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SCHOOL OF GRADUATE STUDIES

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

## **Performance Evaluation of Ethiopia's Road Network Development Planning Policies and Strategies: The Case of RSDP.**

By:

Kaleab Woldeyohannes Yirgu

B.Sc. (Civil Engineering, Addis Ababa University, 2014)

A Thesis Submitted to the School of Graduate Studies in Partial Fulfillment  
of the Requirements for the Degree of Master of Science

In

Road and Transport Engineering

Sponsor: Ethiopian Roads Authority

Advisor: Alemayehu Ambo (Ph.D.)

November 2017

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY  
ADDIS ABABA INSTITUTE OF TECHNOLOGY  
SCHOOL OF GRADUATE STUDIES  
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## **Undertaking**

I, the undersigned, certify that this research work titled “**Performance Evaluation of Ethiopia’s Road Network Development Planning Policies and Strategies: The Case of RSDP**” is my original work performed under the supervision of my research advisor **Dr. Alemayehu Ambo** and has not been presented elsewhere for assessment and for a degree in any other university. All sources of materials used for this thesis have also been duly acknowledged.

**Signature:** \_\_\_\_\_

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**Place of Undertaking:** Addis Ababa, Ethiopia

**Date:** October 2017

## Abstract

It would be an understatement to begin by suggesting that road network development is one complex issue that transcends beyond engineering into political, socio-economic and environmental dimensions. As the Government of Ethiopia strives to uplift the nation into the list of lower middle income countries by 2025, the road transport sector, as a result of its immense contribution to enhancing the expansion of infrastructure development, was identified as one of the seven pillars of the first Growth and Transformation Plan and continues to be a key point in the second phase of the same Plan. However, as determined in this research through analysis of interviews and desk reviews, two basic challenges were identified: the planning of Woreda roads is far from being seamlessly integrated with its implementation; and the maintenance of these roads is still not yet fully embraced by any entity. As a result, the need for proper organizational set up with clear regulations and public responsibilities is now important more than ever.

In the aspect of policy performance evaluation schemes and targeted road network indicator values, the study showed that individual indicators like road density should not be isolated and treated separately to measure accessibility. Instead, interpreting road density together with different indicators such as road condition and rural access index gives a better understanding of the actual situation on the ground. Meanwhile, the targeted road density which was set as a guarantee for 'lower middle income' status has been determined to be overly simplified as variations in road densities among similar economies are rampant and such an approach overlooks other important factors which are more strongly associated with the economy.

The research also indicated that the involvement of indigenous road contractors showed improvement only in terms of number of projects contracted and not in the value of contracts, indicating that they are largely locked out of lucrative road projects which are dominated by international contractors. Lastly, analysis of the funding arrangement revealed that traditional and non-traditional donors have played a fairly massive role in the Ethiopian road network development even though these two groups of donors follow significantly different partnership policies.

**KEY WORDS:** ACCESS, DP, ERA, EVALUATION, FUND(ING), INDICATOR, POLICY (IES), RAI, ROAD, RRA, RSDP, RURAL, URRAP, WOREDA and WRO.

## **Acknowledgment**

I sometimes hear the argument that researchers should not acknowledge deities in their papers. Be that as it may, I have chosen to thank my God for His enduring provisions and faithfulness. God is Good All the Time!

Second in line, I would like to express my heartfelt appreciation of my advisor Dr. Alemayehu Ambo for his sustained support and follow up throughout this unorthodox research. I have enjoyed his mentorship and vast expertise very well.

Third in line, I would like to thank Mr. Yetimgeta Asrat (Director, ERA Planning and Program Management Directorate) for making my data collection at the Authority smooth and for ensuring that my requirements were thoroughly met. Furthermore, I would like to acknowledge Mr. Tesfaye Shiferaw (Senior Economist, ERA), Mrs. Konjit Alemu (Manager, ERA Program Monitoring and Evaluation Department), Mr. Abiy Egual (Team Leader, ERA URRAP Technical Assistance Team) and Mr. Letarik T. Debella (Software System Team Leader, ERA Information Communication Directorate) for their unreserved cooperation.

Last but not least, I owe Mr. Teferra Mengesha (General Manager, W.T Consult) and Mr. Yusuf Ahmed (General Manager, Afro Consult and Trading Plc.) a great deal of gratitude for they racked up hours on top of hours to carry me back and forth over their combined ninety-year plus experience in the Ethiopian road transport planning sector. It was an absolute pleasure and an eye opener.

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## **List of Abbreviations and Acronyms**

AADT	Annual Average Daily Traffic
AfDB	African Development Bank
AU	African Union
BADEA	Bank of Arab for Economic Development in Africa
CBD	Central Business District
CIA	Central Intelligence Agency
CSA	Central Statistical Agency
DAG	Development Assistance Group
DBM	Design Build Maintain
DP	Development Partner
ERA	Ethiopian Roads Authority
ERC	Ethiopian Railways Corporation
ERCC	Ethiopian Road Construction Corporation
ERTTP	Ethiopian Rural Travel and Transport Program
ETB	Ethiopian Birr
EU	European Union
FDRE	Federal Democratic Republic of Ethiopia
FTA	Federal Transport Authority
GDP	Gross Domestic Product
GIS	Geographic Information System
GNI	Gross National Income
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
ha	Hectare
IDA	International Development Association
IHA	Imperial Highway Authority
IMF	International Monetary Fund
km	kilometer
MDG	Millennium Development Goal
METEC	Metals and Engineering Corporation

MoFEC	Ministry of Finance and Economic Cooperation
MoFED	Ministry of Finance and Economic Development
MoT	Ministry of Transport
MoWUD	Ministry of Works and Urban Development
NDF	Nordic Development Fund
NGO	Non-Governmental Organization
NPV	Net Present Value
NTMP	National Transport Master Plan
ODA	Official Development Assistance
	Organization for Economic Development-
OECD-DAC	Development Assistance Committee
OFID	OPEC Fund for International Fund
ORA	Oromia Roads Authority
ORF	Office of the Road Fund
RAI	Rural Access Index
RSDP	Road Sector Development Program
SDG	Sustainable Development Goal
SNNP	Southern Nations Nationalities and Peoples
SSA	Sub-Sahara Africa
SWAp	Sector Wide Approach
TSWG	Transport Sector Working Group
UNECA	United Nations Economic Commission for Africa
URRAP	Universal Rural Road Access Program
USD	United States Dollar
VAT	Value Added Tax
VOC	Vehicle Operating Cost
WRO	Woreda Road Office

## CHAPTER ONE

### 1. INTRODUCTION

#### 1.1. Background

The road sector plays a catalytic role in the economic development and improvement of any community. It is also fair enough to state that any nation is a result of its policies, at least in terms of transportation planning. The road network size and quality of Ethiopia need to keep up with the pace of the ever increasing socio-economic activities and hence, demand in transportation services. That is particularly important in providing rural communities, such as those seventy million plus Ethiopians residing in the countryside access to better socio-economic services through rural roads (Briceno-Garmendia et.al, 2004; and Bhattacharya et.al, 2015). Researches carried out on assessing the importance of roads towards the betterment of developing nations imply that improving and expanding roads, particularly rural roads, directly increases economic opportunities (Faiz, 2012; and Porter, 2014).

In response to a growing economy severely constrained by a shabby road network, the Government of Ethiopia (GoE) formulated the first phase of the Road Sector Development Program (RSDP) in 1997, which identified the investments and crucial reforms that would be undertaken to expand the road network and modernize the sector. The RSDP included components for policy review and institutional capacity building in support of the Ethiopian Roads Authority's (ERA's) modernization program, and a program to build the capacity of the domestic construction industry (Centre for Development of Enterprises, 2013).

The RSDP was extended to 2020 in five successive phases. It is the driving instrument behind one of the seven pillars of the Second Growth and Transformation Plan (GTP II) that aims at enhancing expansion and quality of infrastructure development in much the same way as it was important in GTP I (National Planning Commission, 2015; and MoFED, 2010). The total amount that was disbursed between 1997 and 2016 on the program was Ethiopian Birr (ETB) 266.2 billion (United States Dollar/USD of 17.4 billion). The fund had come from both internal revenues and development assistance from foreign international entities. Accordingly, the road network increased from 26,550 kilometers (kms) in 1997 to 113,066 kms in 2016 with an average annual increment of 8% (ERA, 2016). But as the network expands, the need for a more robust planning policy becomes extremely important so that efficiency can be maintained in choosing among

competing alternatives (Runji, 2015). However, road network expansion does not necessarily mean utilization in Ethiopia. That is because, the annual average daily traffic (AADT) on many regional roads are more or less below design and over 70% of the vehicles in Ethiopia are operating in Addis Ababa (AfDB, 2015).

Although the physical accomplishment of the program was certainly appreciable, especially during the third and fourth phases, there still are numerous planning policy implementation and proper evaluation issues that have not been dealt with satisfactorily. Indicators that are frequently utilized to measure the road sector development are not always accurately reflective given the peculiar context of the nation. That problem is more complicated as there are only very few globally recognized road network progress evaluation mechanisms (Roberts et.al, 2008). Self-insufficiency to fund capacity building programs, construction and maintenance of road projects have made matters worse. That brings about specific political challenges of managing and making the most out of the existing and newly arriving donors. Furthermore, the sector's capacity, especially with regards to community/rural all weather roads, is worrisome as the physical accomplishment rates and prospect of asset management of these roads seem to be in grave danger.

The latest edition of the RSDP is the fifth phase which has resulted in an unprecedented allocation of budget for Federal, Rural and Woreda projects. This is the guiding strategy towards achieving one of the several Sustainable Development Goals (SDGs)/Millennium Development Goals (MDGs) which is to allow the great majority of the rural population access to socio-economic services (W.T Consult, 2017). In this phase, a series of policy reforms have been incorporated, especially with regards to rural roads in the aspects of project delivery methods where Design-Build-Maintain (DBM) has been envisioned and The Federal Democratic Republic of Ethiopia Metals and Engineering Corporation (FDRE METEC) is expected to undertake construction in difficult terrain and unstable territories (ERA, 2015). It is currently being implemented as part of the second GTP since July 2015 and is expected to conclude in 2020. According to ERA, its first year progress up to June 2016 remained at 49% physical and 102% financial accomplishment (ERA, 2016). That, by itself, is a sign of a defective policy whereby the physical progress is less than half way achieved with the monetary usage exceeding 100%. The disparity has been largely placed upon Woreda rural roads' poor execution performance.

Consequently, the need to assess overall policy implementations and more importantly the accuracy of evaluation schemes in the sector from different angles is as important as ever.

## **1.2. Motivation**

As an upcoming engineer specializing in Road and Transportation Engineering, Transport Planning Policy has always been the one particular field that the researcher is most attracted to. It is an applied science which can be acted upon immediately. A number of components such as politics, economics, social circumstances and environmental considerations tend to make road transport planning policy interdisciplinary and less attractive for research by the academic circle in the Ethiopian context. The implementation and monitoring of robust strategies in the sector is important to Ethiopia now more than ever as we draw closer to 2025 by which the nation is expected to join the list of lower middle income countries. Therefore, an enquiry into this issue is practical and extremely timely. Combined with the fact that not too many young road engineers these days acknowledge or pay attention to this subject, the researcher has decided to contribute whatever little in his own capacity.

In conclusion, it needs to be noted that the researcher's particular interest is to emphasize robust road infrastructure development policies and more importantly promote suitable policy monitoring schemes.

## **1.3. Statement of the Problem**

Ethiopia has remained one of the least developed countries on a global scale until recent times when some signs of actual economic improvement were registered. Merely twenty years ago, the national road network stood at a physical size of 26,550 kms. Since then, significant rise in population and a need for economic interaction were witnessed; and road as the most dominant mode of transportation within the country, it was pretty evident some desperate measures had to be taken. Accordingly, in 1997, the GoE launched a series of road network transformation plans through the RSDP consisting of multiple phases.

With different national road sector agencies such as ERA, Regional Roads Authorities (RRAs) and Woreda Road Offices (WROs) overseeing projects within their respective territories, significant advances have been made over the past 19 years. Nearly all road agencies on the national level have been under reform in addition to carrying out physical works on road projects.

However, some important projects such as Universal Rural Road Access Program (URRAP) launched under the fourth stage of the RSDP and also continuing in the ongoing fifth phase were prematurely handed over to WROs. Putting aside physical accomplishment rates, it is possible to see that there are some rather debatable executive and monitoring policy issues. Some risks were taken by entrusting the physical work to infant small enterprises (the researcher believes that was an excellent move by the government towards job creation but doubts the uniformity of competence on the part of these enterprises) on top of letting WROs oversee the implementation. Levels of accomplishment varied among different regions as the ones with weak monitoring schemes registered disappointing level of accomplishment. Benishangul-Gumuz, Gambella and Afar regions showed terrible accomplishment compared with the likes of Oromia, Amhara and Tigray which registered better success rates (Tsegaye, 2014). Furthermore, these WROs in collaboration with RRAs, are expected to come up with the financial and planning program for preserving the vast stretch of URRAP roads. Given the importance of roads' surface condition in sustaining increased transport activities, such a responsibility could prove to be a herculean task for the agencies to handle alone with their current capacity.

ERA has also identified foreign exchange deficit and lack of finances for further road projects as serious threats to the journey towards lower middle income status by 2025 (ERA, 2015). And even though appreciable finance from Development Partners (DPs) has been secured for the road sector over the past 20 years, international contractors have kept on undertaking mega road projects and precious foreign currency still keeps on moving away from the country. Furthermore, extra effort might be required from the Ministry of Transport (MoT) and Ministry of Finance and Economic Cooperation (MoFEC) in terms of policy dialogue as non-traditional DPs, particularly China, with some strategies and partnership policies that seriously differ from the approach of traditional DPs (such as: the European Union (EU); African Development Bank (AfDB); and the World Bank Group) are now taking the lead in financing large scale roads.

Additionally, the budget and focus balance between maintenance of existing roads on one hand and new construction on the other is still a long way from finding harmony. That is particularly magnified as the Office of Road Fund (ORF) which was established for the sole purpose of generating revenue through fuel levy to cover the cost of road asset preservation is barely doing enough in the sector. In stating so, the researcher realizes that there are not too many vehicles in

the country from which sufficient fuel levy could be secured annually for road asset management. But even so, the current level of revenue collection is below what one might expect given the current national motor vehicle fleet.

The issue of sound road network development policy evaluation schemes hasn't also received sufficient attention as the national road agencies keep on tracking progress through traditional and less reflective indicators such as road density which makes very crude assumptions like even distribution and importance of roads throughout the country. The pattern of settlement and socio-economic state of the country poses a unique challenge in keeping a good track record of progress made in the road network development process. And lastly, the targeted value of road density to be attained at the end of RSDP V which was originally set by ERA as part of the nation's quest to join the list of lower middle income countries seems to be oversimplified from planning point of view.

#### **1.4. Research Questions**

- Were the timing of focus on rural connectivity and goals set out in those roads realistic?
- Are WROs and RRAs capable of owning Woreda roads?
- Are the current construction methodologies for rural roads sound and suitable in the context of Ethiopia?
- How indicative and realistic are road network development values suggested for Ethiopia?
- Can the current oversimplified target set for 2020 be a guarantee for 'lower middle income' status?
- How has the RSDP's financial planning depended on donor support over the years 1997-2016?
- Has the local sector, particularly indigenous contractors, been enjoying a fair share of the huge investment made in roads throughout the RSDP?

## 1.5. Objectives

### 1.5.1. General Objective

- Weighing the current road network development policy in terms of: relevance; effectiveness; and sustainability.

### 1.5.2. Specific Objectives

- Analyzing and identifying the shortcomings in the inception, implementation and potential preservation of URRAP from an executive policy point of view;
- Assessing the current national road network size and quality indicators (road density, Rural Access Index (RAI) and condition of roads) and weigh them against those of bench marked countries. And pass on judgment on the proposed forecasted values put forward by ERA and see which indicator is best suited for tracking progress in Ethiopia's particular context; and
- Observing the trends in road network development funding arrangement/financial plans and present findings in tandem with long term implications by taking country partnership strategies and local contractors' participation into consideration.

## 1.6. Scope of Research

Policies that guide road network development are not a set of independent strategies in any nation's context. They are necessarily tied with other aspects of socio-economic performances. The immediate relevance of roads is in granting isolated communities access to social and administrative services, attracting investments towards resource rich remote areas and in essence, combating poverty. That makes these policies and the appropriate policy evaluation schemes interdisciplinary with political, social, economic and environmental dimensions, thereby requiring a huge multi-sectoral approach that could be handful to a single researcher. With this in mind, this thesis has been dedicated only to:

- Planning and implementation issues of rural roads (mainly because they play the greatest role in Ethiopia's road network development and connectivity as over 80% of the population resides in rural areas);
- Accuracy and Suitability of indicators used to evaluate progress made in road network development; and

- Funding arrangement in the huge investments (in terms of financier) needed for roads and the share of local contractors in this framework.

In doing so, the researcher has attempted to magnify the technical and management aspects of the evaluation of relevant road development issues (although very few other readily available interdisciplinary indicators such as national gross domestic product (GDP), debt absorption capacity and levels of urbanization might be involved in the analyses carried out for some objectives) within the framework of the RSDP. However, the link between roads and general sustainable growth/poverty alleviation are fairly elaborated in the Literature Review chapter.

The outlined objectives have been addressed based on Ethiopia's RSDP and road network progress that has taken place since 1997. As labeled in **Table 2.2**, five successive phases have been implemented under the RSDP with the first four spanning a duration of 18 years, i.e. from July 1997 up to June 2015. The fifth phase is currently well underway and is planned to have a total duration of five years with a little under three years to go for conclusion. And understandably, sufficient and full data is not available for this last phase. ERA, however, tried its best to assess the progress for the duration July 2015-June 2016. In conclusion, the research shall be bound between July 1997 and June 2016.

## **1.7. Research Limitations**

Associating road network development policies and more importantly, policy effectiveness evaluations with general poverty reduction, improvement in health care, surplus crop production, environmental conservation and the like could lead to a more inclusive conclusion. The fact that this paper does not include other cross-cutting socio-economic issues makes the methodology less flexible and the findings somewhat less holistic as the analysis should naturally be tied with the aforementioned socio-economic agendas. The majority of the objectives laid out at the outset of the research were designed to minimize overlapping with other disciplines as much as possible.

Secondly, not all aspects of transport policies and strategies are quantifiable. For instance, general planning and implementation approaches of rural roads are qualitative and intangible by nature. They are a set of principles which are not necessarily explained by a set of definitive numerical data. Under those circumstances, the research has attempted to assert and prove points through extensive qualitative discussions with the involvement of less figures.

Thirdly, as the research methodology has mainly relied on desk study based on secondary data (mainly because the information and data required for the outlined objectives can only be generated at the level of governmental or other capable institutions), there could be some rather significant differences in the values suggested by different agencies for the same parameters (such as road conditions, road densities, financial arrangements etc.). In such cases, extreme values will be neglected or be used with clear informative notes.

