

<i>Editorial Note</i>	4
<i>Road development and its impacts in Ethiopia,</i> Belew Dganew	5
<i>Community participation in cobblestone road provision: a case study of Injibara, Amhara Region, Ethiopia,</i> Ayalsew Kindihun & Samson Kassahun	22
<i>Health sector performance in Ethiopia: a study in regional disparities</i> Kanchan Singh	36
<i>Determinants of women's participation in environmental protection and management in selected towns of North Wollo, Amhara Regional State, Ethiopia,</i> Sisay Demeke	55



BUILDING CAPACITIES IN THE
CIVIL SERVICE

Ethiopian Civil Service University
Addis Ababa, Ethiopia
P.O. Box. 5648

ADVISORY BOARD MEMBERS

EDITOR-IN-CHIEF

Prof. Samson Kassahun

MANAGING EDITOR

Dr. Zerihun Doda

EDITORIAL BOARD MEMBERS

Dr. Almaz Baraki	KMU, Ethiopia
Dr. Kassa Teshager	ECSU, Ethiopia
Dr. Desalegn Shamebo	ECSU, Ethiopia
Dr. Firew Mengistu	ECSU, Ethiopia

The African Journal of Development Studies is published twice per year by Ethiopian Civil Service University, CMC Road, P. O. Box 5648, Addis Ababa, Ethiopia. Manuscripts: The JADS invites the submission of unsolicited articles, essays, and book reviews. Article submission should include an abstract of not more than 250 words. JADS is a multidisciplinary, rigorously peer-reviewed journal dedicated to publishing the finest scholarship relating to development issues in Ethiopia, the African continent and beyond. JADS invites the submission of original manuscripts on a full range of topics related to Africa in all disciplines relating to development. To qualify for consideration, submissions must meet the scholarship standards within the appropriate discipline.

© Ethiopian Civil Service University. 2019. Addis Ababa, Ethiopia. P.O. Box 5648. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission in writing from the proprietor

ISSN 2079-0155

Layout & Design: Dr Zerihun Doda

Typeset using Affinity Publisher 1.7.1

<i>Editorial Note</i>	4
<i>Road development and its impacts in Ethiopia,</i> Belew Dganew	5
<i>Community participation in cobblestone road provision: a case study of Injibara, Amhara Region, Ethiopia,</i> Ayalsew Kindihun & Samson Kassahun	22
<i>Health sector performance in Ethiopia: a study in regional disparities</i> Kanchan Singh	36
<i>Determinants of women's participation in environmental protection and management in selected towns of North Wollo, Amhara Regional State, Ethiopia,</i> Sisay Demeke	55

JOURNAL OF AFRICAN DEVELOPMENT
STUDIES
VOLUME 6, No 2, DEC. 2019

Editorial Note

JADS is a re-instituted journal after seven years of interruption. Congratulations to all the editorial board members and the University management for realizing this noble goal! Having been re-instituted in February 2019, the new JADS Editorial Board embarked on a series of institutional and framework setting and building for the journal. Volume 6, No 1 was published following such endeavors. The present issue (Vol 6, No 2, Dec 2019) is composed of four articles that have passed a rigorous review process.

Article 1 by Dr Belew assesses temporal and spatial road infrastructure development during three political regimes in Ethiopia and its impacts, using secondary data (1951-2018) supported with limited primary data. The results show that the road density of Ethiopia per 1,000 people has increased more than four folds from 1951 to 2018). The mean distance of the network is also showing decreasing trends. The empirical analysis also shows that there are significant positive socioeconomic impacts on households. However, the road traffic accident, as one of the main direct negative impacts, is increasing from time to time. Compared to population trend since 1951, the correlation between the density of the total and asphalt roads is 0.87 and 0.38, respectively. This shows that the emphasis given to the expansion of paved roads in Ethiopia particularly in recent years is rather weak and needs attention.

Ayalsew Kindihun & Samson Kassahun's article deals with community participation in cobblestone Road provision in Injibara, Amhara Region, Ethiopia. The study employed a quantitative approach. The survey questionnaire was administered for 368 sample respondents. Findings revealed that community participation was expressed more in financial terms. Participation in policy formulation, planning, implementation, maintenance and operation, and evaluation were not evident. The study shows that there is a strong and positive relationship between the socioeconomic status of respondents and social capital with the level of community participation. The study also found that there was poor communication and relationship among the municipality and kebele leaders that manage the project, and the community. The study concludes bottom-up approaches, building an effective communication channel between the community, kebele leaders and institutionalization of participation in the City is essential. The article recommends that capacity-building strategies are required to promote community participation.

Dr Kanchan Singh takes on the issues of health sector performance in Ethiopia focusing on in Regional Disparities. The paper is an attempt to review the status of health parameters in the light of demographic attributes of population growth and mortality in Ethiopia. Health infrastructures, health personnel and health services to population ratios have been worked out and compared at regional levels. In all, 26 variables have been used to analyze national and regional situations. Results have been explained in terms of regional development levels, regional disparity, relative disparity and absolute disparity in the case of health services, infrastructures and health personnel to population ratios. The study findings showed significant disparities across regions along the key indicators, calling for some policy actions.

The fourth (and last) article by Mr Sisay investigates determinants of women's participation in environmental protection and management in selected towns of north Wollo, Amhara Regional State, Ethiopia. The study employed concurrent mixed methods. The quantitative data were collected from 118 respondents and qualitative data were from purposefully selected participants. Statistical and thematic data analysis techniques were employed to analyze the quantitative and qualitative data, respectively. The study found out that women are indispensable in environmental administration. Accordingly, women's age groups (28-37 & 38-47) were positive factors; whereas, violence, technology, social services, production, consumption, resources and institutions were negative factors. The paper concludes that despite women are essential in environmental protection and management, they are obstructed by various factors. This has an impact on the environment. The paper recommends governmental and non-governmental organizations should work cooperatively to enhance women's participation via training, awareness-rising, and by making social service available..

Finally, I would like to extend my gratitude to the ECSU for its financial support. and the scholars, reviewers, and editors for their valuable contribution to make this issue of the highest quality.

Editor-in-chief

Abstract

Among basic modes, road transport plays a paramount role in socioeconomic development in both developing and developed countries. The main objective of this study was to assess temporal and spatial road infrastructure development during three political regimes in Ethiopia and its impacts. The methodology employed mainly secondary data supported by limited primary data. The results showed that the road density of Ethiopia per 1,000 people has increased for more than four folds from 1951 to 2018). The mean distance of the network also showed decreasing trends. The empirical analysis shows that there are significant positive socioeconomic impacts upon households. However, the road traffic accident, as one of the main direct negative impacts, has been increasing from time to time. Compared to population trend since 1951, the correlation between the density of the total and asphalt roads is 0.87 and 0.38, respectively. This shows that the emphasis given to the expansion of paved roads in Ethiopia particularly in recent years is rather weak and needs attention.

Key words: Density, development, impacts, regime, road.

* Ph.D, Ethiopian Civil Service University, College of Urban Development and Engineering, Department of Urban Infrastructure and Transport
E- email: beledagne@gmail.com, Cell phone: +251911348754

JADS Vol. 6, No. 2, Dec. 2019 Issue; DOI: <https://doi.org/10.56302/jads.v6i2.3118>

Background and introduction

Like many other economic and social activities that are intensive in infrastructure, the transport sector is an important component of the economy impacting on development and the welfare of the people (Rodrigue and Notteboom, 2017). When transport infrastructure is well-organized, it provides various economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to overall services and additional investments (Oosterhaven and Knaap, 2000).

Growth theories have been used to look at regional economic theories as they relate to transportation investment and its impacts on population change and economic development. For instance, Aschauer (1989) and Akhmetzhanov and Lustoy (2013) concluded by stating that positive impacts on private sector productivity occurs when public capital was invested in transportation infrastructure. Moonmaw et al. (1995) also found positive relationships between transportation infrastructure and per capita income.

Particularly rural roads are somewhat typical in terms of their capacity to literally pave the way for various investments in social infrastructure sectors such as schools, health services, and security services. In case of the agriculture sector, better roads can significantly reduce the cost of inputs such as fertilizers, seeds, and extension services (Dercon et al, 2008). On the output side, better roads increase the scope of profitable trade, which in turn encourages on-farm investments to raising agricultural production (Binswanger et al, 1993). This in turn raises rural incomes, lowers food prices (and hence raises disposable income in urban areas), reduces spatial inequality in food prices, and reduces dependence on food imports.

The ideas mentioned in these cases are said to be about direct and indirect impacts which are proved by impact theories. In

these stances, impact evaluation of road development in this study is mainly guided by programme theory and change theory. Programme theory is the issue of intervention by actors such as the government, private companies, etc... for the project formulation and implementation, whereas, change theory is about the direct and indirect impacts created due to the interventions in policy formulations and implementations.

Based on these theories, Patarasuk (2013) elaborates that despite the social and economic benefits, road infrastructures are also perceived as cultural artefacts that lead to negative ecological effects such as traffic accident and congestion which are most of the time direct impacts. However, their outcomes are of indirect impacts in nature. Generally, if hard (road infrastructures such as fixed facilities like tracks and nodes) and soft (overall management of flow entities what we call traffic) are well managed by the support of innovative technologies, then the outputs will transform the quality of life of citizens through dynamic externalities that the development often generates (Sengupta *et al*, 2007: 3). But when the system is deficient in terms of capacity or reliability, it can have an economic cost such as reduced or missed opportunities.

When we come to the historical development of roads from global perspectives, the first roads in various parts of the world were those that developed following trails and paths made by animals that helped people for hunting and gathering activities. Early roads were built in the Near East soon after the invention of wheels about 3000 B.C. The Romans were known for their ingenuity in road construction. Historical development of transportation and the socioeconomic role it played is also well documented by Papi *etal* (2007: 4) as quoted below.

Throughout history it is important discoveries and technological developments which have allowed mankind to leap forward, ameliorating

its status and improving its standards of living. Reaching back thousands of years, the invention of the wheel generated a revolution comparable only to the invention of the steam engine which sparked the industrial revolution. In a similar fashion, it was the engineering feats of the Roman Empire, which allowed them to reach the furthest corners of Europe. Their roads, originally built for the fast deployment of legions, allowed citizens from all over Western Europe to have a better access to economic centres, thus enlarging the potential market for goods and services. It is significant to note, in light of the examples mentioned above, that road infrastructure has always played a key role in the progress and economic growth of a nation, both through the direct effects of a higher mobility for citizens and goods and also via the indirect benefits derived from the process of building infrastructure.

Understanding the importance of roads, the most improved type of its construction was started in 1810, when two Scottish, engineers, Thomas Telford and John Macdam demonstrated that a sheet of broken stones two or three centimetres in thickness became consolidated with the passing of traffic in to a hard water proof mass (Cain, 1975 cited by Shiferaw, 2008). Many authors have also documented that the highway transportation has been expanded rapidly since the end of World War II.

Nowadays, road transport is a dominant and popular mode in both developed and developing countries. In Ethiopia it accounts for 90 and 95 percent of motorised inter-urban freight and passenger movements respectively (MoT, 2018). Road in Ethiopia has paramount role in terms of: supporting growth in agriculture and industry, in opening corridors, port links and tourism areas, and connects each region to the rest of the country. Even though multi-directional development is ongoing in Ethiopia, the pace of the movement in density/ accessibility of road infrastructure is very low as compared to cross countries. Due to this, among others, Ethiopia is still suffering from low socioeconomic development. Therefore, one of the major causes for such low socioeconomic impacts in this respect is low development trends of road

infrastructure in terms of quantity and quality as well as poor management on the hard and soft sector of transport industry. This study therefore deals with the assessment of road infrastructure development trends, and its major positive and negative impacts generated in Ethiopia.

Problem statement

Roads are important to provide the opportunity to realize the productive potentials of agricultural land, to facilitate schooling, health services and marketing and satisfy other social and economic needs. If rural roads are not maintained properly, access will deteriorate and these activities will be negatively affected. It is usual that high peak of benefits occur when a region receives first time access of road whether paved or unpaved. The first roads open up the area to markets, health facilities, schools, government services etc. This can bring about substantial economic and social impacts. Goods, services and facilities become increasingly accessible. Communities enjoy the benefits from access but can become increasingly frustrated if access deteriorates and improvements in their living standards are compromised.

The road infrastructure has a high potential payoff in terms of poverty alleviation and economic growth. Some cross national studies of economic growth and public infrastructure notably one using public investment in transport and communication, and other using capital stocks in roads, railways and telephones, show that infrastructures variables are positively and significantly correlated with growth in developing countries.

This study was conducted to increase knowledge about the relationship between road transportation infrastructure investments and the economic development of Ethiopia. The theoretical framework is derived from Frischmann's theory of infrastructure and commons management which provides a

theoretical foundation for analyzing the contribution of a country's road network to economic growth and development and the resulting social implications in developing economies. Frischmann (2005) argues that a network of roads, would create an economic return for the society and lead to social change. Many researchers have hypothesized that such an analysis must encompass lots of components including GDP, population size, degree of urbanization, traffic density, and level of economic development.

Regarding impact of road infrastructure, valid theories for this study are programme theory and change theory. Programme theory is the issue of intervention by actors such as the government, private companies etc for the project formulation and implementation, whereas, change theory is about the impact created due to the interventions. Under the theory of change, the most important objective is to check temporal and spatial changes (impacts). Spatial change can also be analyzed using concepts from the Central Place theory and Graph Theory, which are dominant theories in transport geography.

There are direct and indirect links between economic growth and the reduction of various social ills, and the road provision. The direct effects are registered in the impact zone by reduced cost: travel time to school, work, hospitals, markets and the savings in fuel and other direct transport costs. On the other side, the indirect effects consist of increase in income and other dimensions of well-being such as health, education, social interaction and political participation. The benefits of road include the access they provide to other goods and services especially in cities, where the poor are concentrated on the periphery of urban areas, as in many developing countries. The cost and availability of public transport become key factors to the poor in their ability to obtain employment (Porter, 2005). For example, "a household survey

in Ecuador identified the access to secure and reliable public transport as an influential factor in determining the ability of low-income girls and women to participate in evening training classes (The World Development Report, 1994).

In China, the investment in road infrastructure was directly linked to rural poverty reduction as well as the economic growth of that country. From 1985 to 2002, the GDP grew by more than 9% per year, making China's economy one of the most dynamic in the world. The absolute poverty in rural China declined from 250 million people in 1978 to 29 million in 2001. A reduction in poverty of such scale and within such a short time unprecedented in history and is seen by many to be one of the greatest achievements in human development in the 20th century (Zhana and Xiaolong, 2002 as cited in Matebie, 2009).

To reduce negative impacts of roads many countries are performing standardised road safety audit (RSA). For instance India has applicable two basic categories of RSA, ie, during new roads and existing roads. Research on RSA is a huge gap in most of developing countries including in Ethiopia. It is obvious that they are characterized by increasing motorization on a limited motor-able roads within ill management conditions. Few of the critical problems characterizing these countries are poor road infrastructure density and quality, traffic congestion, poor public transport service, higher rate of traffic accidents, and costly operation of transport services.

Ethiopia, the second populous country in Africa (110 million in 2018), is facing the above mentioned challenges. Its density of road infrastructure is very low as compared to cross countries which World Bank puts its status among the least countries in the world. Structurally its economy is also based on agriculture and it is suffering from poverty. These basic problems among others, are always forcing

the country to rely on foreign aids and debts. Therefore, one of the major causes in this respect is poor development trend of road infrastructure particularly during the last regimes. For instance, a primate city, Addis Ababa had been without ring road and now it has a minimum alternative networks to fulfil the mobility needs. Its road density at present is 18% which is lower than global standard (25-30%) of cities of developing countries. It is also suffering from congestion due to insufficient network density and motor-able roads. Even though good strategies were formulated in GTP II, the development of the road infrastructure in the Country could not cope with the rate of urbanization, population growth, and the rapidly growing technology and thereby missing of the advantages that can be gained from globalization. Due to mismatched road transport managements in Ethiopia irritating negative impacts are common among which the road traffic accident is the dominant one.

According to Federal Transport Authority (FTA) 2018 report, there are recorded 935,888 vehicles in all over the country. Parallel to road developments, a rapid increase in the number of vehicles (more than the rate of road growth), and an increase in the number of population accompanied with poor traffic accident reduction management as well as overlooked road safety audits have significant negative impacts in the country. In this research, given the capital-intensive nature of road transportation infrastructure and the increasing scarcity of resources for capital-intensive road projects, it is important to investigate the positive and negative impacts of road transportation infrastructure investment in Ethiopia. Based on these, the objectives of this research were:

1. to analyse and compare road infrastructure development trends during the past and present government regimes;
2. to discuss impacts related to road accessibility in Ethiopia;

3. to overview level of satisfaction of end users by road development; and
4. to investigate impacts related to traffic accidents.

Materials and methods

This study used mixed approaches. The nature of the research follows positivist paradigm which supports quantitative and qualitative approaches. To investigate the road network development, the analysis dominantly employed secondary data sources and documentary reviews. The documentary review was made from empirical study of three highways of Amhara, Afar and Oromia regions. The respective study corridors are: Gendewuha – Gelago (gravel type with distance of 125 kms), Mile – Weldiya (paved with distance of 165 kms) and Ginchi – Kachisi (gravel type with distance of 105 kms). The spatial scope of each study area refers 20kms diameter (10 kilometres on both sides of the roads). By using quasi-experimental research design the direct and indirect socioeconomic impacts were compared with before five years of intervention and during study time of road development. The degree of impact was also compared with changes spatially occurring within 5kms and above five kms from each study road.

In addition to vast secondary time-series data of more than 60 years, and documentary review, qualitative data from 77 key informants had been considered. Furthermore, seven end-user persons with disabilities, mainly from Addis Ababa participated in the study. Trend analysis from outputs of GIS utilizing satellite imageries, and traffic counts was also included.

Data analysis was also based on quantitative and qualitative data. Out puts of random method approaches and paired sample t test were used to analyse secondary and primary data, respectively. Qualitative data was analysed using thematic analysis approach. Generally, analysis

methods varied from simple summations and percentages to advanced techniques such as trend analysis, and measurement indicators of transport performance, graphs and other methods.

Results and discussion

Historical development and planning trends of roads in Ethiopia

The Ethiopian experience in road transport development, planning and expansion performance can be discussed under the different regimes as briefed below.

Pre-1973 (Imperial Regime):

Historic chronicles of the 17th and 18th centuries show that there were a number of small roads trails and foot paths, in addition to the traditional shoulder portorage, animals like mules, donkeys and horses and camels were used as a means of transportation in Ethiopia. In the 18th century, especially during the reign of Emperor Tewodros, although the technology was primitive it was believed that planned road construction efforts were made. It is also believed that Emperor Yohannes IV, who succeeded Tewodros, was engaged in road building. However due to the danger of invasion by Egyptians, Derbush and Turkish the Emperor was not able to achieve his desires (Bogale, 2016).

The construction of modern highways and transport service in Ethiopia started during the regime of Emperor Menilik (1889-1913), the founder of modern Ethiopia. In 1902, he undertook the construction of the roads from Addis Ababa to Addis Alem and from the palace (presently located in the area known as Arat Kilo) to the British Embassy and to many different directions in the city (Meron, 2007). The construction of these roads was soon followed by the import of the first automobile to the country in 1908. The vehicle was brought from Britain by a foreigner caller Mr. Bentley. During his importing, Bentley was convinced that he needed a very

strong kind of vehicle that can withstand the long trip and unfavourable road conditions since there was no paved road in the country at that time (Eskinder 2007). In 1912, Emperor Menilik received a present from the King of Austria, a roller (stone crushers) for paving roads, which operated with steam energy. Then the road pavement was undertaken from the palace to 'Entoto Genet' and Addis Alem into modern standards. The rest roads were doomed to be dry and wet season types (Meron 2007). In 1915 other motor vehicles were imported to Ethiopia from Germany and Britain (Eskinder 2007). However, up to the end of his reign in 1920, road pavement was not successful as expected and the transportation within the country was limited to the use of mules, donkeys and horses as well as camels in low land regions with most of the roads being nothing more than trails. Furthermore, it was during the reign of next successor, Emperor Haileselesie I (1930-1974) that road construction began to be undertaken in a better modern and extensive manner.

Regarding the road network expansion in Ethiopia, time series data of Ethiopian Roads Authority (ERA) has been summarised and computed since 1950s. Accordingly, when the Imperial Highway Authority was established in 1951 (renamed Ethiopian Road Authority in 1974), the total road stock was 6,400 kms (0.30 per 1000 people) which was built during the Italian invasion (1931-1936). The mean distance of the network had decreased from 95.31 kms in 1951 to 70.93 km in 1970. The road network in this Era was characterized by radial patterns centring the capital city, Addis Ababa to different resource areas, and administratively important towns and historical sites. It is following these radial roads that the major towns in Ethiopia emerged. The 40-towns master plan project in the mid-1960s that was undertaken by Italian consultant firms was an important opportunity in the consideration of road network. But these town masters plans did not deal adequately with

transport facilities like bus and truck terminals, parking, junctions, and traffic control points as an integral part of the transport infrastructure. Moreover, they paid little attention to integrate urban transport with regional transport system (NUPI 2006).

At the end of the Imperial political power (in the early 1970s), the road stock reached to 9,160 km. In this period, the average annual growth rate of road network expansion was 4.6 percent. The road length per 1000 people and per 1000km² was also 0.30 and 5.2km in 1951, respectively. The respective figures were 0.29 (this decline is caused by low rate of road growth may be due to political instabilities during the transition period than population growth rate) and 7.7 km in 1973 (Table 4.1).

1974-1991 (Derg Regime)

A major breakthrough in urban transport planning was observed in 1986 by Addis Ababa Master Plan (AAMP). It had considered the regional metropolitan transport system; the road network; public transport services and basic infrastructures; future urban mobility scenarios; integration of road infrastructure with public utilities; mass transit consisting of metropolitan railway system; a trolley bus service and the main bus system. AAMP also considered priorities and implementation programmes for key projects though it failed to provide detail action plans for its implementation. Following the AAMP, many urban plans were prepared by the National Urban Planning Institute (NUPI) particularly after 1987 and next Regional Works and Urban Development Bureaus since the early 2000s. However, the attention they gave for road and transport planning was mainly focusing on the city level road networks and not supra-urban level (NUPI 2006).

In terms of the network expansion status (Table 1), when the Derg assumed power (at the end of 1974), the road network had grown to 9,260 km,

of which 3,360 km (36.7%) was paved. By 1991, the network had increased to 19,017 km of which 4,109 (21.6%) was paved. The increase over these years was mainly due to the expansion of the rural network most of which was unpaved. Average annual road growth rate was 4.2% which was lower than both Imperial and, as we shall see later, with the EPRDF period. At the end of its political power (after 17 years), the road density per 1000 people and per 1000km² reached to 0.36 and 15.6kms respectively.

1992- Present (EPRDF Regime)

In the first quarter of 1990s, the Government of Ethiopia gave more emphasis to expand road network to meet its development goals. These goals are: (a) upgrade and expand essential infrastructure; (b) advance the private sector; and (c) conserve the environment. To implement these strategies, the Government formulated the 10-year Road Sector Development Programme (RSDP 1997–2007), a two-phased integrated package of investments, reforms, and institutional reorganization. The programme was later extended to include a third phase up to the end of June 2010. In 2015, ERA completed the 4th RSDP (ERA, 2018)

Analysis on road network expansion and pavement in Ethiopia

After the ousting of the Derg by EPRDF, and due to the formation of Eritrea as a new state in 1992, the road network in the remaining part of Ethiopia was 18,081 kms, of which 3,542 kms (19.9%) was paved. By 2002, the road network had reached 33,297 km of which 4,053 km (12.2%) was paved and the remaining 29,244 km (87.8 %) was gravel. As a result of huge investments under RSDP I, II, III, IV and V, theand the remaining huge proportion is unpaved (1). The figures show that the proportion of paved roads is very week in the EPRDF period (Bogale, 2016).

As shown in the trend line of 67 years data (Table 4.1), both total road, and rural road growth were generally increasing upward almost keeping parallel pace until 2011. But after 2011, a new campaign at *wereda* level contributed to significant increases in the amount and average annual growth rate that reached 7.5%. The average growth rate of asphalt roads almost remained flat up to 2009 .

Table 1 Road Length (kms), Road Density and Population Growth in Ethiopia (1951-2018)

Regime	Year	Asphalt	Gravel	Rural	Wereda Road			Total	Average Annual Growth Rate of Road ¹	Population (000,000)	Road Density /1000 people ²	Road Density /1000 Sq.km
Imperial Period	1951	3400	3000					6400	4.60%	21.5	0.30	5.2
	1973	3360	5800					9160		31.3	0.29	7.7
Derg Period	1974	3360	5900					9260	4.20%	32.1	0.29	7.6
	1991	4109	9298	5610				19017		53.0	0.36	15.6
EPRDF Period	1992	3542	8968	5573				18081	7.5%	53.3	0.34	14.8
	2018	15886	12813	35985	56732	1693	3664	126773		100.0	1.27	115.2

Source: Computed by the author based on ERA Data
¹ The mathematical model of average annual growth rate of road is $AAGR = [\sum [(X_2 - X_1) / X_1] * 100] / T$; Where AAGR is Average Annual Growth Rate of Road; X_2 is the next or the end value of road performance; X_1 is the beginning value of road performance; and T is defined here as number of years.
² Area of Ethiopia before 1992 was 1.22 million km²; after the separation of Eritrea the density is computed by 1.11 million km²

Figure 1 below also depicts that the rate of pavement is 42, 27 and 14% in Imperial, Derg and EPRDF periods, respectively. According to a World Bank study (2014), the density of paved roads per 1,000km² in Ethiopia was 8 kms which is below the average of low income countries.

