technological innovation.

Road networks often link metropolitan centers, rural regions, industrial zones, and commercial hubs, facilitating economic activity and encouraging regional integration. They provide access to markets, education, healthcare, and several other services. A well-established road network facilitates economic development by facilitating the efficient transportation of goods and people. It lowers transportation expenses, streamlines commerce, and entices investments. Furthermore, road infrastructure serves to alleviate geographical inequities by linking isolated and underprivileged regions to more significant economic and social hubs. This incorporation amplifies prospects for education, healthcare, and employment (Dumedah and Garsonu, 2021).

Sustainable road infrastructure design include the consideration of environmental considerations, including the reduction of environmental disturbance during construction, the use of environmentally friendly materials, and the implementation of erosion control methods. Contemporary road infrastructure utilizes advanced technology such as GPS navigation, real-time traffic data, and vehicle-to-infrastructure connection to improve efficiency, safety, and user experience.

Road transport has many benefits, such as the ability to convey persons and commodities directly to their destination, regardless of distance. It also allows for reasonably fast speeds and does not impose any time limits. Road transport and associated infrastructure facilitate the transportation of both people and many types of goods, including materials, raw materials, semi-finished products, and completed

products that are meant for commercial purposes. The employment level is influenced by the flexibility and mobility of the workforce, which in turn is impacted by road infrastructure. Furthermore, an increase in employment levels leads to a rise in the quality of life.

Ivanova and Masarova (2013) found that the level of development of road infrastructure has a significant influence on several aspects, including tourist development, foreign investment inflow, and regional growth. The enhancement of road infrastructure has the potential to positively impact several economic factors such as employment, earnings, consumption, savings, investment, and the advantages derived from tourism. These factors, in turn, contribute to an increase in the volume of gross domestic product (GDP). In addition, the development of road infrastructure plays a crucial role in facilitating the transportation of products and services, particularly in the context of international commerce and collaboration across several sectors.

2.4 Effect of Road Infrastructure Development in Rural Area

Road infrastructure is crucial for improving the quality of life for rural families in several ways. The presence of road infrastructure is crucial for enhancing the quality of life in rural households, since it enhances agricultural revenue, supports economic development, facilitates access to important services, and reinforces social cohesion among communities.

Enhanced road connection enables the efficient delivery of agricultural goods from distant rural regions to markets, resulting in reduced post-harvest losses, less influence of intermediaries in the crop market, and increased revenue for farmers in rural areas. The enhanced accessibility also allows farmers to reach a broader variety of markets, resulting in improved price realization for their goods and expanding economic prospects and options for rural people.

Improved road infrastructure in rural regions stimulates investment and fosters economic activity. Enhanced accessibility incentivizes companies to establish their presence in these places, resulting in a rise in employment prospects, earnings, economic possibilities, and overall development. Rural families' heavy reliance on agriculture for income is diminished by the growth of economic activity in rural regions. Furthermore, enhancing road infrastructure in rural regions fosters social connectedness. Consequently, rural families are able to establish and maintain

stronger connections with their family and friends, avail themselves of social support networks, and participate more easily in community events (Sieber and Allen, 2020).

Improved road infrastructure enables easier access to vital services such as healthcare and education. Rural families have enhanced accessibility to medical facilities, resulting in a decrease in health hazards and a reduction in the expenses associated with accessing healthcare services, hence enhancing overall well-being. Likewise, children may access schools without facing the challenge of inadequate road connection. These initiatives contribute to the development of human resources in rural regions, enhancing the knowledge and skills of rural people, and improving the general quality of life and well-being. Rural settlements are able to establish connections with adjacent villages and cities via the presence of accessible roadways. This fosters social connection, facilitates cultural exchange, and encourages community participation.

Efficiently maintained road infrastructure facilitates prompt emergency responses, which are crucial in times of catastrophes or medical crises. Enhanced road infrastructure may facilitate women's movement, enabling easier access to economic opportunities, education, and healthcare. In addition, a well-developed road network reduces the geographical separation of rural communities, facilitating their integration with metropolitan hubs and regional economies (Ben, 2020). Enhanced road infrastructure has a cumulative influence on rural development, as it improves living standards, reduces poverty, and promotes sustainable economic growth (Lyngdoh, 2017).

The road infrastructure has a significant role in the economic growth of an area, both directly and indirectly. The primary contributions include the reduction of transportation expenses, the provision of door-to-door services, and the enhancement of accessibility and safety. Implementing new or enhanced infrastructure may effectively mitigate transportation congestion, hence reducing traffic congestion, travel time, and transportation expenses. The introduction of new modes of transportation enhances the density and efficiency of the current transportation network, leading to improved accessibility and safety. This, in turn, results in higher vehicle speeds and more flexibility in choosing routes (Hasselgren, 2018).

The indirect impacts of road infrastructure include enhanced investment conditions, optimized industrial structure, hastened urbanization process, and the establishment of an economic traffic ring. The function of transportation in promoting

economic development primarily manifests in two aspects: the investment multiplier impact and the direct economic effect. Investing in transport infrastructure would generate more demand, attracting associated industry expansion to stimulate economic growth. Once the infrastructure is constructed and operational, it has the potential to mitigate transportation strain, relieve congestion, decrease travel time, lower transportation expenses, and enhance transportation revenue (Hasselgren, 2018).

World Bank (2021) states that road infrastructure development improves agricultural commerce, crop output, health, education, and poverty in rural Vietnam. Due to widows or single women leading most female-headed homes, benefits are greater for male-headed households. They have fewer working-age adults in female-headed families to boost agricultural productivity. Male-headed families may enhance productivity and income by employing equipment for ploughing and carrying items or converting from rice to higher-value horticulture crops like acacia, cinnamon, or orange.

Unfortunately, female-headed households do not have the necessary money or time to use capital equipment for cultivation or switching from rice to other crops. Upgrading road infrastructure alone is important but may not be enough for improving rural livelihoods for all. Therefore, in order to achieve inclusive development and reduce poverty, efforts are needed to provide social and economic supports for the livelihoods of the people in deprived area even there is an improvement in road infrastructure. The average monthly income of Vietnamese women who got business development training increased by 33%, while those who were supported to obtain a job more than doubled. Thus, road transport expenditures and accompanying development projects work better together than alone. Good roads help more people, especially disadvantaged populations, via development initiatives (World Bank, 2021).

The impacts of infrastructure and market access differ between rural and urban regions and between central and peripheral regions. For the US, an increase of highway capacity (i.e. the length of the highway network) by 1% is associated with an increase of per capita income of one-fifth for the US and that this effect is stronger for highways in rural areas than for urban highways. The effects of US interstate highways on the development of rural counties. In Europe, highway accessibility adds

predominately to the main transport corridors but also adds overland interaction opportunities to peripheral regions. Only large cities or regions in border regions benefitted clearly from EU enlargements, while smaller cities and regions were not significantly affected. In 42 European cities, road system improvements had the strongest impact on accessibility of peripheral countries. Total highway-induced accessibility had a stronger impact on the economies of smaller countries instead of larger European countries because of trade opportunities that were created, highlighting the asymmetric nature of international accessibility spillovers (USAID, 2018).

Rajasthan's health and education are affected by rural road infrastructure development in India. Rajasthan is India's 7th most populated state. It has 69 million inhabitants, 10 million of whom are impoverished. Rural poor often lack literacy and healthcare. Rural roads allow school buses to access rural settlements, making schooling simpler for youngsters. Everyone, even preschoolers, may attend school, and many youngsters are studying in adjacent towns owing to road infrastructure improvements.

In this area, rural women got job opportunities at the rural childcare center. Health care access is also increased among local residents. They can be able to access healthcare facilities from nearby towns and cities promptly and less costly than before. In the case of emergency, ambulances can reach right up to village homes to take pregnant women and the elderly to hospitals nearby. With improving and increasing access to road infrastructure, people accessed new livelihood opportunities in towns nearby, which in turn changes positively through building brick houses with clean toilet facilities. Moreover, access to market is also a benefit for rural people.

Villagers can trade their horticulture products such as banana, cashew, betelnut and rice cultivation to urban markets through new road. Creating alternative livelihoods is another positive impact of road infrastructure development. Young villagers, who were previously engaging in subsistence agriculture sector are now working in factories and firms in other towns and cities. They can travel to other towns and cities with less time by using new road infrastructure (World Bank, 2022).

2.5 Reviews on Previous Studies

Terefe (2012) conducted a study on the influence of roads on rural poverty, focusing on fifteen rural villages in Ethiopia. The importance of road travel in Ethiopia is significant due to the inadequate railway and water transport infrastructure. This research aims to assess the impact of the public investment program on the welfare of rural families in Ethiopia. The main objective is to determine the impact of changes in road accessibility on poverty reduction and household consumption growth. The study used a panel dataset that included rural households in Ethiopia, together with provincial-level panel data on road density, to assess the influence of road infrastructure on poverty and consumption levels. The results indicate that there is a connection between the decrease in the poverty headcount ratio and the enhancement of road accessibility in rural areas. The research demonstrates that improved road connection not only increases the probability of leaving poverty but also significantly speeds up the pace of consumption growth.

Wiegand and colleagues (2017) investigated the influence of road construction on the well-being of households in rural Papua New Guinea. This study investigates the influence of road infrastructure development on the well-being of households in rural Papua New Guinea from 1996 to 2010. The research utilizes two household surveys conducted at different time points. The endogenous situation of road infrastructure initiatives was addressed using ordinary least square approaches. A novel quantile regression approach was used to examine the extent to which road improvements benefit individuals in lower income brackets. The research revealed that allocating resources towards the improvement of road infrastructure connecting to nearby towns resulted in increased levels of consumption and housing quality, as well as reduced dependence on subsistence farming. The positive effects of road infrastructure development are more pronounced among families that are economically disadvantaged, have lower levels of education, and are headed by women.

Loksha (2017) conducted an empirical research to examine the impact of road infrastructure on agricultural growth in Karnataka. This research evaluates the influence of road infrastructure on agriculture in Hassan district, Karnataka. Information was collected from 300 agricultural families in the region throughout the

2015-16 year. The presence of roads has a beneficial impact on the distribution of cash crops. Furthermore, cash crop distribution was positively influenced by factors such as irrigation, education levels, and land holdings. In terms of socio-economic circumstances, greater distance from urban areas had a detrimental effect on educational attainment, income, and agricultural earnings. The road infrastructure type has a beneficial impact on education levels, revenue, and profitability.