Fourthly, this research has not dealt with those diverse and indirect road network development measures such as the ones indicated on the MDGs/SDGs. Only Road density, RAI and road conditions, which are direct measures of access and traffic attraction have been considered. In doing so, only secondary data were utilized for the following reasons:

- Data from WorldPop which mixes census, survey, social media, and administrative data needs to be carefully integrated with updated satellite and other spatial datasets to produce high-resolution population distribution data, not to mention the need to exclude urban centers to come up with realistic RAI that measures accessibility of every 0.1km x 0.1km square of rural land. On a national context, urban centers might additionally be considered to determine overall access to all-weather roads. And understandably, the technical advances and approaches are beyond the capacity of the researcher for primary data assessment;
- The current road network is well over one hundred thousand kms which does not allow for road condition assessment of sampled roads without incurring too much cost; and
- The population and land size of the Ethiopian Regions, which are the bases for road density analysis, are found at a number of different national agencies and can be used with great confidence.

Lastly, although there are a number of investigations conducted in the field, many of these studies were carried out by governmental agencies and other stakeholders ranging from DPs to some other affiliated institutions. In fact, it is safe to state that ERA is basically the core source of all basic data. The academic circle, as a result of insufficient and continually overlooked industrial linkage with ERA, is not actively involved in this spectrum of transport planning and so it is actually very difficult to find a neutral set of previous researches/data. In the case of Woreda roads (URRAP), it is even more difficult to find documents that are informative of its policy performance.

The researcher has tried his best to compensate the severe lack of policy performance evaluation documents by interviewing experienced independent transport planners and few ERA experts.

## **1.8. Thesis Organization**

The research report is organized into six separate chapters:

### **Chapter 1: Introduction**

The importance of robust road network development policies and a brief review of their performance evaluation is generally elaborated in this section. Particular areas of attention in previous researches are also highlighted. The motivation behind the research and problem statement are also included in this introductory chapter followed by guiding research questions and objectives. Lastly, the scope and limitation of the research are clearly stated in the last two sub-sections.

### **Chapter 2: Literature Review**

An in-depth and elaborate look at available documents which coincidentally have been prepared largely for the consumption of governmental agencies and policy makers is provided in this section. The major road network development policy issues and implementation evaluation aspects in the context of low income African countries are dealt with. National agencies, trends and practices in the Ethiopian context that are relevant to the subject matter are also elaborated.

### **Chapter 3: Research Methods, Materials and Procedure**

In this section, the nature of required data is elaborated along with the methods (such as interviews and desk review) of collecting them. Strategies for tackling the outlined problems and achieving the envisioned objectives are laid out.

### **Chapter 4: Research Data**

The most important and relevant set of data that are strongly related with the objectives at hand are summarized and put forward using tabular and graphical representations. These shall be used for further analysis in the upcoming Analysis and Discussion chapter.

### **Chapter 5: Analysis and Discussion**

The methods that have been specified in Chapter 3 shall be implemented on the set of data that have been presented in chapter 4. The researcher has incorporated results from previous similar studies (particularly for specific objective 2) to validate and compare potential meanings of the research within this chapter. This chapter leads to the main findings of the research.

## **Chapter 6: Conclusion, Recommendations and Areas of Future Study**

In the concluding section of the paper, main findings from chapter 5 shall be condensed and presented. Patterns observed, conclusions reached and remedies proposed shall also be presented in this chapter. Lastly, the researcher will briefly point out areas of concern for future study as observed from the view point of this paper's findings.

## CHAPTER TWO

### 2. LITERATURE REVIEW

#### 2.1. Introduction

Transportation helps in improving any area's socio-economic functionality and quality of life as it provides connectivity, enabling sustained and all-inclusive growth. Not only does the transportation system provide for the mobility of people and goods, but also influences patterns of growth and economic activity by providing access to productive lands and isolated communities. It is also multi-faceted and sensitive in that its performance affects public policy concerns such as environmental resource consumption, social equity, land use, urbanization, economic growth, safety and security (The Transportation Planning Process Key Issues, n.d).

Limited connectivity is a critical constraint in accessing socio-economic and administrative services, especially in rural areas where the majority of the African poor live.

*“Physical isolation is a strong contributor to poverty. Populations without reliable access to social and economic services are poorer than those with reliable access.”*

World Bank (2005:4)

Studies conducted by Mu and Dominique (2007); Khandker et.al (2011); and Stifel et.al (2012) discovered that rural access plays a significant role in alleviating the poverty of communities living in country sides. That is of great interest to Ethiopia as over four fifth of the nation's total population resides in rural areas.

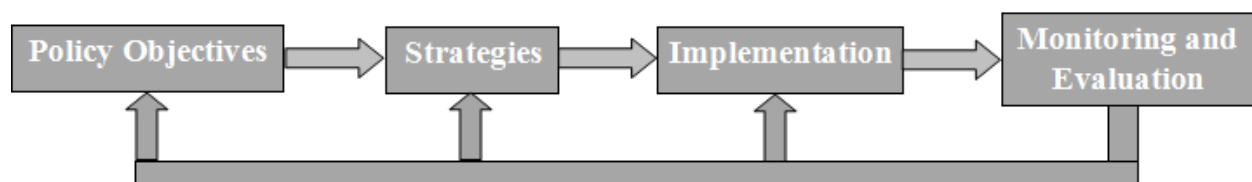
Robust transport planning policies are more than merely listing roads. They require developing as well as evaluating strategies for financing, constructing, operating, managing, maintaining and constantly monitoring an area's/nation's transportation system in such a way as to advance long term goals set out for that particular area/nation. Interestingly enough, transportation policy is just one segment in the entire economic, social, political and environmental context of any nation. It usually fits into a broader vision whereby it serves as a propeller to overall national interests. In simple words, road is a means, not an end by itself.

## 2.2. Policy Aspects of Sustainable Road Network Planning

Nowadays, there is growing interest in the concepts of sustainability, sustainable development and sustainable transport. Some of the developed nations have now arrived at saturation in almost all sectors of growth whereas developing nations are exhibiting non-holistic, non-all-inclusive and rapid growth susceptible to shock. Consequently, developing and underdeveloped nations shall not give the same priority to similar sustainability issues. The former should pay more attention to environmental conservation and the later should prioritize all-inclusive and resource efficient growth (Litman, 2016). That, however, does not mean that all-inclusive growth is exclusive of environmental conservation, especially in light of the fact that many developing Sub-Saharan African (SSA) countries are now suffering from the consequences of environmental disruptions which resulted from developed nations' ferocious industrial activities.

There are indeed numerous burning policy issues of transport planning for sustainable development which are of paramount significance to SSA countries. One such issue is limited connectivity that hinders all-inclusive growth while another equally important aspect is self-insufficiency to fund and properly preserve the road sector. Available budget usage is also inefficient to the most part. This inefficiency could manifest in cost and/or time overrun, incomplete and/or poor designs, inaccurate/unsuitable transport policy evaluation schemes, substandard quality of finished works and the like.

Policy development generally involves research, analysis, consultation and synthesis of information to define policy objectives. It also includes the establishment of strategies to guide and evaluate levels of implementation.



*Figure 2.1:* Key elements of an Effective Transport Policy (Source: Runji, 2015)

It is a well-established fact that transport policy objectives are largely consistent with broader national objectives. In most African countries, overarching transport policy objectives are

relatively similar in seeking to provide reliable, efficient, safe and affordable multimodal transportation infrastructure and services. According to Runji (2015), these objectives are more or less thoroughly acknowledged by policy-makers. According to the Public Works Department of the Government of Kerala (2009), some of the most robust objectives of a functional road network development policy include:

- Develop a sustainable road network that can sufficiently accommodate future traffic;
- Maintain the road network at an acceptable serviceable level throughout its life;
- Mobilize market resource along with increased generation of internal resources for joint development of road projects (construction/maintenance) with the participation of the private sector;
- Enhance quality of the network with a view to reduce transportation fees and vehicle-operating costs (VOCs); and
- Acquire land with better re-settlement and rehabilitation policy (Kerala Road Development Policy 2009-21, 2009).

Underdeveloped SSA Countries such as Ethiopia, usually encounter huge blows both at the implementation and progress evaluation stage of transport sector strategies. Airey (2014), suggested some of those reasons include but are not limited to:

- Inadequate human resources capacity;
- Unaffordability of transport strategies; and
- Inadequate prioritization frame work.

Generally speaking, some of the most important sustainable road network development policy issues relevant to Ethiopia and other SSA countries are mainly related with:

- Financial Planning and Programming;
- Policy Performance Measures/Indicators;
- Public and local sectors' Involvement; and
- Transportation Asset Management (Airey, 2014).

Each of the aforementioned policy issues, in association with Ethiopia's particular experience and performance, are discussed under *Section 2.4*.

## **2.3. Background of Road Network Development Policies in SSA Countries**

### **2.3.1. Introduction**

Numerous agencies, organizations and experts (engineers, economists, politicians etc.) have been supplementing the transportation sector through various researches focusing on sound transport planning policies and policy evaluation schemes. The road sector, as the most dominant mode of transportation on the African continent, has received due attention. Multiple case studies in the sector have been conducted in many SSA countries by the International Monetary Fund (IMF), EU, AfDB, World Bank Group, Development Assistance Group/DAG (partnership of 29 various bilateral and multilateral DPs) and Sub-Saharan Africa Transport Policy Program/SSATP (a vast partnership of 40 African Countries, 8 Regional Economic Communities, United Nations Economic Commission for Africa (UNECA), African Union (AU), Austria, France, Norway, Sweden, United Kingdom, Islamic Development Bank, AfDB and the World Bank Group).

These entities are much more critically involved in the sector than most academicians because they assist SSA Countries both financially as well as technically in nearly all aspects of development activities and so monitoring where their money goes and how effectively it is used is part of their job description. They also continuously monitor the changes each assisted country experiences as a result of assistance efforts exerted through various qualitative and quantitative mechanisms. And so, these studies and researches are practically motivated by equipping governments with proper inputs for putting dynamic road sector policies and evaluation schemes into place. Unfortunately, there has not been too much intersection with the academic world.

### **2.3.2. Current Challenges**

Policy makers in Africa, these days, face the challenge of sustaining the recently witnessed growth momentum by continuously adapting policies to a changing environment. Recent Gross Domestic Product (GDP) growth in Africa has been over 5% per annum although there might be outliers. This good economic performance has benefited from policy reforms in the transport sector over the last 20 years. Notable among such reforms were the introduction of dedicated road agencies and road funds managed by road fund boards or secretariats, the restructuring of railways and ports and the introduction of private sector management in their operations. While transport has made its contribution towards African growth, the overall outcomes at sector level, in comparison with the rest of the world remain characterized by high costs and sub-optimal services (Runji, 2015).

Another issue of great contention is the funding of road projects. The majority of SSA Countries have sought to increase the financial sustainability of road maintenance funding and robustness of road agencies. Some of the mechanisms include establishment of Road Fund Offices mainly for maintenance budget generation reasons on one hand and attracting more assistance (technical and financial) from donors on the other hand. Assistance from DPs are always accompanied by policy dialogues involving DPs themselves and assisted countries. All traditional DPs have their own set of strategies towards each assisted country and policy dialogue is the basic instrument in driving the relationship towards that goal. Furthermore, it allows DPs to understand the reform policies of assisted countries, identify as well as promote sustainable and all-inclusive socio-economic development (AfDB, 2013).

With Africa now attracting numerous international business firms from all over the world and road infrastructure being one such sector, an ever increasing number of international consultants and contractors are undertaking mega projects. Few African countries have recently been viewing this as an omen to the downfall of their local road sector industries and decreasing sense of ownership. Kenya, for instance, through its National Construction Authority, set ownership regulations that compel foreign contractors to form joint ventures with locals who must control at least a third of the value of the deal. The new rules (effective as of August 2016) apply to all new projects involving foreign firms. The indigenous ownership requirement is likely to cut Chinese firms' dominance in Kenya's construction industry, and hand a lifeline to local contractors who have in recent years been locked out of mega deals.

In conclusion, now is as crucial a time as ever for Ethiopia and other SSA countries to pay attention to formulating dynamic road sector policy strategies and setting up policy evaluation schemes with serious commitments so as to enhance an all-inclusive sustainable development in all aspects of socio-economic endeavors.

## **2.4. Review of Road Network Development Sectoral Policies in Ethiopia**

### **2.4.1. Ethiopia's Sector Spending**

Ethiopia is the second most populous country on the African Continent, nearing 97 million of which 81% lives in rural areas (estimated in 2016 by the World Bank), highly scattered around the country. Only six cities, i.e. Addis Ababa, Mekelle, Adama, Dire Dawa, Hawassa and Gondar, are believed to have more than 200,000 inhabitants each. The distribution of the population with one

main city and a high percentage of rural population dispersed throughout the nation's territory, brings about specific geographic patterns of production, consumption and distribution, which in turn have major influence on the local transport pattern. Moreover, Ethiopia's cross-border transport is strongly influenced by the fact that the nation is land-locked and its international trade is characterized by a huge imbalance between exports and imports (normally imported items' gross weight is over five times greater than exported goods) which indicates unbalanced road pavement wear in the opposing lanes of the import-export corridor. Low export has a direct impact on transport efficiency, with a high percentage of nearly empty trucks in the direction of the neighboring foreign ports (Clifton et. al, 2016).

Ever since 1997, but even more vigorously since 2007 (during the third phase of the RSDP), the GoE has identified the transport sector, especially road (but not limited only to roads) as a priority, allocating a lion's share of the national budget to it (more than 20% of actual expenditures). That is in essence equal to 4% of GDP on average. However, experts' analysis showed that emerging SSA Countries need to allocate about 0.8% to 1.4% of GDP to hold the transport infrastructure asset in a maintainable situation (Huale, 2015).

According to Gwilliam et.al (2008), even as early as 2008, spending on roads in SSA Countries stood just below 2% of GDP, with substantial variance among countries. This compares with the typical 1% of GDP in industrialized countries and 2-3% of GDP found in fast growing emerging economies.

Even though road sector reforms among SSA countries, in recent years, had focused on maintenance through organizational setups such as Road Fund Offices, there still were evidences of bias in capital expenditure whereby well over two thirds of total spending went to green/new projects. This imbalance is pronounced in countries without dedicated Road Fund Offices and characterized by rugged terrain (Runji, 2015).

In fact, as strange as it may sound, Chad and Ethiopia had registered better results in allocating the minimum amount of finances for rehabilitation during the first few years of the first decade of the 21<sup>st</sup> century (Gwilliam et. al, 2008). The fact that many African countries depended on Official Development Assistance (ODA) from donors for road construction has led to an ill pattern of public investment since these donors favor only green projects that can generate significant AADT.

As a highlight of how deep the problem is, it is possible to recall that until recent times 50% of

Senegal's road finances and 90% of Rwanda's public road investments used to come from ODA (Gwilliam et. al, 2008). One can imagine the intensity of backlog these countries face in the area of road asset management since maintenance has been overlooked for such a long period of time. Ethiopia's reliance on ODA for road investments stood at a relatively less alarming 20% over the last 20 years. The GoE, in recent years, has kept on building the nation's transportation infrastructure (rail, maritime, air and road modes) at an average 4% GDP allocation. Of this 4%, the road sector is highly unlikely to consume more than 3.0%. This figure is in turn consistent with the value put forward by many scholars as the average financial dedication to roads in emerging economies (Worku, 2011). *Table 2.1* below presents the transportation sector expenditure in Ethiopia between 2008/08 and 2013/14 as provided by MoFED (which is now MoFEC).

*Table 2.1:* Transport Sector Expenditure in Ethiopia 2007/08-2013/14 (in millions of ETB)

Year	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Transport Sector expenditure	8,608	10,444	15,102	19,863	29,576	35,227	41,071
Total GoE expenditure including external funding	46,915	57,775	72,598	93,943	124,416	154,010	184,974
Transport sector as % of total GoE expenditure	18.3%	18.1%	20.8%	21.1%	23.8%	22.9%	22.2%
GDP at 2015 market price	245,836	332,060	379,135	515,079	747,326	864,673	1,047,393
Transport sector as % of GDP	3.5%	3.1%	4.0%	3.9%	4.0%	4.1%	3.9%

Source: MoFEC, Macro Economics Department (2016)

### 2.4.2. Governing Policy Agencies in Ethiopia

The Ministry of Transport (MoT), which is responsible for managing and overseeing the national transport system, is composed of five main directorates (policy formulation & monitoring, strategic management, project and program coordination, transport logistics and sectoral capacity building) and supervises ERA, ORF as well as few other national agencies operating in the transportation sector (Worku, 2011). The Ministry has the following powers and duties:

- ensuring integration of provision of transport services in line with the country's development strategies;
- ensuring construction, upgrading and maintenance of transport infrastructures; and
- establishing/implementing regulatory frameworks that guarantee reliable and safe transport services.

ERA is the autonomous agency responsible for:

- initiating policies and legislations on roads, i.e. classification and designation of the road network, determination of road and bridge design standards, preparation of short and long term road development plans;
- undertaking feasibility studies, designs, construction and maintenance of highways, and take necessary measures for the safe use of highways and for the protection of the environment during construction works; and
- enforcing vehicle (axle) weight and size control regulations.

On the second responsibility, it is worth noting that the Authority no longer carries out design and construction works by its own force. Rather, it hires local/international firms to do the paper and physical works. However, it is solely responsible for overseeing the Federal Network and acts as the executing branch of the nation when comes to all Federal roads.

The GoE developed its own RSDP as early as 1997 in collaboration with long standing DPs including the EU, World Bank Group, AfDB and others. The Program extensively dealt with road network expansion and funding arrangements.

*Table 2.2:* Brief Highlight of the RSDP

RSDP Phase	Beginning	End	Duration (Year)
RSDP I	July 1997	June 2002	5
RSDP II	July 2002	June 2007	5
RSDP III	July 2007	June 2010	3
RSDP IV*	July 2010	June 2015	5
RSDP V	July 2015	June 2020	Ongoing

\*marks the beginning of URRAP

Source: ERA (2016)

The existing Road Transport Policy Statements and Strategies as outlined by ERA could be summarized as follows (ERA, 2015):

- Policy-1:** Upgrade the standard and improve the condition of existing roads to reduce transportation costs and encourage growth of Agricultural, Industrial, Mining, Tourism and Trade sectors and attain sustainable national economic growth.
- Policy-2:** Improve access to crop surplus and economic development potential areas to encourage investment on agricultural, industrial, mining and trade sectors and accelerate national economic growth.
- Policy-3:** Improve Implementation capacity of the sector.
- Policy-4:** Minimize and Mitigate social and environmental impact of road projects.
- Policy-5:** Integration with other infrastructure providing institutions and other stake holders.
- Policy-6:** Expand Express ways.
- Policy-7:** Improving the participation and capacity of women and youth in Road Development.
- Policy-8:** Strengthening Good Governance.

*Note:* There are some elaborate strategies behind each policy and these can be found on RSDP V. Policies 1 and 2 generally aim at improving accessibility through road network development (expansion and asset management) whereas Policy 3 focuses on strengthening the capacity of different public and private agencies involved in the transportation sector, all of which have been set out as target objectives in this research. Policies 4 through 8 shall not be dealt with.

