RURAL ROAD TRANSPORTATION AND ITS EFFECTS: THE CASE OF MELKA BELO WOREDA, EAST HARERGHE ZONE, OROMIA REGIONAL STATE, ETHIOPIA

MA THESIS

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JUNE 2023

HARAMAYA UNIVERSITY, HARAMAYA

Rural Road Transportation and its Effects: The Case of Melka Belo Woreda, East Harerghe Zone, Oromia Regional State, Ethiopia

A Thesis Submitted to School of Geography and Environmental Studies, Postgraduate Program Directorate
HARAMAYA UNIVERSITY

In Partial Fulfillment of the Requirements for Degree of Master of Arts in Geography and Environmental Studies

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June 2023

Haramaya University, Haramaya

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DEDICATION

I dedicated this Thesis to my beloved wife, w/o Buskute Elfinew Million and all my family members for their love and dedicated partnership in the success of my academic achievement.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this Thesis is my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of the Thesis. Any scholarly matter that is included in the Thesis has been given recognition through citation.

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BIOGRAPHICAL SKETCH

The author Mr. Belete Mekuria Getaneh, was born on April 23, 1987 from his father Mekuria Getaneh and his mother Tsige Yifru in Habro Woreda of West Hararghe Zone, Oromia Region. He attended his elementary education at Wachu Elementary First and Second Cycle School in 2001. Furthermore, he completed his secondary education at the Gelemso Secondary School in Gelemso Town in 2005. Then he joined Addis Ababa University, School of Social Science and Humanities, Department of Geography and Environmental Studies in 2006 and graduated with a Bachelor of Arts (BA) Degree in Geography and Environmental Studies in July 2008.

After graduation, he was employed as High School Geography Teacher and worked for 14 years at Harewacha and Jaja Secondary School in Melka Belo Woreda since 2021. Finally, he joined the Postgraduate Program Directorate at Haramaya University to pursue his Postgraduate Program in Geography and Environmental Studies, in 2016.

AKNOWLEDGEMENTS

First of all I would to thanks Almighty God who support me to accomplish my work and his contribution throughout my life.

Secondly, I would like to give my deepest gratitude and sincere thanks to my major advisor, Dr. Tegegne Sishaw and co-advisor, Dr. Admasu Bogale for their willingness support with valuable feedback to finalize my study. My special gratitude to Ministry of Education for sponsoring me to completion of my education for providing this chance and Haramaya University, School of Geography and Environmental Studies, all instructors that thought and given basic knowledge and skill during in the class and empowered me to be included in scientific society.

My deepest appreciation and respect belongs to my wife W/o Buskute Elfinew, for her uncountable support and strengthening on my every step of work. I would like to give my everlasting thanks to my mother Tsige Yifru for her courage in my life. I am also extended my thanks to every population take part in my data collection in general, for providing to me with technical support work partner Tewodros Tesfaye in particular and also head of Melka Belo Woreda road authority and expert those helped me to get data and relevant information for my thesis.

Finally, I would like to express my appreciation to my classmates and friends, especially Bekri Saneyo, Dine Bukush and Aklilu Bergude for their encouragement and support on the successfulness completion of my Thesis.

ACRONYMS AND ABBREVIATIONS

CSA	Central Statistical Agency
ERA	Ethiopian Road Authority
EPRDF	Ethiopian People Republican Democratic Front
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
GTP	Growth and Transformation Programs
IFAD	International Food and Agricultural Development
IRI	International Roughness Index
NMT	Non-motorized and Motorized
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
RAI	Road Accessibility Index
RSDP	Road Sector Development Program
SSATP	Sub-Saharan Africa Transport
UN	United Nations
UNDP	United Nations Development Program
URAP	Universal Road Access Program

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ABSTRACT

This study was aimed at assessing rural road transportation and its effects in the study areas. In order to accomplish the intended objectives descriptive survey research design were employed. Both primary and secondary sources of data were used. About 336 sample sizes were selected from 2665 total household for target population by using simple random sampling techniques. The primary data were collected from 336 sample households using questionnaires, interview from key informants and field observation by the researcher. Both quantitative and qualitative methods of data analysis were employed. It was observed from the result of the study, that there were great variation in provision of social services like education, health center, market center and improvement of agricultural productions as well as travel time and ways of mobility among society of the study areas with access to road and poor access to road transportation. Access to road transportation have positive effects on socio-economic developments while inaccessible road transportation have negative effects that affects the overall life condition of the population. In general, the study shows that there were positive relationships between accessibility of road transportation and socio-economic development. It is therefore recommended that interventions in the transport sector should include provision of rural roads as well as measures that will help improve accessibility of rural road and transport services in rural areas.

Key words: Road transport services, Road transport effects, Melka Belo Woreda.

1. INTRODUCTION

This part of the paper would present the background of the study, a brief statement of the problem, the objective of the study, and significance of the study, the scope of the study and with a possible explanation of the limitation of the study. Finally, it would include definition of key terms as well as the organization of the research.

1.1. Background of the Study

Transport is a great enabler of economic and social opportunity. But if the range of transport services available to people of different incomes, ages, and/or ethnic groups fails to keep pace with the growth in the level of such services available to the average member of society, the sustainability of that society's mobility is suspect (Cervero, 2013).

The main function of transportation system is transit of human beings as well as carrying of goods between a given destinations. An excellent transportation infrastructure means providing the accessibility of all possible social services like education, healthcare, water, electricity as well as markets for the development of any destination. It influences the accessibility of communications of a given people in any country and all over the world. Development of hospitality and leisure activities are practically connected to the transportation infrastructure, in fact they are correlated each steps they pass through (Bharat, 2013).

Accessibility is labeled as the physical access to goods, services, and destinations. It is one of the most important outcomes of the transportation system, is characterized as the facilitation in accessing a specific area or location (Mavoa *et al*., 2012). It is a measure of the advantage of the location of a zone or area compared to the other zones and areas (Biosca and Stepniak, 2013). Good accessibility of public transport improves the accessibility to other services as well (Abreha, 2007).

The travel modes used by the poor – walking, cycling and public transport – are almost without exception inadequately provided for in developing cities. Bocarejo (2012) describes the lack of accessibility to transport and opportunities as an 'obvious problem'. Bruun (2016) describes the situation as one that offers an 'incontrovertible case for major reform in the quality, reliability and coverage of public transport systems', and dramatic improvements in walking and cycling facilities (SSATP, 2015; Bruun, 2016).

The link between transport, poverty and social exclusion is the inaccessibility of social capital, inability to access decision-making, services, and a multiple other social 'goods' (Lucas, 2012). This may be, among others, because of the distance to transport and key facilities, the cost of travel, long travel times, or fear for personal safety (Lucas, 2012). Since consensus has been reached that the focus should be on the provision of access, there is a clear need to measure the outcomes of improved access, and to determine a minimum level of access that is to be regarded as equitable.

Poverty and access to transport options are in extricable linked in a dynamic process that reinforces poverty: for example, the poor are more likely to live in areas that have poor transport services, and therefore have insufficient access to the advantages and opportunities to reduce poverty that these services may bring (e.g. health-care, employment and education). Thus transport disadvantage is not only associated with poverty; it at the same time gives rise to, and further entrenches poverty (Tiwari 2008; Cervero 2011 and Wachs, 2011).

Rural areas are places for the production of primary goods and services worldwide. Increases in sufficient roads in rural areas tend to increase access to agricultural inputs and market, communication and technology. The expansion and improvement of a given road network would contribute to increases in accessibility and mobility, while reducing the distance to destinations, travel costs and travel time. Despite these social and economic benefits, road networks are also perceived as cultural artifacts that lead to negative ecological effects (Patarasuk, 2013).

In Ethiopia, Rural road is one of the main priorities as it is considered as a mechanism towards reducing poverty (ERA, 2017). It is also an important aspect considered by the development community in the poverty alleviation process and the provision of more equitable opportunities for rural communities. To this end, the government has a set vision to make public, economic and social services physically more accessible to the rural population. There remains a critical need to provide rural communities with transportation infrastructure and services that ensures permanent accessibility to social and government services, economic and business services, and better opportunities for employment and income generation (ERA, 2011).

The study site is among the rural parts of Ethiopia which can be categorized with poor access to road transportation network, transportation service, and mobility. Most of the people and goods are move by use of human and/or animal muscles. This is critical factor for the socio-economic development of an area, which calls for study to be conducted.

1.2. Statement of the Problem

Today, all countries have been engaging in development of transport infrastructure, especially least developed countries. These countries have been expecting huge population and economic growth, which pushed up the demand of transport in the urban areas, and then creating challenges to satisfy increasing demands of transport (World Bank, 2012).

Like many other economic and social activities that are intensive in infrastructure, the transport sector is an important component of the economy impacting on development and the welfare of the people (Rodrigue *et al.*, 2011). When transport infrastructure is efficient, it provides various economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment, education, health and additional investments (Oosterhaven and Knaap, 2000).

Conversely, different studies conducted in Ethiopia indicated that, the investment on the road sectors is remaining low. According to Worku (2011), rural accessibility still remains far from the desired target level that the country need to have. Moreover, transportation infrastructure in the country has been neglected for decay and responsible for low industrial development in the country (Admasu, 2013).

Approximately, 64 percent of the land area in Ethiopia lies more than 5km from an all-weather road service. Some 48million people in the rural areas of Ethiopia live further than 2km away from the nearest all weather road. On average, households are often more than 10 kilometers away from a Dry-weather road and 18kilometers away from public transport services. Communities are often left isolated and without access, particularly during periods of rains. This excludes them from exposure to new ideas and influences remoteness, isolation and lack of services increases vulnerability and severely constrains their ability to contribute to the economy and development of Ethiopia. Investment in transport, and particularly road transport, improves the wellbeing of the poor (URAP, 2010).

In Ethiopia, since 1997 the government launched a road sector development program (RSDP) with the objective of improving transport operating efficiency and reduce road transport costs for freight and passengers so as to encourage production, distribution and export; developing adequate institutional capacity of the road sub-sector both at central as well as regional level and providing access to previously neglected food deficit rural areas to support efficient production, exchange and

distribution throughout the country. Despite of significant improvements on road length, accessibility and quality of roads as a country level, there is still a great problem with road accessibility and transportation system at rural levels of our country (ERA, 2016).

The total length of road in Melka Belo Woreda was 206km and about 56 km is dry weather road and only 150km is all-weather road (Road Office Melka Belo Wereda, 2020). The low road density and seasonal state of road raises constraints to rural producers. Many people live and produce far away from major roads, markets and to other socio-economic service center. Consequently small holder agricultural producers face high transportation costs that raises prices of inputs, and impair further access to market, which leads to low productivity, health, education which in turn hinder economic growth in the area. It is generally supposed that the establishment of accessible road transportation in the study area have major inferences for efforts to increase agricultural production, educational expansion, social provision and market access.

Therefore, the study site was characterized by poor access to road transportation. Most roads are dry-weather roads and hence access is difficult during rainy seasons. Moreover, the road network connecting the Kebele with Woreda as well as Woreda with neighboring Woreda was very poor due to lack of proper maintenance. This condition makes delivery of services such as health, education, extension services very challenging and impede mass mobility, marketing and general development interventions. Thus, this study goes to examine rural road transportation and its effects in the study area.

There was different research conducted in different areas of Ethiopia. Abiyou (2017), has been studied about assessing the services and challenges of road transportation. His finding under the physical related challenges of road transportation services mainly focused on how the low performance of road and high rate of erosion restricted the type of vehicles. Alemayehu (2019), has been studied on assessment of the contribution of rural road based on local community perception. His finding is mainly focused on overall positive social impacts after the construction of the road compared to before the road has been constructed, indicating that road accessibility crowds in other basic social services. Hika (2017), has been studied about road sector development and socio-economic growth. His finding is mainly focused on the contribution of road on the quantity of agricultural production. It also indicated that there is variation in the prices of agricultural products and inputs between places accessible to road and not. His finding was mainly focus on agricultural production and its price variability due to lack of access to road transportation and fails to address

the other basic social services. So, the above researchers did not specify about the overall socio-economic effects of rural road transportation on the rural population.

Therefore, effects of rural road transportation services on the socio-economic development of rural household were the key issues that would be discussed in this study. Moreover, there was no research has been conducted about any transportation service before in the study areas. This information gap necessitated the design of this study to conduct a research with the following objectives.

1.3. Objectives of the Study

1.3.1. General objective

The main objectives of this research is to assess rural road transportation and its effects in Melka Belo woreda.

1.3.2. Specific Objectives

1. To assess the current status of rural road transportation services in the study area.
2. To identify major effects of rural road transportation services in the study areas .

1.4. Research Questions

1. What is the current status of rural road transportation services in the study area?
2. What are the major effects of rural road transportation services in the study area?

1.5. Scope of the Study

The scope of study was mainly focus on rural road transportation services and its effects in the study areas. The place would be chosen as the study area where transportation accessibility has given little attention**.** The spatial scope of the study was delimited to Melka Balo Woreda. Especially, the study was specific to selected sample kebeles in this Woreda. Some farmer's household, civil servant and key informants from different office was selected as subject of the study.

