



Impacts of Transport Infrastructure Service on the Livelihoods of Rural Households: The Case of Sibu Sire District, East Wollega Zone, Western Ethiopia

Gemechu Merga (MA)

Lecturer at Department of Geography and Environmental Studies, Assosa University,
P.O. Box 18, Assosa, Ethiopia

Abstract: *The study delved on the impacts of road service on livelihoods of rural households in Sibu Sire district. Specifically, the objectives were intended to assess effects of road service mainly on household income and access to markets with the general hypothesis established as improved road service contributes to improved livelihood conditions. The research design employed a mixed-method approach by adopting poor access and good access to all-weather road grounding on rural access index (RAI) and connectivity index. A Sample size of 304 households was statistically determined and randomly selected for household survey whereas participants of FGD and key informants were purposively included. Quantitative data were analyzed using simple descriptive and inferential statistics using SPSS version 20 and triangulated with qualitative findings. In line with the established hypothesis, the study found overall better livelihood conditions in locations with good access to road service. In a nutshell, the variation in annual and off-farm income, access to and market price of agricultural products, access to loans and purchase of agricultural inputs among the two groups of households were statistically significant at ($p < 0.0001$). Notwithstanding to the level of accessibility, the variation of total cultivated land and distance of potable water among the two groups of rural households were not statistically significant. Generally, the author concludes that households with poor access to road service who suffer from inaccessibility to goods and services are the most affected one and thus, alternative ways of improving their resilience need to be sought.*

Key terms: Accessibility, All-weather-road, Livelihood

1. Introduction

Transport infrastructure plays an important role in the process of economic and social development. Almost a third of people in developing countries live in poverty and their poverty is reflected in some basic indicators of lack of access to basic services. Improving the access and mobility of the isolated poor paves the way for access to markets, services and opportunities. It also enables them to make better use of essential services such

as health and education and keep abreast of social, economic and political developments happening in their country (IFAD, 2001).

According to World Bank (2006), only 10 percent of the rural population in Ethiopia lives within two kilometers of all-weather roads whereas the remaining 90 percent of rural people live at a distance of more than two kilometers of all-weather roads.



According to the argument of Airey (2002), 'a community without road does not have a way out'. Market access problem can affect areas (due to remoteness or infrastructure) and groups such as the illiterate or poorly educated and women. Hine (2002) stated that access to transport, by providing better access to markets, increases the opportunity for farm production and off-farm opportunities. Legesse, (2001) indicated that distance to market is negatively associated with the use of production enhancing inputs. Bunjo (2012), pointed out that poor rural transport systems increase the costs of marketing from farms, inhibit use of fertilizer and other inputs, limit the spread of information and increase risk.

Road transport in Ethiopia is the major means of movement for about 93% of freight and 95% of all passengers. The road center in Addis Ababa radiated in all directions in a spoke-like pattern. Only about 12% of the population had ready access to the roads. Most roads in the national network are concentrated in the central, eastern and northern highlands. However, substantial parts of the country, notably in the west, southwest, and southeast still lacked all-weather connections to this network (Abeje, 2013).

However, in spite of its importance, the impact of road infrastructure on livelihood condition is a deep-rooted problem in the district and there is apparently little research work at an empirical level on the issue in Ethiopia in general and in the study area in particular. Therefore, this problematic situation prompted the researcher to fill the existing literature gap in this respect with the general objective of examining

impact of road transport on the livelihoods of rural households in the study area. Specifically, it attempted to assess the impact of road transport on households' income (farm and off-farm) and access to markets among the two groups of households.

2. Materials and Methods

2.1 Description of the study Area

The research was conducted in Sibule District, East Wollega, in Oromia regional state, western Ethiopia located at 281km west of Addis Ababa. This district geographically between 9°20' N latitude and 36° 53' E longitudes. The three agro-ecological zones in the district include mid-land (74.3%), lowland (18.27%) and highland (7.53%). The minimum, maximum and mean temperature of this area is 14.09 °c, 27.30 °c, and 22.55 °c, respectively. The annual average rainfall of the district is 1295 mm (RLEPOSSD, 2016). The official sources reveal that the length of road in the year 2014/2015 was only 120 kilometers dry weather road, 8 kilometers all-weather road and 32 kilometers of asphalt road (SSRA, 2016).