It should be pointed out that formulating a set of good and sensible policies is one thing but it is entirely another thing to set up a configuration whereby the execution of each policy can be guaranteed and properly evaluated with accurate and reflective indicators. From such a perspective, it is understandable that developing nations such as Ethiopia, face severe limitations in terms of financial, organizational and professional capacities.

### **2.4.3. Financial Planning and Programming**

#### **2.4.3.1. Funding Trends**

Constructing and maintaining roads is not an easy investment. It requires a huge amount of expenditure with substantial foreign currency. The GoE, since the beginning of RSDP II, has allocated the lion's share of the total capital expenditure on road construction, indicating how serious the road sector is to the overall functionality of the economy (MoFEC, 2016). However, the required amount of investment capital has proven impossible for the GoE to cover independently. As a result, the government has kept on financing road construction and maintenance projects through loans and aids from multiple bilateral and multilateral DPs in addition to domestic revenue. On average, over the years 1997-2016, the largest share of finances for roads (nearly 81% of the total RSDP budget) has come from internal sources (including the GoE and ORF) followed by other traditional DPs (ERA, 2016). These include the International Development Association (IDA) of the World Bank Group, EU and AfDB who strongly believe that Ethiopia and Nigeria are the bases for changing Africa. That is particularly convincing as roughly two out of twelve Africans are likely to be Nigerian(s) and/or Ethiopian(s). Other donors include the Nordic Development Fund (NDF), Bank of Arab for Economic Development in Africa (BADEA), OPEC Fund for International Development (OFID) and the Governments of Japan, Germany, U.K, Ireland, the Saudi Fund for Development, the Kuwait Fund and the like.

A recent powerful player in the financing sector is the non-traditional Chinese Government with huge contributions in the infrastructure sector (Maria Ana d'Orey et. al, 2017). The Chinese government, between 2007 and 2016 invested USD 4.4 billion on roads and railways in Ethiopia, not to mention another USD 2.1 billion in the Energy sector. That made Ethiopia the second largest Chinese Infrastructure Aid recipient after Ghana. However, according to Jalata (2014), the Chinese Government, between 2005 and 2012 invested differently with 52% of its total commitment going

to energy generation and supply with transportation coming in second with 31%, followed by the industrial sector that received 12%. The remaining assistance went to other minor sectors.

#### **2.4.3.2. Policy Dialogue in terms of Road Financing**

As briefly discussed in *Section 2.3.2*, assistance from DPs is always accompanied by policy dialogue involving DPs themselves and assisted countries. However, some sensitive policy issues might fail in the process because affected groups face problems in getting organized or because of the absence of mutually binding solutions to policy reform issues (AfDB, 2013).

In the Ethiopian context, the MoFEC has the exclusive mandate to negotiate bilateral and multilateral assistance programs for the GoE (including regional state governments), as well as to scrutinize loan agreements prior to their approval by parliament. There are four directorates within MoFEC; the Bilateral, EU, International Finance Institutions and Ethio-China Directorates, with the last one created in response to China's increasing importance to Ethiopia's development. The DAG is responsible for dialogue with the GoE on development programming, policies and processes using formal government-donor dialogue structures. As mentioned in *Section 2.3.2*, the DAG is a group of 29 bilateral and multilateral DPs that provide development assistance to Ethiopia and many other African countries.

Road sector interventions and dialogue are coordinated within the framework of the RSDP and the Transport Sector Working Group (TSWG) which is co-chaired by the EU and MoT. It is the main forum for policy dialogue and plays a key role in closely reviewing the formulation and implementation of sectoral policies, analyzing results, identifying shortcomings and discussing possible ways forward. According to Maria Ana d'Orey et.al. (2017), the most active participants are AfDB and the World Bank Group whereas China and South Korea have so far shown no willingness to get involved in conversations that include members of the DAG.

This research strongly advocates the ever-growing theory that non-traditional DPs such as China, India and South Korea bring about specific challenges to the GoE in the form of both opportunity as well as hostile competition involving Ethiopia's long standing traditional DPs. Non-traditional donors, especially China whose presence is nowadays strongly felt, do not associate road funding with general poverty reduction or broader socio-economic policies. No clearly defined policies are in place for cooperation but many argue that the Chinese have adopted a mutually beneficial

approach (Hackenesch, 2011). Such an approach is highly repelled by traditional donors which frame all kinds of assistance with some socio-economic or political reform strategy. And so, very good policy formulations and negotiations need to keep on taking place so as to retain both groups of donors and minimize potential clash of partnership policies as much as possible.

#### **2.4.4. Policy Performance Measures/Indicators**

##### **2.4.4.1. Background Information**

Policy indicators are an essential part of modern age road asset management. The guiding rationale for having these measures is the fact that limited resources force allocation (of these resources) as effectively as possible among competing alternatives. And as such, the level of accomplishment registered in resource allocation shall be quantified progressively. The possible methods of quantifying improvement could range from calculating annual percentage increase in physical road length to estimating the economic improvement witnessed in the livelihood of the community as a result of roads.

Generally speaking, these indicators are supposed to be parameters which could come in the form of objectives, targets or thresholds to evaluate progress towards outlined policy objectives and goals. In most situations, no single indicator is adequate, and so an index (a set of indicators) should be utilized to reflect on levels of improvement (Litman, 2016). As an illustration, the following set of performance indicators are advocated by the Canadians (Haas et. al, 2009):

- Analysis of progress made in physical length, road distribution and ease of access to administrative and social services;
- Assessment of physical condition (in terms of level of service provided to road users such as surface smoothness, structural distress and adequacy, surface friction in relation with safety) and other various measures related to culverts, signs, fences, curbs, gutters and the like;
- Determination of asset value which can vary with accounting base such as in the case of financial and economic calculations; and
- Monitoring mechanisms for assessing policies in terms of their effectiveness and/or compliance with predefined policy objectives.

#### 2.4.4.2. Recent Studies in the Area

As important as policy evaluation schemes are, there are surprisingly few international indicators that systematically measure progress made in transportation connectivity. The traditional measures are physical length of roads and percentage of paved roads. The RAI has perhaps remained one of the most informative and yet continually debated global indicator for measuring access provided through road network development over the last decade. RAI estimation has relied on household surveys on a massive level and other modeling techniques (Roberts et. al, 2008). Such house hold surveys on the ground lacked spatial representativeness and due to the huge resources required, only few countries were investigated (Iimi et. al, 2016). The RAI was originally defined by the proportion of population that is within an approximate walking distance of 2kms to an all-season road. In 2006 it was found out that only 33.9% of the total population in SSA Countries was within the defined RAI (Roberts et. al, 2008).

In November 2016, The Transport and ICT Global Practice Team of the World Bank Group came up with a new RAI that included main determinants correlating roads with poverty and carried out researches in eight different countries: Bangladesh, Ethiopia, Kenya, Mozambique, Nepal, Tanzania, Uganda and Zambia. The approach used was significantly different from its predecessor in that household surveys were totally replaced by digitized road network and high-resolution population distribution data. The research aimed at identifying which policy measurement indicators were best suited in the particular context of each country. The results showed that for SSA Countries, road condition is actually one of the most accurate indicators along with road density (Iimi et.al, 2016).

Thoses results are fairly convincing as a significant number of road projects aim at maintaining, rehabilitating or upgrading existing segments so as to keep them functional enough to attract sufficient AADT. However, the national road agencies in Ethiopia have a tendency of clinging onto physical length and density of roads as their favorite indicators. ERA has set its focus on achieving an average road density of  $0.2\text{km}/\text{km}^2$  by the end of RSDP V. The researcher believes pursuing a preset value based on the average of other lower middle income countries is too oversimplified and some analyses have been carried out in Chapter 5 to point out the problems.

### 2.4.5. Role of Local and International Firms in the Road Sector

In Ethiopia, the road construction industry is dominated by Chinese contractors as shown by one hundred (100) large scale projects chosen for inspection by the EU at the end of the fourth phase of the RSDP, i.e. July 2015. Of the twenty two (22) major foreign contractors, fourteen (14) were found to be Chinese which by then had nearly 50% of the market share in value terms (Clifton et.al, 2016). However, the participation of local contractors also showed marked improvement in terms of number of contracts over the RSDP period (ERA, 2016).

**Table 2.3:** Share of Local and International Contractors in 100 Finalized Projects by 2015.

Type	Contractors (number)	Projects (number)	Road Length (km)	Contract Value (billion ETB)	Road Length (%)	Contract Value (%)
Chinese	14	35	2,631	41.3	41.4%	49.6%
Other Foreign	8	13	1,024	11.1	16.1%	13.3%
Local	31	52	2,697	30.9	42.5%	37.1%
Total	53	100	6,352	83.3	100%	100%

Source: EU (2016)

The average contract value per kilometer of road length as recently as two years ago, i.e. by 2015 stood at ETB 14.3 million for foreign contractors that were predominantly engaged in asphalt/paved road projects as opposed to ETB 11.5 million for local contractors who are believed to be mainly involved in gravel/unpaved road projects (Clifton et. al, 2016). Even though significant price increment has been witnessed in both kinds of projects since then, the small difference still remains unexplained as paved roads should cost significantly more than gravel roads. The reasons behind will definitely be great inputs in revising the national road transport planning policy, especially from the perspective of what could be done to strengthen local contractors' financial muscle.

Chinese contracting firms, with excellent communication and relationship among themselves, manipulate prices on bid documents in a winning manner on a continental level. When multiple project bids get floated simultaneously in different African countries, these firms collectively decide which firm should get a project in which country and accordingly submit winning prices in

a way that undermines the chances of other regular indigenous contractors (Thakur, 2009). There are also substantial evidences pointing to the fact that the Chinese Government offers incentives on a mega scale for its contracting firms so that they keep on securing more and more foreign currency and advance the State's overall agenda on the African continent which is to tap into a vast land, labor and consumer base (Besada H., 2008).

#### **2.4.6. Road Asset Management**

There is broad awareness at the Office of the Road Fund (ORF) and ERA's Road Asset Management Department that more needs to be done on maintenance, particularly on periodic preventive maintenance. At the beginning of the first phase of the RSDP (in 1997), ORF annually received ETB 320 million which gradually increased to ETB 1 billion per year during RSDP II. Ten years on, the annual allocation is only ETB 1.2 billion with some carry over budget not exceeding ETB 400 million. That puts its total annual fund at ETB 1.6 billion which is extremely alarming when one notices the budget has hardly shown any improvement in amount since RSDP IV was launched (See *Table 5.16*). By the end of 2014, the national motor vehicle fleet was estimated at about 500,000. But according to insurance data, the insured fleet is about 350,000, which is a relatively small fleet size for providing the road user charges needed for maintenance of the rapidly growing road assets (Clifton et. al, 2016).

*“The money which is seemingly saved by not maintaining roads is ultimately paid for by the users and the society. I call it the invisible tax, and the total cost to the economy is huge.”*

Levik (n.d:2)

Considering the fact that there isn't an appreciable number of vehicles in the country, the growth of the vehicle fleet and consequently, its fuel consumption in particular is of great importance for the improvement of the Road Fund (fuel levy) aimed at road maintenance.

The following simple calculation shows why the above trend is alarming.

Assume a low price of ETB 13.33 for a litre of fuel. In case of an imposed Value Added Tax (VAT) equal to 15% on fuel and a levy of ETB 2 per litre, then at least 4 Birr/litre, i.e.  $(0.15 \times 13.33) + 2$ , should flow to the ORF. Consequently, an insured national fleet of 350,000 (again underestimated through the exclusion of the remaining over 150,000 un-insured vehicles to calculate expected income with minimal expectation) operating motor vehicles traveling an

average of 30,000kms/year (10.5 billion veh-kms) at an average fuel consumption of 8kms/litre, would annually raise a total amount of ETB 5.25 billion ( $350,000 \times 4 \times 30000 / 8$ ).

This implies that, of the expected ETB 5.25 billion (calculated with minimalistic approach), only 30.5% reaches the ORF annually and barely any of this goes to URRAP roads which now account for a surprisingly significant portion (over 40%) of the national road network length-wise. Local authorities and Woreda Road Bureaus are expected to come up with the fund for URRAP roads maintenance which by 2015 stood at well over ETB 500 million annually.

AfDB sees the picture of ORF slightly differently as it claims that the revenue of the office increased by a factor of four between 2004/5 and 2013/14 (AfDB, 2015). However, official figures of the ORF show that the increment in disbursed amount was only threefold (W.T Consult, 2017). But one thing that is common to nearly all stakeholders in the sector is that the ORF is far from generating enough revenue for road asset management activities.

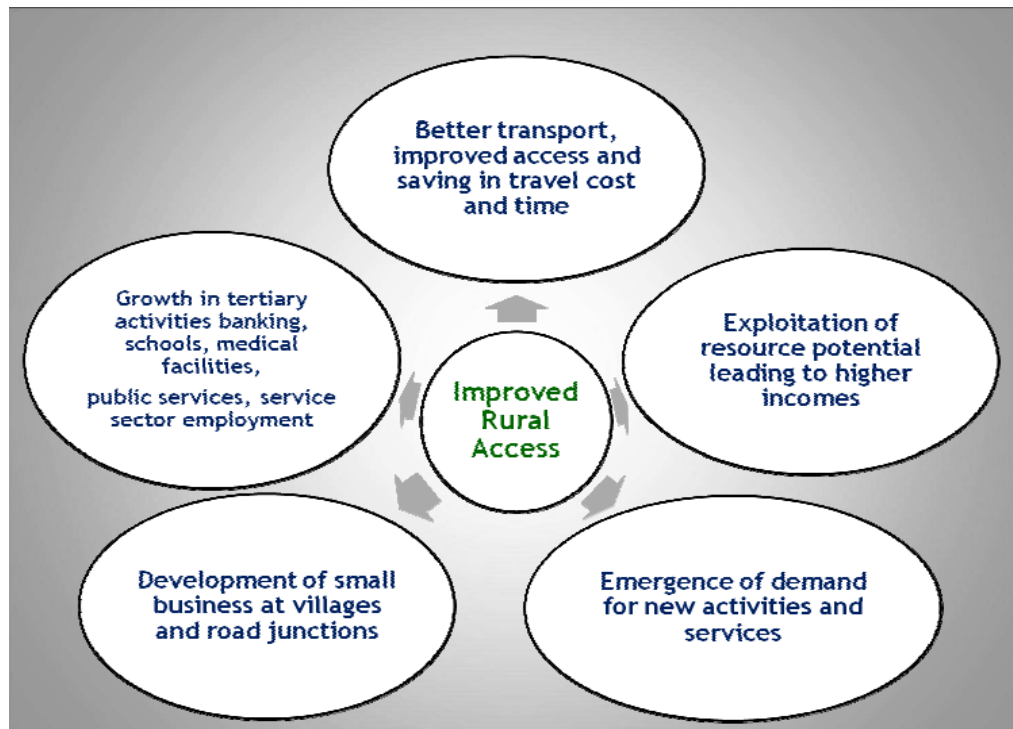
With regards to limiting damage to pavement, towards the end of RSDP IV, 180,000 vehicles (with a total of 800,000 axles) were checked for overloading and results indicated that the proportion of overloaded axles showed an appreciable decrease compared with that of RSDP III during which the share of illegally loaded trucks used to reach 30% (ERA, 2016).

## **2.5. Some Important Policy Findings on the Road Sub-Sector**

### **2.5.1. Rural Connectivity**

Ethiopia embarked upon the process of preparing a Rural Road and Transport Services Strategy after a seminar in 1992 that was attended by representatives of relevant ministries, Addis Ababa University (AAU), major donors and Non-Governmental Organizations (NGOs). Later on, experts of the World Bank Group came up with a draft of rural and transport strategy in May of 1996. By 1998, a document was prepared by an independent indigenous consultant of ERA to assist in setting future directions and developing consensus on rural road and transport in Ethiopia. Five years later, the multi-sectoral Ethiopian Rural Travel and Transport Programme (ERTTP) that placed equal emphasis on both constructing roads and providing social services to rural areas was tried on a pilot basis under the ownership of the Ministry of Works and Urban Development (MoWUD). The successor to this program, i.e. URRAP project was envisioned seven years later.

URRAP was supposedly expected to be a key tool in the transformation of the overall road network expansion over the past few years.



**Figure 2.2:** Interaction of rural connectivity with socio-economic agendas (Source: Irigoyen, 2016)

*“The Mission of URRAP is to connect all Kebeles by all-season roads and provide year round access, and that all road infrastructure will be appropriate to meet the needs of the rural communities and will be affordable to build and maintain.”*

Excerpt from WT Consult in association with Assefa Addisu Consult (2014)

During the fourth phase of the RSDP in which the URRAP program was launched, all projects were handed over to small scale contractors and consultants that were specifically formed for the purpose of URRAP without any kind of competitive bidding (ERA, 2016). Individual contractors were randomly put together to form enterprises by the RRA. The Federal Government, through MoFEC allocated financial resources (under the category MDG support budget) to all regions based on their respective number of zones. In some regions where the labor-based contract reportedly failed, the Woredas further supplemented the allocated budget by raising funds from the local farmers and mobilizing the community for an-all out physical labor. In those cases,

contractors were mainly endowed with the responsibility of gravelling/surfacing and structures' works (Tsegaye, 2014).

### **2.5.2. Other Cross-Cutting Issues**

In 2008, the EU organized and funded the comprehensive National Transport Master Plan Study (NTMP study) dealing with formulating: (i) a strategy for sustainable planning; (ii) an investment and action plan for all modes of transport; (iii) legal, social, environmental and road safety issues; and (iv) a National Transport Model. Unfortunately, the MoT underwent a re-establishment process whereby its agencies got reshuffled in 2010 and the NTMP never reached the stage of being owned by the MoT. In fact, it was later on overtaken by the Federal Road Network Master Plan and the Analytical Work on Transport Sector in Ethiopia (Clifton et.al, 2016).

Institutional reforms became more effective at the beginning of GTP I (2010) and consisted of the separation of the policy, planning and regulatory functions of ERA from physical (Force Account) works implementation, with the latter assigned to the newly created Ethiopian Road Construction Corporation (ERCC). Both ERA and ERCC, as well as the ORF came under the control of the MoT whereas previously ERA used to report to the MoWUD.

Transport Sector Management is primarily the responsibility of the MoT, which in contrast with ERA, has so far received little capacity building support in the form of technical support. All agencies (MoT, ERA, ERCC and FTA) are subject to government civil service rules and have great problems with recruiting and retaining professionally qualified and trained staff. However, ERA, with a tradition of some capacity building since the start of the first phase of the RSDP and ERCC as a young and ambitious agency with Chinese training opportunities, appear to be more attractive to young engineers than the FTA and ERCC (Worku, 2011).

## **CHAPTER THREE**

### **3. RESEARCH METHODS, MATERIALS AND PROCEDURES**

#### **3.1. Introduction**

Areas of concern for this particular research are clearly outlined in the first portion of this chapter. In subsequent sections, the research has attempted to magnify the policy and policy evaluation aspects of road network development. Targeted documents, data and personnel are listed in the Data Collection Section whereas the combination of methods to be used to arrive at some definitive conclusions are presented in the Data Analysis Section.

