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Keywords: road sector development, socio-economic growth, agricultural production, social service, market access.

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Keywords: road sector development, socio-economic growth, agricultural production, social service, market access.

I. Introduction

a) Background of the study

Road infrastructure has always played a key role in the progress and economic growth of a nation, both through the direct effects of higher mobility for citizens and goods and also via the indirect benefits derived from the process of building infrastructure (Vatanen, 2007). In addition, the road transport sector is essential for developing countries for the reason that provision of other advanced means of transportation is expensive. For instance, Fan and Rao (2003), Baum and Korte (2001), Pollack and Heertjee (2000) indicated that public expenditure in rural infrastructure is one of the most powerful instruments that governments can use to promote economic growth and poverty reduction and among these services, road transport sector is considered as the crucial one.

In sub-Saharan African countries roads are the most useful way of transport which accounts for over 75% of passenger and freight traffic, and the road network in the region plays a significant roles in their socio-economic development. The development and maintenance of appropriate road infrastructure is, therefore, fundamental to economic growth and poverty reduction in sub- Saharan Africa (Abedi, 2008).

Recognizing the importance of the road transport, the government of Ethiopia has launched a road sector development program (RSDP) since 1997 which focused on upgrading and rehabilitating the existing road network, and providing regular maintenance. Since then, the condition of roads has improved and the road network which was about 26,550km at the beginning of RSDP in 1997(UNECA, 2009), had grown to 33,297km by 2002, of which 4,053km (12%) were paved and the remaining 29,244km (88%) were gravel, and it has increased to 44,359km by the year 2008.

b) Statement of the problem

In Ethiopia road transport is the dominant mode and accounts for 90 to 95 percent of motorized inter-urban freight and passenger movements. However, because of its limited road network, provision of infrastructure has remained one of the formidable challenges for Ethiopia in its endeavor towards socio-economic development and poverty reduction (ERA, 2008).

The total length of road in Benishanigul Gumuz Region was only 1473.2 km which is 746.8 km, 523.6 km, 202.8 km in Metekel zone, Assosa zone and Kamashi zone respectively (CSA, 2008) and the road density is 28.4 km/1000 sq km (EDH, 2004). The low road density and seasonal state of road raises constraints to rural producers. Many people's live and

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produce far away from major roads, markets and to other socio-economic service center. Consequently small holder agricultural producers face high transportation costs that raises prices of inputs, and impair further access to market, which leads to low productivity, health, education which in turn hinder economic growth in the area.

It is generally believed that the improvements of transportation services in the study area have major implications for efforts to increase agricultural production, educational expansion, social provision and market access. However, the region as well the woreda was characterized by very low infrastructure. Most roads are dry-weather roads and hence access is difficult during rainy seasons. Moreover, the road network connecting the region with zones and Woreda's was very poor. Kebeles are in most cases not connected with Woreda and Market network is almost negligible (BGFSS, 2004) as well the roads are not in good condition because of lack of proper maintenance. This condition makes delivery of services such as health, education, extension services very challenging and impede mass mobilization, marketing and general development interventions. **Thus,** this study attempts to examine the contribution of road transportation to socio economic growth of Wonbera woreda.

c) Objective of the study

i. *General objective*

The general objective of the study is to assess the role of road transport development to the socio-economic growth of Wonbera Woreda, Benishangul Gumuz, Ethiopia.

ii. *Specific objectives*

1. To examine the role of road development for the improvement of social services in the area
2. To analyze the contribution of roads for economic growth of the study area
3. To investigate the market access in relation to road development of the study area

d) Research Questions

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 is the role of road in the economic growth of the study area?

II. Literature Review

Road is Line of communication (a travelled way) using a stabilized base other than rails or air strips which is open to public traffic or a line which serve primarily to provide services (IRF). It is one of the major factors determining the socioeconomic variables such as education, health, economic activities, and social services.

