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Public Infrastructures and Livelihood Strategies: The Case of Rural Households in Kersa District, Jimma Zone

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Abstract

Public infrastructures: roads, agricultural extension services, electricity, ICT, protected water sources, irrigation, formal education centers, and formal health centers are essential for human-being in diversifying their livelihood strategies. The general objective of this study is to examine the possible effect of rural public infrastructures on the rural households' livelihood strategies. The empirical assessments elsewhere in Ethiopia and the circumstances on the rural livelihood in association with public infrastructures have conferred the paucity of sociological research. This study used the pragmatist research philosophy that advocates ontological and epistemological mixes in an effort to minimize the gaps noted on the empirical knowledge. Accordingly, the research strategy employs the triangulation of quantitative and qualitative approaches. As mirror to the methodological triangulation, the analysis has followed a mixed design that combines descriptive and inferential techniques with the themes emerging through qualitative explorations. Cross-tabulation descriptive statistics and binary and multinomial logistic regression were employed. Consequently, the findings of the research revealed that public infrastructures have a significant influence on livelihood diversification strategies. Specifically, there were significant associations whereby households who have access to assume infrastructures did more likely engage in mixed livelihood diversification strategies than households who don't have access to respective rural public infrastructures. The findings from qualitative data also emphasize indispensability of given public infrastructures for diversification of livelihood strategies. Thus, by including cultural elements of local people, responsible

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bodies should increase the required resources for the purpose of upgrading and managing public infrastructures particularly on all-weather roads.

Keywords
Public infrastructures; livelihood; livelihood strategies; rural household; and livelihood diversification strategies

1. Introduction

1.1 Background of the Study

The beginnings of public infrastructures construction can be traced as far back as the Roman Empire two thousand years ago. The industrialization in Europe of the 19 century brought rapid urbanization and expansion of public infrastructures such as transport (railways, tramways, metropolitan), water supply and sewerage and energy. Nowadays cross the globe, infrastructure is the lifeblood of prosperity and economic confidence (Phillips and Roth 2013).

Access to public infrastructures is often identified as a key factor for sustained and rapid socio-cultural, economic and political development for rural people (Mensah, Bourdon and Latruffe 2014). Improved rural infrastructure also leads to expansion of markets, improvement of food security, social participation, female participation, and job opportunities. The development of rural infrastructure also helps to enlarge services with greater access to factors of production and productivity. The female labor participation rate increases as traditional taboos against it are overcome with public infrastructures enhancement (Rahman 1993). Easier access to rural public infrastructures allows diversification of livelihood diversification strategies (Bryceson and Bradbury 2008).

Because of well documented importance of rural public infrastructures to promote the above listed and other advantages for rural people, either national governments or international aid agencies seem to prioritize investments in the construction of new public infrastructures and maintenance of existing infrastructures. The UN Millennium Project (2005) has re-emphasized the need for a ‘big push’ strategy in public investment to help

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poor countries and groups of people break out of their poverty trap and meet the MDG goals. Regarding public infrastructures in Africa; infrastructure has been responsible for more than half of Africa's recent improved growth performance and has the potential to contribute even more in the future (Foster and Briceño-Garmendia 2010). In addition, African governments need further scientific researches for the purpose of bringing a balanced socio-economic development in selection, funding, implementing, monitoring and evaluating the projects of rural public infrastructural development (ADB 1999).

Ethiopia is the second-most populous country in Africa with a population of more than 100 million. It is one of the world's poorest countries. It has lowest level of public infrastructure particularly in rural areas of which an estimated 83 percent of the country's population lives (CSA 2015). Nowadays, it is alleged that the fundamental causes of poverty, isolation, powerlessness, vulnerability, unemployment, and high income inequality are insufficient and also unequal access and custody of public infrastructure (Escobal 2005). As a result, international community in general and Ethiopia government in particular are promoting basic services program at a national and local levels to improve access to and quality of public infrastructures such as education, health, water supply, rural roads, agricultural extension services, electricity, ICT, irrigation, and credit services (FAO 2014).