The selected low-income and less populated countries with the share of paved road in this study are Nigeria (31kms), Cameroon (9kms), Vietnam (423kms), Madagascar (10kms), Kenya (19 kms), Cambodia (13 kms), and Algeria (36 kms)(World Bank, 2014).

Ethiopia. The average density in high-income countries is 167.6km per 1,000 km², which is about 3.4 times higher than that of Ethiopia. However, the road density in very high-income countries (315.8km per 1000 km²) is about 6 times higher than that of Ethiopia. Finally, the

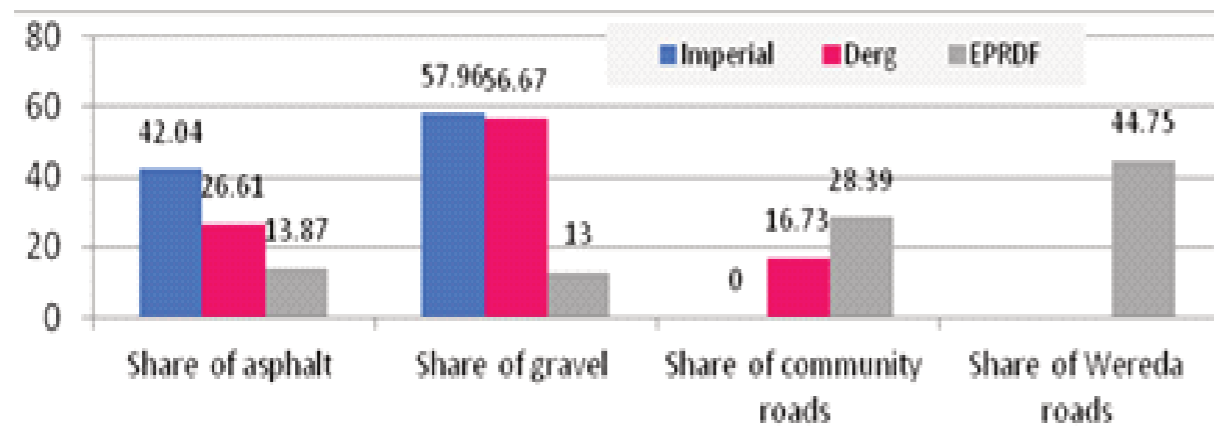


Figure 1: Share of Road Types in Ethiopia from the total (1951–2018) Source: Computed by the Author based on the raw data of ERA

Comparing road density status of Ethiopia with low and middle income countries

In spite of recent increases in the density, the road network of Ethiopia is one of the least developed in Africa. For instance, in 1997 Ethiopia had 0.5km per 1000 people as opposed to Sudan (0.8), Kenya (2.3), Tanzania (2.0), Angola (6.0), DR. Congo (2.8), and South Africa (12.6) (ERA, 2007). By 2010, the figure for Ethiopia had increased to 0.59 km per 1,000 people and 44.4 km per 1000 km² (the change which is lower than the Africa region average of over 54 km per 1000 sq. km) (ERA, 2011).

On the other hand, Ethiopia's road development status can also be compared with low and middle income countries using comparable data for 2012. Accordingly, the average road density for the low-income countries is 39.5km per 1000 km², whereas Ethiopia's road density at 49km per 1000 km² is greater than the average of low income countries. The average road density for the middle-income countries is 104.7km per 1,000 km², which is twice higher than that of

ERA, 2014a document suggests that Ethiopia should reach a road density of about 120km per 1000km² to arrive at middle per capita income countries by the year 2025.

Road infrastructure growth index

Road growth index is commonly used to evaluate and compare the changes by taking into consideration the base line in the given time. The model developed in this study is indicated as follows:

$$Rgi = (k/x_1) * x_2 * x_3 * x_4 * \dots * x_n$$

$$ARgi = \frac{\sum [(k/x_1) * x_2 * x_3 * x_4 * \dots * x_n]}{T} \quad (1)$$

$$T \quad (2)$$

- Where Rgi is the value of road growth index
- K is the constant and here is 100
- x₁, x₂, x_n are the consecutive figures according to the given time x_i, considered as base line
- ARgi is the value of average road growth index
- T is time

As illustrated in Figure 2A, by taking 1951 as the base line (index = 100), growth of total road, paved road, Ethiopian population and road density indexes per population could reach to 1981, 517,

465, and 510 in 2018 respectively. The growth rate of the road network is very fast particularly after 1992 (Figure 2B). However, the figure illustrates that pavement and the impact on density is not rapid, though improvements have been observed particularly since 2011 under GTP-1 implementation.

Regional comparisons of road growth and induced density changes

Data on changes in road density depicted in Figure 4.3 shows significant differences across the various regions. The comparison is made excluding urban centred regions like Addis Ababa, Dire Dawa and Harari National Regional states. As illustrated in the Figure, Amhara Region is found to have very low road density as compared to other regions during the last seven years. It performed the road density of 0.15, 0.2 and 0.38 in 2007, 2010 and 2013, respectively. Whereas sparsely populated regions like Gambella and Afar have high road density. In terms of total road length, comparison can be viewed among the three highest populated regions. Oromia with 8354 km is the first (31.33% of the total road stock in the country) followed by SNNP region that has 7482 km (28.06%) in 2013.

Comparing road network growth with motorized vehicle growth in Ethiopia

The low level of road provision in Ethiopia is accompanied by a very low level of motorization. The total vehicle fleet has been growing at an annual average rate of 6.7% as it increased from 96,502 vehicles in 1996/97 to 190,367 in 2006/07 of which, 69% are passenger vehicles, 28% are cargo vehicles while the remaining refer to other types such as motor cycles.

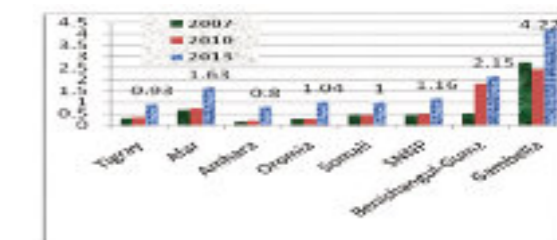


Figure 3: Road Density Changes in Ethiopian Regions in Selected Years (2007–2013) (km per 1000 inhabitants) Source: Computed by the Author based on data of ERA

Furthermore, in 2013, the total number could reach to 474,143 vehicles which is 5.5per 1,000 people in the country. When we compute and compare the density of low and middle income countries with the available data for 2012 that is obtained from ERA, Ethiopia has 3.3 vehicles per

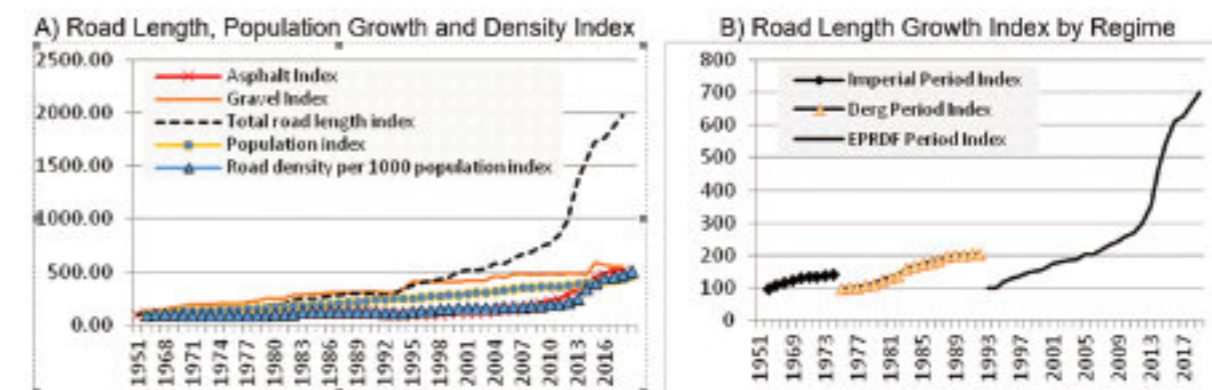


Figure 2: Road Length, Population Growth and Density Indexes in Ethiopia (1951-2018) Source: Computed by the Author based on ERA Data, 2018

In this perspective, Oromia, has performed 2.3 times greater. than Amhara, which is expected to have better implications in terms of socioeconomic impacts

1000 people which is 2.8 and 19 times lower, respectively. With regard to Ethiopian regions, excluding urban areas (outliers like Addis Ababa, Dire Dawa and Harari), average vehicle ownership is 1.59 per 1,000 people. The figure

for Tigray (4.82 per 1000 people) is 5.54 times higher than that of Amhara (0.87 per 1000 people) in 2013.

Analysis of impacts of road network development on accessibility by using random model approach

In the preceding sections, explanations was given how the implementation of road development strategies brought about gradual changes in the total stock of roads as well as in the overall densities per inhabitant and per area. In particular, the empirical results that are based on time series data show disparities among the last three regimes. This can be attributed to the fact that different regimes accord different priorities to the road sector. In the following sections, it is also important to analyze the extent of impacts due to policy interventions on accessibility, road conditions and mobility.

The change of accessibility can be demonstrated by employing the commonly used parameter, *Random Model Approach*. The word *random* is to explain that if all pieces of road tracks are distributed equally in a given area, keeping many other barriers constant. Of course, in reality, it is impossible to distribute all road tracks equally in a given area because of natural and man-made factors. The random model approach, therefore, is a model which measures road accessibility scientifically (ERA, 2008). In this model, accessibility is measured in terms of the distance to the nearest location of the road network for any residence or business area. The random model assumes that the road track is straight and distributed randomly on a plane. The time series data available for the period 1951 to 2018 is computed to check the impact of the road network expansion on accessibility during the three regimes.

For a given pattern of roads, the average distance to be travelled per person to a road link is inversely proportional to the area's road density. Assume that, for an area 'A' with road

length 'L' the *mean distance* to the road network 'M' is given by $0.5A/L$. i.e. the constant of proportionality is around half. Within the given area, the average distance to the nearest all weather road may take long hours before the construction of additional roads. But if the government or local communities intervene and developed the road network length in the same mentioned area, time or distance of taken to arrive to the nearest all weather road obviously reduces since the road density per area is increased. For instance, the total area of Ethiopia in the Imperial and the Derg periods is the same, 1.22 million km² whereas in the EPRDF period, it is 1.1million km². The total road length in 1951 and 2016 is 6,400 and 113066kms of randomly distributed network of the country, respectively. The mean distance to the network is calculated as:

$$\text{In 1951(during Imperial period)} = 0.5 \cdot (1220000 \text{ km}^2 / 6400 \text{ km}) = 95.31 \text{ km}$$

$$\text{In 1970(during Imperial period)} = 0.5 \cdot (1220000 \text{ km}^2 / 8600 \text{ km}) = 70.93 \text{ km}$$

$$\text{In 1990(during the Derg Period)} = 0.5 \cdot (1220000 \text{ km}^2 / 18946 \text{ km}) = 32.20 \text{ km}$$

$$\text{In 2013(during EPRDF)} = 0.5 \cdot (1100000 \text{ km}^2 / 85966 \text{ km}) = 6.4 \text{ km}$$

$$\text{In 2018(during EPRDF)} = 0.5 \cdot (1100000 \text{ km}^2 / 226773 \text{ km}) = 4.34 \text{ km}$$

The computed result shows that the mean distance of the network had decreased from 95.31kms in 1951 to 70.93km in 1970 during the Imperial period; and to 32.20kms in 1990 during the Derg period and finally to 4.34kms in 2018 under the EPRDF period. As illustrated in Figure 4.4 the result shows that the accessibility (proximity to the network) is increasing from year to year with decreasing in the average distance within each network. Based on this, the *proportion* of the area farther than a given distance, 'd' to the network is given by the formula $P = e^{-d/m}$. The proportion of the area, for instance, more than 5 km from all-weather road networks in 1951 in the country was 95 percent.

$$P = e^{-5/95.31} = 95 \% ; \text{ where 'e' is transcendental number given as } 2.718282$$

As computed based on the above formula, the change in 1970 was 93%; in 1990, 86%; in 1997, 79% and in 2018, 34%. Figure 4.4 shows that the *proportion of areas beyond 5km of all-weather roads* is declining. In other token, the proportion of the area within a distance of 5 kms from all-weather roads had increased from 5 percent in 1951 to 66 percent in 2018. The result confirms the existence of a gradual increase in network accessibility under all of the three regimes. Accordingly, one can say that such change contributes to socioeconomic development of the country at macro level in general and its citizens in particular as briefly summarised below.

The findings show that there are more positive and less negative temporal and spatial socioeconomic impacts generated by the three corridors notwithstanding disparities among the different locations. Accordingly, the paved highway is found to have more powerful positive impacts than the gravel roads, which are of low standards and functioning poorly. The status of truck and bus terminals which should have been integrated in the highway development projects are still underdeveloped with obvious effects on the sustainability of their socioeconomic impacts in the study areas. Specifically economic and social impacts are briefly summarised below.



Figure 4 Trend of Average Distance to all Weather Roads(km) and Proportion of Area More than 5km from all Weather Roads(%) in Ethiopia(1951-2018)
Source: Computed by the Author based on data of ERA, 2016

The positive socio-economic impacts (benefits) gained due to such all-weather road accessibility growth are many among which the empirical study of three highways of Amhara, Afar and Oromia regions, can be recent evidences. Based on the empirical data from 392 households, the results show that road access has brought about economic and social impacts temporally and spatially as summarised in the following sections.

Temporal and spatial impacts of road network accessibility on economic and social aspects

As stated by Bogale(2016), governments' intervene temporally and spatially on road construction and maintenance. Such strategy implementations bring about short, medium and long term economic, social and environmental impacts. The results of empirical study taken from 392 respondents in 2014 from three road corridors (Gendewuha-Gelago, Mile-Weldiya and Ginchi-Kachsi) by Bogale are summarised in the following sections.

Economic impacts

- The paired sample t test shows that there are significant changes in individual incomes between the "before" and "after" the project intervention throughout the study corridors. All results are significant at p value of less than 0.001.
- Regarding the use of agricultural technologies, improvements have been achieved due to road intervention though still at infant stage. Fertilizer use in Gendewuha-Gelago, Mile-Weldiya and Ginchi-Kachsi is found to be 1.15, 1.02 and 1.18 times greater after road intervention than before.
- The road intervention has strong significant impact spatially on the productivity of maize within less than 5kms than 5 to 10kms from the study roads (at P value of less than 0.001 and 0.05, respectively). On the other hand, the significant differences from Mile to Weldiya and in all corridors show negative road intervention impacts for sorghum.

- In terms business expansion, the average initial capital the businessman before road intervention was ETB 12,093.18, whereas, during the follow-up period, it had been increased to ETB 138,229.84. The increase is 1043 percent and is significant at P value of less than 0.001.
- As regards the average amount of tax businessman pay per year is calculated to be ETB 1,231.04 and 4,380.56 before and after the road intervention, respectively. The increase in this regard is 245.85 percent and is significant at P value of less than 0.05. This contribution shows how the road development adds value on GDP of the Country.

Social impacts

- The density of population is found to be higher near the study roads, which was observed to be even higher in 2014 as compared to the base line situation in 2007.
- Households were getting lower number of meals per day before than after the road intervention, with households located near the study roads (<5kms) getting 1.3 times higher number of meals than those households located away (>5kms) after the road intervention except in some parts of highway in Afar region.
- In terms of access to education, it has been computed that the longer the distance of a household from the study roads, the lower is students' school enrolment.
- As computed based on mean values, there is positive change in terms of access to health facilities (km) by 1.82, 5.80, 9.0 and 6.18 percent for Mile - Weldiya, Gelago - Gendewuha, Ginchi - Kachisi highways and for all corridors, respectively, and the result is found to be significant for all corridors taken together at p value of less than 0.10.
- Women are thus found to have had more intense work burden before the road

intervention than after, while the same holds true for women within less than 5kms than 5 to 10kms from the study roads.

Temporal and spatial impacts of road sector development program (RSDP) on road network quality, mobility and urban settlement expansion

Since there are no complete data available for the previous two regimes, the researcher has used the last seventeen years data to analyze trends in quality and mobility.

Impacts on road network quality in Ethiopia

The share of the road network categorized under good condition had been increased from 22 percent in 1997 to 72 percent in 2016. In other words, during the first year of RSDP, 52 percent of the road network was found to be in poor condition and only 22 percent was in reasonably good condition. The proportion of roads in good condition has overtaken the proportion of roads in poor condition from 2004 onwards. Another observation is that the roads in fair and poor condition are consistently declining shifting to good condition since 2002. This change is mainly linked with the rapid expansion of roads with better standards as well as attention given to road maintenance.

In general, interventions made to standardize and maintain roads had contributed for further improvements in the quality of roads. Yet, the World Bank study (2014) mentioned above pointed out that the density of paved road of Ethiopia still remains far below the standard of 260 middle-income countries in 2013. When changes in road condition over time are viewed in terms of their classification, that is asphalt and gravel roads, it shows improvement in good condition from 17 to 74 percent and from 25 to 55 percent between 1997 and 2011 respectively (RSDP III- 2009, ERA, 2014, 2016).

Impact on mobility

Classified traffic counts have been undertaken on most of the road network in Ethiopia. An assessment of traffic on main roads reveals that there is a rapid and continuous change in the volume of motorized traffic mobility (3,771,565 VKM in 1997 to 27,119,110VKM in 2015). It shows that rate of traffic growth is about 10.6 percent per annum on average(ERA, 2018). This is the fact that with an increase in road expansion and road quality, traffic mobility increases.

Impact on urban settlement

- Based on the study of three corridors stated under section 4.8, the expansion of the built up areas in general exhibited a peak immediately after the road interventions as shown in Chifra town of Mile to Weldiya study highway. It is evident that this pattern also holds true in the others study roads.
- The annual average expansion rate of settlements along paved study roads is found to be higher than that has occurred in the gravel roads. This shows that paved roads have more strong impacts in settlement expansion than gravel roads. As computed employing GIS software, the annual average settlement expansion in Chifra and Hara towns (along paved road of Mile to Weldiya study highway) is 11.7 and 4.5 percent, respectively, whereas, in Shikute and Kachisi (along gravel road of Ginchi to Kachisi) is 1.1 percent. That means, the lower the distance against each road, the higher is the settlement density.
- In all the study corridors, the proportion of houses with wood and mud walls has exhibited a slight decline from 91 to 88%, while those with stone walls increased from 1 to 3 percent. On the other hand, there has been considerable conversion from thatched to corrugated iron roofed houses after the road intervention

Satisfaction level of end users on accessibilities and facilities of road infrastructure

Accessibility ensures that all citizens have nearness of the road transport services which the users require. Facilities also deal with the conditions and appropriateness of the road transport service delivery sites and their appearances to meet the users' needs and expectations. In both cases, the finding of empirical data of 4309 passengers in all regions of Ethiopia(a study by Federal Transport Authority) indicate that their satisfaction rate is 54 and 51 percent respectively where Addis Ababa is the least among all regions (FTA, 2018)

As the results of interview made by the Author (2018) author the disabilities confirmed that the designs of roads, parking and terminal facilities for disabilities are with very poor access in Ethiopia. For instance, road crossing accesses are not to the standard. For some roads lines, ditches are constructed at both or at one side of road, but the design excludes for disabilities crossing particularly for physically impaired and visually impaired community. For instance at the place where interviewee lives, ditch had been constructed parallel to the route. To cross this open ditch, she asks her family or neighbours to lay a lumber. Some roads are also with elevated and traditional stares difficult to climb as observed at Hara, Chifra and in many other secondary cities of the country. Some are also being excavated by other sister sectors like telecommunication, electric power and water resources for reconstruction or to fix their network and stay damaged for long years. Holes along main roads are common dangers of disabilities particularly for visually impaired persons. The existing condition in this regard shows that the federal and local governments are not abiding to the rules and international conversions. Disabled and non-disabled end users of the road service customers walk more than 10 minutes at an average to access nearest

motor-able road terminal or parking in many cities of the country. This shows that the nearest road access is below the world standard distance of 5 minutes' walk. Generally the access and facilities of roads what we call physical infrastructure have satisfied the disabilities by more than 30 percent. Therefore, even though there are physical changes in terms of overall road development, the satisfaction level of end users is very low as quantitative and qualitative evidences confirm. Under the following sections the negative impacts due to road development will be discussed.

Road traffic accident (RTA), which is one of the main direct negative impacts of road development, is increasing from time to time and has impacted in Ethiopia as fatalities, disabilities and property damages (which is estimated to be reduction of equivalent to about 1 percent of the national GDP per year). Many economies in the world should pass through the growth of population, road network and motor vehicles. These can be viewed as opportunities and non negligible to be attained in the life of the countries and have paramount roles in the socioeconomic developments.

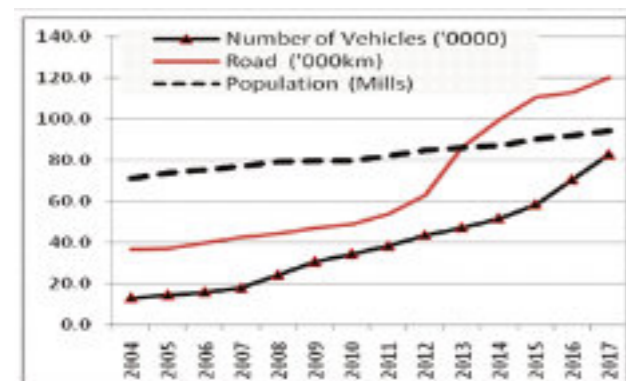


Figure 5: Trends Vehicles, Roads and Population Growth in Ethiopia (1996-2017)
Source: Computed by the Author based on data of ERA, and MoT, 2018

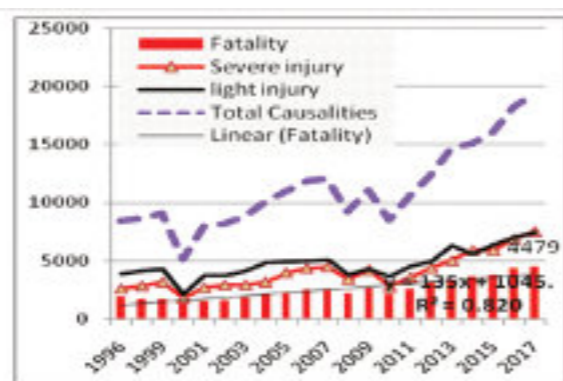


Figure 6: Traffic Accident Trends in Ethiopia (1996-2017)
Source: Computed by the Author based on data of ERA and MoT, 2018

Overview of negative impacts of road development in Ethiopia

Road development has much positive socioeconomic impacts. However, one should not put this infrastructure development always as positive since it contributes to impacts of traffic accidents, traffic congestion and environmental degradation (particularly air, and noise pollution). The dominant problem happening in developing countries like in Ethiopia is the former outcome. In line with this, this section describes road traffic accident trend in Ethiopia in general and the impact in Addis Ababa in particular (where about 70% of Ethiopia's vehicles dominate).

Overview on road traffic accidents and impacts in Ethiopia

However, in other side, these opportunities also passes certain threats like road safety problems (road traffic accidents, road congestions and environmental degradations) which could be obviously happening dominantly in developing countries. Figure 4.5 and 4.6 and 4.7 illustrates part of the issues explained above in Ethiopia. The increase of traffic accident is enduring as normal agenda in Ethiopia (a country of very low per capita vehicle ownership).The number of traffic fatalities in 2017 had been increased by 129 percent as compared to the baseline year (1996), with an average annual growth rate of 5.85 percent. In terms of fatalities in 2013, about 50, 34 and 15 percent were pedestrians, passengers, and drivers respectively. During

2017 and 2018; 4,479 and 5,118 people were killed along the road.

Bogale's study(2016) from FGD made at Hara (Highway of Mile - Weldiya) study centre illustrated that about 95 percent of the paved route is elevated from the normal surface (ground) level thus challenging to livestock and even old people that try to cross it. Due to poor road designs, some sections of the study roads that have sharp curves and sloppy route were prone to frequent traffic accidents. A good example is the locality named as Allewuha (Highway of Mile to Weldiya), which is 11 kms from Hara town. That area is known by the frequent fatality of the road users. In addition, Ethiopia is with poor road safety audit system as compared to cross countries and this gap is said to be one of traffic accident escalation.

Impacts of road traffic accidents (RTAS) on quality of life, the case of Addis Ababa

Once individuals come across RTA, their chances could be death, heavy injury, light injury or property damage. The victims and their families will suffer from low quality of life, which would result from health related impacts such as pain, or temporary or permanent disability. Because of data limitation, this section focuses on the impacts of both heavy and light injuries in Addis Ababa.

As analysed by Bogale (2016), RTAs contributes up to 29 percent of the total annual disability caused by all forms of accidents in Addis Ababa. He indicated that musculo-skeletal injuries are ordinary in road users obviously for pedestrians. Moreover, severe limb strain, psychological disorders and depression are the long lasting wounds that road accident can bring about. People who are hurt can have physical and mental impacts and even they are people who are facing themselves with the problem of activities and capabilities which may be permanent upon them. Furthermore, the victims

or their households can be further forced into financial burden or selling of their own assets, or interruptions from schooling. If the injured is from poor households, the impacts can run much deeper since the poor segment of the society also happens to be an extremely vulnerable group. In this case Quality Adjusted Life Years (QALYs) model can be used which the researcher could not show the measurements due to non-availability of complete data. QALYs is a health outcome measure that gives a value of one to a year of perfect health and zero to death (Gold *et al.*, 1996, cited in Samson *et al.*, 2012). This model is widely used by transport planning and transport economics.