Road Communication plays a crucial role in promoting economic, social and cultural development of a region. Their importance has always been recognized and found from the history that once road communication is given the development of civilization, their quality and quantity have improved significantly. Thus, the road is one of the great fundamental institutions of mankind. It develops with man's advance. In the modem world, roads have proved to yield profound economic and social significance (Kantharajappa, 1998).

Manohar Lal (1989) studied the roads and their socio-economic impact on the rural community. He found that the road development has bestowed a package of benefits on the village people in agriculture sector. Lal found that the development of road network has resulted in faster and more equitable distribution of marketing of products. Allied agricultural and non-agricultural activities have also started growing with expanding road communication. Small trade and business establishments have come up in some of the villages linked with roads. Lal also observed that the rural road network generated a better access to facilities for schooling, health, banking and postal services to the rural people. Thus, there was a clear indication that the developments of rural roads have become a necessity to accelerate socio-economic transformation of rural society (Kantharajappa, 1998).

Improved accessibility is even more crucial to landlocked countries that suffer from limited access to regional and global markets. Such countries bear the costs of inefficiencies at land border crossings and transits through neighboring countries. Improved transport accessibility allows landlocked developing countries to participate in and benefit from the globalization process (UNESC, 2008).

a) Road and Socio-economic Development

Transport plays a pivotal role for social and economic development of a society. On the one hand, the achievement of economic growth and poverty reduction requires good physical access to resources and markets, whilst on the other; quality of life is generally dependent on the quality of physical access to employment, health services, homes, education and other amenities. Fromm (1965) identifies that transport performs the following four broad functions in assisting economic development:

i. as an input into the production process permitting goods and people to be transferred between and within production and consumption centers;
ii. transport improvements can shift production possibility functions by altering factor costs and reducing levels of inventory tied-up in the production process;

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iii. increasing factor mobility and permitting factors of production, specially labor, to be transferred to places where they may be most productively employed; and
iv. Increasing the welfare of individuals by extending accessibility to a range of facilities and providing superior public goods, such as improved social cohesion and security.

b) Road Development and Agricultural Production

Road transport plays an important role in agricultural development. This is because it is the major means of transporting agricultural produce from the farms to the markets as well as to various urban communities (Tunde and Adeniyi, 2012). In rural areas, the development of roads affects agriculture directly by enlarging the areas under cultivation. There is a two-fold relation between road development and increased agricultural production: these are: Firstly, intensive cultivation, to exploit the resources of land fully is made possible due to easy transport of manures, good seeds and better agricultural equipment: Secondly, scope for extensive cultivation has increased.

c) Road Transport and Impact on Domestic Market Development

Various researches in developing countries have concluded that rural (farm to market) roads have a major effect in improving marketing opportunities and reducing transaction costs. The marketing of agricultural commodities, excluding the stages of processing, can account for 2560 percent of final prices for foodstuffs in developing countries, with about half of the marketing costs attributable to transport (Beenhakker, 1987).

Analyses of the impacts of transport systems on agricultural marketing argue that the benefits of investments in improved transport depend greatly on the policy regimes governing crop pricing, regulation of marketing, and conditions of competition in transport (Beenhakker, 1987 and Gersovitz, 1991). This implies that 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).

d) Road Transportation and Social Development

It was only towards the end of the 1970s that the impact of investment in roads in developing countries on a broad range of social aspects – including access to education, health and other welfare facilities – started to be considered (Howe and Richards, 1984). The late 1990's were a period of considerable innovation with, and discussion about, almost all aspects of the rural road project cycle as governments, lending, and aid institutions struggled with the renewed emphasis on poverty reduction. Attention was varyingly given to the poor themselves, different aspects of social benefits, and more holistic approaches to rural transport especially the philosophical approach underlying the design of infrastructure and provision of services (Lebo and Schelling, 2001; Starkey et al, 2002). Inadequacy or absence of transport facilities may undermine the productive process. Ahmed et al (1976), cited in Button (1993) aptly remarked that inadequacy of transport facilities is one of the bottlenecks to socio-economic development and national integration in many developing countries.

e) Transport and development in Ethiopia

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

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

This is part of government's effort at strengthening the infrastructure backbone of the economy as well as accelerating market-based agricultural development. Preparations have also been made to step up the Ethiopian Rural Transport Program through the construction of substantial amount of low level rural roads, and the provision and expansion of conventional and intermediate means of transport. There are measures to facilitate the participation of local contractors in road construction as a way of ensuring the sustainability of transport development (ERA, 2011).