Ye Htet Zaw (2019) conducted a study on the impact of infrastructure development on rural society in Taikkyi Township as part of his Master's thesis in Economics. The title of his thesis was "An examination of the impact of infrastructure development on the rural community in Taikkyi Township from 2009 to 2018." This research investigated the effects of infrastructure development in Taikkyi Township on the rural community. The survey is conducted as a case study in Taikkyi Township. Recent findings in Taikkyi Township indicate significant advancements in both rural infrastructure and rural development. Furthermore, it has been shown that the expansion of the transportation industry reduces transportation expenses and travel durations, while also accelerating the delivery of goods to markets. The construction sector plays a significant role in driving rural development due to its potential to provide job opportunities and produce positive impacts.

Mie Mie Tun (2019) conducted a research on the effects of road infrastructure networks in rural areas of Myanmar, specifically focusing on the Ywa Ngan Township as a case study. The primary aim of the research was to examine the impact of the rural road network on several socio-economic indicators, including income, education, health, and tourism, specifically in Ywa-Ngan Township. The research included both qualitative and quantitative data obtained from home surveys and focus group discussions. The findings of her research revealed that the development and improvement of rural roads had both beneficial and detrimental effects. The good outcomes include augmented income, an elevated attendance rate of pupils, convenient availability of healthcare services, and an increased influx of tourists to the region. The negative consequences include heightened availability of detrimental pharmaceuticals, proliferation of illnesses, and the promotion of environmental degradation.

Su Mon Mon Phuu is a film scheduled to be released in 2022. An investigation of the enhancement of rural road infrastructure in Gyopinkauk

Township. The objective of this research is to evaluate the present condition of rural road infrastructure in Gyopinkauk Township and examine its socioeconomic consequences. The research results emphasize the significant indirect influence that the building of rural roads has on the overall degree of economic growth in each specific study region. This research suggests that the government should allocate capital funds in accordance with future development plans, with a particular emphasis on increasing the area of rural roads that are covered with concrete. The results indicate that the building of rural roads has a considerable indirect impact on the overall economic growth of each region under investigation.

CHAPTER III

OVERVIEW OF ROAD INFRASTRUCTURE DEVELOPMENT IN MYANMAR

3.1 Background of Rural Roads 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 established in 2012 with the purpose of concentrating on activities related to rural development. These activities include: (1) carrying out rural development tasks in accordance with a people-centered approach, (2) building rural infrastructure, (3) improving the socio-economic conditions of rural residents, and (4) taking necessary measures to reduce poverty.

The government of Myanmar enacted twelve different economic policies in 2016 with the intention of fostering the prosperity of the nation. Among the government's top goals is the expeditious development of essential economic infrastructure, which includes the generation of energy, the construction of roadways, and the establishment of ports. In addition, the government intends to develop a system for data identity cards, a digital government strategy, and an electronic government system. Essential elements for a nation to achieve developed status include sufficient infrastructure in the form of well-maintained roads, reliable electrical supply, access to clean water, and efficient telecommunications systems. The development of road and

transport infrastructure has a substantial impact on the socioeconomic circumstances of an area by generating dynamic externalities. It plays a crucial role in both direct and indirect intervention for socio-economic and regional development.

Roads and bridges in rural areas operate as a conduit allowing rural communities to get access to important services and facilities, which in turn enables these people to improve their lives and participate more actively in the economy of the country. A sizeable segment of the rural population in Myanmar continues to be disconnected from the road network, and an even larger section of the population is subjected to physical isolation at certain times of the year when roads that are accessible during the dry season become unusable due to high rains and floods. Myanmar has a population of around 54 million people, with 70 percent of the population living in rural areas, according to the census completed in 2014. These rural regions are dispersed throughout 64,000 settlements and are connected by a rural road network that extends for a total of 55,000 km. Rural roads in Myanmar consist of several types, including concrete roads, bituminous roads, gravel roads, laterite roads, dirt roads, and roads specifically designed for motorcycles and ox carts.

Rural roads specifically exclude the more advanced roads overseen by the Department of Highway, which is under the jurisdiction of the Ministry of Construction (MOC). Additionally, they do not include the urban roads maintained by the City Development Councils and Town Development Councils. Rural roads refer to the least developed roads that are under the management of the Department of Rural Roads Development (DRRD) under the Ministry of Construction since 2017, as well as the Ministry of Border Affairs (MOBA). Nevertheless, the majority of rural roads are overseen by the DRRD with the primary objectives of (1) consistently improving rural roads and bridges and (2) ensuring timely and cost-effective transportation of agricultural goods to the market. (3) The prompt execution of efficiently accessing the Core Rural Road Network (CRRN) is crucial for the socioeconomic advancement of rural communities. (5) By the year 2030, it is imperative to improve all rural roads to provide year-round accessibility.

According to the Myanmar Transport Sector Note by ADB, there is a population of nine million residing in rural areas that lack any road connectivity. In the absence of a road, people are compelled to traverse small pathways by foot or bicycle. They are responsible for transporting items either manually or by placing them on the backs of animals. An additional estimated eleven million individuals are linked, however not all

of them have access to roads during the whole year. It signifies that people have the option to use vehicles to go to nearby cities and towns, but the route becomes inaccessible during the rainy season. Twenty-two percent of all registered villages have connectivity through higher-level roads, twenty-eight percent have connectivity through all-season rural roads, thirty-six percent have connectivity through dry-season rural roads, and fourteen percent have no road access at all, according to the findings of a nationwide village access survey that was carried out by the Development R&D Department in collaboration with the Asian Development Bank. It is estimated that around fifty percent of the villages in Myanmar do not have access to roads or only have access during the dry season. As a consequence, many communities are physically isolated for at least a portion of the year during the heavy rainy season. There are a total of 14 million people that are affected by this, which is equivalent to approximately forty percent of the rural population.

The relationship between access and poverty in Myanmar is characterized by the fact that in areas without roads, agricultural output is poor. This is because agriculture is primarily focused on subsistence, since inputs and products need to be transported by foot or by animal. (ii) Individuals who need regular or urgent medical care are compelled to travel vast distances either on foot or with inadequate transportation, resulting in significant time consumption. (iii) Children residing in isolated villages primarily have access to primary education. However, up to 90% of them discontinue their education due to the considerable time required to commute to the nearest village tract or township. (iv) In the absence of access, household members are compelled to allocate a significant portion of their time to travel, a responsibility that disproportionately burdens women. The primary constraint for rural transportation in Myanmar is the lack of road connectivity. Hence, the Government of Myanmar is prioritizing rural development and expediting the implementation of rural development programs.

3.2 Rural Roads Strategy in Myanmar

The Government of Myanmar regards the enhancement of rural road infrastructure as crucial for the development of rural regions and the mitigation of rural poverty and disparities within the nation. In the absence of adequate road infrastructure, individuals living in rural areas are unable to avail themselves of essential services and amenities necessary for enhancing their quality of life and

engaging in the broader national economic activities. The Government of Myanmar intends to enhance the accessibility of rural areas by establishing road connections to rural villages, aligning with the Sustainable Development Goals (SDGs). By 2030, the government plans to construct and upgrade rural roads to meet all-season standards, ensuring that rural residents can utilize these roads year-round. The National Strategy for Rural Roads and Access has been developed with the goal of enhancing rural access by providing year-round access to rural roads by 2030. This strategy also seeks to promote the achievement of the Sustainable Development Goals (SDGs) by 2030.

It is envisaged that the attainment of the Sustainable Development Goals (SDGs) that are listed below would be facilitated by the development of rural roads and the accompanying improvement of access to services and facilities. In addition to providing access to marketplaces where they may sell their goods and purchase essential commodities, rural roads will also make it possible for villagers to access job possibilities that are located outside of their communities. Further, the construction of these roads will make it easier to get an education, which will result in improved possibilities for future income. This, in turn, contributes to poverty reduction and supports the Sustainable Development Goal of ending poverty. Rural roads contribute to increased earnings and food consumption, as well as improved access to information and resources needed for agricultural productivity. These benefits align with the objectives of SDG 2, which aims to eliminate hunger.

Rural roads will enhance the ability to reach health facilities and services, as well as health education, resulting in enhanced health standards in rural regions. This aligns with SDG 3, which aims to guarantee healthy lifestyles and promote well-being for people at all ages. Rural roads would enhance year-round accessibility to educational institutions and contribute to elevated education levels, hence mitigating the expenses and challenges associated with acquiring an education and diminishing dropout rates. By facilitating access to employment opportunities both within and outside of the village, improved education contributes to the achievement of Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive and equitable quality education and promote opportunities for lifelong learning for all. Additionally, SDG 8 (SDG 8) aims to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. Roads in rural areas are now being built to conform to the requirements essential for usage

throughout the whole year. These roads are constructed to endure the effects of climate change and are maintained in an appropriate manner to guarantee that they do not deteriorate or sustain harm. As specified in Sustainable Development Goal 9, this method is in accordance with the objective of constructing infrastructure that is robust, supporting industry that is both inclusive and sustainable, and encouraging innovation.

3.3 Legal Framework of Road Infrastructure in Myanmar

The Ministry of Construction, a governmental department in Burma, is responsible for the planning, development, and upkeep of the nation's infrastructure, including its roadways and bridges. The Ministry of building is in charge of the building of roads and bridges, as well as their maintenance and regular inspections. In 2019, the Ministry of Construction is accountable for the supervision of the ministries listed below:

1. Department of Building
2. Department of Highways
3. Department of Bridge
4. Department of Urban and Housing Development
5. Department of Rural Road Development

A brand new organization that will be known as the Rural Road Development Agency will be established by the Ministry of Construction (MOC). This department will have the responsibility of executing rural road projects. The previous government approved a total of 2224.7 miles of rural roads in the 2016-2017 budgets. However, only 202.4 miles were actually granted for construction in the 2017-2018 fiscal year. This discrepancy indicates that there may have been a shift in the incoming administration's plans for road building. Approximately 40% of the population in Myanmar resides in villages that lack year-round rural roads, which includes over half of the rural population. The accessibility of a rural road that links most of the communities is not consistently available. A villager may possess the ability to operate a motor vehicle to reach the next settlement, but, the route is prone to becoming inaccessible during the rainy season. The Rural Road Access Index (RAI) is a commonly used measure that indicates the proportion of rural inhabitants who live at a distance of less than two kilometers from a road that remains accessible

throughout the year. According to the projected Rural Accessibility Index (RAI) for Myanmar, which stands at 36%, 64% of individuals in rural regions have to travel over two kilometers to reach an all-season road. Improved accessibility to rural road infrastructure is vital in Myanmar to alleviate rural poverty. There are a number of prerequisites that need to be achieved in order to assist with rural development. This is due to the fact that mobility does not have any impact on agricultural output, health, or educational achievement. In spite of this, it is abundantly clear that the establishment of rural road connections is a necessary condition for the alleviation of poverty and the improvement of the efficiency of other government initiatives.