Conclusion and recommendations

Using time series data, the performance of road expansion has been analysed since 1951. A spatial analysis on the trends in the distribution of the road network is made both at the national and regional level, which is also compared with the situation in other countries. This analysis of the performance of road expansion is the first objective related with programme theory and to a certain extent with graph theory. programme theory is understood as the underlying assumptions and delivery mechanism of how a programme set should work. It is related to the development of programme goals and objectives.

The remaining objectives of the study are also more of about positive and negative impacts directly and indirectly occurring temporally and spatially most importantly based on change theory. The primary data from temporal point of view confirms that there is a significant change due to road accessibility between before 5 years of road intervention and during study time as computed using paired sample t test. This temporal change has also a significant impact spatially benefiting households in influence zone of less than five kms as compared to households above five kms (control zones). With context of

spatial impacts, theory of change postulates that distance of individuals' residence from the road is inversely related to their income, suggesting that the longer the distance of individuals from the road, the lower is their income

In this regard, explanations had been given how the implementation of road development strategies had brought about changes in the stock of roads, accessibility, mobility, and overall socioeconomic changes upon households of the study areas notwithstanding their negative impacts due to road traffic accidents (RTAs). What should be advised for decision makers and stakeholders as to whether to expand, or improve road related interventions by way of programmes, projects and policies throughout the country to gain positive socioeconomic impacts from road development?

- Government at all levels should take appropriate measures towards upgrading the unpaved roads expand new links throughout the country by creating coordination and mobilizing the community at their local areas and implement sustained mobility environment for end users. .
- It is obvious that mobility on the road is accompanied by traffic accident related risks. With the rapid expansion of roads for vehicular use, about 95 percent of traffic-related accidents occur on the road mode as compared to other transport modes (Rodrigue *et al*, 2014). It can be said that RTA in Ethiopia is a major health scourge. Therefore, national and local governments should have strict measures on the accident spot areas, proper implementations of rules and regulations, road safety audit, road quality and standards and appropriate technology use.
- The rapid expansion of roads in Ethiopia is expected to invite further increase in motor vehicle ownership. Therefore, proactive actions must be made by measuring the quality of life in terms of impacts and costs

that RTA can be caused by the increased in fixed facilities and flow entities.

- Federal transport authority and the regional transport bureaus in collaboration with other stakeholders should upgrade service points and ensure accessibility to all users (including the disabled and elder).

Acknowledgment

Acknowledgement is made to Ethiopian Roads Authority (ERA) and Ministry of Transport (MoT) for their contribution to facilitate secondary data. I am thankful to the Ethiopian Civil Service University for initiating to prepare this research. I also want to acknowledge University of South Africa (Unisa) which helped me to have the initial base of this study from broad thematic area of my unpublished dissertation

References

Akhmetzhanoy, B. A., & Lustoy, N. S. (2013). High-speed mainlines and their contribution to regional development. *Problems of Economic Transition*, 56(3), 44-48. doi:10.2753/PET1061-1991560305

Agbigbe, W.A.,(2016). The Impact of Transportation Infrastructure on Nigeria's Economic Development, Ph.D Dissertation, Walden University.

Aschauer, D. A. (1989). Is public expenditure productive? *Journal of Monetary Economics*, 23, 177-200.

Bogale, Belew Dagne (2016). "Socioeconomic Impacts of Road Development in Ethiopia: Case Studies of Mile - Weldiya, Gengewuha -Gelagu and Ginchi-Kachise Roads". University of South Africa (UNISA).

Dercon, S, Gilligan, D.O., Hoddinott, J., Woldehanna, T, 2008. The impact of agricultural extension and roads on poverty and consumption growth in fifteen Ethiopian villages. IFPRI Discussion Paper 00840.

ERA, (2018). Road sector development programme, 21 years performance assessment. Addis Ababa: Ethiopian Roads Authority.

ERA, (2016). Road sector development programme, 19 years performance assessment. Addis Ababa: Ethiopian Roads Authority.

ERA (Ethiopian Roads Authority), (2014a). Federal road network master plan, Final Report. Addis Ababa: Prepared by KDEC- KOTI Consultant in JV with CWCE.

ERA, (2014b). RSDP Performance and MDG transport indicators 2012/13 (E.F.Y 2005) – Final Report. Addis Ababa: Prepared by W.T Consult PLC.

ERA, (2011).Road sector development programme, RSDP years performance and phase IV. Addis Ababa: Ethiopian

ERA. (2008). Enhancing rural accessibility, concept paper. Addis Ababa: Federal Democratic

Republic of Ethiopia, Ministry of Works and Urban Development.

ERA, (2007). Road sector development programme III (2007-2010). Addis Ababa: Ethiopian Roads Authority

FTA, (2018). Customer satisfaction study in the road transport service delivery (demand and supply side), Final Report, Addis Ababa, Federal Transport Authority.

Frischmann, B. M. (2005). An economic theory of infrastructure and commons management. *Minnesota Law Review*, 89, 917-1030

Kadyali, L R & Lal.N B (2004). *Principles and practice of highway engineering*. New Delhi: Khanna Publisher

Eskinder D. 2007.The automotive industry and trend analysis in Ethiopia, MBA Thesis, Addis Ababa University, Addis Ababa: Faculty of Business & Economics.

Matebie, A. (2009). An assessment of the socio-economic impacts of road infrastructure on the development of Debreworkos Town, Amhara Region, MA Thesis, Unpublished, Addis Ababa: Ethiopian Civil Service University.

Meron K. (2007). Public transportation system and its impact on urban mobility: The case of Addis Ababa, Addis Ababa: Faculty of Technology, Addis Ababa University.

Ministry of Transport, (2018). Annual statistical bulletin in 2016/17(2009). Addis Ababa:Planning and Research Department.

Moonmaw, R. L., Mullen, J. K., & Martin, W. (1995). The interregional impact of infrastructure capital. *Southern Economic Journal*, 61, pp. 830-845. doi:10.2307/1061001

Musekene E N. (2010). A geographic perspective of labour-intensive methods in the development and maintenance of transport infrastructure, PhD Thesis, South Africa: Department of Geography, University of South Africa,

National Planning Commission, (2013). *Demographic and socioeconomic profile of Ethiopia*. Addis Ababa: Population and Development Directorate.

National Urban Planning Institute(NUPI), (2006). Addis Ababa.

Oosterhaven, J. and Knaap, T. (2000). Spatial economic impacts of transport infrastructure investments. Paper prepared for the TRANS-TALK Thematic Network, Brussels(Sn).

Papí, J; Halleman, B; Antonissen, T; Falco, F; Vizcarra-Mir, B. and Dezes, L. 2007. *The socio-economic benefits of roads in Europe*. Brussels: International Road Federation (IRF) Research Council.

Patarasuk, R.2013. Road network connectivity and land-cover dynamics in Lop Buri province, Thailand. *Journal of Transport Geography*. 28 (2013):111–123.

Porter, S.2005. Enhancing rural road policy: the case for incorporation of the capabilities approach in to rural road appraisal in Africa, Working Papers No 115. Cape

Town: Centre for Social Science Research,

Rodrigue, J-P and Notteboom, T. (2017). *Transportation and economic development* New York: Routledge,

Rodrigue, J-P.,(2017), *The Geography of transportation systems*, New York: Routledge,

Redrigue, J-P; Comtois, C. Slack B. (2014). *The geography of transport systems*. New York: Routledge,

Samson k; Bonngwa A.and Van Dijk M P,(EDS), 2012. Cities as engines of growth and transformation in Ethiopia. Addis Ababa: Lesan Printing Press.

Sengupta, R. Coondoo, D.and Route, B.2007. *Impact of a highway on the socio-economic well-being of rural households living in proximity*, centre for economic studies and planning. New Delhi: Jawaharlal Nehru University.

Shiferaw D. 2008. The impact of road accessibility on investment: The case of Sheka Zone, an Essay, Unpublished, Addis Ababa: Ethiopian Civil Service University.

World Bank, (2014). National urban development scheme, existing situation and diagnostic final report, Prepared by Egis International in association with IAU-IdF & Urba Lyon, Addis Ababa, Urban Planning, Sanitation & Beautification Bureau

World Bank, (2006). *Social analysis in transport projects: guidelines for incorporating social dimensions into bank-supported projects*, Washington DC: Social Development Department

The World Development Report, (1994).

World Health Organization, (2018). Global Status Report on Road Safety 2018

World Health Organization, (2013). Global Status Report on Road Safety 2013

Community participation in cobblestone road provision: a case study of Injibara, Amhara Region, Ethiopia

Ayalsew Kindihun* & Samson Kassahun**

Abstract

This study aimed at analyzing the effect of social capital on the level of community participation in cobblestone road provision. The study employed a quantitative approach. Samples were selected by using a probability sampling technique. From the probability sampling technique, the researchers used a stratified random sampling technique followed by simple random sampling for the selection of households. The survey questionnaire was administered for 368 sample respondents. Findings revealed that community participation was expressed more in financial terms. Participation in policy formulation, planning, implementation, maintenance and operation, and evaluation were not evident. The study shows that there is a strong and positive relationship between the socioeconomic status of respondents and social capital with the level of community participation. The study also found that there was poor communication and relationship among the municipality and kebele leaders that managed the project, and the community. The study concludes that bottom-up approaches, building an effective communication channel between the community, kebele leaders and institutionalization of participation in the City is essential. Capacity-building strategies are also required to promote community participation.

Keywords: Cobblestone Road, Community Participation, Impact, Social Capital

*BA in Economics and MSc in Urban Infrastructure Provision and Management) E-mail: ayalsewkindihun@gmail.com, cell: (+251) (0) 911733244, Addis Ababa, Ethiopia

**Professor of Urban Planning and Development, Department of Urban Planning, College of Urban Development and Engineering, Ethiopian Civil Service University. Samson.kassahun@ecs.u.edu.et.

JADS Vol 6, No. 2, Dec. 2019; DOI: <https://doi.org/10.56302/jads.v6i2.3119>

Introduction

Since the beginning, there has been always a movement from one place to the other. Free movement is a component of human rights. This right has got a guarantee in the Universal Declaration of Human Rights (UDHR). Technological advancement makes the movement of people easy. According to ECA (2009), infrastructure is a significant element in driving a country's growth and development. Especially, road infrastructure is crucial for regional cooperation and integration. In urban areas, roads generally comprise the most important part of the transport infrastructure system. It is a pillar and determinant factor for city growth, directly related to the day-to-day movement of people and freight. Similarly, Kokebe (2011) argued that road infrastructure is central to socio-economic development and poverty alleviation since economic growth, development, and people depends extremely on competent road infrastructure.

By realizing the benefit of road infrastructure in the development of the national economy, the Ethiopian government has given due attention to road infrastructure development. Cobblestone pavement has a long history in Ethiopia going 100 years back (Azeb, 2011). Cobblestone was first introduced to Ethiopia following the construction of the Ethio-Djibouti railway by French contractors. After the Ethio-Djibouti railway construction was finished, the construction could not show any progress until the starting of the engineering capacity building program in collaboration with the German Technical Cooperation of the Engineering Capacity Building Program by the year 2005. The program was started to create job opportunities and income for youth and

provide comfortable roads for Ethiopian cities (MUDC, 2012).

Community Participation is desirable in urban development works. Starting from the 1960s, the tendency to give consumers a say in different aspects of community life in the field of education, health, welfare services, and urban planning and development has increased. It is believed that community participation enables communities to contribute towards designing acceptable and user-friendly projects and make communities develop an interest in the operation and maintenance of projects. Lack of safe tenure rights, inappropriate technical standards, inflexible planning methods; time-bound project management requirements, and lack of practicable models is the potential contributing factors for the low level of community participation in urban road infrastructure development (Schubeler, 1996).

Urban Local Government Development Program (ULGDP) manual (2013) of Ethiopia stated that Cobblestone road constructions under ULGDP are expected to pass through community participation either in a direct construction by forming MSEs or in the procurement work through elected committee members. Urban road infrastructure development strategies can be successful only when there are active participation and mobilization of urban people at the local level. Community participation aims to enhance the skills and capacity of communities by promoting their participation in their development. Therefore, it is imperative and appropriate to find working strategies that can improve the level of community participation in cobblestone road works.

Social Capital which is an important idea in development studies was taken as an important component for ensuring project sustainability since 1990, (World Bank, 2009). However, incorporating social capital in community-based development works has got little attention (McGee, 2010). Recent studies on social capital argued that the process of community participation in development works can highly be influenced by social capital (Johannesson et al., 2003; Jones, 2005; Karlsson, 2005; Macbeth et al., 2004; Nordin & Westlund, 2009 as cited in Zhao et al., 2011). This study was conducted to analyze the social capital's effect on community participation in cobblestone road provision in Injibara town of Amhara Regional State, Ethiopia.

Problem statement

Injibara Town Municipality office started participatory planning and implementation approach for cobblestone road provision and other related urban development works in 2004 E.C. Based on the evidence brought from the city municipality, the level of community participation on the cobblestone road provision has been increasing through time. Existing evidence show the presence of community participation from the planning up to the construction stage of the cobblestone road project, but it is not enough to conclude that the level of participation is enough and appropriate. Due to this, in the past seven years, the cobblestone road provision has been facing extreme delaying of completion. The quality of those built cobblestone roads is also poor in some areas. The Town administration is confronting with the growing demand for cobblestone road provision from different areas (Injibara Town Annual Report, 2017).

Low road coverage is the reason for low mobility and health problems. The low level of community participation in cobblestone road provision leads to low cobblestone road coverage. This also leads to other socio-economic and environmental problems.

In the last seven years, the municipality was trying to incorporate community participation in cobblestone road works. Community participation in cash is the most commonly known form of participation in cobblestone road works. Every year a huge amount of cobblestone is stored in one dumping site and also surplus cobblestone is left uncollected in finished cobblestone road sites. It is caused by poor management systems accompanied by low community participation. There is no check and balance system developed for the residents. So, this problem has to be solved.

In Ethiopia, few studies concerning cobblestone road provision were done in recent years. Most of them focused on the economic, transportation, and social impact of cobblestone road provision. The relationship between community participation and cobblestone road provision is little researched. A study conducted by Melesse (2015) had tried to address the challenges of community participation on the effectiveness of cobblestone road projects; however, the study did not discuss the issue of the role of the community in the provision of cobblestone road projects well. A study by Meskerem (2015) also tried to research the procedures and problems for urban road infrastructure provision. A study by Samson (2012) as well focused on the actors in road provision and the contribution of the community for it. In all the above studies we

could not find any relationship analysis between socioeconomic statuses with community participation level and also social capital with community participation level.

Additionally, no research was done on the issue of community participation in cobblestone road provision in Injibara town. Therefore, the above problems motivated the researchers to conduct this study on community participation in cobblestone road provision and forward possible solutions that can narrow the gap between the demand for and supply of cobblestone road provision in Injibara town. The objective of this paper was analyzing the impact of social capital on community participation level on the cobblestone road provision.

Literature review

Jerry (2004) defined community as a group of people who have been able to accept and transcend their differences regardless of the diversity of their backgrounds. This creates a platform to communicate effectively and openly to work together towards goals identified for their shared benefit. The theory of community participation called “a ladder of citizen participation” which was introduced by Sherry R. Arnstein in the year 1969 in America. Arnstein explained that this classification is necessary to reveal the manipulation of people in the grab of community participation projects by authorities and policyholders. The ladder has eight rungs each matching to a different level of participation, that is, manipulation, therapy, informing, consultation, placation, partnership, delegated power, and citizen control.

The rungs at the bottom of the ladder are the ones with minimum citizen participation

or non-participation and include manipulation and therapy. Informing, consultation, and placation occupy the middle rungs of the ladder and edge between manipulation at the bottom and citizen control at the top and is called tokenism where the people are permitted to participate only to the extent of voicing their views but have no real say that matters.

The last three rungs, partnership, delegated power, and finally citizen control at the top of the ladder are termed equal to citizen power and this is where true and meaningful participation takes place. This categorization of the various types of people involved is vital in clarifying the mix-up between non-participation and true citizen power also to identify the real reasons behind participatory projects, which are often used by critics as a shortcoming of the concept of participation (Arnstein, 1969). The theory is relevant to the study where there is manipulation done by local authorities and local leaders about community participation development projects funds which lead to communities' loss of interest towards participation in development projects.

Wattam (1998) defined community participation as the empowerment of citizens to manage the utilization and distribution of resources and production capital in society for their living. Wattam's (1998) classification of community participation.

Passive participation: People participate by living in the area of the project. They may be told what is going to happen or has already happened but will have no other input.

Participation for material incentive: People participate by being paid for labor in food or cash, for a pre-determined project.

Participation by resource contribution: People participate by contributing a resource such as labor or money, to a pre-determined project.

Participation by consultation: People participate by being consulted on Projects where the majority of the decisions have been made, their view may/may not be considered.\

Interactive participation: People participate by joining with external professionals in the analysis of their situation, developing action plans, and determining common projects.

Spontaneous mobilization: People participate by taking their initiative independent of external professionals to change their situation.

Strategies to participation for infrastructure development

1. Process-based strategies: process-based Strategy takes the entire process of infrastructure management as their frame of reference. The basic objective is to improve the efficiency, demand responsiveness, and accountability of infrastructure service management through a general decentralization of delivery processes.
2. Functionally-based strategies: employs the functional structure of the infrastructure system as the frame of reference for organizing development inputs. The main objectives of this approach are first to designate areas of responsibility within which each stakeholder may pursue particular interests and exercise capacities, and second to establish effective collaboration between these various domains.
3. Area-based strategies: Rather than a social group, a particular residential area constitutes the frame of reference for development efforts.

- Community-based strategies: The main objectives are to support the local development of infrastructure services; enhance community groups' capacity to manage service development; and enable these processes through appropriate changes in the legal, technical, and policy context.

Community participation is influenced by different factors and social capital is one of them. The impact of social capital on the level of community participation is discussed by different intellectuals. Social capital incorporates several perspectives on social relations (Macbeth et al., 2004). Sociologists, philosophers, and political scientists like Bourdieu (1986), Coleman (1988), Putnam (1993), and Ostrom (1999) conceptualized Social Capital in different ways.

Social Capital is an important idea in development studies. Since 1990, it was taken as an important component for ensuring project sustainability (World Bank, 2009). But incorporating social capital in community-based development works has got little attention (McGehee, 2010). Recent studies on social capital argued that the process of community participation in development works can highly be influenced by social capital (Johannesson et al., 2003; Jones, 2005; Karlsson, 2005; Macbeth et al., 2004; Nordin & Westlund, 2009 as cited in Zhao et al., 2011). Hounslow (2002) and Woodhouse (2006) find that building a community's capacities depends on Social Capital. Relationships and social networks describe Social Capital, which indicates the importance of connecting the concepts of community participation with Social Capital. The way of using an individual's resources using the technique is affected by relationships with, and trust in others. Trust can determine the level of capacity of the community (Balint,

2006). Differences in power had to be taken into account and identified whether or not they are effectively contributing to improving the participation in meetings and training for capacity building (Chu, 2003, as cited in Wong, 2007). To be able to view relationships, networks, and competencies of the community from different perspectives for the analysis, the researchers used the 'synergy' views developed by Woolcock and Narayan (2000). The researchers explain social capital as a combination of bonding, bridging, and linking types. Bonding social capital developed by relationships in similar network members.

Bridging social capital denotes outward-looking individuals of a community that creates associations across social and ethnic groups and henceforth the establishment of new ideas and outlooks (Gittel & Vidal, 1998). Communities with high bridging social capital can serve as an accelerator for small businesses to emerge and advance (Karlsson, 2005). Linking social capital denotes associations among individuals and institutions throughout all power gradients. They are often relatively weak ties but have significant outcomes (Woolcock, 2001; Szreter & Woolcock, 2004).

Operational definition of variables

Social capital: contains themes of associations, networks, and abilities in addition to its related concepts of trust and power and it is the complex and immaterial resources of a community (Stone, 2001)

Community Participation: Participation in cobblestone road provision includes, planning, programming, monitoring, implementation, operation, and maintenance in the form of partnership between government and the community

members, which may be endorsed in the framework of programs for improving road quality. The indicator used in this research is several people participating in key activities such as construction, maintenance, planning in cobblestone road provision within a year. The researchers used the operationalization of social capital at the household level developed by Samson (2004).

The density of membership: Expressed as membership of household head in several associations. It indicates the presence of both bonding and bridging social capital. Having more participation in different local associations builds a sense of community due to the possible learning effect through information diffusion and social capital accumulation (Baland and Platteau, 1997; Pender and Scherr, 1999).

Active Participation: Associations following a democratic system in decision making, are more likely to be effective than others in employing community-oriented activities (Grootaert, 1999). The local association is expected to be a significant factor to have community development. A household member who is active in local association's activities is more likely to develop and attain generalized trust (Putnam, et al., 1993; Fukuyama, 1995) and reciprocity, which can reduce transaction costs and manages community development.

Trust variables: Trust is considered as a good lubricant in given cooperation. It also minimizes the transaction cost between people and hence liberates resources. Instead of having to invest in monitoring, other individuals can trust them to act as expected. The act of trusting someone engenders reciprocal trust. Trust has three types: the trust we have in individuals that

"we know" is called 'particularized trust' (Fukuyama 1995); and the trust we have in those "we do not know," but the trust arises because of our confidence in a known social structure, is called 'generalized trust' (Knack and Keefer, 1995). The third type of trust is the trust that we have informal institutions, which is called 'confidence in the institution' (Hardin, 1999; Putnam, 2000). All trust variables of the household have been taken in the analysis of the willingness of the household to be engaged in a partnership for community development through their local association.

Reciprocity: Reciprocity and exchanges also increase the sense of community and solidarity. There are two types of reciprocity (Putnam, Leonardi and Nanetti 1993; Coleman, 1990): specific reciprocity and diffuse reciprocity. Specific reciprocity is expressed as simultaneous exchanges of items of roughly equivalent value and diffuse reciprocity, refers to a continuous relationship of exchange that at any given time may not be returned, but is sure to be repaid over time and balanced. Again, this contributes to the development of long-term obligations between people, which can be a central part of achieving positive outcomes. Norms of reciprocity, which entail mutual aid, are reliant on social networks. Bonding networks that connect persons who are members of a certain group or association can ensure specific reciprocity (Putnam, Leonardi, and Nanetti, 1993). Bridging networks that link persons who are diverse sustain diffuse reciprocity (ibid.).

Conceptual framework

The foregoing discussion has given the base for our theoretical framework. First, actors of the community should be self-motivated and also be networked formally



and informally. Consequently, we expect that a higher level of membership in local associations and trust build in community and confidence in governmental institutions will increase participation in community development.

Research methodology

Stratified and simple random samplings among probability sampling techniques were employed in this study to select representative household heads to survey. This study considered the entire population as heterogeneous in various dimensions. Thus, the stratified sampling technique was used to stratify the population into four strata based on their location. Then a total of 350 sample households were selected proportionally from the four strata; homeowners and renters were selected by

Table 1: sample frame and size

No	Kebele	Population Size	Sample Size	Sampling Technique
1	Kebele 01	2,427	97	Simple Random Sampling
2	Kebele 02	2,264	91	Simple Random Sampling
3	Kebele 03	1,808	73	Simple Random Sampling
4	Kebele 04	2,236	89	Simple Random Sampling
5	Total	8,755	350	

Source: Injibara Town Administration Finance and Economic Cooperation Office, 2011

using a simple random sampling technique. Injibara Town Administration is composed of 4 *kebeles*. Table 1 below, illustrates the total population of the study areas and the sample size selected from the entire population.

Data gathering instruments

The study was undertaken using primary and secondary data. Primary data is collected from the samples through observation and questionnaire.

Data analysis

After the collection of raw data on the field was completed editing, coding, and recording of the data on a tabular form is started. Those collected data that were not complete and probably having an effect on the output of the study were neglected from the sample. To get meaningful information from the collected samples, SPSS version 22, was used. The data were analyzed through simple statistical methods like percentages and cross-tabulations to facilitate meaningful analysis and interpretations of the research findings. Community participation is analyzed as a function of social capital and the household's socio-economic characteristics. Indicators of the level of trust and networking and reciprocity were used to measure social capital. Thus:

$$W_i = (SC_i, D_i, H_i, \dots, e)$$

Where 'SC' denotes social capital variables (trust, reciprocity, and networks), 'D' denotes demographic variables (sex of the head of the household), and 'H' denotes household characteristics (age, household size, income level, education level, marital status, occupation, length of living)

$$W_i, SC_i, D_i, H_i, V_i, V_i, N_i \in [0, 1]$$

A Logistic Regression Analysis, which is a statistical technique for predicting a dependent variable with one or many independent variables, was also employed. The basic difference between a Logistic Regression Model and Linear Regression Model is that the outcome variable in

logistic regression is binary or dichotomous; it allows for identifying the direction and magnitude of change in the probability of Y occurring given a unit increase in X. Thus, Logistic Analysis computes the change in the probability of an event occurring, given a unit increase in the value of independent variables of interest (Hosmer and Lemshow, 1989). Thus, the dependent variable "level of participation" was coded as:

$$W_i = 1 \text{ If the household is participating}$$

$$W_i = 0 \text{ Otherwise}$$

The logistic regression model is given by the function:

$$W = e^{(\beta_0 + \beta_1 SC + \beta_2 D + \beta_3 H + \dots)}$$

For instance, 'W' would be the probability of the household to participate, whereas 1-W is the probability of not participating. 'β' is the vector of coefficients, and 'SC', 'D', and 'H' are the independent variables.