Major Challenges of the Rural Road service

According to Akiliu (2007) Construction of adequate road system greatly hampered by rugged terrain of highlands and normally heavy seasonal rainfall

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and some of the main structural and operational problems of the road transport sub sector in Ethiopia are a close look at the characteristics of the road transport mode such as backward management system, old vehicles, lack of skilled man power on the sector, disintegrated transport sector institutions relationship and communication, Problems of maintenance; Procurement problem; Access/availability of rural roads linking Kebeles and Woredas; Quality/standard of rural road; Availability of contractors; Rural road budget distribution and utilization; Lack of clarity to road ownership and responsibility of the community and so on.

III. Methodology

a) Research Design

The researcher employed descriptive research design to examine the role road sector development on socio-economic growth of the study area. since such design helps the researcher to describe the contribution of road sector development on economic growth.

b) Data Source and type

The researcher used both secondary and primary sources of data. The primary data were collected through interview, questionnaire, and focus group discussion from the concerned bodies while the secondary data were collected from books, journals, unpublished documents, internet, and reports.

c) Sample size and Technique

The researcher used stratified sampling techniques in order to select Kebeles based on their distance from the road. According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all weather roads are considered to have road access and those far from five kilometer as poor road access. Thus the researcher categorized the Kebeles based on their distance from road, Kebeles within 5km from the road, Kebeles 6-10km from the road and Kebeles more than 10km from the road. The study area, Wonbera woreda, has 33 Kebeles and based of distance categories 9 Kebeles were selected proportionally.

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).

$$n= N/1+N (e2)$$

Where,
n=the desired sample size
N=the total population
e=the desired level of precision which is 0.07

According to this method the researcher took sample size of 190households out of 2700 households of the selected Kebeles by using simple random sampling technique in order to avoid the research bias. The proportional allocation of the sample was made on the basis of the size of households in the selected Kebeles of Wonbera Woreda.

Table 3.1: Number of sample households by Kebeles

Distance from Road	Kebeles selected	Total number of HH	Sample HH
<5km	02 kebele	535	38
	Etashumo	451	32
5-10km	Sanki	361	25
	Minjo	293	21
	Tesoboka	340	23
>10km	Kitar	215	15
	Melkan	205	14
	kisia	150	11
	Bania	150	11
Total	9	2700	190

d) Method of data Collection

In order to obtain relevant information for the study, the researchers employed questionnaire (for this study the researcher designed and administered both closed ended and open ended question to selected households of Wonbera woreda), interviews (the respondents for the interview were selected from woreda level Offices. Hence, the researcher selected the respondents from office of woreda Rural Road Authority, Wonbera Woreda trade and Transport office, Agricultural office, educational office, and health office through semi-structured interview questions) and finally, secondary data were collected from magazines, reports, manuals, internet, published and published documents.

e) Method of Data Analysis

The researcher analysis the data by using both qualitative and quantitative data analysis method. Thus,

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simple descriptive statistics (like frequencies and percentages) and inferential statistics was used to analyze quantitative data. The qualitative method of analysis particularly narration was employed for the data that was collected through structured interview and open ended questionnaires.