3.3.1 Policies and Strategy for the Department of Rural Road Development

(1) Policies of the Department of Rural Road Development

The mission of the Department of Rural Road Development is to construct rural roads in a way that enhances the socioeconomic well-being of the people; this is the department's primary purpose. A little less than fifteen percent of the villages that are recognized in Myanmar do not have access to roads. Out of the settlements that have road connections, over 40% are connected by country roads that are only usable during the dry season and become unusable during the wet season. In all, 50% of the currently recognized villages experience physical isolation for some or all of the year because they lack a rural road that is accessible during all seasons. This situation impacts more than 14 million people living in rural areas. The absence of year-round rural roads has a significant impact on the ability of rural residents to reach health care, education, job opportunities, markets, and other essential services and facilities. This limitation hinders both the development of rural communities and the overall progress of the nation.

Inadequate transport infrastructure and related methods of transportation result in avoidable deaths, with around 75% of perinatal mortality globally being attributed to insufficient transit. Internationally, it has been shown that improved rural roads result in enhanced attendance rates for both boys and girls in primary and secondary schools. Additionally, these roads contribute to improved staffing and teacher attendance, as well as better teaching facilities, by facilitating the transportation of educational and building supplies. There is much global data indicating that the provision of road access results in better market access, increased

use of fertilizers and agricultural inputs, enhanced agricultural productivity, higher employment rates, improved living standards, and reduced poverty. Enhanced rural transport infrastructure significantly decreases the expenses associated with moving people and commodities, resulting in higher economic development and a reduction in rural isolation and poverty. This is achieved by increasing mobility rates and improving access to markets and services. Lack of adequate infrastructure impedes rural communities' access to essential services and amenities, hindering their ability to enhance their quality of life and contribute to the national economy. The Government of Myanmar regards the enhancement of rural roads as crucial for the development of rural regions and the mitigation of rural poverty and inequities in the nation.

(2) Goals of the DRRD

The goal of the government of Myanmar is to improve the accessibility of services and facilities for the rural people by establishing road connections to locations that are now inaccessible. The government of Myanmar will undertake the building and development of rural roads in order to enable people of rural areas with accessible throughout the whole year. This will connect these communities to a standard that is adequate for weather conditions throughout the year. Every hamlet in Myanmar should have access to the internet during the whole year, according to the overall objective of the government of Myanmar. In order to accomplish our long-term development objective, the National Strategy for Rural Roads and Access is centered on the next 15 years, which will bring us to the year 2030. Over the course of this time period, the government of Myanmar intends to make certain that at least eighty percent of the communities in each state or area have access to roads that are open throughout the year. The following are some of the goals that the DRRD hopes to accomplish:

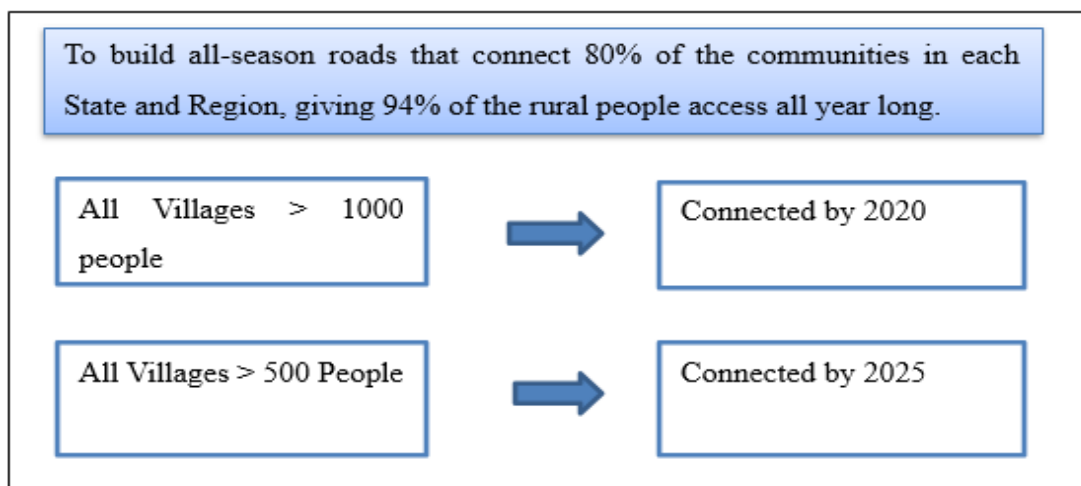
1. To development Rural Roads and Bridge continuously
2. To bring rural products to market as quickly and affordably as possible
3. To quickly facilitate by using Core Rural Road Network (CRRN) for socioeconomic development of residents in Rural Areas
4. To support the National Logistic Hub
5. To upgrade all rural roads for year-round accessibility in 2030

For the sake of rural development, the building of rural roadways in a fast and efficient manner is absolutely important. The development of township and district roads, as well as state and division circle roads, is the purpose of the construction of numerous roadways. These roads will connect cities, villages, and towns to highways, hence improving connectivity.

In order to improve the development of Myanmar's rural road infrastructure, the Ministry of Agriculture, Livestock and Irrigation (MOALI) and the Ministry of Border Affairs (MoBA) worked together to develop a national strategy for rural roads and access. The Ministry of Construction (MOC) and the Ministry of Transport and Communications (MOTC) also made significant contributions to the formulation of this strategy. The lack of year-round rural roads in Myanmar is a problem that the initiative intends to address. This lack of roads makes it difficult for the rural people to access healthcare, education, and employment opportunities.

As a core strategy to encourage the development of rural areas and solve problems of rural poverty and inequality in the country, the government of Myanmar intends to improve rural connection by constructing rural roads that are capable of withstanding all types of weather by the year 2030. For the purpose of overcoming access issues and providing year-round access to a sizeable percentage of rural households by the year 2030, it is imperative that investments in the rural road sector be prioritized over the course of the following 15 years. As a result, this will contribute to the achievement of the Sustainable Development Goals (SDGs) for the year 2030.

Figure (3.1) Strategy Objective for 2030



Source: The Department of Rural Road Development (2018)

The government aims to provide year-round access to rural areas for every community in Myanmar as a part of its long-term development objective. During the 15-year period outlined in this plan, the government of Myanmar aims to ensure that 90% of all registered villages in every state and area have access to roads. Additionally, the goal is for at least 80% of registered villages to have year-round access to roads.

The strategy aims to provide year-round road connection to all registered villages with a population of over 1,000 by 2020, and to at least 95% of registered villages with a population of over 500 by 2025, with a particular emphasis on larger settlements. By the year 2030, roads will be built to link 90% of all registered villages in each state and area. This will have a positive impact on 95% of the rural population. Additionally, 80% of registered villages will have access to roadways throughout the year. By executing this scheme, an additional 10 million individuals will get access to highways that are usable throughout the year, while an additional 3 million people would gain access to roads specifically during the dry season. Additional rural roads will be constructed, while current country roads will undergo renovation. Thorough maintenance will be conducted to ensure the continued availability of higher levels of access. The source of this information is the Department of Rural Road Development in the year 2018.

3.4 Development of Rural Roads Infrastructure in Myanmar

In Myanmar, the significance of rural roads has been significant throughout the previous decade. In 2017, almost 15% of communities registered in Myanmar still lack road infrastructure connectivity. Of the settlements that have access to roadways, fewer than 50% depend on country roads that become inaccessible during the rainy season. Consequently, about 14 million rural individuals are adversely affected by physical isolation at certain seasons, since half of the recorded villages experience this. The lack of year-round rural road access greatly impedes their capacity to access crucial services such as healthcare, education, job prospects, markets, and other critical amenities, hence impeding both their personal growth and the general advancement of the nation.

The insufficiency of transportation infrastructure, namely road networks, adds to preventable deaths. Globally, the existence of upgraded rural road networks has consistently been associated with improved school attendance rates for both male and

female students, increased access to qualified teachers, enhanced teacher attendance, and better educational infrastructure. This correlation is due to the fact that improved roads facilitate the transportation of educational materials and construction supplies. Significant global data highlights the profound influence of road connectivity on market accessibility, enhanced usage of agricultural inputs such as fertilizers, increased agricultural output, elevated employment rates, better living conditions, and alleviation of poverty. Improved rural transportation infrastructure has a substantial impact on reducing the expenses related to transporting people and commodities. This, in turn, promotes economic development, eliminates rural isolation, and helps alleviate poverty by increasing mobility rates and enabling better access to markets and services.

Rural populations have formidable obstacles in accessing vital services and resources necessary for improving their lives and making contributions to the national economy due to the lack of sufficient road networks. The Government of Myanmar acknowledges the significant importance of enhancing rural roads for rural development and the reduction of poverty and disparities. It is in accordance with the 2030 Sustainable Development Goals (SDGs) that Myanmar has pledged to accomplish. The construction of rural roads and the subsequent improved availability of services and amenities are anticipated to accelerate advancements towards several Sustainable Development Goals (SDGs).

In order to provide all-year road access to as many rural inhabitants as possible, the Government of Myanmar 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% 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% via roads that can be used all year round by the year 2030. In addition, the government plans to ensure that at least 50% of settlements with less than 250 persons are connected with all-season roads by 2030.

