ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR ENVIRONMENT AND DEVELOPMENT STUDIES

SOCIOECONOMIC BENEFITS AND ENVIRONMENTAL CHALLENGES OF RURAL ROADS: A CASE STUDY ON UNIVERSAL RURAL ROAD ACCESS PROGRAM (URRAP) IN WALISO DISTRICT, OROMIA, ETHIOPIA.

BY

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Socioeconomic Benefits and Environmental Challenges of Rural Roads: A Case Study on Universal Rural Road Access Program (URRAP) in Waliso District, Oromia, Ethiopia.

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This is to certify that the thesis prepared by Tesfaye Debelo entitled: Socioeconomic benefits and Environmental Challenges of Rural Roads: A Case Study on Universal Rural Road Access Program (URRAP) In Waliso District, Oromia, Ethiopia. Submitted in Partial Fulfillment of the Requirements for the Degree of MA in Environment and Sustainable Development complies with the regulation of the University and meets the accepted standards with respect to originally and quality.

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Date: 22 August, 2019

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Abstract

Ethiopia has been undertaking numerous development programs and projects with the objective of taking a country to the middle-income countries in the near future. Universal Rural Road Access Program (URRAP) roads being constructed in WalisoWoreda are among the projects in Ethiopia. Aim of this thesis was to examine the perceptions of the community on the socioeconomic benefit of the construction and upgrading of the URRAP road in Waliso district, Oromia region, Ethiopia. To accomplish the objective, the researcher employed descriptive research design. Both primary and secondary data sources were used. In line with this both qualitative and quantitative data type was employed. The study finds that development of the road has had various changes to the social, economic and environmental situation of the households and investors/ institutions located along the road. This changes have been mostly positive especially in reference to increased job opportunities and greater markets but found to be negative in reference to the environment and in specific vegetation and Animal and communities livelihoods. The study also found significant local differences of opinion regarding the various socioeconomic benefit and environmental impacts of the roads. Differences in opinion at a community level were based on the age, level of education, Occupation, distance as well as sex of the sample respondent. This study shows that perception of community in the study area was further development of road net work by increasing control and management to minimize its impact on environment. The study recommends the use of environmental impact assessments to be used to a greater extent before the commencement of such projects and monitoring done during the progress of road development projects to reduce loss of Vegetation, Animal and distraction of ecosystem. Government and Policy maker had to be give series attention for sustainable development. Further research is also recommended in the regulations pertaining to road development and preparation and use of environmental impact assessment.

Keywords: *access, accessibility, road, impacts, road development, socioeconomic, transport, road sector development, agricultural production, social service, market access.*

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Acronyms and abbreviation

CSA	Central Statistics Agency
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
ERA	Ethiopian Road Authority
ERTTP	Ethiopian Road Travel and Transport
GoE	Government of Ethiopia
HHH	House Hold Head
MoE	Means try of Education
MoH	Means try of Health
RSDP	Road Sector Development Program
SDPRP	School Development Program To Reduce Poverty
UNESCO	United Nations Educational, Scientific and Cultural Organization
URRAP	Universal Rural Road Access Program
WB	World Bank

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Development is seen as an important component in any countries vision in the world, however it can have major impacts on the environment, social and economic life of the same countries. According to Schiefelbusch (2010), the environmental impact can be degrading soils and waterways, altering landscape and destroying biodiversity and habitat. 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.

Roads are viewed as a means of socioeconomic development because they link regions, places, people and economic activities. 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). Particularly rural roads are somewhat typical in terms of their capacity to literally pave the way for various investments in social infrastructure sectors such as schools, health services, and security services. Roads also facilitate access to new technologies as well as the marketing of surplus produce that contribute to increases in agricultural productivity. In case of the agriculture sector, better roads can significantly reduce the cost of inputs such as fertilizers, seeds, and extension services (Dercon et al 2008). 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).

Road infrastructure is one of the key components of economic development. Without good road development movement in an economy is critically impeded resulting to curtailing of the ferrying process of produce and other goods to the market, which in turn leads to transport bottlenecks that invariably hamper economic development. Roads have significant impacts on both nearby communities and the natural environment (World Bank, 2011). Burnett (2001) points out that there are numerous benefits to having proper road networks especially in the range of social and economic benefits while to a certain extent environmental benefits. As much as new roads bring development to previously underdeveloped areas, sometimes this development can cause significant effects on sensitive environments and the lifestyles of the people living near or using the road. Roads are viewed as a means of socioeconomic development because they link regions, places, people and economic activities. 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 artefacts that lead to negative ecological effects Patarasuk(2013).

Environmental effects of roads may include spatial and temporal dimensions and biotic and a biotic components. Effects can be local (along a road segment) or extensive (related to a large road network). Spatial effects of roads vary because species habitat requirements and ecosystem characteristics are diverse. Road construction may negatively affect species, habitats and physical and chemical characteristics at the site and landscape levels. Road effects could have direct and indirect impacts. There are those common during construction, those along a newly completed road, and those with long-term impacts Diagle (2010).

It is however expected in general that road development projects must be economically viable, socially acceptable and environmentally sound. Structured assessments of road developments can therefore help resource and land managers identify road-related benefits,

problems, environmental risks, economic and social opportunities and trade-offs among possible management actions. If road infrastructure is well managed, it transforms the quality of life of citizens through dynamic externalities that its development often generates (Sengupta et al., 2007:3). But when the system is deficient in terms of capacity or reliability, it can have an economic cost such as reduced or missed opportunities.

Road systems can also cause negative impacts on their surroundings. Roads can be badly designed, resulting in increased risks for road overtopping and flooding. Road networks do act as artificial structures in the landscape and can be major interventions in the local hydrology. Roads may connect catchments, obstruct or change natural (sub) surface flow patterns. The higher volume, concentrated and diverted flows cause higher chances for erosion, flooding or water logging to occur . (Belew, 2016)

According to ERA (2012), Ethiopia formulates many development policies to achieve Growth and Transformation plan. Road sector Development Policy (RSDP) and Ethiopian Rural Travel and Transport (sub-) Programme (ERTTP) were policies formulated for this sector. Government has launched a new Universal Rural Road Access subprogram after 2010 to work at woreda level and to address the rural accessibility and connectivity

1.2 Statements of the problem

One of the major causes of poverty which is dominant in developing countries like in Ethiopia is limited access and isolation attributable to poor road network distribution. Low emphasis given during the past time to the road development has been impacted upon the Country not to enjoy the benefits of development that could be as a result of improvements in the transport sector. One of the bottlenecks is that policy makers do not have sufficient knowledge about the importance the impact assessment whatever the project or project they formulate. In a basically agriculture economy, achieving fast (now ambitious) agricultural and industrial growth requires a range of further investment particularly in road transportation accompanied by impact assessment. Rural people in countries specifically in study area have many problems and rural transport interventions are meant to alleviate the following challenges:

- Poor communities are isolated due to lack of reliable road access.
- Most journeys are long, numerous and time consuming. They typically occur for production or subsistence needs, such as collecting water and fuel, crop production, harvesting and processing.
- Longer journeys are infrequent, though they may well be essential to livelihood strategies. Such journeys include visits to hospitals and clinics, marketing of produce, or searching for jobs.
- Poor people do not own motorized vehicles and can rarely secure access to them

Therefore, based on the above mentioned issues of rural locations, improving the access for the isolated poor paves the way for access to better markets, better services, and better economic opportunities such as better living standards. Thus, investing on improved and standardized ruralroads increases net returns to other worthy investments in both the farm and non-farm sectors. And such projects should be supported by scientific impact assessment studies to monitor and evaluate where they would achieve the expected outcomes.

In the various stages of Road construction introduces huge quantities of new material to the natural environment and disrupts the soil conditions and runoff behavior for hundreds of kilometers. Moreover, the process of road construction has faced with problem of road design, environmental and social impact assessment study application. Consequently, the road construction process has paramount impact on the environment. On the other sides, the materials used for road construction bring change on the chemical composition of the surrounding environment (through the toxicity of leach ate, runoff and groundwater) while the design and construction methods cause mechanical damage (erosion, soil disruption, watershed changes) World Bank (2007).

1.3 Objective of the study

1.3.1 General objective

The general objective of the study is to investigate the socioeconomic benefit and environmental challenges of Universal Rural Road Access Program (URRAP) roads in Waliso woreda.

1.3.2 Specific Objective

Along with general objective, the specific objectives are:

- Assess the socio-economic benefit that has come up as a result of URRAP
- Examine environmental problems associated with URRAP roads
- Compare the perception of local communities toward the URRAP roads.

1.4 Research question

1. What is the contribution of road development on the provision of social services?
2. What is the contribution of Road sector development to socio economic growth in the area?
3. What are the socioeconomic activities that have come up as a result of rural Roads?
4. Which environmental problems are associated with road development?
5. What is the attitude of local communities on development of rural road?

1.5 Significance of the study

The study is significant to the Ethiopia Road Authority which is charged with the development of the road system in Ethiopia in identifying the implication of the developments that have been made so far on the rural road development and this information can be used to come up with better policies and plans that will ensure that benefits are fully realized and negative effects of the road developments in Ethiopia future are minimized.

The National Environment protection Authority which is mandated to ensure that developments made in Ethiopia are in line with environmental concerns will use the findings of the study to consolidate their own assessments that were made before the beginning of the improvement project. Other researchers in the same study area will use the

findings of the study as reference points for further study in the areas as well as use the literature in the study to guide their own studies.

1.6 Scope of the Study

The study is limited to the rural road development, on URRAP road development in Wolisoworeda. The study took up a descriptive approach in research at understanding the socio-economic and environmental impacts that the improvement of the rural road has had on the community that live and work near. The study based its findings on the major centers along the road, targeting individuals, businesses and institutions that are located in that area..

1.7 Limitation of the Study

Like every researches, this study is not free from limitations. The study is limited to the rural road development, on URRAP road development in Woliso woreda. The study took up a descriptive approach in research at understanding the socio-economic and environmental impacts that the improvement of the rural road has had on the community that live and work near. The study based its findings on the major centers along the road, targeting individuals, businesses and institutions that are located in that area. It has conceptual/theoretical, methodological and knowledge limitations. Since, the issue of road is interdisciplinary; the concepts which have been used in this study were not exhaustively listed, used and/ or identified. For example, "non-URRAP roads" were not included in this study. Besides, sample size used in this study was not too enough which extends to the limitation of sampling techniques. The less attention given for quantitative data in the study might be another limitation of the paper. Directly or indirectly these limitations had association with the given time and budget

1.8 Organization of the Thesis

This research paper is organized in to five chapters. The first chapter contains background of the study, statement of the problem, significance of the study etc and chapter two tells us the review of related literature. Chapter three contains research methods, materials and procedures and chapter four contains data presentation and analysis. The last chapter briefly explains summaries, conclusions and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of Road development in Ethiopia

Government of Ethiopia (GoE) has shown greater commitment for road sector development by formulating the comprehensive Road Sector Development Programme (RSDP) in 1997 to address the constraints the road sector faced for long. The GoE embarked on the Universal Rural Road Access Program (URRAP) that sets out to connect all kebele by roads of a standard that provides all-weather, year round access, meets the needs of the rural communities, are affordable and maintainable. It mainly designed to improve rural mobility by reducing isolation for rural populations and to provide year round access to their markets, social and other services (ERA, 2013)

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 centre 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).