1.6. Significance of the Study

Transportation system in general, accessible road transportation in particular, plays a vital role to improve the socio-economic status of the world population specially developing countries, like

Ethiopia**.** Thus, understanding its contribution in changing the overall welfare of worldwide society has a major significance to solve the problem**.** This study was significant to increase the awareness of the societies in the study area towards rural road transportation and its effects and to give attention on the benefits that they get from accessible roads in their local area. The study would serve as reference materials in providing sufficient information for future researchers about the current status of road transport in the study area. Moreover, the study serve as a basic information for policy makers, road and transport office for future designing and planning regarding accessibility of roads and transportations.

1.7. Limitations of the Study

The emergence and expansion of COVID-19 all over the world in general and Ethiopia in particular at the end of 2019 and that continuous until this year create challenges in data collection process and dealing with concerned body take part in this study since there was low awareness and frustration of this disease among the society. The other limitation was political condition of the country because since the time is the period for national election, travelling from one Kebele to other for data collection could be seen with the eyes of politics rather than for the purpose of the study.

1.8. Definition of Key Terms

Mobility: is the ability of people to transport themselves and their goods, and to reach economic and social services social services, market access (FAO and World Bank 2009 in Banji *et al.,* 2012:37).

Road Accessibility: refers to the opportunity to use or to reach some destination.

Road density: Road density can be measured as the ratio of the total road network in an area to the land area or to the total population in that areas (Ibrahim, 2011).

Rural accessibility: is the degree of ease or difficulty rural people or communities encounter in accessing locations for satisfying their basic social and economic needs such as food production, water collection, firewood collection, education, primary health care, trading, and transport (Banji *et al* 2012:37).

Transportation: is considered as blood vessel of one economy contemporary economic process have been accompanied bay significant increase in mobility and higher level of accessibility and also to give attention improvement of mobility, quality and safety of transport system (Rodriguez *et.al.,* 2009).

1.9. Organization of the Thesis

This thesis was organized in five chapters. The first chapter started with the background of the study, followed by statement of the problem. In the same chapter the purpose of the study was outlined, followed by highlighting of research objectives and the research questions. Then the scope and limitations of the study followed. The significance of the study and definition of key terms was also given and the chapter also concluded basic assumptions and the organization of the study. The second chapter deals with the related literature review on rural road transportation and its effects. Chapter three covered the research methodology and description of the study area. Chapter four covered result and discussion as well as presentation and interpretation of data while Chapter five dealt with summary of findings, conclusions and recommendations of the study. References to the study and all relevant appendixes are placed after chapter five of the research report.

2. REVIEW OF RELATED LITERATURE

This section deals with the theoretical and empirical literature related to rural road transportation services and its effects. Accordingly, the definition and concept transportation, rural road transportation system, road accessibility, mobility, road conditions and road density. This section deals with the features and status of road transportation, importance of rural accessibility, quality and accessibility of public transportation and accountability relationship in road transportation sector. Finally, the chapter ends with empirical evidence and conceptual framework.

2.1. Concept of Transport geography, transport and transportation systems

Transport geography is a sub-discipline of geography which is concerned about the movement of people, freight and information. It seeks to link spatial constraints and attributes with the origin, the destination, the extent, the nature and the purpose of movements (Rodrigue *et al.,* 2006). This definition underlines a strong connection between geography and transportation.

There would be no transportation without geography and there would be no geography without transportation (Rodrigue *et al.,* 2006:1). He asserts that transportation concerns geographers for two major reasons. a) Transport infrastructures (such as networks and terminals), and equipment occupy a vital place in space and form the basis of a complex spatial system. b) Since geography inquires about to explain spatial relationships, networks are of specific interest because they are the main support of these interactions. Transport through its evolved components (infrastructure, modes and users) forms spatial imprints on the space.

The transport system is fundamental to economic and social development in rural areas, and significant investment is required to ensure it is of a suitable level. Transport is considered as a key factor involved in agricultural development as well as other socio-economic development all over the world. It is the only means by which food produced at farm site is moved to different homes as well as markets. Market for agricultural produce is created by transport; furthermore, transport increases interaction among geographical and economic regions and opens up new areas to economic focus (Tunde, 2012). Road transport is the most predominant mode of transportation in all over the world and this is a confirmation of the crucial role transport plays in the socio-economic development of a nation (Ajiboye and Afolayan 2009).

In Ethiopia, the issue of rural transportation development has continued to be of national importance. For instance, most of the rural roads are in poor condition, and this has imposed significant cost on the national economy especially to the agricultural activities due to increased vehicle operating costs and travel times. The Federal Government of Ethiopia has embarked on various programs like Growth and Transformation Plan (GTP) at one time or the other to ensure the provision of adequate transport facilities to meet the needs of the rural population but these programs have not been able to achieve required successes.

2.2. Concepts of Mobility, Road Density, Accessibility and Road Condition

Mobility is the ability of people to transport themselves and their goods, and to reach economic and social services. Mobility is made possible by the transport means available both motorized and non-motorized (NMT). Individuals and private entities typically own and operate these means of transport (Banji *et al.,* 2012:37). Higher mobility does not necessarily represent better living conditions. What matters is the accessibility to desired destinations, which can be obtained with less movement. (Vasconcellos, 2011).

Road density can be measured as the ratio of the total road network in an area to the land area or to the total population in that area. Given similar network topology, in different zones, higher road density (road per area) implies a higher availability of alternative routes. This will imply higher directedness and connectivity levels within the network. The road density evaluates the network structure only considering the supply side, whereas the road density per unit of population measures the availability of network distance per person.

According to Ibrahim (2011), the proper level of road network is assessed by road density, which is measured by road length per 1000 persons or by road length per 1000 km^2. In the three RSDP periods, there was a plan to increase the road density form 0.43 to 1.5 km per 1000 persons and from 21 to 116 km per 1000 km^2, starting 1997 through 2009.

Road accessibility refers to the opportunity to use or to reach some destination. It is measured as the percentage of population having access to all weather roads. The accepted theory, according to ERA's (2008b) study, is that accessibility has three elements: 1) the location of the individual; 2) the location of the supply, service, or facility to which the individual needs access; 3) the link to bring the two together. The same study has used the random model approach among others to

identify the country's network demand. This demand was estimated as such that all rural population could have access to all weather roads within a 5 km distance (Ibrahim, 2010).

According to the ERA study the country is required to construct 200,000 km of optimum national road network, which is considered as a target road network on the assumption that it will give reasonably good accessibility. Whereas, for the country to be competitive enough and enter into middle income category, the targeted road density which secures the rural population to have access to all weather road is estimated to be 0.3 km/km^2, the average road density of the lower middle countries. In this case the road transport network has to reach 330,000 km.

The same study defined the concept measured in terms of average distance from the road network and proportion of area farther than 5 km from all-weather roads as lack of access, which deprives people from the opportunities to improve their lives. Access is composed of two elements: mobility, reflecting the ease or difficulty in traveling to a service or facility; and proximity of those services and facilities. The study considered access to be one key element in providing the opportunity for both social and economic development, and a key determinant of both poverty itself and opportunities to escape from the poverty trap.

According to Ibrahim (2011), when we look at the trend regarding society's access to the all-weather road network, we find a slight improvement the past seven years from 2002-2008. However, in 2008 only about 33% of the rural population had access to an all-weather road within a distance of 5 km. Given the fact that around 80 million people are living in rural area, such a low rate exacerbates the problem of poverty. Improving the current access rate should be a major concern of the country's road sector expansion program. Similarly, African Development Indicators (ADI) (2008/09) data indicates that the country has made an effort to provide access to all weather road, though it is not satisfactory.

ERA (2008b) study also indicates that with the recent construction of new roads, the average distance from a road has been reduced from 21km in 1997 to 11.7 km in 2009. On the other hand, the proportion of area farther than 5 km from all-weather roads, which was 79% in 1997, has been reduced to 65.3% in 2009. Therefore, the issue of accessibility calls for a kind of "big-push" approach in expanding all weather roads for the destitute rural poor. The problem of accessibility could also be addressed through a well-designed planning process coinciding with the parallel trends towards the decentralization of decision making and the concern to involve the local communities in the decision making process. The effort made so far towards the improvement of

main roads and rural roads is a necessary but not sufficient measure to enhance rural accessibility. However, the future is not unwelcoming. It has been observed that a continuous support from the government and a serious commitment of the sector offices and other stakeholders would enable to achieve enhanced access of the rural population.

Rural accessibility is the degree of ease or difficulty rural people or communities encounter in accessing locations for satisfying their basic social and economic needs such as food production, water collection, firewood collection, education, primary health care, trading, and transport (Banji *et al* 2012:37).

To evaluate the status and quality of classified roads (those roads that are included in the roads legislation as public roads), the standards are broadly classified into three good, fair and poor. The document of Sub Sahara Africa Transport Policy (SSATP) by Banji *et al* (2012:119) indicates that 'Good' classification includes 'Very Good' and 'Poor' classification includes 'Very Poor'. The guide is based on the International Roughness Index (IRI), which is most commonly used in the world. IRI can be obtained from measured longitudinal road profiles expressed in m/km or mm/m. For instance, of paved roads, the roughness per km ranging between 1 and 3.5 meters of its longitudinal surface is said to be 'good' and of 'earth' road ranging between 15.5 and 25 meters is said to be 'poor'.

2.3. Major features and status of road transportation

2.3.1. Features of road transportation

Many rural Africans still suffer from poor access to markets, health, schooling, and high transport costs (Perschon, 2001). Inadequate rural roads make it hard for farmers to produce more and to transport any surpluses after harvest. Traffic on most rural roads still consists mainly of pedestrians often carrying head loads (DFID, 2008 and Lindsay 2015). Poor and inadequate rural roads have been the main concern by both small producers and consumers. Rural Africa has only 34% of road access covered as compared to 90% in the rest of the world (AFDB 2010).

Rural transport infrastructure is still poorly developed in Ethiopia, and therefore it is a crucial impediment for the growth of the rural as well as national economy. For instance, only 27% (Lulit, 2012) of the rural population has access to all weather roads in 2011, compared to 60% in India and 61% in Pakistan (Giz, 2013). The road density of Ethiopia per thousand square km was 49 km during the same period which falls far behind the average road density of lower middle income

countries which is about 0.3 km/sq.km (IRF, 2006 and Lulit, 2012). Therefore, most places in the country especially in the rural areas have still low road accesses and poor connectivity to major road networks.

Ethiopia's rural road network is one of the least developed in sub-Saharan Africa. The poor tends to live in isolated villages that can become virtually inaccessible during the rainy seasons. When there is a post-harvest marketable surplus, it is not always easy to reach the markets. Limited accessibility has also cut off small-scale farmers from sources of inputs, equipment and new technologies. Crop productivity is therefore low because farmers lack these important inputs. In particular, inadequate access to fertilizer is a real problem in many parts of Ethiopia where farmers have to cope with diminishing soil fertility (Fakayode *et al*., 2008). Consequently, efficient rural road transport infrastructure is central to raising agricultural productivity and increasing socio-economic growth in Ethiopia. However, evidence show that a weak rural road transport infrastructural base has been one of the major factors militating against the attainment of the Ethiopia's growth and development objectives.

2.3.2. Status of Road transportation

After the ousting of the Derg by EPRDF, due to the formation of Eritrea as a new state in 1992, the road network in the remaining part of Ethiopia was 18,081 km, of which 3,542 km (19.9%) was paved. By 2002, the road network had reached 33,297 km of which 4, 053 km (12 .2%) was paved and the remaining 29, 244 km (87.8 %) was gravel. As a result of huge investments under RSDP I, II, III, and IV, the road stock in 2013 has reached 85,966km, of which 11, 301km (13.15%) is paved. Both total road, and rural road growth were generally increasing upward almost keeping parallel pace until 2011. But after 2011, a new campaign at Woreda level contributed to significant increases in the amount and average annual growth rate that reached 7.4%.

The average growth rate of paved roads almost remained flat up to 2009. According to a World Bank study (2014), the density of paved roads per 1,000kms in Ethiopia (8kms) is below the average of low income countries.

In most African countries, road transport network and road density measured as per person and per square kilometer of land area is very low compared to the global average. Yet road transport sector is the dominant means of transport in the continent carrying around 80 to 90 percent of passenger and freight traffic; and most rural communities are accessible only through roads (Gwilliam, 2011).

In Ethiopia since 1997 when the RSDP started road density measured as density per 1000sq km was 24.1, while measured by density per 1000 population in km was 0.46. But since 2010 it improved considerably reaching nearly 90 km per 1000sq km in 2014.

At the downfall of the Derg regime, the average distance to all weather road in Ethiopia was 30 km which decline drastically to 5.5 km in 2014 .In 1991, nearly 93 percent of the areas in Ethiopia were farther than 2 km of all-weather roads and 85 percent farther than 5 km. But since especially 2010, there has been dramatic improvement mainly of Woreda and rural roads contributing to declining average distance to all weather roads throughout the country.

In spite of recent increases in the density, the road network of Ethiopia is one of the least developed in Africa. For instance, in 1997 Ethiopia had 0.5km per 1000 people as opposed to Sudan (0.8), Kenya (2.3), Tanzania (2.0), Angola (6.0), DR. Congo (2.8), and South Africa (12.6) (ERA, 2007a). By 2010, the figure for Ethiopia had increased to 0.59 km per 1,000 people and 44.4 km per 1000 km^2 (the change which is lower than the Africa region average of over 54 km per 1000 sq. Km) (ERA, 2011).