The government of Myanmar has committed to provide all-season road access to at least 80 percent of all registered villages in each state and region. This is

done with the intention of achieving a fair and equitable distribution of resources and benefits among all states and regions, regardless of the population numbers of those states and regions. The Myanmar Transport Sector Policy Statement on Rural Roads and Access tackles a wide range of important concerns that are associated with the accessibility and mobility of rural areas in Myanmar:

- (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 bituminous 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, establishing fundamental water crossings (such as causeways and drifts), and implementing 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 Department of Rural Development (DRD), which is under the Ministry of Agriculture, Livestock, and Irrigation. The Department of Progress of Border Areas and National Races Development (DPBANRD), which is part 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 General Administration Department of the Ministry of Home Affairs. These committees may levy taxes and provide financial assistance for rural development and infrastructure.

Table (3.1) Development of Rural Roads by Types in Myanmar

(Mile/Furlong)

Year	Concrete	Bitumen	Gravel	Laterite	Earth
1988	-	295/0	822/7	730/5	2092/2
2005	-	1182/3	3957/7	1689/1	17070/5
2012-2013	41/3	175/7	273/6	-	577/6
2013-2014	100/2	262/2	744/5	-	1569/6
2014-2015	167/3.20	389/5.83	1697/3.94	-	2662/6.58
2015-2016	120/2	225/0	1265/0	164/2	2030/7
2016-2017	92/7.45	88/2.35	523/7.8	208/5.08	878/6.68
2017-2018	107/4.17	155/6.1	210/5.31	355/7.6	1051/3.87
2018-2019	353/7.12	401/2.99	464/2.63	1067/6.2	1027/0.05
2019-2020	603/2.1	430/0.1	742/5.4	1842/3.6	1593/2
2020-2021	630/7	397/1.1	714/3.9	1544/6.6	1030/2.3
2021-2022	197/0.17	139/0.39	198/2.38	380/5.45	265/1.42
2022-2023	274/1.23	143/7.66	282/4.9	212/1.81	340/7.22
Total	2688/7.44	4285/6.52	11898/5.25	8196/4.34	32191/0.12

Source: Department of Rural Road Development (2023)

The data shown in Table (3.1) indicates a substantial growth in the construction of rural road infrastructure from 1988 to 2005. In 1988, Myanmar had a total of 3940 miles and 6 furlongs of rural roads, which grew to 23239 miles and 6 furlongs by 2005. The extension of rural roads varies annually. The year 2019-2020 saw the highest level of rural road building in Myanmar, with a total of 5211 miles and 5.2 furlongs. This was followed by the year 2014-2015, which saw the development of rural roads spanning 4917 miles and 3.54 furlongs. In 2020-2021, 4317 miles and 4.9 furlongs of country roads were constructed, while in 2015-2016, a total of 3805 miles and 3 furlongs of rural roads were built.

3.4.1 Rural Road Classification

The National Rural Road Standards and Specifications (NRRSS), which are now being produced with help from development partners, will provide a detailed explanation of the technical criteria that must be met in order to meet the all-season

standard. Assuring that the standards and specifications used in this plan are acceptable for both the current usage of rural roads as well as the projected future usage of these roads is the major objective of these standards and specifications. In the first place, the standards and specifications need to be suitable for the function of the road and the traffic that uses it, which includes both people and vehicles. The standards and specifications must also be in accordance with the expertise of the engineers and technicians who are responsible for designing the roads, the materials that are available for the construction of the roads, the capabilities of the contractors and laborers who are involved in the construction of the roads, and the skill levels of the local villagers and contractors who are responsible for the maintenance of the roads.

The standards and specifications also make an effort to achieve a balance between the costs that are connected with the building or upgrading of roads and the costs that are incurred for the upkeep of roads once they have been constructed. The purpose of this is to avoid overburdening local budgets or communities with unnecessary maintenance expenditures, as well as to avoid designing things that are unduly costly and quickly drain the available investment money. When a number of elements, including climate, terrain, soil types, building materials, and traffic volumes, are taken into consideration, there will be variations in the precise kind of all-season standard that is used in various states and areas. These elements have an impact on the creation and maintenance of the standard that is most suitable or appropriate. The most important aspects of the all-season standard are described in this article; more information may be found in the National Road Safety Standards. In the event that this strategy and the NRRSS are significantly different from one another, the NRRSS shall be given precedence.

(a) Road Surface Type

In order to obtain an improved, unsealed surface, construction and upgrades will be carried out on rural roads of both class A and class B specifications. Typically, this will need the use of a macadam surface that is either dry-bound or water-bound. The National Rural Road Standards and Specifications (NRRSS) allow for the use of gravel and other suitable materials in some areas. However, this is only the case in certain districts. An improved unsealed road surface will make it possible to use the

road throughout the whole year, with the exception of periods of impassability that may occur during periods of intense rainfall and flooding, which typically do not continue for more than a few days. Class A roads will be progressively enhanced with a sealed surface, either made of cement concrete or bituminous material, based on its significance and projected traffic volumes. According to this policy, rural roads classified as Class C will have a surface made of soil and will not be given priority for improvement to a better surface quality.

(b) Road Carriageway Width

The minimum carriageway width for both class A and class B highways will be 12 feet. A stepwise upgrading method will be used, whereby the carriageway width of class A and B rural roads with high traffic volumes that above the minimum criteria for widening, as stated in the NRRSS, may be expanded to 18 feet or greater. In areas with challenging topography that necessitates extensive excavation and filling to achieve the desired width of the road, as well as in flood-prone regions where the construction of the road requires the implementation of more costly flood-resistant designs, it may be preferable to choose a narrower carriageway width with single lane access of either 6 or 9 feet. This design choice ensures the provision of adequate passing areas. Class C roads may have a carriageway width that is less than 12 feet, varying according to local circumstances.

(c) Drainage System and Bridges

Rural roads in both Class A and Class B categories would be equipped with adequate side drains and cross drainage systems. Sidedrains may be made of soil, but they must be reinforced with lining in areas where there is a significant danger of erosion, often when slopes exceed 6% and when they pass through settlements. The construction of cross drainage structures, such as bridges, will use either cement concrete or steel materials, ensuring a minimum load bearing capability of 20 tons. For class A country roads and class B rural roads with traffic volumes over the minimal threshold for bridge strengthening according to the NRRSS, the load bearing capacity will be adjusted to meet the criteria. Timber structures are limited to temporary usage on class A and class B country roads and should be progressively replaced by concrete or steel structures. Timber bridges may still be used on Class C highways.

(d) Slope Protection

Both class A and class B highways are required to be outfitted with appropriate safeguards to protect cut and fill slopes and embankments, therefore avoiding major damage to the road. In order to handle the problem, there is a wide variety of potential solutions available, including the use of vegetation as a form of protection (bio-engineering) and the construction of barriers composed of concrete, masonry, or gabion. Within the scope of the building and improvement operations, necessary slope protection measures will be implemented.

Rural roads will be categorized into three distinct administrative groups in order to facilitate their categorization. The first two administrative categories are concerned with country roads that are a component of the core rural road network (CRRN), while the third administrative category includes rural roads that are not included in the CRRN.

(i) Class A Rural Roads

These include all primary rural roads that connect village tracts or link rural populations of more than 1,000 inhabitants to the wider road network. Class A roads typically consist of a road that connects a substantial hamlet or a road stretch that links many villages with a total population exceeding 1,000 persons. Class A rural roads will comply with elevated requirements and specifications due to their crucial function in supporting bigger populations and enabling connection for village development committees, services, and amenities inside village tracts. Class A country roads often serve as direct connections between higher-level routes or metropolitan areas.

(ii) Class B Rural Roads

This category includes all remaining primary rural roads that link communities with populations below 1,000 people. Class B rural roads generally serve smaller or fewer settlements. Although they will be built and improved to satisfy all-season standards, their requirements and specifications will be less strict compared to class A roads. Class B country roads often serve as connectors between class A rural roads, however they may also directly connect smaller villages to higher-level roadways or cities.

(iii) Class C Rural Roads

Class C rural roads are any rural roads that are not a part of the core rural road network and do not serve as the primary route to a hamlet. These roads are referred to as classified rural roads. Despite the fact that these roads provide additional entrance points to agricultural regions and connect more remote communities to the main village, they do not align with the primary objectives of this plan. As a consequence of this, they are not given priority when it comes to being modernized to satisfy the needs for all seasons.

Table (3.2) Length and Classifications of Roads by States and Regions (2023)

(Mile/Furlong)

State/ Region	Class A Road	Class B Road	Class C Road
Naypyitaw	615/3.14	553/7.93	438/5.66
Kachin	960/2.88	606/6.63	831/6.54
Kayah	188/2.51	147/1.76	129/7.56
Kayin	785/3	230/3	172/4
Chin	2377/6	1434/2	922/4
Sagaing	4535/1.62	2481/7.42	691/0.56
Thaninthayi	768/6.75	938/6.64	261/1.32
Bago	2439/3.84	806/4.94	938/1.53
Magway	4154/3.29	2061/1.38	1255/1.22
Mandalay	3059/1.62	1740/2.51	467/4.32
Mon	571/2.69	295/2.08	93/7.63
Rakhine	1048/1.57	423/7.88	243/6.71
Yangon	864/0.68	758/5	326/1.75
Shan	5133/6.57	3468/1.38	2537/6.52
Ayeyarwaddy	1931/6.49	1115/4.6	942/7.28
Total	29433/4.65	17061/7.53	9703/2.6

Source: Public Works Department (2023)

Table (3.2) indicates that the combined length of various road types in all States and Regions is 56198 miles and 6.78 furlongs, equivalent to 90443.28 kilometers. Class

A roads provide the most contribution among the other classes of roads, with a total length of 29,433 miles and 4.65 furlongs, which is equivalent to 47,368.76 kilometers. The Class B road is the second longest form of road, measuring 17061 miles and 7.53 furlongs (27458.53 km). In comparison, Class C Roads are shorter, measuring just 9703 miles and 2.6 furlongs (15615.46 km).

3.5 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 seal coating for every mile, the dressing of shoulders, the cleaning 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. In the first stages of designing and constructing the road, it is crucial to use efficient methods. One of the primary objectives of maintenance work on a well-constructed road is to ensure the ongoing efficiency of the drainage system. Maintenance activities are sometimes categorized into two separate groups based on the location of the activity. Off-carriageway work largely focuses on the maintenance

of the drainage system and the repair of damage to the exterior components of the road. To ensure the proper management of rainwater runoff from the road, the maintenance of drains and cross drainage systems is carried out diligently (Ministry of Construction, 2017).