Regarding the road network expansion in Ethiopia, time serious data of Ethiopian Roads Authority (ERA) had been summarized and computed since 1950s. Accordingly, when the Imperial Highway Authority established in 1951(renamed Ethiopian Road Authority in 1974), the total road stock was 6,400 kms (0.30 per 1000 people), which reached 48,793 kms in 2010 (0.59 km per 1000 people). The mean distance of the network had decreased from 95.31 kms in 1951 to 70.93 km in 1970 (in the Imperial period); and to 32.20 kms in 1990 (in the Derg period); and finally to 11.27 kms in 2010 (in the EPRDF period). The proportion of areas more than 5 km from all weather roads in 1951was 95 percent, in 1970,

93 percent; in 1997, 79 percent and in 2010, 64 percent showing significant improvements in terms of road accessibility. These illustrate that the stock of road network in Ethiopia has been growing at encouraging higher pace. The budget allocated by FDRE for the construction of roads has exhibited a tenfold increase relative to the situation a decade ago. A recent government report on the implementation of the five year (2010-2015) Growth and Transformation Programme (GTP) indicates that, out of the total expenditure of the Government in 2010 and in 2011 the share of roads was 19.3 and 20.2 percent respectively. And out of the total expenditure in those sectors identified as pro-poor such as education, health, agriculture, water, and road, the share of roads was 29.24 and 30.33 percent (MoFED 2012). A recent report by W.T Consult PLC (2014) indicates that improvements in the road sector has helped to increase the accessibility of rural areas and their integration with the mainstream economy, as well as improve their access to health, education and other basic services (ERA 2014b).

Having quality road infrastructures is not a mere choice but a must for them to be competent enough in facilitating trade and investment in this era of globalization. Investors wish to deploy their capital where these facilities are available in good quality as the investors' main interest is to get good returns on their investment.

2.2 Theoretical Studies on Socioeconomic Benefits and Impacts by Road Development

Theory is a set of explanatory concepts that is useful for explaining a particular phenomenon, situation or activity. Since the research process is not divorced from theory, this study has employed theory of evaluation among others under which programme theory and change theory are used as tools for checking the road development impacts in the study areas. Programme theory is the issue of intervention by actors such as the government, private companies etc for the project formulation and implementation, whereas, change theory is about the impact created due to the interventions. Therefore, using theory as the research base has a paramount importance not to wander aimlessly. The four stages (inputs, outputs, outcomes and impacts) in the project cycle are about both change theory and programme (intervention) theories. Under each component, the impact pathway is growing

with the continuum of multiple change processes due to the intervention. According to Khandker et al (2010) evaluation approaches for development programme had evolved significantly over the past two decades aimed at helping policy makers decide whether the drawn projects are generating intended results; to promote responsibility and answerability in the allocation of resources across public programmes; and to fill the gaps in understanding what works or not, and how measured changes in the well-being of the community are attributable due to a particular project or policy intervention. Given the availability of sufficient data, QED can be performed after a programme has been implemented. Based on this, Edwards (2000) had outlined the guides in impact evaluation and noted that development impact assessment is designed to assess the impacts taking place at one point in time and space. In other words he pointed that it would have to be adapted to understand the impacts of many increments of development over time (temporally) or across an extensive area (spatially). In conclusion, as many literatures depicted, it can be generally understood that, in theory, roads facilitate rural development; new roads will improve transport; improved transport will solve access problems; improved access enhances living conditions and income earning opportunities. Improved living conditions and income saving opportunities foster further development. In the next chapter, the research design is formulated to check the impact theories discussed.

2.3 Empirical Studies on Socioeconomic Benefits and Impacts by Road Development

Infrastructure investments especially in rural road development enhances access to markets for inputs such as fertilizers and improved seeds and enables the farmers to sell their produce to nearby markets through a reduction in transport fare and time (Raballand et al, 2010). On the other hand, the lack of road network can lead to increased transaction cost in rural areas which results in limited market access for farmers (Key, de Janvry, and Sadoulet, 2000). In developing countries like Africa, transport cost constitutes more than half of the marketing costs (Fafchamps, Minten, and Eleni, 2005). Hence such roads are vital in improving agricultural productivity and raising living standards in poor rural areas (Gannon and Liu, 1997). Rural roads also allow farmers to achieve additional non-farm employment opportunities, leading to a rise in income and reduce rural poverty (Ali and

Pernia, 2003). Rural roads improve mobility which in turn facilitates access (Donnges, 1998). In China, Fan and ChanKang (2005) found that rural roads have benefit–cost ratios for national GDP that are about four times greater than the benefit–cost ratios for high-quality roads. As far as agricultural GDP is concerned, high-quality roads do not have a statistically significant impact while lowquality roads are not only significant but also generate 1.57 yuan of agricultural GDP for every yuan invested. Investment in low-quality roads also generates high returns in rural non-farm GDP. It also lift more urban as well as rural poor out of abject poverty than do high quality roads. Using state level data from India in 1970-93, Fan and Thorat (2000) found that government spending on rural roads have larger poverty reducing impacts per rupee spent than any other government investment and generate higher productivity growth. Similarly using household level data from Nepal, Jacoby (2000) showed that providing extensive roads access to markets would lead to substantial benefits on average especially to poor households. In three Africa countries-Burkina Faso, Uganda and Zambia, using village level data, Barwell (1996) showed that proximity to an active local urban center and to a main road, complemented by good rural road access, has a positive influence on the level of household income; and good road access broadens the economic opportunities available to rural people. In most African countries women and children shoulder most household transport burden and make significant contribution to the agricultural efforts of the household, including frequent trips to the field for cultivation activities. It significantly reduce the transport burden of women and children (Barwell, 1996). 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 programme like RSDP1 also contributed positively to the size and structure of the manufacturing sector in Ethiopia (Admasu et al; 2012). Bryceson, Bradbury and Bradbury (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. Most of the above empirical evidences and others on impact of roads on socio economic conditions are analysed using quasi-experimental methods and on wealth differentiated approaches. Attempts to delineate the road influence on the basis of distance from road, understand threshold type trends and map the influence zone on socio economic outcomes are scanty at best. Road influence zone analysis has been used to analyze influence of roads on ecological and environmental effects of road but not on socio economic conditions. This study is the first attempt to quantify and map out the influence zone of roads on socio economic outcomes.

2.4 Socioeconomic Impacts of Road Infrastructure Development

Long term development benefits are among others likely to result from road investment interventions and in the long run vice versa. This means transport development presupposes economic development and economic development gains further presupposes road infrastructure development in terms of quality, technology and expansion. The quality and efficiency of road development impacts on quality of the social system, and the continuity of economic activity which assist multidirectional growth by reducing transport costs and improve the environment by removing unsuitable roads (Wimpy 2005). However, road is not always useful in and of itself, but the benefit comes when it allows users better and better which impacts through accessibility to various opportunities.

As pointed above, impacts of a road infrastructure development can be seen in terms of the local impacts as well as in wider regional and national perspectives. The local impact is expected to be limited to the immediate neighborhoods of the highway. That is, to the towns and villages lying on both sides of the highway within an average distance of commonly 5 to 7 or 10 kms defining the influence zone (Vogel and Stephenson 2012:26; Sengupta et al 2007:10). The entire regional or national economic space beyond these neighborhoods should also benefit from the development through progressive spread effect. Such effect may be called the regional or national level impacts. Further, the impact may be direct or indirect in nature. It may be mentioned in this context that the indirect effects on income, output, employment, land rent and land price and poverty are realized not only in

the local economies in the proximity of the highway, but are also spread throughout the regional and the national economy by way of various linkage effects (Sengupta et al 2007:10). In line with this, this research focuses to assess the socioeconomic benefit and its environmental impacts of rural road in the case of URRAP road program in Woliso Woreda. Socioeconomic development in this study refers to a process of improving the quality of life and level of well-being or prosperity of a local community. Increased employment opportunities, increased household income, promoting access to services and emerging socioeconomic activities, improved local infrastructures such as roads, health, education and housing, are all facets of socioeconomic development (Edward, 2000).

2.5 Environmental impacts of road development

Infrastructure, in general, defines as a set of facilities through which goods and services are provided to the public. Its installations do not produce goods and services directly but provide inputs for all other socio-economic activities. Infrastructure is the stock of basic facilities and capital equipment needed for the functioning of a country or area; the term to refer collectively to the roads, bridges, rail lines, and similar public works that are required for an industrial economy, or a portion of it, to function.

Economic and social development of Ethiopia is significantly dependent on efficient road transport infrastructure which facilitates delivery of agricultural produce, merchandise and commodities to markets as well as easy access to basic services (health, schools, water, trading centers, and administrative offices etc.) by the people. The benefits from efficient road transport are felt at all levels of the society, directly or indirectly, such as to include improved national economy, social income, wealth and job creation, health care, public transport and general service delivery. Improvement of all these areas is desirable for the current national aspirations including inter-sectoral growth collaborations (Perkins, 2011).

*Success of Vision 2030 initiative is basically a function of the infrastructure, efficient road network being the key unit. Development of new roads and improvement of existing facilities have potential negative effects to the physical environment and social wellbeing of the communities as well as natural habitats. Among the potential negative impacts from road construction projects could include: environmental pollution from construction

activities, risk to health and safety of the residents and employees, demand of construction materials such as water, wood, gravel and hard stones; increased run off, socio-cultural changes including loss of farming land, changes of domestic and wild animals access to water point, demolition of structures, displacement of human settlement/commercial centers, interference with animal reserves and foot paths, increased traffic, increased ambient air pollution, increased potential for road accidents, increased surface run off, flooding and associated disasters among other impacts. Other anticipated impacts from road projects is disruption of natural habitats by interference of food chains and breeding sites and habitats, risks of fatal wildlife attack, displacement or extinction of species, destruction of land, vegetation, introduction of exotic species and possible interference with natural eco-balance.

2.6 Road development and environmental sustainability

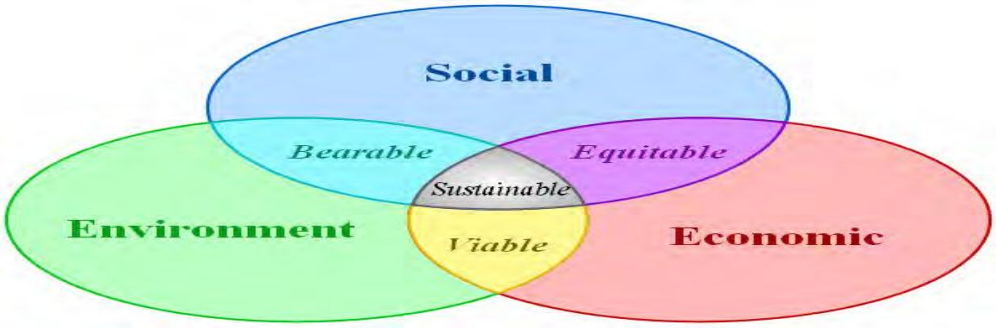
Over the decades, thinking about sustainability has focused on the interaction among its three key dimensions: economic, environmental, and social. The interlocking circles model of sustainability (Figure 2.1) points to the need to better integrate these three dimensions and to redress the balance between them in order to achieve desirable development outcomes.

From an operational standpoint, sustainable development has a wide range of interpretations. (Adams, 2006) argues that sustainability as a concept is holistic, attractive, elastic but imprecise, and it is precisely this looseness that explains the widespread acceptance of the idea of sustainable development, as it can be used to cover very divergent views. The sustainability model in Figure 2.1 assumes that trade-offs are always possible between the Environmental, social, and economic dimensions. In practice, development decisions by governments, donors, and development agencies, while allowing for trade-offs, put greater emphasis on the economic dimension (and in that dimension, growth generally takes precedence over distribution). A distinction is often drawn between strong sustainability (where such tradeoffs are not allowed or are restricted) and weak sustainability (where they are permissible).

There is, however, no agreed upon and universally accepted metric for defining the extent and level of sustainability achieved in development programs and projects. Sustainability and Sustainable development tend to be ethical concepts to express the desirability of good environmental and social outcomes from economic decision-making. As Adams noted, "often sustainable development ends up being development as usual, with a brief embarrassed Genuflection towards the desirability of sustainability.