Researchers (such as Baron 2010; Dubale 2010; Tirkaso 2011; Mogues 2011; Assefa, Bienen, and Ciuriak 2012; Deribe and Roda 2012; Kahssay and Mishra 2013; Demenge, Rossella, Katharina, Alemu, and Kebede 2014; Derso, Mamo and Haji 2014; FAO 2014; Shiferaw, Söderbom, Siba, and Alemu 2015;) studied the role of a given specific infrastructures in improving the life of rural people in socio-economic and political aspects. They all come up with the findings that improvement in a given public infrastructure improves the livelihood outcomes (augmentation of household incomes, boost of production and productivity, improvement of human and social well-being, decreasing poverty, increment of natural resources conservation and management, decrement of vulnerability and increment of working days) through diversifying livelihood strategies. Although many studies were done so far on the impacts of public infrastructure on the

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livelihood outcomes, there are still gaps that this study anticipated to fill. Most of the researches didn't show the correlation among livelihood strategies and combination of public infrastructures in the context of accessibility of public infrastructures. Thus, this study attempted to fill this gap.

1.2 Objectives of the Study

1.2.1 General objective

The general objective of this study is to investigate the possible effect of accessibility to public infrastructures on rural households' livelihood strategies in the case of Kersa district, Jimma Zone.

1.2.2 Specific objectives

- To identify the nature and types of livelihood strategies along with an enlargement of public infrastructures
- To examine an association of public infrastructures towards rural households' livelihood strategies
- To find out the possible effect of accessibility of public infrastructures on livelihood diversification strategies

1.3 Significance of the Study

This study will provide a solid document that might be used as a source of information regarding, the impact of rural public infrastructures on rural livelihood strategies, for various actors (readers, students, researchers). It will also help the responsible bodies and stakeholders of an area, in which the study was conducted, to get information, to improve

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strategic plans and to reconsider social policy. This can be possible through publishing and providing a finding document to responsible bodies.

1.4 Limitations of the Study

Several limiting contexts present challenges to the level of progresses required in this study. The scantiness of empirical research, unavailability of forums and scientific papers exclusively or primarily dedicated to the effects of public infrastructures on livelihood strategies created challenges to the research's endeavour.

2. Literature Review

2.1 Conceptual Framework

The selected conceptual framework among the definitions of public infrastructures is the conceptualization of the conventional theory on public goods that recognize public infrastructures as goods that are typically technical indivisible, have low excludability, long life and are rarely traded (Escobal 2005). Ahmed and Donovan (1992) recognize that with the increasing importance of the role of agriculture in economic development, the literature started including agricultural research, extension services, financial institutions or/and irrigation as part of a much broader concept of infrastructure.

A lot of researchers envisage that infrastructure investments may have macroeconomic and microeconomic impacts. At the macroeconomic level, improved access to new infrastructure services may change the marginal rate of return of the main infrastructure, but it may also affect the marginal rate of return of other public infrastructure as well as the returns to those private assets that are already in the hand of the poor. On the other hand, microeconomic effects can be traced through changes in market specific relationships or household specific behavioral changes (Escobal 2005).

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2.2 The livelihood Impact of Public Infrastructure: Theory

Sustainable livelihood outcomes approaches are based upon evolving thinking about poverty reduction, the way the poor live their lives, and the importance of structural and institutional issues. The twin influences of the policy framework and governance, which have dominated much development thinking since the early 1980s, are also reflected in sustainable livelihood, as is a core focus on the community. Community-level institutions and processes have been a prominent feature of approaches to natural resource management and are strongly emphasized in sustainable livelihood approaches, though in sustainable livelihood the stress is on understanding and facilitating the link through from the micro to the macro, rather than working only at community level (Ashley and Carney 1999).

2.3 The Impacts of Infrastructure on Livelihood Sustainability

Several studies conducted and show that rural infrastructure (both physical and institutional) such as irrigation, watershed development, rural electrification, roads, markets, credit institutions, rural literacy, agricultural research and extension together play a key role in determining the people livelihood (Narayanamoorthy and Hanjra 2006). In this regard, the work made by Chaya (2007) argued that the existing poor transportation and communication outlets limited provisioning of basic health services for societies residing in rural and remote areas especially on times of emergencies needed.