The second classification of maintenance duties included the restoration of the road's surface. Primarily, this task involves maintaining the road's running surface in a satisfactory state, ensuring it is clear of any obstacles, and has the necessary slope to facilitate proper drainage. In order to ensure the longevity of rural roads, it is necessary to safeguard the bulk of the drainage system, which is situated outside the carriageway. High-traffic highways need a substantial amount of money to maintain the road surface. Rural roads see lower traffic volumes compared to highways, resulting in reduced maintenance needs due to fewer road surface repairs. The presence and upkeep of the drainage system are intimately linked to the maintenance priorities for rural roads. When planning road development, it is important to consider the potential damage that might occur to the road network.

Emergency maintenance involves activities such as:

- (a) Repair or reconstruction of cross-drainage infrastructure that have been harmed by flooding or heavy vehicles,
- (b) Road sections that have been destroyed by washouts, erosion, or floods may need to be repaired or rebuilt,
- (c) Repair or restoration of erosion control damages caused by landslides or high-water flows,
- (d) Clear the road's carriageway of landslides, trees, or rocks.

For the purpose of enhancing transportation and land linkages, promoting regional development, and satisfying national objectives, the government of Myanmar has created rural roads. The government of Myanmar has been working to put various initiatives and policies into action. In order to achieve the goals for the development of rural roads and transportation, the Department of Rural Road Development is now working on road improvement projects, the primary focus of which is on rural roads. The Department of Rural Road Development is tasked with the maintenance, improvement, and construction of rural roads that provide connectivity between villages and towns, as well as interconnecting different communities. The Department of Rural Road Development (DRRD) is now constructing new rural roads, while also

expediting the upgrading process of old ones on an annual basis. The source of this information is the Ministry of Construction in 2017.

3.6 Background Information of Taungoo Township

3.6.1 Geographic, Demographic and Economic Situation

Access to basic, intermediate, and higher education has grown from 197 to 210 respondents, 124 to 199 respondents, and 97 to 122 respondents, respectively, according to Table (4.17). On the other hand, the proportion of respondents who said they had no access to education declined significantly from 17 to 5.

3.6.2 Development of Rural Roads Infrastructure

The year 2017 marked the beginning of operations for the Department of Rural Road Development in Taungoo Township. Before 2017, the Department of Rural Development was in charge of the construction of rural roads in Taungoo Township. This obligation was handled by the department. When it comes to the construction and improvement of rural roads, the Department of Rural Road Development (DRRD) is able to lead ideas that are capable of being implemented. The Rural Road Development Department (DRRD) was responsible for the construction of interconnecting road networks that extended from village to village throughout the whole country. The table (3.6) presents the implementation of rural roads from 2017 to 2018 and from 2023 to 2024.

Table (3.3) Construction of Rural Road Condition in Taungoo Township

(Mile/Furlong)

Year	Concrete	Bitumen	Gravel	Laterite	Earth
2017-2018	-	3/7.28	2/6	-	1/0.96
2018 Mini		0/1.12	2/0.48	-	-
2018-2019	-	1/2.48	3/6.88	1/6.96	-
2019-2020	3/4.8	0/2	5/4.8	-	17/6.32
2020-2021	1/7.92	2/7.44	10/6.64	7/2.88	-
2021-2022	0/4.48	0/3.04	2/2.4	-	-
2022-2023	1/4.96	-	-	3/7.92	3/5.92
2023-2024	-	-	8/4.96	-	-
Total	7/6.8	8/7.52	36/0.4	13/1.52	22/5.28

Source: DRRD, Taungoo Township (2024)

According to the Table (3.3), between 2017-2018 and 2023-2024, total length of rural roads 36 miles and 0.4 furlongs of roads were constructed. Especially the new gravel roads were constructed in the length of 22 miles and 5.28 furlongs, the concrete roads in the length of 7 miles and 6.8 furlongs, bitumen roads in the length of 8 miles and 7.52 furlongs, the laterite roads in the length of 13 miles and 1.52 furlongs, the earth roads in the length of 22 miles and 5.28 furlongs were constructed between 2017-2018 and 2023-2024.

A 27-mile and 2.48-furlong rural road was built in total between 2019 and 2020. Comparing this year to last, it is evident that the government has dedicated a significant portion of its budget and efforts to rural development in order to advance as a developed nation and lessen the disparities that exist between urban and rural areas.

CHAPTER IV

SURVEY ANALYSIS

4.1 Survey Profile

Seik Hpu (South) Village-Tract has 9 villages. A simple random sampling method is used to select 6 villages, which are the located around on the Taungoo-Leiktho Road. This study focuses on the effect of the villagers after the improvement of the rural road in sample villages. The sample size of households is 300 out of 1498 households. Seik Hpu (South) and Bhuyar Hkyay Yin Villages are located on the Taungoo-Leiktho Road. Four Miles and Five Miles Villages are the 4 miles and 5miles away from the road. Ta Lote Kone Village is 7 miles away from the road and LeThaPyinKwe Village is 1mile away from the Taungoo-Leiktho Road. Table (4.1) shows the villages chosen, as well as the number of households and gender population.

Table (4.1) Households and Population in Seik Hpu (South) Village-Tract

No.	Villages	Households	Population		
			Male	Female	Total
1	Seik Hpu (South)	450	837	890	1727
2	Bhuyar Hkyay Yin	190	410	442	852
3	4 Miles Village	430	739	819	1558
4	5 Miles Village	211	323	366	689
5	Ta Lote Kone	88	206	233	439
6	LeThaPyinKwe	129	279	301	580
Total		1498	2794	3051	5845

Source: General Administration Department, Taungoo Township

4.2 Survey Design

Both quantitative and qualitative methodologies are used in this research, which uses a descriptive methodology. On the Taungoo-Leiktho Road, in Seik Hpu (South) Village-Tract, 300 families provide the main data. The General Administration Department, the Department of Highways, the Department of Rural Roads Development, foreign organizations, and online websites are the sources of the secondary data.

After reading the literature review, the questionnaire was created. The purpose of the survey questionnaire was to evaluate how improving rural roads affected families' social and economic circumstances as well as their perceptions of such improvements. Data for the survey were gathered between April and May. A structured questionnaire was used in a face-to-face interview, which served as the main means of gathering data.

There are three sections to the questionnaire. The sociodemographic details of the sample homes are covered in Part I. Demographic background includes the head of household's age, gender, and level of education, as well as the number of family members and their primary source of income. Part II covers the socioeconomic scenario, which includes home access points, revenue sources, lighting sources, and kinds of houses. In Part III, sample families' views about rural road improvements are measured using a five-point Likert scale to gauge respondents' satisfaction.

4.3 Survey Results

4.3.1 Socio-demographic Characteristics of Sample Households

Characteristics of the respondents consist of the demographic and economic condition of the respondents such as, gender, age and education among respondents (household heads), number of household members, occupation, types of houses, electricity usage, type of ownership of farm, type of industry and type of shop. In Table (4.2), gender of respondents is presented.

Table (4.2) Gender of Household Head

Gender	Number of Respondent	Percentage
Male	267	89
Female	33	11
Total	300	100

Source: Survey Data (2024)

The majority of respondents—89% of them are males and the remaining 11% are women—are identified by the survey data. As a result, a greater proportion of males and a smaller number of women responded to the poll.

Table (4.3) Percentage of Households Heads by Age Group

Age Group	Number of Respondent	Percentage
Less than 30 years	24	8
31-40 years	98	32.7
41-50 years	102	34
51-60 years	53	17.7
Above 60 years	23	7.7
Total	300	100

Source: Survey Data (2024)

Table (4.3) displays the age distribution of the homes based on survey data. The largest age range among the heads of households surveyed is 41–50 years old, representing 34% of the sample. This table demonstrates this. Ages 31 to 40 make up 32.7 percent of the population, while ages 51 to 60 make up 17.7 percent. Eight percent of the population is under thirty, while seven percent is over sixty. Most sample households consist of individuals between the ages of 40 and 50, with those between the ages of 30 and 40 coming in second.

Table (4.4) Number of Households by Size of Households Member

Size of Households Member	Number of Respondent	Percentage
Less than 3 members	152	50.7
3-5	120	40
6-8	18	6
More than 8 member	10	3.3
Total	300	100

Source: Survey Data (2024)

The table (4.4) displays the members of the sample homes based on the data. Depending on the size of the household, it is classified into four groups: fewer than

three, three to five, six to eight, and more than eight persons. Household size is the total number of individuals that live, work, and eat in the same home. The families divide household expenses and cohabit under one roof. Families are made up of parents, children, and more family members that collaborate on a regular basis. 50.7 percent of households are made up of less than three people. Families with six or eight people are the fewest—by six percent. Households with three to five people make up 40% of the total, while households with eight or more members make up 3.3%.

Table (4.5) Educational Level of the Head of Households

Level of Education	Number of Respondent	Percentage
Illiterate	5	1.7
Read and Write	13	4.3
Primary	78	26.0
Middle	56	18.7
Higher	86	28.7
Graduated	52	17.3
Master/PhD	10	3.3
Total	300	100

Source: Survey Data (2024)

The survey data categorizes respondents' educational attainment into seven groups: no education, read and write, elementary, middle, high school, graduated, master's/PhD, and no education. Eighty-six respondents, or the majority, had completed high school. The next group of respondents included 78 individuals who had completed elementary school, 52 individuals who had graduated, 13 individuals who were literate, 10 individuals who had master's degrees, and 5 individuals who said they had never attended any kind of education. Given that the majority of respondents having completed higher education, this indicates that the level of literacy is not extremely low and that they can make informed decisions regarding their economic, social, and health.

Table (4.6) Types of Houses

Types of Houses	Number of Respondent	Percentage
Zinc roofs and brick wall	122	40.7
Zinc roofs and wooden wall	147	49
Thatch roofs and wooden wall	4	1.3
Thatch roofs and bamboo	3	1
Zinc roofs and bamboo wall	24	8
Total	300	100

Source: Survey Data (2024)

Table (4.6) displays the survey data, which indicates that 49 percent of the households reside in homes with timber walls and a zinc roof. Eight percent of dwellings have bamboo walls with zinc roofs, compared to forty-seven percent with brick walls and zinc roofs. There are many people living in wooden wall buildings in this region, which is covered with woods and trees in plenty. Additionally, it is presumable that the majority of responders had quite comfortable living conditions.