On the other hand, Ethiopia's road development status can also be compared with low and middle income countries using comparable data for 2012. Accordingly, the average road density for the low-income 3 countries is 39.5km per 1000 km^2, whereas Ethiopia's road density at 49km per 1000 km^2 is greater than the average of low income countries.

The average road density for the middle-income countries is 104.7km per 1,000 km^2, which is twice higher than that of Ethiopia. The average density in high-income countries is 167.6km per 1,000 sq km, which is about 3.4 times higher than that of Ethiopia. However, the road density in very high income countries (315.8km per 1000 km^2) is about 6 times higher than that of Ethiopia.

Finally, the ERA, 2014a document suggests that Ethiopia should reach a road density of about 120km per 1000km^2 to arrive at middle per capita income countries by the year 2025.According to ERA (2014a) low income countries are those with per-capita income of less than USD 1,000, middle income countries are those with per capita income of USD 1001-5000, high income countries are those with per capita income of USD 5001-10,000, while very high income countries are those with per capita income of above USD 10,000.

2.4. Quality and Accessibility of Public Transportation

Service quality measured by conducting surveys among population that try to capture the degree of customer satisfaction, reliability of service and friend are some of measure that should be measured on regular basis. The quality of transport may compromise by quality of road the passengers waiting time before being able to transport (SPUTNIC, 2012).

Furthermore, service quality is also measured by conducting surveys among population that try to capture the degree of customer satisfaction issues relating to comfort safety and clean lines security reliability of service and friend line of personal are some of measures on regular basis (SPUTNIC, 2012)

Accessibility transportation is the passport to independents living for every one mobility means having transport services going where and when one wants to travel being informed about the services; knowing how to use them and the means to pay for them (suen and Mitchell, 2012).

2.5. Importance of Rural Accessibility

Road infrastructure is vital in supporting delivery of essential utility services and has great strategic, political, economic and social significance. There are numerous studies that support the relationship between rural accessibility and poverty reduction (Arethun and Bhatta, 2012), economic growth and development (Bryceson *etal*, 2006) and decreases in maternal deaths and infant mortality (Irigoyen, 2007). Throughout the developing world, the lack of adequate road infrastructure and the long distances to markets and essential services have been a major concern for rural communities.

Over 218 million people in Sub-Saharan Africa live in extreme poverty and the highest concentrations of these rural poor people can be found in Eastern and Southern Africa (IFAD, 2011). Rural populations in many of Sub-Saharan African countries remain underserved by infrastructure despite the considerable investments that have been made in the recent past. Accessible paved roads and railroad networks are limited and according to Hearn (2014: 27), “there are fewer than 1000 km of unpaved roads per 1 000 persons” in many countries, this being “a level of service that is an order of magnitude smaller than the amount of paved roads in many industrialized countries.”

2.6. Effects of Road Transportation

2.6.1. Socio-economic effects

It is evident from different studies and observations that rural isolation poses an obstacle to rural development. There is a strong link between the socio-economic development and livelihoods of rural communities, and the provision of rural access. Empirical studies on the impact of rural road transport have shown that rural roads can play a meaningful role in improving rural income, fostering consumption and reducing poverty (Anega, 2016).

Improved rural access equates to among other things, reduced travel time and costs, better use of resources leading to higher incomes, the development of small businesses in rural areas as well as growth in tertiary activities and public sector employment. Because the Sub-Saharan Africa region suffers immensely from poorly developed and poorly maintained infrastructure which limits access to basic services and markets for the majority of the people, improved and more sustainable access through the expansion of rural roads and their maintenance can lead to improved utilization of existing social infrastructure and other local resources (Hearn, 2014).

2.6.2. Fertility and mortality effects

According to (Porter, 2002), health facilities of any kind are rare in off-road locations. A study from a Pakistan household survey (Irigoyen, 2007) revealed that villages with all-weather motorable access had increased access to prenatal consultation and higher chances that births would be attended by skilled attendants than villages without all-weather motorable access roads. The percentage of maternal deaths and mortality rates is also higher for rural areas with limited to low connectivity. Therefore transport also improves access to maternal and pediatric health care.

2.6.3. Link with agriculture

According to Anega (2016), poor people living in rural areas are mainly poor because of their isolation and that can be ascribed to low agricultural growth in these areas is the lack of access to adequate transport infrastructure. A literature study conducted by Anega (2016) indicated that governments that spend on rural roads as well as irrigation can contribute significantly in increasing agricultural productivity and reducing poverty.

According to Gollin and Rogerson (2010), agriculture is highly sensitive to transportation costs; hence roads and other infrastructure contribute to both income growth and long-term productivity. Farmers can easily benefit from a road when the road extends the distance to breakeven locations and reduces the costs of transporting agricultural products to markets (Arethun and Bhatta, 2012). Better access to roads improves labor force mobility, which results in an increase to job opportunities for households. It also increases income from farming activities, contributes to making prices more stable and thus allows the poor people living in these communities to reduce risk which improves risk management.

2.7. Road Transportation and Possible Cost Level

In frankly spirited transport market, allocation of all possible resources of services can be determined in the basis of operator producing at the minimum possible cost services required by their customers. This applies to both freight and passenger and in both sectors. Customers are always grown enough to choose the best combination of cost and quality, where price consider by then high quality services are often available with higher price but considered as luxury and comfort. This comfort is not only characters but also the timing of arrival and departure affects the customer psychologically (Baylhiss, 2012). Road transportation networks would be help to develop the logistic relationship. Land value is also one of the important factors for the economy. As a distance from the center increases, the total cost of transportation factors for the economy and factors determine the highest use of value of any particular location, which affects the economic part directly (Berchman, 1999).

2.8. Accountability Relationship in Road Transportation Sector

According to World Bank (2004), successful services for people emerge for institutional relationship in with the actors are accountable to each other. In addition, UNDP (2006) provide definition of accountability is that officials answers to stakeholder on the display; of their powers and duties, act on criticism or requirements made of then and accept responsibility for failure in competence or deceit. The transportation sector highly exposed for corruption and others malfunction, therefore actors function is clear and strong in addition another dimension to accountability is responsiveness. Responsiveness is what citizens want when they exercise their voice and it is fostered by the existence of soundly functioning accountability mechanism (World Bank 1996).

2.9. Major Challenges of the Rural Road Service

According to Akliliu (2007) Construction of adequate road system greatly hampered by rugged terrain of highlands and normally heavy seasonal rainfall and some of the main structural and operational problems of the road transport sub sector in Ethiopia are a close look at the characteristics of the road transport mode such as backward management system, old vehicles, lack of skilled man power on the sector, disintegrated transport sector institutions relationship and communication, Problems of maintenance; Procurement problem; Access/availability of rural roads linking Kebeles and Woredas; Quality/standard of rural road; Availability of contractors; Rural road budget distribution and utilization; Lack of clarity to road ownership and responsibility of the community and so on.

2.10. Transport and Development in Ethiopia

In Ethiopia majority of the rural communities are isolated for significant portions of the year because of lack of access to reliable all-weather roads. With about 77% of rural families needing to travel more than 20km in order to access health and other basic facilities, efficient transport system will not only improve the living conditions of the people but also improve social interaction and help diversify rural economic activities. Walking and non-motorized transport are the major forms of transport in the rural areas with most journeys on foot involving an average distance of 5-6km and a time consumption of about 2 to 3 hours. Women tend to bear a disproportionate share of this burden of travelling. The gap between the urban and rural center in relation to access to public transport is very wide with about 97% of the urban compared to 28% of the rural households having access to transport services within 5km (ERA, 2011).

In response to this, the transport development in Ethiopia is much focused on road development as evidenced in the Road Sector Development Program (RSDP) and the PASDEP. Road infrastructure development has been given the highest priority because of its critical role in enhancing rural growth through improved delivery of agricultural inputs and connection of farmers to markets. The commitment of the state is evidenced in the expenditure pattern of the state; in 2005, government's expenditure in the road sector was 11.2% compared to 4.8% in the health and 4.5% in water and sanitation.

This is part of government's effort at strengthening the infrastructure backbone of the economy as well as accelerating market-based agricultural development. Preparations have also been made to

step up the Ethiopian Rural Transport Program through the construction of substantial amount of low level rural roads, and the provision and expansion of conventional and intermediate means of transport. There are measures to facilitate the participation of local contractors in road construction as a way of ensuring the sustainability of transport development (ERA, 2011).

2.11. Empirical Evidence

Efficient and effective rural transportation serves as one of the channels for the collection and exchange of goods and services, movement of people, dissemination of information and the promotion of rural economy (Adedeji *et al.* 2014). It is also clear that development of rural infrastructure generally contributes significantly to the level and quality of rural development. Countries that have developed their rural infrastructure have recorded higher and better quality of rural development than those that have failed to do so (Economic Commission for Africa 2013).

The existence of accessible, acceptable, efficient transportation system is a pre-condition for linking remote farm areas located far from consumer centers with the agricultural production process (Taiwo and Kumi, 2013). Philemon (2014) strongly emphasized remoteness and consequent poor access to social-services and opportunities as a key factor in low farm productivity.

Arethun and Bhatta (2012) conducted on contribution of rural roads to access to and participation in markets in Ethiopia and they come up with the conclusion that road accessibility as one of the major factors influencing the productivity of rural household.

Obayelu *et al*., (2014) has noted the importance of paved or good graveled roads for the evacuation of agricultural produce. The observed correlation between the two variables might be explained by the fact that the growth of farm productivity is linked closely to the type and quality of rural road infrastructure in place. This means that countries that will provide adequate, affordable and accessible road infrastructure in rural areas will succeed in increasing their agricultural productivity. Surveys such as that conducted by Usman *et al*., (2013) have shown that owing to the very poor condition of road transport in Kwara State of Nigeria only 1.1% of the respondents own personal four wheeled vehicles and hence many people are forced to depend on motorcycle and bicycle as means of transportation. A similar work by (Porter 2013) revealed the fact that since Poor people rarely own motorized means of transport, so walking, cycling and animal traction predominates.

Using Generalized Methods of Moments and controlling for household fixed effects. Dercon *et al*, (2008) found that access to all-weather roads reduces poverty by 6.9 percentage points and

increases consumption growth by 16.3 percent in Ethiopia. Road infrastructure and the spread of extension services has contributed to growth and poverty reduction in rural Ethiopia (Dercon *et al*, 2007). Improvement in road infrastructure resulting from large scale public investment program like RSDP also contributed positively to the size and structure of the manufacturing sector in Ethiopia (Admasu *et al*., 2012).

Bryceson, *et al.,* (2008) found that in extremely remote areas, road improvements may catalyze the expansion of social-service provision, as evidenced in Ethiopia. However, given the poor's relative lack of motor vehicles and ability to pay for public transport, they are, by no means, a sufficient condition for enhancing the mobility of the rural poor.

Worku (2011) analyze the impact of roads sector development on economic growth in Ethiopia. The study use time series data on the country's road network and GDP growth over the period 1971-2009. Results from a two-step GMM estimator show that paved roads have positive and significant impact on economic growth while gravel roads do not. He adopts an extended Cobb Douglas production function and an OLS estimation technique to investigate the Ethiopian economy in the specified period.

Lulit (2012) on her study to identify the impact of road on rural poverty by taking fifteen rural villages in Ethiopia show that the poverty head count ratio declines with improvement in road accessibility of rural villages. She used econometric techniques using GMM to assess the robustness of the association between road infrastructure and rural wellbeing. The study shows that better road connectivity not only increases the likelihood of crossing over the poverty line but also enhances the rate of consumption growth significantly. In addition she found that rural households with better road network are not only more likely to use modern fertilizers but they also make intensive use of fertilizers. Moreover, the study finds evidence that the overall productivity of farm households increases significantly with the degree of road access.

Generally, most of the above empirical study conducted in various countries prove that rural roads infrastructure development reduced poverty, improved the provision of social services and the quality of life, especially for the poor and narrowed down the income gap between citizens.

2.12. Conceptual Framework

A number of theories have been put forward to capture evolution of social systems as transport infrastructure are where technology, economic and institutions like political system interact to shape the development . The basic concepts go back to discussions based on ecology in the 1960's according to (Bergh and stagl 2003). According to Kaijser (2004) Points to interesting aspects of development of infra systems, specifying them as socio technical where "the" institutional frame works and the system culture are as important as the technical components "This reflects a co-evolutionary stance as regards development over time. The period from 1963-1980 with growing role for socio economic was marked by prolongation of the post war polices based on competition and markets with a per transport mode perspective. As a balance to this decentralized expert or was seen as the modern way of handling societal planning e.g. Road planning (Herness, 2012).

Movement of people, goods and information has always been fundamental components of human societies. Transportation is yet given in adequate in development studies, but fundamental importance in day to day activity of people and economy. Transportation is considered as blood vessel of one economy contemporary economic process have been accompanied bay significant increase in mobility and higher level of accessibility and also to give attention improvement of mobility, quality and safety of transport system (Rodriguez *et.al*,2009).