#### **3.2. Study Area**

As part of the RSDP which was launched by ERA in 1997 with different phases, a total of 1,358 projects were executed amounting to 128,470 kms on a national level (ERA, 2016). RSDP V is a strategy which is currently being employed as part of the government's ambitious multi-sectoral plan to uplift the nation to the status of 'Lower Middle Income' by 2025 (MoFED, 2010; and National Planning Commission, 2015). It is also a key role player in achieving the MDGs/SDGs as briefly mentioned in the last portion of *Section 1.1* and it works in tandem with the major road infrastructure policies set in motion by ERA (See *Section 2.4.2*).

ERA, which is the executive branch of the government in road network development, is responsible for overseeing those projects undertaken by the Federal Government whereas the RRAs and WROs are mainly endowed with the responsibility of following up non-Federal Regional roads and Woreda/URRAP projects respectively. It is worth noting that URRAP projects, with the vision of connecting all Kebeles within Regional Woredas, were included in the road sector transformation plan during the fourth phase of the RSDP whereas Regional roads existed since the very beginning of the first phase of RSDP.

With regards to funding, it is estimated that approximately twenty percent (20%) of the entire RSDP finance came from DPs such as the EU, the World Bank Group, AfDB and later on the Government of China closely working with the GoE in different aspects of road network development policy strategy formulations (ERA, 2015). All the objectives of this particular study have been addressed based upon the RSDP which is still ongoing having begun in July of 1997.

But for the reasons mentioned in *Section 1.6*, the research shall be bound between July 1997 and June 2016.

### **3.3. Study Design**

#### **3.3.1. General**

This paper is mainly intended to promote the policy aspect (policies themselves and policy evaluation schemes) of road network development planning. One of the critical issues in Ethiopia, in much the same way as other African countries, is failure of executing road network development plans with control and treatment groups, let alone take reliable baseline data in such groups. Such negligence halts policy effectiveness evaluation measurement efforts (Grootaert, 2002). This in turn, requires developing nations to re-examine their data generation and access policies and work with DPs to their mutual benefit (Stern et. al, 2012). Bamberger (2006) also endorses this approach and stresses the importance of actively involving universities, think tanks (group of experts brought together by governments) and research institutions in the evaluation process (Bamberger et.al, 2006).

Conclusions in this research, to a significant level, have been reached based on a combination of quantitative and qualitative analysis of policy performances. Generalized qualitative performance analysis could be drawn particularly for cases such as the following:

- The deficiencies in URRAP's timing, planning and implementations (which are Woreda-based) noted during the fourth phase of the RSDP cannot be definitively presented in terms of numbers alone as they need to be augmented with administrative findings that are qualitative in nature.

Thus, it is reasonable enough to state that this research embraces a combination of explanatory qualitative method and quantitative analytical approach. As advocated by Stern et.al (2012), much of these seemingly intangible/unquantifiable aspects of policies could systematically be tackled with the involvement of the academic world and a widened dissemination of raw data beyond the immediate circle of interested parties (Stern et. al, 2012). In *Section 3.3.2*, policy evaluation indicators that can be quantitatively delivered are presented.

According to Bamberger et. al (2009) and OECD-DAC (1991), for the kind of objectives that have policy implications on a national level such as the ones listed on this thesis, there are four major approaches that have been used on a global scale to date:

1. The Monitoring and Evaluation (M&E) is carried out by M&E unit of the sector or subsector managing the project and within the context of Ethiopia, that would be the M&E branch of ERA. This usually has the advantage of better access to key stakeholders, secondary data along with a better understanding of the political and organizational context in which the evaluation takes place. But more often than not, M&E is focused on progress and performance monitoring which has a strong engineering and contractual bias manifesting in limited statistical/econometric techniques. These limitations need to be addressed by appropriate technical support. More importantly and as the researcher would like to emphasize, this approach will have difficulty in maintaining its independence since the evaluation team is invariably affected by the politics of both the Ministry and Government and may find it impossible to deal with and present candid findings on sensitive issues.
2. Evaluation is carried out by a national organization/body (such as a research institute or university). Theoretically, this approach would still have access to key stakeholders and secondary data etc. but practically it is very unlikely and troublesome. Compared with the first approach, this one will maintain an improved level of independence, will bring in experience from other sectors and also explore sensitive issues such as local political pressures or the exclusion of vulnerable groups etc. This approach is hardly used in Ethiopia, especially in light of road network development policy evaluations.
3. Evaluation services with the required mix of national and international consultants are procured and managed by the sector. This is the more common approach to address the capacity and resource weaknesses of the previous two but information asymmetry makes it difficult to manage the contract. Therefore, technical assistance may be needed to prepare terms of reference and contract documents and evaluate the tenders as well as monitor performance and peer review the analysis and findings. The researcher is convinced that ERA has shown inclination towards this method as it has regularly procured international and local consultants to assess policy performances over the last ten years.

4. The evaluation is led by DPs supporting the sector who take full responsibility for the approach and findings. This approach is likely to produce the best product for DPs themselves but according to Airey (2014), limited involvement of local stakeholders and partial knowledge-transfer will always be there as disadvantages (Airey, 2014). Some experts have their doubts about how beneficiary assisted countries could be with this approach.

With some documents assembled using Techniques 2 and 4 at hand as platforms, it is possible to carry out a separate synthesis of available and/or processed data and cross-check findings. Some of the objectives of this research have not been readily dealt with in such documents and so reliance on some other literature was found to be necessary.

### 3.3.2. Specific

Specifically, a number of policy performance indicators/measures and trends that will help in addressing the outlined objectives have been targeted for analysis as stated in *Table 3.1* below.

*Table 3.1:* Specific Indicator Requirements

Policy Performance Indicators and Trends	Important Citing
Rural roads planning and implementation indicators, particularly URRAP under RSDP IV as per <i>Section 3.4.1</i> *	<ul style="list-style-type: none"> <li>• Terefe (2012);</li> <li>• Nesbitt. Et. al (2012); and</li> <li>• S'phumelele Lucky N. et. al (2016)</li> </ul>
Accuracy of connectivity measures, i.e. road network size and quality indicators	<ul style="list-style-type: none"> <li>• Bell et. al (2012); and</li> <li>• Khandker et. al (2011)</li> </ul>
Financing trend of roads throughout the RSDP (Measure of self-sufficiency) and capacity of the local sector	<ul style="list-style-type: none"> <li>• Maria Ana d'Orey et. al (2017);</li> <li>• Tempo, F. ( 2003);</li> <li>• Tucker, V. (1999); and</li> </ul>

\*Subject to qualitative assessment to the most part

### 3.4. Data Availability and Sampling

As briefly mentioned in *Section 3.2*, the focus of this research is basically the road network development policy performance that had taken place from 1997 up to 2016. Therefore, the data required for analyzing/addressing the outlined objectives for the first four phases of the RSDP are more or less available. The majority of previous studies and researches carried out in the sector

are at organizational and governmental level. Individual and independent researchers were apparently not as active in the area as they normally were in other subject matters.

Documentation regarding policy performance issues of URRAP (which begun with the fourth phase of the RSDP) has barely been exercised, even by ERA. The fifth phase of the RSDP that begun in July 2015 is still not expected to come to an end for another three years. However, few measures that are indicative of its progress up to June 2016 were quantified by ERA in its 'Nineteen Years Assessment of the RSDP'. Other agencies, particularly DPs have not yet evaluated RSDP V to any substantial level, largely because the majority of projects and reforms that were launched have not been concluded. It is true that these DPs, from time to time, carry out mid-term project execution evaluations but do not disclose them instantly. The research largely relies on ERA's providences and to a certain limit, on the findings of ERA's independent consultant for the period between July 2015 and June 2016. For the remaining time period, i.e. July 1997 up to July 2015, information and findings presented by DPs, ERA, other agencies and independent consultants shall be used in combination.

### **3.4.1. The Case of URRAP (Rural Connectivity)**

#### **3.4.1.1. Planning Phase**

The first specific objective of this paper deals with planning policy issues of URRAP. There are numerous WROs all over the nation that oversee such projects within their respective territories. The planning aspect of URRAP could be generally scrutinized for the entire nation mainly because the plan was condensed into brief documents aiming at similar objectives in almost all regions of the country. Important planning research questions apply to all regions that are exercising the program with the exception of Afar and Somali Regions which have basically rejected the idea of URRAP.

#### **3.4.1.2. Implementation**

Observing implementation evaluation in each one of the nine regional zones would be too wide and less thorough for this thesis as there are also other objectives to be pursued. As can be seen on *Table 3.3*, there are numerous Woredas within each region and their implementations vary indefinitely. WROs act as autonomous entities with nearly zero interference from ERA. Narrowing

down the main implementation issues to one particularly large region could lead to a more exhaustive analysis. Accordingly, Oromia Region was selected based on the following criteria:

- The Region is the largest by territorial area and population size on the Ethiopian land as presented in *Tables 3.2* and *3.3*;
- URRAP projects in the Region are eventually likely to contribute the highest percentage to the national road network development;
- More number of zones, and thus more number of URRAP projects exist there; and
- The budget allocation the Federal government, particularly MoFEC, exercises for all regions is similar as all financial resources come from MDG support budget. However, contractual approach of regions might vary as some resorted closely to the original labor-based approach while others have moved more towards an equipment-based method. The issue of construction methods is thoroughly dealt with under *Section 5.1.2*.

A second sampling is also necessary to come up with the number of zones to be inspected. In this regard, sampling was done on an already existing frame which was designed by ERA for nearly the same purpose as the first specific objective of this thesis. Accordingly, South West Shewa, Jimma, Buno-Bedele, Ilubabor, East Wollega and the Special zone of Sebeta were randomly selected (ERA, 2017). The sampling technique is justified as it is virtually equivalent with a probabilistic approach of picking every third zone out of a total of eighteen. The sample size was also fairly navigable in financial terms for the team that set out to carry out URRAP implementation assessment and identify major problems that were encountered by the implementing Woredas during the fourth phase of the RSDP.

The researcher did not conduct site investigations himself, but rather depended on the findings of ERA's independent consultant that undertook the assignment of evaluating Oromia Region's URRAP implementation through a field visit that included close inspection of rural roads (both ongoing and completed). The team carried out its task between June 28 and July 7, 2017. Methods of complementing the findings with primary data are described in *Section 3.5*.

*Table 3.2: Population Projection of Selected Years by Region*

No.	Region & Municipality	2007	2012	2017	2022	2027	2032
	<b>Country Total</b>	<b>73,918,505</b>	<b>84,020,599</b>	<b>95,478,200</b>	<b>107,880,104</b>	<b>121,991,675</b>	<b>137,656,199</b>
<b>1</b>	Tigray	4,314,456	4,881,411	5,501,337	6,163,770	6,899,217	7,692,266
	%	5.84	5.81	5.76	5.71	5.66	5.59
<b>2</b>	Afar	1,411,092	1,573,294	1,757,568	1,950,028	2,161,444	2,386,409
	%	1.91	1.87	1.84	1.81	1.77	1.73
<b>3</b>	Amhara	17,214,056	18,727,852	20,514,853	22,209,406	24,043,932	26,029,992
	%	23.29	22.29	21.49	20.59	19.71	18.91
<b>4</b>	Oromia	27,158,471	31,214,531	35,801,173	40,822,810	46,594,218	52,974,740
	%	36.74	37.15	37.50	37.84	38.19	38.48
<b>5</b>	Somali	4,439,147	5,047,035	5,721,399	6,441,723	7,245,652	8,118,123
	%	6.01	6.01	5.99	5.97	5.94	5.90
<b>6</b>	B/Gumuz	670,847	777,696	895,444	1,028,025	1,179,089	1,347,097
	%	0.91	0.93	0.94	0.95	0.97	0.98
<b>7</b>	SNNP Region	15,042,531	17,353,928	19,903,902	22,739,999	25,954,913	29,509,128
	%	20.35	20.65	20.85	21.08	21.28	21.44
<b>8</b>	Gambella	306,916	375,209	450,346	542,667	652,653	778,899
	%	0.42	0.45	0.47	0.50	0.53	0.57
<b>9</b>	Harari	183,344	208,317	236,843	269,276	306,150	348,298
	%	0.25	0.25	0.25	0.25	0.25	0.25
<b>10</b>	Addis Ababa	2,738,248	3,363,654	4,131,902	5,075,614	6,234,866	7,658,889
	%	3.70	4.00	4.33	4.70	5.11	5.56
<b>11</b>	D/Dawa	342,827	387,877	438,848	496,516	561,762	635,582
	%	0.46	0.46	0.46	0.46	0.46	0.46
<b>12</b>	Special Enumeration	96,570	109,794	124,586	140,271	157,777	176,775
	%	0.13	0.13	0.13	0.13	0.13	0.13

Source: KDEC/KOTI/CWCE & CSA (2012) with analysis result

Table 3.3: Woreda and Population Distribution by Region

No.	Region and Municipality	Number of Zones	Number of Woredas		Population as of 2012 (Estimated)		Population Density (person/km <sup>2</sup> )
			Rural	Urban	Size	%	
	<b>Ethiopia</b>	<b>69</b>	<b>676</b>	<b>79</b>	<b>84,020,599</b>	<b>100</b>	<b>76.0</b>
1	Tigray	6	34	13	4,881,411	5.8	97.4
2	Afar	5	30	0	1,573,294	1.9	20.4
3	Amhara	11	128	9	18,727,852	23.3	117.6
4	Oromia	18	265	40	31,214,531	36.7	81.2
5	Somali	9	53	0	5,047,035	6.0	23.3
6	B/Gumuz	3	20	0	777,696	0.9	15.5
7	SNNP	13	134	16	17,353,928	20.4	152.6
8	Gambella	4	12	1	375,209	0.4	13.7
9	Harari				208,317	0.2	-
10	Addis Ababa				3,363,654	3.7	-
11	D/Dawa				387,877	0.5	-

Source: KDEC/KOTI/CWCE and CSA (2012)



Figure 3.1: Map of Sample Oromia Region (Source: <http://www.ocha-eth.org/Maps/downloadables/OROMIYA.pdf>)

### 3.4.2. Road Network Development Policy Goals and Performance Schemes

This is one of the three important specific objectives of the research which has completely relied on quantitative analysis. As briefly mentioned in *Section 1.4*, (bullet point number three), some important countries have been benchmarked as references for the Ethiopian road network to follow after and these countries are: Brazil, China, India and South Africa.

**Note:** Referencing is not based on current day road network size and quality indicator. Rather, comparison is based on past road condition when these countries joined the list of Lower Middle Income Countries. Additionally, countries other than the aforementioned ones were taken into consideration by ERA while coming up with an average value of road density to be pursued (ERA, 2015).

However, the researcher does not believe the conditions of this group of countries can accurately be sought after for the following reasons:

- their levels of urbanization and rural communities' settlement configuration could be significantly different from Ethiopia's; and
- their patterns of production, foreign trade policies, value and quality of export goods and modal blend could be quite different from the Ethiopian context.

Some typical countries that could help the research are listed in *Table 3.4* on the following page.

**Table 3.4:** List of Countries that passed through the 'Lower Middle Income' Status in Recent Years

<b>List of Countries that passed through the Lower Middle Income Status</b>	
Albania	Iraq
Algeria	Jamaica
Angola	Jordan
Armenia	Kazakhstan
Azerbaijan	Kiribati
Belarus	Lesotho
Bolivia	Macedonia
Bulgaria	Micronesia
Cameroon	Moldova
Cape Verde	Morocco
Colombia	Namibia
Congo	Nicaragua
Cuba	Paraguay
Djibouti	Peru
Dominica Republic	Philippines
Ecuador	Samoa
Egypt	Serbia
El Salvador	Sri Lanka
Fiji	Suriname
Georgia	Swaziland
Guatemala	Thailand
Guyana	Tonga
Honduras	Tunisia
Indonesia	Turkmenistan
Iran	Ukraine

Source: World Bank (2006) as presented in Clifton et. al (2016)

### 3.4.3. Road Financing Trends and Local Sector's Participation

As described in *Section 1.5.2*, this is the third specific objective of the research and shall receive due attention. The GoE has been funding the road network development program through two basic approaches as follows:

- From internal revenues: the GoE and ORF; and
- Long term loans and concessional grants from various bilateral and multilateral DPs.

The contribution of some of the more influential financiers shall be thoroughly investigated in tandem with governing **Country Partnership Strategies**. It needs to be pointed out that not each DP is led by a set of well-known and documented partnership strategy. Some of the most traditional DPs, however, have guiding policies in partnering with any developing nation, not to mention their fully functional mega offices in the capital cities of almost all assisted countries. They are also involved in monitoring Ethiopia's progress in the sector through: feasibility study of proposed roads; individual project execution mid-term and completion assessments; policy formulation assistance; technical training and the like. These activities could be considered as high quality information sources for the selection of the following DPs through 'expert sampling' technique (Gall et. al 2003). The most traditional DPs are:

- AfDB;
- IDA of the World Bank Group; and
- European Union.

Their involvement is of great depth that they are relevant enough to participate in countries' policies inception. That is of particular interest to this paper as the research has set policies and strategies as pillars of the research. For further details, see *Section 2.4.3.2*.

In recent times, the questions of 'What works?' and 'For whom does it best work?' have been receiving an ever increasing attention from both DPs and assisted SSA Countries (MoFEC, 2016). *Table 3.5* illustrates the major DPs that have been involved throughout the RSDP since 1997.

**Table 3.5:** List of RSDP's Financiers

<b>Major Financiers of the RSDP (since 1997)</b>	
GoE	OFID
Road Fund*	Germany
Community**	BADEA
World Bank	Saudi Fund for Development
European Union***	Kuwait Fund
China	Abu Dhabi
African Development Bank	Various
Japan	

\*Disbursement to Municipalities shall be acknowledged.

\*\*Contribution is in both cash and labor for URRAP projects.

\*\*\*Sector Budget support contribution will be considered.

Source: ERA (2016)

With regards to the local sector's participation, there is no need for sampling as the share of all indigenous contractors on one hand and international contractors' on the other can be scrutinized within the frame work of the entire RSDP, i.e. from 1997 up to 2016.

### 3.5. Data Collection

The research has adopted two commonly used basic mechanisms of data collection:

- Primary data through interviews; and
- Secondary data through review of official documents.

Information valuable to all three specific objectives were gathered through a combination of the above two data collection procedures.

An official letter describing the title and objectives of the research signed by the Dean of the School was used to address each expert both during interviews and document gathering. **Table 3.6** illustrates the qualities and expertise the researcher looked for in the targeted professionals relevant to the subject matter at hand. In all cases, semi-structured interviews that aimed at seeking answers to the questions in **Table 3.10** were exercised. The questions forwarded to each expert were in line with their areas of expertise.