Table (4.7) Source of Lighting

Source of Lighting	Number of Respondent	Percentage
Public electricity	201	67
Candle	3	1
Generator	18	6
Solar Power	75	25
Other	3	1
Total	300	100

Source: Survey Data (2024)

The sample homes in the research of rural road improvement in the study region employ solar power, candles, generators, and public electricity for illumination. Table (4.7) displays the results of sample households in certain villages. Sixty-seven percent of sample homes utilize public electricity, according to this data. Twenty-five percent of houses utilize solar electricity since some settlements are situated in isolated locations that are not connected to the national grid. Candles are used in the 1% of households because certain sample homes do not have access to

public power. Those having access to electricity outperformed those without in terms of income and consumption growth. Better rural roads allow the government to subsidize electricity.

Table (4.8) Type of Farm Ownership

No.	Type of Farm Ownership	Respondent
1	Peasant Proprietor	179
2	Tenant	9
3	Lease	8
4	Other	5
	Total	201

Source: Survey Data (2024)

According to the study area, there are 201 farmers who work in the agricultural sector in the village-tract; most of them cultivate their own farms, and only a small number of them work for tenant and work on lease. Table (4.8) shows that the types of ownership of farm, peasant proprietor is 179 respondents, tenant is 9 respondents, lease is 8 respondents and other types of ownership are 5 respondents. When cultivating the land, few farmers use large-scale tractors, while most farmers use small hand-held tractors. Most of the poor farmers cultivate their farms with cattle and cows.

Table (4.9) Types of Crops

No.	Types of Crops	Acres
1	Paddy	405
2	Groundnut	128
3	Sesame	154
4	Green Gram	135
5	Garden	32

Source: Survey Data (2024)

According to table (4.9), there are five major crops are grown in the study area. These major crops are paddy, groundnut, sesame, green gram and garden. Among these major crops paddy sown acres is 405 acres, sesame 154 acres, groundnut 128 acres, green gram 135 acres, and garden cultivated 32 acres of the total

sown acres. The study of sample area, the ownership of land only a small number of farmers who own more than 15 acres, and the majorities are farmers who own between 5 and 10 acres and less than 5 acres.

"Le," "Ya," and "Garden" crops are grown in the research area. The "Le" crops among them are paddy, with a huge planted area. The crops categorized as "Ya" and "Graden" are the second and third most farmed, respectively. It is discovered that relatively little land is used for garden production. The amount of land planted with crops varied based on the local population's needs, crop prices, government project crops, soil characteristics, and climate. The strategy for key crops to expand the economy and the corresponding plan for agricultural growth had been established by the government. A cereal crop is paddy. The two main crops used as oil seeds were sesame and groundnut. It is thought that pulses are a commercial crop.

Given that farmers make up the majority of the respondents, the issue of where they sell their agricultural goods was posed. Simple access has altered the settlements' selling locations. Adjustments to the selling locations are indicated in table (4.10).

Table (4.10) Selling Places of the Agricultural Products

Selling Places	Before		After	
	Number of Respondent	Percent	Number of Respondent	Percent
Own Village	84	41.8	32	21.1
Nearest Market	72	35.8	51	33.6
Taungoo	35	17.4	45	29.6
Yangon / Mandalay	10	5	24	15.8
Total	201	100	152	100

Source: Survey Data (2024)

The table illustrates how their selling location changed both before and after the road was improved. The majority of small-scale farmers that cultivate crops sell their produce at the closest market. They don't often harvest all at once. They sometimes harvest and sell their goods in the closest marketplace. It is customary for people to sell their agricultural goods and shop in the market for necessities like meat, clothing, oil, and other supplies. Only a small percentage of large-scale farmers who own plantations or large farms sell their goods in large cities. Just 5% of respondents sent their

agricultural goods to Mandalay and Yangon, two major cities, before to the road development. However, after the road repair, farmers selling their goods in Mandalay/Yangon have climbed by a remarkable 15.8%, while farmers selling their goods in Taungoo have increased by much more, from 17.4% to 29.6%. Furthermore, a fall from 41.8 percent to 21.1 percent occurs in the percentage of farmers who also sell their agricultural goods in the villages. Their trading location has altered due to easier accessibility, allowing the farmers to make more money. Because the roads are smooth, most farmers go to the larger cities in hopes of receiving a higher price for their produce. Because of this, the percentage of selling spaces at the closest market has decreased from 35.8 to 33.6.

Table (4.11) Type of Industry

No.	Type of Industry	Number	Number of Worker
1	Rice Mill	4	43
2	Auto Workshop	2	15
3	Motorcycle Workshop	6	15
4	Tea Shop	3	13

Source: Survey Data (2024)

Table (4.11) illustrates the various industries present in the studied region. There are four different kinds of industries: tea shops, motorbike workshops, auto workshops, and rice mills. Road connections provide business owners the chance to establish industrial facilities, especially agro-industries that rely on locally sourced raw resources. The construction of rural roads facilitates the faster flow of labor and supplies between the market and the producing center. It is easy and less expensive to move the excess product from the community. Additionally, it guarantees farmers fair rates for their produce and perishable goods like eggs, milk, and vegetables. The residents also purchase more vehicles, such as tractors, scooters, and bicycles. There's an upsurge in traffic on the road connection. For those who can afford the investment, improved roads and more freight transportation provide the chance to establish small businesses in the village or purchase local food or create their own to sell in the surrounding market places. They also free up time for individuals with the necessary skills and/or funds to invest in other small enterprises, freeing up time from their former professions.

Table (4.12) Shopkeeper

No.	Type of Shop	Number	Number of Worker
1	Wholesale	5	20
2	Retail	14	29

Source: Survey Data (2024)

Table (4.12) displays the kind of store that the participants operate. The data indicates that 14 shops operate as retail establishments, 5 operate as full sale stores, and the respondent is involved in the delivery of products and services within the sample area. In addition, the research area's predominant commercial activity were determined by the economic climate. This is one of the main reasons why retail stores make up a larger portion of the market than whole sale stores do. Stated differently, it is a commercial hub where products are transported to be sold.

4.3.2 Effect of the Road Improvement on Economic Conditions of the Rural Households

In this section, changes in economic condition include changes in occupation conditions, the changes in average monthly income from the main source of household income, change in access to household and access to job opportunities by youths. Table 4.13 shows the changes in occupation among respondents. In the table, changes in source of income of the respondents are grouped into agriculture, livestock breeding, government staff, private staff, own business, transportation and casual workers.

Table (4.13) Changes in Occupation Conditions Before and After Road Improvement

Items	Before		After	
	Number of	Percent	Number of	Percent
Agriculture	201	67	152	50.7
Livestock and Breeding	22	7.3	25	8.3
Government Staff	17	5.7	32	10.7
Private Staff	19	6.3	31	10.3
Own Business	12	4	19	6.3
Transportation	9	3	15	5
Causal Worker	20	6.7	26	8.7
Total	300	100	300	100

Source: Survey Data (2024)

Table (4.13) breaks out the seven categories of profession for heads of households: breeders, farmers, government employees, private employees, owners of their own businesses, transportation, and causal labor. Most family heads are farmers since farming is the main economic activity. Most people in the area are employed in agriculture, and commercial raising of cattle, buffalo, pigs, and chickens is also practiced.

Before road improvements, the survey data shows that 67% of respondents are farmers, 7.3 percent are breeders, 5.7 percent are government employees, 6.3 percent are private employees, 4% are owners of their own businesses, 3% are drivers and transportation, and 6.7% are casual laborers. The agricultural industry employed 152 respondents, but following road improvements, that percentage drops to 17%, and the number of livestock breeders has somewhat declined. In contrast, the number of own business increased from 4 to 6.3 percent after improvement of road. This research demonstrated the shift in the employment status of every family member. It was difficult for residents of Taungoo Township to go about and go to work before rural roads were built. Rural citizens may now work as government or corporate workers in Taungoo's metropolitan areas when rural roads are improved. Improved rural roads would allow those living in rural areas to work remotely. The members of the family may also increase the number of revenue sources since they

may work in different industries.

On average the total monthly income of all family members is the monthly household income. The primary determinant of a household's quality of life is its income level. Household well-being may be measured with the use of household income surveys. The monthly average income of the sample families is shown in table (4.14) based on the data.

Table (4.14) Change in Income Before and After Road Improvement

Monthly Income (Kyat)	Before		After	
	Number of	Percent	Number of	Percent
Less than 100000	7	2.3	0	0
100000-200000	9	3	3	1
200000-300000	32	10.7	33	11
300000-400000	141	47	147	49
400000-500000	93	31	97	32.3
Above 500000	18	6	20	6.7
Total	300	100	300	100

Source: Survey Data (2024)

Table (4.14) displays the average monthly income of respondents both before and after road improvements. Prior to the road's renovation, 18 respondents earned more than 500000 kyats; after the road's improvement, this percentage rose to 0.7 percent. After road improvements, the proportion of responders earning between 400,000 and 500,000 MMK has increased. The middle-income level has grown from 47 percent to 49 percent between 300,000 and 400,000 MMK. The income range has shrunk from 3 percent to 1 percent between 100,000 and 200,000, and from 2.3 percent to 0 percent below 100,000.

The building of rural roads may have an effect on the recipients' income, which is why the average monthly income of sample families in all sample villages has grown after the roads were improved. Crop households make up the majority of the sample. This might include paying farmers more directly or expanding the market's supply of agricultural products. Thus, achieving even one of these would enhance revenue from both agricultural and non-agricultural labor markets, potentially leading to a rise in non-agricultural employment.