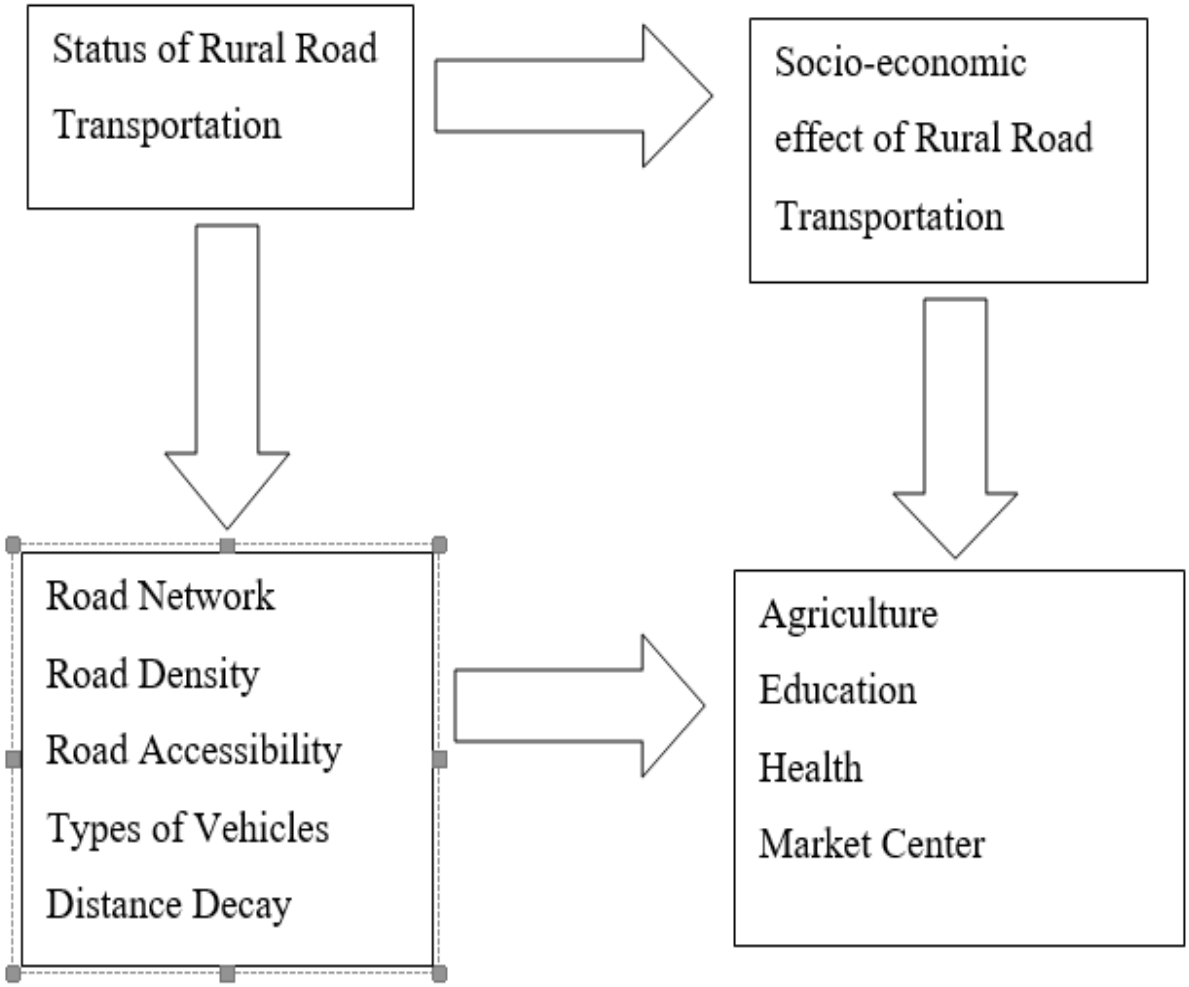

Figure 1**:** Conceptual framework

Source: Own conputation, 2023

3. RESEARCH METHODOLOGY

This chapter presents methods that would be in use during this research study. The chapter describes description of study area, the research design, the research approaches, the sample and sampling procedure, the sources of data, data processing and data analysis.

3.1. Description of Study Area

3.1.1. Location and Size

Melka Bello is one parts of, East Hararghe Zone of Oromia Regional State in Ethiopia. It is located at a distance of 487 km from Addis Ababa Capital city of Ethiopia to Eastern Hararghe Zone.The total areas of Woreda land mass coverage is about 114,725 hectares and geographically found between $8^0$30'-$9^0$10'North of latitude and $41^0$10'- 41^0 30' East of longitude.

This woreda shares a common boundaries with three (3) different administrative Woredas of Eastern Hararghe namely; Deder Woreda in the North, Gola Oda in the South-Eastern and Bedeno in the Eastern and also with two of western Hararghe Woreda called Mesela in the Western and Kuni in the South West. (DHS, 2010). Administratively, Woreda is sub-divided into 26 kebeles of which 4 urban kebeles and the rest 22 rural kebeles. The administrative center for this woreda is Jaja; other towns includes Harawacha, Harew and Bareda (Melka Belo Woreda Agricultural Office, 2022).

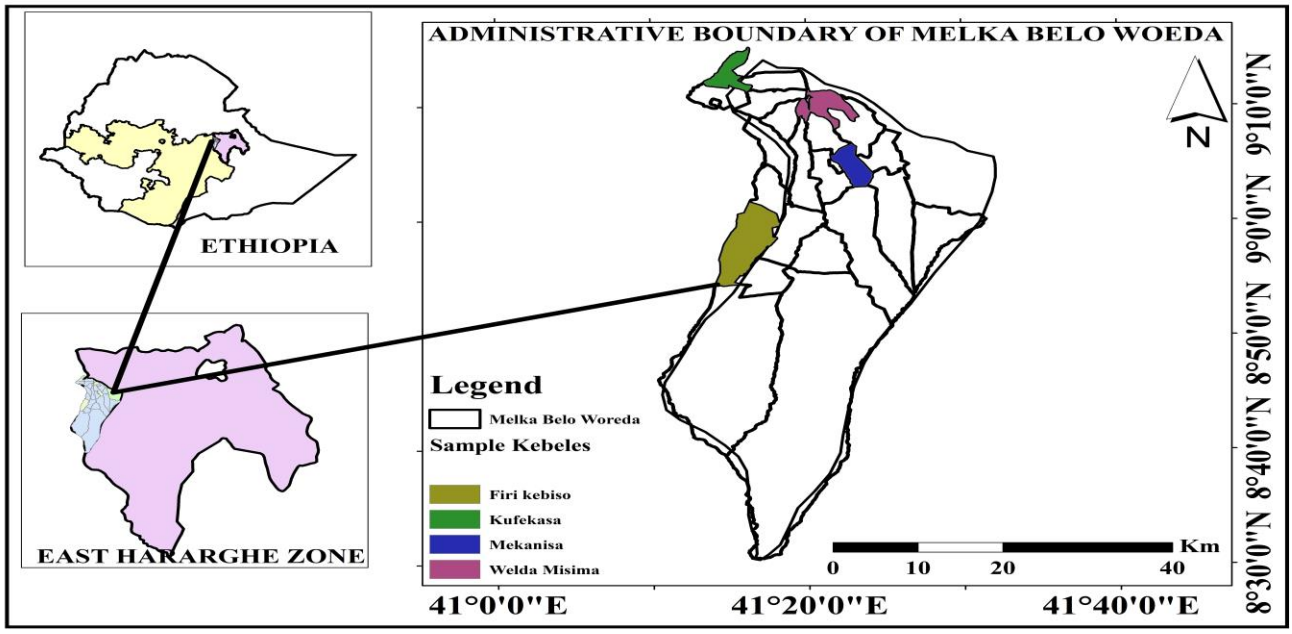

Figure 2. Location Map of the study area

Sources: Own Computation, 2022

3.1.2. Relief and soil

The altitude of the study area ranges between 600-3138m above sea level. Adem Gedi Burqa is the highest point. There general relief of areas includes mountain with different altitude, plateau, small and large size valleys and plain.

There are different types of soils are found in the study areas among these the dominant types covering large areas includes, Nitosoil 60%, vertisoil 20%, sandy soil 15% and other 5%(Melka Belo Woreda Agricultural Office, 2022).

3.1.3. Climate and drainage

Based on its climatic condition, this Woreda is sub -divided into three categories; Dega(cold) covering 20% of the area has average annual rainfall of 1770mm which has medium , weyna –dega (moderate) that covers 39% has averages rainfall of 944mm which coverage with highly populated and kola(Desert) covers about 41% of the area population sparsely populated and its average annual rainfall is 540mm.Totally, the environmental temperature of the study area ranges from 25-30C^0 with average annual rainfall of 1086mm (Melka Belo Woreda Agricultural Office, 2022). The study areas are drained by both perennial and intermittent rivers with different amount of discharges. The dominant perennial rivers include Jerjertu, Wayu, Jaja, Dugo, Cubo and Ramis.

3.1.4. Vegetation and wildlife

The study areas are rich in varies species of trees. There are areas that permanently covered with forests that locally named as ,Agdora, Sheekmul'ato, Adame and Oda jilo which takes the largest share of vegetation covers .The major forests species of an areas includes wanza (*Cordia Africana), podocarpus falcatus*, *Hagenia abyssinca*, weira (*olivera*), *cussonia ostini* and Tid (*Juniperus procera*). The most common types of wildlife are monkey, Ape, Jackal, Hayena and others.

3.1.5. Population characteristics

This study site has estimated total population size of 232,622 of which 118,881are male and 111741 are female. Among these populations, 14,129, of which 7,221 male and 6,908 females are found in urban kebeles while 218,493 of which 111,660 male and 106,833 female are found in rural kebeles. Generally, about 98% were rural residents and only 2% were urban residents. (Melka Belo Woreda Administrative office, 2018)

3.1.6. Socio-economic Characteristics

The majority of the population of an area is dominated by agricultural economic activities. Among the population of an area about 95% conduct on agricultural activities, 2% livestock herders, 2% traders and 1% occupied in others activities. Some commonly cultivated crop plants in the study area include Teff (*Eragrotisteff*), Bean (*Viciafaba*), *Sorghum bicolor*, Wheat (*Triticum species*), and Barley (*Hordeumvulgare*, Pea (*Pisumsativum*), Coffee, various types of fruit and Zea *mays*. The most common type cash crop of areas was Coffee and Chat (Melka Belo Agricultural Office, 2020).

According to Natural resources and livestock health care agency of Melkabelo (2015), an areas possesses a total 338,906 livestock population consisting of 136,345 cattle, 71,847 goats, 11,657 sheep, 100651 hens, 855 horses, 12,968 donkeys and 4092 mules.

3.2. Research Design

The major focus of the study was description of information related to socioeconomic effects of road transportation on the population of the study areas. So, the researcher employed descriptive survey research design because it was suitable for describing the existing situation and phenomena as they exist now. It also used to describe, analyze and interpret nature of the problem under study. The combination of both qualitative and quantitative approaches of research applied because it gives the potential to cover each methods weakness with strengths from the other method. Thus, triangulation mixed method research design would employ.

3.3. Types and Sources of Data

The study employed both primary and secondary sources of data. Primary data were collected using questionnaire, key informant interview; informal discussion and personal field observation collect data from the selected samples. Therefore, questionnaires would be employed for sampling residents and semi-structured interviews would be held for key informants official and experts.

Secondary data were also collected from office manuals (woreda transport agency and administrative office) and variety of books from libraries, published and unpublished government documents.

3.4. Sampling Size and Sampling Techniques

Both probability and non- probability sampling techniques were employed for the study. So, the investigator was used stratified sampling techniques in order to select kebeles based on their distance from the road. According to the Ethiopian Road Authority (ERA, 2008), peoples within five kilometer distance of all-weather roads are considered to have road access and those far from five kilometer as poor road access.

The study area has 22 rural kebeles and 4 urban kebeles. The study was focused on the rural kebeles to assess the socio-economic effects of road transportation. The sample selection was involved two basic stages. The first stage was classifying 22 rural kebele into two separate strata based on their distance from road as kebeles within 5km and more than 5km from the road. Among 22 rural kebeles of study areas 9 of them are found within a distance of 5km and 13 of them are far from 5km from all-weather road. The second stage involves selection of sample kebele from each strata with their household size.

Thus, based on distance categories, the researcher selected 4 kebeles by using simple random sampling and purposive sampling method. By using lottery method, the researcher selected one kebele out of nine kebeles within a distance of five kilometers and another one kebele within five kilometers near to the market was selected purposefully. At the same time the researcher was selected 1kebeles out of thirteen found far from five kilometers and other 1kebele far from any others selected purposefully. According to population projection of 2019, the total population of woreda is 250402. From these populations, the total household size is 52167 and 41311 of them are rural households.The researcher taken sample size of 336 households out of 2665 households of the selected kebeles by using simple random sampling technique in order to avoid the research bias.