2.4 Policy Framework of Infrastructures

The development of public infrastructures enables all countries to achieve the MDGs, there should be identification of priority public investments to empower poor people, and these should be built into MDG-based strategies that anchor the scaling-up of public investments, capacity-building, resource mobilization, and official development assistance. Seven main investment-and-policy clusters are identified in the areas of rural development; urban

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development; health systems; education; gender equality; environment; and science, technology and innovation. This 'big push' strategy is designed to set low-income economies on a growth path that will become self-sustainable, as core investments in infrastructure and human capital will enable poor people to join the global economy and establish the basis for private-sector-led diversified exports and economic growth (Anderson, Renzo and Levy 2006).

3. Research Methods

3.1 Study Setting and Population

The study area is in the Oromia National Regional State (ONRS) of Ethiopia, Jimma Zone administrative area. According to the CSA (2015) census, the Oromia regional state has a population of 33, 692,000 of which 4,880,000 is urban dwellers and 28, 812,000 is rural dwellers (CSA 2015). Jimma Zone is purposively selected from the zones of Oromia region. The total population of Jimma zone is 2,986,957 of which 1,498,021 are male and 1,488,936 are female.

Kersa is one of the woredas in the Jimma Zone of the Oromia Region of Ethiopia. It is bordered in south by Dedo, southwest by seka chekorsa, west by Mana, north by Limmu kosa, northeast by Tiro afata and southeast by Omo nada. The altitude of this woreda ranges from 1740 to 2660 meters above sea level; mountains include Sume, Gora, Kero, Folla and Jiren.

3.2 Research Design

The study at hand deployed a mix of both quantitative and qualitative designs. The philosophical foundation of the study is pragmatism. The reasons for the selection of pragmatic approach are: to use variety of data sources, to use multiple methods in the study at the same time or one after the other and to use multiple perspectives to interpret the

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results. Approximating longitudinal survey with cross-sectional design was employed. The researchers selected this study design because there were no baseline data in the study area.

3.3 Methods of Data Collection

A. Household survey

The data which were collected through household survey are: demographic and socio-economic data (age, sex, religion, marital status, educational status, household's size); nature and changes of livelihood diversification strategies; and accessibility to a given infrastructures.

B. In-depth Interview

In-depth interview was employed in collecting detailed information to substantiate quantitative data and to offer a complete picture of association among accessibility of public infrastructures and livelihood strategies. Hence, *kebeles*' elders – 16 individuals (four from each *kebele*) were purposively selected and deeply interviewed. The researcher selected the above participants assuming that they have experience on issues under study and can provide profound information on the changes of livelihood strategies as a result upgrading public infrastructures.

C. Key Informant Interview

In the opinion of Bernard (2006), key informants are groups of people with whom the researcher talks and communicates extensively over a lengthy of duration. The key informant interview was held with key individuals on all selected sectors of public infrastructures. Accordingly, the head of all respective infrastructures (sectors) bureaus at district level – 16 individuals (two each) from office of: health; education; water, mineral and energy; irrigation and rural development; electricity (power); transportation; agricultural; and ICT were interviewed about an associational changes of public infrastructures and rural livelihood strategies and its diversification.

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3.4 Instruments of Data Collection

In this study, the main data-generation instruments were structured questionnaires and semi-structured checklists. The primary objective of structured questionnaire was to elicit quantitative information from households' heads. The preparation of structured questionnaires, i.e. the instruments followed a design that hastens enticing pertinent information from the target groups. Items on each of the instruments communicated clearly the purposes of the study, shaded light on precautionary ethical issues and explained the powers of following instructions while filling out the questions. Altogether, the contents of the questionnaire items covered issues on an association and extricable effect among an accessibility of public infrastructures and livelihood strategies.

Checklists used for the qualitative field research were semi-structured guides that elicited qualitative information (meanings, words and ideas) through deeper consultations from informants, key informants and discussants.