The important matter of principle therefore becomes a victim of the desire to set targets and measure progress" (Adams, 2006). Nowhere is this more apparent than in the rhetoric of green roads or in the standardized environmental and social safeguard policies of development institutions that aim to minimize environmental and social harm from development projects, when the objective of such policies should be affirmative action to enhance environmental and social values. As a working proposition, sustainability can be optimized, taking into account indirect and long-term impacts. Sustainable development is the process for making progress towards sustainability (Litman et al., 2011).

Figure 2.1: Interaction of the three fundamental dimensions of suitability.



Source: (Adams, 2006)

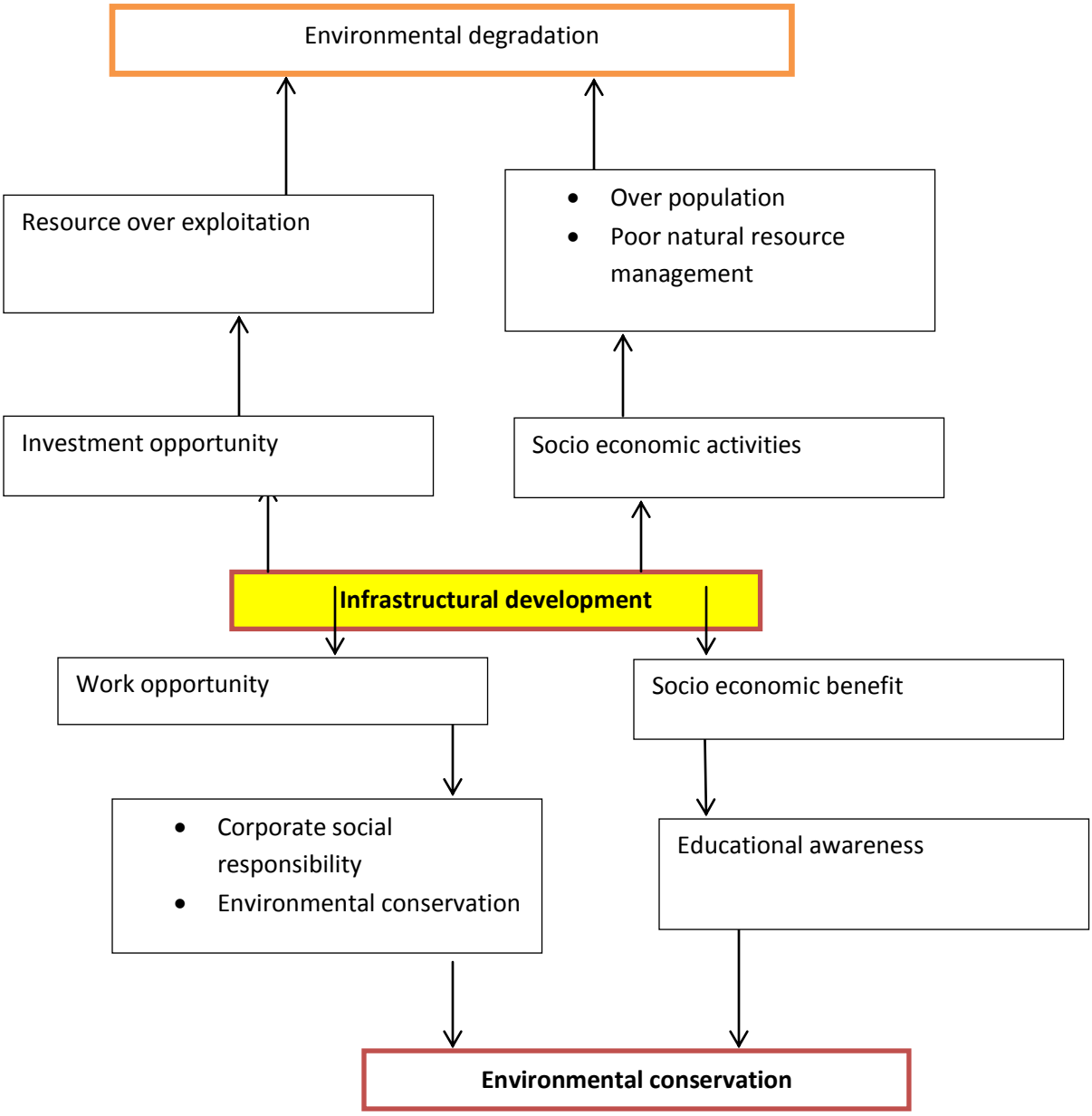
2.7 Conceptual framework

Infrastructure development has both negative and positive impacts on the bio physical and socio-economic aspects of the environment as shown in figure 2.2. Socio-economic benefits associated with these development includes; facilitation of trade due to increased competition and better and diverse products, improvement of movement of people and goods and increased employment opportunities. Investments in the road sector benefit the

whole society by providing access to territory and allowing poverty alleviation to take place. Consequently, the road network creates and stimulates positive synergy and enhances social cohesion and integration by giving citizens the same opportunities. Beneficiaries of infrastructure development appreciate the benefits and opportunities accrued by the improvement and thus readily take part in environmental conservation through raising awareness and pursuing environmental education so as to continue enjoying the infrastructure as well as protecting the environment.

Road transport has undeniable socio-economic benefits, which are often underestimated with respect to their negative impacts. Owing to the fact that road transport is affordable and easily accessible leads to overpopulation thus leading to overcrowding and congestion. Increase in population leads to increased housing development which may necessarily have not been planned for which may lead to poor waste management and inadequate provision of basic and social amenities .Increased investments may lead to resource over exploitation and depletion thus environmental degradation.

Figure 1.2 Conceptual model of infrastructural development



Source: Own illustration, 2019

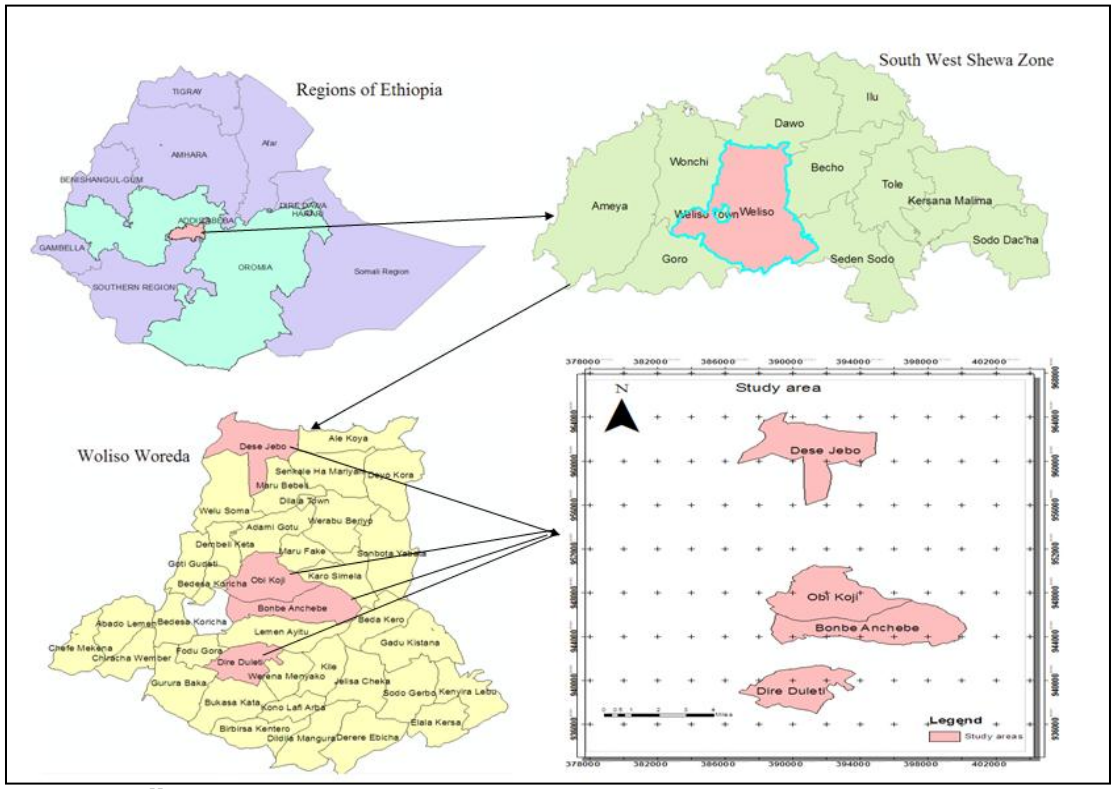
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Study area description

3.1.1 Location

The study will be conduct in Woliso district, southwest shewa of Oromia regional state, Ethiopia. It is bordered on the east by *Becho and Dawo* district, on the West by *Goro and Hemeya* district, on the South by *SedenSodo and Goro* district and on the North by the *Wenchi* district and *West Shewa Zone*. It is located at about 114 km southwest of Addis Ababa and situated between 8° 31` and 8° 36` N latitude and 37° 58` and 37° 36` E longitude.

Figure 2.1: Location map of the study area



Source: own illustration, 2019

3.1.2 Topography and soil

Information collected from District Agricultural and Natural Resource office indicated that the area is characterized by flat lands, moderately steep and rolling hills with valley bottoms. The altitude of the District ranges between 1800 to 2300 meters above sea level. The soil type of the study area is 70% red soil, 15% black soil and15% mixtures of black and red soils *(source:WalisoWoreda Agriculture and Natural Resource Office).*

3.1.3 Climate

Weliso District is divided into two agro-ecological zones locally called highland (30%) and midland(70%). The study area experiences alternating wet and dry season. The Mean annual rain fall in the area varies from around 900 to 1400mm and average annual temperature is about 24.50ºc.The highest rainfall recorded was from June to August*(source:WalisoWoreda Agriculture and Natural Resource Office).*

3.1.4 Population

According toWolisoworeda finance and economic office, (2008) populations and housing census, the Weliso District has a population of approximately 183,676 are found in 35 rural kebeles of the district. According to local sources, the population of the study area is rising continuously and putting huge pressure on the natural resources.

3.1.5 Agricultural activities

There are various sources of livelihood and income for local communities living in the woreda. These products serve either for house hold consumption or for cash income or for both. For example, vegetables, cattle, honey, and, tree are exclusively for income and field crops and livestock are mainly for house hold consumption. Certain community members also earn their daily income from petty trading and daily labor. Teff, barley, wheat and bean are the major field crops grown in the district. Cash crops such as banana, chat, tomato and onion are also grow in the area. Livestock like cattle, sheep, goat, donkey and apiculture are common in the area.

The major land use categories of the district are forest, agriculture, grazing land, and settlement. Agricultural expansion, settlement and overgrazing are the major threats to existing forest *(source: WalisoWoreda Agriculture and Natural Resource Office).*

3.1.6 Vegetation

Forests and vegetation are extremely decreased below (7%) due to increased human interference. At present the major types of natural vegetation found in the Woreda are ; high forest, woodland, shrub and bush*(source: Waliso Woreda Agriculture and Natural Resource Office).*

3.1.7 Infrastructure and social facilities

Transport: According to the data from Woliso woreda finance and economic office Woreda have the access of asphalt(32km), gravel(60km) and dry weather roads(288.5km) with different distance. Health institution; Woliso woreda have 9 health center and 31 health post. Education: In waoliso woreda 35 elementary school and 6 high school are give services according to Woliso Woreda finance and economic office data.

3.2 Research design and approach

This study was employed a survey research design. It was applied mixed research approach (both qualitative and quantitative). Quantitative was applied statistical tools such as Descriptive. On the other hand, it was qualitative approach because it can describe the using texts about environmental impact of URRAP. Furthermore, this study was used explanatory type of research design in order to explain the relationship environment and rural roads.