Results and discussion

Backgrounds of respondents

Regarding the educational status of respondents, Table 2 depicts that about 94% of the total respondents were attending formal education at different levels. Literate people are more expected to have more awareness about the practice of community participation in road infrastructure development than those who are not. The age group of the respondents was composed of middle-age respondents in the age group between 36-45 takes a major share which represents 125 (35.71%) of the total sample respondents, followed by age group between 26-35 which accounts 92 (26.29%) of the respondents. While the remaining 61 (17.43%) of the respondents were found between 46-55 age group, 40 (11.43%) of the respondents were found above 56 age

group, 32 (9.14%) of the respondents were found between 18-25 age group.

Out of the total 350 respondents, 137 (39.14%) were having a household size of 1-4 people, 157 (44.9 %) were having 5-7 members and 34 (9.7%) also have 8-10 family members, 22 (6.3%) were having above 10 household members. This shows that the majority of the respondents have 5-7 household size. The large population needed large demand for infrastructure provision and labor force which directly implicate cobblestone road infrastructure provision. Therefore, this large amount of household size wants usage of cobblestone road infrastructure to create a good environment of living in the Town.

Out of 350 respondents, representing 279 (79.71%) of the total sample respondents had been in the area for four years and above. This implies that the largest share of the total respondents lives for long years in the town. This means that they had various experiences on the trend of community participation and cobblestone road infrastructure development. The data collected from them is very relevant and valid. The remaining 71 (20.29%) respondents had been in the area for 3 or fewer years. As the table shows, out of the total 350 sampled respondents, 152 (43.43%) participate while the rest 198 (56.57%) did not participate in cobblestone road works.

As shown in Table 2 above, males are household heads in almost equal ratio with little difference (1.4%) and majorities (83.4%) of them are between thirty-six and forty-five of age. 142 (40.6%) of the respondents earn between 4,000 (about \$133) and 8,000 Birr (about \$266) monthly, while almost 82% of them are graduates of higher institutions of learning, which implies

Table 2 Socioeconomic, demographic and housing characteristics of respondents in the study area

Factors	Frequency (n 350)	Percent (%)
Gender		
Male	180	51.4
Female	170	48.6
Age		
18-25	32	9.1
26-35	92	26.3
36-45	125	35.7
46-55	61	17.4
Above 56	40	11.4
Family Size		
1-4	137	39.1
5-7	157	44.9
8-10	34	9.7
Above 10	22	6.3
Level of Education		
No formal Education	21	6.0
Elementary	22	6.3
Secondary	21	6.0
Certificate	22	6.3
Diploma	79	22.6
Degree	174	49.7
Masters and above	11	3.1
Marital Status		
Single	77	22.0
Married	236	67.4
Widowed	17	4.9
Divorced	20	5.7
Living period		
1-3 years	71	20.3
4-7 years	63	18.0
8-10 years	44	12.6
Above 10 years	172	49.1
Employment Status		
Government Employee	120	34.3
NGO Employee	51	14.6
Private Sector Employee	72	20.6
Self-Employee	107	30.6
Unemployed	120	34.3
Income		
Below 2,000 birr	36	10.3
2,001-3,000 birr	45	12.9
3,001-4,000 birr	81	23.1
4,000-8,000 birr	142	40.6
Above 8,000 birr	46	13.1
Participation		
Yes	152	43.4
No	198	56.6

In this study, the researchers discussed the **network, trust, and reciprocity** dimensions only. The civic engagement dimension of social capital is not part of the research. The reason for excluding it from the research is to manage the scope of the study. In Ethiopia, there is a strong traditional mutual help and these mutual help manifests itself also in collective action, often undertaken for the betterment of the community (Koehn and Koehn, 1973 cited in Samson, 2004). Table 3 below presents the result of the logistic linear regression participation level of the household for the cobblestone road construction in the town as the dependent variable and social capital aspects as the independent variable. Most of the social capital variables showed direct and significant effects on the participation level in cobblestone road provision.

member of a local association), which enables a diversity of individuals within the locality to become connected. The informal network (through individual relationships) was not considered in the study. To collect important data related to formal networks, respondents were asked about the density of membership (to be engaged in several associations shows bonding and bridging social capital. In this research it is hypothesized that the more the household is participating in different local association the higher the tendency to be part of collective action in his/her residence.

The second component of formal networks is active participation. In this research, respondents were asked different questions to get their idea on their participation level in local associations. It is hypothesized that a member of a household who is active in the local

Table 3: Model summary and coefficients of social capital predictors of participation

Dependent Variable	Community Participation				Remarks
	Independent Variable	Standardized coefficients		df	
β		Std. error			
Constant					
Social Capital Dimensions					
Density of membership	3.201	0.527	1	0.000**	Significant
Active Participation	2.983	0.275	1	0.000**	Significant
Reciprocity	8.080	0.824	1	0.000**	Significant
Generalized Trust	5.606	0.041	1	0.000**	Significant
Confidence in local Institutions	3.932	1.421	4	0.006*	Significant
Model Summary					
Number of Observation	350				
Log-Likelihood	0.000				
Chi-square	0.000				
R ² (Neglekerek)	1.000				
Significant level	0.000				

Note Dependent variable: participation in cobblestone road provision.

*Significant predictors (p < 0.05)

**Significant predictors (p=0.000)

Network

Under this study, the emphasis was given to formal networks (in terms of being a

association is more very probable to have generalized trust and reciprocity.

Table 3 above shows that both density of membership ($\beta=3.201$; $P<0.001$) and active participation ($\beta=2.983$; $P<0.001$) have a positive and a significant impact on the community participation level. The result is in support of the hypothesized assumption made earlier.

Trust

In this research, trust is classified into **generalized trust** (the type of trust we build on those people that we do not know or know little which arises based on our confidence in the social structure) and confidence in governmental organizations (**Institutional confidence**). Since the issue is more focused on society level in this research **particularized trust** is not part of the research. To know about **generalized trust** in this research, the respondents were asked their view about the general trust level in the locality with questions like "Generally speaking, would you say most people living in this locality could be trusted or that you can't be too careful in dealing with people".

To know about the **institutional confidence** of the residents on different governmental institutions, the respondents were asked about their level of confidence towards different institutions such as municipality council, municipality officers, city administration leaders, and city administration officers. By doing so, it is found that **institutional confidence** has a positive and significant impact on the community participation level ($\beta=2.983$; $P<0.01$).

Reciprocity

Reciprocity is classified into two (Putnam *et al.*, 1993). The first type of reciprocity is Specific reciprocity, is expressed as simultaneous exchanges of items of

roughly equivalent value; and the second is diffuse reciprocity, refers to a continuous relationship of exchange that at any given time may not be returned, but is sure to be repaid over time and fully balanced. This relationship trend can create a stable relationship between people and also builds trust. Norms of reciprocity is a factor of social networks. Particularized reciprocity can be sustained by bonding networks that connect individuals who are members of a certain group or association (Putnam *et al.*, 1993). Generalized reciprocity is sustained through bridging networks that connect diversified individuals (Putnam *et al.*, 1993). Based on these two relationships we can have a hypothesis that a better score of reciprocity in a household would favor a collective action.

To know about the reciprocity pattern of the households of the study area questions like whether a household does a favor to their neighbors in the recent 6 months or not, do a household will ask help from their neighbor in a state of need were asked. The logistic regression analysis shows that reciprocity has a positive as well as a significant effect on the community participation level. ($\beta=8.080$; $P<0.001$). The output is compatible with the hypothesis developed earlier. The general impact of the social capital community participation level is expressed by ($\beta=1.560$; $P<0.001$). This implies that overall social capital has a significant and positive impact on community participation level. The findings reveal that social capital has a positive and significant impact on the level of community participation. The three dimensions of social capital have a different level of influence on the participation level. Reciprocity ranks first followed by trust and network.

Conclusion

Social capital, one predictor variable for community participation, has three dimensions. These are network, trust, and reciprocity. The hypothesis is the more social capital society has the more tend to participate in community works. The network dimension of social capital is measured by the density of membership and active participation. Studies by Balland and Platteau (1997), and Pender and Sherr (1999) revealed that the one with a high density of membership has a good community participation level. Also, active participation in the community through different mechanisms can improve generalized trust and reciprocity which reduces the transaction cost for community participation (Grootaert, 1999; Putnam *et al.*, 1993; Fukuyama, 1995b). The regression analysis result for the density of membership and active participation shows that the existence of a strong network among people and the municipality can serve as a lubricant to speed up community participation in any development work of the municipality.

The second dimension of social capital; i.e., trust is also classified into generalized trust and institutional confidence. Balint (2006) argued that trust can determine the performance of community capacity. The regression analysis result for both generalized trust and institutional confidence shows that the more you trust your locality and government institutions, the more you feel comfortable and happy to participate in communal works.

The third dimension of social capital, reciprocity, is classified into specific and diffused reciprocity. In both types of reciprocity, there is a sense of giving and take. The hypothesis is that the more the

reciprocity level, the more tendency to participate in communal works. The act of reciprocity increases the sense of community and solidarity (Putnam, Leonardi & Nanent, 1993; Coleman, 1990). When people develop an exchange of items among themselves for long times, they develop a strong relationship and people think as a community. Then they will be active in community works. The regression analysis produces the same result as that of the hypothesis. So, in all the above listed three dimensions of social capital has a direct and positive impact on the level of community participation.

Recommendation

Acknowledging the importance of the social capital of the society and using it as an input for the day to day work of the municipality is important. The network, trust, and reciprocity dimensions of social capital have a positive impact on the level of community participation. Therefore, when the municipality plans the cobblestone road project it has to know how the society is networked, the level of trust among the community, and the level of reciprocity. Based on this data, the municipality has to develop a strategy that maximizes community participation. Among the strategies reviewed in the literature, Area-based strategy is the appropriate one.

Reference

- Arnstein, S.R., 1969. *A Ladder of Citizen Participation*. *Journal of the American Institute of planners*, 35(4).
- ANRS, Urban Development Housing and Construction Bureau, Community Participation Guideline, 2007.
- Azeb, N. 2011. "Contribution of Cobble Stone Enterprises to Urban Household Food Security: The Case of Gulele Sub-city, Addis Ababa." MA thesis, School of Development Studies, AAU, Addis Ababa, Ethiopia.
- Baland, J.M., and Platteau, J.P., 1997. *Wealth inequality and efficiency in the commons*

- Part I: the unregulated case. *Oxford Economic Papers*, 49(4).
- Balint, P.J., 2006. Improving community-based conservation near protected areas: the importance of development variables. *Environmental Management*, 38(1).
- Bourdieu, P., 1986. "The Forms of Capital." *Handbook of Theory and Research for The Sociology of Education*. JG Richardson. New York, Greenwood, 241(258).
- Chu, K.Y., 2003. *Collective Values, Behavioural Norms, and Rules: Building Institutions for Economic Growth and Poverty Reduction* (No. 2001/98). Wider Discussion Papers/World Institute for Development Economics (UNU-WIDER).
- Coleman, J.S., 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology*, 94, pp. 95-120.
- _____. 1990. *Foundation of Social Theory*. Cambridge: Harvard University Press.
- CSA, Population Survey, 2007.
- ECA, 2009. *Africa Review Report on Transport*, viewed 28 November 2018. http://www.un.org/esa/dsd/csd/csd_pdfs/csd-18/rims/African Review Report Sum.pdf
- Fukuyama, F., 1995a. Trust: The social virtues and the creation of prosperity.
- _____. 1995b. Social capital and the global economy. *Foreign Aff.*, 74.
- Gittel, R. and Vidal, A., 1998. *Community Organizing: Building Social Capital as A Development Strategy*. Sage Publications.
- Grootaert, C., 1999. *Social Capital, Household Welfare, And Poverty in Indonesia*. The World Bank.
- Hardin, R., 1999. Do we want to trust in government? *Democracy and trust*.
- Hosmer, D.W. and Lemeshow, S., 1989. *Applied Logistic Regression*. New York: Jhon Wiley & Son.
- Hounslow, B.E.T.T.Y., 2002. Community Capacity Building Explained. *Stronger Families Learning Exchange Bulletin*, 1(1), Pp.
- Injibara city Administration Economic Cooperation Office Report. 2017
- Jóhannesson, G.P., Skaptadóttir, U.D. and Benediktsson, K., 2003. Coping with social capital? The cultural economy of tourism in the north. *Sociologia Ruralis*, 43(1).
- Jerry, L.H. 2004. *Seven Community Definitions, Group Dynamic and Community Building*, Viewed 10 December 2, 2018, <http://www.community.com/comm.definitions.html>
- Jones, S., 2005. Community-based ecotourism: The significance of social capital. *Annals of tourism research*, 32(2).
- Karlsson, S.E., 2005. The social and the cultural capital of a place and their influence on the production of tourism—a theoretical reflection based on an illustrative case study. *Scandinavian Journal of Hospitality and Tourism*, 5(2).
- Knack, S. and Keefer, P., 1995. Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & Politics*, 7(3).
- Kokebe, Y. 2011. *Urban Road Infrastructure and Provision Management*, unpublished book Adama, Oromia, Ethiopia, viewed 29 October 2018 <http://www.infrastructureafrica.org/system/files/WB147-AIATT-CH10.pdf>.
- Macbeth, J., Carson, D., and Northcote, J., 2004. Social capital, tourism and regional development: SPCC as a basis for innovation and sustainability. *Current Issues in Tourism*, 7(6).
- McGehee, P., 2010. Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity*, 9(3).
- Melese, K. 2015. *Assessment of community participation on the cobblestone road project: the case of Addis Ababa Bole Sub-city Woreda 17*
- Meskerem I. 2015. *Community Participation in Urban Infrastructure Development: Experience from Bishoftu Town, Oromia National Regional State*.
- MUDC. 2012. *Manual for Community Participation in Procurement and Construction of Cobblestone Roads under ULGDP*, 3rd ed., Addis Ababa, Ethiopia.
- Nordin, S. and Westlund, H., 2009. Social capital and the life cycle model: The transformation of the destination of Åre. *Turizam: međunarodniznanstvenostručničasopis*, 57(3).
- Ostrom, E., 1999. Social capital: a fad or a fundamental concept. *Social capital: A multifaceted perspective*, 172(173).
- Pender, J.L. and Scherr, S.J., 1999. *Organizational development and natural resource management: Evidence from central Honduras* (No. 581-2016-39372). <http://dlc.dlib.indiana.edu/documents/dir0/00/00/04/67/>
- Putnam, R.D., 2000. *Bowling alone: The collapse and revival of American community*. Simon and Schuster.
- Putnam, R.D., Leonardi, R. and Nanetti, R.Y., 1993. *Making democracy work: Civic traditions in modern Italy*. Princeton University Press.
- Samson, K., 2004. *Social capital for synergic partnership: development of poor localities in urban Ethiopia*. CuvillierVerlag.
- Samson, T. 2012. *The role of community participation in urban road infrastructure provision in SNNPRS- The case of Bonga Town*.
- Schubeler, P., 1996. *Participation and partnership in urban infrastructure management*. The World Bank.
- Stone, W., 2001. Measuring social capital. *Research paper*, 24.
- Szreter, S. and Woolcock, M., 2004. Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology*, 33(4).
- ULGDP manual, 2013. Operational Manual.
- Wattam, M., 1998. *Community Participation in Rural Transport Infrastructure*, IT Transport Ltd. Viewed 29 November 2018.
- Wong, S., 2007. *Exploring 'unseen' social capital in community participation: everyday lives of poor mainland Chinese migrants in Hong Kong* (Vol. 2). Amsterdam University Press.
- Woodhouse, A., 2006. Social capital and economic development in regional Australia: A case study. *Journal of rural Studies*, 22(1).
- Woolcock, M. and Narayan, D., 2000. Social capital: Implications for development theory, research, and policy. *The World Bank Research Observer*, 15(2).
- World Bank, 2009. The developmental state is dead—long live social capital? *Development and Change*, 30(1).
- Zhao, W., Ritchie, J.B. and Echtner, C.M., 2011. Social capital and tourism entrepreneurship. *Annals of Tourism Research*, 38(4).

Acknowledgments

The researchers would like to express their gratefulness to all respondents and the officials of Injibara Town Administration for their collaboration. We would also like to thank ECSU for the financial support for the research.

Health sector performance in Ethiopia: a study in regional disparities

Kanchan Singh*

Abstract:

The paper is an attempt to review the status of health parameters in the light of demographic attributes of population growth and mortality in Ethiopia. Health infrastructures, health personnel and health services to population ratios have been worked out and compared at regional levels. Twenty-six variables have been used to analyze national and regional situations. Results have been explained in terms of regional development levels, regional disparity, relative disparity and absolute disparity in the case of health services, infrastructures and health personnel to population ratios. In terms of health sector development; Addis Ababa, Amhara and Harari regions have high development (D.I.= 0.283-0.74); Dire Dawa, Oromia and Tigray have moderately high development (D.I. = 0.165-0.220); Afar, SNNPR, and Somali regions have a moderately low level of development (D.I. from 0.125 to 0.155); while regions of Gambella and Beneshangul Gumuz reflect a low level of development (D.I. from 0.114 to 0.115) in relation to health facilities and infrastructures. The absolute disparity was extremely high in variables such as Basic Emergency Obstetric Care (BemOC) (1:534) and Comprehensive Emergency Obstetric Care (CemOC) (1:204) and availability of all other health professionals (1: 118.13). Similarly, the relative disparity was very high in cases of the functional health center to population ratio (230.71 %), all other health professionals (133.22%), BEmOC (120.36), CemOC (116.52% and deaths due to malaria (114.85%). In terms of health sector performance Addis Ababa and Amhara regions present low regional disparities while Gambella and Beneshangul Gumuz regions reflect a very high regional disparity.

Keywords: Health infrastructure, Health Services to population ratios, Regional Development, Regional Disparity, Relative Disparity, Absolute Disparity

*Dr. Kanchan Sing Department of Urban planning and Development, College of Urban Development and Engineering, Ethiopian Civil Service University, Addis Ababa, Ethiopia. Email: drks197@gmail.com

JADS Vol 6, No. 2, Dec. 2019 Issue; DOI: <https://doi.org/10.56302/jads.v6i2.3120>

Background

Most of the developing countries including Ethiopia are currently faced with a situation of widening disparity in the health sector (World Bank, 2020). This is due to the concentration of additional health services and infrastructures in and around those regions which are better placed in terms of health services. The burden of illness, injury, disability, or mortality experienced by one social group such as pastoralists relative to another social group such as agriculturalists is one of the causes for dissatisfaction among the people (Ahmed et. al., 2019). Similarly, people in a rural setup, who are dispersed in distribution, are placed at a disadvantage relative to people in urban setup who have clustered distribution (Hailemichael et.al., 2019). Some of these dichotomies are better expressed in regional setup. For example, pastoralists of Afar, Somali, and some parts of the Oromia region have similar situations in terms of burden of sickness, injury, disability and mortality

(World Bank, 2019). As mentioned by Abebe (2020), poverty is more rampant in rural parts than in urban areas. In Ethiopia, 60 % of the population lives in highland parts of the country with various agro-ecological zones engaged in sedentary farming. The rest of the population which comprises 40% resides in low land parts of the country engaged in pastoral and agro-pastoral activities.

According to QU Dongyu, Director- General, FAO quoted by Mehari Beyene (2020), in many areas, the relationship between farmers and pastoral herders, which was once cooperative, has become confrontational as they compete over the same scarce resource. As such, there is an apparent need to re-orient policy attention in favor of disadvantaged social groups and lagging regions to incorporate health equity into national public health policies, thus,

minimizing the gap between the groups; within and among the regions.

Statement of the problem

To review these backgrounds, an attempt has been made to analyze the level of regional development in the health sector in Ethiopia and to measure the regional disparity that exists. Disparities in health and health care not only affect the groups facing disparities, but also limit overall gains in quality of care and health for the broader population and result in increased costs and burden. Addressing health disparities is increasingly an important issue as the population becomes more diverse with expanding disease burden. It causes discontent among the groups of the people.

In the Ethiopian context, one can think of such a situation in case of the rural and urban communities. Urban communities have relatively greater access to health services compared to rural communities because of their scattered distribution (Abraha et al., 2019). Somewhat similar is the case of communities residing in lowland setup which is disadvantaged as compared to those residing in highland setup (World Bank, 2019). The provision of health services and infrastructure is relatively more in highland areas where a greater proportion of the Ethiopian population (about 60 %) resides, compared to lowland areas (Khan, 2014). Further, health infrastructure and services have a higher concentration in large towns and cities while small and medium-sized towns have a relatively very low level of health infrastructure and services (Unlocking the power of Ethiopian Cities, 2015).

Thus, there is marked variation within rural communities, when the comparison is made between pastoralist and agriculturists groups. Further, the rural-urban divide is very wide in the case of health infrastructure. It is somewhat narrowed down in the case of small urban to

large urban set up. Thus, disadvantaged groups placed in different agro-ecological zones have different disease burden and demand region-specific provision of medical treatment and health services. It is in this context that, in this paper, absolute and relative disparity needs to be explained to focus on the indicator specific gap in health provision. Such input will help to set priority areas in the health sector so that disparities are minimized while the disparity and equity in the health sector are achieved.

Review of literature

Ethiopia has formulated a Comprehensive Health Policy in 1993 during Interim Government (World Bank, 2019). Further, the country has initiated Health Sector Development Programs (HSDP) under the Ministry of Health (MOH). Similarly, as a policy; strategic plans were also initiated in 2008. The progress was reviewed during HSDP-III which dealt with 2005-06 to 2009-10 (Federal Ministry of Health, 2010/11). The annual performance report was also published during 2011-12 (Federal Ministry of Health, 2012). The first documented report about the status of health in Ethiopia was published by Koblinsky et.al in 2010. The paper analyzed the constraints related to health care and its possible remedial measures. The results of the study explained that health care is so essential for ensuring a substantial reduction in child and maternal mortality besides a reduction in overall death rates in the country. Federal Ministry of Health (FMOH 2010 and 2014) has also brought out performance reports entitled 'Health Sector Development Program IV for 2010/11 – 2014/15. The study has critically analyzed that country has made substantial progress in making provision for basic health care. However, it has also remarked that there is still a wide gap in the fields of critical health care, particularly in rural areas.

Similarly, Ethiopia's Fifth National Health Accounts Report was brought out for 2010/11

(Bazie and Adimassie, 2017). National health account report presented the expenditures incurred in the field of developing health infrastructures and making adequate provisions for medicines, trained manpower to attend to the issues such as treatment for deficiencies of vitamins and minerals during sickness, pregnancy and immunization programs. However, the report could not identify the gap areas across different health sectors besides the magnitude of health sector requirements of different population groups and regions in the country. A Mid Term Review Report regarding HSDP IV was also brought out in 2013 (Hailemichael et al, 2019). These reports have summarized the investment expenditures and their outcomes at regional and national levels. CSA (2012) in association with the Institute of Maryland USA published the Demographic and Health Survey of Ethiopia (FAO, 2020).

In line with the above reports, Health and Health-Related Indicators were also published in 2012 (Federal Ministry of Health, 2015). According to *UNDP Ethiopia Country Report (2012)*, it has indicated that levels of achievements in different indicators at the country level have made considerable progress (World Bank, 2020). The report has further explained that although national child immunization coverage rates rose rapidly over the last five years, coverage rates are particularly low and need to be increased in Afar and Dire Dawa regional state while taking measures to sustain progress and prevent progress reversals in the rest of the regional states (World Bank, 2020). It is commendable to see regional states that initially had low immunization rates had rapidly increase immunization coverage during the last five years. Consequently, the disparities in measles and DPT3 immunization rates across regions have declined by 44 percent and 55 percent, respectively between 2006 and 2010 (*ibid*).

Besides review reports and assessments, some scholarly articles have been published to explain the performance of the health sector in Ethiopia. Important among them are the studies conducted by Banteyerga H, and Kidanu A. (2008), Birhan et.al (2010), Singh P. et al. (2010), Teckle Haimanot et al. (2013), Bilal, et al. (2014), Khan Et.al (2014), Bazie et.al (2017), Abegaz et al (2018) and Abraha, W. et.al (2019). Banteyerga & Kidanu (2008) attempted a rapid appraisal of the health extension program: Ethiopia Country Report. The study outlines the challenges that are faced by the program at the country level. In memory of 100 years of Ethiopian modern medicine and the New Ethiopian Millennium; Birhan (2010) published an article in *Ethiopian Medical Journal* on “A special issue on medical doctors’ profile in Ethiopia: production, attrition and retention. The article is a review article and explains slow yet steady progress in the health sector in Ethiopia. Similarly, the country case study of Ethiopia regarding human resources for health program was published by Singh P. (2010). It was part of a GHWA task force on scaling up education and training for the health work force by WHO (2016).

Later on, World Bank attempted an initiative on Yes African Can: Success Stories from a Dynamic Continent, Washington DC in 2011 (World Bank, 2020). It was an edited volume by Chauhan Pole P; Angwafo M. Bilal, N.K. et al contributed an article in this volume on “Health extension workers in Ethiopia: Improved access and coverage for rural poor”. The study has explained as to how health services have expanded to cover even remote areas and rural poor. Teklehaimanot, H & Teklehaimanot, A (2013) worked on human resource development for community- based health extension programs: the case of Ethiopia. Similar concerns were reflected in the studies conducted by Khan et al. in 2014 in a study undertaken by World Bank, Washington DC. The research aimed at improving basic services for the bottom forty

percent: Lessons from Ethiopia (Khan J et al., 2014). Later on, Bazie et al. (2017) worked on the “Modern health services utilization and associated factors in North East Ethiopia”. Somewhat different and a longitudinal study was conducted by Abegaz, et al. in 2018. The results of the study are important as scholars have compared the two trends of GDP and health care expenditures in Ethiopia. The study results have shown a positive association between the two variables. Further, it has also proved that there is a bidirectional relationship between the variables as health care expenditure leads to improve the status of community health which in turn contributes to improving the GDP.