3.5 Sampling and Sample Size

Since it was possible to access the lists of the residents from the respective study *kebeles*. This quality marked simple random sampling technique as the most appropriate to be used. From thirty one rural Kebeles, four kebeles (Tolikarso, Bulbuli, Babo and kallacha) were randomly selected. Thereby 255 households were selected by simple random sampling; and lottery method of sampling was utilized among its strategies. The sample size was determined depending on the formula of Yamane (1967:886) because it's the simplified in the case of finite population. The formula considers 95% of confidence, and 5% margin of error. The formula is $n = N / [1 + N (e)^{2}]$; where n is the sample size, N is the population size, and e is the level of precision.

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3.6 Reliability and Validity

The aspects of inter-rater technique of reliability proved its usefulness in the context of the pilot testing. The inter-rater reliability assessed the reliability of research instruments by utilizing four interviewers per site (Tolikarso, Bulbuli, Babo and kallacha). Internal consistency of instruments was assured by the split-half correlation. The two halves of an instruments provided similar result of (r = .88). Subsequently, instruments had strong internal consistency. The researchers believed that the items on the instrument captured the concepts that are essential in the research.

3.7 Methods of Data Analysis

The analysis applies a mixed design. Quantitative analysis uses the numeric data gathered through the sample household. The quantitative data applied both the techniques of descriptive and inferential statistics. The descriptive analysis emphasizes on percentages, central tendencies and graphic presentations. Consequently, the interpretations followed presentations made through frequency tables portraying numeric facts in different chapters of the study. The results conferred the prevailing relationships among the variables compared through column percentages. In addition, the Phi-coefficient, Lambda-coefficient and Spearman's Rho-coefficient help to explain the strength and direction of association wherever the data appeared apparent. The qualitative data were transcribed, categorized, interpreted and schematized based on their respective contents and themes. The meanings, words, symbols and argumentative texts have formed basic premises in the structures of reporting the sub-titles, sections and chapters.

3.8 Ethical Considerations

In conducting this study, an ethical considerations and safety measures were made. Accordingly, before going to the field the letter from Jimma University, college of social

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sciences and humanities research coordinate, was taken and given to the *woreda* administrative and other required bodies. After we went to the field and contacted with respondents, the purposes and importance of the study were 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 be kept confidential. That is, the confidentiality and anonymity of information were strongly maintained.

4. Results and Discussion

This chapter deals with data analyses and presentation of the study and attempts to answer the research's objectives concerned with possible effect of public infrastructures on the rural livelihood strategies in four *kebeles of* Kersa district. Specifically, it includes about the presentation of: (a) demographic and socio-economic information of respondents; (b) nature and types of livelihood diversification strategies (mixed livelihood strategies, only non-farm strategy, merely off-farm strategy, purely farming strategy and others) along with accessibility of public infrastructures; and (c) possible effects of accessibility to public infrastructures (all season road, formal health centers, formal education centers, ICT, protected water sources, agricultural extension services, electricity, and irrigation) on livelihood strategies diversification.

4.1 Demographic and Socio-economic Characteristics of Sample Respondents

This section presents demographic and socio-economic variables such as sex, age, religion, educational status, and marital status.

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Table 4.1: Sex, age, religion, educational status, and marital status of respondents

Variables	Category	Frequency	Percent
Sex	male	218	55.5
	female	37	14.5
Age	<30	3	1.2
	31-40	20	7.8
	41-50	99	38.8
	51-60	33	12.9
	61-65	80	31.4
	>65	20	7.8
Religion	orthodox	31	12.2
	Islam	199	78.0
	Protestant	17	6.7
	Other	8	3.1
Educational status	Can't read and write	99	38.8
	Grade 1-8	96	37.6
	Grade 9- 10	45	17.6
	Grade 11 - 12	9	3.5
	Diploma holder	3	1.2
	Degree and above holder	3	1.2
Marital status	Married	192	75.3
	Divorced	16	6.3
	Widowed	47	18.4

Source: Household Survey 2016

Table 4.1 shows that the majority of the respondents were male (55.5 percent) and followed by (14.5 percent) of female. Concerning age, majority of respondents were fall under a category of 41-50 (38.8 percent) and followed by 61-65 (31.4 percent), 51-60 (12.9 percent), 30-40 (7.8 percent), > 65 (7.8) and <30 (1.2 percent) respectively.