IV. Results and Discussion

This part deals with the analysis and discussion of the data gathered from the study area. It primarily discusses the road sector development and socioeconomic growth in Wonbera Woreda of Benishangul Gumuz Regional State. Then, it discusses Agricultural production, educational and health services, income level, investment, and market accessibility.

a) Road network in Wonbera woreda

Road network is at a very low level in the wonbera woreda since there is lack of all weather roads connecting most of the kebeles. However, several road projects are underway since then, including Chagni-Wonbera, Guba-Wonbera. Chagni-wonbera road is 169km gravel road which is constructed after 1992 or in 1996 EC and Guba-Wonbera road is also a gravel road which is still under way. Additionally wonbera is connected with Dibatie and Bullen on the same line and the Woreda were connected with Asossa through zonal city Gilgel belles and with capital city of Ethiopia, Addis Ababa, through Amhara and Oromia region. The government of Benishangul Gumuz and as well local government have a program to connect every kebele with each other through road network. Accordingly, in wonbera woreda most of the kebeles are interconnected with each other through voluntary vigilization program. So the government constructed 628km of weather road (both dry and all weather roads) and under way to construct 225km which connect the Kebeles with the woreda city and with each other. That means the total road network of Wonbera were 738km of which 120km gravel road and 618 km weather road (WWRRA, 2011).

b) Road Density

The road density of the region shows an improvement from time to time. The EPRDF developed Road Sector Development Program (RSDP) with a plan of increasing the road density of a country from 0.43 to 1.5 km per 1000 persons and from 21 to 116 km per 1000 km2 starting from 1997 through 2009 (ERA, 2008). Accordingly, the road density of Benishangul Gumuz has increased in each year plan period. In 2004 the road density of the region has reached 3.2 km per 1000 persons and 28.9 km per 1000 km2.

Even though the road density of the region has increased to some extent it does not achieved the target set by the government in its Road Sector Development Program (RSDP). In 2011, the road density of the region including the dry weather road reached 6.5 per 1000 persons and 85.51 per kilometer square which is higher than the national road density values of 0.57 km per 1000 persons and 42.6 km per 1000km2 for the same period (ERA, 2008). Although the regional as well as the federal road authorities are work to bring accessibility of the weather road for those who are inaccessible to road they were unable to meet the target.

c) Road Accessibility

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 Benishangul regional bureaus of rural road authority only 15 percent and 25percent of the rural population of the region lives within 5km and 6-10 km of the main roads (asphalt and gravel) respectively. Thus the remaining 60 percent of rural people of Benishangul Gumuz live at a distance of more than 10 km from the main roads. Moreover, out of 423 kebeles only 166 kebeles has access to road both all-weather and dry weather roads and has improved after 1997 as a result of the RSDP program. This under development of road network has its implication for the development of the agricultural sector, education, health, investment and market access of the region. The effort made so far towards the improvement of main roads and rural roads in the region is an indication to bring development but not good enough to enhance rural accessibility and thereof economic development.

Table 4.1: Road Accessibility

		No of respondents	percent
Road accessibility	<5km	70	36.8
	6-10km	69	35.8
	>10km	51	28.4
	Total	190	100

Source: survey, 2013

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According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all weather roads are considered to have road access and those far from five kilometer as poor road access. Of course, those within 6-10 km distance from all weather roads are not equally deprived of opportunity as those of far more than ten kilometer. Thus, the study has grouped the respondents in there accessibility categories. Accordingly, out of the total respondents 36.8% are within 5km from the main road, 35.8% between 6-10km distance from the main road and the remaining 27.4% with a distance of more than 10km from the road (table 4.1). From this it can be inferred that the majority of the respondents are settled closer to road transport which may enable them get access to market, education, health, etc.

Table 4.2: Type of road

		No of respondents	percent
Type of road	Asphalt	-	-
	Gravel	64	33.7
	Dry weather	126	66.3
	total	190	100

Source: survey, 2013

Table 4.2 indicates that out of the total respondents 66.3% replied that the type of road is dry-weather road and the remaining 33.7% responded that the type of road in their area is gravel road (all weather roads). From this it can be inferred that the major have access to dry- weather road and one-third access gravel road. The data also shows that there is no asphalt road in the study area.

d) Contribution of Road to Agriculture production

i. *Agricultural production*

Agriculture is the major sector for Wonbera population. Farmers produce different types of crops both for consumption and sell. However, marketing of agricultural products is affected by lack of road infrastructure. Thus, farmers carry saleable agricultural products to distant markets using human portage and pack animal.