**Table 3.6:** Brief Look at Interviewees

Organization	Full Name	Position	Area of Expertise
ERA, Planning and Program Management Directorate	Mr. Yetimgeta Asrat*	Director	<ul style="list-style-type: none"> <li>Overall Road Network Development Planning</li> </ul>
ERA, Program Monitoring and Evaluation Department	Mrs. Konjit Alemu	Department Manager	<ul style="list-style-type: none"> <li>Major: Policy performance evaluations at Federal level.</li> <li>Minor: Policy Performance evaluations at Woreda level.</li> </ul>
ERA, URRAP Technical Assistance Team	Mr. Abiy Eguale	Team Leader	<ul style="list-style-type: none"> <li>Planning and Implementation of URRAP/regional and Woreda level performance.</li> </ul>
W.T Consult (ERA's and DPs' independent consultant)	Mr. Teferra Mengesha**	Owner and General Manager	<ul style="list-style-type: none"> <li>Federal, Regional and Woreda level policy performance evaluation</li> <li>Funding Arrangement</li> <li>DPs' Country Partnership Strategy</li> <li>Other cross-cutting issues.</li> </ul>
Afro Consult & Trading P.L.C (ERA's and ERC's independent consultant)	Mr. Yusuf Ahmed***	Owner and General Manager	<ul style="list-style-type: none"> <li>Federal, Regional and Woreda level policy performance evaluation</li> <li>Funding Arrangement</li> <li>DPs' Country Partnership Strategy</li> <li>Other cross-cutting issues.</li> </ul>
AfDB, Ethiopia Country Office	Mr. Eriso Gerbado****	Regional Branch Manager	<ul style="list-style-type: none"> <li>Road Network Development Funding arrangements</li> <li>Country Partnership Strategy</li> </ul>

\*Played a key role by allowing the researcher access to ERA and its experts

\*\*Contact was created through the researcher's advisor

\*\*\*Contact was created informally

\*\*\*\*Was unavailable

Source: Researcher's Methodology

With regards to secondary data, *Table 3.7* illustrates an overview of essential documents which were deemed necessary for this research.

*Table 3.7:* List of Secondary Data required by Source

Source Organization	Document/ Nature of Document
ERA, Planning and Management Directorate.	<ul style="list-style-type: none"> <li>• Road Sector Development Program, 19 Years Performance Assessment (2016).</li> <li>• The Road Sector Development Programs, Phases I-V (1997, 2007, 2010, and 2015).</li> </ul>
ERA, Planning and Management Directorate in collaboration with KDEC/KOTI/CWCE.	<ul style="list-style-type: none"> <li>• Federal Road Network Master Plan (2012).</li> </ul>
ERA, Monitoring & Evaluation Dept' in collaboration with W.T Consult.	<ul style="list-style-type: none"> <li>• RSDP Performance and SDGs/MDGs Transport Indicators 2015/16 (E.F.Y 2008), Final Report (2017).</li> </ul>
ERA, URRAP Technical Assistance Team.	<ul style="list-style-type: none"> <li>• Technical Cooperation Program for the Ethiopian Road Sector Development Program, URRAP Field and WRO Visit that took place between 28<sup>th</sup> June and 5<sup>th</sup> August 2017 to Amhara, Tigray, Oromia and Southern Nations Nationalities and Peoples (SNNP) Final Report (2017).</li> <li>• URRAP/Woreda Road Development Plan (2010).</li> </ul>
W.T Consult for ERA	<ul style="list-style-type: none"> <li>• Rural Road and Transport Strategy (1998).</li> </ul>
ERA, Information Communication Directorate, Software System Team	<ul style="list-style-type: none"> <li>• Geographic Information System (GIS) based Road Network Data (Inventory) for rural connectivity case study Region, i.e. Oromia (2017).</li> </ul>

Source Organization	Document/ Nature of Document
AfDB, Ethiopia Country Office	<ul style="list-style-type: none"> <li>• Ethiopia Country Strategy Papers (Multiple years).</li> <li>• Independent Policy Performance &amp; Bank Intervention Evaluation papers.</li> </ul>
World Bank Group, Addis Ababa Office	<ul style="list-style-type: none"> <li>• Ethiopia Country Partnership Strategy (Multiple years).</li> <li>• Independent Policy Performance &amp; Bank Intervention Evaluation papers.</li> </ul>
International Roads Federation and Public Domain Material, Central Intelligence Agency (CIA) World Factbook website, <a href="https://www.cia.gov/library/publications/the-world-factbook/index.html">https://www.cia.gov/library/publications/the-world-factbook/index.html</a> .	<ul style="list-style-type: none"> <li>• Benchmarked Countries Road Network Information.</li> </ul>
Online sets, other governmental and non-governmental agencies.	<ul style="list-style-type: none"> <li>• Indefinitely varying reports, journals, conference papers and working papers relevant to Ethiopia's road transport planning, policy, monitoring, evaluation, ODA, road network indicators, etc...</li> </ul>

Source: Researcher's Methodology

Some of the basic source organizations (as illustrated in *Table 3.7*) are DPs largely because they have been playing key roles in shaping up the nations road transport infrastructure planning policies as they have been involved in preparing the RSDP, offering technical

assistance, funding hundreds of road projects and monitoring the nation's overall progress in the sector through their own experts working in collaboration with the GoE. Furthermore, the researcher believes data collected from these organizations will greatly help in maintaining the neutrality of the research because some information gathered from local roads authority offices might be biased due to different reasons.

### 3.6. Data Analysis

#### 3.6.1. Analysis for General Objective

The analysis of the general objective is dependent on the findings of the specific objectives. Assessment on different attributes of Ethiopia's road network development strategies are based on scores assigned to different policy performance evaluation criteria described in *Table 3.1*. The attributes are:

- Relevance;
- Effectiveness; and
- Sustainability.

These three measures have been adopted from the standard evaluation criteria of OECD-DAC which historically have been extensively used by the AfDB in intervention evaluation. In fact, all five of the standard evaluation criteria include: relevance, effectiveness, efficiency, impact and sustainability (AfDB, 2015 and Clifton et. al, 2016). Detailed definitions of the aforementioned attributes are available on AfDB (2015) or <http://www.netpublikationer.dk/um/7571/html/chapter05.htm>. Although these attributes are commonly used for assessment of donor intervention, they can also be analogously applied to all transportation policy evaluation enquiries or critical questions indicated in *Table 3.10*.

However, as elaborated in *Section 1.7*, a multi-sectoral approach is not used in this research which really does not allow for impact and efficiency evaluations. In other words, in order to assess efficiency and impact, base line data before road reformations and after reformations need to be carefully evaluated, which in turn, call for a team of inter-complementary professionals. Therefore, this paper has not dealt with the last two evaluation criteria.

The following *Table 3.8* illustrates the approach and rating system used for assessment scoring. The concepts have been adopted from AfDB.

**Table 3.8:** Rating System

<b>Rating Level</b>	<b>Rationale for Rating</b>
Highly Satisfactory (6) (HS)	Overwhelming prevalence of positive aspects, with nearly zero flaws
Satisfactory (5) (S)	Marked prevalence of positive aspects, clearly outweighing negative aspects
Moderately Satisfactory (4) (MS)	Prevalence of positive aspects with some negative aspects
Moderately Unsatisfactory (3) (MU)	Prevalence of negative aspects, only partly compensated by positive aspects
Unsatisfactory (2) (U)	Marked prevalence of negative aspects, clearly outweighing whatever positive aspects
Highly Unsatisfactory (1) (HU)	Overwhelming prevalence of negative aspects

Source: AfDB, 2015

Each of the important specific indicators elaborated in **Table 3.1** shall be assessed for the qualities of relevance, effectiveness and sustainability based on the rating system indicated in **Table 3.8**. In very few cases, one or two of the qualities might fail to be relevant to some indicators. In those cases, the research ignores them and assigns 'Not applicable (NA)'. A simple average is then used to arrive at an aggregated value for each quality.

### **3.6.2. Analyses for Specific Objectives**

#### **Objective 1**

Previous researches/studies with objectives that are qualitatively similar with the first specific objective of this research have resorted to a combination of the following two basic analyses approaches (Clifton et. al, 2016; Maria Ana d'Orey et. al, 2017; Tadesse, 2014 and Terefe, 2012).

- Interview prominent individuals representing different stakeholders to find out the root problems of the subject at hand and use a logical frame work to arrive at some conclusive finding; and

- Assess the findings of different entities from existing documents and present discoveries either in a ranked manner or level of severity.

As the first specific objective deals with rural connectivity, the basic problems in planning and implementation shall be dealt with according to the following two sets of logical steps as the analyses for planning and implementation slightly vary. These steps are simply an extension of the common logical frameworks which were used by previous researchers and organizations cited at the beginning of this section.

The following logical sequence shall be used for planning analysis:

- Identify critical questions;
- Review documents and analyze secondary data in search of answers to these questions;
- Offer these same questions to interviewees; and
- Present answers in tandem with a rating assignment as per *Table 3.8*.

For implementation issues, the following logical sequence shall be applied:

- Identify problems and patterns observed in each sample zone in the selected Region;
- Identify non-intersecting findings that are peculiar to individual zones;
- Identify intersecting findings that are existent in two or more zones; and
- Assign a definite weight of importance to each finding based on how widely spread it is and trace it back to 'Effectiveness' quality (described at the beginning of *Section 3.6.1*) with an aggregated singular rating as per *Table 3.8*.

## Objective 2

In case of the second objective of the research, attention is given to the following:

- determining the level of accuracy and suitability of road network size and quality indicators in Ethiopia's context;
- assessing whether the average value of road density for lower middle income countries should be justifiably pursued; and
- weighing findings of the previous two points with an assignment (HS, S, MS, MU, U, HU) against relevance and effectiveness only. Sustainability is not strongly correlated with the objective.

There are a number of road network size, quality and general access indicators (Bell et. al, 2012; ERA, 2015; Khandker et. al, 2011; Limi et. al, 2016; Roberts et. al, 2008; S’phumelele Lucky N. et. al, 2016) as listed below:

- Road density (per area and/or per population size);
- Proportion of population within 2kms of reach to an all-weather road, RAI (based on ground survey);
- RAI (based on satellite survey);
- Proportion of gravel roads and paved roads; and
- Ratio of roads in good condition to roads in fair up to poor condition.

Previous individual and organizational studies have been carried out in search of a realistic value of the aforementioned indicators within the context of Ethiopia. **Table 3.9** hereafter presents summary of road network indicators comprising approach/indicator and important citing.

**Table 3.9:** Summary of Road network indicators

<b>Approach/Indicator</b>	<b>Important Citing</b>
RAI modeling and calculation	Clifton et. al, 2016; Limi et. al, 2016; Nesbitt et. al, 2014; Purdie et. al, 2016, Roberts et. al, 2008; and W.T Consult, 2016
Road density calculation	ERA, 2015; ERA, 2016; KDEC/KOTI/CWCE, 2012; and W.T Consult, 2016.
Road conditions assessment	AfDB, 2015; Clifton et. al, 2016; ERA, 2015; ERA, 2016; KDEC/KOTI/CWCE, 2012; and W.T Consult, 2016.

Source: Researcher’s Methodology

The degree to which the findings of each organization match are measured with common statistical analysis and a representative value shall be set for the purposes of evaluation against the quality/ies described in **Section 3.6.1**. With the aid of literature review, the most important indicators (combination of indicators) are hinted in the context of Ethiopia.

Generalized comparison is also made with the corresponding values of other bench-marked countries such as South Africa, Brazil, China, India and others that have been specified in **Table 3.1**.

In doing so, the research aimed at incorporating the following issues out of which some basic differences could emanate:

- Size of population and settlement pattern (rural vs urban); and
- The level of variation in indicator values even among similar countries.

### **Objective 3**

Concerning the last specific objective, road funding patterns (since the beginning the first phase of the RSDP) have been quantitatively dealt with. Hence, the following are analyzed:

- Sources of fund, i.e. GoE Vs DPs;
- Funding trend among different DPs in association with Country Partnership Strategy;
- Level of self-sufficiency and freedom of the GoE in road sector policy formulations; and
- Local sector's level of involvement in the huge RSDP investment.

Just like specific objective 1, a logical sequence that uses both interviews and document review/analysis of secondary data is utilized to arrive at findings (Maria Ana d'Orey et. al, 2017):

- assess the level of dependence on ODA and other development assistances for road investments;
- evaluate the local sector's share in the massive RSDP investment; and
- look for areas of concern in terms of policy dialogue and partnership.

A condensed summary of the logical framework for all analyses is presented in ***Table 3.10***

## Evaluation Matrix

The critical questions and set of policy indicators have been combined into a set of evaluation matrices per evaluation criteria. The matrices also include sources of information that are used such as: document reviews and interviews. The sources have been coded as follows:

- i. Interviews with National Agency staff;
- ii. Interviews with non-National Agency staff;
- iii. Desk review of country documents (generated by indigenous national agencies);
- iv. Desk review of DPs documents;
- v. Desk review of non-National and non-DP documents;
- vi. Datasets and Indices; and
- vii. Analysis result of this thesis.

**Table 3.10:** Logical Matrix of Analyses for all Specific Objectives

<b>Objective 1: Rural Connectivity/URRAP Planning</b>			
<b>Critical Questions</b>	<b>Judgment Criter(ion/ia)</b>	<b>Source of Information</b>	<b>Rating and Remark</b>
<b>Quality 1: Relevance</b>			
Was the need for rural access sensed at the right time?	Timing	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Were the goals set out at the beginning of URRAP in terms of indicators too ambitious/unrealistic?	Objectivity level	Relevant code	Rating as per <i>Table 3.8</i> and key findings
<b>Quality 2: Effectiveness</b>			
Were the allocation and disbursement of budget efficient?	Budget distribution	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Were construction approaches sound and exercised as planned?	Suitability of construction methods and execution level	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Are Woreda Road Desks truly capable of administering and owning URRAP?	Administrative capacity	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Implementation problems as per <i>Section 3.6.2</i>	Multi-dimensional		
<b>Quality 3: Sustainability</b>			
Have the majority of Kebeles within regional Woredas been connected?	All-inclusive connectivity	Relevant code	Rating as per <i>Table 3.8</i> and key findings

Does the asset management of URRAP roads look promising?	Future service	Relevant code	Rating as per <i>Table 3.8</i> and key findings
<b>Objective 2: Road Network Development Indicators</b>			
<b>Quality 1: Relevance</b>			
Are the current proposed values of indicators truly reflective of the progress made?	Accuracy	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Are the targeted network indicator values, especially road density, adopted from other lower middle income countries justifiable?	Outlined goal	Relevant code	Rating as per <i>Table 3.8</i> and key findings
<b>Quality 2: Effectiveness</b>			
Which indicators are more suitable and are they consistent among themselves?	Consistency	Relevant code	Rating as per <i>Table 3.8</i> and key findings
<b>Quality 3: Sustainability-Not applicable</b>			
<b>Objective 3: Funding Arrangement and Local Sector's Participation</b>			
<b>Quality 1: Relevance</b>			
How important and influential has donor support been throughout the RSDP?	Contribution and influence	Relevant code	Rating as per <i>Table 3.8</i> and key findings
<b>Quality 2: Effectiveness-Not applicable</b>			
<b>Quality 3: Sustainability</b>			
How has the trend in dependence on financial assistance behaved over the RSDP period?	Self-sufficiency	Relevant code	Rating as per <i>Table 3.8</i> and key findings
Has the participation of the local sector, particularly indigenous contractors been appreciable?	Local sector's involvement	Relevant code	Rating as per <i>Table 3.8</i> and key findings

Source: Researcher's Methodology

AAiT, Graduate Studies, School of Civil & Environmental Engineering, Road and Transport Engineering Chair

### 3.7. Research Tools

Statistical analysis, graphical and plotting tools on **MS-Excel** have been used to perform the requirements of this research, particularly for observing the trends registered in the items mentioned under *Section 3.6.2* (only those that need statistical interventions).

## CHAPTER FOUR

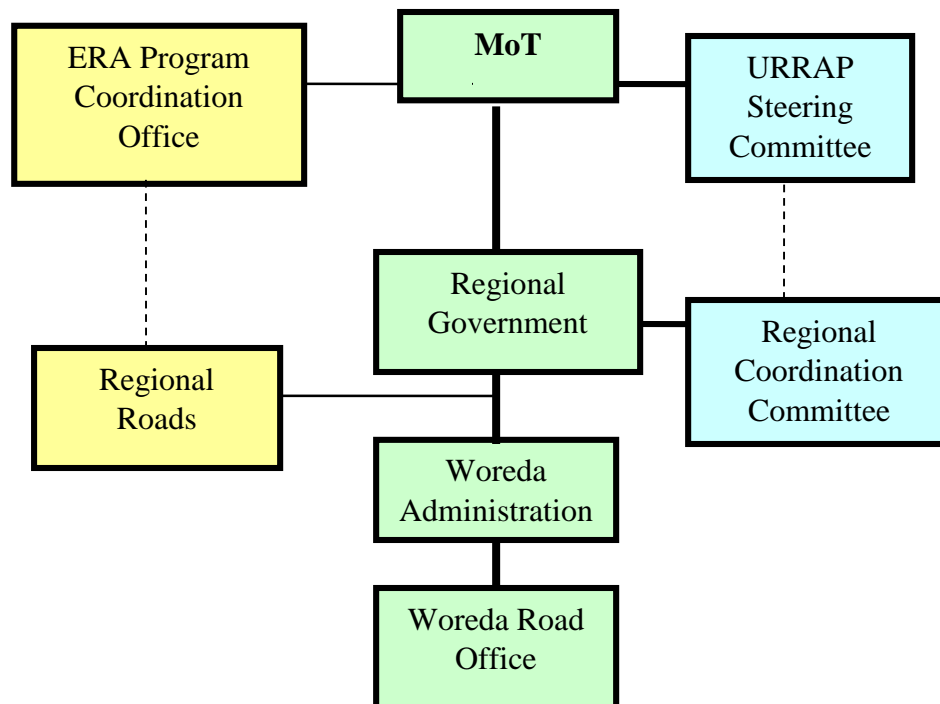
### 4. RESEARCH DATA

#### 4.1. Introduction

A condensed tabular and graphical presentation of the most important secondary data acquired through document review is made in this chapter. The dataset can be basically grouped into three general categories, i.e.: one for each specific objective, with few inter-objective data types.

#### 4.2. Rural Connectivity (URRAP’s Planning and Implementation)

The following figures and tables are presented under this section: *Figure 4.1* and *Table 4.1* present “Governance Structure for URRAP” and “Status of All-weather Roads at the Beginning of URRAP”; *Table 4.2* presents “Original URRAP Work Plan with Network Size to be Upgraded/Constructed”; *Table 4.3* presents “Original Level of Service Envisioned as a Result of URRAP” *Figure 4.2* presents “RAI as envisioned by ERA at the beginning of URRAP”; *Table 4.4* presents “Evidence Presented for Labor-based URRAP Contract”; and *Table 4.5* presents “Rural Access as Measured in terms of Kebele Connectivity”.