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Regarding religion of respondents the majority of respondents were Muslims (78.2 percent), followed by Orthodox (12.2 percent), Protestant (6.7 percent), and other (3.1 percent) respectively. On the subject of educational status of the survey respondents, the majority of the respondents 99 (38.8 percent) were can't read and write. The second largest were those between grade one and eight 96 (37.6 percent). An accumulation of respondents below grade eight were 76.4%. The smallest were those who hold diploma and who hold degree and above each of 3 (1.2 percent). To conclude the mainstream of the sample households 192 (75.3 percent) were married; followed by widowed 47 (18.4 percent) and divorced 16 (6.3 percent) respectively.

4.2 Accessibility to Public Infrastructures and Livelihood Diversification Strategies

The people in the study area have involved in numerous livelihood diversification strategies. In so doing, describing about the nature and types of these livelihood diversification strategies has a lion share in presenting the possible effect of an assumed infrastructures on it.

Diversification as a livelihood strategy is defined as a process in which the person or the rural family unit builds a group of activities and goods looking for better ways of living (Ellis 2000). One of interviewed respondents stated that, "diversification is our norm. Very few people manage their life by single source, hold all their wealth in the form of any single asset, or use their assets in just one activity." This implies that almost all of rural households diversify their life. For the purpose of this study, the researcher has grouped it into: (1) mixed livelihood diversification strategies – messing one or more of activities from either off farm activities, non-farm activities, farming activities and others; (2) only off-farm[1] strategy – fetching from only one or more off farm activities such as land renting to other farmers, purchasing additional farm land, and employment on another farm; (3)

[1]Some authors use off-farm strategy and non-farm strategy interchangeably. However, for the purpose of this study, the researcher used: off-farm strategy as activities made up of agricultural wage income; while non-farm refers to those activities that are not primary agriculture or forestry or fisheries.

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only non-farm strategy - endearing in only one or more of non-farm activities such as daily employment out of farm (skilled, semi-skilled and non-skilled worker); and small business (charcoal production, quarrying and production of building materials, furniture making, carpentry, painting, pottery, baskets making and selling); (4) only farming strategies (specialty crops, organic and biomass production, and crop harvesting); and (5) others - appealing with either getting social help, family and friends help, or begging. Reardon et al. (2007) found that the development of public infrastructures have significant effect in increasing non-farm activities besides agricultural activities.

In other words, the percentage of respondents who affianced in mixed strategies were (60.4 percent) followed by only farming strategy (19.6 percent), only non-farm strategy (9.8 percent), and 5.1 percent each of only off-farm strategy and other. This is equivalent to saying that the probability of engaging in mixed, only farming, only non-farm, only off farm and other strategies in sample were 0.604, 0.196, 0.098, 0.051, and 0.051 respectively.

Majority of respondents claimed that accessibility to public infrastructures suggestively initiates them to engage in mixed livelihood diversification strategies. Consistently, one respondent argued that, “an access to a given infrastructures can easily expand our means of income generation.” Majority of key interviewed respondents from different sectors also contended as an upgrading of a given public infrastructures is a pull factors for rural households in diversifying their income generating activities. Consistently, Fernando and Porter (2002) found that facilitating mobility can empower women to gain greater control over their own lives by increasing their access to markets and their exposure to education, training, and information and by offering them more opportunities for political participation. Likely Paudel (2014) found that transportation facilities were significantly aided to increase in participation of women in social and income generating activities.

Of 113 who have an access to all-weather roads, 62.8 percent mixed their livelihood diversification strategies while the remaining fell in either one of a categorized livelihood diversification strategies. The chi-square test shows that there was significant and

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positive association between all-weather roads and livelihood diversification strategies with (χ2 (4), 255 =131.881, P=0.000) at (α=0.05). The phi coefficient reported that there is strong association between variables with (Φ=0.719) value.

Expert from transport office indicated as, "all-weather road helps rural people particularly youth in diversifying their income generating activities." Expert from agricultural and development office also added, "all-weather road helps rural people to expand their production from that of only for consumption to that of for market." Likely Gibson and Oliva (2009) argue that there is growing interest in the rural non-farm sector in developing countries as a contributor to economic growth, employment generation, livelihood diversification, and poverty reduction.