The need to take up a descriptive study is because of its ability to ensure complete description of the situation, making sure that there is minimum bias in the collection of data and to reduce errors in interpreting the data collected

3.3 Data sources and types

Primary data was collected directly from the field. Secondary data was also as the second hand information from government and non-government, annual and inventory reports, previous studies, and books. The researcher also use secondary sources as to have some background information about the issues related documents was analyzed. Documents like magazines, books, journals, and research papers, published and unpublished materials were examined not only to help to establish the review of related literature, but also to come up with sufficient information about the issue.

3.4 Sample size and sampling techniques

The study used simple random sampling techniques in order to select Kebeles those who have the access of URRAP road project.

To determine the sample size of the households (HH) from the selected kebeles the researcher applied a standard statistical approach for sample determination. Accordingly the following formula was used (Yamane, 1967).n= N/1+N (e^2) Where,

n=the desired sample size

N=the total population

e=the desired level of precision which is 0.05

Simple random sampling technique appeared appropriate since the lists of the units studied was accessible. In it, each member of the population under study had an equal chance of being selected from a list of the population. The sample size of the respondents was determined depending on the formula of Yamane (1967) because it is simplified in the case of finite population. The formula considers 95% of confidence, and 5% margin of error. Accordingly, 220 household heads were randomly selected.

3.5 Data collection methods

Data was collected through data collection instrument. As mentioned before, the data sources have been both primary and secondary sources. The following a brief description of data gathering instruments.

The investigators was conducted through questionnaire (open and close ended), interview (structured and unstructured), observation and focus group discussion for the collection of primary data sources. The following is a brief explanation how the primary data collected.

A. Through household survey: demographic and socio-economic data; nature, types and changes of pillar environmental issues; accessibility to URRAP roads; and feeling of household heads about URRAP roads along with pillar environmental issues.
B. Interview: In-depth interview was employed in collecting detailed data which are a complete picture of the objectives of this study from randomly selected respondents. The researchers selected those participants assuming that they have an experience on issues under study and can provide pertinent information.
C. Focus Group Discussion: So as to get detail information, FGD was employed with purposively selected discussants. The criteria to select members to FGD were: living areas, age, and distance from rural road. Accordingly, data were collected through FGD in all selected kebeles.
D. Observation: Observation was served as a complementary method to triangulate data collected through in-depth interviews and other methods. Accordingly, the researchers observed about road construction, road structure, deforested areas, and soil erosion as a result of URRAP road.

3.6 Data analysis and interpretation techniques

Quantitative analysis methods were used with the numeric data. Both descriptive and inferential statistics were calculated. The descriptive analysis emphasized on percentages, central tendencies and graphic presentations. Consequently, the interpretations that followed presentations were made through pie charts and frequency tables portraying numeric facts in finding chapter of the study. The Chi-square test of association was tested for looking at the prevailing associations among the interactional variables. The qualitative data were transcribed, categorized, schematized and interpreted based on their respective contents and themes. The meanings, words, symbols and argumentative texts formed basic premises in the structures of reporting the sub-titles, sections and chapters.

3.7 Ethical considerations

In conducting this study, an ethical considerations and safety measures were made. Before going to the field the letter from Addis Ababa University was taken and given to the districts‟ administrative and other required bodies. After going to the field and

contacted with respondents, the purposes and importance of the study was explained for the participants of the study and informed consent was obtained from each of them. Thus, participants were given the authority to permit or refuse in the collection of data in any form; full right was deserved to withdraw at any time: to change ideas or to edit recorded materials. Besides, the privacy of the participants was promoted, and they were informed that whatever information they provide will be kept confidential.

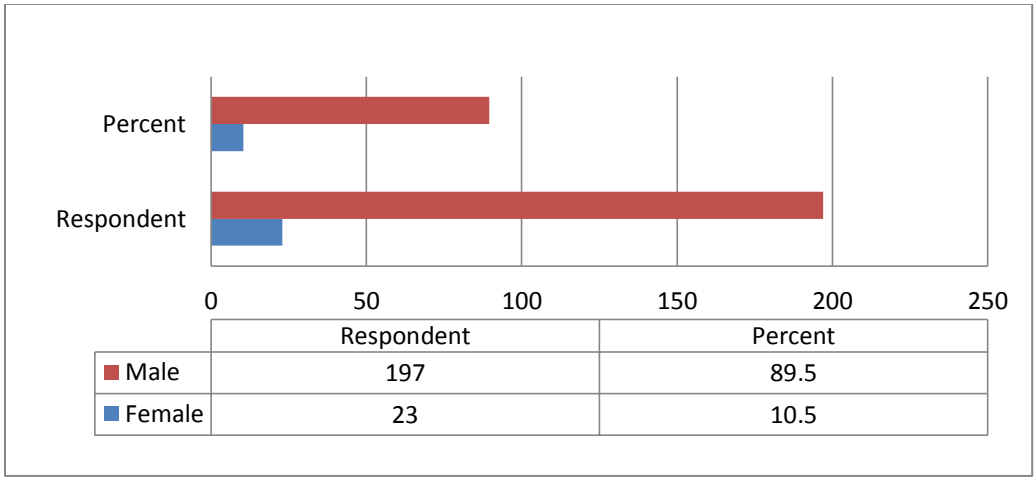
CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter deals with data analyses, interpretation and discussion of the study. The purpose of the study is to assess the socio economic benefits and environmental impacts of URRAP. The study has attempted to answer the research questions and has stated objectives that need to be addressed regarding the Socio-economic benefit and environmental impacts of URRAP roads in Waliso district. This part of the study includes the presentation of (a) demographic information of respondents (b) socio-economic benefit of URRAP road project;(c) URRAP road accessibility and social services;(d) URRAP roads and environmental sustainability from the perspective of local people; (e) possible effect of accessibility to URRAP roads on pillar environmental issues. The analysis and presentation from the data obtained from field survey through questionnaire and interview presented as follows.

4.1 Socio- Demographic characteristics of sample households

Under this section socio demographic characteristics of respondents which include sex, age, educational level and household size of respondents included. The data obtained from the field summarized as follows.

Figure 4.1: Distribution of sex of household heads



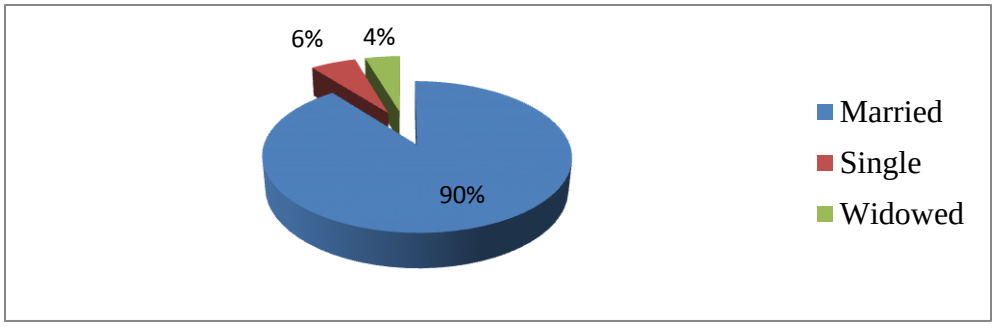
	Respondent	Percent
Male	197	89.5
Female	23	10.5

Source: Household survey, 2019

Figure 4: Deals with sex of respondents. Regarding sex of respondent 197of (89.5%) of the respondents were male sex category while 23(10.5%) of the respondents were female

sex category. From the above information it is possible to say the majority of the participants of the study were male sex category. This is because of the house holed head is male. So, this is the case for the majority of participant in this study were male.

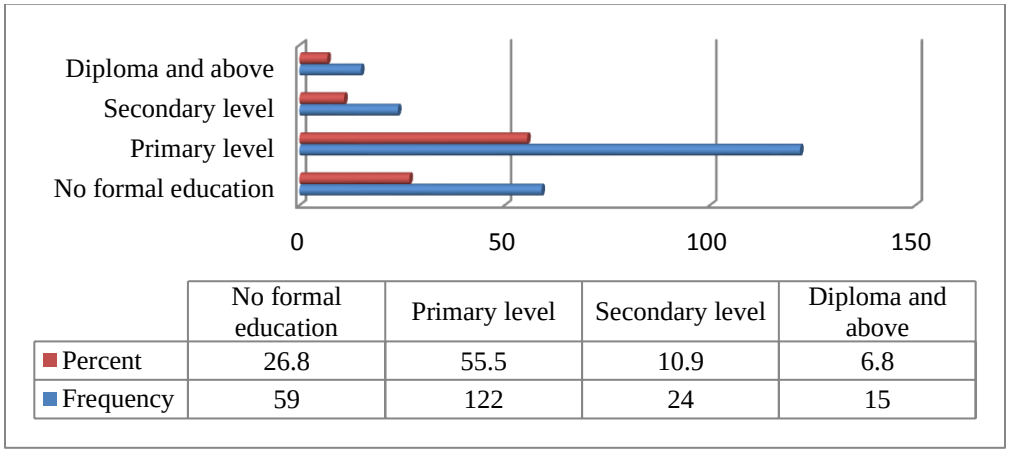
Figure 4.2: Distribution of marital status of household heads



Source: Household survey, 2019

Figure 5 depicted that distribution of marital status of respondents. Regarding to marital status, 90% of the respondents were married, 6% of the respondents were single and 4% of the respondents were widowed. From the above information, the majority who participated in this study were married in their marital status.

Figure 3 Figure 4.3: Distribution of educational level of respondents

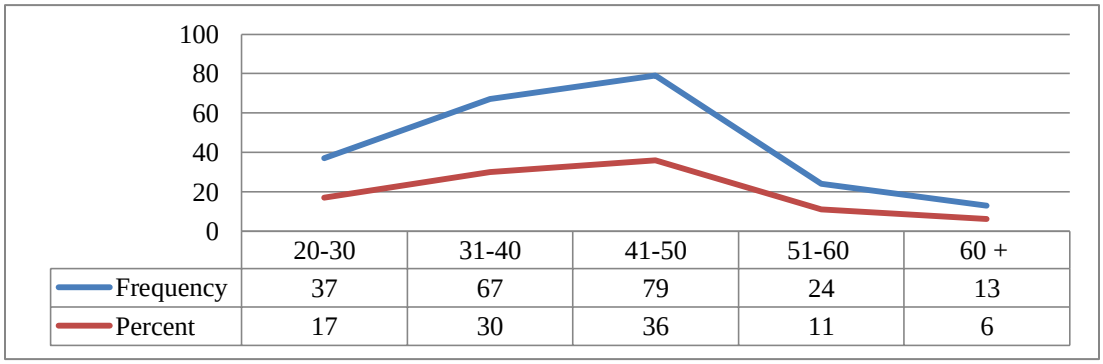


	No formal education	Primary level	Secondary level	Diploma and above
Percent	26.8	55.5	10.9	6.8
Frequency	59	122	24	15

Source: Household survey, 2019

Figure 6: With distribution of educational level of respondents. Concerning to this, 122(55.5%) of the respondents were primary school complete, 50(26.8%) of the respondents were attended no formal education, and 24(10.9) of the respondents were attended secondary school complete. Thus, the majority of respondents were primary school complete.