As indicated in table 4.3 out of the total respondent 57.4% responded that roads has high contribution on the quantity of agricultural production, 24.7% moderate contribution, and 14.7% responded very high contribution. From this it is clear that road has great contribution on agricultural production.

According to the interview made with head of agriculture bureau of Wonbera woreda, road has plenty of contribution on the quantity of agriculture production. Before the construction of gravel road, the woreda have no chance to export agricultural products rather they use and produce only for consumption purpose. Small amount is sold to cover loans of agriculture inputs (fertilizer, pesticides, herbicides, and the like). But after the construction of road the farmers began to produce agricultural products in large quantity including for export purpose.

Table 4.3: Contribution of road on agricultural production

		No of respondents	percent
Contribution of road on quantity of agriculture production	Very low low moderate high Very high	4 2 47 109 28	2.1 1.1 24.7 57.4 14.7
	Total	190	100
prices of agricultural products for areas with road access are higher than inaccessible areas	yes	186	97.9
	No	4	2.1
	Total	190	100
Use of agricultural inputs was significantly different for areas accessible to road and poor access to road.	SA	80	42.1
	Agree	108	56.8
	disagree	2	1.1
	SD	-	-
	Total	190	100

Since then the woreda exported agriculture products to other place, especially after the construction of Asosa-Gilgel and Gilgel-Wonbera road export of products like coffee and sesame was started in the woreda. For example, in 2003, about 75,000 quintal and in 2004, about 88,000 quintal of coffee was exported to Oromia region of Genbi town. On the other hand in 2004, 48,305.82 quintal and in 2005(half year) 1369.34 quintal of sesame was export to Asosa and to other region (Wonbera woreda Agricultural Office, 2013).

As table 4.3 shows from the total respondents 97.9% of them responded that there are variations in

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prices of agricultural products between places accessible to road and those with less access. According to the focus group discussion (FGD) made with farmers, farmer's households with poor transportation facilities get double punishments. They said inaccessible farmers sell agriculture produce at lower prices and buy agriculture inputs at high prices.

The farm gate prices of manufactured goods are significantly higher while farm gate prices of agricultural products are significantly lower in localities with poor transportation facilities. This means a huge price bands between the buying and selling prices for the peasant households with poor transportation access (Sadoulet and de Janvry, 1995). Therefore, it can be concluded that road transportation has an effect on prices of agricultural products i.e. transport improvements reduce the cost of moving agricultural products to market and, therefore, extend the market, thereby encouraging cultivation and also investment in rural areas.

e) Road and Social services

i. *Accessibility of schools*

As Ethiopia's SDPRP 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 4.4: Accessibility of schools

		No of respondents	percent
School distance from home	<5km	75	39.5
	6-10km	66	34.7
	>10km	49	25.8
	Total	190	100
Road construction on improvement of education quality.	Very low	2	1.1
	low	9	4.7
	moderate	32	16.8
	high	126	66.3
	Very high	21	11.1
	Total	190	100

Source: own survey, 2013

As indicated in table 4.4. Item 1, out of the total number of respondents 39.5% replied that the distance of school from their home is within 5 km, 34.7% replied the school distance from their home is6-10 km and the remaining 25.8% responded that they walk more than 10 km to reach school. From the data it is clear that majority of the respondents walk more than five kilometer distance (approximately more than one hour) to reach school.

According to the Head of Wonbera Woreda Educational bureau schools are sparsely located and thus majority of the students walk more than five kilometer to reach the nearest school. Thus, the dropout rate at the secondary level is very high because of distance of the school. There are more schools closer to the road than away from the road. This implies that students closer to road had to walk significantly less time to get to both primary and secondary schools in comparison to those far away from the road. 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.

ii. *Contribution of road on improvement of education*

It is obvious that availability of infrastructural facilities encourages the establishment of services such as schools, health centers, market centers, etc. In this regard transportation play significant role. Therefore, road has high contribution on the improvement of education 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 4.4. Item 2, Shows that out of the total number of respondents 66.3% responded that road has high contribution to educational development, 16.8% moderate contribution, and 11.1% very high contribution. From this it is clear that road has high contribution on improvement of education as majority of respondents replied. According to the interview made with Head of the Education Bureau of Wonbera woreda, the bureau is committed to the provision of better education aiming to improve the access, quality, equity and efficiency of education to address the needs of the community. To bring this in to action road is one of the major components in addition to government policy.