Regarding public education centers, of 137 respondents who have an access to it, 78.1 percent encompassed in mixed strategies while the remaining incorporated in either one of a given strategies. The Chi-Square test found positive and significant association between an access to formal education centers and livelihood diversification strategies, with (χ2 (4) =40.992, P=0.000) at (α=0.05). The Lambda coefficient with the value (0.347) also reported the strength of the association to be moderate. Likely, officer from education office claimed that:

> *Formal education centers are where knowledge is produced. The existence of education centers at nearby of households home initiate them to learn for themselves and send their children to school. Thus education increases farmers' ability to use their labor and other assets effectively and efficiently.*

Regarding public health centers, of 111 respondents who have an access to it, 80.2 percent mixed their livelihood diversification strategies. The Chi-Square test also shows positive and significant association with (χ2 (4) =36.44, P=0.000) at (α=0.05). The Lambda coefficient with the value (0.216) reports that the association had weak ties. In addition, officer from a district's health office contended that:

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> *The main objective of health posts are to keep healthy of community. If they are healthy, they engage in whatever they want. This means, there is no predecessors of health. Thus over all, through keeping health of society, health centers increases livelihood diversification for rural community.*

The majority of respondents; who have an access protected water sources (91.7 percent) engaged in mixed strategies and those who have not an access (37.4 percent) betrothed in only farming activities. The association was tasted significant and positive with ($\chi 2$ (4) =116.2, P=0.000) at (α=0.05). The lambda coefficient with the value (0.642) reports that an association had moderate influences. An expert from water, energy and mineral office also claimed this as:

> *In areas where water is not available, women and children travel tens of kilometers to fetch water. This is seen through queues in water points during dry seasons. Disease associated with water affect the poor with greater margins as compared to those who have an access with a burden of ill health that creates a vicious cycle of poverty and sickness.*

The majority of respondents who have an access to ICT (87.7 percent) encompassed in mixed strategies while those who have not an access (32.8 percent) engaged in farming activities. The association between an access to ICT and livelihood diversification strategies was tasted significant and positive with ($\chi 2$ (4) =55.1, P=0.000) at (α=0.05). The lambda coefficient with the value (0.552) states that there was moderate association between ICT and livelihood diversification strategies. An interviewed respondents also witnessed, “An access to ICT components particularly to mobile is highly helping us to diversify our livelihood diversification strategies.”

Of 159 respondents who are getting agricultural extension services, 88.5% mix their livelihood diversification strategies. Getting agricultural extension services and diversifying livelihood diversification strategies were significantly and positively associated with ($\chi 2$ (4) =51.2, P=0.000) at (α=0.05). However, the strength of the association between the variables was weak (Φ=0.448). One of interviewed agricultural extension workers also added as, “We are teaching and showing people about the nature

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and advantages of diversifying their livelihood diversification strategies by using the resources they have effectively and efficiently."

All of respondents who have an irrigation access managed their life by engaging in mixed livelihood diversification strategies. The chi-square test found the significant and positive association between an access to irrigation and livelihood diversification strategies with (χ2 (4) =15.1, P=0.000) at (α=0.05). However, cramer's V coefficient[2] with value (0.243) reports that there was very little strength of an association.

Finally, an access to electricity had also a significant and positive association with livelihood diversification strategies with (χ2 (4) =50.9, P=0.000) at (α=0.05). However, (Φ=0.348) reports shows weak association between variables. Unswervingly, Beyene and Muche (2010) found that development interventions aiming at increased income diversification will immensely and significantly contribute to the attainment of food security. Gachassin, Najman and Raballand (2015) also found that Better road access increases the number of activities within households. This corresponds to a 'pull' factor that draws people into greater earnings opportunities. By connecting places, people, and opportunities, tarred roads can act as a development tool in rural areas of Africa. In addition, table 4.8 below presents the parameter estimates of the level of livelihood selection consequences of an access to public infrastructures.