Figure 4.4: Distribution of age of respondents

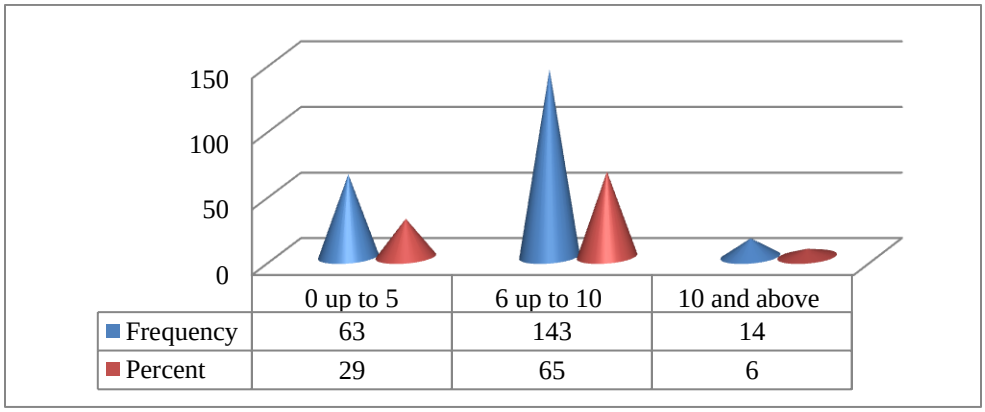


	20-30	31-40	41-50	51-60	60 +
Frequency	37	67	79	24	13
Percent	17	30	36	11	6

Source: Household survey, 2019

Figure 7.Showed that distribution of age of respondents. With regard to age of respondents, 79(36%) of the respondents were in the age group of 41-50 years old while 67(30%) of the respondents were in the age group of 31-40 years old. Thus, the majority of participant of the study were in the age group of 41-50 years old.

Figure 4 Figure 4.5: Distribution of Family Size of Respondents

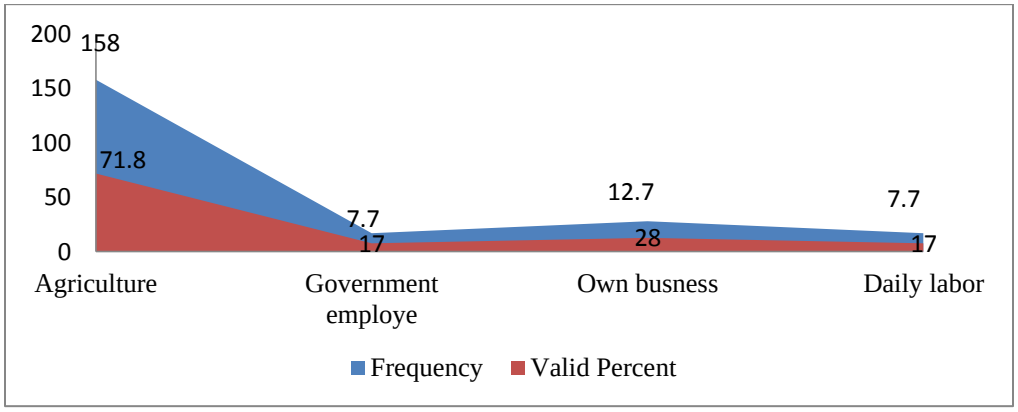


	0 up to 5	6 up to 10	10 and above
Frequency	63	143	14
Percent	29	65	6

Source: Household survey, 2019

Figure 8.Reveled that distribution of family size of respondents. In relation to family size of respondents, 143(65%) of the respondents have family size of 6 up to 10 while 63(29%) of the respondents have family size of 0 up to 5. From the above information it is possible to say the majority who participated in this study have 6 up to 10.

Figure 4.6: Distribution of occupation of respondents



Source: Household survey, 2019

Figure 8.Showed that distribution of occupation of respondents. In this regards,158(71.8%) of respondents engaged in agriculture, 28(12.7%) of the respondents were engaged in own business. From the above information it is possible to conclude that the majority who participated in this study were engaged in agriculture.

4.2 Accessibility of URRAP road

Access refers to the opportunity to use or the right to or the ability to reach some destiny. Accessibility is measured as the percentage of population having access to all weather roads. The benefits of having access to a road network is measured in terms of reductions in monetary costs or time needed by beneficiaries to access output markets or key public social services like health and education.

According to the interview administered with head of Walisowarada road authority majority of the kebele(91%) has got dry weather(URRAP) road and population of the woreda lives within 5km from URRAP road and time to access services with in a kebele

is not mor than one hour and to woreda town it takes in average 1-2hr. The development of road network high contribution for the development of the agricultural sector, education, health, investment and market access of the Woreda

Table 4.1 Distribution of types of road, transport access, often used transport means of respondents

Items	Category	Frequency	Percent	Mean	Stan Dev.
Types of road often use to access woreda town	Pavement road	12	5.5		
	Dry weather	178	80.9		
	Pathway	30	13.6		
	Total	220	100	2.22	0.745
Existence of transport access	Yes	220	100		
	Total	100	100	1	0
Means of transport	Horse cart	39	17.7		
	Bajaj	130	59.1	1.05	
	Vehicle	51	23.2		0.639
	Total	220	100		

Source: Field survey,2019

Table 1: Showed that distribution of types of road, transport access and often used transport means of the households. In this regards, 178(80.9%) of the respondents were used a type of road to access the woreda town was dry weather while 30(13.6) of the respondents were used used a type of road to access the woreda town was path way. From the above information the majority participant of the study used a type of road to access to woreda town was dry weather road. Moreover, the respondents were asked whether they do use transport access to woreda town services. With this regard 220(100%) of the respondents reported that as they use or have transport access to woreda town services.

On other side, the respondents were used various means of transport to travel outside their village. In this regards, (59.1%) of the respondents reported as they use Bajaj, while (17.7%) of the respondents reported as they use Hoarse cart and (23%) of respondent use

vehicle. From the above information it is possible to say the majority of respondents used Bajaj to travel outside their village.

4.3 Community perception on Socioeconomic benefit of Universal Rural Road Access Program(URRAP) road project.

Perception is closely related to attitudes. Perception is the process by which human being interpret and organize sensation to produce a meaningful experience of the world (Lindsay &Norman, 1977). Perception indicates the consciousness of local farmers toward the socio-economic benefit and environmental impact of URRAP road in the study area. The respondents (90%) were aware of the Socio-economic benefits of rural road had positive attitude towards those road. It may be due to low quality and poor management and control of government most of the respondents agreed that URRAP road increased soil erosion, air pollution and deforestation.

4.3.1 Independent samples t-test

According to Pallant (2010), an independent-samples t-test tells us whether there is a statistically significant difference in the mean scores for two different groups (e.g. male versus female) on the measured dependent variable(s). For instance, whether male and female differ significantly in terms of their knowledge and perception on the socio economic benefit and environmental impacts of URRAP road project. An independent-samples t-test is an appropriate technique to provide answers to research questions, for instance, "is there a significance difference in the mean scores for male and female in terms of their knowledge and perception on the benefit of URRAP road project and its environmental impact?

According to Pallant (2010), two variables, one categorical independent variable (e.g. males/females) and one continuous, dependent variable, are needed for the use of an independent samples t-test. Accordingly, the first two hypotheses of this study were tested using this technique. It should be recalled that in this study first, it was hypothesized that there is a significance difference between male and female on their knowledge and perception on the benefit of URRAP road project. Besides, in the second was hypothesized that the respondents differ significantly in terms of their occupation on

the benefit of URRAP road project, respectively. Table 2 presents the results of the independent-samples t-test for the three dependent variables of this study from the two independent variables (i.e. gender, and occupation).

Table 4.2An independent-samples t-test result used to measure knowledge and perception of respondents on benefit of URRAP road project

Dependent variables	Gender		Occupation	
	t-value	**p-value**	**t-value**	**p-value**
Agriculture production increased	9.755	.000	-2.26	0.025
Access to agriculture input increased	10.02	.000	-1.383	0.168
Income of house hold have been increased	0.684	0.495	-6.879	.000

Source: Output of t- test

Gender was used as a categorical independent variable (1=males and 0=females) to compare the knowledge and perception of sample respondents on the benefits of URRAP road project in terms of gender. Then, an independent-samples t-test was conducted for males and females.

There was significant difference in scores for males and females on the contribution of URRAP road project for increasing agricultural production (p=.000), increasing access to agricultural input (*p*=0.000). But, on the contribution of URRAP road project in increasing income of house hold male and female have no difference assumption or knowledge. Because p=0.684 which is greater than cut value of 0.05.

As shown under Table 4.2, 71.8% of the respondents were engaged in agricultural activities, whereas the rest were engaged in non-agricultural activities during the field survey. Hence, they were recorded into two "current occupation" groups (i.e. 1= Agriculture, 2=Non-agriculture). Then, an independent-samples t-test was conducted to compare the knowledge and perception of respondents on the benefit of URRAP road project based on their occupation.

There was a significant difference in scores for those who are engaged in agriculture and non-agricultural occupation on the contribution of URRAP road project increasing agricultural production p=0.025 , its contribution to increase income of household p=000 and there was no significance difference in contribution of URRAP road project increase access to agricultural input p=0.168. This result implies that, knowledge and awareness of respondent based on the two variables on the contribution of URRAP road project were significantly differ that means they have different perception on the benefit of URRAP road project.

4.3.1.1 ANOVA test results and discussions

According to Pallant (2010: 55), one-way ANOVA shows whether there are significant differences in the mean scores on the dependent variable across more than two groups (e.g. across three groups). Then, post-hoc tests can be used to find out where these differences lie. For the use of one-way ANOVA technique, one categorical independent variable with three or more distinct categories and one continuous dependent variable are needed.

In this study, it was hypothesized that the knowledge and perception of respondents will differ on the socioeconomic benefit of URRAP road project in terms of their age and education level. In other words age and education can be used as independent variables in this study. These variables were recoded to give three equal groups. For instance, respondents were divided into 3 age categories (i.e. 36 and younger, between 36 and 46, 46 and above), three year's lived group (i.e. 36 years and below, between 36-46 and 46 years and above). Likewise, the education level was recorded into three groups for ease of analyses (no education, primary education (1-8 grade) and secondary and above). Table 4.3 presents the descriptive statistics of these two independent variables.A one-way between-groups analysis of variance was conducted to explore the impact of age on increase in market access , increase in education access and increase in health care access due to URRAP road intervention, which was measured by four dependent variables. Subjects were divided into three groups according to their age (Group 1: 36 years and below; Group 2: 36 to 46 years; Group 3: 46 years and above). These three age groups are named as young, middle and old aged groups.

Table 4.3. Community knowledge and perception of the benefit of URRAP road project

Dependent variables	Age		Education level	
	F-value	P-value	F-value	P-value
Market access increased	0.221	0.802	32.91	.000
Education Access have increased	1.224	0.296	6.845	0.001
Health care access increased	1.478	0.23	19.959	.000

There was a statistically significant difference at $p<0.05$ level in mean scores for the three age groups on the benefit of URRAP road project implementation. The result from ANOVA table shows, increase in market access p=0.820, Education access increased p= 0.296 and health care access increased p=0.230. This implies that the knowledge or perception of three age group of sample respondents (young, middle and old) aged group were not significant, that means there perception is relatively similar.

A one-way ANOVA between-groups analysis of variance was conducted to explore the impact of education level on knowledge and perception of respondents on the expropriation process, which was measured by three dependent variables. Subjects were divided into three groups according to their education level (Group 1: no education; Group 2: primary education (grade 1-8); Group 3: secondary and above).

Table 4.3 indicated that the mean score for the no education group (p=0.000), mean score for the primary education group(0.001) and mean score for the secondary and above group(0.000). This implies that in all groups of level of education they have aware or accepted the benefit of URRAP road in terms of increasing market access, increasing health care access and increasing educational access.

4.4 Contribution of Road to Agriculture production

Agriculture is the major sector for Waliso population. Farmers produce different types of crops both for consumption and sell. URRAP road development in the study has high contribution for marketing of agricultural products. Farmers carry saleable agricultural products to distant markets and transport agricultural inputs to farm site using vehicles.

As indicated in table 4.4 out of the total respondent 154(70%) responded that roads has high contribution on the quantity of agricultural production, 50(22.7%) moderate contribution, and 9(4.1%) responded very high contribution. From this it is clear that road has great contribution on agricultural production.