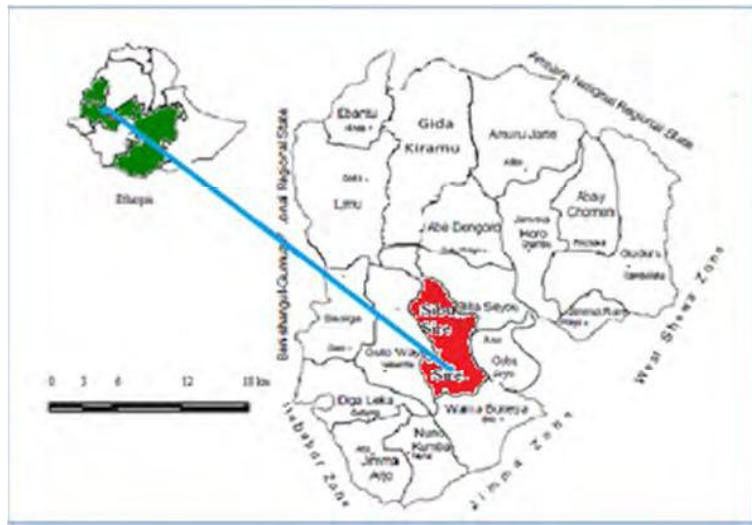
2.2 The Research Methodology

In light of the main paradigm of information system research, the research design adopted in this research could be positioned within the pragmatist camp which employs a mixed-method approach to research. A sample size of 304 households from a total of 1445 households (735 in the good access and 710 in the poor access to all-weather road) was statistically determined and randomly selected. The good access and poor access to road *kebeles* were determined on the ground of connectivity indexes and Rural Access Index (RAI).



Accordingly, the first two most inaccessible *kebeles* (Dangajo Guyo and Hombosse Hobo) and the two most accessible (Chari Jarso and Adda Buke) kebeles to the all-weather road were

empirically selected. Four FGD and sixteen key informants made up of community representatives, public officials and women development army were purposively selected and included.



Map of Sibu Sire District

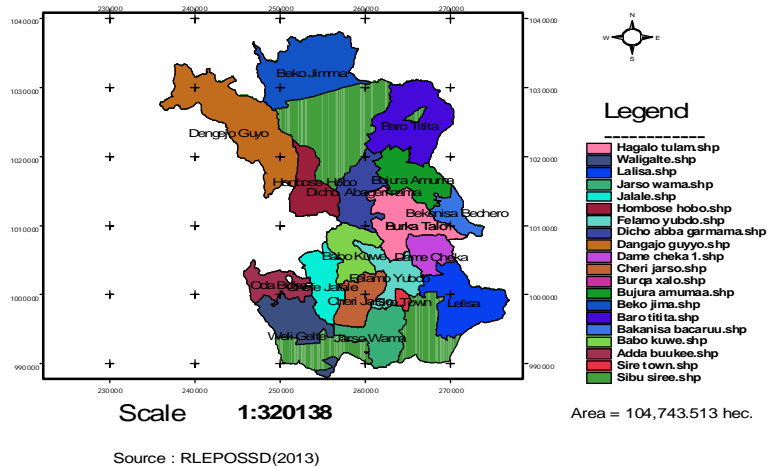


Fig.2.1 Map of the Study Area



2.3 Data Collection Methods

The study used questionnaire (both open and close-ended), focus group discussions and key informants for collecting relevant data. The questionnaires focused on demographic characteristics and livelihood conditions of the households.

2.4 Method of Data Analysis

In the process of analysis, the researcher adopted poor access and good access to road approach for comparative analysis of the issues grounding on Rural Access Index (RAI) prepared by World Bank (2003) and connectivity index. In line with the established hypothesis, simple descriptive and inferential statistics mainly independent t-test was employed to compare and test the statistical significance and Karl Pearson's correlation was also adopted to investigate the degree of association of the variables using SPSS version20 and triangulated with qualitative findings.

3. Results and Discussion

3.1 Demographic Characteristics

Demographically, the gender of the sample population constituted 254

(83.60%) male households (129 in good access and 125 in poor accesses to a road) and 50(16.40%) female households. Regarding the age distribution of the sample populations, 121(39.80%) of them are found within the age bracket of 25-40, 178(58.6%) of them aged between 41- 60 whereas 5(1.60%) them aged 61 and above years. With regard to family size of respondents, 35(22.58%) and 22(14.77%) of households with good access and poor access to road possess family size between zero and three respectively, and 73(47.1%) and 66(44.29%) possess between 4-6 respectively while 47(30.32%) and 61(40.94%) of households from good and poor access to road had family size of seven and above.