To draw the sample size from each kebeles, the researcher used C.R. Kothari (2004); hence, by considering the level of acceptable error at 5%, the sample size required for this research would be determined by using the following formula:

$$n = \frac{Nz2pq}{E2\,(N-1) + z2pq}$$ ----------***Equation 1***

Where, N= population size

n = desired sample size,

Z = at 95% confidence level which is 1.96

P = estimated characteristics of target population; q = 1-p

E = level of significance test 5% (0.05) margin error,

Where, N= 2665 Z = 1.96 p = 0.5 q = 1-p = 0.5 d = 0.05

Then, the level of confidence or want to be sure to get the same results of the study multiple times done is 95%. Then Z=1.96, expected margin of error or accuracy of estimating the population parameter (d) will be (0.05) and the population distribution of the variable of interest was p=50%, then the required sample size computed as follows;

$$n = \frac{2665(1.96)2\ (0.5)\ (0.5)}{(0.05)2(2665-1)\ +\ (1.96)2(0.5)\ (0.5)} = \frac{2559.466}{7.6204} = 335.87 \approx 336$$

According to this method, the researcher would take the sample size of 336 households out of 2665 household of the selected kebeles by using simple random sampling method in order to avoid the research bias. The proportional allocation of the sample would be made on the basis of the size of households in the selected kebeles. So, sample size (n) of each zone selected were as follows:

Table 1: Number of sample Household

Distance from road	Selected kebeles	Total number of HH	Sample of HH	Formula
<5km	Makanisa	610	58	$n_z = \frac{n(n_{thz})}{N}$
	Waldamisoma	745	70	
>5km	Kufakas	690	65	
	Firiqabso	620	59	
Total		**2665**	**336**	

Sources: Own survey, 2022

N.B: n_z= Sample size of each kebeles n = Sample size

n_{thz}= Total household in each kebele N = Total household

The key informant's for the interview would be selected using purposive sampling method from road transport authority of the woreda 2, traffic police 2, and 2 civil servants from each kebeles that is 8 civil servants and totally 12 key informants.

3.5. Instrument of Data Collection

The required data to undertake the study would be collected from the sample population through the use of a combination instrument, namely; questionnaire, interview, and field observation. The questionnaires were both open and closed ended question, the interview would also be held with the used of semi structured interview methods, whereas the field observation would be a non-participant observation.

3.5.1. Questionnaires

The researcher would use questionnaires to generate the necessary information from a large number of respondents and data collected could be easily analyzed, tabulated, presented and generalized. Open ended and close ended questions would be incorporated to assess socio-economic effects of road transportation. These questionnaires would be administered to the respondents to be filled. Since the respondents would be selected randomly the questionnaire would be filled out by those respondents who could read and write. But the researcher would help those who couldn't read and write in filling the questionnaires.

3.5.2. Key Informant Interview

The researcher would conduct interviews with purposefully selected key informants based on the reason that these researchers would get sufficient and appropriate data from those respondents because they had technical expertise and knowledge about the problem under study. Accordingly, official and expert of road Woreda transport authority, traffic police and civil servants from each kebeles would be selected to get reliable data.

The interview was a useful tool because it was an active process which directly involves the interviewer and interviewee and it generated more detailed information about the issue. Due to this, the interviewee was relatively free to give responses and this would help to obtain relevant data and to supplement and cross check the reliability of data obtained through questionnaires.

3.5.3. Field observation

Personal observation was one of the most important data gathering instruments. Moreover, the researcher would use field observation to see the current situation of socio-economic effects of road transportation on the population of the study area. The reason for choosing personal observation was to generate information about observable situation and facts about effects of poor road access and access to road transportation on socio-economic developments of an area understudies. While conducting field observation; the investigator used digital camera to capture a photograph that visualizes the real situation understudies.

3.6. Data Processing and Analysis

Data would be analyzed using both qualitative and quantitative ways of data analysis. The quantitative data mainly obtain using close-ended questionnaire was analyzed by simple descriptive

statistics like percentage, average and frequency and the result would summarize in the form of table and graph.

The qualitative data and information that was collected through structured interview, open ended questionnaires and the researchers observation would analyzed, described and interpreted in the forms of narration and compare and contrast methods. The data analysis would be conducted using Excel and SPSS version 20 software.

After collecting and analyzing, data would be presented using percentage, graphs / charts and tables in an easily understandable way, based on the objectives of the study.

3.7. Validity and Reliability of Data

In the process of preparing the instruments which were competent enough to secure relevant data, the validity and reliability issues would be given due attention. Because, the heart of the research findings highly depends upon the quality of data to be collected using these instruments. Therefore, the data collection tools to be prepared would review based on the comments forward by the advisor.

3.8. Ethical Consideration

Research ethics were mandatory to maintain the value of research. Research should adhere to research ethics standards like honesty, impartiality, and willingness to accept their own feasibility. The researcher used some guidelines to bring good research ethics. The research ought to give main concern to research efforts that could benefit society and cultures of the study area. Respecting for individuals and groups: -includes obtaining free and informed consent, respect individuals' privacy and close relationships, respect for vulnerable groups, recognize other cultures and times, avoid plagiarism, regard for third parties that were not directly included in the research and respect for the values and motives of others.

4. RESULT AND DISCUSSION

This parts of the thesis deals with the respondents' demographic characteristics, analysis, interpretation, and discussion of the data collected for the present study. In this attempt the questionnaires collected from the sampled household respondents; the interview details obtained from the key informants, the information more acquired from experts of Melka belo woreda road authority office and personal field observation and secondary data were analyzed in the study.

4.1. Demographic Characteristics of the Respondents

4.1.1. Age composition

The Table 2 below shows that highest concentration of the respondents is found in 29-39 age group which accounts 47%. The next highest concentration of the respondents is found in 40-48 age group. From this it can be stated that about 68% of the respondents were between 29-48 years of age. Less concentration of respondent is found in the age groups of above 49 years 18% and between 18-28 years of age 6% respectively.

Table 2: Age structure of Respondents

Age group	Frequency	Percentage
18-28	20	6
29-39	158	47
40-49	98	29
Above 49	60	18
Total	**336**	**100**

Sources: Field Survey, 2022

4.1.2. Sex Structure

The Table 3 below shows the gender of the respondents. It shows that, from respondent category, 55.06% of the total respondents were male and 44.94% of the sampled respondents were female. This indicates that, the sex composition of the study area is dominated by male population groups rather than female population.

Table 3: Sex Structure of the Respondents

Sex Category	Frequency	Percentage

Male	185	56
female	151	44
Total	**336**	**100**

Sources: Field Survey, 2022

4.1.3. Marital Status

As we can infer from Table 4 below, 82.14% of the sampled respondents were married, 11.9% were single, 4.46% were divorced and finally, 1.48% of them were widowed. This implies that majority of the marital status of the study area were married, that is related to the mobility of large number of people from place to place which requires transport access and infrastructure at large.

Table 4: Distribution of respondents by marital status

Title			Gender of respondent		
			M	**F**	**Total**
Marital status of respondent	Married	count	146	130	276
		% of total	43.45%	38.69%	82.14%
	Single	count	32	8	40
		% of total	9.52%	2.38%	11.9%
	Divorced	count	5	10	15
		% of total	1.48%	2.97%	4.46%
	widowed	count	2	3	5
		% of total	0.59%	0.89%	1.48%
Total		Count	185	151	336
		% of total	55.06	44.94	100

Sources: Field Survey, 2022

4.1.4. Family members

As we have seen from Table 5, 55.4% of the sample households have 3-4 family members, 31.8% of them have 5-6 family members, 22.6% of the respondents have 1-2 family members and 9.2% of the sample households have above 7 family size. This indicates that, more than half of the household heads have 3-6 family in size in the study area.

Table 5: Family size of the Household Heads

Category	Frequency	Percent
1-2	76	22.6
3-4	186	55.4
5-6	107	31.8
Above 7	31	9.2
Total	**336**	**100**

Source: Field Survey, 2022

4.1.5. Educational Status

As indicated from the Table 6 below out of the total respondents 43.2% of them were with the educational level of read and write only, 26.5% primary school, 14% illiterate, 8.3% high school, 4.5% university students and 3.5% those educated in different technical school. Therefore, this shows as the educational status of the respondents occupied by primary school and above at large.

Table 6: Educational status of the Household Heads

Category	Frequency	Percent
Unable to read and write	145	43.2
Read and write	47	14
Primary school	89	26.5
High school	28	8.3
University	15	4.5
Others	12	3.5
Total	**336**	**100**

Sources: Field Survey, 2022

4.1.6. Types of Occupations

As we have seen from Table 7, 32.7% of the sample households were engaged in agriculture, 27% of them were students, 26.3% of the respondents were engaged as government employee, 8.6% of the household heads were also engaged in small-scale trade and 5.4% of the sample households are house ladies. This indicates that, more than half of the household heads are engaged in different occupation in the study area.

Table 7: Types of occupation engaged

Category	Frequency	Percent
Agriculture	110	32.7
Student	91	27
Government Employee	88	26.3
House Lady	18	5.4
Small-scale Trade	29	8.6
Total	**336**	**100**

Source: Field Survey, 2022

4.1.7. Annual income of respondents

As indicated in Table 8, 28.9% of the household heads generate above 600 ETB as their source of annual income followed by 27.7% of them with annual income between 4001-6000ETB. Among the total household heads, 19.9% earn 2001-4000ETB followed by 16.7% of the household heads with 500-2000ETB as their annual income earned. From the total respondents, 6.8% have no income earned to sustain their life in the study area. This implies that more than half of the household heads earn annual income ranging between 2000ETB-6000ETB on average.

Table 8: Annual income of respondents

Category	Frequency	Percent
No income earned	23	6.8
500-2000 birr	56	16.7
2001-4000 birr	67	19.9
4001-6000 birr	93	27.7
Above 6000 birr	97	28.9
Total	**336**	**100**

Source: Field Survey, 2022

4.1.8. Agricultural land owned by respondents

According to Table 9 below, 32.7% of the respondents have 2-3hectare of agricultural land followed by29.2% of them with 4-5hectare agricultural land. Among the total household heads, 27.4% were having greater than 6hectares of land in the study area. from the total of them, 10.7% have land hold size below 1hectare. From this, we can conclude that the agricultural land ownership of the household head ranges between 2-5hectares of land.

Table 9: Land hold size of the respondents

Category	Frequency	Percent
Below one hectare	36	10.7
2-3 hectares	110	32.7
4-5hectares	98	29.2
Above 6 hectares	92	27.4
Total	**336**	**100**

Source: Field Survey, 2022

4.2. Current status of road transportation in Melka Belo Woreda

4.2.1. Road network in the study areas

Melka belo Woreda has very low level of road network since there is lack of all-weather roads connecting most of the kebeles. The total length of road in Melka Belo Woreda is 206km, from this 56km is dry weather road and only 150km is all-weather roads. Most of the Kebele remain isolated from basic social services and market access especially during rainy season because of the difficulty of topography and Major River hinder communication even among Kebele within all-weather road. Additionally, the road network connecting Woreda with other Woreda and market centers are not in good condition because of lack of proper maintenance. This condition hinders social services provision such as health, education, extension services very challenging and impede mobility, marketing and general socio-economic development of the study areas.

However, the government of Oromia regional state and as well local government have a program to connect every Kebele with each other through road network. Some road projects were underway by Oromia regional government budget and local government as well as through voluntary participation of the society. Among the road projects constructed in study areas were the construction bridges along the major river of Jarjertu that connect kebeles which was isolated for the long period of time from access to market and basic social services due to difficulty of transportation services. Moreover, the other road projects by the local governments were also in progress through Qiqe to Jerjertu to connect isolated kebeles with all-weather roads.

Figure 3: Bridges that connects kebeles with each other and market centers along the rivers

Sources: Own survey, 2022

4.2.2. Road Density

Road density is the density of transport network in the given areas. It is calculated in terms of geographical areas or size of the population of a given areas. The total length of road in Melka belo

Woreda is 206km of which 150km is all-weather road, the total population according to population projection of 2019 was 250402 and the total areas of Melka belo is 114275 hectares'. So, the road density of Melka belo is 0.131sq.km per 100 hectars, and 0.6km per 1000 people or 6km per 10000 peoples.

According to ERA study for the country to be competitive enough and enter into middle income category, the targeted road density which secures the rural population to have access to all weather road is estimated to be 0.3 km/km^2, the average road density of the lower middle countries. In this case the road transport network has to reach 330,000 km. The same study defined the concept measured in terms of average distance from the road network and proportion of area farther than 5 km from all-weather roads as lack of access, which deprives people from the opportunities to improve their lives. In Ethiopia since 1997 when the RSDP started road density measured as density per 1000sq km was 24.1, while measured by density per 1000 population in km was 0.46. But since 2010 it improved considerably reaching nearly 90 km per 1000sq km in 2014 (ERA, 2014).

Generally, about 1000 people of the study area were served by 0.6km of all-weather road, 10000 people were served by 6 km of roads and the total road density is 0.131square kilometer per 100 hectares, this shows that the road density of the study area is very low when compared with expected road density from middle income countries and national average. Even though the road density of Woreda has increased to some extent from time to time, it is still needs due attention to achieve overall socio-economic developments of the study areas.