A study conducted by Abraha et.al (2019) analyzed the availability and inequality in accessibility in health center- based primary healthcare in Ethiopia during 2015-2017 based on GHE (Government Health Expenditure) at health center level for each district. The purpose of the study was to assess availability and measure the magnitude and trend of inequalities in the accessibility of health center based PHC resources in Ethiopia during the period under study. The study area Tigray has 52 districts (18 Urban and 34 Rural); Afar has 34 districts (2 Urban and 32 rural, and Dire Dawa has one district consisting of nine health centers (HCs) catchment areas (6 in Urban and 3 in rural settings). The results of the study revealed clear contrasts of availability and inequalities in PHC (Primary Health Centers) resources across three regions (Afar, Dire Dawa and Tigray) in Ethiopia. The study has identified contributing factors to low densities and high inequalities of SHWs (Skilled Health Workers) that may help improve PHC services nationwide, along with the pathway towards UHC (Universal Health Coverage).

The foregoing literature review about studies conducted in the field of health services, facilities, and infrastructures in Ethiopia reveal

that there are limited studies, both theoretical as well as empirical. Moreover, these studies may be because of certain limitations, remained confined to researches on specific themes of health and specific parts of the country. For example, a study undertaken by Abraha, Woldemichael et.al (2019) relates to the theme of accessibility and inequality in health services in northern (Tigray) and eastern (Afar and Dire Dawa) parts of Ethiopia. There is, thus, an apparent gap towards focusing researches on health services and infrastructures involving many health indicators for all regions of the country. This study is an attempt to fill this gap. The study is an exploratory exercise and does not claim to be comprehensive as it is based on the secondary data. However, it presents a synoptic view of the status of various health indicators across all regions of the country. As such, this study may serve as a base for making other empirical researches to conduct in-depth inquiry and substantiate the results in the future.

Research paradigm

According to WHO(2016) estimate, Ethiopia's total population was 102,403,000 persons (2016) and is growing rapidly. Gross national income per capita (PPP international \$, 2013) was 1,350. Life expectancy at birth, as per 2016 estimates was 64 years for males and 67 years for females. United Nations (2012) predicts this rapid growth will continue, reaching nearly 120 million people by 2025. Ranking 92 out of 95 on the UNDP (2012) Human Poverty Index, Ethiopia is one of Africa's poorest states, with 45 % of its 70 million people living below the poverty line. Three-quarters of the population lack access to clean water, and four persons out of five live without proper sanitation (Khan J et al., 2014). In addition, Ethiopia hosts some 133,000 refugees from neighboring countries. In the last two decades, major crises combining droughts, epidemics,

displacements and armed conflicts, have repeatedly affected the country.

Ethiopian land is severely eroded and deforested. Consequently, Ethiopian land is increasingly turning to desert, due to the country's high population growth, unsustainable land use, and lack of land ownership (Federal Ministry of Health, 2005). Certain projects have been initiated in the country to combating these devastating trends by meeting the country's complex challenges with integrated solutions. For example, EWNRA (Ethio Wetlands and Natural Resource Association), PHE (Population, Health and Environment in Ethiopia-2010), and PDE (Population, Development and Environment in Ethiopia-2005) are working effectively in this regard. According to a global report on food crises launched jointly by European Union, FAO and World Food Program (2020), there is a clear link between conflict and rising levels of acute food insecurity on the one hand and between livelihood interventions and peace processes on the other. FAO (2020) in its report cited that the nature of conflict in the Sahel where 12 million people experienced acute food insecurity last year, and this number could rise to 17 million during the upcoming lean season. In densely populated areas of the central and southern parts of the country, farmers' yield is declining from time to time due to land scarcity. During drought, which is frequent, their living is critically hit.

As per UN (2020) report cited by Abebe (2020) the areas that have been affected by recurrent drought, based on data brought from satellite image in Somali State, in places known as Adadele, Kebri Dehar and west Elimu, unrest and conflicts have increased significantly resulting in displacement and outmigration. It is further reported that about 13 million small holder farmers account for about 90 percent of agricultural GDP in Ethiopia. Nearly 55 percent of small holders' food producers are engaged in farming on one hectare of land or less. Humans

as well as livestock face different kinds of risks like disease/ illness, accident, calving, windstorm, smoke, electrocution, flood and snake bite.

The main health concerns in Ethiopia include maternal mortality, malaria, tuberculosis and HIV/AIDS compounded by acute malnutrition and lack of access to clean water and sanitation. The limited number of health institutions, inefficient distribution of medical supplies, and the disparity between rural and urban areas, due to severe under-funding of the health sector, make access to health-care services very difficult. It is estimated that more than half of the population lives more than 10 km from the nearest health facility, usually in regions with poor transportation infrastructure.

According to Relief Society of Tigray (REST), family planning is very crucial to sustainable development. If the family has more children, they can't feed them properly; they can't send the children to school, because there is a food gap in the household. REST uses a watershed planning model jointly developed by the community, health workers, and government agencies.

According to Britannica Ethiopia/Health-and-Welfare; Ethiopia's health care system includes primary health centers, clinics, and hospitals. Only major cities have hospitals with full-time physicians, and most of the hospitals are in [Addis Ababa](#). Access to modern health care is very limited, and in many rural areas, it is virtually nonexistent. The infant mortality rate is almost twice that of the world average (<https://www.britannica.com/place/Ethiopia/Health-and-Welfare>). Common health concerns are lower respiratory infections, diarrheal diseases, and HIV/AIDS. Ethiopia's HIV/AIDS adult prevalence is above the world average and slightly above that of neighboring countries, although it is lower than that of many other

African countries. In Ethiopia the prevalence is higher in urban areas and among young women and girls (Khan J et al., 2014).

Health facilities are mostly government-owned and are comparatively lower compared to its population size. Medical schools in the country continue to produce general practitioners and a few specialists, but the scale of output does not match the rising demand for health. Shortages of equipment and drugs are persistent problems in the country. Widespread use of traditional healing, including such specialized occupations as bone setting, midwifery, and minor surgery (including circumcision), continues to be important.

Abraha, W, et.al (2019) have conducted a cross-sectional population-based analysis of district-level data collected from 16th December 2017 until 24th May 2018. Afar, Dire-Dawa, and Tigray regions were purposefully included in the study to represent the four pastoralist/semi-pastoralist, three urban and four agrarian regions in Ethiopia, respectively. The analysis was based on primary data from 51 districts (17 urban or municipalities and 34 rural districts) in Tigray, nine operational districts (six urban and three rural) in Dire-Dawa and 34 districts (two urban or municipalities and 32 rural districts) in Afar region. One urban district in Tigray was excluded in the study. Authors in this study have used ratios, different inequality indices and Gini decomposition techniques to characterize the inequalities. The study first worked out the annual GHE per capita in Birr and the ratios of the HCs per 15,000 inhabitants of each district. Besides, district-level annual ratios of the SHWs were calculated per Health Center, and 10,000 inhabitants separately.

A large section of the Ethiopian population (more than 80 percent) resides in rural areas and is directly engaged in the systems of primary productions. Agricultural and pastoral activities

are the dominant sources of earning for the rural population. Lowland set up in the rural population, where weather conditions are hot and dry, like that in Afar, Somali and parts of the Tigray region, pastoral activities dominate. Since pastoralists are moving with herds of animals from place to place, in search of grazing grounds and water points, accessing health facilities is a serious problem. These areas suffer from heat stroke and malnutrition. Consequently, mortality rates both among animals and humans are comparatively higher than the national average. As against this, the rural population living in hot and wet conditions like that in Beneshangul Gumuz, Gambella, and parts of SNNPR, the rural population is largely agro-pastoral and led a sedentary life. These areas also suffer from low access to health facilities due to highly scattered settlements and fields of operation. Prevalence of malaria, diarrhea, water-borne diseases, and high rate of IMR are common in such regions. Mortality in these regions is usually higher. Highland setups of rural areas are characterized by cold dry and cold wet conditions, due to higher altitude, which supports agriculture and horticulture. These areas have a higher density of population due to the higher carrying capacity of the land.

Depletion and degradation of land resources, on which three fourth of the Ethiopian population depend directly, continues due to deforestation and destruction in the land cover. Land degradation coupled with increasing frequency of extreme climate events, such as droughts and floods, has led to the pauperization of rural society (Federal Ministry of Health, 2005). Prevalence of poverty, high burden of sickness faced due to acute health problems; a large section of the rural population especially youths migrate towards cities in search of jobs for survival and sustenance (Abebe, 2020). Such a system of rural to urban migration has resulted in registering one of the highest rates of urbanization in Ethiopia. Urban centers are

growing without having basic infrastructure, housing and health facilities at par with growing population pressure in cities and towns (Abebe, 2020).

Thus, health services in rural areas are not only inadequate but do not meet the operational and functional requirements of the people living in remote areas (Abegaz & Mohammed, 2018). In terms of distribution, rural settlements are highly scattered and also lack connectivity to PHCs and availability of trained health workers². Besides, the pastoral group of the population in rural set up is relatively more disadvantaged compared to their counterparts' agricultural population (Abegaz & Mohammed, 2018). Because of the clustering of business, industry, and construction activities in urban centers health infrastructure and services are relatively better served both in terms of quantity as well as quality. Studies have shown marked inequalities in the provision of health infrastructure within rural set up. Somewhat different but similar trends were noted in the case of small and medium towns where the provision of basic health infrastructure is there but they lack higher-order health services which are mostly concentrated in large towns and metro cities such as Addis Ababa, Dire Dawa and Harar (Koblinsky et al, 2010).

Therefore, innovative public-private partnerships and major stakeholders, the government, which plays a crucial role in poverty alleviation, should create an enabling environment by formulating legal framework and introducing proclamation helpful for accelerating the pace of development through supporting innovative technologies to access the health facilities in remote rural areas.

For a better appreciation of achievements in the health sector at regional and national levels, additional studies need to be carried out. Health, being an important indicator of social well-being and social development, needs to be accessible and available to all at affordable costs. Regional

development of health infrastructure and services along with disparities needs to be studied for setting priorities of planning for future investments at federal and regional state levels. While planned efforts are needed to be made to ensure access to basic health services to all localities irrespective of their population size and geographic location. However, specialized and higher-order health services which are costly and hence cannot be provided to all the locations need to be planned at regional levels to satisfy the health requirements of regional people and to minimize the level of disparity within and between the regions.

Health disparities in the Ethiopian context could be conceptualized at three distinct levels (refer to figure 1). Considering the rural and urban settings of communities, there are relative health disparities that are caused largely due to the disadvantages of the profession followed in a specific area by the people. For example, pastoralists have to incur high mobility along with herds of livestock in search of pastures and water points; hence access to the health facility, which is mostly available in towns, remains difficult. As against this, agriculturists mostly working in the fields in the nearby settlement have relatively better access to a health facility.

Similar relative disparities exist between small and medium towns as compared to large towns and cities. Health facilities and infrastructures are relatively less equipped in small and medium towns compared to large towns and cities, which are the preferred locations for making provisions of health facilities.

Absolute disparities in health services and infrastructures related to the amount of gap that exists between the minimum and maximum scores recorded in a specific health facility. If this gap is wide, there is a need to reduce the absolute disparity by making more health

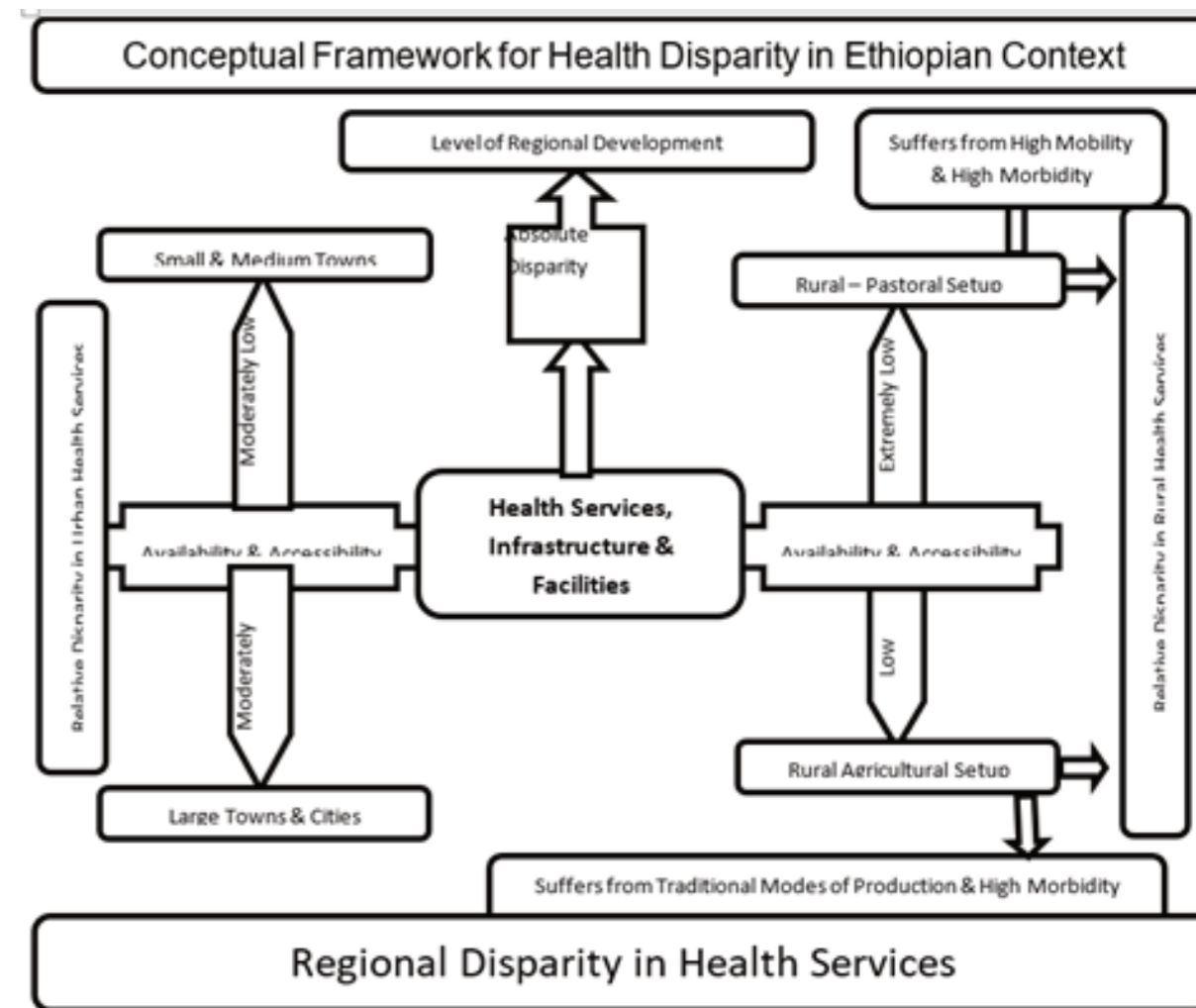


Figure 1: Conceptual framework for disparities in health services and infrastructures.

provisions in favor of those at the low levels. Both relative as well as absolute disparities; viewed in terms of development at the regional levels; produce regional disparities. In the Ethiopian context, hot and dry lowland regions display marked regional disparity in health services compared to highlands which are comparatively wet and cold and support higher population density. As such, health facilities per unit of population in specific areas need to be matched to reduce the regional disparity; otherwise it may serve as a cause of discontent and unrest which remains detrimental to the federal structure of national development.

Methodology

Data base: The paper is based on the data from United Nation's Estimates (2019) for the current population of Ethiopia, life expectancy at birth and other vital statistics such as IMR, U5MR, MMR, CBR, CDR, etc. Information related to health infrastructures such as the number of hospitals, health centers and health posts besides health facilities and population ratios have been obtained from the Federal Democratic Republic of Ethiopia- Ministry of Health: *Health and Health -Related Indicators-Version 1, 2008 E.C.*

The methods used: The exercise has used five set of methods to derive the results related to the status of health indicators with regard to development, absolute disparity and relative disparity in case of health indicators. The derivation of each method is explained below.

1. The Composite score of ranks (CSR):

Where: CSR is the 'Composite Score of Ranks' obtained by summing of the rank scores of all the variables involved in the exercise for each unit area under consideration. It is expressed as $R_{x_1} + R_{x_2} + \dots + R_{x_n}$.

2. The Normalized score of ranks (NSR):

Where NSR is the 'Normalized Score of Ranks'. It is worked out by dividing the CSR values of each unit of study by their average (mean value). It is expressed as $NSR = \frac{CSR}{\bar{X}}$ where CSR is the sum of the composite score of ranks in the case of each unit of study and \bar{X} is the average value of.

3. Development index (D.I.) = NSR RO

Where, D.I. is the 'Development Index'. It is worked out by dividing the NSR values of each study unit with its rank order (RO).

The methods used in this exercise related to the measures of variation. The absolute disparity has been worked out by measuring the gap between performing regions (highest- lowest scores) in case of all indicators into consideration. It is reflected in terms of times the gap between the minimum and maximum performing regions as a ratio. It is reflected as:

4. IAD = 1:

Where, IAD refers to the 'index of absolute disparity'. 1 is a measure of ratio denoting the score of minimum performing region (LSD) in a specific variable against which absolute disparity is worked out and compared. HSD refers to the

highest score in a distribution, while LSD refers to the lowest score in a distribution.

5. IRD = $\frac{C.V.}{\bar{X}} \times 100$ Where: IRD refers to the 'index of relative disparity' refers to the standard deviation; \bar{X} refers to the average value in the distribution.

The coefficient of variation is used as a standardized measure to reflect the index of relative disparity. The coefficient of variation (C.V.) is the standard deviation of observation divided by the mean and expressed as a percentage. Higher the percentage, higher is the relative disparity.

6. RDI = DI*DR

Where, RDI is the regional disparity index. It has been worked out with the help of the development index (DI) multiplied with the respective development rank. RDI so obtained is divided into four classes of disparity as low, medium, high and very high.

Results and discussion

Health facilities in Ethiopia - levels of regional development:

This exercise has been worked out to understand the overall status of health parameters in different regions of Ethiopia. Regions have been ranked based on their performance in each parameter; the region performing at the top was assigned the first rank followed by second and so on. Ranks secured by specific region in all parameters have been added together to get a composite score of ranks (CSR). It was further divided by an average value to get the smaller value close to one termed as the normalized score of ranks (NSR). The development index for regions was determined based on the normalized score of ranks. To keep the order unchanged, values of normalized scores of ranks (NSR) were divided by specific rank orders. By following this procedure while D.I. value for the

region at the top reflects the highest score at par with its NSR value being divided by one, regions in subsequent order reflect lesser scores successively. It was based on the logic that the region at the top should also reflect the highest index value.

Levels of health facilities were determined based on the grouping of the rank orders into four from the top as high, moderately high, moderately low and low levels. Regions with high levels of development (D.I. from 0.283 to 0.74) in health facilities are Addis Ababa, Amhara and Harari regions. Regions with moderately high (D.I. from 0.165 to 0.22) levels of health facilities are Dire Dawa, Oromia and Tigray. Similarly, regions with moderately low (D.I. from 0.125 to 0.155) levels of health facilities are Afar, SNNPR and Somali. Regions having low (D.I. from 0.114 to 0.115) levels of health facilities are Gambella and Beneshangul Gumuz (table 1).

Table 1: Levels of health facilities in Ethiopia: A regional profile 2015

Ser. no.	Regions	Composite score of ranks (CSR)	Normalized score of ranks (NSR)	Rank Order (R.O.)	Development index D.I.	Level of health facility
1	Tigray	154.5	0.99	6	0.165	Moderately high
2	Afar	169.5	1.086	7	0.155	Moderately low
3	Amhara	130	0.83	2	0.415	High
4	Oromia	149	0.95	5	0.190	Moderately high
5	Somali	175.5	1.125	9	0.125	Moderately low
6	Beneshangul Gumuz	198	1.26	11	0.114	Low
7	SNNPR	173.5	1.11	8	0.139	Moderately low
8	Gambella	179	1.147	10	0.115	Low
9	Harari	134	0.85	3	0.283	High
10	Addis Ababa	115.5	0.74	1	0.740	High
11	Dire Dawa	137.5	0.88	4	0.220	Moderately high
		Mean (\bar{x}) score =156				
		Median (Med.) score =154.5				

Source: Health and Health-Related Indicators-Version 1, 2008 E.C. (2015 G.C). The figures for each variable across regions were ranked and added to obtain the composite score of rank values.

Status of absolute disparity in health indicators in Ethiopia

Attributes related to the growth of population:

Before analyzing the health attributes of a country, it is essential to take stock of population parameters such as population growth rate, birth rate, death rate, etc. The population growth rate ranges between 1.7 percent, the lowest in the Amhara Region, to 4.1 percent the highest per annum in Gambella Region. The absolute disparity works out to be 1:2.4 times. In case of total fertility rate (TFR) which means the total number of children born or likely to be born to a woman in her lifetime if she were subject to the prevailing rate of age-specific fertility in the population. As such, Ethiopia recorded the lowest value of TFR as 1.5 in Addis Ababa to the highest value of 7.1 in Somali Region. The absolute disparity is worked out to be 1: 4.7 which explains the presence of a large disparity level in TFR. Crude birth rate

(CBR) is a ratio of the number of live births in that population to the total size of the population, scaled to a denominator of 1000. The lowest value of CBR was recorded in Addis Ababa Region as 23.3 as against the highest value of

34.7 recorded in the Oromia Region. The absolute disparity in the case of CBR is 1: 1.49 (refer to table 1). RNI is a rate of natural increase in population. It is worked out in percentage terms by subtracting crude death rate from the values of the crude birth rate. RNI can indicate the stage of the demographic transition model (DTM) a country is in. Results of RNI indicate that the lowest value is recorded as 2.0 in Afar Region while the highest value as 2.6 in Oromia Region. The absolute disparity is worked out as 1:1.3. Thus, the absolute disparity from highest to lowest was recorded in the case of TFR followed

Table 2: Ethiopia: Absolute disparity related to the attributes of population growth of 2015

Score	The annual population growth rate (1)	TFR (2)	CBR (3)	RNI (4)
Highest recorded at	Gambella	Somali	Oromia	Oromia
Highest Value	4.1	7.1	34.7	2.6
Lowest recorded at	Amhara	Addis Ababa	Addis Ababa	Afar
Lowest Value	1.7	1.5	23.3	2.0
Rate (Highest value/ Lowest value)	1: 2.4	1: 4.7	1: 1.49	1: 1.3
Q-3	2.9	5.2	34.4	2.5
Median	2.6	4.6	32.2	2.4
Q-1	2.2	3.8	30	2.3

Source: Health and Health- Related Indicators-Version 1, 2008 E.C. (2015 G.C). Figures for each variable were arranged in a descending order to obtain the highest and lowest scores besides determining Q-3; median and Q-1 scores were used to understand the location- specific values and absolute gap

by APGR (annual population growth rate), CBR, and RNI in a sequential manner rated at the ratio of 1 as the point of reference (table 2).

The absolute disparity in death-related attributes: The absolute disparity in death-related attributes reveals that in case of crude death rate (CDR); which is the number of deaths occurring among the population of a given

geographical area during a year per 1,000 mid-year total population of that area during the same year; the lowest value of 6.3 was recorded in Addis Ababa Region while the highest value of 11 in Beneshangul Gumuz Region. The absolute disparity is worked out to be 1: 1.7.

In case of infant mortality rate (IMR); which is the number of deaths per 1, 000 live births of children under one year of age; recorded the lowest value as 40 in Addis Ababa and the highest value as 101 in Bene- Gumuz Region. The absolute disparity is worked out as 1: 2.5. Under 5 mortality rate reveals that the lowest value was recorded as 53 in Addis Ababa Region while the highest value was recorded as 169 in

Beneshangul Gumuz. The absolute disparity is worked out as 1:3.18. The child mortality rate (CMR) refers to the death of children under the age of 14 and encompasses neonatal mortality, under 5 mortality, and mortality of children aged 5-14. Results reveal that the lowest value was recorded as 14 in Addis Ababa Region and the highest value as 76 in Beneshangul Gumuz Region. The absolute disparity is worked out as 1: 5.4. Deaths due to malaria are one of the major health problems in Ethiopia. Results reveal that the lowest value was recorded as 2 in Harari

Region; whereas the highest value as 214 in the Oromia region. The absolute disparity is extremely high as 1: 107.

The overall analysis of absolute disparity related to death variables reveals that it increases substantially in a sequence from CDR to IMR, U5MR, CMR and deaths related to Malaria as 1.7, 2.5, 3.18, 5.4 and 107 respectively with reference to the lowest score considered as 1 for all the above variables (table-3).

Table 3: Ethiopia: Absolute disparities in

Score	CDR (5)	IMR (6)	U5MR (7)	CMR (8)	Deaths due to Malaria (9)
Highest recorded at	Ben-Gumuz	Ben-Gumuz	Ben-Gumuz	Ben-Gumuz	Oromia
Highest Value	11	101	169	76	214
Lowest recorded at	Addis Ababa	Addis Ababa	Addis Ababa	Addis Ababa	Harari
Lowest Value	6.3	40	53	14	2
Rate	1:1.7	1:2.5	1:3.18	1:5.4	1:107
Q.3	9.8	76	123	56	95
Median	9.2	71	112	41	20
Q.1	7.6	64	94	32	6

Source: Health and Health- Related Indicators-Version 1, 2008 E.C. (2015 G.C). Computation of data by the researcher.