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Table 4.5: Relationship between home distance from the road and school

		school distance from home				
		<5km	6-10km	>10km	Total	%
Home distance from the road	<5km	65	5	0	70	36.8
	6-10km	10	57	2	69	36.3
	>10km	0	5	46	51	26.8
	Total	75	67	48	190	100
	39.5	35.2	25.3	100		

Source: survey, 2013

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 in table 4.5 shows that there is 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 4.6 presents the result).

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

	Value	df.	asym.sig. (2-sided).
Home distance from the road and school distance from home	266.755	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.)= 28.504, 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.

f) Health Facilities

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 influence of road network on health services is examined.

Table 4.7: Health services

		No of respondents	percent
Do you think that road improve health situation.	Yes	184	96.8
	No	6	3.2
	Total	190	100
Contribution of road development on health services	Low	4	2.1
	Medium	40	21.1
	High	119	62.6
	Very high	27	14.2
	Total	190	100

Source: survey, 2013

In Wonbera woreda there are only two clinics and 20 health posts. Almost half of the kebeles (13 kebeles) of the woreda don't have any health services and thus patients go to the neighboring Kebeles in search of health posts. This is against 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. Item1 Revealed that out of the total sample population 96.8% of the respondents responded that construction of road near by their home bring improvement on their health situation and only 3.2 % of the respondents replied that road construction nearest by their home doesn't bring improvement on their health situation. From the data it is clear that road bring improvement in the health situation as the majority of the respondents replied. The respondents also explained that before the construction of the 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

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and it bring improvement to the health of the people in general.

Table 4.7. Item 2 shows that out of the total number of respondents 62.6% of the respondents indicated that the contribution of road on improvement of health is high, 21.1% replied moderate and 14.2 % replied very high. Thus, road has high contribution on improvement of health as majority of respondents' replied. According to the interview made with Head of Health Bureau of Wonbera woreda, 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.

Table 4.8: Respondents' home distance from road and health institution

		Home distance from health institution				
		<5km	6-10km	>10km	Total	%
Distance of home from road	<5km	61	9	0	70	36.8
	6-10km	8	58	3	69	35.8
	>10km	2	4	45	51	27.4
	Total	71	71	48	190	100
	%	37.4	37.4	25.2	100	

Source: survey, 2013

In order to examine the relationship between distance to the nearest health center and road transport cross tabulation were used. Table 4.9 illustrates that 37.4 % of the respondents are found within 5km from health centers, 37.4% within 6-10 km and 25.3 % more than 10 km. This implies that majority of the patients' travel more than 5 km looking for health facilities. As cross tabulation in table 4.8. Shows that there is relationship between home distance from the road and health institution. Hence, in order to examine the association Pearson Chi-Square test analysis was used.

Table 4.9: Relationship between home distance from road and health institution

	value	df.	Asymp,sig. (2-sided)
Home distance from road and health institution	247.421	4	.000

Examination of results on the association between home distances from road and health institution distance from home, x2(4df) = 247.421, sig.000 (table 4.9). 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.

g) Market Access

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).

Table 4.10: Respondents home distance from market and means of transport used

		No of households	Percent
Home distance from market	<5km	60	31.6
	6-10km	73	38.4
	>10km	57	30
	Total	190	100
Means of transportation	Pack animal	115	60.5
	Human portage	35	18.4
	Vehicle	40	21.1
	Total	190	100

Source: survey, 2013

As indicated in table 4.10. Item 1 out of the total number of respondents 38.4% of the respondents replied that the distance of their home and the nearest market center, is between 6-10 km 31.6% within 5km, and the remaining 30% more than 10 km. From this it is clear that majority of the respondents walk more than

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five kilometers (more than one hour) to reach market centers.