3.2. Impact of Road Transport on the Livelihood Conditions

3.2.1 Impact on Income Conditions

For the two groups of households, the mean of the socio-economic variables are computed and comparison had been made to test the existence of significant difference. According to Montgomery, (2000) the appropriate test statistic to use for comparing means of two samples in the completely randomized design is the two-sample t test.



Table 3.1 Impact on Households' Economic Conditions

Socio-economic variables	Poor access (Mean)	Good access (Mean)	T-test
Household annual income (in birr)	6346.31	10546.45	-4.952(p<0.0001)
Total farm size (in hectare)	3.26	2.57	4.706(p<0.0001)
Total Cultivated land (in hectare)	1.91(58.6%)	1.89 (73.5%)	0.093(0.926)
Off- farm income (in birr)	2412.50	5431.03	- 5.692((p<0.0001)
Distance of potable water (in kms)	1.18	1.12	0.65(0.516)
Annual expenditure on non-farm products (in birr)	1735.23	2188.26	-2.933(0.004)
Annual expenditure on agricultural inputs (in birr)	1401.01	1716.45	-3.127(0.002)
Amount of product supplied to market (in quintal)	8.15	18.10	- 7.202((p<0.0001)
Cost of buying farm product (in birr)	137.58	222.58	-1.389(0.166)

Source: Household Survey, 2016(p-values are given in the parenthesis)

As can be clearly seen in the above table, the independent t-test shows that many of the socio-economic variables; household total annual income, total farm size, household off-farm income, household's annual expenditure on non farm products, household's debt and amount of products supplied to market were statistically significant at ($p < 0.0001$) confirming the hypothesis stated as poor road transportation in the rural communities negatively affects households' income.

Road accessibility makes markets available for agricultural outputs stimulating cash-crop farming. It also influences access to off-farm employment opportunities, diversifies income and creates more opportunities for nonfarm income. In line with this, Hine (2002) stated that access to transport, by providing better access to markets, increases the opportunity for farm production and off-farm opportunities.

With regard to the type of off-farm activity they were engaged, the households were reacted to an open question. Accordingly, accessibility to road provided off-farm employment opportunity for only 9(6.04%) of households with poor access to road compared to 29(18.7%) of households with good access to road.

In addition, the difference of the mean of households' expenditure on farm inputs among the good and poor access to road is statistically significant. This finding was similar to the result found by Legesse, (2001) in that distance to market is negatively associated with the use of production enhancing inputs. Therefore, this provides clear evidence that rural isolation is associated with low agricultural productivity linked to poor market access and low use of fertilizers and modern agricultural technologies. The immediate implication of farmers'



lack of access to market means lack of income for production inputs, consumer goods and immediate cash requirements, and prevents asset accumulation. Market access, thus, influences farmers' production systems: those who live close to better roads produce more of cash crops for the market while those with poor market access are forced to produce mainly cereal crops for home

consumption. Notwithstanding to the level of accessibility, not significant variation in total cultivated land, distance of potable water and cost of buying farm products among the two groups of rural households was found. Moreover, the results of FGD and key informant interview further supplemented the results of the household survey.

3.2.2 Impact on Access to Markets

Table 3.2 Independent T-tests for prices of agricultural crops and commodities at the two markets

Variables (prices at local market)	Poor access (mean in Birr)	Good access (mean in Birr)	Independent t-test	Carl Pearson's Correlation (Distance of all-weather road)
Maize (in quintal)	303.56	390.13	-49.557(p<0.00001)	-0.967(p<0.0001)
Wheat (in quintal)	629.73	779.09	-93.617(p<0.0001)	-0.978(p<0.0001)
Teff (in quintal)	1197.98	1405.80	-45.514(p<0.0001)	-0.945(p<0.0001)
Coffee (in kilogram)	52.42	60.64	-41.00(p<0.0001)	-0.928(p<0.0001)
Potato(in kilogram)	324.76	378.74	-46.898(p<0.0001)	-0.952(p<0.0001)
Tomato (in kilogram)	4.35	7.34	-41.142(p<0.0001)	-0.931(p<0.0001)
Butter (in kilogram)	121.34	143.17	-46.110(p<0.0001)	-0.948(p<0.0001)
Kerosene (in Littre)	25.05	22.38	15.373(p<0.0001)	0.683(p<0.0001)
Oil (in Littre)	47.19	40.00	51.272(p<0.0001)	0.950(p<0.0001)
Sugar (in kilogram)	34.80	27.89	25.800(p<0.0001)	0.836(p<0.0001)