Attributes related to life expectancy at birth:

Life expectancy is an important measure of quality for people living in a country. In the case of Ethiopia, life expectancy for the male population ranges from a lowest value of 20.1 in Beneshangul Gumuz to a highest value of 60.3 years in Dire Dawa Region. The absolute disparity is worked out as 1: 3.0. However, in the case of life expectancy for the female population ranges between the lowest value of 51.1 years in Beneshangul Gumuz to the highest value of 64.1 years in Dire Dawa. The absolute disparity is 1:1.25. Thus, there is a wide gap in an absolute disparity between male and female population groups of Ethiopia. It is relatively much better in

the case of the female population group compared to the male population group (table 4).

Attributes related to contraceptive acceptance, health care coverage, and services:

Acceptance of contraceptive is considered to be a positive parameter for balanced population growth and family welfare at the national level. In the case of Ethiopia, the lowest value of contraceptive acceptance was recorded as 5.7%

Table 4: Ethiopia: Absolute disparity in Life expectancy 2015

Score	Life expectancy- Male (10)	Life expectancy- Female (11)
Highest recorded at	Dire Dawa	Dire Dawa
Highest Value	60.3	64.1
Lowest recorded at	Bene-Gumuz	Bene-Gumuz
Lowest Value	20.1	51.1
Rate	1:3.0	1:1.25
Q.3	57.6	56.0
Median	54.1	55.4
Q.1	52	53.5

Source: Health and Health- Related Indicators-Version 1, 2008 E.C. (2015 G.C).

in Somali Region as against this the highest value was recorded as 97.2% in Amhara Region. As such, the absolute disparity in this case, worked out as 1: 17.05 which reflects the large variation. Similarly, deliveries by skilled attendants were recorded as lowest 18.7 in the Somali Region and highest as cent percent

(100%) in the regions of Addis Ababa and Harari. The absolute disparity in this case, worked out as 1:5.3 which reflects the gap to be about five times. Post natal care coverage is yet another important parameter of family welfare. Results reveal that the lowest value was recorded as 12.8% in the case of the Gambella Region while the highest score was cent percent (100%) in three regions of Addis Ababa, Harari and Oromia. The absolute disparity was worked out as 1:7.8. As such, there is a marked disparity to the extent of about 8 times from the lowest. The health facility of basic emergency obstetric care, popularly known as, BEmOC is an important parameter of health care. Results reveal that with the lowest score of 1 in the Gambella Region and highest score of 534 in the Amhara Region; the absolute disparity is worked out as 1: 534 which reflects a huge gap in this parameter. In the case of health facility called as comprehensive emergency obstetric care, popularly known as CEmOC, is yet another parameter of health care which records the lowest value as 1 in the Gambella Region and highest value as 204 in the SNNPR.

Table 5: Ethiopia: Absolute disparity in contraceptive acceptance, health care coverage and services 2015

Score	Contraceptive acceptance rate % (12)	Deliveries by skilled attendant % (13)	Postnatal care coverage% (14)	No. of HF with BEmOC Services (15)	No. of HF with CEmOC Services (16)
Highest recorded at	Amhara	Addis Ababa, Harari	Addis Ababa, Harari, Oromia	Amhara	SNNPR
Highest value	97.2	100	100	534	204
Lowest recorded at	Somali	Somali	Gambella	Gambella	Gambella
Lowest value	5.7	18.7	12.8	1	1
Ratio	1:17.05	1:5.3	1:7.8	1:534	1:204
Q.3	72.4	71.6	100	409	152
Median	49.9	60.1	74.4	29	18
Q.1	33.1	25.7	34.5	14	7

Source: Health and Health-Related Indicators-Version 1, 2008 E.C. (2015 G.C).

As such, absolute disparity worked out in this parameter is 1:204 which reflects a very large service gap of about 204 times. It is important to note that while the absolute disparity in case of

deliveries by skilled attendants and post natal care ranges in less than ten times of variation; contraceptive acceptance crosses well over 10 times and those of BEmOC and CEmOC crosses much above 100 times at the national level (table-5).

Attributes related to OPD attendance, BOR and health facility to population ratios:

This section relates to a set of five parameters related to peoples' health. OPD attendance per capita is an important measure of comparison between the units of observation. The lowest value recorded in this case is 0.05 in Somali Region while the highest value is 1.27 in the Addis Ababa region. The absolute disparity, in this case, is 1: 25.4 which reflects a big gap that needs to be balanced through planning. The BOR (bed occupancy rate) is yet another significant parameter of health-related to human welfare. It records the lowest value as 0.02 in Somali Region as against the highest value of 0.42 in the case of Addis Ababa Region. The absolute disparity is 21 times that of the lowest record. Health center post to population ratio was

recorded lowest at Dire Dawa as 5000 as against this the highest score was recorded at Addis Ababa as 218200 persons per health center post. It must be noted that the lower value indicates a relatively better health care.

The absolute disparity is worked out as 43.64 times in this case which needs to be lowered down in the larger interest of the society and its welfare. Hospital to population ratio is yet another important indicator of provisions made in favor of human welfare. Results reveal the lowest value of 33,143 was recorded in Harari Region while the highest value of 635,698 in the case of the Oromia Region. The absolute disparity is worked out as 1: 19.1 times. In the case of the health post, the lowest value was recorded as nil in Addis Ababa while the highest value as 13750 in the case of Dire Dawa city. Thus, absolute disparity works out to be infinite as the lowest value is nil. The overall assessment in this group of parameters reveals that health posts reflect the highest disparity as infinite followed by health center as 43.64 times. Per capita OPD attendance, reflects 25.4 times while the bed occupancy rate reflects absolute disparity as 21 times from the lowest recorded value (table 6).

Table 6: Ethiopia: Absolute disparity in public health facilities in Ethiopia 2015

Score	OPD attendance per capita (17)	Bed Occupancy Rate (18)	Public health facility to population ratio		
			Health center post (19)	Hospital (20)	Health post (21)
Highest recorded at	Addis Ababa	Addis Ababa	Addis Ababa	Oromia	Dire Dawa
Highest Value	1.27	0.42	218,200	6,35,698	13,750
Lowest recorded at	Somali	Somali	Dire Dawa	Harari	Addis Ababa
Lowest Value	0.05	0.02	5,000	33,143	-
Ratio	1:25.4	1:21	1:43.64	1:19.1	-
Q.3	0.95	0.38	27,162	502,888	7,101
Median	0.66	0.37	25,174	409,002	5,135
Q.1	0.37	0.11	20,512	287,168	3,466

Source: Health and Health-Related Indicators-Version 1, 2008 E.C. (2015 G.C).

Attributes related to public health professionals and their density:

This group of indicators includes five variables such as non-medical, other health professionals

besides density (per 10,000) of the health officer, midwifery, and all nurses. Results reveal that in the case of total specialists (non-medical), the lowest record was nil in Gambella Region and the highest record was 232 in SNNPR. As such, the absolute disparity is very large. In the case of all other health professionals, the lowest value recorded was 153 in Harari Region and the highest value as 18075 in Oromia Region. The absolute disparity was worked out as 1:118.1 times. In the case of health officer density per 10,000 of the population; the lowest value was recorded as 0.44 in Afar Region while the highest value as 2.41 in Harari Region. Absolute disparity, in this case, was worked out as 1: 5.4 times. In the case of midwifery density per 10,000 of the population; the Afar Region recorded the lowest value of 0.30 and Harari Region the highest value as 2.20. The absolute disparity in this case, was worked out as 1:7.3 times. All nurses' density 10,000 of the population was lowest 3.67 in Afar Region while the highest value was 17.59 in Harari Region.

Thus, the absolute disparity, in this case, was 1:4.7 (table 7).

Table 7: Ethiopia: Absolute disparity in public health professionals and their density in Ethiopia 2015

Score	Total specialists (non-medical) (22)	All other Health Professionals (23)	Health Officer Density per 10,000 (24)	Midwifery Density per 10,000 (25)	All nurses Density per 10,000 (26)
Highest recorded at	SNNPR	Oromia	Harari	Harari	Harari
Highest Value	232	18075	2.41	2.20	17.59
Lowest recorded at	Gambella	Harari	Afar	Afar	Afar
Lowest Value	-	153	0.44	0.30	3.67
Ratio	-	1.118.1	1.5.4	1.7.3	1.4.7
Q-3.	191	7938	1.80	1.36	8.57
Median	25	1364	1.11	1.20	7.51
Q-1.	4	637	0.73	0.76	4.27

Source: Health and Health- Related Indicators- Version 1, 2008 E.C. (2015 G.C).

Relative disparity in Ethiopia

The relative disparity has been worked out using the coefficient of variation (C.V.) for each variable. Further, based on the range of variation values, levels of relative disparity have been worked out and analyzed for all the 26 variables used in this exercise. The range of (C.V.) variation is 224.54 percent among the variables. As such, variables were grouped into 5 as very low, medium, high and very high having an interval of 25 percent each. A minimum variation of 6.17 percent was observed in the case of life expectancy for females to a maximum of 230.71 percent in the case of population ratio to the functional health center (table 8).

Results reveal that a very low level (0- 25 %) of relative disparity was observed in cases of life expectancy at birth both for male as well as female, RNI, CBR, CDR and annual population growth rate. It was also at a low level (25-50%) in cases of TFR, IMR, health officer density per 10,000; post natal care coverage; under 5MR, all nurses' density per 10,000; deliveries by skilled attendants; contraceptive acceptance rate and population ratio to a functional hospital. The

medium level (50-75%) of relative disparity was observed in cases of five variables such as

population ratio to a health post, bed occupancy rate, midwifery density per 10,000, CMR and OPD attendance per capita. A high level (75-100%) of relative disparity was observed in the case of total non-medical specialists. Very high level of (>100 %) relative regional disparity was observed in cases of deaths due to malaria, CEmOC, BEmOC, all other health professionals and population ratio to the functional health center.

Regional disparity in health indicators in Ethiopia:

Results reveal marked regional disparities in health indicators in Ethiopia (table-8). Addis Ababa City Administration region leads in most of the health indicators. Regional disparity index ranges between 0.74 (Addis Ababa) up to 1.254 (Beneshangul Gumuz Region). The low level of regional disparity was observed in the regions of Addis Ababa, Harari and Amhara. These regions are in the first quartile (0.740 up to 0.849) of the regional disparity index. The regions with moderate regional disparity index are Dire Dawa/Oromia and Tigray. These regions are in the 2nd quartile and the regional disparity index ranges between 0.880 up to 0.990. Regions of Afar, SNNPR and Somali represent a high

Table 8: Levels of relative disparity related to health facilities in Ethiopia 2015

Level: Very low Disparity (<25%)			Level: Medium Disparity (50-75%)		
No.	Variable	D.I. Value	No.	Variable	D.I. Value
1	Life expectancy (female)	6.17	16	Health Post population ratio	52.31
2	RNI	6.75	17	Bed Occupancy Rate	58.77
3	CBR (Per 1000)	11.33	18	Midwifery Density per 10,000	62.35
4	CDR	14.53	19	CMR	64.45
5	Life expectancy (male)	19.77	20	OPD attendance per capita	71.17
6	Annual population growth rate	22.69	Level: High Disparity (75-100%)		
Level: Low Disparity (25-50%)			21	Total Specialists (Non-Medical)	92.74
7	TFR	28.80	Level: Very high (>100%)		
8	IMR	30.13	22	Deaths of Malaria	114.85
9	Health Officer Density per 10,000	30.75	23	Comprehensive Emergency Obstetric Care (CEmOC)	116.52
10	Postnatal care coverage	39.89			
11	U5 MR	39.92	24	Basic Emergency Obstetric Care (BEmOC)	120.36
12	All Nurses Density per 10,000	42.76	25	All Other Health Professionals	133.22
13	Deliveries by a skilled attendant	45.73	26	Functional Health Center population ratio	230.71
14	Contraceptive acceptance rate	47.01			
15	Functional Hospital population ratio	49.13			

Source: FDRE, (MoH): Health and Health-Related Indicator, EFY 2007 (2015GC). Scores of relative disparity (IRD) for each indicator have been worked out by the author.

regional disparity index. These regions are in the third quartile of the regional disparity index. Regions of Gambella and Beneshangul Gumuz in the 4th or upper quartile of regional disparity index. The RDI ranges between 1.150 up to 1.254. Thus, these regions are highly

disadvantaged and reflect a very high regional disparity in health indicators. There is a very high significant negative correlation ($r = -0.98$) between the development index and the disparity index of health indicators in the study area.

Table 9: Regional disparity in health indicators in Ethiopia

Dev't Ranks	Regions	Dev't Index	Index disparity	of Quartile	Level of regional disparity
1	Addis Ababa	0.740	0.740	Top	Low
2	Amhara	0.415	0.830		Low
3	Harari	0.283	0.849	3 rd	Moderate
4	Dire Dawa	0.220	0.880		Moderate
5	Oromia	0.190	0.950		Moderate
6	Tigray	0.165	0.990	2 nd	High
7	Afar	0.155	1.085		High
8	SNNPR	0.139	1.112		High
9	Somali	0.125	1.125	1 st	Very High
10	Gambella	0.115	1.150		Very high
11	Beneshangu I Gumuz	0.114	1.254	Bottom	Very high

Source: Health and Health- Related Indicators- Version 1, 2008 E.C. (2015 G.C). Index of disparity and its levels have been worked by the researcher.

Conclusion

The foregoing analysis leads to conclude the following:

1. Being one of the ancient civilizations Ethiopia has a long tradition of health workers and healers to address the ailments and sickness. However, modern medical care and health infrastructures were introduced to the country in the early decades of the 20th century. The country has achieved remarkable success in its health and health- related indicators during the past two decades. Distribution of health infrastructure and services has recorded success in all the regions and city administrations. However, health infrastructure and services are relatively more concentrated in city regions and regions with higher levels of development as compared to rural areas in general and depressed/less developed regions in particular.

2. Regions registering a high level of development (scores from 0.283 to 0.74) in health sector infrastructures, facilities and services are Addis Ababa, Amhara, and Harari; moderately high (scores from 0.165 to 0.22) are Dire Dawa, Oromia and Tigray; moderately low (scores from 0.125 to 0.155) are Afar, SNNPR and Somali regions while regions at the low level of development (scores from 0.114 to 0.115) are Gambella and Beneshangul Gumuz).

3. The absolute disparity presents wide variations in the case of health indicators. It varies from a minimum of 1: 1.25 in case of life expectancy at birth for females up to a maximum of 1: 534 in case of several hospital facilities with BEmOC. There are two variables with exceptionally high absolute disparity reflecting infinite ratio; four variables with very high absolute disparity ranging above 100 times up to 534 times; five variables with high absolute disparity ranging from 17.05 times up to 43.64 times; 11 variables with moderate absolute disparity ranging from 2.4 times up to 7.8 times and remaining four variables with low absolute disparity ranging from 1.25 times up to 1.7 times.

4. The relative disparity in the case of health infrastructure and services ranges between a minimum of 6.17 % in the case of life expectancy at birth for females up to 230. 71 % in the case of the functional health center to population ratio. There are 6 variables reflecting very low level (<25 %); 9 variables with low level (25-50%); 5 variables with medium level (50-75%); one variable with high level (75-100 %) and remaining 5 variables with very high level (>100 %) of relative disparity.

5. Regions with high development scores in health indicators usually have a low regional disparity index. There is a significantly high negative correlation between the development level and level of regional disparity in health indicators. Both are inversely proportional. Addis Ababa and Harari regions with a high index of development reflect low level of regional disparity. On the contrary, regions of Gambella and Beneshangul Gumuz have very low levels of development and hence have a very high level of regional disparity index in health -related indicators.

6. It is important to note that country is making rapid progress in health and associated indicators. Further, there are significant improvements in reducing child mortality, improving extension works and deliveries by skilled nurses. Disparities need to be minimized to ensure normal health care to all the people across all regions irrespective of their levels of development and geographic setting.

Acknowledgment

Author acknowledges with sincere thanks to the Ministry of Health, Federal Democratic Republic of Ethiopia for utilizing their published data in this exercise.

References

- Abebe, W. (2020), "Reaching the low- income rural population through the provision of micro finance" *Ethiopian Herald, Sunday Edition*, 26th April 2020, page -22. Addis Ababa.
- Abegaz, K.H. & Mohammed A.A. (2018), "Health care expenditure and GDP in Ethiopia from 1995 to 2014: A time -series analysis", *Agriculture and Food Security Vol.7, No.1*.
- Abraha, W. Amirhossein, T. Aliakbari, S.A. & Olyemnesh, A. (2019), "Availability and inequality in the accessibility of health center- based primary health care in Ethiopia", *PLoS ONE 14 (3): e 0213896*. <https://doi.org/10.1371>.
- Ahmed, M. Demissie, M. Worku, A. Abrha, A and Berhane, Y. (2019), "Socio-cultural factors favoring home delivery in Afar pastoral community, northeast Ethiopia: A Qualitative Study", *Reproductive Health*, Vol. 16, Article No.171.
- Banteyerga, H. & Kidanu, (2008), *A. Rapid appraisal of health extension program: Ethiopia Country Report*, The L10 K Project of JSI.
- Bazie, G.W., Adimassie M.T. (2017), "Modern Health Services Utilization and Associated Factors in North East Ethiopia", *Plos One*, 12 (9) e 0185381.
- Bilal, NK et al. (2011), Health extension workers in Ethiopia: improved access and coverage for the rural poor. In: Chuhan-Pole P, Angwafo M, editors. *Yes, Africa can: success stories from a dynamic continent. Washington (DC): World Bank*; 2011:433-44.
- Birhan Y. (2010), Special issue on medical doctors' profile in Ethiopia: Production, attrition, and retention. In memory of '100 years of Ethiopian modern medicine and the New Ethiopian Millennium.' *Ethiopian Medical Journal Vol. 46*.
- Central Statistical Agency and ICF International (2012), *Ethiopia demographic and health survey 2011*. Addis Ababa and Calverton, Maryland, USA.
- FAO (2020), "FAO asks urgent response for food crises" *Ethiopian Herald, Sunday Edition*, 26th April, 2020, page -6. Addis Ababa.
- Federal Ministry of Health (2005), Draft human resources for health strategic plan, Addis Ababa, Ethiopia: Health sector strategic

- plan (HSDP-III) 2005/06–2009/10. Addis Ababa.
- Federal Ministry of Health (2008), *Draft human resources for health strategic plan*, Addis Ababa, Ethiopia.
- Federal Ministry of Health (2010), *Health Sector Development Program IV: 2010/11 – 2014/15*, Addis Ababa, Ethiopia
- Federal Ministry of Health (2010/11), *Ethiopia's Fifth National Health Accounts*, Addis Ababa, Ethiopia.
- Federal Ministry of Health (2012), *HSDP IV annual performance report – 2011/2012*. Addis Ababa, Ethiopia.
- Federal Ministry of Health (2012), *Health, and health-related indicators*. Addis Ababa, Ethiopia..
- Federal Ministry of Health (2012), *HSDP IV annual performance report – 2011/2012*. Addis Ababa, Ethiopia.
- Federal Ministry of Health (2015) *Health and health-related indicators. Version 1*, 2008 E.C.; Addis Ababa, Ethiopia.
- Hailemichael, Y. Hanlon, C. Tirfessa, K. Docrat, S. Alem, A. Medhiin, G. Fekadu, A. Lund C. and Hailemariam D. (2019), "Mental health problems and socioeconomic disadvantage: a controlled household study in rural Ethiopia" *International Journal for Equity in Health*, Vol.18, Article-121.
- Khan J et al. (2014), "Improving basic services for the bottom forty percent: Lessons from Ethiopia" *World Bank Studies*, Washington DC.
- Koblinsky M, Tain F, Gaym A, Karim A, Carnell M, Tesfaye S.(2010) "Responding to the maternal health care challenge: the Ethiopian health extension program". *Ethiopian Journal of Health Development*, Vol. 24; pp.105–9.
- Singh P. (2010), "Country case study Ethiopia: Human resource for health program" *GHWA task force on scaling up education and training for the health workforce*, The Earth Institute, New York.
- Teklehaimanot H D, Teklehaimanot, A (2013), Human resource development for a community-based health extension program: a case study from Ethiopia. *Human Resource for Health*. 2013; pp. 11–39.
- Transitional Government of Ethiopia (1993), *Health policy of the transitional government of Ethiopia*. Addis Ababa.
- UNDP Ethiopia (2012): Empowered Lives and Resilient Nations-Ethiopia Country Report-2, pages 5-8.
- WHO (2016), Ethiopia Country Report.
- World Bank (2019): Livelihoods Resilience in the Low land areas of Ethiopia, PDF
- World Bank (2020): Ethiopia has Made Major Strides in Poverty Reduction but Disparities, Inequality Remain, *Press Release*, April 16, 2020.

Websites

- <https://www.wilsoncenter.org/publication/issue-21-population-health-and-environment-Ethiopia>
- <https://www.britannica.com/place/Ethiopia/Health-and-Welfare>
- <https://www.britannica.com/place/Ethiopia/Education>

Determinants of women's participation in environmental protection and management in selected towns of north Wollo, Amhara Regional State, Ethiopia

Sisay Demeke Molla*

Abstract

Environmental challenges are inter-weaved which trigger multi-phase dilemmas. Tackling this intricacy requires integrating gender into environment management efforts because coordinated approach is needed in order to solve such problems. But there are determinants that affect this integration. This study intends to assess determinants of women's participation in environmental protection and management. A mixed approach with concurrent design was employed. The quantitative data were collected from 118 respondents and qualitative data were from purposefully selected participants. Statistical and thematic data analysis techniques were employed to analyze the quantitative and qualitative data, respectively. The study found out that women are indispensable in environmental administration. Accordingly, women's age groups (28-37 & 38-47) were positive factors; whereas, violence, technology, social services, production, consumption, resources and institutions were negative factors. It is possible to conclude that despite women are essential in environmental protection and management, they are obstructed by various factors. This has an impact on the environment. Therefore, governmental and non-governmental organizations should work cooperatively to enhance women's participation via training, awareness-rising, and by making social service available.

Key words: *determinants, environmental protection and management, women's participation*

*Lecturer, Department of Political Science and International Relations, Woldia University, E-mail: demekesisay9@gmail.com; Phone: +251928858849

JADS Vol 6, No. 2, Dec. 2019 Issue; DOI: <https://doi.org/10.56302/jads.v6i2.3121>

Background

As Morelli (201) and Ghafoor (2013) argue, the concept of environment protection has evolved since it started to become a global issue in the early 1970s. At first, it was a kind of global recognition that the earth's ecosystems are in fact fragile, and that human beings have been contributing much to its deterioration. The social and economic welfare of human beings are closely allied to the environment. Any change in the socio-economic fields will have an impact on the environment and vice versa, whether positively or negatively, immediately or eventually. And in many cases, negative results are irreversible.

Goosen (2012) and Ghafoor (2013) noted that with instantaneous increases in global population, industrialization, technological advancement, and enhanced demands on natural resources, the earth is no longer able to sustain a healthy and balanced ecosystem. Accordingly, coordinated approaches

are necessary for solving major environmental and sustainability problems. Therefore, among other things, gender should be integrated into the environment because gender norms influence the impact of people on the environment, and vice versa. Likewise, Goosen (2012) & Koohi, et al. (2014) outlined that a gender analysis of environmental administration is necessary; i.e., looking at gender aspects of the use of natural resources, consumption of services and experiences of environmental degradation.

Women and men should be agents in environmental management including equal participation in decision making and policy processes. Globally, women provide a livelihood for their families and simultaneously manage the environment via keeping waste emissions, preservation of biodiversity and forest management.

However, due to gender power relations, their knowledge is often disregarded, and they are not counted as agents of change (Ogra, 2012; UNEP, 2016; Morufu, et al., 2019). Besides, because of patriarchal patterns, absence of environmental education and decision-making power, women's roles in environmental sustainability initiatives are unnoticed and un-integrated. Thus, meeting resources to needs of current and future generations would be perplexed. Accordingly, it is worthwhile to study determinants of women's participation in environmental sustainability efforts in empirical settings. Hence, this study intends to assess determinants of women's participation in environment protection and management in the study population. The study further documents the types of roles women play in environmental sustainability efforts, and challenges and opportunities regarding their participation.

.Problem statement

According to UN (2016), environmental challenges are interlinked with several socio-economic issues. Better human well-being; i.e., poverty reduction, improved human health, energy access and economic growth are associated to ecological factors. Solutions for one problem can lead to unintended negative consequences. For example, increasing in food production depletes soil, water, biodiversity, and increase deforestation and desertification, eventually ascertain self-limiting. World Bank (2012) sketched that because of population growth, industrialization, energy technologies and urbanization; global dimension of environmental problems like climate change, biodiversity loss, energy crisis, pollution, and desertification would be happening haphazardly. Thus, to address these interacted environmental challenges, possible remedies (i.e. better uses of human resource) should be made. Analogously, Principle 23 of the Rio Declaration (1992) declared that the environment and natural

resources of people under oppression, domination and occupation shall be protected. Thus, gender should be integrated into environmental sustainability efforts. Accordingly, women should be part of the solution since they are eco-friendly and indispensable in soil preservation, resource management, pollution fortification and environmental administration (World Bank, 2012; Manjunath, 2015).