Table 4.4 Contribution of road on agricultural production

Variable	Rasponce	Frequency	Percent
Level of contribution of URRAP road in agriculture	very high	9	4.1
	High	154	70
	Moderate	50	22.7
	Low	7	3.2
	Total	220	100

Source: Field survey, 2019

According to the interview made with head of agriculture bureau of Walisoworeda, road has high contribution on the quantity of agriculture production. Before the construction of URRAP road, the woreda have no chance to export agricultural products rather they use and produce only for consumption purpose. Before there are low production of vegetable and fruit (Onion, Tomato, Chat, and the like). But after the construction of road the farmers began to produce agricultural products in large quantity including for export purpose.

4.5 Contribution of road on improvement of social services

4.5.1 Contribution of road to Education services

As Ethiopia's SDPRP(school development program to reduce poverty) states, the education sector is expected to help reduce poverty by universalizing primary education and by producing a workforce capable of filling jobs requiring skilled labor. To realize this schools are being opened in all corners of the country. In the study area, there is also an attempt made to the realization of the intended plan by the MOE.

Table 4.5.Accessibility of schools

Variable	Response	Frequency	Percent
School distance from home	<1km	60	27.3
	1-3km	111	50.5
	3-5km	49	22.3
	Total	220	100
Education access	Strongly agree	143	65
	Agree	65	29.5
	Disagree	12	5.5
	Total	220	100

Source: Field survey 2019

As indicated in table 5. Item 1, out of the total number of respondents 27.3% replied that the distance of school from their home is within 1 km, 50.5% replied the school distance from their home is 1-3 km and the remaining 22.3% responded that they walk 3-5 km to reach school. From the data it is clear that majority of the respondents walk 1-3kilometer distance (approximately less than one hour) to reach school.

According to the Head of WalisoWoreda Educational bureau majority of schools are located near the road and thus majority of the students walk not more than three kilometer to reach the nearest school. Thus, the dropout rate at the primary level is very low because of distance of the school. Additionally, Road accessibility and closeness of household from woreda headquarters may have positive effect on school enrollment of children. Because of distance to school, lack of better information flow, and knowledge

of the importance of education households couldn't enroll their child. Road accessibility and distance of households from woreda headquarters may also influence children school enrollment indirectly through income (Bhata, 2004). Therefore, distance to school from home has effect on school enrollment because it is difficult for the children to walk to school if the school is too far.

On another way, road has high contribution on the education access through the attraction of other services (cafeterias, shops, etc) for teachers and students, provision of educational materials to schools, transport services to students and teachers and from schools as required. Table 5. Item 2, Shows that out of the total number of respondents 65% responded that strongly agree on the contribution of road to school development, 29.5% agree, and 5.5% disagree. From this it is clear that road has high contribution on improvement school development.

Thus, the households with good road access had less walking distance to school than the households with poor road access and they have also the opportunity to get better education services than those less accessible to road. This indicates that the construction of road nearby home brings education services better and easier for parents to enroll their children to school.

The cross tabulation on relationship between home distance from the road and school distance from the home. Hence, in order to examine the association between home distance from the road and school distance from the home Pearson Chi-Square test was used (Table 6 presents the result).

Table 4.6.Relationship between home distance from the road and school

	Value	Df	Asymp.Sig.2-sided)
Home distance from the road and school distance from home	21.216	4	.000

Examination of the results on the association between home distance from road and school distance from home revealed to be strongly significant, x2(4df.)= 21.216, sig.000. This shows that there was a significant association between home distance from road and

school distance from home. Therefore, it is clear that road accessibility contributes to school accessibility.

4.5.1 Contribution of road on Health

It is obvious that infrastructure facilities may influence the social services given in a certain area among which health service is not exceptional. Under this topic the benefit of road network on health services is examined.

As indicated in table 7. Item 1, out of the total number of respondents 27.3% replied that the distance of health post from their home is within 1 km, 50.5% replied the health post distance from their home is 1-3 km and the remaining 22.3% responded that they walk 3-5 km to reach health post. From the data it is clear that majority of the respondents walk 1-3kilometer distance (approximately less than one hour) to health post.

According to the head of Walisoworeda health bureau there are 10 health center and 32 health posts. Health post coverage in the study area was around 91.42%. This is almost fulfill the government's policy that focuses a four-tier health service system which comprises of a primary health care unit (a network of a health center and five health posts), the hospital, regional hospital and specialized referral hospital (MoH,1993).

Table 4.7.Health services

		Frequency	Percent
Health post distance from home	<1km	60	27.3
	1-3km	111	50.5
	3-5km	49	22.3
	Total	220	100
Health facility access increased	Strongly agree	147	66.8
	Agree	72	32.7
	Disagree	1	0.5
	Total	220	100

Source: field survey 2019

Road has vital contribution on improvement of health situation of the people especially to the rural people because the presence of road make things suitable i.e. it is possible to

give ambulance service during emergency case, to provide medicines at right time at desired place and people with good road access are motivated to go to health institution while poor road access people fear a long distance walk without transport services and they prefer to be at their home when they are sick. Moreover, mothers give birth at health posts. Therefore, road development helped in the reduction of maternal mortality, infant and child mortality and it bring improvement to the health of the people in general.

FGD respondents also explained that before the construction of the URRAP road they travel long distance to get health service and they pay high tariff for transportation. Mothers also give birth at home without the help of health workers. Following the construction of road health posts were constructed in most of the rural Kebeles and as a result farmers get primary health care such as vaccination, delivery, and other health services from the nearby health posts. Moreover, mothers give birth at health posts. Therefore, road development helped in the reduction of maternal mortality, infant and child mortality and it bring improvement to the health of the people in general.In order to examine the relationship between distance to the nearest health center and road

Examination of results on the association between home distances from road and health institution distance from home, x2(4df) = 21.216, sig.000. This shows there was a significant association between home distance from road and health institution distance from home. Therefore, it is clear that road accessibility brings adequacy of health institution for the society.

Table 4.8.Relationship between home distance from the road and health post

	Value	Df	Asymp.Sig.(2-sided)
Home distance from the road and sch distance from home	21.216	4	.000

4.5.2 Contribution of road on Market

Monahar Lal (1989) found that the development of road network has resulted in faster and more equitable distribution of inputs as well as marketing of products. Investment in road sector brings market transparency and widespread access to market information

which creates a competitive marketing system and also it helps the market integration among the regions (Kessides, 1993)

As indicated in table 9. Item 1 out of the total number of respondents 28.2% of the respondents replied that the distance of their home and the nearest market center is < 5km, 43.2% is between5km and 10km, and the remaining 28.6% more than 10km. From this it is clear that majority of the respondents walk five kilometer up to ten kilometers (approximately one hour) to reach market centers.

Table 4.9.Respondents home distance from market and means of transport used

Variable	Response	Frequency	Percent
Distance to market	<5km	62	28.2
	5-10km	95	43.2
	>10km	63	28.6
	Total	220	100
Means of transportation	Horse cart	39	17.7
	Bajaj	130	59.1
	Vehicle	51	23.2
	Total	220	100

Source: field survey data 2019

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 systematically for the market, while those with poor market access are forced to produce for domestic consumption.

Because of improvement in URRAP road development in the study area, majority of the households get advantage of using transport and save their time and challenges on road when they take their products to market and back to home.

Cross tabulation in table 10.shows the relationship between home distance from the road and market distance. In order to examine the association between home distance from road and market centers Pearson Chi-Square test analysis was used.

Table 4.10Relationship between home distance from the road and health post

	Value	Df	Asymp.Sig. (2-sided)
Home distance from the road and market distance from home	4.4	4	.000

Examination of results on the association between home distances from road and market distance from home, x2(4df) = 4.400, sig.000 (table 4.10). This shows there was strong significant association between home distance from road and market distance from home. This implies that a household with good road access has good market access and they have the opportunity to buy inputs and to sell their out puts at reasonable price with low transportation price.

4.6 Contribution of road on creating job opportunity

The construction or the upgrading of roads can facilitate the gaining of off-farm employment (Bravo, 2002; Grootaert, 2002; World Bank, 1996). Roads allow rural residents access to the urban centers where the majority of off-farm employment exist but also have the potential to create off-farm employment within the rural communities. Off-farm employment can be created with the construction of the road itself and any corresponding infrastructure.

Rural transformations have turned the sites under study into very dynamic rural areas that have changed tremendously in terms of local economic profile. These dynamics have triggered a variety of mobility flows and rural-city connections. FGD Saied the introduction of cash crops has turned the sites into attractive locations for investment. Several sites attract traders, businessmen and women who want to invest in land and create additional labor opportunities for local people. In turn, these rural people have a better income through which they can afford to look for additional livelihood opportunities in towns, cities or other rural areas. Others start a variety of productive businesses in the community; they open small shops, Bajaj, become motorbike and a taxi driver. This is why increasing local business opportunities can be observed in the different regions under study.

Table 11: Showed that distribution of benefits of URRAP projects. The first item deals with URRAP project increases access to transport. In this regards, the respondents reported 172(78.2%) said strongly agreed, while 48(21.8) of the respondents said disagreed.

Table 11. Distribution of negative impact of road project.

Variables	Response	Frequency	Percent	Mean	Std.dev.
	Strongly agree	86	39.1		
	Agree	84	38.2		
	Un decide	22	10		
	Disagree	28	12.7		
Increases soil erosion	Total	220	100	1.96	1.002
	Strongly agree	85	38.6		
	Agree	84	38.2		
	Un decide	23	10.5		
	Disagree	28	12.7		
Increase deforestation	Total	220	100	1.97	1.002
	Agree	168	76.4		
	Un decide	1	0.5		
	Disagree	51	23.2		
Increase air pollution	Total	220	100	2.47	0.846
	Strongly agree	40	18.2		
	Agree	142	64.5		
	Un decide	15	6.8		
	Disagree	23	10.5		
Increase resettlement	Total	220	100	2.1	0.814
	Agree	96	43.6		
	Un decide	73	33.2		
	Disagree	51	23.2		
Risk to health and safety	Total	220	100	2.8	0.793
	Strongly agree	15	6.8		
	Agree	154	70		
	Un decide	23	10.5		
	Disagree	28	12.7		
Land use change	Total	220	100	2.29	0.775

Source: Field survey, 2019

The calculated mean was 1.78which was near to coded as 2 agreed and the standard deviation was 1.22 which was concentrated near to the calculated mean. This implies that URRAP project increased transport access for respondents. The second item was URRAP road projects decreased travel time . Concerning to this, 172(78.8) of the respondents said agreed while 39(17.7%) of the respondents said agreed. The calculated mean wase 1.68 which was near to code 2 agree and the standard deviation 1.17 was concentrated near to calculated mean. This implies that URRAP project create the opportunity of enjoying decreased travel time.

The third item was URRAP project makes increasing market access. Regarding to this 119(99.6%) of respondents said agreed while 1(0.5%) of the respondent said disagreed. The calculated mean was 1.44 which was near code 1 of strongly agree and the standard deviation was 0.524 which was concentrated near the calculated mean. This implies that URRAP project create the opportunity of enjoying increasing of market access.

The fourth item was URRAP project increases education access. With this regards, 108(94.5%) of the respondents said agreed, while12 (5.5%) of the respondents said disagreed. The calculated mean was 1.46 which was near to code 1 of strongly agree and the standard deviation was .760 which concentrated near to calculated mean. This implies that URRAP road project created access to education of the respondents.

The fifth item was URRAP road projects increased health care access. In this regards, 159(99.5%) of the respondents reported that agreed with URRAP road projects cause increasing health care access while 1(0.5%) of the respondents said disagreed. The calculated mean was 1.34 which near to coded 1 of strongly agreed and the standard deviation was 0.503 which was concentrated far from the calculated mean. This implies that URRAP road project increased access to agriculture production. In this regards, 206(93.7%) of the respondents said agreed, while 13(5.92%) of the respondents said un decide. The calculated mean was 1.55 which was near to code 2 of agree, while the standard deviation was 0.628 which was concentrated far from the mean. This implies that agriculture production access was increased due to URRAP projects.