5. Conclusion and Recommendations

This chapter begins by offering a glimpse on the core foundations of the inquiry. It draws the conclusions based on the presentations, analysis and discussions made in the previous chapter. It also forwards a range of implications to public infrastructural development, policy practice, institutional operations and casts light on public infrastructures and rural livelihood research that seeks perfection.

[2]A measure of association independent of sample size. This statistic is a modification of the Phi statistic so that it is appropriate for larger than 2 × 2 tables. V ranges between 0 (no relationship) and 1 (perfect relationship).

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5.1 Conclusion

Conclusions entail empirical knowledge generated on the two inter-related key components of the study: an accessibility of public infrastructures and rural livelihood diversification strategies. Regarding demographic and socio-economic backgrounds, majority of rural household's head are male, can't read and write, marriage, and have greater than five households members respectively.

Public infrastructures coverage in rural parts of Ethiopia is at infant stage. However, large number of people live in rural areas. In other words, the demand of rural people about public infrastructures couldn't be answered. They are using traditional means of life in place of these infrastructures. As a result, they can't get an access to compulsory livelihood strategies easily.

The levels of public infrastructures and livelihood diversification strategies are directly related with each other among rural communities. As there is low level of access to public infrastructures, there is low level of livelihood diversifying livelihood strategies. All public infrastructures are significantly and positively associated with an engagement of rural people in mixed livelihood diversification strategies. They move from a single strategy to multiple strategies proportionally to access to a given specific infrastructure. All-weather roads, electricity, ICT and agricultural extension services might initiate rural people to start pity trade, engage in skilled and unskilled labor wage, share farming land with other, and etc. for instance, if there is no road there is no production for market but only for consumption. So, an advancement of public infrastructures leads rural households to diversify their livelihoods which inextricably intimates to achieving improved rural livelihood. This is also consistent with 'multi-voicedness' principle of activity theory which argue that livelihood diversification is a multiple role division among household's members that leads to livelihood outcomes' components improvement.

Finally, an advancement of public infrastructures and rural livelihood strategies are intractably associated with each other. This is consistent with the conclusion of Ellis

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(2000), who argued, "Livelihood includes natural, physical, human and financial goods, and social capital. Facilities to access these goods determine rural families´ livelihood and well-being." Similarly, an access to public infrastructures improves rural livelihood strategies simultaneously. Analyzing one of them separately from the others is problematic. In other words, to get a full map of rural people with its objective oriented activities, multi-voicedness, historicity, contradictions and transformation; studying instantaneously about the possible effects of public infrastructures on the complex and changing rural livelihood assets, strategies and components of outcomes have a decisive role.

5.2 Recommendations

The implications of the research call for ways to merge the theoretical claims and the practical actions pertaining to effect relationships between rural public infrastructures development and livelihood improvement. In this respect, the research forwards a range of intertwined implications to development, research, policy and institutional operations in view of promoting the practices associated with the sociology of rural sociology.

All sectors of government should keep on in constructing new public infrastructures and maintaining the existing ones. Lagging of public infrastructures coverage resulted in lagging of rural people livelihood improvement. The more public infrastructures constructed the more the more rural people diversify their livelihood strategies.

Local communities' culture is not at the center of public infrastructures development and by implication pushed away to the fringes of socio-cultural development. Locals are in the margins of the wider interactional scenarios and benefits. A countervailing initiative, taken by responsible organs, should reconsider ways to educate, train, re-orient and abridge direct stakeholders who give services to the rural community about a local cultures and mores.

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Upgrading public infrastructures is not inclusive. For example rural people could not use the languages by which messages are sent for them from telecommunications. Urban people treat them again as they are far from information. These lead them to fearing of asking for their rights in utilizing public infrastructures. Thus responsible bodies should work on raising awareness on the rights and duties of rural people in accessing and utilizing public infrastructures.

Public infrastructures intervention programs need to pursue a more clearly defined gender strategy to ensure participation by women in infrastructures resource management and decision making in all aspects. Public infrastructures users, especially women and children, should be among those consulted during the planning stage before any decisions are taken about public infrastructures improvement. Finally, the aim and purpose of construction should be vibrant and unambiguous. In other words, the sectors working on specific public infrastructures should be transparent and accountable.

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