Table (4.15) Assets

Assets	Before		After	
	Number	Percent	Number	Percent
Cattle/ Buffalo	66	22	72	24
Pig/ Chicken/Duck	97	32.3	101	33.7
Tractor (Heavy/Small)	4	1.3	30	10
Mobile Phone	287	95.7	289	96.3
Car	5	1.7	9	3
Bicycle	29	9.7	30	10
Motorcycle	139	46.3	148	49.3
Refrigerator	9	3	16	5.3
TV	102	34	113	37.7
VCD/DVD	102	34	113	37.7
Water Pump	26	8.67	32	10.7

Source: Survey Data (2024)

Table (4.15) shows that prior to the construction of better rural roads, 22% of households had agricultural animals such cattle and buffalo, and 32.3 % of households owned livestock. There were 1.3 percent of people who owned tractors, 95.7 percent who owned cell phones, 29 percent who owned bicycles, 46.3 percent who owned motorcycles, 3% who owned refrigerators, 34% who owned TVs, 34% who owned VCDs and DVDs, and 8.7% who owned water pumps. Household agricultural assets grew by 24 percent, animal assets climbed by 33.7 percent, and tractor assets increased by 10 percent after the construction of improved rural roads. There was a 96.3 percent increase in mobile phone assets, a 10% increase in bicycle ownership, a 49.3 percent increase in motorcycle ownership, a 16 percent increase in refrigerator assets, a 37.7 percent increase in television assets, a 37.7 percent decrease in VCD/DVD assets, and a 10.7 percent increase in water pump ownership.

The table shows that after rural road development, sample families' assets increased. As family incomes rise, so do their assets in this community, which is a direct result of improved rural roadways.

Table (4.16) Job Opportunities of Youths Before and After the Road Improvement

Items	Before		After	
	Number of Respondent	Percent	Number of Respondent	Percent
Difficult to Find Job	68	22.7	31	10.3
Work in their Village	73	24.3	68	22.7
Work in Other Village	45	15	39	13
Work in Urban	53	17.7	79	26.3
Work in Other Cities	43	14.3	52	17.3
Work Abroad	18	6	31	10.3
Total	300	100	300	100

Source: Survey Data (2024)

Table (4.16) shown that changes in job opportunities of the youth from the sample' households resulting from road improvement are classified into difficult to find job, work in their village, work in other village, work in urban, work in other cities, and work abroad. The changed in nature of jobs among youths from respondents' households are asked. Among the respondents, number of youths in their household's face difficulties in finding jobs has declined from 22.67 percent to 10.33 percent. This means that road infrastructure improves youths' ability to find jobs. Moreover, the number of youths, who work in their jobs and in nearby villages declined from 42 to 24 respondents and 25 to 19 respondents respectively. In contrast, number respondents who work in other cities and from abroad. Because rural road construction provides quicker access to job options, it may have more economic potential. Opportunities to purchase property in the village or create a small business might be beneficial because of the upgraded roads and increased capacity for moving products.

4.3.3 Effect of Road Improvement on Social Conditions

Changes in social condition include improvements in access to education, healthcare services, and women participation. Education accessibility were at different levels by respondents' households cover access to primary education, access to secondary education, access to higher education and no education access. Access

to healthcare services include access to basic/primary healthcare services, access to specialist services, access to emergency healthcare services and no access to healthcare services at all. Another variable is the changes in women’s economic decision making that include whether women can lead and manage economic operation or not, whether women can initiate own new business or not whether women can penetrate into new market or not and no economic activities at all. Changes in education, healthcare, and women participation in the respondents’ households before and after the road development are shown as following.

Table (4.17) Access to Education Before and After the Road Improvement

Items	Before		After	
	Number of Respondent	Percent	Number of Respondent	Percent
Access to primary education	197	65.7	210	70
Access to secondary education	124	41.3	199	66.3
Access to higher education	97	32.3	122	40.7
No education access	17	5.7	5	1.7

Source: Survey Data (2024)

According to Table (4.17), it was revealed that access to primary; secondary and higher education have increased from 197 to 210 respondents, 124 to 199 respondents and 97 to 122 respondents respectively. In contrast, number of respondents, who responded no education access declined significantly from 17 to 5 respondents.

Table (4.18) Access to Healthcare Services Before and After the Road Improvement

Items	Before		After	
	Number of Respondent	Percent	Number of Respondent	Percent
Access to Basic Healthcare Services	283	94.3	293	97.7
Access to Specialist Services	42	14.0	184	61.3
Access to Emergency Healthcare Services	67	22.3	278	92.7
No Healthcare access	13	4.3	5	1.7

Source: Survey Data (2024)

Likewise, alterations in healthcare services are likewise gratifying. The number of respondents who had access to basic/primary healthcare services went from 18 to 41. Similarly, the number of respondents who had access to specialty services increased from 3 to 30, and the number of respondents who had access to emergency healthcare services increased from 2 to 14. The number of respondents who had not visited healthcare services before to the road repair was 13. However, following the road improvement, this number decreased from 13 to 5 respondents.

Table (4.19) Women Participation Before and After the Road Improvement

Items	Before		After	
	Number of Respondent	Percent	Number of Respondent	Percent
Women can lead and manage economic operation	130	43.3	157	52.3
Women can initiate own new business	12	4.0	46	15.3
Women can penetrate into new market	4	1.3	32	10.7
No economic activities at all	37	12.3	25	8.3

Source: Survey Data (2024)

Finally, women economic participation resulting from improving road infrastructure is asked. These include women's ability to lead or manage economic operations, initiate own new business and penetrate into new and wider market. After the road improvement were increased 130 to 157 respondents for the first statement, 12 to 46 respondents for the second statement and 4 to 32 respondents in the third statement. Women with no economic activities before the upgrading projects were 25 respondents. This was declined to 12 respondents after the road improvement.

4.3.4 The Perception on Before and After the Road Improvement

The overall degree of social and economic progress in each of the research areas was significantly impacted by improvements to rural roads. The views of households about the road constructions of rural homes are shown in table (4.20).

Table (4.20) Perception on Road Improvement of Rural Area

No.	Statements	Mean	Standard Deviation
1	I. Business Sown acreage/ firms can be extended.	3.43	0.97
2	Buying the required inputs is more accessible.	3.66	0.91
3	Dispatching the products to market is easy to access.	3.12	0.95
4	Getting technologies concerned with agriculture/ livestock and firm is more accessible.	3.53	0.96
5	Job opportunity in other area is more accessible.	3.87	0.68
6	One can go to the workplace from home	3.67	0.98
7	Purchasing goods for selling in outlet becomes more efficient.	3.90	0.93
8	Up to date new commodities can be sold quickly.	3.83	0.94
9	Increase family income.	3.90	0.93
	Overall Mean Value	3.65	
1	II. Education For those students who have to attend in other areas can go to school in time.	4.11	0.60
2	Attending professional trainings is easier to access.	3.66	0.91
	Overall Mean Value	3.89	

Table (4.20) Perception on Road Improvement of Rural Area

No.	Statements	Mean	Standard Deviation
1	III. Health Hospital and clinic can be arrived in time, than previously for emergencies.	3.26	0.92
2	Health care services are easier to access.	3.31	0.97
	Overall Mean Value	3.29	
1	IV. Transportation Going one area to another is easier to access.	3.90	0.75
2	Save more time than previously for going one place to another.	3.96	0.51
	Overall Mean Value	3.93	

Source: Survey Data (2024)

Based on the survey results, the average value of 3.65 indicates that there is potential to increase the size of cultivated land in the sample homes. Rural regions are often known for their agricultural activities, which provide a substantial contribution to the economy. Efficient transportation of agricultural products to markets is made possible by the presence of easily accessible rural roads. This minimizes post-harvest losses and guarantees the prompt delivery of agricultural goods to customers. Furthermore, enhanced availability of resources such as fertilizers, seeds, and machinery, along with easy accessibility to market for agricultural products and advancements in agricultural and livestock technologies, as well as improved access to rural roads, all contribute to increased agricultural productivity and the promotion of sustainable farming methods. The efficiency of purchasing items for resale at the outlet has increased. Rural roads enhance trade and commerce by establishing connections between rural regions and metropolitan centers as well as regional marketplaces. Rural areas benefit from increased access to a broader selection of products and services, as well as the ability to transport locally produced items to outside markets. This fosters entrepreneurship, boosts local enterprises, and generates job prospects in rural regions. The families consent to expanding the work possibilities via the sampling. Following the completion and improvement of construction projects, families have the opportunity to seek employment in many sectors, particularly metropolitan regions, such as

corporate and government positions, as well as casual labor positions, among others. The sample homes have expressed the need for more flexibility in order to enhance road safety. In addition, enhanced connection via rural roads entices investments from enterprises seeking to establish their operations in rural areas.

Rural road improvements provide job prospects for local communities. Road construction projects need manpower-intensive workforces, offering temporary employment opportunities during the construction process. Moreover, enhanced road connection entices enterprises to set up operations in rural regions, resulting in the generation of long-term job possibilities. This initiative aims to mitigate rural-urban migration and relieve poverty by facilitating income-generating opportunities within rural communities. Following the completion and improvement of the construction, families have the opportunity to seek employment in many sectors, particularly metropolitan regions, such as corporate and government positions, as well as casual labor roles, among others. The sample families advocate for more flexibility in order to enhance traffic safety. Improved rural road infrastructure enhances socioeconomic development by facilitating increased household income. The construction and improvement of rural roads have a significant indirect influence on the overall level of economic development in each studied region.

The average score of 3.89 indicates that there has been an improvement in human resources, educational infrastructure, and facilities for sending children to school. It is now more easy and secure to send children to school. Improved road conditions contributed to increased enrollment rates by providing extra transportation choices. The accessibility of professional trainings for the sample homes is improved. Moreover, rural roads promote social cohesion by reducing seclusion and enhancing communication among rural populations. This promotes societal unity, intercultural interaction, and the dissemination of information across diverse geographies.

The average score of 3.29 indicates that families have convenient access to health care services after the construction of rural roads. There is a growing need for an increased number of health care professionals, and there has been notable improvement in this field over time. The rural health division has returned, making transportation to and from the hospital and clinics more convenient than before. Prior to an emergency, it was not possible to summon an ambulance. Following the building and improvement of rural roads, there has been an increase in fatal accidents involving family members.

Based on the table, the average value of 3.93 indicates that the surveyed households believe that they are able to save more time for traveling between places following the building of rural roads. Furthermore, they agree that the travel expenses are minimal. In earlier times, due to the inadequate condition of roads, individuals were compelled to go on foot when bicycles were not a viable option. Consequently, it results in a temporal disruption in road transportation. Rural transport ensures the availability of agricultural inputs and enables the transportation of farm products to the markets. Farmers with access to larger markets often achieve higher crop yields. In order to enhance the growth of the agricultural sector, it is crucial to establish a connection between the enhancement of rural road infrastructure and transport services and the roads leading to major markets. Failure to do so would result in a minimal influence on the agricultural industry.