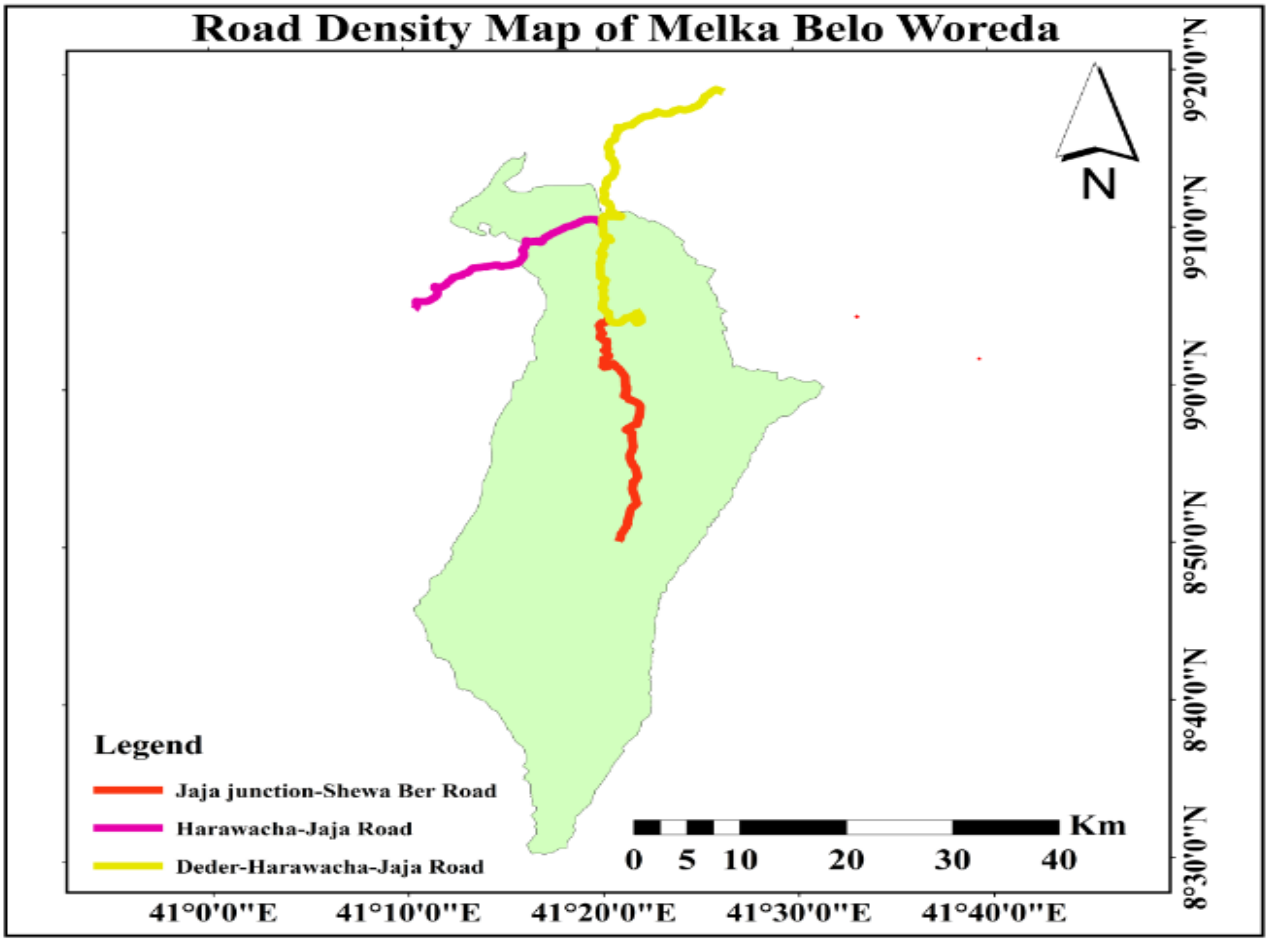

Figure 3: Road Density Map of Melka Belo Woreda

Sources: Own survey, 2022.

4.2.3. Types of vehicles

Table 12 below regarding types of vehicles, show that out of the total respondents 49% of them responded that the types vehicles used in their local areas are motorcycles, 24% replied that types of vehicles are bus, 19% replied Deyna and the rest of 8% are others.

Table 12: Types of vehicles used for transportation

Question	Types of vehicles	Frequency	Percent
What types of vehicles are being used for transportation in your areas	Bus	80	24
	Motorcycle	165	49
	Deyna	65	19
	Pickup	-	-
	Others	26	8
	Total	**336**	100

Sources: Field Survey, 2022

4.2.4. Home distance from all-weather road.

According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all-weather roads are considered to have road access and those far from five kilometer as poor road access. Of course, those within 6-10 km distance from all-weather roads are not equally deprived of opportunity as those of far more than ten kilometer. Thus, the study has grouped the respondents in there accessibility categories.

Consequently, from Table 13, out of the total respondents 64% are between 6-10km from all-weather road, 25% within 5km distance from all-weather road and the remaining 11% with a distance of more than 10km from the road. From this it can be clear that the majority of the respondents are found outside the distances of 5km, which can be considered as areas with poor road access which may deprived them to get access to market, education, health, etc.

Table 13: Average distance of home from all-weather road

	Ranges of distance	Number of respondents	Percent
What ranges of distances for your home from all-weather road	<5KM	84	25
	6-10KM	214	64
	>10KM	38	11
	Total	**336**	**100**

Sources: Field Survey, 2022

According to the interview made with the expert of Woreda road authority and traffic polices there is great variation among areas with access to road and poor access to road regarding travel time, travel cost and provision of social services. For instances, the population with poor road access moved on foot for about an hours in order to get basic social services and access to market centers which combined with problem of travel cost since the majority of vehicles used in this area is motorcycle which is costly.

4.3. Socio-economic Effects Of Road Transportation

4.3.1. Perceived effects of road accessibility

According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all-weather roads are considered to have road access and those far from five kilometer as poor road access. As indicated in Table 10 Item 1, out of the total respondents only 25% replied there is accessible road transportation in their local areas.

As observed in Table 10 Item 2, on the negative effects of inaccessible road transportation on socio-economic conditions, out of the total respondents 69.94% replied that it has high negative effects, 25% replied very high effects. In contrasts this, about 1.48% response very low effects and 3.57% low negative effects. From this we can suppose that there are direct relationships between road accessibility and positive socio-economic developments of every country.

Table 10:Perceived effects of road accessibility

Question	Items	Frequency	Percent
Is there any accessible road transportation in your local areas	Yes	84	25
	No	252	75
	Total	**336**	**100**
If your answer in question number 1 is no, what is its negative effects on the socio-economic condition of your local areas	Very low	5	1.48
	Low	12	3.57
	High	185	55
	Very high	50	15
	Total	**252**	**75**
What types of roads are accessible in your local areas	Asphalt	-	-
	Dry weather	250	74.40
	All-weather	86	25.6
	Total	**336**	**100**

Sources: Field Survey, 2022

Moreover, from the above Table 10 item 3, out of the total respondents 74.4% replied that the type of road is dry-weather road, and the outstanding 25.6% responded that the type of road in their area is all-weather (gravel) road. From this it can be conditional that the majority of respondent have access to dry- weather road and the lower percentages of respondents have access to gravel road. The figure also indicates that there is no asphalt road in the study area.

Additionally, According to interview made with the Woreda head of road authority, the majority of kebeles remains without access to road transportation except for those kebeles adjacent to all-weather road and Woreda administration centers. The current status of road density do not matched with the number population in the study areas. However, they are planned to connect all-kebeles with all-weather road through community participation even if there are encountered with the challenge of topography and budget.

4.3.2. Transportation availability and mobility

As shown from Table 11 item 1, based on the suitability of road transportation out of the total respondent about 83.3% replied that there is no suitability of road transportation in their local areas and the remaining 16.7% of respondent replied they have suitable road transportation. From this we can conclude that the majority of respondents neglected from suitable transportation services.

Table 11: Availability of transportation and mobility

Questions	Items	Frequency	Percent
Does road in your areas suitable for transportation	Yes	56	16.7
	No	280	83.3
	Total	**336**	**100**
Is there any variability of transportation service during dry and rainy season	Yes	289	86
	No	47	14
	Total	**336**	**100**
If your answer for the above question is yes, what do you think for the reason	Flood problem	13	3.9
	High mud	95	28.27
	High rainfall	20	5.95
	Poor road condition	161	47.9
	Total	**289**	**86**

Sources: Field Survey, 2022

As indicated Table 11, item 2, with regards to seasonal variability of transportation services in the study areas out of the total respondents about 86% replied that there are great variability of transportation services during rainy season and dry season and the rest of 16% replied no seasonal variability of transportation services in their local areas. From this we can inferred that transportation is somewhat suitable during dry season than rainy seasons due to poor road condition combined with flood problems, high mud and the nature of topography of the study areas.

According to interview made with the Woreda head of road authority and with other key informants the suitability of road transport for transportation services and the ways of mobility of population is somewhat better among kebeles closer to all-weather road and Woreda administrative center even though, there challenged with poor road condition, high rainfall and high mud which resulted for variation of transportation services during rainy and dry season. The remaining kebeles with poor access to all-weather road remain neglected from the provision of social services which can be negatively affects the socio-economic condition of the population of the study areas. In additions to respondents' responses, the field observation conducted by the researcher also proof these facts.

Figure 4: Seasonal variability of transportation services

Sources: Field survey, 2022

As indicated from Table 11, item 3, question based on the reason for the seasonal variation of transportation services out of the total respondents 55.05% replied that poor road conditions, 35.5% replied high mud problems, 5.95% high rainfall and the remaining 3.9% replied that the reason is flood problems. From this we can inferred that the major reason for the seasonal variation of transportation services is highly caused by poor road condition that combined with high mud and flood resulted from the rainfall condition and nature of topography. As field observation conducted the figure below indicated that even all-weather road that connect Woreda with other Woreda and kebele with access to road with the head of Woreda.

Figure 5: Reason for seasonal variability of transportation service

Sources: Field survey, 2022

4.3.3. Major effects on agricultural products

According to Table 14 item 1,out of the total respondents 67% replied that high contributions ,29% very high contributions, 3% low contributions and the lowest number of respondent 1% replied that it very low contributions of road transportation on agricultural productions. From this we can inferred that the majority of respondents have good understanding about the contribution of accessible road transportations for agricultural productions.

As shown in Table 14 item 2, about the difference on price of agricultural products among areas with poor road access and access to road transportations, out of the total respondents 96% replied that there is price difference among areas with poor access and access to road transportations and the remaining 4% replied that there is no price difference.

Furthermore in Table 14 item 3, out of the total respondents 88.1% of them replied that high degree of difference in price of agricultural products, 8% of them replied very high difference and about the lowest percentage of respondents 2.4% and 1.5% replied that it have low and very low price difference respectively.

Table 14: Perceived effects on agricultural products

Questions	Items	Frequency	Percent
What is the contribution of accessible road transportation for agricultural production	Very low	3	1
	Low	10	3
	High	224	67
	Very High	99	29
	Total	**336**	**100**
Is there any difference in price of agricultural products for areas with access to road and poor access to road	Yes	323	96
	No	13	4
	Total	**336**	**100**
If your answer for the above question is yes, what is the degree of difference in price of agricultural products	Very Low	5	1.5
	Low	8	2.4
	High	283	84
	Very high	27	8
	Total	**323**	**96**

Sources: Field Survey, 2022

Agriculture is the backbone of the population of the study areas. Farmers produce different types of crops both for expenditure and market. However, selling of agricultural products is affected by lack of road communications that hindered the population of Woreda with poor road access to export agricultural products rather they use and produce only for consumption purpose. Some farmers carry profitable agricultural products to distant markets using human portage and pack animal.

However, according to interview conducted with key informants, kebeles with access to road transport export some crops like coffee, groundnut, khat (chat) and others to the market with good prices than areas with poor road access.

Generally, from the figures given above we can conclude that access to road transportations have great contributions for the developments of agricultural sector. As indicated in Table 13 below the effects of accessibility of road on agricultural product is highly determined. Distance of home from all-weather road, difference in agricultural product price with areas access to road or not and degree of difference in agricultural product price are significantly correlated to differences in agricultural product prices.

Table 15: Correlation between home distances from all-weather road and difference in agricultural price

		Distance of home from all-weather road	Difference in agricultural product price with areas access to road or not	Degree of difference in agricultural product price
Distance of home from all-weather road	Pearson Correlation	1	-0.269**	0.321**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	336	336	336
Difference in agricultural product with areas access to road or not	Pearson Correlation	-0.269**	1	-0.823**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	336	336	336
Degree of difference in agricultural product	Pearson Correlation	0.321**	-0.823**	1
	Sig. (2-tailed)	0.000	0.000	0.000
	N	336	336	336
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field Survey, 2022

4.3.4. Major effects on educational services

It is evident that accessibility of road transportations encourages the establishment of social services such as schools, health centers, market centers, etc. Therefore, road has high contribution on the improvement of access to education through the attraction of other services for teachers and students, provision of educational materials to schools, transport services to students and teachers and from schools as required.

Table 16 on item 1, Shows that out of the total respondents 51.8% responded that road has high advantages for improvements of quality education, 47% very high advantages, and the remaining 1.2% low advantages. From this it is clear that accessible road transportation has high advantages for improvement of access to education.

As indicated in Table 16 on item 2, out of the total respondents 48.5% replied that the distance of school from their home is 6-10km, 35.1% replied the school distance from their home is within 5km and the remaining 16.4% responded that they walk more than 10 km to reach school. From the facts it is clear that majority of the respondents walk more than five kilometer distance to reach school.