*Figure 4.1:* Governance Structure for URRAP (Source: ERA, 2010)

**Table 4.1:** Status of All-weather Roads at the Beginning of URRAP

<b>All-weather, regional and federal roads by 2010 (km)</b>	<b>Community roads network size at the beginning of URRAP (km)</b>	<b>Year round access percentage (%)</b>	<b>Un-paved effective all weather community roads (km)</b>
49,000	>80,000	32.88	0

Source: ERA, 2010

**Table 4.2:** Original URRAP Work Plan showing Network Size to be Upgraded/Constructed

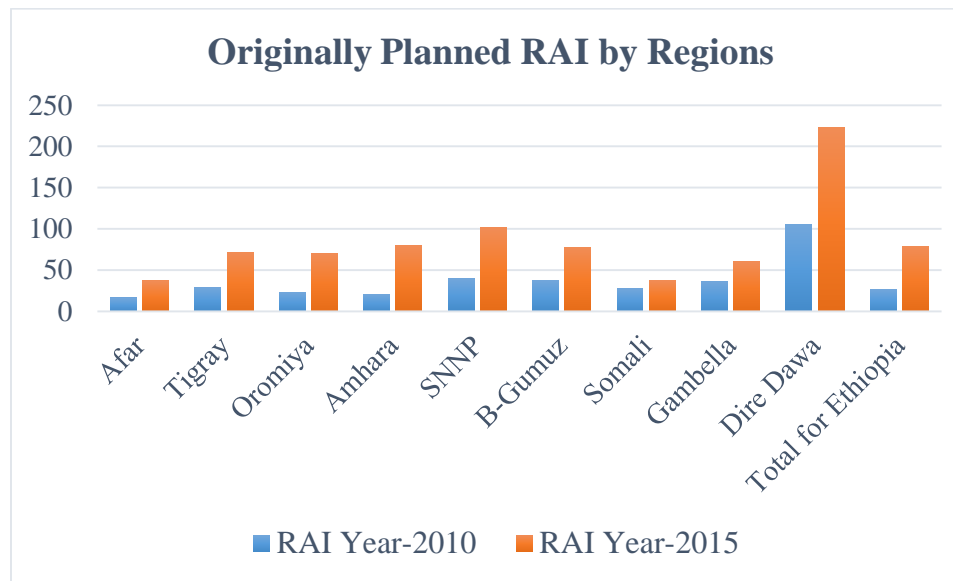
<b>Region and Municipality</b>	<b>Annual Work Plan (km)</b>					
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Tigray	335	515	550	550	550	2,500
Afar	241	371	396	396	396	1,800
Amhara	2,408	3,708	3,963	3,964	3,960	18,003
Oromiya	4,014	6,180	6,606	6,607	6,600	30,007
SNNP	1,873	2,884	3,083	3,083	3,080	14,003
Gambella	27	41	44	44	44	200
B/Gumuz	241	371	396	396	396	1,800
Somali	401	618	661	661	660	3,001
D/Dawa	21	33	35	35	35	159
Harar	7	10	11	11	11	50
<b>Total</b>	<b>9,568</b>	<b>14,731</b>	<b>15,745</b>	<b>15,747</b>	<b>15,732</b>	<b>71,523</b>

Source: ERA, 2010

**Table 4.3:** Original Level of Service Envisioned as a Result of URRAP

Indicator	Beginning of URRAP (2010)	End of URRAP (2014/15)
All weather road network (km)	48,793	135,811
Road Density (km/1000km <sup>2</sup> )	44.4	123.6
Road Density (km/1000 persons)	0.58	1.46
RAI (%)	27	80

Source: ERA, 2010



**Figure 4.2:** RAI as envisioned by ERA at the Beginning of URRAP (Source: ERA, 2010)

**Caution:** Please take a look at *Section 5.2.1.2* before using the data presented in *Figure 4.2*.

*Table 4.4:* Evidence Presented for Labor-based URRAP Contract

<b>Unpaved roads Construction</b>	<b>Equipment-based option</b>	<b>Labor-based option</b>
(% of total cost)		
Labor wage	≤22%	≤45%
Original average cost of URRAP roads per km with 4.5m wide surfacing= ETB 367,000		

Source: ERA, 2010

*Table 4.5:* Rural Access as Measured in terms of Kebele Connectivity

No.	Region	Number of rural Woredas	Number of rural Kebeles	Kebeles connected by all-weather roads in RSDP IV under URRAP		Kebeles connected by all-weather roads in RSDP V first year under URRAP	Kebeles connected by all-weather roads by June 2016	
				Number	%		Number	%
1	SNNP	134	3,808	2,531	66	5	2,536	67
2	Amhara	129	3,217	2,030	63	59	2,089	65
3	Oromia	295	6,478	6,028	93	30	6,058	94
4	Tigray	35	714	565	79	2	567	79
5	B/Gumuz	20	377	252	67	-	252	67
6	Dire Dawa	1	38	38	100	-	38	100
7	Harari	3	-	25		-	25	
8	Gambella	11	198	87	44	-	87	44
9	Somali	50	401	122	30	-	122	30
10	Afar	29	371	193	52	-	193	52
	Total	707	15,602	11,871	76	96	11,967	77

Source: ERA, 2016

*Note:* The implementation issues of URRAP are rather exhaustive and so they will not be presented here in the Research Data section and shall be dealt with under Analysis and Discussion Chapter.

### 4.3. Road Network Development Indicators

The following tables are presented successively: *Table 4.6* presents “RSDP Physical Accomplishment”; *Table 4.7* presents “RSDP’s Annual Growth in Physical Accomplishment and Road Density”; *Table 4.8* presents “RSDP V’s Envisioned Road Network Measures”; *Table 4.9* presents “ERA’s Estimation of RAI at Selected Years”; *Table 4.10* presents “World Bank’s New RAI Estimate for Selected Countries”; *Table 4.11* presents “RAI Estimation of W.T Consult for ERA”; *Table 4.12* presents “ERA’s Assessment of Road Conditions and other Important Indicators”; *Table 4.13* presents “W.T Consult’s Assessment of Road Conditions”; and *Table 4.14* presents “Selected Lower Middle Income Countries’ Road Density by 2005”.

*Table 4.6:* RSDP Physical Accomplishment

RSDP	Federal			Regional			Woreda/URRAP			Overall		
	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%
I	3,777	2,709	72	5,131	6,000	117				8,908	8,709	98
II	5,375	7,483	139	2,877	4,106	143				8,252	11,589	140
III	8,956	7,996	89	5,730	4,399	77				14,686	12,395	84
IV	14,782	13,633	92	11,212	9,814	88	71,523	62,413	87	97,517	85,860	88
V (1 <sup>st</sup> Year)	2,585	2,374	92	1,451	1,920	132	16,234	5,622	35	20,270	9,917	49
Total	35,475	34,195	96	26,401	26,239	99	87,757	68,035	78	149,633	128,470	86

Source: ERA, 2016

**Table 4.7:** RSDP's Annual Growth in Physical Accomplishment and Road Density

Year	Road Network (km)						Growth Rate (%)	Road Density (km/1000 persons)	Road Density (km/1000km <sup>2</sup> )
	Paved	Gravel	Regional	Woreda	Municipality				
					Paved	Gravel			
1997	3,708	12,162	10,680				26,550	0.46	24.14
1998	3,760	12,240	11,737				27,737	4.5	25.22
1999	3,812	12,250	12,600				28,662	3.3	26.06
2000	3,824	12,250	15,480				31,554	10.1	28.69
2001	3,924	12,467	16,480				32,871	4.2	29.88
2002	4,053	12,564	16,680				33,297	1.3	30.27
2003	4,362	12,340	17,154				33,856	1.7	30.78
2004	4,635	13,905	17,956				36,496	7.8	33.18
2005	4,972	13,640	18,406				37,018	1.4	33.60
2006	5,002	14,311	20,164				39,477	6.6	35.89
2007	5,452	14,628	22,349				42,429	7.5	38.60
2008	6,066	14,363	23,930				44,359	4.5	40.30
2009	6,938	14,234	25,640				46,812	5.5	42.60
2010	7,476	14,373	26,944				48,793	4.2	44.39
2011	8,295	14,136	30,712	854			53,997	10.7	49.09
2012	9,875	14,675	31,550	6,983			63,083	16.8	57.30
2013	11,301	14,455	32,582	27,628			85,966	36.3	78.20
2014	12,640	14,217	33,609	39,056			99,522	15.8	90.50
2015	13,551	14,055	30,641	46,810	1,693	3,664	110,414	10.9	100.40
2016	14,632	13,400	31,620	48,057	1,693	3,664	113,066	2.4	102.80
<b>Targeted value at the end of RSDP V</b>									<b>196.00</b>

Source: ERA, 2016

**Table 4.8:** RSDP V's Envisioned Road Network Measures

Aspect/Year	2015	2020
Total Road Network (km)	<113,000	>215,000
Paved Roads (km)	15,244	25,800
Roads in Good Condition (%)	72	80

Source: ERA, 2015

**Table 4.9:** ERA's Estimation of RAI at Selected Years

Total Area ('000 km <sup>2</sup> )	Inhabited Area (80%) ('000 km <sup>2</sup> )	Year	Total Population (number)	Rural Population (number)	Rural Population Density (persons/km <sup>2</sup> )	Total Road Network (km)	Rural Population Within 2km Access (number)	Rural Access Index (%)
1,176	796	1997	58,117,000	46,493,600	58	26,550	6,203,041	13
		2002	67,220,000	53,776,000	68	33,297	8,997,887	17
		2007	74,186,830	61,259,132	77	42,429	13,061,124	21
		2010	79,777,690	65,680,187	83	48,793	16,104,158	25
		2011	82,100,000	68,143,000	86	53,997	18,483,797	27
		2012	84,500,000	70,135,000	88	63,083	22,232,795	32
		2013	86,000,000	71,380,000	90	85,966	30,835,443	43
		2014	87,000,000	72,075,185	91	99,522	36,045,561	50
		2015	89,887,957	73,228,102	92	110,414	40,630,189	55
		2016	91,865,492	74,839,120	94	113,067	42,521,783	57

Source: ERA, 2016

**Table 4.10:** World Bank's New RAI Estimate for Selected Countries

Country	New RAI (%)	Year of Assessment
Bangladesh	86.7	2015
Nepal	54.2	2015
Ethiopia	21.6	2015
Kenya	56.0	2009
Mozambique	20.4	2010
Tanzania	24.6	2014
Uganda	53.1	2015
Zambia	17.0	2011

Source: Iimi et.al, 2016

**Table 4.11:** W.T Consult's RAI Estimation

Year	Conventional RAI (%)			RAI in terms of Transport Service Delivery Station (%)		
	Rural	Urban	Total	Rural	Urban	Total
2003/04	31	95.7	41.4	20.6	89.6	31.4
2004/05	31	95.7	41.4	20.6	89.6	31.4
2005/06	32.2	96.6	43.1	21.8	91.4	32.9
2006/07	33.2	97.6	44.4	22.9	93.2	34.2
2007/08	N/A	N/A	N/A	N/A	N/A	N/A
2008/09	35.5	99.4	46.9	25.5	97	37.5
2009/10	36.7	99.8	47.6	26.9	98.9	39.1
2010/11	37.8	99.8	48.6	28.3	99.8	40.5
2011/12	38.56	92.33	48.02	28.4	90.10	39.3
2012/13	38.92	92.87	48.98	28.86	90.56	40.3
2013/14	39.7	93.33	49.5	29.4	90.7	41.1
2014/15	40.3	93.9	50.7	29.8	91	41.7
2015/16	40.6	94.3	50.2	30.2	91.2	41.8

Source: W.T Consult for ERA, 2017

**Table 4.12:** ERA's Assessment of Road Conditions and other Important Indicators

<b>Indicators</b>	<b>1997 (Start of RSDP)</b>	<b>2016 (First Year of RSDP V)</b>
Proportion of Asphalt roads in Good Condition	17%	73%
Proportion of Gravel roads in Good Condition	25%	59%
Proportion of Rural roads in Good Condition	21%	55%
Proportion of Woreda roads in Good Condition	-	83%
Proportion of Total Road network in Good Condition	22%	72%
Road Density (km/1000km <sup>2</sup> )	24.1	102.8
Road Density (km/1000 population)	0.46	1.23
Proportion of area more than 5 km from all-weather road	79%	35.8%
Average distance to all weather road (km)	21	4.9
Road Network length including URRAP and Municipality Roads (km)	26,550	113,066

Source: ERA, 2016

**Table 4.13:** W.T Consult's Assessment of Roads' Conditions

Year	Gravel Roads (%)			Year	Paved Roads (%)		
	Good	Fair	Poor		Good	Fair	Poor
1996/97	22	23	56	1996/97	20	30	50
1998/99	22	22	56	1998/99	22	26	51
1999/00	22	14	64	1999/00	2	20	78
2000/01	43	13	44	2000/01	15	19	66
2001/02	59	9	32	2001/02	19	35	46
2011/12	30	59	11	2009/10	23	11	66
2012/13	27	59	14	2010/11	19	15	66
2013/14	24	61	15	2011/12	24	42	34
2014/15	18	71	11	2014/15	49	38	13
2015/16	36	54	10	2015/16	27	48	25

Source: W.T Consult for ERA, 2017

**Table 4.14:** Selected Lower Middle Income Countries' Road Density

<b>Road density of Lower Middle Income Countries</b>			
<b>(km/km<sup>2</sup>)</b>			
Albania	0.63	Iraq	0.1
Algeria	0.05	Jamaica	1.94
Angola	0.04	Jordan	0.08
Armenia	0.27	Kazakhstan	0.03
Azerbaijan	0.68	Kiribati	0.92
Belarus	0.45	Lesotho	0.2
Bolivia	0.06	Macedonia	0.34
Bulgaria	0.39	Micronesia	0.34
Cameroon	0.11	Moldova	0.39
Cape Verde	0.25	Morocco	0.13
Colombia	0.1	Namibia	0.05
Congo	0.05	Nicaragua	0.14
Cuba	0.55	Paraguay	0.07
Djibouti	0.12	Peru	0.06
Dominica Republic	0.26	Philippines	0.67
Ecuador	0.15	Samoa	0.82
Egypt	0.09	Serbia	0.16
El Salvador	0.48	Sri Lanka	1.48
Fiji	0.19	Suriname	0.03
Georgia	0.29	Swaziland	0.21
Guatemala	0.13	Thailand	0.11
Guyana	0.04	Tonga	0.91
Honduras	0.12	Tunisia	0.12
Indonesia	0.19	Turkmenistan	0.05
Iran	0.11	Ukraine	0.29

Source: International Roads Federation, 2006

#### 4.4. Financial Planning Trend and Local Sector's Involvement

The following tables and figure are presented under this section: *Table 4.15* presents “Financial Accomplishment of RSDP by Phase”; *Table 4.16* presents “RSDP Funding Share by Financier”; and *Figure 4.3* depicts “Share of Contract Value in million ETB between Local and International Contractors in the RSDP (1997-2016)”.

*Table 4.15:* Financial Accomplishment of RSDP by Phase

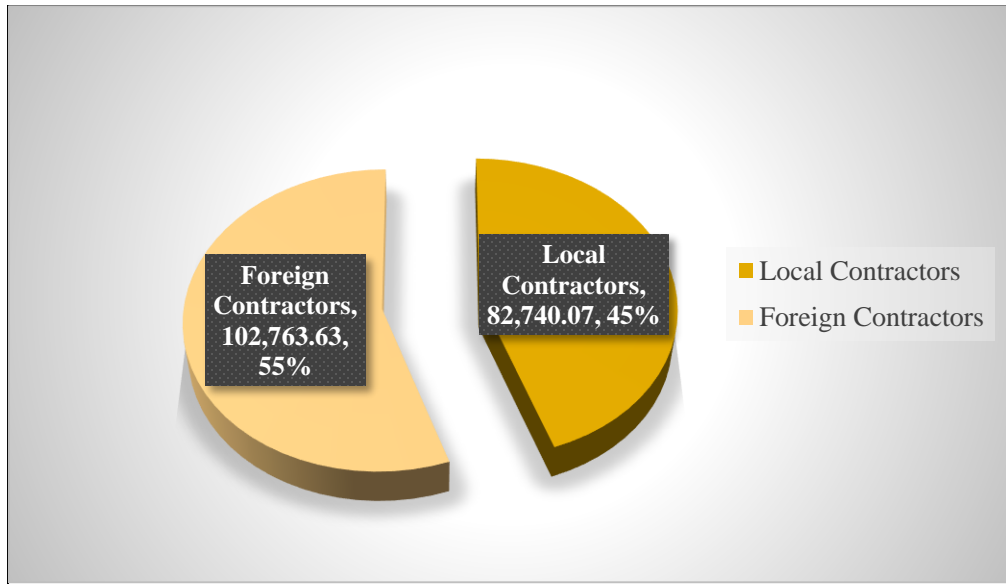
Program	Financial Plan Vs. Disbursement (million ETB)		
	Budget	Disbursed	%
Total RSDP I	9,812.9	7,284.6	74
Total RSDP II	15,985.9	18,112.8	113
Total RSDP III	34,643.9	34,957.9	101
Total RSDP IV	125,409.1	158,333.5	126
RSDP V (First Year)	46,605.1	47,520.3	102
Total RSDP (19 years)	232,456.9	266,209	115

Source: ERA, 2016

*Table 4.16:* RSDP's Funding Arrangement by Source

Phases of RSDP	Financing from Local Sources (million ETB)		Financing from External Sources (million ETB)		Total
	Amount	%	Amount	%	
RSDP I	4,433.7	60.9	2,850.9	39.1	7,284.55
RSDP II	11,497.4	63.5	6,615.5	36.5	18,112.86
RSDP III	26,298.2	75.2	8,659.6	24.8	34,957.77
RSDP IV	130,949.9	83.0	27,383.6	17.0	158,333.50
RSDP V ( First Year)	42,474.9	89.4	5,045.4	10.6	47,520.3
Total (Undiscounted)	215,654.0	81.0	50,555.0	19.0	266,209.0

Source: ERA, 2016



**Figure 4.3:** Share of Contract Value in million ETB between Local and International Contractors in the RSDP, 1997-2016 (Source: ERA, 2016)

## **CHAPTER FIVE**

### **5. ANALYSIS AND DISCUSSION**

#### **5.1. Introduction**

In this chapter, the methods elaborated in the third chapter are carried out with the help of the appropriate discussions. Each specific objective is dealt with in separate sections within the chapter. However, few objective parameters that tend to transcend individual objectives such as specific road network development indicators like RAI and the others are discussed more than once where necessary. Primary data that has been collected through interviews is also incorporated into the discussion without giving away anonymity.

#### **5.2. Rural Connectivity**

##### **5.2.1. URRAP's Planning**

By 2010, it was estimated that Ethiopia had over 80,000kms of non-engineered and unmaintained community roads (ERA, 2010). This figure, according to ERA's independent consultant is actually just over 58,000kms of designated community roads (W.T Consult, 2017). The efforts made in the first three phases of the RSDP had resulted in a national combined paved and gravel road network of nearly 49,000kms. That brought the total country road network size to well over 100,000kms. However, out of this, only the paved and gravel roads were capable of providing year round access beyond one rainy season. That essentially meant, all of the existing community roads came down to nil in terms of access. ERA's estimation of RAI for the rural community at the time stood at 27% (ERA, 2010). This figure was consistent with the estimation put forward by researchers that were devising new ways of calculating RAI as they suggested Ethiopia's RAI stood below 20% just 4 years earlier (Roberts et. al, 2006). This was a crystal clear indication that the majority of the rural community (over 73% of the total rural population) in the country was isolated and had to travel on foot for well over 2kms to access an all-weather road.