The seventh item was URRAP road project can increase access to agriculture input. Concerns to this, 181(82.3) of the respondent said agreed, While 38(17.3%) of the respondent said undecided. The calculated mean was 2.01 which was near to 2 which was the code of agree and the standard deviation was 0.604 which was contributed near to calculated mean. This implies that URRAP road project increased access to agriculture input.

The Eightieth was URRAP project increase income of the households. Regarding to this, 171(77.7%) of the respondent said agreed, while 49(22%) of the respondents said disagreed. The calculated mean was 2.2 which was near to code 2 of agree and the standard deviation was 1.1 which was concentrated near to calculated mean. This implies that URRAP project increase the income of the households.

The Ninth item was URRAP project created new job opportunity. In this regards, 172(78.2%) of the respondents said that agreed, while 48(21.8%) of the respondents said that disagreed. The calculated mean was2.04 which was near to code 2 of agree while the standard deviation was 1.13 which was concentrated near to the calculated mean. This implies that URRAP project created job opportunity.

The Tenth item was URRAP projects increased access to government office. Concerning to this 110(95.5%) of the respondents said agreed while 10(4.5%) of the respondents said disagreed. The calculated mean was 1.92 which was near to 2 coded as agree and standard deviation was 0.591 which was concentrated near the calculated mean. This implies that URRAP project has been help to access government office.

4.7 Community Perception on Environmental impacts of URRAP road development

4.7.1 ANOVA test results and discussions

According to Pallant (2010: 55), one-way ANOVA shows whether there are significant differences in the mean scores on the dependent variable across more than two groups (e.g. across three groups). Then, post-hoc tests can be used to find out where these differences lie. For the use of one-way ANOVA technique, one categorical independent

variable with three or more distinct categories and one continuous dependent variable are needed.

In this study, it was hypothesized that the knowledge and perception of respondents will differ on the environmental impact of URRAP road project in terms of their age and education level. In other words age and education can be used as independent variables in this study. These variables were recoded to give three equal groups. For instance, respondents were divided into 3 age categories (i.e. 36 and younger, between 36 and 46, 46 and above), three year's lived group (i.e. 36 years and below, between 36-46 and 46 years and above). Likewise, the education level was recoded into three groups for ease of analyses (no education, primary education (1-8 grade) and secondary and above). Table 4.3 presents the descriptive statistics of these two independent variables.

There was a statistically significant difference at $p<0.05$ level in mean scores for the three age groups on the environmental impact of URRAP road project implementation. The result from ANOVA table shows, increase in soil erosion p=0.381, increase deforestation p= 0.441, increase dust pollution p=0.345, and increase land degradation p=1.176. This implies that the knowledge or perception of three age group of sample respondents (young, middle and old) aged group were not significant, that means there perception is relatively similar.

Table 12.Community knowledge and perception on the environmental impact of URRAP road project

Variables	Age		Education level	
	F-value	p-value	F-value	p-value
Soil erosion	0.969	0.381	43.494	.000
Deforestation	0.821	0.441	13.178	.000
Dust problem	1.071	0.345	36.599	.000
Land degradation	1.176	0.31	9.727	.000

Table 12: shows that mean scores for the level of education on the variable soil erosion (p=0.000), mean scores for variable deforestation (p=0.000), mean scores for the variable

dust problem (p=0.000) and mean scores for variable land degradation (p=0.000). The result of all variables are <0.05 or less than the cut points of Tukey HSD test. This implies that there is significant difference in education level on understanding the environmental impacts of URRAP road project. These means all the local communities have no equal knowledge/ understanding about the environmental impact of URRAP road project.

4.8 Environmental Problems associated with road development

There have been debate and struggle about the definition of environmental sustainability among the scholars for the past decades (Moreli, 2011). The process of prioritization from social, economic, and environment is different from country to country. Ethiopia has also been expanding various programs for the purpose of social and economic sustainability including URRAP. However, majority of the respondents of this study (77.3%) believe that the concern had not been given for environmental sustainability, while URRAP road construction have been expanding and implementing in a country in general and in rural areas in particular. Accordingly, this subsection deals with the negative impact of URRAP on environmental sustainability from the households perspectives. In case of pillar environmental issues like deforestation, soil erosion, dust problem, decrease agricultural land, and resettlement have been selected. Likely, the impacts of un-surfaced roads on ecological resources include direct habitat loss, facilitated invasion of weeds, pests and pathogens many of which are not indigenous as well as a variety of edge effects.

FGD respondents of the study area attached environmental sustainability with mercy, altruism, peace, development, stability, wisdom, healthy, and civilization. They argued that in one way or another, environmental sustainability is the causes and consequences of these human life basic values. According to waliso woreda head of Environmental protection, Forest and climate change authority environmental sustainability is a major problem in woreda and they give attention and work on it to overcome the problem. If this problem is not solved earlier, the study area as well as country will wait for destruction, disorganization, instability, chaos, and loss of self-identity. These problems are not only concerned with environmental elements, but it connected with our life and

socio-economic satisfaction. This implies that environmental sustainability is not a concern of some person or few groups but it is a concern of all people over the world.

Table 13: Illustrated that environmental impact of URRAP project is the first environmental impact is increasing soil erosion. In this regards, 170(67.3%) of the respondents said increased soil erosion, while 28(12.7%) of the respondents said URRAP project increases soil erosion. The calculated mean was 1.96 which was near to code 2 agreed and the standard devotion was 1.00 which was concentrated near to calculated mean. This implies the URRAP project increased soil erosion.

The second environmental impact is increasing deforestation. In this regard, 169(76.8%) of the respondents said agreed, while 28(12.7%) of the respondents disagreed. The calculated mean was 1.97which was near to 2coded agreed and standard deviation was 1.00 which was concentrated near to a mean. This implies that URRAP project is increasing deforestation.

The third environmental impact is increasing air pollution. In this regards, 168(76.4%) of the respondents reported agree, while 51(23.2) of the respondents reported disagreed. The calculated mean was 2.47 which were near to 2 coded as agreed and the standard deviation was .846 which was concentrated near to the mean. This implies that URRAP project is increasing air pollution. FGD respondents Saied that URRAP road project causes dust problem on people and plants near the edge of the road. This dust causes risk to health and safety spatially for children.

The fourth item of environmental impact of URRAP project was increasing resettlement. In this regards, 182(82.7%) of the respondents said agree while 23(10.5) of the respondents said disagree. The calculated mean was 2.10 which is near to 2 code as agree, while standard dilation was .814 which was concentrated near to mean. This implies that URRAP project increase resettlement. The fifth item was land use change, Concerning to this, 169(76.8%) of the respondents said agreed, while 28(12.7%) of the respondents said disagree. The calculated mean was concentrated near to mean. This implies that URRAP project causes for land use change

Table 4.13.Environmental impact of URRAP projects

Variable	Response	Frequency	Percent	Mean	Std.dv
	Strongly agree	86	39.1		
	Agree	84	38.2		
	Un decide	22	10		
	Disagree	28	12.7		
Increases soil erosion	Total	220	100	1.96	1.002
	Strongly agree	85	38.6		
	Agree	84	38.2		
	Un decide	23	10.5		
	Disagree	28	12.7		
Increase deforestation	Total	220	100	1.97	1.002
	Agree	168	76.4		
	Un decide	1	0.5		
	Disagree	51	23.2		
Increase air pollution	Total	220	100	2.47	0.846
	Strongly agree	40	18.2		
	Agree	142	64.5		
	Un decide	15	6.8		
	Disagree	23	10.5		
Increase resettlement	Total	220	100	2.1	0.814
	Strongly agree	15	6.8		
	Agree	154	70		
	Un decide	23	10.5		
	Disagree	28	12.7		
Land use change	Total	220	100	2.29	0.775

4.8.1 Dust pollution:

Dust can be defined as the fine material released from the road surface under the wheels of moving vehicles. Silt-sized particles (5 - 75 μm) are the predominant elements in dust. Dust produces several negative effects such as safety problems, health complications, air pollution, economic effects on farming and agriculture, discomfort and vehicle damage. The major vehicle pollution in the study area is dust pollution. Dust generation is a function of aerodynamic shape and travel speed of vehicles, surfacing material properties and moist content. According to FGD respondents said that peoples near the road affected by dust. These dust particles mainly affect children's and crops and plants near the road.

Vehicles sound and chemical pollution forces wild animals to live the area. They need an area free from disturbances. They also require to be kept hidden. Thus, the sound of vehicles (classic or other related sounds) has been acting against the principles of these animals. According to FGD respondent from Waliso woreda, "wild animals run away from the sounds of human and vehicles during and after the construction of rural roads." Likely, Karani (2007) also found that road construction and upgrading and vehicles pollution have a negative impact on bird species, reptile species, amphibian species, mammal species, and butterfly species. The effects of new road include pollution from moving vehicles, chemical spills from trucks, displacement wild animal species due to construction of new roads, disturbance of hydrology and the ecosystem among others.

4.8.2 Resettlement and Land use change

Along with the enlargement of rural road, there is expansion of houses either by kebele community or externals. Data from FGDs discussants implies that along with the construction of road, there were people who moved to the edge or nearby to the road line by leaving their original place. Thus, they lived their former place and found another place for their house and other activities. This might have been directly or indirectly impacting farm land, vegetation and animals. As the walisowareda head of Agricultural bureau said "After URRAP road constructed, many farmers move to nearby the road because to reduce travel time and cost to get different social services. Road in the study area helps farmers to use modern technology, thus before majority of the farmer produce food crop but know majority of farmer produce cash crop specially(Onion, Chat, Tomato and Potato) and they easily sell their product by using vehicles/Bajaj.

Table 13: above showed that from the total respondent 40(18.2%) strongly agree on URRAP road development in the study area increases resettlement, 142(64.5%) agree and 15(6.8%) undecided and 23(10.5%) disagree. This implies URRAP road development in the study area had high contribution in resettlement or they lived their former place and found another place for their house and other activities.4.8.3 Impact of road development on aspects of environment

Table 4.14.Impact of road development on plant, soil and Animal

Variable	Response	Frequency	Percent
Plant	No	77	35
	Yes	143	65
	Total	220	100
Soil	No	70	31.8
	Yes	150	68.2
	Total	220	100
Animal	No	107	48.6
	Yes	113	51.4
	Total	220	100

Source: field survey,2019

Table 14. Shows in terms of the impact the road development had on different aspects of the environment, the most negatively affected aspect was the soil as indicated by 68.2% of the household respondents in table 4.15 who said the road's development had a negative effect. Plant was also highly indicated to have been negatively affected by the development by 65% while Animal was seen to be more positively affected by 51.4% of the respondents in comparison to 45% who said it had experienced a negative effect.

Figure 5: Impact of URRAP road project on Environment

Source: Waliso woreda Environmental protection, forest and climate change Authority, 2019

4.8.3 Community participation in road development

Table 4.15.Community participation in road development

Variable	Response	Frequency	Percent
Cash	No	178	80.9
	Yes	42	19.1
	Total	220	100
Labor	No	63	28.6
	Yes	157	71.4
	Total	220	100
Material	No	143	65
	Yes	77	35
	Total	220	100

Source: field survey,2019

Table 4.16: Illustrated that community participation in URRAP road development. In this regards, from the total respondent (19.1%) of the respondents interested to participate in cash, while (71.4%) of the respondents interested to participate in labor and (35%) of respondent interested to participate in material. From this it is clear that majority of community in the study area wants to participate in road development by their labor.