Table 16: Effects of road on educational services

Questions	Items	Frequency	Percent
How do you express the advantages of accessible road transportation for improvement of access to education	Very Low	-	-
	Low	4	1.2
	High	174	51.8
	Very high	158	47
	Total	**336**	**100**
What is the ranges of distances between your home to school	>5 KM	118	35.1
	6-10 KM	163	48.5
	>10 KM	55	16.4
	Total	**336**	**100**
By what means of transport do you go to school	Walking	319	95
	Bicycling	-	-
	Non-motorized	-	-
	Not going to school	17	5
	Total	**336**	**100**
If your children do not go to school, what do you think for the reason	School is too far	110	32.74
	Unavailability of road	165	49.11
	Transportation is costy	61	18.15
	Total	**336**	**100**

Sources: Field Survey, 2022

As we have seen from Table 16 on item 3, 95% of the respondents are going to school by means of walking without any transport alternatives and 5% were not going to school due to different reason. As indicated on item 2 on the same table students travel to school for 6-10km from their residents. In the same Table on item 4 indicated that, 49.1% of responded that unavailability of roads hindering the students to attend their class on time, 32.7% responded that schools are too far from residents and 18.2% were replied that transport is too costy to transport student from home to school.

According to interview made with the Woreda head of education bureau and expert the total number of school in the Woreda are six secondary schools and about 96 primary schools. Most the school are concentrated in areas with access to road transportation and the remaining found in areas with poor road access where much of them are constructed through local community participation through which every facility to schools are transported by human portages and non-motorized. Accordingly, there is great variation in the number of student enrollment and dropout as well as facilities including the number of teachers. However, the Woreda education bureau are works with commitment in order connect isolated school with road network at least with dry weather road through community participation on road construction in order to address every children to school.

The correlation between home distances from all-weather road to school indicates that there was positive and insignificant relationship between road accessibility and education services. A one unit increase in road accessibility creates 0.120km distances from home to school. This implies that there was an influence of road accessibility on expansion of education service for the society (see Table 17 below).

Table 17: Correlation between home distances from all-weather road and schools

			Distance of home from all-weather road	Ranges of distance between home to school
Kendall's taub	Distance of home from all-weather road	Correlation Coefficient	1.000	0.120*
		Sig. (2-tailed)	0.000	0.017
		N	336	336
	Ranges of distance between home to school	Correlation Coefficient	0.120*	1.000
		Sig. (2-tailed)	0.017	0.000
		N	336	336
*. Correlation is significant at the 0.05 level (2-tailed).				

Source: Field Survey, 2022

4.3.5. Major effects on health services

Table 18 Item 1, exposed that out of the total respondents about 97.91% of them responded that access to road transportations improved health situations and no more than 2.1 % of the respondents replied that access to road transportations do not improved health situation. From the records it is clear that road bring improvement in the health situation as the majority of the respondents replied.

Table 18 Item 2, shows that out of the total respondents 42.26% of them indicated that the distance of their home from the health services are between 6-10km, 40.18% replied their home distance

from health services are within 5km and the remaining 17.56 % replied their home distance from health services are more than 10km. As a result From the above figures we can concluded that the majority of the population of the study areas live more than 10km from the health services since the poor road access people fear a long distance walk without transport services and they prefer to be at their home when they are sick.

Table 18: Effects of road transportation on health services

Questions	Items	Frequency	Percent
Do you think that access to road transport improve health service situation	Yes	329	97.91
	No	7	2.1
	Total	**336**	**100**
What is the average distance of your home from health services	<5 km	135	40.18
	6-10 km	142	42.26
	>10 km	59	17.56
	Total	**336**	**100**
What is the means of transportation used to transport patient to health care	Back loading	188	56
	Ambulance	84	25
	Bus	20	6
	Others	44	13
	Total	**336**	**100**

Sources: survey, 2022

Besides Table 18 item 3, reveal that out of the total respondents 56% of them replied that the means of transportations to transport patients to healthcare is through back loadings, 25% with the use of ambulance, 13% with the uses of other services including non-motorized services and only the remaining 6% replied that they used bus to transport patients to health services. From the data given above we can sum up that the majority of populations in the study areas uses back loading to transport patients to health cares or their last probability is to be at home with patients excepts for those population closer with access to road transportation. The correlation between home distances from all-weather road to health center indicates there was significant positive relation to each other. This implies that, a 1 unit increase of distance from all-weathered road leads to an impact on the accessibility of health services in the Woreda (see Table 19).

Table 19: Correlation between home distances from all-weather road to health center

			Distance of home from all-weather road	Average distance of home from health center
Spearman's rho	Distance of home from all-weather road	Correlation Coefficient	1.000	0.360**
		Sig. (2-tailed)	0.000	0.000
		N	336	336
	Average distance of home from health center	Correlation Coefficient	0.360**	1.000
		Sig. (2-tailed)	0.000	0.000
		N	336	336
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field Survey, 2022

4.3.6. Major effects on access to market

As indicated in Table 20 item 1, out of the total respondents 37% replied that their home distance from the market center is 6-10km, 35% is within 5km and the remaining 28% replied that their home distance from market center is more than 10km.

From this it is clear that majority of the respondents walk more than five kilometers to reach market centers. Therefore, Better road accessibility could help to get market information because of lower transaction costs and perfect information. It could also encourage people to take more advantage to produce and sell it in the market and the people nearest to the road have advantage to get the market access that they are willing to produce more steadily for the market, while those with poor market access are enforced to produce for domestic consumption. Despite the fact that there is improvement in road sector investment in the study area, majority of the households come across long distance (6-10km and above) still using pack animals and carrying loads on their head and backs to take their products to market places particularly those far away from roads.

Table 20: Effects of road transportation on market access

Questions	Items	Frequency	Percent
What is the average distance between your home to market center	<5 km	118	35
	6-10 km	124	37
	> 10 km	94	28
	Total	**336**	**100**
What means of transports are available for you to go to market	Pack animals	49	14.6
	Human portage	190	56.5
	Vehicles	97	28.9
	Total	**336**	**100**

Sources: Field Survey, 2022

In additions Table 20 item 2, shows that out of the total respondents 56.5% replied that their means of transport available to go to market is through human portages, 28.9% through vehicles and the remaining 14.6% replied through pack animals. From the above data we can inferred that the majority of the population of the study areas used human portages and pack animals in order to reach at the market centers. The correlation between home distances from all-weather road to Market center implies that distance from home to market center in relation to all-weathered road was under influence. A 1 unit increase on distance from all-weathered road to home and home to market center creates 0.406 load to transport their materials to the market (see Table 21 below).

Table 21: Correlation between home distances from all-weather road to Market center

			Average Distance of home from market center	Distance of home from all-weather road
Spearman's rho	Average Distance of home from market center	Correlation coefficient	1.000	0.406**
		Sig. (2-tailed)	0.000	0.000
		N	**336**	**336**
	Distance of home from all-weather road	Correlation coefficient	0.406**	1.000
		Sig. (2-tailed)	0.000	0.000
		N	**336**	**336**
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field Survey, 2022

5. SUMMARY AND CONCLUSION

5.1. Summary

This study was aimed to assess road transportation and its socio-economic effects on selected kebeles of Melka Belo Woreda, East Hararghe Zone, Oromiya Regional State, Ethiopia. The study was made on the premises accessible road transportation has an impact on socio-economic status on the community of the Melka Belo Woreda.

For the purpose of this study descriptive survey research design was used. In order to collect data questionnaire, key informant interview and field observation were employed. Total 336 sample household heads were selected by using systematic random sampling techniques and 12 respondents purposively selected for interview from road transport authority, traffic police and civil servants from each kebeles. The data analysis would be conducted using Excel and SPSS version 20 software. After collecting and analyzing, data would be presented using percentage, graphs / charts and tables in an easily understandable way, based on the objectives of the study.

Melka belo woreda has very low level of road network since there is lack of all-weather roads connecting most of the kebeles. Most of the kebele remain isolated from basic social services and market access especially during rainy season because of the difficulty of topography and Major River hinder communication even among kebele within all-weather road. The road density of Melka belo is 0.131sq.km per 100 hectars, and 0.6km per 1000 people or 6km per 10000 peoples. Generally, this means about 1000 people of the study area were served by 0.6km of all-weather road and 10000 people were served by 8.186 km of roads.

Inaccessible road transportation has a negative effects on the socio-economic status of the dwellers of the study area. The places where faraway from all-weathered roads are not accessible to social services which can affect the socio-economic condition of the population of the study area. The road transportation of the study area is not accessible during the rainy season that results in effects on the exchange rates of agricultural products, achieving quality education, promoting health services and getting the benefits from market places.

5.2. Conclusion

The lack of accessible road transportation have its own negative effects on the socio-economic development of population of a given areas. Rural areas in developing countries do not have a

dependable and efficient access to roads. Socio-economic backwardness and poor road accessibility are major concerns for rural areas in developing countries. Therefore, the study, attempted to investigate rural road transportation and its perceived effects. The study reveals that even though currently the government work hard in order to expand road network and to connect every kebeles with Woreda and Woreda with zone, access to road transportation is still the major problem in the study areas since the majority of the populations walk on foot more than 5km (more than an hour) from their home to get basic social services and access to market centers. In addition there is variability of transportation service during dry and rainy season that resulted from poor road condition, high rainfall and mud. The study shows that the highest percentages of vehicles used in the study areas are motorcycle even if the cost of transportation is very high when compared with the cost of bus. There is great variation among areas with poor access to road and access to road in terms of travel time, travel cost, provision of social services and quick flow of information.

As the majority of respondents replied that access to road transportation have highest contribution for the development of agricultural sector and motivated the farmers to conduct diversified crop production which solved the problem of variation in prices of agricultural product, flow of current information which helps the farmers to produce every crops equally both for market and consumption which increases the total income of the population of the study areas. Education is base for every socio-economic development if it is supported with accessible road transportation services which connect every school with all-weather road in order to solve the problem related with provision of school facilities, teachers, high rate of dropout and low rate of student enrollment among areas with poor road access where some children still remains at home without education since school is too far from their home. So, as the study shows there is the direct relationship between accessible road transportation and improvement of quality education.

The study reveals that access to road transportation have positive effects for the improvements of health situation in the study areas. Although governments work hard in order to reduce rate of maternal mortality, infant mortality with the prevalence of access to health facilities, the majority of the population of the study areas live on more than 10km and still neglected from access to clinic and hospital since they walk a long distances from their home with patient through back loading due to poor access to road except for those with access to road transportation that transport patient to clinic and hospital through ambulance and bus. Better road accessibility could help to get better market information because of lower operation costs and perfect information which helps the farmers to produce profitable product for market and sell with good price that changes the life

condition of the society by increasing their income. However, as the majority of the respondents responded, they move more than five kilometers in order to reach at the market center and their means of transportation that used to transport the saleable product to the market is with the help of human portage and pack animals that resulted from poor road access.

5.3. Recommendations

Based on the finding of the study the following recommendations were forwarded. These are mentioned as follows.

- ✓ Local, State, and Federal transport policies should be put in place to ensure a sustainable transport services. Such a policy would underpin the already existing relationship between the transport network and the development of socio-economic activities, whereas at the same Time creating a favorable transport network for further growth.
- ✓ Raising the human capital base and access to other productive resources, such as education and health services, will be necessary for rural road infrastructure to raise household income in general and the income of the poor in particular.
- ✓ Remote communities, such as agricultural settlements in and around Melka Belo Woreda, should be linked by good quality roads to improve connectivity and mobility to these areas. This will increase the use of local resources.
- ✓ Rural roads connecting the market should be rehabilitated for easy transport, which may ultimately reduce the high cost of transport.
- ✓ Access to health centers and hospitals consequently reduced morbidity and mortality rate as well as changing health seeking behavior of communities should be improved in parallel, to observe substantial impacts due to the accessibility of roads.

6. REFERENCES

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APPENDICES:

Appendix IA: Questionnaires

The objectives of this study would be to assess rural road transportation services and its effects: The case of Melka Belo woreda, East Harerghe Zone, Oromya Regional State, Ethiopia. So, you are kindly requested to provide relevant answer to the questions willingly. Your correct responses have great contribution to attain the purpose of the study. Finally I would like to thank you in advance for your valuable response in filling this question.

Read the following instructions carefully to fill the questionnaires.