Source: Household Survey, 2016

(p-values are given in the parenthesis)

As clearly observed from the above table, the difference of the average prices of agricultural products (maize, wheat, teff, coffee, potato, tomato, and butter) and commodities (kerosene, oil and sugar) between the local markets of the two groups (poor and good access households) is statistically significant. In other words, the result of Carl Pearson's correlation shows that the market price of agricultural products is negatively correlated to the distance of the all-weather road. This indicates that the more households are further from the all-

weather road, the higher the market price of the commodities. This finding is similar with the study conducted by Ellis, (2003) who found that families with good access to the main road made more use of the road and were better off on average than those who are in poor access to the road. On the ground of this discussion, one can easily deduce that households with poor access to road are indirectly paying transport costs by reducing the market price of their products



4. Conclusion

Although many remain to be studied, this study delved on the impact of road transport service on the livelihood conditions of rural households in Sibu Sire district. Accordingly, after a thorough collection and comprehensive analysis of the relevant information, the researcher confidently draws the following main conclusions.

Rural households with poor access to road possess lower total annual and off-farm income compared to those at good access to road households which was statistically significant at ($p < 0.0001$) confirming the established hypothesis.

It was investigated that accessibility to road provided off-farm employment opportunity for only 9(6.04%) of households with poor access to road compared to 29(18.7%) of households with good access to road.

It was also found that the difference of the mean of households' expenditure on farm inputs among the good and poor access to road was statistically significant.

Rural households with good access to road possess the lion's share of the provision of loans by micro-finance institutions.

Notwithstanding to the level of accessibility, not significant variation in the total cultivated land, distance of potable water and cost of buying farm products among the two groups of rural households was found.

5. Recommendations

It is generally understood that the availability of roads facilitate rural development, improve mobility and solve transport access-related problems; while good road access enhances livelihood

conditions and income earning opportunities that in turn foster the achievement of sustainable development. To bring this to a good end, the government agencies (transport stakeholders) and non-governmental organization need to take the following proactive intervention strategies.

The concerned bodies need to pay attention for construction of feeder all-weather roads for the poorly accessible rural communities.

Promoting equitable and efficient access to markets as well as pricing and payment for agricultural products and consumer goods for households with poor access to road

Ensure provision of credit services and market accessibility mainly for households with poor access to road.

Stimulate rural development by creating off-farm employment opportunities and encouraging community participation in the process.

Moreover, regular monitoring and evaluation of impact of access to road on livelihood conditions of rural households need to be undertaken.

Acknowledgements

The author would like convey his gratitude to Dr. Fekadu Gurmessa for his professional guidance and constructive comments throughout the completion of the study. I would also like to extend my gratitude to Sibu Sire *Woreda* Transport Agency in providing the relevant information of the study area.

The author declare that there is no conflict of interest on the issue



References

Abeje T.(2013). A Bird Eye View on Ethiopian Rural Road Service: Addis Ababa

Airey, A. (2002). A Study of Household Travel in the Meru District of Kenya: TRL Report 353.

Anderson, A. (2005). The community builder's approach to theory of change: A practical guide to theory development. New York: Aspen Institute Roundtable on Community Change

Bunjo, B.(2012) . Rural transport: Improving its Contribution to Rural Growth and Poverty Reduction in Sub-Saharan Africa.WorldBank,Washington DC.

Ellis, S. (2003). Key Issues in Rural Transport in Developing Countries, Transport Research Laboratory, and Overseas Development Administration, TRL Report 260.

Hine.J. (2002). *Transport and Priorities to Improve Food Security in Ghana and the rest of Africa*; Paper Presented to

International Symposium: Regional Food Security and Rural Infrastructure.

IFAD (2001). Rural Poverty Report 2001. Rome: International Fund for Agricultural Development

Legesse, D. (2001). Empirical Analysis of Duration of Herbicide Adoption in Teff Based Farming System of West Shewa Zone, Ethiopia. *Journal of Agricultural Economics*.

Montgomery. D (2000). Design and Analysis of Experiments. 5th Edition. New York: John Wiley & Sons, Inc.

RLEPOSSD (2013).Rural Land Environmental Protection Office of Sibu Sire District

SSRA (2016).Sibu Sire Road Authority

World Bank (2003). World Development Report 2001. Infrastructure for Development; World Bank, Washington, DC

World Bank (2006). World Development Report 2007: Development and the Next Generation.