Therefore, Better road accessibility could help to get market information because of lower transaction costs and perfect information. It could also encourage people to take more advantage to produce and sell it in the market and the people nearest to the road have advantage to get the market access that they are willing to produce more systematically for the market, while those with poor market access are forced to produce for domestic consumption.

Even though there is improvement in road sector investment in the study area, majority of the households come across long distance (6-10km and above) still using pack animals and carrying loads on their head and backs to take their products to market places especially those far away from roads. Table 4.10. Item 2 revealed that out of the total sample population 60.5% of the respondents respond that they use pack of animals to sell agricultural products to the nearest market center, 21.1% use vehicle and the remaining 18.4% use human portage. The result shows that the majority of respondents use pack of animals to transport saleable agricultural products to the nearest market center.

Table 4.11: Respondents home from the road and market

		<5km	6-10km	>10km	Total	%
distance of home from the road	<5km	55	15	0	70	36.8
	6-5km	4	58	7	69	36.3
	>10km	1	1	49	51	26.8
	Total	60	74	56	190	100
	%	36.1	38.9	29.5	100	

Source: survey, 2013

Table 4.11 illustrates that out of the respondents 38.9 % are located 6-10 km distance from market centers, 31.6 % within 5km and the remaining 29.5% more than 10 km. This implies that majority of the respondents travel more than 5 km for marketing. The cross tabulation in table 4.11 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 4.12: Relationship between home distance from road and market

	Value	df.	asymp.sig. (2-sided)
Home distance from road and market distance from home	243.083	4	.000

Examination of results on the association between home distances from road and market distance from home, x2(4df) = 243.083, sig.000 (table 4.13). This shows there was strong significant association between home distance from road and market distance from home. This implies that households 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 and households with poor road access get double punishment. I.e. high price for input they buy and low price for the output they sell in addition to transportation cost and time cost.

V. Conclusion and Recommendation

a) *Conclusions*

Based up on the findings, points were concluded as follows:

- The study indicates that in the recent decade the government is making a relentless effort towards expanding the road network in the region and woreda as well. However, an important key indicator is the issue of accessibility of the existing road. The overall accessibility of road does not meet the need of the study area.
- The study shows that the contribution of road on the quantity of agricultural production was high. It also indicated that there is variation in the prices of agricultural products and inputs between places accessible to road and not. Farmers' with poor road accessibility experienced double punishments, i.e. they pay higher price for the commodities they buy while they get lower price for the commodities they sell. Thus, road accessibility brings improvement in the quantity of agricultural production.
- The study indicates that schools were sparsely located in Wonbera woreda, as a result majority of the households are found more than five kilometer away from the nearest schools. There were more schools closer to the road than away from the road. Thus, students closer to road had more opportunity to get schools in comparison to those far away from the road.

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– Road development helped in reducing maternal mortality, infant and child mortality as well as health costs. However, in the study area health institutions are few and people had to walk more than five to ten kilometer to reach the nearest health posts. For referral to zonal or regional level health services, the distance traveled could be in days. 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, low transportation price and better means of transportation, which help to produce more saleable agricultural products.

b) Recommendations

Up on the conclusions made, the following recommendations were forwarded:

– The area is far from the center of the country and it is big challenge to promote developmental programs in the area. Thus, in order to connect the area with the interior part of the country and also properly utilize the natural resources road network needs to be expanded in accordance with road transport policy of the country. Therefore, the Regional Road Authority should work to connect the study woreda with big market centers within and outside the region.
– The study area is rich in natural resources particularly in agricultural and industrial raw materials. However, the area is poorly linked with road transport and farmers mostly produce for consumption. Thus rural Kebeles needs to be connected with market centers in order to collect the products during harvesting seasons.
– Road in the area is not only poorly networked but also poorly maintained. Road construction alone does not bring the intended level of economic development and provision of social services unless continuously maintained. Therefore, the existing roads have to be repaired on time to give the required services so that communication remains continue.

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