The study's findings indicate that rural road repair has a significant influence on family living standards, commuting time, belongings, and income. Improved rural infrastructure facilitates the government's ability to provide electricity subsidies. The enhancement of rural roads potentially impacted the income of the rural populace, resulting in an increase in the average monthly income of households in every village after the development of rural roads. If either the quantity of commodities purchased by farmers for the market or the price they directly get were to increase, it would lead to a rise in their agricultural income. The earnings from non-agricultural labor markets may increase for non-agricultural employment.

Prior to the implementation of road enhancements, securing employment in the metropolitan area was challenging. Following the completion of road improvements, rural inhabitants now have the opportunity to be employed by the government, businesses, or work as casual workers in the urban areas of the Township. Access to social services such as healthcare and education is made easier, and economic possibilities are more easily accessible. Manufacturing equipment, including machinery, seeds, and fertilizer, is readily accessible. Lower transportation expenses enable producers, merchants, and end customers to purchase items at a reduced price, with more efficiency, and across shorter distances. Transportation-related issues or malfunctions pose reduced dangers. Transportation resources are conserved, resulting in less product damage. The level of communication between local government officials and the rural populace has seen enhancement. The enhancement of rural roads has a considerable indirect effect on the overall degree of economic development in each studied region.

CHAPTER V

CONCLUSION

5.1 Findings

Because they enable rural residents to access markets, medical facilities, and educational opportunities, rural roads are essential to the economic and social growth of nations. Infrastructure development for rural areas, productive sectors, and social and economic services must be given top priority in developing nations. Today, the majority of consumer products are imported since there are few processing businesses that use local resources. In increasingly developed countries, society is progressing towards an exchange economy, where transportation relies heavily on external sources, unlike in industrialized nations.

The impact of enhancing rural road infrastructure on the quality of life for rural residents encompasses several aspects, including household occupation, power consumption, trip duration, household assets, income, and more. Working in the metropolitan environment was challenging before the building took place. Following the completion of the construction, individuals residing in rural regions would have the opportunity to commute to metropolitan townships for employment in various sectors such as government, corporate, and industrial positions. The government may prioritize the provision of power over rural roads, since it is a more advantageous option. Consequently, the majority of villages rely on public electricity. Households having access to electricity had superior performance compared to those without power. Regarding the growth of income and consumption, those who had access to electricity had superior performance compared to those who did not have access. As a result of the enhanced infrastructure in rural areas, the government is able to provide financial assistance for electricity.

This research discovered that the ease of access has altered the primary sources of revenue. The improved accessibility has led to a rise in job prospects, such as the construction of small stores, workshops, and employment in the truck driving and transportation sectors. The improved road conditions also led to a rise in the

number of motorized vehicles. The use of private automobiles has risen, leading to an increasing need for transportation. As a result of the decrease in transportation costs, the farmers decided to alter the locations where they sell their agricultural goods.

The number of farmers transporting their agricultural goods to major cities has risen. Another emerging trend is the increasing number of brokers who are venturing into rural areas to purchase agricultural goods. Consequently, the number of farmers who sell their goods directly at their own establishments has also risen, allowing them to save both trip time and transportation expenses. Information may be obtained via phones and/or social media in exchange for the cost of things. The farmer has the autonomy to choose the timing of their product's harvest and select the locations for selling. The shift in primary sources of income and the decrease in both trip time and travel expenses resulted in a rise in family income within the study regions. Additionally, the improved road infrastructure facilitated the provision of power. There has been a small rise in the use of machines.

The upgrading of roads facilitated enhanced accessibility to fundamental education. The enhanced road infrastructure has contributed to the elevation of the school's standing. Moreover, it has augmented the enrollment rate in basic and middle schools. Improved road infrastructure decreased the duration of travel to school and ensured year-round accessibility to educational institutions. Consequently, there has been a rise in school enrollment from elementary to middle school. Due to the growing student population, the institution has undergone upgrades. There has been an increase in the number of teachers available, resulting in a drop in the student-teacher ratio. Despite their parents' lack of formal education, since they were unable to finish primary, middle, and high school owing to limited accessibility, the parents are enthusiastic about improving the educational opportunities for their children and ensuring they attend school. There has been an increase in the attendance of high school students.

The research revealed that enhanced accessibility led to a higher frequency of hospital visits. The patients may access township hospitals within one hour, and even hospitals in major cities can be reached within a three to four hour timeframe. The visit of mobile health care teams has seen a significant growth due to the convenient accessibility they provide. This offers a valuable opportunity for senior individuals who are unable to travel to get medical checkups and treatment.

The availability of roads has led to decreased rates due to the supply of competitive transportation services. Improved road infrastructure enables direct access for trucks or trailer jeeps to the communities. The convenient accessibility of truck vehicles to their farms resulted in a decrease in both transportation expenses and journey duration for the transportation of their goods. Transport rates fall due to reduced journey times and cheaper vehicle operating expenses. In addition, reduced transportation expenses enable farmers to cultivate and save money by growing alternative crops that may be exported.

5.2 Suggestions

The majority of the villagers transition from subsistence agriculture to small-scale production enterprises and the service sector in order to enhance their revenue generating activities. Job prospects for young people are also enhanced inside their own homes. Furthermore, the availability of financial resources and the ability to reach new and expanded markets are also important. Regarding the social sector, road construction has led to advancements in the accessibility of education and healthcare services at all levels. In order to ensure long-term sustainability and improvement in this rural community, it is crucial to have good socioeconomic consequences.

However, when it comes to the enhancement of women's decision-making power and economic involvement in their households, progress is rather sluggish compared to other sections of their rural community. The active involvement of women in their families and economic sectors is crucial for the socioeconomic advancement of their children. Hence, it is imperative to provide training sessions, improve educational programs, and give tailored assistance to empower women living in rural areas of these communities.

While it is essential to enhance and maintain rural road infrastructure for long-term sustainability, it is also important to address and minimize any adverse effects via various mitigation measures. In order to mitigate road traffic accidents, it is essential to implement educational programs specifically tailored for the villages. Simultaneously, implementing effective surveillance, oversight, and enforcement measures for motor vehicle operators to decrease speed and ensure adherence to laws and regulations, with the aim of minimizing avoidable losses and injuries.

It has been noted that the enhancement of local area manufacturing systems in rural regions has led to an increase in the financial earnings of rural inhabitants and an improvement in their overall quality of life. Hence, to enhance the social well-being of rural inhabitants and ensure long-term progress in education, health, and transportation, it is imperative for the government to persist in providing essential assistance for the sustainable advancement of rural road infrastructure.

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7. Type of Houses

Zinc roofs and brick wall	Zinc roofs and wooden wall	Thatch roofs and wooden wall	Thatch roofs and bamboo	Other

8. Electricity Usage of Households

Public electricity	Candle	Generator	Solar Power	Other

9. Assets of Household

Type of Assets	Before Road Construction	After Road Construction
Farm		
Cattle/Buffalo		
Pig/Chicken/Duck		
Tractor (Heavy/Small)		
Mobile Phone		
Car		
Bicycle		
Motorcycle		
Refrigerator		
TV, VCD/DVD		
Water Pump		

10. Agriculture

1. (A) Peasant proprietor(B) Tenant (C) Lease (D) Other _____
2. Total area _____(acres).
(A) Paddy Field _____(acres).
(B) Plot of farm land _____(acres).
(C) Other _____(acres).

3. Cultivation of crops in previous year

No.	Crop	Sown acres	Yield	Price per unit	Total revenue (ks)	Total cost(ks)	Net income (ks)

4. Agricultural assets and other productive assets

Assets	Number
Cattle	
Tractor	

5. Livestock for Income (Previous year)

No.	Animal	Revenue (ks.)	Cost of feed (ks.)	Net income (ks.)

6. Industry

No,	Type of Industry	No. of worker	Production (year)	Average Net profit (ks/year)

7. Shopkeeper

Type of Shop	No of worker	Average net profit (ks./month)

B. Economic Effects of the Road Improvement

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

Items	Before	After
Farmer		
Breeder		
Government Staff		
Private Staff		
Own Business		
Driver/Transportation		
Other		

9. Average Monthly Income

Before Road Construction	After Road Construction

10. Job Opportunities of Youths from Respondents' Households before and after the road improvement

Items	Before	After
Difficult to Find Job		
Work in their Village		
Work in Other Village		
Work in Urban		
Work in Other Cities		
Work Abroad		

12. Changes in Market for your Products or Services before and after the road improvement

Items	Before	After
Within the Village		
Other Village		
Within Township		
In other State and Regions		

C. Social Effects of the Road Improvement

13. Access to Education before and after the road improvement

Items	Before	After
Access to primary education		
Access to secondary education		
Access to higher education		
No education access		

14. Access to Healthcare Services before and after the road improvement

Items	Before	After
Access to Basic Healthcare Services		
Access to Specialist Services		
Access to Emergency Healthcare Services		
No access		

15. Women Economic Participation Before and after the road improvement

Items	Before	After
Women can lead and manage economic operation		
Women can initiate own new business		
Women can penetrate into new market		
No economic activities at all		

D. People Perception on Road Improvement of Rural Area

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<p>I. Business</p> <p>1. Sown acreage/ firms can be extended.</p> <p>2. Buying the required inputs is more accessible.</p> <p>3. Dispatching the products to market is easy to access.</p> <p>4. Getting technologies concerned with agriculture/ livestock and firm is more accessible.</p> <p>5. Job opportunity in other area is more accessible.</p> <p>6. One can go to the workplace from home.</p> <p>7. Purchasing goods for selling in outlet becomes more efficient.</p> <p>8. Up to date new commodities can be sold quickly.</p> <p>9. Increase family income.</p>					
<p>II Education</p> <p>1. For those students who have to attend in other areas can go to school in time.</p> <p>2. Attending professional trainings is easier to access.</p>					
<p>III Health</p> <p>1. Hospital and clinic can be arrived in time, than previously for emergencies.</p> <p>2. Health care services are easier to access.</p>					
<p>IV Transportation</p> <p>1. Going one area to another is easier to access.</p> <p>2. Save more time than previously for going one place to another.</p>					

If you have additional information, please feel free to write here!

Thank You for your Kind Participation!