There are different impending factors that restrict women from engaging in environmental conservation activities. These include gender-based violence, stereotypes, social service inaccessibility, gender roles, and lack of resources. These factors have been restricting women from taking part in environmental protection activities and have damaging effect on the environment (Ogra, 2012; SSNC, 2015; Marius & Maxim, 2017; SEI, 2018; WHO, 2019).

As far as the researcher's knowledge is concerned, limited researches have been conducted wide-reaching on factors obstructing women from participating in environmental protection. For instance, Tiondi (2000) carried out a study on women's involvement in environmental management and development in Sub-Saharan Africa and Latin America. Bingeman (2001) assessed women's participation in forest management decisions in the Upper Kullu Valley. Sharma and Kaushik (2011) and Kumar (2016) conducted a research on the role of women in environmental conservation in India. Ogunjinmi et al. (2012) looked at scaling up women's roles in sustainability and conservation through wildlife farming. WB (2012) undertook a study on linking gender, environment, and poverty for sustainable development focusing on Ethiopia and Ghana. Wasike (2012) carried out a study on challenges facing women in accessing and controlling natural resources in Kenya. Similarly, Solomon, et al. (2014) reviewed women's participation in environmental protection and management

focusing on lessons from Plateau State, Nigeria. Koochi, et al. (2014), Singh (2015), Manjunath (2015), Prebble (2015), UNEP (2016), Eminel (2018) and Morufu, et al. (2019) undertook studies addressing various aspects of women and environmental management.

However, most of the gender perspective environment analytical and operational works so far weren't conceptually inclusive. These studies focus on specific issues such as challenges facing women in accessing and controlling natural resources, and women's involvement in environmental protection and management. The aforementioned works neither emphasized determinants, challenges and opportunities of women's participation in environmental protection and management nor considered gender-based environmental needs and implications of the study. Furthermore, these studies have not comprehensively addressed women's full involvement in environmental protection and management. The present study fills these conceptual gaps addresses the study objectives via answering designed research questions. Accordingly, the study adopted concurrent research design with a mixed approach. To this end, both descriptive and inferential statistics were employed to address the quantitative objectives whereas thematic analysis for qualitative issues.

Objective of the study

General objective

The overall objective of this study was assess the factors affecting the participation of women in environment protection and management in the study population.

Specific objectives

- To identify the types of roles women play to environment protection and management, in general, and in the study area;
- To explore challenges and opportunities of women's roles to protect the environment; &

- To examine factors that determine women's role in achieving sustainable environment goals.

Review of related literature

Concepts on integrating women into environmental sustainability strategies

According to Rao (2012) and UNEP (2016), environmental sustainability involves making decisions and taking action that are in the interests of protecting the natural world with particular emphasis on preserving the capability of the environment to support human life. These days, environmental sustainability is a topical issue that receives plenty of attention from the media, different governmental departments, academicians, researchers and stakeholders. This is a result of the amount of research going into assessing the impacts that human activity can have on the environment. Although the long-term implications of this serious issue are not yet fully understood, it is generally agreed that the risk is high enough to merit an immediate response. To this effect, issues of environment and ecology entered the mainstream discourse only after the conference on environment and development at Stockholm in 1972. Thus, it is believed that protest movements against environmental destruction should be made via joint efforts of both men and women.

Eco-feminists argue that women as women have a special relationship with nature. Women's interaction with nature and their responses to environmental degradation must be analyzed and located within the material reality of gender (Rao, 2012). Women are victims of environmental degradation, but active agents in the regeneration and protection of the environment. Chukwu (2014) and Singh (2015) also noted that women around the world play distinct roles in protecting the environment. They participate in environmental protection significantly through agricultural activities, drainage management, waste disposal, flood

management and water resource management. Moser (1991), cited in Rao (2012), identified three roles for women; i.e., as managers or maintainers of the natural environment; rehabilitators of the natural environment in the sense of sustainable development, and as innovators in the use of appropriate technology in the creation of new environments. Thus, women should be integrated into the environment profoundly.

Gender and international environmental negotiations

As stated in WB (1991) and UN (1992), the first mention of women in the environmental treaties was in 1968 during the African Convention on the Conservation of Nature and Natural Resources held at Algiers. Despite the treaty was made to show the incorporation of women issues in the planning, design and implementation of environmental agenda; however, it was limited with regard to validating gender relations with the environment. As a result, in the 1980s, the relationship between women and the environment received considerable attention since the impact of the international environmental crisis on women was became an important subject of study. The parallel workshop of NGO's along with the first World Conference on Women in Nairobi (1985) was symbolic of the interlinked concerns of women, development, and environment. Both recognized and stressed women's concerns and their incorporation as an integral part of the policy planning.

Besides, Women's Action Agenda 21 as part of the 1992 UN Conference on Environment and Development reflected a cross sectoral approach including women's issues. The focus was on the strong links between women and environment. But it was the International Drinking Water Supply and Sanitation Decade and the UN Conference on Environment and Development that was hailed as promoting the role of women

in natural resource management in a major way (UN, 2016). In connection with this, in order to realize women's participation in conservation and management of resources, governments should give equal access to education, make healthcare systems responsive, open employment and careers, and bring women into full participation in social, cultural, and public life.

According to UN (2016), in 1998, the World Conservation Union framed a gender policy statement that recognized the need to consciously enlist women's concerns for sustainable use, management, and conservation of natural resources. Gender equality and equity were felt to be fundamental to human rights and social justice issues and a foundation paving the way for sustainable development. Understanding the linkages between gender relationships and the environment became a major theme for advocacy and shifting paradigm. It concluded that only with a gender perspective in place can a complete picture of human relationships and ecosystems be built up. For that reason, many countries in the world including Ethiopia are built policy documents, legislative instruments, and international initiatives to develop a gender-sensitive environmental strategy in order to implement the agreements.

Theoretical contexts

Bingeman (2001) noted that gender relation perspective regards current social roles as established and maintained through power and authority, and therefore intrinsically contested and dynamic. A gender perspective is pertinent because issues of access, use, and resource management are linked to prescribed gender roles. As reviewed by Bingeman (2001), as part of a gender analysis, a feminist environmentalist perspective, or a gender and development framework, Jackson (1993); Agarwal (1992); Locke (1999) rejected the concept of women and men as unitary categories (undifferentiated by class, age, ethnicity, region, and wider political

economy/ecology factors). This idea is also valid to the present discussion of women's roles in forest management. Furthermore, women are not a homogeneous group; assuming homogeneity can mask women's exploitation by other women on the basis of marital status, seniority, caste, and social-economic standing, while also underestimating the challenges inherent in the creation of a common identity as women. As Wasike (2012), eco-feminists believe that there is a relationship between women, human rights, and the exploitation of nature. They argue that male domination is harmful to both women and the environment. Men desire to control women and the environment in order to have complete power. An attempt to control women and the environment leads to the destruction of the environment.

The literature on gender and environment is largely grouped into two main strands; i.e., a liberal attempt to incorporate gender aspect into developmental policy and practice; and relational perspectives that lay emphasis on binary power relations between women and men. In both literatures, the main assumption is that men and women experience the environment differently. Since men and women have different roles, responsibilities, and knowledge with regards to the environment, they have different interests in natural resource management (Eminel, 2018). In terms of environmental and resource management issues, attention to policy implications and institutions for different groups of women may be very important. Bingeman (2001) emphasized that the material realities of men's and women's environmental dependence have to be recognized and issues of gender that influence participation in environmental management need to be identified.

Determinants of women's participation in environmental conservation

According to Bannerjee (1991), women workers with a science and technology background are key resources in today's knowledge-based

economies. In view of that, there is a rising demand for science and technology workers, and job growth in this era is being driven by increases in female employment. Greater female participation in computer science, engineering and technology-oriented jobs would spur innovation that helps to safeguard the environment in all countries. But technology gender gap is visible; i.e., lesser involvement of young girls in science and technology can be observed as early as the secondary school level. Thus, women remain vastly underrepresented in science and technology studies and in the overall technical work forces. Consequently, they might not update themselves with regards to environmental management. Hence, technology is a variable that adversely affect women's contribution in environmental administration.

Besides, educating men and women is vital to economic growth and sustainable development. Raising the literacy rates of women is one of the most effective investments for increasing female productivity. Reducing gender inequality gaps in education is essential to reducing poverty, accelerating economic development and environmental sustainability. But most women are not in a position to get access to education and information. So, this is one of the factors that affect women's direct participation in ecological administration (Bannerjee, 1991; Catalyst, 2007).

The government should provide healthcare financing, health system reforms, education, and policies and programmes via considering gender dimensions. Prevention and treatment should be planned on the basis of gender. Despite health problems affects both men's and women's environmental effectiveness in all cases, women are more prone than men to self-declared ill-health that reduced their work capacity (WEN, 2007; WHO, 2019). This source further described that these physical and mental health

problems may be due to lack of job security as well as discriminatory workplaces in all countries.

Catalyst (2007) identified another variable that affect women's participation in environmental management. Accordingly, although women make-up half of the world's population and despite their achievement of equal citizenship status to men, they remain vastly under-represented in governance forums. In most countries, there is a clear absence of women involved in decision-making processes at local, regional and national levels. This source further sketched that the governance gender gap can be found in countries regardless of their economic status, religion or institutions. Factors contributing to the lack of female participation in decision-making processes include their low wage work participation and time poverty in relation to men as well as stereotypical attitudes towards the societal roles of women and men. This also encourages women's low self-team and undesirably affects their indoor and outdoor partaking.

Furthermore, a study in the United Kingdom shows that women's decisions regarding consumption of food, clothes, shelter, medicines, household goods, and education are decided by men's preference and this determines the well-being of families and has related ecological impacts. Women are more productive, but they are less likely to consume the outcomes. To mean that production and consumption are elements that determined women's environmental support (WEN, 2007).

Eco-feminist literature portrays the historical exploitation and domination of women and nature as going hand in hand, and both are seen as victims of development. Within the patriarchal conceptual framework, all those attributes associated with masculinity are given higher status or prestige than those associated with femininity, resulting in hierarchical dualisms

(Warren, 1987). All eco-feminists are of the view that it is the logic of domination, in association with value-hierarchical thinking and value-dualisms that sustains and justifies the twin domination of women and nature (Warren, 1991). For eco-feminists, therefore, the domination of women and nature is basically rooted in human thought. Hence, this twin oppression of women and nature determined women's production and environmental participation and it exacerbated ecological complications.

Absence of women's organizations also identified as determinants of women's advancement and participation in environmental management. Accordingly, autonomous women's groups should emerge because women's movement is very much fundamental to protect them from oppression. The campaign for women's rights challenged the dichotomy between public and private sphere, and the social, cultural, economic and political manifestations of gender (Bingeman, 2001; Labaris, 2009; Singh, 2015).

Lastly, lack of waste disposal equipment, social service inaccessibility, lack of access of clean water, human waste pollution, fumes from household fuel, and lack of awareness among the general public regarding to environment are identified as challenges faced by women that hindered their involvement in environmental administration (Bingeman, 2001; Labaris, 2009; Solomon et al., 2014; Singh, 2015).

Conceptual framework of the study

A conceptual framework was developed for the proposed study based on reviewed literatures as presented below.

Materials and methods

Research design

Using an appropriate research approach is a key step to achieve the objectives of the study so that a mixed research approach was employed. It is



Figure 1 The relationship between dependent and independent variables

because the objectives of the research would demand to generate both quantitative and qualitative data. Moreover, Greene et al. (1989) and Creswell (2012) outlined that the rationale to employ mixed approach is that it helps to use multiple data collection methods, provides a better view of reality, remove weaknesses and address research problem accurately. Concurrent research design was employed for the reason that it allows the researcher to gather information from both quantitative and qualitative sources. To make it clear, Creswell (2012) delineated that the reason to employ concurrent research design is that it helps to give equal priority for both quantitative and qualitative data and it also enables the researcher to compare the results to determine if the two data bases yield similar or dissimilar results.

Firstly, a random sampling technique was applied to select the study towns and kebeles. Secondly, a stratified random sampling technique was used to select male and female-headed households from each kebele

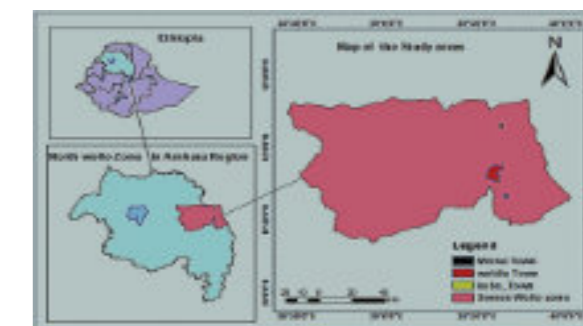


Figure 2: Map of the study areas; source: WGS-1984UTM-Zone 37N

considering women headed in male-headed households. Thirdly, a proportional stratified random sampling technique was used in accordance with the size of the kebele. Here,

each kebele's list of male and female-headed households was used as a sampling frame. Fourthly, a systematic random sampling technique was applied to select sampled women i.e. random selection and appropriate intervals were employed. Here, the target samples were accessed via their house number. On the other hand, a purposive sampling technique was employed to select the participants to obtain qualitative data.

Sample size determination

Cochran (1963), cited in Israel (1992), outlined that a formula to determine sample number is needed for a questionnaire-based survey studies when the population is large, and the needed sample is to analyze proportion. Likewise, to determine the representative sample size, the study employed sample size determination formula given by Cochran (1963), cited in Israel (1992). The formula is: $n = \frac{z^2 pq}{e^2}$ where, n= the required numbers of sample, z = the desired confidence level, e= maximum allowable error, p= the estimated proportion on past experience (pilot survey) and q= 1-p. Hence, $n_0 = 118$. As no related study is taken in the empirical setting, it is recommended to give 50% chance (0.5) as the maximum sample proportion and the range of acceptable errors that can be tolerated comprise 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, and 10% (Cochran, 1963, cited in Israel, 1992). Accordingly, the study employed 50% (0.5) maximum sample proportion, and 9% (0.09) margin of error. Therefore, the required sample sizes of this study were 118 women. To get sample women in each kebele, formula was run i.e. $n_j = \frac{N_j n}{N}$ where n_j = the required number of sample in each kebele, N_j = total number of households in each kebele, N = the size of the total population, and n = sample size.

Data sources and data collection instruments

The study employed both primary and secondary data sources. Primary sources were survey

respondents, key informants and FGDs whereas secondary sources were relevant books, documents, journal articles, and related works. Accordingly, survey questionnaire, interview and document review were data collection instruments. On the one hand, to gather the quantitative data, structured questionnaires i.e. both closed and open-ended questions were prepared. Hence, the questionnaires were distributed by enumerators for 118 sample women. On the other hand, to collect the qualitative evidences, focus group discussions were formed from 9 *kebeles*, each group containing 8 individuals. The discussion was held through selecting suitable places by the preference of discussants. There are rationales why FGD was employed. FGD provides an insight how people think and offer a deeper understanding of the phenomena. Besides, it has a high face validity and low cost. As well, an interview was conducted with 27 key informants. The key informants were 9 *kebele* administrators; 3 heads of Women and Children Affairs Office from 3 *woredas*; 3 city administrators; 3 women's league leaders from 3 *woredas*; and 9 women's league members from 9 *kebeles*. The reason why this data gathering tool was employed is that it can provide in-depth facts directly from concerned and knowledgeable individuals.

Data analysis techniques

The study employed quantitative and qualitative data analysis techniques. Finally, the combination of data analysis methods was carried. Particularly, descriptive and inferential statistics were used to analyze the quantitative data. Upon the data collection task completed, the data were encoded edited and entered into the SPSS software version 20 and analyzed using both descriptive and inferential statistics. Hence, tables, frequencies, and percentages were used to run descriptive statistics whereas Pearson Chi-square test and binary logistic

Table 1: Summary of sampled women by kebeles

Sample Administrations	City	Sample kebeles	Number of households in each kebele			Number of women taken from each kebele		Total
			MHH	FHH	Total	MHH	FHH	
Kobo		01	273	177	450	2	1	3
		02	437	482	919	3	3	6
		04	1707	138	3092	10	7	17
Woldia		02	875	761	1636	5	5	10
		04	1207	131	2524	8	9	17
		06	416	332	748	3	3	6
Mersa		01	1125	137	2500	7	8	15
		03	1885	206	3947	11	13	24
		04	1550	157	3125	10	10	20
Total			9475	946	1894	59	59	118

Source: field survey 2019.

Issues of validity and reliability

regression were used for inferential statistics. Besides, qualitative analyses were performed by identifying major and sub-themes in each context. Then, triangulation took place between quantitative and qualitative data.

Model goodness-of-fit

To examine the adequacy of the model, Hozmer and Lemeshow model goodness-of-fit test (Pearson Chi-square test), and Omnibus tests of model coefficients were employed. As the regression analysis showed, Hozmer and Lemeshow test had a Chi-square value of 11.308 with 8 degrees of freedom and $p=0.185$; and the Omnibus tests of model coefficients had a Chi-square value of 38.880 with 27 degrees of freedom and significant at $p<0.05$ (Table8). It denotes that the selected predictor variables have a combined effect in predicting the outcome variables.

To assure the reliability of the study, a reliability test was carried out. Pretesting and piloting were used. Cronbach alpha was employed to measure the internal consistency of the instrument. Accordingly, the reliability test statistics showed that the prepared questions were reliable at a Cronbach alpha value of 0.856. As well, the findings were triangulated with the literature review and previous studies for the purpose of analytical generalization.

Ethical consideration

This study was conducted with adherence to research ethics including the statement of confidentiality, refraining from deceptive practices, reciprocity, and maintenance of anonymity of participants.

Results and discussion

This section presents the findings of the study. The findings are summarized and grouped into four major themes i.e. the types of roles women play to environment protection and management; challenges and opportunities of women's roles to protect the environment; and factors that determine women's role in achieving sustainable environment goals.

Women's roles in environment protection and management

Initially, a single table was formed to show women's participation in soil conservation. Accordingly, almost all responses are located on all soil conservation activities. This implies that women are participating in initiatives to protect the soil.

Table 2

Sample Administrations	City	Sample kebeles	Number of households in each kebele			Number of women taken from each kebele		
			Kebeles	MHH	FHH	Total	MHH	FHH
Kobo		01	273	177	450	2	1	3
		02	437	482	919	3	3	6
		04	1707	138	3092	10	7	17
Woldia		02	875	761	1636	5	5	10
		04	1207	131	2524	8	9	17
		06	416	332	748	3	3	6
Mersa		01	1125	137	2500	7	8	15
		03	1885	206	3947	11	13	24
		04	1550	157	3125	10	10	20
Total			9475	946	1894	59	59	118

Source: field survey 2019.

ikewise, Key informants (KIS) stated that women have decisive roles in soil preservation activities such as mulching, tracing, planting and flood managing. FGDs also conveyed the qualitative facts concerning to participation of women in soil preservation activities as:

We are involving in soil preservation tasks. We are energetically participating in tracing, tree planting and flood administration activities. Our environment is our life. From the environment we get food to eat, water to drink, air to breathe and all the basic necessities required to our day to day living. Hence, these basic necessities are directly or indirectly influenced by the quality of soil. Soil provides support to the plants; absorbing rain water; holding moistures; and controlling water flowing. Not only these but also others such as soil maintains fertility for plants and vegetation to flourish. Thus, preserving the soil is not optional rather it is mandatory. We are happy to tell you our feelings at this time. You can imagine how we are busy. You can also see that how much we are vital to our community lives.

Thus, the study revealed that women are actively involved to preserve the soil from degradation. This finding was confirmed with a study result found by Labaris (2009) & Chukwu (2014).

Hence, the majority of women (80%) are involved in farming and contributed in preserving the soil.

Another single table was constructed for respondents' responses to their roles in cultivation and plant protection. Thus, almost all responses are located on all cultivation activities, and plant protection tasks. This indicates that

women have a significant contribution in cultivating and protecting plants to preserve the environment.

Table 3

Options	Responses		Percent of Cases
	N	Percent	
Crop cultivation	98	14.0%	83.1%
Vegetable cultivation	97	13.9%	82.2%
Fruit cultivation	111	15.9%	94.1%
Gardening	118	16.9%	100.0%
Watering	118	16.9%	100.0%
Plant protection	105	15.0%	89.0%
Others	16	2.3%	13.6%
Total	700	100.0%	593.2%

Source: survey data, 2019. NB: the total is not 100% because of multiple responses.

Similarly, the participants mirrored the qualitative information that women are busy in doing of cultivation tasks including crop, vegetable and fruit cultivation. They further described as women are highly participated in protecting of plants to manage the environment. Hence, this finding was consistent with a study result founded by Singh (2015). Accordingly, women are actively involved in managing the environment through cultivating fruits and vegetables and protecting plants in their living areas. In cultivation of crops, fruits, vegetables, flowers, honey, mushroom, hops and medicinal plants, women have been playing a pioneer role in environmental administration. Besides, a single table was created for respondents' responses to the variables shown in Table 4. Thus, almost all responses exhibited that women have essential roles in managing water resources.

Also, KIs reported the qualitative data analogous to the quantitative facts. Accordingly, women are playing a part in managing, protecting and providing water for the household. Parallel with KIs, participants of one of the FGDs reported:

It is obvious for everybody that we women are carrying out all activities regarding to water management

Table 4

Options	Responses		Percent of Cases
	N	Percent	
Managing communal water resources	118	19.0%	100.0%
Managing household water requirement	118	19.0%	100.0%
Prevent children from damaging water pipes	118	19.0%	100.0%
Keep rivers from untreated sewage	117	18.8%	99.2%
Irrigation management	33	5.3%	28.0%
Controlling water pollution	118	19.0%	100.0%
Total	622	100.0%	527.1%

Source: survey data, 2019. NB: the total is not 100% because of multiple responses.

inside and outside of the home. Amazingly, cleaning, refining and sheltering the water both at public and household levels are our daily tasks. Additionally, we are actively contributing in supervising of communal taps; protecting water pipes at household level; replacing old water pipes by the new one; and protecting rivers from damage. Not only these but also others such as the burden of proper consumption of water resources during fetching, cooking, drinking and washing are left for women. Further, we are participating in conserving of natural resources. You know that division of labor is based on sex and age. Therefore, we women perform the majority of these responsibilities in our community.

Hence, the study revealed that women are significantly participated in water resource management. This finding was similar with the survey out puts found by Labaris (2009); Chukwu (2014); Kumar (2016); Eminel (2018). Accordingly, women are always at the center of the management of water resources both at communal and household levels. They are in-charge of the control and management of communal taps; and preventing children from damaging the water pipes. The burden of fetching water for cooking and other home use falls on the women and girls. They make use of streams, pond, wells, rivers water when the tap water is not available. In addition, they take care of these water bodies to avoid water pollution which will be detrimental to aquatic lives.

Another single table was produced to women's participation in managing the forest. Hence, the majority of responses are located on tree planting, rehabilitation, providing seedlings, and reducing hazards. It denotes that women play key roles in forest management activities to preserve the environment.

Table 5

Options	Responses		Percent of Cases
	N	Percent	
Soil protection	93	9.4%	78.8%
Water sheds	28	2.8%	23.7%
Climatic stability	102	10.3%	86.4%
Tree planting	118	11.9%	100.0%
Rehabilitation	118	11.9%	100.0%
Protection	90	9.1%	76.3%
Providing seedlings	95	9.6%	80.5%
Reducing hazard	118	11.9%	100.0%
Biodiversity preservation	91	9.2%	77.1%
Wildlife protection	59	6.0%	50.0%
Sowing	42	4.2%	35.6%
Transplanting	37	3.7%	31.4%
Total	991	100.0%	839.8%

Source: survey data, 2019. NB: the total is not 100% because of multiple responses.

FGD participants and KIs also shared similar ideas in line to the numerical data as women in the empirical settings have numerous roles in forest management such as tree planting, rehabilitating, transplanting and protecting it from damages. Hence, the finding publicized that women play pivotal roles in forest management. This finding was related with previous research findings of Labaris (2009) & Bingeman (2001); i.e., women have been actively involved in monitoring, protecting, and managing of village forest areas. There are women who participated in forest management through plantation, rehabilitation, and protection. Thus, water and air pollution, ozone depletion, and desertification could be controlled or minimized. Besides, Singh (2015) noted that conservation of natural

resources in rural areas cannot be done without the involvement and training of women.

Extra single table was made to women's participation in air pollution protection. So, 100% of responses are located on alternative fuel wood, improved cook stoves, prevention of burning of litters, and indoor and outdoor air pollution. This shows that women are engaging in air pollution protection activities to manage the environment.

Table 6

Options	Responses		Percent of Cases
	N	Percent	
Use alternative fuel wood	118	25.0%	100.0%
Use improved cook stove	118	25.0%	100.0%
Prevention of burning of litters	118	25.0%	100.0%
Preventing indoor and outdoor air pollution	118	25.0%	100.0%
Total	472	100.0%	400.0%

Source: survey data, 2019. NB: the total is not 100% because of multiple responses.

Participants one of FGDs also reported that women play immunes roles to protect air pollution. Besides, a participant from KIs noted:

I am carrying out numerous reproductive, productive and community tasks. Thus, I have roles in air pollution protection. You know how much fresh air is crucial for human beings, but it is polluted by both natural and synthetic factors. Therefore, we shall protect it from pollution otherwise we will influence by air born related diseases. As you see now I am using improved cook stove. This helps to reduce both indoor and outdoor air pollution. I believe that this will reduce fuel consumption not only pollution. Besides, this adoption decision is also cost-effective. For your surprising, it is better than using traditional stoves in producing better tasting food, less smoke emissions, less cooking time and less fuel collection time. As you can see the villages around, improved cook stoves are few and not generally adopted properly. This will damage

the environment. Hence, we need help from the government.