In response to this need, the GoE formulated URRAP that set out to connect all Kebeles with roads that provide all-weather, year-round access, capable of meeting the needs of the rural community in an affordable and maintainable fashion. URRAP was supposed to be a five year programme (2010/11- 2014/15) during which it was planned to construct a total 72,000 km of all-weather roads throughout the country at an estimated cost of ETB 26,431.8 million.

### **5.2.1.1.Relevance: Q1: Was the need for rural roads sensed at the right time?**

Even long before 2010, it was pretty evident that all the nation's community roads used to get permanently damaged in a single summer and provided zero year round access. The history of systematized rural roads in Ethiopia actually dates back to 1951 which saw the creation of the Imperial Highway Authority (IHA) (Emmenegger, 2012). Road construction was largely dependent on donors by the time and as these donors were least attracted to rural roads, the majority of the Ethiopian rural community stayed unconnected. Fifty years on, the entire designated community roads were built at an expenditure of less than 1.5 billion ETB ( an average of 25,860 ETB/km) suggesting they were to a great extent substandard (W.T Consult, 2017).

The need for better rural roads surely must had lurked behind the minds of Ethiopia's transport planners. There are different factors to consider to pass on a certain level of judgment towards its timing. The first factor to consider is 'how important are functional rural roads to nations such as Ethiopia with a great proportion of their population residing in isolated rural and remote areas'?

No country comes closer to this scenario more than India which joined the list of lower middle income countries in 2007. By then, nearly 70% of the total Indian population resided in rural areas. Based on the need to provide this massive population access to basic socio-economic services, the Indian Government launched a program called "Pradhan Mantra Gram Sadak Yojana (PMGSY)" in 2000 aiming at providing rural access. The program has remained quite popular worldwide and is still taken as a good model globally in expanding rural road and transport. The program aimed at connecting areas with populations of 1,000 and above (and in hotter and mountainous areas above 500 residents) with all-weather roads. The overall goal of the program was guided by 'Vision 2021' which aimed at a step by step connection of areas with populations up to 250 with an all-whether road. In general, the program incorporated construction of more than 365,000 km of new roads and upgrading of 370,000 km of road (ERA, 2016). That leads to the impression that for countries whose great majority of their population resides in rural areas, rural access is the key to advancing a more inclusive poverty reduction. For elaboration on how much these roads elevated the Indian economy, other literatures may be referred.

The second factor that needs examination is what happened to the first 'Rural Road and Transport Strategy' that was envisioned in 1998? The strategy was rather intensive in that it adopted a sector wide approach (SWAp) that placed emphasis on the following points:

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- Streamlining institutional arrangements suited to both classified roads and off-road infrastructure as well as improved means of transport;
- Broadening planning and programming to respond to nature and size of transport demand;
- Developing facilities (schools, health centers, storage facilities, grinding mills, wood lots etc.) taking into consideration settlement pattern and impact on transport and effort time;
- Refining and modifying rural road design criteria to meet challenges and opportunities in rural areas;
- Exploiting the immense potential of labor-based technology in the construction and maintenance of roads;
- Introducing new means of maintenance, rehabilitation and upgrading of rural roads; and
- Promoting rural banking and deepening the financial system.

Despite being clouded with political and legal constraints, the 1998 Rural Transport Reformation Strategy provided valuable insight into the subject matter. However, it was only five years later in 2003 that the famous ERTTP was actually physically launched. Village-based connectivity which was initially envisioned by the foreign consultant was modified to a Kebele-based approach. The programme made connecting productive and extremely distant Kebeles its priority through a multi-sectoral approach. The ERTTP was far aiming and potentially more sustainable compared with its successor URRAP for the following reasons:

- It recognized the fact that maintenance would be the ultimate challenge in rural roads;
- It took into consideration that local labor would not be able to do anything about rural roads maintenance without a sustainable source of budget;
- It was able to recognize that without the proper institutional arrangements, roads would eventually become owner-less; and
- It emphasized that roads should go hand in hand with other socio-economic and administrative services, thereby taking up a multi-sectoral approach.

These strategies were only exercised as pilot projects in different zones during the second and third phases of the RSDP. Severe shortage in skilled manpower throughout the country forced the GoE to heavily rely on foreign consulting and contracting firms with the exception of very few local consultants. Coordination among different stakeholders involved in education, healthcare, water

supply and the like remained poor and led to chaos as the ERTTP was basically an all-inclusive holistic reformation program. Major lessons were learnt and that pack animals and walking modes were severely limiting the agricultural development, not to mention other socio-economic services such as health and education which were quite low in terms of coverage. Engineered Woreda roads were tested and RRAs were involved in building the capacity of the lowest local administration, i.e. Woredas. However, the program never reached the stage of full-fledged implementation. In the meantime, the construction of non-engineered Woreda roads throughout the country also continued. That brings us back to the first factor discussed previously that addresses the issue of how important rural access is to countries such as Ethiopia with a great majority of their population residing in rural areas and depending on agriculture to drive the economy. And so yes, there are signs that Ethiopia recognized rural access was the key to augmenting agricultural productivity and poverty reduction sufficiently early.

The third factor that needs examination is why the ERTTP was never strongly pursued immediately? There is no simple answer to that question as politics is involved in roads in much the same way as engineering is. It is believed that a phase by phase rural roads development was unacceptable at the time by the GoE. Furthermore, the immense resources needed to engage in a full-fledged national rural network development were simply not there. In *Table 5.1* here after, the budget disbursed for the first three phases of RSDP between 1997 and 2010 (right before the beginning of URRAP) are indicated.

**Table 5.1:** Budget Planning of RSDP I-III

Program	Financial Plan Vs Disbursement (million ETB)		
	Budget	Disbursed	%
Total RSDP I	9,812.9	7,284.6	74
Total RSDP II	15,985.9	18,112.8	113
Total RSDP III	34,643.9	34,957.9	101

Source: ERA, 2015

The total budget that was set aside for URRAP in 2010 stood at just over ETB 26.4 billion (excluding communities' contribution). However, as can be clearly seen from *Table 5.1*, the first two phases of the RSDP had a total disbursement much less than that required by URRAP, and in the third, the disbursed budget exceeded the one required by URRAP by just over ETB 8 billion.

Even if comparisons were made at a discounted rate, it is clear the government lacked the financial muscle to undertake such a huge national project.

**Answer to Critical Question 1: Yes, there are signs that it was sensed sufficiently early but it was not strongly pursued within the designed framework for a long time for reasons of both financial and human (skilled manpower) resources' deficiencies.**

### **5.2.1.2. Relevance: Q2: Were the goals set out at the beginning of URRAP too ambitious/unrealistic in terms of target indicator values?**

The idea behind this question is not only limited to accomplishment assessment. In fact, it is more influenced by the question 'Was the severity in lack of rural access truly understood and the baseline situation properly assessed?'

*"The Key Quality of Planning is Realism"*

Anonymous

*Table 5.2* below presents the original plan outlined with the introduction of URRAP.

**Table 5.2:** Original Level of Service Envisioned as a Result of URRAP

<b>Indicator</b>	<b>Beginning of URRAP (2010)</b>	<b>End of URRAP (2014/15)</b>
All weather road network (km)	48,793	135,811
Road Density (km/1000km <sup>2</sup> )	44.4	123.6
Road Density (km/1000 population)	0.58	1.46
RAI, %	27	80

Source: ERA, 2010

Figure 5.1 below depicts the targeted RAI values on a regional basis.

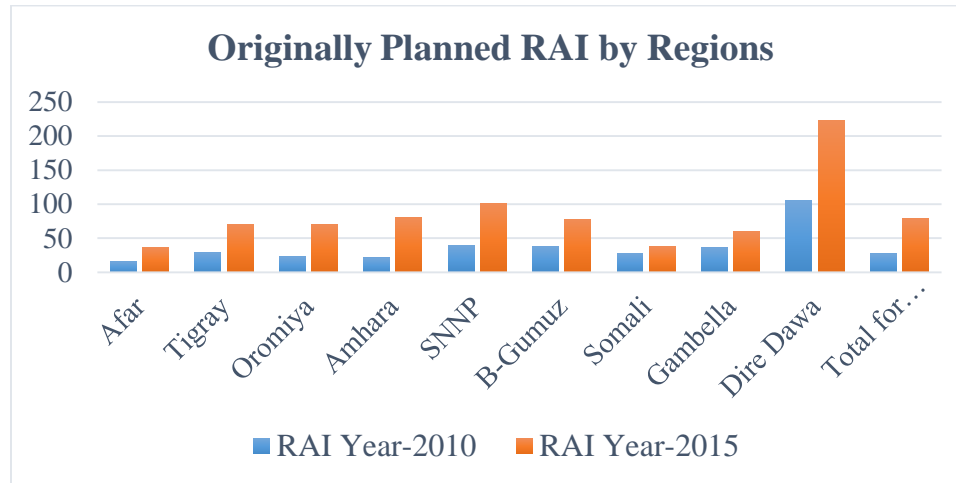


Figure 5.1: RAI as Envisioned by ERA at the Beginning of URRAP (Source: ERA, 2010)

During the period 2010-2015, as a result of URRAP, 71,523kms of all-weather rural roads were planned and ERA reported that 46,810kms were built with an overall physical implementation of just over 65%. However, physical accomplishment is not the only indicator in roads as discussed in Section 5.3. URRAP was programmed to be a five-year program and what is striking is the fact that an RAI of 80% and all Kebeles' connection were envisioned. An RAI of 80% meant that 80% of the rural population was expected to be brought within 2kms reach of all-weather roads by 2015. Hereafter in Table 5.3, the actual RAI accomplishment over RSDP IV is presented.

**Caution:** As illustrated in Figure 5.1 (which is also shown in Figure 4.2), ERA had set a value of 200% for D/Dawa's targeted RAI value. As RAI can assume a maximum value of only 100%, the researcher would like to advise readers to be extra-careful with this data.

*Table 5.3: Actual RAI tracker for 2010-2015*

Total Area ('000 km <sup>2</sup> )	Inhabited Rural Area (80%) ('000 km <sup>2</sup> )	Year	Total Population (number)	Rural Population (number)	Rural Population Density (person/km <sup>2</sup> )	All-weather Road Network (km)	Rural Population Within 2km Access (number)	Rural Access Index (%)
1,176	796	2010	79,777,690	65,680,187	83	48,793	16,104,158	25
		2011	82,100,000	68,143,000	86	53,997	18,483,797	27
		2012	84,500,000	70,135,000	88	63,083	22,232,795	32
		2013	86,000,000	71,380,000	90	85,966	30,835,443	43
		2014	87,000,000	72,075,185	91	99,522	36,045,561	50
		2015	89,887,957	73,228,102	92	110,414	40,630,189	55

Source: ERA, 2016

*Table 5.4* below presents the physical plan envisioned at the outset of URRAP.

*Table 5.4: URRAP Work Plan for 2010-2015 as Originally Planned*

	Annual Work Plan (km)					
	2011	2012	2013	2014	2015	Total 2015
Individual budget year	9,568	14,731	15,745	15,747	15,732	71,523
Cumulative	9,568	24,299	40,044	55,791	71,523	71,523

Source: ERA, 2010

*Table 5.5: Physical Accomplishment for 2010-2015*

<b>Physical Plan vs Accomplishment</b>								
<b>Year</b>	<b>Planned Length of Federal and Regional Roads (km)</b>	<b>Accomplished Length of Federal and Regional Roads (km)</b>	<b>Planned Woreda roads (km)</b>	<b>Accomplished Woreda roads (km)</b>	<b>Woreda roads success rate (%)</b>	<b>Planned all-weather road (km)</b>	<b>Accomplished all-weather road (km)</b>	<b>All-weather roads Success rate (%)</b>
<b>2010</b>	48,800 (existing baseline length)		0			48,800 (baseline km)		
<b>2011</b>	51,636.0	53,143.0	9,568.0	854.0	8.9	61,204.0	53,997.0	88.2
<b>2012</b>	54,818.0	56,100.0	24,299.0	6,983.0	28.7	79,117.0	63,083.0	79.7
<b>2013</b>	58,211.0	58,338.0	40,044.0	27,628.0	69.0	98,255.0	85,966.0	87.5
<b>2014</b>	61,771.0	60,466.0	55,791.0	39,056.0	70.0	117,562.0	99,522.0	84.7
<b>2015</b>	64,522.0	63,604.0	71,523.0	46,810.0	65.4	136,045.0	110,414.0	81.2

Source: Analysis Result

It is evident that the physical accomplishment rates of Woreda/URRAP roads are less than satisfactory (especially during the first two years of implementation) and they seem comforting only when they are added up with the remaining paved and gravel roads to give a cumulative length of all-weather roads. That could also be attributed to the change in width of surfacing from 4.5m to 6m by the implementing regions. That does not necessarily imply the plan was too ambitious, in fact it is rather an indication of poor execution. Road density per land area and per population size are entirely dependent on the physical accomplishment. The most flawed plan, however, was made in terms of RAI as presented in *Table 5.6* hereafter.

**Table 5.6:** Physical and RAI Plan VS Accomplishment as per ERA

Physical and RAI Plan vs Accomplishment						
Year	Planned all-weather road (km)	Accomplished all-weather road (km)	All-weather roads Success rate (%)	Planned RAI (%)	Actual RAI (%)	RAI Success Rate (%)
2010	48,800 (baseline)			25 (baseline)		
2011	61,204.0	53,997.0	88.2	N/A	27	
2012	79,117.0	63,083.0	79.7	N/A	32	
2013	98,255.0	85,966.0	87.5	N/A	43	
2014	117,562.0	99,522.0	84.7	N/A	50	
2015	136,045.0	110,414.0	<b>81.2</b>	80	55	<b>68.8</b>

Source: Analysis based on ERA's RAI

The RAI of 55% which is used in **Table 5.6** has been adopted from ERA. The value adopted from W.T Consult (ERA's independent consultant) is in fact lower and stands at 40.6%. With this figure, the RAI accomplishment basically drops down to just over 50% as indicated in **Table 5.7** hereafter.

**Table 5.7:** Physical and RAI Accomplishment as per Consultant

Physical and RAI Plan vs Accomplishment						
Year	Planned all-weather road (km)	Accomplished all-weather road (km)	All-weather roads Success rate (%)	Planned RAI (%)	Actual RAI (%)	RAI Success Rate (%)
2010	48,800 (baseline)			25 (baseline)		
2011	61,204.0	53,997.0	88.2	N/A	27	
2012	79,117.0	63,083.0	79.7	N/A	32	
2013	98,255.0	85,966.0	87.5	N/A	43	
2014	117,562.0	99,522.0	84.7	N/A	50	
2015	136,045.0	110,414.0	<b>81.2</b>	80	40.6	<b>50.8</b>

Source: Analysis based on W.T Consult's RAI

Hailu (2013) argues that the average time required to reach an all-weather road in Ethiopia decreased from 3.5 hours in 2010/11 to 3.2 hours in 2011/12 and 2.7 hours in 2012/13. According to ERA (2016), the average distance to an all-weather road decreased to 4.9km or an approximate walking time of 1.6hr by 2014/15. Considering the fact that RAI is internationally assumed to be a walking distance of 25 minutes, it is evident the planned RAI was too unrealistic. However, that

does not qualify the entire URRAP to be categorized as 'too ambitious' as the physical accomplishment rate indicates otherwise.

Generally speaking, the success rates experienced in terms of physical accomplishment and RAI exhibited large disparity where the former was in excess of 80% and the later just over 50%. There are three possible explanations for this disparity:

- i. In the initial planning phase, the proximity of settled population (which is marked by one of the three, i.e. highland; agricultural; and mobile villages) to potential URRAP roads were not carefully assessed using GIS and refined satellite images so as to arrive at a more realistic RAI target;
- ii. The previously existing RAI which was estimated based on field/ground survey could have led to wrong extrapolations; and
- iii. Routes which were identified as important during planning phase might have not gotten priority during implementation thereby curbing a hastened increment in RAI.

In the 5<sup>th</sup> phase of the RSDP which is well underway at the moment, a total of 90,000kms of Woreda/URRAP roads have been envisioned. Compared with its predecessor 4<sup>th</sup> phase, the first year accomplishment of URRAP in RSDP V is horrendous (with 34.6% accomplishment rate) and seems like the program as a whole is facing a crisis. But knowing that major lessons could have been learnt during RSDP IV and more finances were availed for the upcoming phase, the physical target set for the end of RSDP V in terms of physical size is fairly reasonable. Poor execution takes the lion's share in the terrible accomplishment of URRAP during 2015/16. The physical accomplishment assessment is presented in *Table 5.8* on the following page.

**Table 5.8:** Physical Accomplishment of URRAP in the First Year of RSDP V

No.	Regions & Municipality	5 Years Plan (km)	2015/16		
			Plan (km)	Accomplished (km)	Accomplishment (%)
1	SNNP	18,722	2,006	1,067	53.2
2	Amhara	20,488	3,886	1,006	25.9
3	Oromia	35,005	7,339	1,718	23.4
4	Tigray	5,164	983	395	40.2
5	B/Gumuz	1,126	225	63	28.0
6	D/Dawa	286	45	3	6.7
7	Harari	135	27	-	0
8	Gambella	428	66	-	0
9	Somali	6,619	1356	-	0
10	Afar	2,027	301	-	0
<b>Total</b>		<b>90,000</b>	<b>16,234</b>	<b>5,622</b>	<b>34.6</b>

Source: ERA, 2016

**Answer to Critical Question 2: No, the rural access goals set out for 2010-2015 were not overly ambitious, nor are those outlined for 2015-2020. However, some of the indicator targets envisioned for 2015 such as RAI were unrealistically exaggerated and could have resulted from faulty planning. In addition, the implementation of URRAP roads under the first year of RSDP V is extremely worrisome.**

### **5.2.1.3. Effectiveness: Q1: Were the allocation and disbursement of budget efficient?**

Budget effectiveness is a crucial part of implementing transportation plans as expanding and preserving roads consume huge public investments. The all-out rural access (URRAP) program was fully funded by the GoE, particularly MoFEC under the MDG support budget. A financial amount of ETB 26,431.8 million, with a construction cost of ETB 367,000 per km was set aside for the duration 2010-15. This arrangement was made at the Federal level with a 4.5m wide surfacing. At first glance, this figure of ETB 367,000 per km appears rather bizarre as the unit (per km) cost of community roads should naturally cost more than this. The rationale behind is the fact that a labor based approach was chosen over equipment based construction method which

made these roads much less costly. In reality, much of the activities associated with road construction such as: setting out; bush clearing; obstruction removal; ditching; excavation in soft to stiff soil; loading and short haul of materials; unloading and shaping; compaction; building masonry and other structures such as culverts and small bridges are all perfectly amenable to labor. Furthermore, small scale enterprises were being groomed to take up the responsibility of designing and constructing URRAP roads as a massive way of creating job opportunities.

After almost all regions chose to construct a 6m wide (which is the usual width of rural roads in many African countries) Woreda roads, the Federal budget was augmented by local communities in both financial and labor forms. *Table 5.9* below explains how the rural community assisted the program.