4.8.4 Cause of poor quality of road

Table 4.16.Cause of poor quality of road

Variable	Response	Frequency	Percent
Management	No	57	25.9
	Yes	163	74.1
	Total	220	100
Skill	No	178	80.9
	Yes	42	19.1
	Total	220	100
Capital	No	143	65
	Yes	77	35
	Total	220	100

Source: field survey,2019

Table 4.17: Illustrated that cause of poor quality of URRAP road development. In this regards, from the total respondent (74.1%) of the respondents perception on the poor quality of URRAP road project was in appropriate management, while (19.1%) perception was skill and (35%) of respondent perception was lack of sufficient capital. From this it is clear that majority of community perception on poor quality of URRAP road project was poor management during and after construction. FGD Saied that contractors or enterprises who construct the URRAP road have no enough skill. The biding system and finance management is not follow construction rule. This opens for corruption, and finally poor quality of road.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

URRAP road have been constructed from 2012 in different parts of Ethiopia. Its players are both government and people. The eager and enthusiasm of people to get road is greater than what the government has been undertaking. People need road institution with all acceptable definitions: process, methods, and outcomes. This means, people give balanced weight both for quantity and quality of roads. However, the government has been going on only quantitative dimensions. The connection and association of road institution with other social institutions was not given considerable and required value. Based up on the findings, URRAP road project had high contribution on livelihood of the people. The major advantage is increase the percent of people having access to weathered road accessibility. The study shows that the contribution of road on the quantity of agricultural production was high. It also indicated that rural road development has high contribution to access different social infrastructure in terms of reducing travel time and reducing distance having alternative means of transportation.

URRAP road has been inserting various problems into pillar environmental issues. It has resulted in soil erosion, deforestation, and loss of animal species. Indigenous trees are being cut and indigenous animal species are been moved. As a result, climate change appeared in most parts of the country. Inequitable road line selection, investment and farming land expansion, and corruption are among the main causes of these problems associated with URRAP road construction in Ethiopia. However, if managed, designed, supervised, customized and internalized, road would play a vital role in environmental sustainability. Even though there are a large number of problems, URRAP road has also been providing various services for rural people. It creates a job opportunities, increases socio-political participation encourages social network, facilitates production and consumption, increases tourism, and assists the expansion of other social services.

The study also identifies the perception of the community toward the rural road project. Perception indicates the consciousness of local farmers toward the socio-economic benefit and environmental impact of URRAP road in the study area. The respondents

(90%) were aware of the Socio-economic benefits of rural road had positive attitude towards those road. Some of the respondents responses indicates agreed that may be due to low quality and poor management and control of government URRAP road project increased soil erosion, air pollution and deforestation and land degradation.

It also indicated that there is variation in the prices of agricultural products and inputs between production area and market. Majority of farmers in the study area have access to rural road, i.e. they sell the commodities at higher price using different means of transportation and they get lower price for the commodities they buy. Thus, road accessibility brings improvement in the quantity and quality of agricultural production.

The study indicates that primary schools were constructed in all kebeles of Waliso woreda, as a result majority of the households are found less than three kilometer from the nearest schools and goes in average not more than 1:00hr. Therefore, following the road primary schools are constructed and reduce time to access school that far away from home.

Road development helped in reducing maternal mortality, infant and child mortality as well as health costs. Therefore, in the study area health institutions are good distribution and people walk less than five kilometer to reach the nearest health post. The ratios of hospital health center and health post of the study area were good. The survey area was, therefore, underdeveloped in terms of health services though improvements are under way in terms of road accessibility and health services. The study revealed that household with good road access has good market access and vice versa. That means better road accessibility could help to get market information, within a short time, low transportation price and better means of transportation, which help to produce more saleable agricultural products. Another benefit of URRAP road are, it creates a job opportunities, increases socio-political participation encourages social network, facilitates production and consumption, increases movement, and assists the expansion of other social services.

The study indicates that several sites attract traders, businessmen and women who want to invest in land and create additional labor opportunities for local people. In turn, these

rural people have a better income through which they can afford to look for additional livelihood opportunities in towns, cities or other rural areas.

5.2 Recommendation:

Under this subsection, recommendations derived from the findings of the study, particularly those pertaining factors contravening positive socioeconomic impacts, are provided for further consideration by policy makers, executive bodies and researchers. The main focus areas of the recommendation are: road pavement, road maintenance, environmental impacts. Additional points considered include: the need to harmonize organization structures and staffing plans as well as rules and regulations related to road and transport planning and management, the need to institute workable mechanisms for road transport impact assessment and main issues for further research.

5.2.1 Timely Road Maintenance

No asset lasts long without due maintenance and rural roads are no exemption. The achievement of long-term social and economic benefits from rural road is often threatened by the lack of regular maintenance. It is obvious that gravel roads quickly deteriorate if they are not regularly maintained. Road users are generally risk averse and will not engage in new activities or mobility once they know that the roads on which their livelihood depends is temporarily unusable or if its poorer condition in the following year will mean additional costs and time.

The community knows well about the importance of roads, whereas there are few initiatives to promote their participation in the upgrading of nearby roads as well as the construction of bridges over river crossings and new links with the existing main roads. This would require serious commitment on the part of the various sector offices and other stakeholders to provide continuous support that would enable to achieve enhanced access of the rural population. This will create significant opportunities for facilitating the mobility of workers, women, students, the elderly and persons with disabilities, etc. to commute to the workplace, markets, schools, health facilities, and recreational and other cultural facilities and public service providing institutions.

5.2.2 Performance Monitoring and Evaluation and Regular Impact Assessment

Regular monitoring and evaluation of the socio-economic and environmental impacts of road development interventions need to be undertaken. These have to be carried out taking into account baseline conditions as well as employing standard indicators. This will ensure that, in the future, impacts of road development on poverty and sustainable development are captured, rather than assumed

5.2.3 Recommendation for Further Research

Research on the socio economic impact assessment of road development provides a framework for addressing several purposes. Due to time and financial constraints, this study could not address all social, economic and environmental aspects of the area. Secondly the study was not supported by GIS technology to clearly address spatial and temporal distribution of different land cover and land cover change and infrastructure in the study area. Therefore, one can upgrade this study by completing the mentioned and other gaps of this research.

The researcher would also recommend further research into the regulations pertaining to road development and the environmental impact it has in areas where the development occurs and the awareness of these regulations amongst community members and investors.

- More studies should be done on how road users can be used to improve the biodiversity of areas that are affected by road construction

- More studies should be done on design quality and future maintenance of URRAP road so as to continue enjoying the benefits of community without degrading the environment.

- There is need for further research on how public participation can be involved in road development so as to achieve occupants and users satisfaction.

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Appendices

House hold Survey questioner

The questions under this section focus on the overall background of respondents. Please circle your best choice.

1. Household head sex: 1) male 2) female
2. Household head age _____ years :
3. Marital status: 1) Married 2) Single 3) Widowed 4) Divorced
4. Family size : _____
5. Level of education of house hold head: 1) No formal education 2) Primary level 3) Secondary level 4) Diploma and More
6. Occupation 1) Agriculture 2) government employs 3) Private Sector employs 4) Own business 5) labor
7. What types of road often use to access woreda town? 1) Pavement road 2) Dry weather 3) Asphalt 4) pathway
8. Do you use transport to access wored town services? 1) yes 2) No
9. What means of transport do you often use to travel outside of your village? 1) Public transport 2) Bajaj 3) motor 4) Horse cart

Section II: Main socio-economic benefits of URRAP roads

10. What is the advantage URRAP road contributed for your livelihood? 1,transport access 2, job opportunity 3. Minimize travel time
11. Contribution of URRAP road on quantity of agriculture production: 1) Very high 2) high 3) moderate 4) low 5) very low
12. How many hectares of land you owned 1) <1hek 2) 1-2hek 3) 2-4hek 4) 4-5hek 5)>5hek
13. What is your income / month 1) < 1000 2) 1000 - 3000 3) 3001 - 5000 4) > 5000

14. If question no 6 is 'Agriculture', how much crop did you produced in this production year? 1) <10qt 2) 10-20qt 3) 20-30qt 4) 30-40qt 5) >40qt
15. Where did you sell agricultural products? 1) In Village 2) At Market
16. Estimate the average price of cash crop at Worada market.

Types of crop	Price at Market
Chat	
Onion	
Tomato	
Potato	
Wheat	

16.How far your home from social services in (km), and how long times it takes you to access?

Types of social services	Distance in (km) from home	Travels time(hr)
From School		
From Health post		
From Market		
From Woreda town		

Section III: Environmental challenges

16. Do you think URRAP road constructed in your area/kebel caused for environmental impact? 1) Yes 2) No

17. If 'yes' which impact happened in your area? 1) Soil erosion 2) deforestation 3) Dust pollution4. Land degradation

17. As you think which one of the environmental aspects more affected by URRAP road in your area? 1) Plant 2) Animal 3) Soil
18. The questions under this section focus on the Environmental impacts of URRAP road construction in the area/kebele. To what extent do you agree with the following statements? Please rate the items in the table below by using this rating scale: Scale: *1=Strongly agree; 2=Agree; 3=Un decided;4=Disagree; 5= Strongly disagree*

	Impacts of URRAP roads	Scale				
		1	2	3	4	5
24.1	Increase soil erosion					
24.2	Increase deforestation					
24.3	Increase air pollution					
24.4	Increase resettlement					
24.5	Risk to health and safety					
24.7	Change land use					

Section IV: Perception of Local community toward the project

The questions under this section focus on the benefits the communities have got from URRAP 21. Road constructed in their area/kebele.To what extent do you agree with the following statements? Please rate the items in the table below by using this rating scale: Scale: *1=Strongly agree; 2=Agree; 3=Un decided;4=Disagree; 5= Strongly disagree*

No	Benefits of the URRAP	Scale				
		1	2	3	4	5
21.1	Access to transport have increased					
21.2	Travel time has been decreased					
21.3	Market access has increased.					
21.4	Education Access have increased					
21.5	Healthcare access have increased					
21.6	Agricultural production have increased					
21.7	New job opportunity created					
21.8	Access to Government offices increased					
21.9	Women's work burden has been decreased					

22. Do URRAP road in your kebele has been maintained since constructed? 1) yes 2) No

23. As you think who is the responsible to control and maintain URRAP road in your area/kebele? 1) Government 2) Community

24. How do you participate in the road development? 1) Cash 2) labor 3) Material

25. As you think what is the main cause for poor quality of road? 1) Management 2) Skill 3 Capital

Focus group discussion:

Focus group discussion for this study are selected based on their occupation (i.e. Farmer, business owners, Bajaj driver, government employer)

1. What advantage did the rural road (URRAP) have on your community? [If necessary, prompt with the following areas: income, services, livelihood opportunities, accessibility/mobility, health, education and etc.]
2. What was the changes do you think the road brought to your community? mainly positive, negative, or no significant changes
3. Who do you think benefited from the rural road (URRAP)? [E.g. by sex, by occupation, by economic status, etc.] Why
4. What is your perception on sustainable development issues in relation to development projects in general and Universal Rural Road Access Program (URRAP) in particular? [eg. Social, economical and environmental perspectives
5. In your opinion, what are the causes for environmental degradation related with Universal Rural Road Access Program (URRAP)? [e.g Soil erosion, deforestation, water pollution, air pollution etc
6. Do you participate in planning, management and maintenance of the road?(in ESIA/EMP preparation)

Questioners for key informant

The key informant for this study is from woreda sectors such as(Road sector, Agricultural sector, Health sector, education sector, Land use sector and EPF&CC sectors)

1. What do you think the impact of road construction/improvement on: (education, health, agricultural production, income of hh…)
2. Does the road development under study create new job opportunities?
3. Does road investments contributed to agricultural development?
4. Do you think that there is environmental effect due to the road development If yes in what way it affects the environment?
5. Do you think the community participates in planning, implementation and management of road to the effective and sustainable of road services?
6. What economic, social, environmental impacts (positive/negative) do road development brought about?
7. Is there involvement of local communities and other stakeholders in the management and maintenance to sustain and improve the URRAP road?
8. Does community participate in planning construction, management and maintenance of road infrastructure in the study area?
9. Do you believe that this road meets good road standard or qualities?
10. What do you think the benefit you gained from the road and the opportunities you missed