This result was comparable with the research findings of Labaris (2009) & Chukwu (2014). Accordingly, women have knowledge in protecting the environment, natural resources and air pollution significantly through waste disposal management. Moreover, Moser (1991), cited in Labaris (2009), noted that women are more concerned about environmental protection and ecological preservation via managing, rehabilitating, and innovating appropriate technology in the creation of new environments.

Moreover, a single table was generated based on women's participation in environmental hygiene. Therefore, almost all responses are located on all activities listed out in Table 7. It suggests that women are highly responsible to make the environment safe.

Analogously, findings from KIs supports this result, showing women have indispensable roles to make the environment clean and safe through washing, sweeping, avoiding wastes, burning of litters and protecting waste emission. Thus, the finding revealed that women powerfully play a part to make the environment hygienic. This result compares with a research finding by Labaris (2009) & Chukwu (2014).

Challenges, opportunities and determinants of women's role in environmental protection and management

Binary logistic regression outputs

Variables in the equation

Selected predictor variables, challenges and opportunities of women's participation in environmental protection and management are discussed below simultaneously. The study

Table 7

Options	Responses		Percent of Cases
	N	Percent	
Waste disposal	107	12.8%	90.7%
Keeping waste emission	118	14.2%	100.0%
Weeding	118	14.2%	100.0%
Sweeping	118	14.2%	100.0%
Cleaning drainages	93	11.2%	78.8%
Washing	89	10.7%	75.4%
Packing refuse	94	11.3%	79.7%
Filling ditches	68	8.2%	57.6%
Others	28	3.4%	23.7%
Total	833	100.0%	705.9%

Source: survey data, 2019. NB: the total is not 100% because of multiple responses.

employed a binary logistic regression model to identify determinants variables. Thus, from 28 explanatory selected variables, 12 variables were identified as determinants of the dependent variable. Accordingly, being other variables constant, the multiple regression analysis showed that a unit increase of age (28-37, 38-

Table 8: determinants of women's participation in environmental protection and management

Observed vs Predicted

Observed	Predicted		in Percent
	Women's Environmental Protection and Management	Yes	
Step 1: Women's Participation in No Environmental Protection and Management	24	7	81.3
Overall Percentage	31	14	55.8

Variables in the equation

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I. for Exp(B)
Age			15.138	1	.001	1.042	1.020 - 1.066
Age(2)	4.404	1.085	6.895	1	.009	1.012	1.020 - 1.348
Age(3)	4.348	1.069	6.785	1	.009	1.012	1.020 - 1.341
Age(4)	-1.041	.713	6.683	1	.016	.462	.258 - .821
Education	-2.282	.805	6.183	1	.022	.102	.047 - .234
Education(2)	-.688	.726	7.881	1	.005	.502	.236 - 1.068
Education(3)	-1.669	.889	6.776	1	.009	.207	.086 - .529
Education(4)	-1.385	.852	7.720	1	.009	.251	.102 - .578
Education(5)	-1.913	.898	6.290	1	.022	.149	.062 - .352
Education(6)	-1.182	.763	6.020	1	.022	.347	.168 - .725
Education(7)	-1.182	.811	6.845	1	.014	.318	.144 - .703
Education(8)	-.943	.872	7.583	1	.009	.501	.228 - 1.098
Education(9)	-1.280	.804	6.046	1	.022	.282	.120 - .667
Constant	3.108	2.570	.761	1	.382	11.836	

Variables entered on step 1: Age, Education, Income, Health, Literacy, Skills, Training, Experience, Knowledge, Attitude, Motivation, and Resources.

47), women's participation in environmental protection and management is more likely to

increases by the odds ratio of 6.895 & 6.783 as compared to women under other age categories. A significant relationship was also observed at $p < 0.05$ in both cases (Table 8). As well, the qualitative data exhibited that as age increases; women's participation in environmental management also increases. This result was somewhat likened with a finding outlined by Chukwu (2014). Accordingly, majority of the women (38%) are in their middle ages (30-39 years) so that they can participate actively in environmental protection activities. But the current finding was in agreement with a study result found out by (Basnayake and Gunaratne, 2002); i.e., age could be determinant of various human development stages accompanied by the ability to perform certain activities. The age of a person is usually a factor that can explain the level of production and efficiency.

Besides, being other variables constant, for every one-unit increases of the influence of social norms, gender-based violence, social service inaccessibility, tripled gender roles, dearth of information-technology, least possible production-consumption, lack of resources and institutions; women's participation in environmental protection and management is more likely to decrease by the odds ratio of 6.003, 6.353, 7.801, 6.774, 7.728, 6.200, 9.028, 5.845, 7.653, and 5.046 as compared to these women who responded as no. Statistical relationships were perceived at $p < 0.05$ in all cases (Table 8). The KIs also conveyed the qualitative details similar with the numerical facts. They identified the challenges that deterred women's participation in environmental management. Accordingly, patriarchal thinking, gender relations, low decision-making power and lack of awareness among the general public were challenges women faced, but food and material aid were opportunities that sometime provided for women as opportunities to participate in environmental protection and management activities.

A participant from KIs noted:

Women have direct contact with natural resources such as fuel, forest, water and land. Thus, they have knowledge to manage the environment. They are participating in environmental protection and management activities including planting and protecting, flood controlling, keeping waste emission, waste disposal, cleaning, and soil and water managing. Thus, conservation of natural resources and promotion of environment cannot be done without women's participation. However, their participation in environmental protection and management is being faced by various challenges including social norms, poor infrastructure development, lack of access to, and control over resources, household food insecurity, limited livelihood options, lack of decision making power, gender-based violence, and lack of training and awareness rising regarding to environmental administration. Occasionally women gain a few opportunities from the government and NGOs such as food and material aid.

Similarly, a participant from of a women's FGD reported:

Surely, we are playing vital roles to safeguard our environment. We strive day and night to make our environment fresh, clean, and comfortable. We are planting trees; washing the living house and compound; avoiding and burning disposals; protecting both public and household water sources. Even we are using improved cook stoves to make the air fresh and save the forest from cutting for firewood. Despite doing these; however, things are not as such contented for work. We are producing but not consuming; traditional customs and beliefs are influencing us; higher prestige is giving for males than females; every decision is passing by males rather than females. Our challenges are not only these but also others. For example, lack of waste disposal equipment, healthcare facilities (i.e. vaccination, glove, health related training and awareness-raising) and access of clean water. Besides, people's poor drainage system, human waste pollution, and fumes from household fuel are challenges for us.

The finding compares with similar studies in the (See Bannerjee, 1991; WEN, 2007; Catalyst,

2007; Labaris, 2009; Ogra, 2012; Solomon et al., 2014; SSNC & Singh, 2015; Marius & Maxim, 2017; SEI, 2018; WHO, 2019). These studies highlighted that productive, reproductive and community managing roles as well as access to, and control of technology, information, resources, and production consumption are adversely affected women's participation in environmental management.

The results above align with the eco-feminist concept of Carolyn Merchant (1983) which argues men have always seen both nature and women as a resource which can be exploited for their personal use, and he doesn't see any value for both. Both nature and women are created for their benefit and they seem to assume themselves as the master of both. This is the reason why they want to control both and displays no reverence for both. In patriarchal societies, a woman is compared to nature and a man is compared to culture. Women and nature were always an inspiration for men or rather we could say that the women and nature were mere instruments for the masculine ego. This masculine ego and the patriarchal mindset of the society led to the degradation of both human life and ecology. Besides, Reshma (2017) underlined that ecofeminism grew out of radical or cultural feminism which holds that identifying the dynamics behind the dominance of male over female is the key to comprehending every expression of patriarchal culture with its hierarchical, militaristic, mechanistic and industrialist forms. Hence, this could hamper women's participation in environmental administration.

The current findings were also analogous with the eco-feminist concept of Hosseinnezhad (2017) provided that men are dominant over women and nature and it is a men's claim that women and nature are inferior to men. This could discourage women's ecological management attitude. This author further emphasized that the

schema of patriarchy which is governed by hierarchy and by conflicting dualism such as male/female, mind/body, reason/emotion, universal/particular, and culture/nature, where the first term is associated with men and is elevated, the second is associated with women and is devalued. These patriarchal ideals of women and nature, science and development and rationale and awareness have brought us to this downtrodden situation where we can see the fate and plight of women and the irreparable damage caused to nature and the natural resources, which has led to its exhaustion.

Conclusion

In a nutshell, this study shows that men and women experience the environment differently. Both men and women have different roles, responsibilities, and knowledge on the environment, denoting that alike men, women make a significant contribution in environmental protection and management. They are indispensable in soil preservation, resource management, pollution fortification and environmental hygiene. However, they are hindered by several factors (social service inaccessibility, dearth of information-technology, least possible production-consumption, social norms, gender-based violence, gender power relations, low decision making power, and lack of access to, and control over resources), but enjoyed limited opportunities such as food and material aid. This condition deters their participation in environmental protection and management, and it comes to be difficult to promote gender-based environmental outcomes. It has also negative effects on the global environment. Hence, this issue becomes a field of inquiry wide-reaching.

Recommendation

To tackle the identified problems, the government, and the local NGOs (Women Support Association and Save the Children) work cooperatively have to provide extensive training for both men and women

together with reference to social norms, social capital, and gender-based violence to create smooth gender relations, to ensure women's access to, and control over resources, and to assert women's decision-making power and property rights. This might help them to increase their participation in environmental protection and management. Moreover, the government and the local NGOs should jointly focus on both men's and women's awareness rising regarding to technological advancement and technology gender gaps via sharing empirical evidence. Besides, considering women, the government makes social service delivery available i.e. healthcare facilities, education and infrastructure development. Additionally, the government should provide fund for women's organization and has to attempt to improve women's participation in environmental protection and management.

Acknowledgment

I am very much indebted to my sources of information (respondents, focus group discussants and key informant participants) for providing relevant information during the field work.

References

Banerjee N. (1991). *Indian Women in a Changing Industrial Scenario*, Oxford University Press, Delhi.

Basnayake, B.M., & Gunaratne, L. H. (2002). Estimation of technical efficiency and its determinants in the tea small holding sector: Sri Lanka. *Sri Lankan Journal of Agricultural Economics*, Vol. 4 (1). Pp.137-150.

Bingeman, K. (2001). Women's Participation in Forest Management, Decisions in the Upper Kullu Valley, Himachal Pradesh: University of Manitoba, India, the *Journal of the Association for Nepal and Himalayan Studies*: Vol. 21: (2), article 10, pp. 53-61.

Catalyst. (2007). *The Bottom Line: Corporate Performance and Women's Representation on Boards*.

Chukwu, M. N. (2014). A study on gender involvement in environmental protection in Pedro Village, National Open University of Nigeria, Lagos-Nigeria. *Academic Journal of Interdisciplinary Studies* Vol. 3 (7): ISSN 2281-3993, MCSER Publishing, Rome.

Creswell, J. W. (2012). *Educational research, planning, conducting, & evaluating quantitative and qualitative research*. University of Nebraska-Lincoln.

Eminel, S.E. (2018). *Women, Water Resource Management, and Sustainable Development: The Turkey-North Cyprus Water Pipeline Project*, Near East University.

Ghafoor, A. A. (2013). Relationship between Environment and Sustainable Economic Development: A Theoretical Approach to Environmental Problems, *Institute of Southern Punjab, Multan-Pakistan. International Journal of Asian Social Science*, Vol. 3 (3):741-761.

Goosen, M.F.A. (2012). *Environmental management and sustainable development*. Alfaisal University, Riyadh, 11533, Kingdom of Saudi Arabia.

Greene, J., Caracelli, V., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, Vol. 11, No. 3.

Hosseinnezhad, F. (2017). Women and the Environment: Eco-feminist Approach to Environmental Attitudes and Behavior in Iran. Hacettepe University, *European Journal of Sustainable Development Research*, 1:1, 4: ISSN: 2542-4742.

Koohi, E., Mohammad, S., koohi, E., & Meiboudi, H. (2014). Women's participation in environmental management and development Promotion Culture, Payame Noor University. *The Open Access Journal of Resistive Economics (OAJRE)*, Vol. 2 (2), pp. 49-61, ISSN 2345-4954.

Kumar, A.S. ((2016). Role of Women in Environmental Conservation, Ambedkar Central University, India. *International Journal of Political Science and Development*. Vol. 4(4), pp. 140-145. DOI: 10.14662/IJPSD2016.026.:

Labaris, A. ((2009). Women Involvement in Environmental Protection and Management: A Case of Nasarawa State, University of Pennsylvania. *Journal of Sustainable Development in Africa* Vol. 10 (4) : ISSN: 1520-5509.

Manjunath K. V. (2015). Marching Towards Sustainability: Role of Women in Environmental Conservation in Kolar district, Karnataka state. *International Journal of Academic Research*, Vol. 2, 2(6), ISSN: 2348-7666.

Marius, C.A., & Maxim, A. (2017). Political Determinants of National Environmental Performance in the European Union. *European Journal of Sustainable Development*, Vol. 6 (1), ISSN: 2239-5938: Doi: 10.14207/ejsd.2017v6n1p277.

Merchant, C. (1983). *The Death of Nature: Women, Ecology, and the Scientific Revolution*. Harper and Row: New York, 1983.

Morelli, J. (2011). Environmental Sustainability: A Definition for Environmental Professionals at Rochester Institute of Technology, *Journal of Environmental Sustainability: Vol.1, (1), Article2* DOI: 10.14448/jes.01.0002.

Morufu, R., Romoke, S., Oluwaseun, O., John, S., Modupe, O., Stephen, A., & Bosede, M. (2019). Women Role in Environmental Conservation and Development in Nigeria. *Ecology and conservation science*, Vol. 1 (2), ISSN 2689-4637.

Ogra, M. (2012). *Gender mainstreaming in community-oriented wildlife conservation: experiences from nongovernmental conservation organizations in India*. Society and Natural Resources, 25, 1258– 1276.

Ogunjinmi, A.A., Ogunjinmi, K.O., & Osunsina, I.O.O. (2012). Scaling up women's roles in sustainability and conservation through wildlife farmig- an overview. *Journal of Environmental Extension*, 10, 52-55.

Prebble, M. (2015). *Women's Participation in Environmental Decision-Making: Developing a New Global Dataset with the IUCN Global Gender Office*, Duke University.

Rao, M. (2012). *Ecofeminism at the Crossroads: A review: Women's University, Mumbai, India*; ISSN 1824-4483.

Reshma, R. (2017). Ecofeminism, Patriarchy, Capitalism and Post Colonialism in the Indian Scenario: A Short Study. *IOSR Journal of Humanities and Social Science (IOSR- JHSS)*, vol. 22, (9), pp. 18-24, ISSN: 2279-0845.

Sharma, R., & Kaushik, B. (2011). Role of women in environmental conservation, Hindu College, Sonapat. *International Journal of Multidisciplinary Management Studies*, Vol.1 (2), ISSN 2249-8834.

Singh, K. (2015). Women and Their Role in Natural Resources: A Study in Western Himalayas. University of Delhi, *International Journal of Research*, Vol.3 (10): ISSN- 2394-3629.

Solomon, Z.W, Dung, C.V. Buhari, H.A., Daloeng, H. Madaki, Bitrus, A.B. (2014). Women Participation in Environmental Protection and Management: Lessons from Plateau State, Nigeria. *American Journal of Environmental Protection*, Vol. 2 (2), pp 32-36. DOI: 10.12691/env-2-2-1.

Stockholm Environment Institute. (2018). *Integrating gender and social equality into sustainable development research*.

Swedish Society for Natural Conservation. (2015). *Protecting the environment: Why a gender perspective matters*.

Tiondi, E. (2000). *Women, environment and development: Sub-Saharan Africa and Latin America*: University of South Florida.

United Nations Conference on Environment and Development. (1992). *The Rio declaration on*

environment and development. Having met at Rio de Janeiro from June 3 to 14.

United Nations Environment Programme. (2016). *Global gender and environment outlook –the critical issues*. Nairobi, Kenya. ISBN No: 978-92-807-3581-9: www.unep.org.

Warren, K. (1987). Feminism and Ecology: Making Connections: *Environmental Ethic*, 9 (1).

Warren, K. (1991). *Introduction to Ecofeminism*. American Philosophical Association Newsletter on Feminism and Philosophy.

Wasike, S. (2012). *Challenges Facing Women in Accessing and Controlling Natural Resources in Tuuti Ward, Bungoma County in Western, Part Of Kenya*, Institute of African Studies: University of Nairobi.

Women's Environmental Network (WEN). (2007). *Women's Manifesto on Climate Change: United Kingdom*.

World Bank. (1991). *Women's Crucial Role in Managing the Environment in Sub-Saharan Africa*, Africa Technical Department, Women in Development Unit, Technical Note, BRD, Washington.

World Bank. (2012). *Linking Gender, Environment, and Poverty for Sustainable Development: A Synthesis Report on Ethiopia and Ghana*. Social Development Department: Report No. P125713. Washington, DC. 20433.

World Health Organization. (2019). *Health, environment and climate change: Seventy-second world health assembly, Provisional agenda item 11.6*.

Journal of African Development Studies

Submission guidelines

Manuscripts

Manuscripts need to be problem-solving research outputs. They can be original articles, systematic reviews or short communications. Thematically, the Journal has broader aim and scope on issues of development broadly defined and the name "Africa" in its nomenclature displaying its commitment to engaging scholars from Africa as well as addressing regional matters of development. The Journal will accept manuscripts from disciplinary, multidisciplinary and interdisciplinary policy and development sciences, social and behavioral sciences, humanities, education and language, health, agriculture, socio-economic development, and political economy.

However, manuscripts of pure disciplinary focus that do not have explicit development relevance are outside of the scope. Manuscripts should be submitted in English except in the case when the theme of the study requires it in Amharic. The title should be precise and clearly describing the content of the manuscript. A short running title of fewer than 160 characters is advisable. Never use abbreviations or formula in the running title. All submitted manuscripts must follow the following structure:

Manuscript structure

Title: The title must be informative and specific. It should be easily understandable by readers and reflects the content and motive of the research paper.

Author name affiliation and email address: author/s' first name and last name only. Please don't include salutations like Dr/ Mr./Prof, et cetera. If possible, provide only your professional/ institutional email address.

Abstract: one paragraph containing at most 150 words. The abstract should be informative and explainable without reference to the text. It should state succinctly the problem, objective method, result, and conclusion and recommendation of the paper. The use of abbreviations and citations is not advisable here.

Keywords: 5 most important terms that describe

your research domain and the specific problem area investigated.

Introduction: A brief section usually not more than a page. It should be informing the reader of the relevance of the research. It should further serve as a gateway and a pre-taste of your research endeavor; introduction should further outline the core sections of your manuscript.

Problem Statement: This section should provide a concise yet comprehensive review of relevant classic and contemporary theoretical and empirical literature pertinent to your problem area, followed by a concrete definition of your problem, depiction of gaps in prior researches, why your current study is worth studying and how it intends to fill the gaps. Your closing paragraph here should pose the core research questions and/or objectives (with an optional list of specific objectives).

Materials and Methods: This section should describe how your study area (geographic, socio-demographic, etc); salient methodological and design approaches adopted with justifications (quantitative, qualitative or mixed); the procedures used; methods of data collection; analytical procedures (including what software package employed) and how you dealt with ethical issues.

Results: this section describes outputs generated in the methodology section. The results section should present your key findings, without discussing or sources citations.

Discussion: Here, you should provide discussions and further analysis of your results, with the comparative treatment of your findings with other similar studies. Conceptual or theoretical models and perspectives introduced in your literature review sections should be linked with your key findings, thereby putting your findings in broader academic and policy contexts.

Conclusion: This section provides the key messages and implications of your study findings. concisely elaborate on your final output here.

Recommendation: This is optional. But if you wish, you can forward not more than 3-4 salient recommendations, which should be firmly grounded in your conclusion.

Acknowledgments: In this section, you should outline all the main agents that have contributed to your research outcome, financially or otherwise.

Author Contributions: Here, briefly declare the type and level of contribution of each author, if the manuscript is authored by more than one author. For example, you can declare thus: XX has conceived the study idea and developed the proposal; YY has supported in the design and statistical analysis process; XX and YY conducted the fieldwork; ZZ has designed survey tools and reviewed the manuscript, etc.

References: Every idea that is not yours and of quotable importance should be cited in the text. All sources cited in the text should appear in the reference list. Please use **APA** reference styling for both in-text citation and bibliography.

Formatting styles specifications

Font family: Arial

Title font-size: 16 pts.

Author name font-size: 11pts, bold

Author affiliation font-size: 9 points:

Abstract font-size: 9 points, italic

Key words font-size: 9 points

Heading font-size: 12 points, bold

Subheading font-size: 11 pts, bold

Table heading font-size: 9 pts, italic

Figure and table caption font-size:

10 points

Line spacing: 1.5 points

Page orientation: portrait

Number of columns: 1

Page margins: Top, 0.7-inch; bottom, 0.7 inch; left, 0.67 inch; right, 0.56 inch

Writing Styles and Language

Authors should seek clarity and simplicity of expression; avoid the use of long, complex sentences and lengthy and too short paragraphs. Authors may seek to have their manuscripts checked by language experts before submission. Alternatively, authors may wish to use free online language and grammar aides such as Grammarly software. Manuscripts failing to meet minimum writing language and scientific research standards shall be rejected at the gateway stage of preliminary screening. The spelling may be either British or American way but must be consistent throughout the paper. The file format must be supported by Microsoft W.doc/ .docx format. The size may not exceed 20-pages in A4 size

paper or **6000-8000** words (for original field-based or systematic review research); or **3000** for short communications and 1000 words for book reviews, including references.

Tables and figures

Tables and figures shall be numbered with Arabic numbers in the order of appearance in the text.

Graphs, flowcharts, drawings, and photographs are considered as figures; legends or captions for the tables and figures should be placed just above and below the image respectively. All tables and figures are to be duly acknowledged and placed in the appropriate place in the manuscript making the discussion easier for readers.

Submission

Submit your manuscript via emails: Managing Editor: zeri.hun.doda@ecsu.edu.et or Editor-in-Chief - samson.kassahun@ecsu.edu.et. Alternatively use the electronic submission process enabled by ECSU Official webpage: <http://www.ecsu.edu.et>. If the manuscript does not meet the requirements and/ or thematic scope the journal editors reserve the right to reject it. Submission should include two versions of the manuscript; one provided with full name/s of the author or authors as well as contact address; the second should be an anonymous copy, all traces showing the identity of the author/s should be removed from the manuscript. The filled and signed submission form to be provided by the managing editor shall be submitted along with the manuscript submission. Manuscripts submitted is unpublished and is not being considered for publication elsewhere.

Novelty and plagiarism

Authors are expected to present the entirely original piece and all ideas taken from external sources should be duly acknowledged. JADS Editorial Board maintains zero-tolerance for plagiarism and it has put in place Plagiarism Detection Software (Plagiarism Checker X Pro and Plagiarism Detector). All manuscripts shall be tested by these two software before being sent for reviewers. The maximum tolerable similarity percentage shall be 15%. Every author will be held responsible for the performance and fulfillment of the policy to avoid malpractices and breach of ethical standards of

publication. A plagiarism declaration form will be signed by authors.

Authors should assure that the piece of knowledge ready for publication is original copy and has not been published anywhere earlier and is not in consideration for publication anywhere else. Authors should accept and correct the mistakes and consider the suggestions given by a panel of reviewers.

Peer review process

The Journal follows a double-blind review process the following indicative rules should guide the peer review process as follows:

- Upon the submission of manuscripts for review, the Managing Editor's Office shall run a plagiarism test (similarity/-originality test) using licensed plagiarism detection software. The Board proposes a maximum tolerable percentage of similarity should not exceed 15%. Recommended plagiarism detection software, for the time being, shall be: Plagiarism Checker X Pro- Paid Version and Plagiarism Detector-Paid Version. The University shall ensure that institutional licenses acquired for these or other similar but internationally recognized proprietary software.
- The managing Editor then forwards the manuscripts to relevant Editor/ Associate Editor to offer their comments regarding preliminary issues (whether the manuscript falls within the Journal Scope, meets the author guideline, language standard, etc)
- Each manuscript shall be reviewed by at least two competent reviewers.
- Reviewers shall maintain the scientific standards and rules of reviewing ethics
- Manuscripts shall be blind reviewed; the identity of the authors shall be removed from the body of the text.
- When both reviewers pass a positive review decision, it shall automatically be taken by the editorial board.
- When one author rejects and the other renders positive evaluation, a third reviewer shall be solicited, and the average decision shall be maintained.
- The final publication decision, however, shall rest on the prerogatives of the editorial board in general and the Editor-in-Chief in particular.

- The Managing Editor makes sure that the comments of the reviewers are addressed duly, and whenever feasible sees that the reviewers approve that comments had been addressed by the authors.
- Manuscripts for review shall a in soft copies; reviewers shall also be provided with soft copies.
- The review process should preferably utilize objectively verifiable review and comment schemes, including the MS Office Comment and Track change tools.
- Authors shall also ensure that objectively verifiable means are used when addressing reviewers' comments.

ECSU if pleased to announce that it is launching a new journal, based at the College of Urban Development and Planning (See poster next page)

JUDS

Journal of Urban

Development Studies

Volume: Year: ISSN: www:

College of Urban Development and Engineering,
Ethiopian Civil Service University