1. Writing your name is not necessary
2. Please Circle choice below with proper answer.

Part I. **Background of the respondents**

1. Age: A. 18-28 B. 29-39 C. 40-48 D. Above 49

2. Sex: A. Male B. Female

3. Marital status: A. Single B. Married

4. How many members were found in your family (excluding household head)?

A.1- 2 B. 3-4 C. 5-6 D. Above 7

5. Educational status: A. Unable to read and write B. Read and write only C. Primary school D. High school E. Others

6. In what types of occupation did you involved?

A. Agriculture B. Student C. Government employee D. House Lady E. Small scale trade

7. What is the annual income earned in your family in birr?

A. No income earned at all B. From 500-2000 birr C. From 2001-4000 birr D. From 4001-6000 birr E. Above 6000 birr

8. How many hectares of agricultural land do you owned in your area?

A. Below one hectare B. 2-3 hectares C. 4-5 hectares D. above 6 hectares

Part II: **Questions regarding the socio-economic effects of accessible rural road transportation.**

9. Is there any accessible road transportation in your local areas? A. Yes B. No

10. If your question in number 1 is no, what is its negative impacts on socio-economic condition of your local areas? A. Very lowB. Low C. High D. Very high

11. What types of roads are accessible in local areas? A. Asphalt B. Dry weather C. All weather

12. Does road in your areas suitable for transportation? A. Yes B. No

13. Is there any variability of transportation services during dry season and rainy season?
A. Yes B. No

14. If your answer for the above question is yes, what do you think for the reason?
A. Flood problem B. High mud C. High rainfall D. Poor road condition

15. What types of vehicles are being used for transportation in your areas?
A. Bus B. Motor cycle C. Deyna D. Pick up E. Others

16. What are the ranges of distance for your home from all-weather road?
A.<5km B. 6-10km C. >10km

17. What is the contribution of accessible road transportation for agricultural production?
A. Very low B. Low C. High D. Very High

18. Is there any difference in price of agricultural products for areas with access to road and poor access to road? A. Yes B. No

19. If your response for question number 10 above is yes, what is the degree of difference in price of agricultural product? A. Very low B. Low C. High D. Very High

20. How do you express the advantage of accessible road transportation for the improvement of quality education? A. Very low B. Low C. High D. Very High

21.What is the ranges of distance between your home to school?
A. <5km B. 6-10km C. >10km

22. By what means of transport do you go to school?
A. Walking B. Bicycling C. Non-motorized D. Not going to school

23. If your children do not go to school, what do you think for the reason?
A. School is too far B. Unavailability of road C. Transportation is costy

24. Do you think that access to road transport improve the health services situation?
A. Yes B. No

25. What is the average distance of your home from health services?
A. <5km B. 6-10km C. >10km

26. What is the means of transportation used to transport patient to health care in your local areas?
A. Back loading B. Ambulance C. Bus D. Others

27. What is the average distance between your home and market center?
A. <5km B. 6-10km C. >10km

28. What means of transports are available for you to go to market?
A. Pack Animal B. Human portage C. Vehicle

Appendix IIA: Checklists of Key Informant Interview

1. How do you think the current status of road transportation in terms of accessibility, road density and mobility in your woreda?
2. How do you compare areas with access to road and poor access to road with respect to travel time, travel cost and opportunity for basic social services?
3. List down the major contribution of rural road transportation for the socio-economic developments of your local areas?
4. Why do you think that some kebeles from your woreda remains without access to all-weather road?
5. Is there any variability of transportation condition during the rainy seasons and dry seasons? If there is variability identify the reasons.
6. Identify the major consequences of inaccessible road transportation on socio-economic development of your woreda.

Appendix III A: Observation Checklist

The main objectives of this checklist were to assess the socio-economic effects of rural road transportation services and its effects in the study area.

Name of Woreda _____

Name of Observer _____

Date of Observation _____

1. Road types and accessibility in the selected study Area.

Dry weather road		All-weather road		Areas with access to all-weather road	Areas with poor access to all-weather road	Ways of mobility
Km	percent	km	percent			

2. Different ongoing road projects in the study area and difficult topography hinders road projections

APPENDIX IB: GAAFILEE BARREEFFAMAA

Kaayyoon Ijoon Qoranno kana Dhibbaa Haanqinni karaadha rakkoo Hawaasa-dinagdee Ummata Aanaa Malka Ball'oo irratti qabu sakata'uun furmaata barbaachisuu adda baasuun qaama dhimmi kun ilaallattuuf dhiheesuun akka furmaata kennan taasisuudha. Kanaafu, namoonni Gaaffin isinif qophaa'ee hundi gaaffilee dhiyaatanif deebii sirri fi dhugaa jiruu akka deebistan kabajaan isin gaafanna. Sababni isaatis gaaffin sirrin isin har'a kennitan rakkoo ummata keenya furuuf gahee olaanaa qaba waan taheef. Dhumarratti qaamni gaaffilee dhiyaatan kana deebisuuf haayamamoo taatan hunda kabaja olaanaan isinif qabu ibsuun barbaada.

Gaaffilee dhiyaatan guutuuf qajeelfama kennamee sirritti duubbisi.

1. Maqaa kee barreessuun hin barbaachisuu.
2. Fillannoo dhiyaate keessaa deebii sirri ta'ee itti mari.

Kutaa I. Haala waligalaa Gaafatamttootaa

1. Umrii: A. 18-28 B. 29-39 C. 40-48 D. Above 49

2. Saala: A. Dhira B. Dubara

3. Haala Gaa'elaa: A. Kan hin fudhiin /hin herumin B. Kan fudhee/heerumte

4. Baayyinni miseensa maati keessani meeqa ni ta'aa(abbaa warraa osoo hin haammattin)?
A.1- 2 B. 3-4 C. 5-6 D.Above 7

5. Haala Barnootaa: A. Kan hin barattin B. Barreessuu fi dubbisuu qofa C. Sadarkaa tokkoffaa D. Sadarkaa Lammaffaa E. Kan biroo

6. Gosti hojii isiin irratti hirmaatan isa kami? A. Qonna B. Barattoota C. Hojjettoota motummaa D. Haadha manaa E.Hojii daldalaa xixxiqaa

7. Galiin isiin waggaatti argatan qarshiidhaan meeqa ni ta'aa jettani yaadduu?
A. Galii waan tokko hin qabu B. Qarshii 500-2000 C. Qarshii 2001-4000
D. Qarshii 4001-6000 E. Qarshii 6000 ol

8. Lafa qonnaa hektaaraan hangam ta'uu akka naannoo keessanitti qabdan?
A. hectare tokko gad B. Hektaara 2-3 C. Hektaara 4-5 D.Hektaara 6 ol

Kutaa II.Gaafilee Dhibbaa Haanqinni Daandi rakkoo hawaasa-dinagde irratti qabuun wal qabatan.

9. Naannoo ati jiraattuu daandiin gahaa tahee ni jiraa? A. Eyyeen ni jira B. Lakkii hin jiru

10. Naannooati jiraatu gosa daandii kamituu jira?
A. Aspaaltti B. Korata C. Daandi bonaa D. Daandi bonaa gannaa E. Kan biroo

11. Daandiin naannoo keessan jiruu geejjibaaf mijaawaadhaa? A. Eyyeen B. Lakkii

12. Naannoo kessanitti gosa konkolaata kamituu gejjibaa ummataaf tajaajila kenna?
A. Baasi B. Motor saaykila C. Daynaa D. Konkolaataa manaa E. Kan biroo

13.Fageenyi mana jirrenyaa keessani fi daandii bonaa-gannaa jiddu jiruu hangam ni ta'a?
A.<5km B. 6-10km C. >10km

14. Gaheen daandii gahaa tahee qabaachuun omiisha qonnaa keenya irratti qabu hangami?

A. Baayyee Gadaanaa B. Gadaanaa C. Olaanaa D. Baayyee olaanaa

15. Iddoo daandii gahaan tahee jiruu fi daandiin gahaan hin jirree jidduu garaa garummaan gati omisha qonnaa ni jiraa? A. Eyyeen ni jira B. Lakki hin jiru

16. Deebisaan kee gaaffii lakkoofsa 7 yoo eyyeen tahee hangam tokko garaagarummaa gati ni qabaata? A. Baayyee Gadaanaa B. Gadaanaa C. Olaanaa D. Baayyee olaanaa

17. Faayidaa daandii gahaa tahee qabaachuun qulqullina barnootaa foyyessuuf qabuu akkamitti ibsama? A. Baayyee Gadaanaa B. Gadaanaa C. Olaanaa D. Baayyee olaanaa E. Hin bekamuu

18. Garaagarummaan fageenya mana keessani fi mana barumsaa jidduu jiruu kilometiraan hangam ni taha? A. <5km B. 6-10km C. >10km

19. Daandii gahaa tahee qabaachuun tajaajila fayyaa kennamu ni foyyeessa jattee ni yaadaa?

A. Eyyeen ni foyyeessa B. Lakki hin foyyeessu

20. Fageenyi manni keessan Buufata fayyaa irra qabuu kilometiraan hangami?

A. <5km B. 6-10km C. >10km

21. Gosti geejjibaa naannoo jiraatani nama dhukubsate iddoo tajaatila fayyaa argattu biraan ittin geesitan maali? A. Ba'aa namaa B. Ambulaansii C. Konkolaataa baasi D. kan biroo

22. Fageenyi manni jireenyaa keessan iddoo gabaa ykn magaalaa fayyadamtan irraa qabuu hangam ni ta'aa? A. <5km B. 6-10km C. >10km

23. Yeroo gabaa ykn magaalaa dhaqattan gosti geejjibbaa isin fayyadamtan maali?

A. Geejjiba Aadaa B. Ba'aa namaa C. Konkolaataa

24. Daandii mijaawaa fi foyya'aa ta'ee qabaachuun tajaajila gama fayyaattin kennamu ni foyyeessa jattee ni yaadaa? A. Eyyeen ni foyyeesa B. Lakkii hin foyyeessuu

25. Fageenyi manni jireenyaa kessan iddoo tajaajila fayyaa argatan/bufata fayyaa irraa qabuu kilometiraan hangam ni t a'aa? A. <5km B. 6-10km C. >10km

26. Yeroo dhukubsataa bufata fayyaatti gessitan gosa gejjibba kan akkam fayyadamtuu?

A. Ba'aa human namaa B. Ambuulaansii C.Konkolaataa baasi D. Kan biro

27. Fageenyi iddoo mana jireenyaa keessani fi gabaa fayyadamtan jidduu jiruu kilometira meeqa ni ta'aa? A. <5km B. 6-10km C. >10km

28. Yeroo iddoo gabaa demtan gosa geejjibaa kam fayyadamtu?

A. Beeylada fe'inaa B. Ba'aa human namaa C. Konkolaataa

APPENDIX IIB:**AFGAAFFII**

Kaayyoon Ijoon Qoranno kana Dhibbaa Haanqinni karaadha rakkoo Hawaasa-dinagdee Ummata Aanaa Malka Ball'oo irratti qabu sakata'uun furmaata barbaachisuu adda baasuun qaama dhimmi kun ilaallattuuf dhiheesuun akka furmaata kennan taasisuudha. Kanaafu, namoonni Gaaffin isinif qophaa'ee hundi gaaffilee dhiyaatanif deebii sirri fi dhugaa jiruu akka deebistan kabajaan isin gaafanna. Sababni isaatis gaaffin sirrin isin har'a kennitan rakkoo ummata keenya furuuf gahee olaanaa qaba waan taheef. Dhumarratti qaamni gaaffilee dhiyaatan kana deebisuuf haayamamoo taatan hunda kabaja olaanaan isinif qabu ibsuun barbaada.

1. Daandiin Aanaa keessani kallatti dhiheenya ummannii daandi bonaa-gaannaaf qaban, dhiheessii geejjibaa, turtii yeroo geejjiba eguuf taasifamuu fi walingahinsaan walqabatee sadarkaa maalirra jira jattee yaada?
2. Anaa keenya keessatti Arradaale daandii bonaa-gannaatti dhihaatanifi hin dhiyaani kallatti gatti geejjibaa, turtii yeroo, oddeffannoof dhihoo ta'uu fi carraa isaan dhiheessi tajaajila hawaasaaf qaban akkamitti dorgomsifta, kamtuu carraa gaarii qaba?
3. Bu'aalee gurguddoo dhiheenya daandii bonaa-gannaatti argamani jiraachuun guddina hawasa-dinagdee naannoo keessanif qabu tarreessii?
4. Aanaa keessan keessaa Arraddaalee daandii bonaa-gannaa irraa fagaatani argaman heddun ni jiruu? Sababni isaa maali jattani yaadduu?
5. Tajaajilli geejjibaa akka aanaa keessani taasifamee yeroo gannaa fi bonaa garaa garummaa ni qabaa? Yoo garaa garummaa qabaatee sababa isaa tarreessi?
6. Midhaa daandii mijaawaa ta'ee fi bonaa-ganna tajaajiluu dhabuun guddina hawaasa-dinagdee aanaa keessani irratti qabuu adda baasi tarreesi?

Appendix III B: Cheklistii Daawwii

Kaayyoon ijoon checklistii kanaa faayidaa fi dhibbaa daandii bonaa gannaatti dhiyaatani argamuun guddina hawasa-dinagdee ummata naannichaa irratti qabuu sakata'uun fala barbaadudha.

Maqaa Aanaa_____

Maqaa Daawwataa _____

Guyyaa Daawwii _____

1. Gosa daandii fi dhiheenya naannoon filataman san daandii bonaa gannaaf qaban daawwachuu.

Daandii Bonaa		Daandii Bonaa-gannaa		Iddoolee daandii bonaa-gannaaf dhiheenya qaban	Iddoolee daandii bonaa-gannaaf dhiheenya hin qabnee	Haala geejjiba ummataa
Km	persentii	km	persentii			

2. Daandilee bonaa-gannaa yeroo amma motummaa fi hawaasaan hojetamaa jiran daawwachuu fi rakkoo haallii teessuma lafaa annichaa hojilee baballina daandii annichaa irratti fidaa jiruu daawwachuudha.