**Table 5.9:** Community Assistance to the MoFEC Budget

No	Region	Five-Year Plan (km)	Accomplishment (with 6m wide surfacing)		Community Participation (man-days)	Employment Opportunity (number)
			km	%		
1	SNNP	14,003	7,185	51	5,082,223	522,978
2	Amhara	18,003	9,415	52	4,661,630	165,728
3	Oromia	30,007	27,158	91	18,339,648	663,903
4	Tigray	2,500	2,283	91	2,517,294	133,818
5	B/Gumuz	1,800	366	20	2,360	2543
6	D/Dawa	159	214	>100	645	3326
7	Harari	50	144	>100	280	1416
8	Gambella	200	45	23	573	428
9	Somali	3,001	0	0	-	-
10	Afar	1,800	0	0	-	-
<b>Total</b>		<b>71,523</b>	<b>46,810</b>	<b>65</b>	<b>30,604,653</b>	<b>1,494,140</b>

Source: ERA, 2016

A free labor exceeding thirty million man-days and an indirectly disclosed sum of money had been contributed by the community over the period 2011-15. With an assumption of 50 ETB/day, the labor contribution breaks down to 30,604,653\*50Birr/man-day= ETB 1,530,232,650. ERA reported that over ETB 2.7 billion was secured as a result of the communities' participation through free labor and fund raising for URRAP under RSDP IV (ERA, 2016). Deducting ETB 1.53 billion

from this official figure, it is estimated that ETB 1.17 billion was contributed in financial form. Given Ethiopia's huge manpower in rural areas, the contributed labor is lagging behind from what one might expect.

The fact that the surfacing width of these rural roads changed from 4.5 to 6m also led to a linear increase in the amount of construction budget needed per km. Including training, supervision, operational and other costs, the average value of resource required per km of URRAP roads ended up at ETB 689,025 as opposed to the initial ETB 367,000. An increase of 1.5m in surfacing width meant that the whole cost of construction roughly increased by a third. Increasing the original ETB 367,000 by a third leads to ETB 489,333. According to ERA (2016), the remaining 199,692 ETB/km was expended through indirect costs:

- More than 7,461 Low Volume Roads Design Manuals were distributed to all Regions, Woredas, and consultants involved in URRAP;
- More than 8,000 small and medium capacity equipment; including tractors, trailers, towed rollers, towed graders, water tankers, fuel tankers, and pick-ups, were manufactured/assembled and distributed to regions by FDRE METEC; and
- More than 1,220 medium enterprises, consultants and contractors were developed and trained.

The allocation of budget in an almost fixed manner for every kilometer of URRAP project, however, is not reasonable in light of engineered roads for the following reasons:

- It discourages optimizing roads according to traffic and forces uniform design for all kinds of AADT;
- It disregards the availability and proximity of construction materials to actual sites;
- It neglects the extreme variation that could result from terrain condition as rugged lands' earthwork could be as much as three times that of level fields;
- It forces consultants to reduce the quantities of work done by contractors if, during as built measurement for payment, the amount of work executed per km exceeds the fixed lump sum;
- It results in the construction of less roads as the budget would be incapable of covering the entire planned roads, thereby leading to serious backlogs; and

- It gives the implementing regions limited freedom in revising the cost in order to meet sporadic inflation with the appropriate response.

Up to the 2013/14 fiscal year, the RRAs which directly received the monetary resources allocated by the MoFEC redistributed budget to different zonal Woredas primarily based on the estimate submitted by these Woredas for the different projects taking place within their respective territory.

With the exception of the Amhara Region (which achieved 89.3% disbursement against requested MDG budget), the requested Vs disbursed amount for the remaining regions fell well below 65%, firstly because WROs attempted to embark upon a wide scale Woreda roads construction beyond that which the Federal Government was ready to fund. Some other poor performing regions, on the contrary, proposed to construct below their full potential while other regions even rejected the very idea of URRAP (ERA, 2016). Secondly because the proposed budget requirement of WROs was not fairly bound by the unit price of roads placed on a single km by the Federal organ, leading to a request of well over ETB 500,000 per km for many projects. *Table 5.10* below depicts the variation between requested and disbursed budget for the Oromia Region.

*Table 5.10:* Oromia Region's URRAP Support from MoFEC

<b>Oromia Region's Request Vs Disbursement for URRAP</b>			
<b>Fiscal Year</b>	<b>Requested amount from MDG Budget (million ETB)</b>	<b>Disbursed from MDG Budget (million ETB)</b>	<b>Financial need met (%)</b>
2011/12	6,111.35	5,184.44	84%
2012/13	5,619.11	3,667.39	64%
2013/14	4,762.13	1,681.74	41%
2014/15	3,478.56	233.96	17%
<b>Total</b>	<b>19,971.15</b>	<b>10,767.52</b>	<b>55%</b>

Source: ERA, 2017

One should note that the entire budget for URRAP was just ETB over 26.4 billion and Oromia Region alone presented a request for nearly ETB 20 billion over the period 2010-15 as indicated *Table 5.10* above. The needs of regions were clearly exceeding what MoFEC could possibly

disburse. In response, the budget from MoFEC got restructured by allocating just ETB 1.5 million per Woreda per year since 2014. That is why there was a drastic reduction in disbursed budget registered in 2014/15 as indicated in *Table 5.10*. This extremely limited budget forced WROs to undertake earthworks by mobilizing the community for free and even raising fund from those that cannot participate through physical labor. Contractors were mainly endowed with the responsibility of only graveling and structural works since then.

The institutional set up for financial flow was also identified as inconvenient by both ERA and RRAs (ERA, 2016 and ERA, 2017). It takes an excessively long time for resources to reach the contractors from MoFEC all the way through RRAs, zones and then WROs.

In conclusion, the budget allocation at the Federal level and the requirement by WROs were not in harmony and there were some rather large differences showing that the planner and implementer did not work seamlessly during the inception of URRAP.

**Answer to Critical Question 1: No; the budget allocation and disbursement were not efficient largely due to a lump sum technique that disregards availability of materials, traffic condition, terrain condition, rampant inflation and the like. The planning organ evidently did not involve the implementing organ to a sufficient level during planning. The organizational setup for financial flow from MoFEC up to contractors has also been reported as inconvenient and lengthy by the majority of stakeholders.**

#### **5.2.1.4. Effectiveness: Q2: Were construction approaches sound and exercised as planned?**

The basic construction approach outlined for URRAP was one that intended to make extensive use of unskilled and semi-skilled labor, thereby igniting a new wave of employment opportunities for the poor rural community (ERA, 2010). The development of locally-based (Woreda and Regional level) contractors was planned to assist in spreading employment opportunities into all areas of the country, providing capacity at the local level for the road improvement works envisaged under the program and its subsequent maintenance.

Labor-based methods are widely believed to be an important entry route that allow new and emerging local contractors into the road sector market. Different Asian and African countries have used them with very good degrees of success. The construction methods are well established and

presented in organized documents by the International Labor Office as early as 1995. One of the main reasons for the suitability of this approach in constructing all-weather community roads is that by using labor-based methods, the level of investment required by the contractor is reduced when compared with the size of investment that would be required for a more substantial equipment intensive operation. Local suppliers to the civil works industry (e.g. producers and suppliers of cement, aggregates, steel, and equipment) and other support services (e.g. equipment servicing, design specialists, monitoring and evaluation specialists; quality assurance services and private testing laboratories) were also supposed to be actively promoted as a result of URRAP.

By using labor-based methods, it becomes possible for contractors to enter the road sector at varying levels of skill and operational capacity. This could range from petty contracting for routine maintenance, to periodic maintenance, construction of rural roads and sub-contracting on larger construction contracts. With the decentralization thrust, it is important to have contractors who can operate at the local level without incurring large mobilization costs for relatively simple works.

**Table 5.11:** Labor's Wage Variation between Equipment-based and Labor-based Construction

Unpaved Roads		
Unpaved roads Construction	Equipment-based option	Labor-based option
(% of total cost)		
Labor wage	≤22%	≤45%

Source: ERA, 2010

However, this evidence presented by ERA is not very convincing as equipment-based construction could be twice as expensive as labor-based construction per km and therefore, the labor wage is very likely to be similar per unit length of road built. Motorized equipment available on the international market for grading earth and gravel roads demands huge foreign exchange to purchase and is generally expensive to operate and maintain. Most of these equipment are designed for operation in a high-wage, high-capital-cost environment. The costs of purchasing, ownership and operation make them virtually impractical and too expensive for sustainable application on rural, unpaved roads serving the Ethiopian poor. There is another range of intermediate equipment that is far more appropriate for use on these rural roads.

Some RRAs in Ethiopia have come to a rather interesting and conclusive decision based on their experience of building community roads before the commencement of URRAP.

*“Labor-based methods are significantly cheaper than equipment-based methods for similar types of road works (i.e. the same quality and standard) in both financial and economic terms in Ethiopia. The Regional Road Authorities using force account units, report that the average cost per kilometer for road construction using labor-based methods compared to equipment-based methods was 54% cheaper in financial terms and 60% cheaper in economic terms.”*

ERA (2010: 19)

As opposed to Ethiopia's RRAs, the Ghanaian experience showed that labor-based method was only 30% more financially cheaper and about 1.7 to 2.8 times slower than equipment-intensive rural roads' construction (The Department for International Development, 1998).

At this point, it should be pointed out that the argument which states 'labor-based approach could lead to the same qualities of finished works as equipment-based methods' should be strongly interlinked with the skill of labor at hand and level of strictness in supervision. One should also note that the equipment used in tandem with URRAP's labor-intensive construction was planned to be in the range of low to intermediate such as pedestrian rollers for compaction and other equipment which are based on tractor technology. ERA (2010) provided application strategies for this technology as outlined in the box hereafter.

**Application of Tractor Based Technology for Rural Road (paved and unpaved) Construction and Maintenance**

**Haulage:** - *Gravel Haulage, Water Collection, Haulage and Distribution, Bridge & Culvert Materials Haulage, Fuel Haulage, Plant Haulage (low loader trailer or semi-trailer)*

**Earthworks:** *Excavation & Haulage (towed scraper), Excavation (back hoe/ripper/scarifier/compressor & pneumatic tools), Loading (front shovel attachment)*

**Spreading and Mixing:** *Milling, Mixing with disc harrow, Towed grader, Water Distribution – Towed Bowser*

**Compaction:** *Towed Compaction (rubber tired/steel rollers)*

**Maintenance:** *Towed Grading (heavy and light), Grass Cutting/Trimming*

**Sealing:** *Brushing/Sweeping; Towed bitumen/emulsion heater/sprayer, Stone crushing (towed crusher and screens), Chippings Transport, Slurry Sealing (mixer and spreader), Premix Patching Material Production*

**Other:** *Temporary Accommodation (towed caravan/workshop); Personnel Transport*

Source: ERA (2010:21)

These plans, however, did not fully come into effect. Encounters of experts have shown that influential machinery owning firms and individuals severely meddled with RRAs advocating for equipment-based construction. Furthermore, WROs which were relatively infant in the road sector did not have the capacity and capability to implement the planned construction methodology with the least acceptable deviation. Highly motorized equipment such as pneumatic tire rollers, motorized graders and excavators that were initially not envisaged to be involved were apparently seen on multiple projects leading to unplanned cost of machinery rental fees. Unfortunately, these violations of key planning policies are not closely monitored and documented by RRAs for reasons of conflict in interest. Consequently, the researcher was unable to quantify the cost incurred as a result of this interference, nor has he managed to find any such document from ERA. Furthermore, according to W.T consult (2017), there is a critical lack of consensus on road works technology mix. That led to mass confusion as to which methodologies qualify as labor-based on one hand and equipment-based on the other. However, there are two indirect ways of explaining that labor was not so intensively used as planned:

1. We can take a look at the historical increase in labor employment registered in road projects in Ethiopia as presented hereafter in *Table 5.12*.

**Table 5.12:** Employment of the local Community in Road Constructions by level of skill

<b>Year</b>	<b>Ratio of skilled to total labor</b>	<b>Ratio of unskilled to total labor</b>
2001/2 (baseline)	0.25	0.75
2002/3	0.25	0.75
2003/4	0.25	0.75
2004/5	0.30	0.70
2005/6	0.30	0.70
2006/7	0.30	0.70
2009/10	0.43	0.57
2010/11	0.42	0.58
2011/12	0.40	0.60
2012/13	0.40	0.60
2013/14	0.39	0.61
2014/15	0.38	0.62
2015/16	0.33	0.67
Average	0.35	0.65

Source: W.T Consult, 2017

By the time URRAP was launched in 2010, a road length of less than 900kms was built in the first two years as 2010 and 2011 were largely years of preparation and less physical accomplishment. From 2011/12 onwards, the level of employment for unskilled labor (which URRAP was supposedly largely dependent upon) did not show any marked improvement, moving only by 0.02% until 2014/15. The 0.05% increase in unskilled labor employment from 2014/15 to 2015/16, on the other hand, cannot actually be attributed to URRAP as the first year performance of the program under RSDP V is basically below enough to create this much improvement in employment for the locals, i.e. only 5,622kms out of the planned 16,200kms. In fact, only 103,578 labor employment opportunities were

created (ERA, 2016). There are no initial plans estimating the number of employments to be created annually under URRAP.

2. ERA reported that over 1,400,000 labor employment opportunities were created as a result of URRAP during RSDP IV, i.e. 2011-2015 (ERA, 2016). With the registered physical accomplishment of 47,000kms of road, the manpower utilized equals to 29 laborers per km of rural road. This laborers' distribution per km has further decreased to a dramatic 18 during the first year URRAP execution under RSDP V. With moderate efficiency of laborers, that is basically not too different from an equipment-based construction. Furthermore, making an assumption of 200 working days per year for four out of the five fiscal URRAP years and recalling that only 30,000,000 man-days were contributed by the rural community for free, we get a total of 800days leading to just 37,500 men and women working on the projects ( $30,000,000/800$ ). Knowing that Ethiopia has well over 70,000,000 rural residents out of which much more than 37,500 are capable of physical labor (excluding the youngster, elderly and the disabled), this figure is rather alarming and a reflection on WROs incapacity to mobilize/involve the vast manpower at hand and resist the influence of machinery owning entities who planned to make money out of rental payments.

**Answer to Critical Question 2: The Construction Methodology chosen has proven useful to other lower income countries and it is the right one considering Ethiopia's massive manpower on one hand and limitations in public investments on the other. However, the implementing agencies are still not capable of stringently executing these methodologies and thus, unplanned heavy equipment construction was apparently exercised. The appropriate mix of technology is also not in place as there are limitations on the Design Manual for Low Volume Roads which places more emphasis on design/maintenance issues and gives less attention to blending of methodologies.**

#### **5.2.1.5. Effectiveness: Q3: Are Woreda Road Desks truly capable of administering and owning URRAP?**

One of the most important planning issues of URRAP was the governance structure which was partially influenced by the Federal system that is already in place. As indicated in *Figure 4.1*, the major agencies involved include:

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- i. National Steering Committee:** composed of representatives from relevant Ministries and Regional offices. The main duties and functions of the National Steering Committee include:

  - Coordination of National Program;
  - Reviewing and endorsing Annual Reports;
  - Reviewing biannual progress and monitoring reports submitted through the Regional Coordination Committees; and
  - Setting direction for upcoming fiscal year performance.
- ii. Program Coordination Office:** seated at ERA, it assumed the responsibility for overall coordination of the program including strategic planning, compilation and consolidation of national budgeting information/data, monitoring and follow up and oversight of the works. The Program Coordination Office also took the task of preparing drafts of annual and other reports for approval by the Steering Committee. It is also the central point of contact for the program and it would provide links to coordination with all stakeholders, funding agencies and other interested parties.
- iii. Regional Coordination Committee:** established to provide regional level leadership, coordination, steering and monitoring of the program implementation. Members of these committees were drawn from the relevant regional offices and chaired by the respective Regional Presidents. The Regional Coordination Committee was supposed to consolidate regional data, information and statistics for submission to the Program Coordination Office.
- iv. Woreda Administration:** center of delivery and implementation of the program. Through its WRO, the Woreda keeps on acting as employer and assumes responsibility for contracting the planning and design services, in addition to managing and administering construction works and maintenance contracts.
- v. Woreda Road Desk:** responsible for formulating, executing and managing all aspects of the Woreda and community access roads provision contracts. Woredas are expected to utilize their own force units and small scale contractors in the delivery of works and contract additional services to support supervision for some or all of the works. The Woreda road desks provide monitoring and other data and

statistics, through the Woreda Administration to the Regional Government and ERA.

- vi. **Technical Support Team:** to ensure efficient program and contract management, both ERA and RRAs would be available to provide technical support when required. ERA also prepared design and construction manuals, draft specifications and model contract documentations for minor works envisaged under the program. In association with RRAs, ERA additionally undertook the preparation of schedules for training potential Woreda enterprises and distribution of material assistance (design manuals and the like) to WROs.

By the time RRAs and WROs were endowed with the huge responsibility of formulating, executing and managing all aspects of Woreda/URRAP roads within their respective territories, they had not developed the least acceptable capacity in terms of qualified personnel. It did not take too long for ERA to observe these limitations or it probably was aware of it even at the very beginning. The fact that URRAP was envisioned to be the 'community's road' meant that there was only so much distance ERA could have gone. Furthermore, the framework of Federalism in place does not really allow ERA to do more besides assisting these infant road agencies as regions are entitled to stick to whatever decision they themselves make in such aspects. Apparently, some regions such as Afar and Somali have basically rejected the idea of Woreda roads claiming that schools and health centers are of greater importance to them at the time. Experts are convinced that even if ERA was at liberty to get involved more deeply in URRAP, it would not be able to do so with its current capacity as its hands are tied with numerous Federal roads.

According to ERA, the capacity insufficiency in most regional road offices manifested in the areas of design review, contract management, financial management as well as rural road asset management. The majority of consultants hired by WROs for the sector severely lacked project management skills. As a result, it has actually become quite common to see projects exhibiting too much deviation from the specified quality, time and cost (ERA<sup>b</sup>, 2015). Furthermore, the continuous turnover of experienced and trained staff at regional and Woreda level has made it difficult for the relevant offices to manage tasks in reasonable time with a newly substituted and un-trained staff.

One of the most accredited aspects of URRAP which is the participation of the rural community has also come with its own setback. Different regions exercised varying levels of community mobilization and those that successfully did usually failed to make the most out of the mobilized force. This could be viewed in terms of level of productivity and quality of works (ERA, 2016). The low productivity and substandard quality, in turn, implied insufficient programming and lax supervision by the WROs through consultants and Woreda engineers.

Lastly, the depth of WROs' and RRAs' incapacity has resulted in their regular failure to deliver timely annual reports and action plans to ERA as they struggle with compiling documents stating what they have achieved in each fiscal year. The fact that ERA depends on this RRAs to prepare national documents is disturbing as every reporting error made by RRAs appears in these documents which end up in the public domain.

**Answer to Critical Question 3: No; WROs are far from capable of efficiently carrying out the responsibility of delivering, implementing and owning URRAP roads. ERA does not have the mandate to get involved besides technical assistance and the most feasible way forward is to keep up efforts in building up the capacity of the implementing organs, particularly the RRAs and WROs.**

#### **5.2.1.6. Sustainability: Q1: Have the majority of Kebeles within regional Woredas been linked?**

As mentioned a few times earlier, the core idea behind URRAP was 'to connect all Kebeles with all-weather roads by 2015'. This question basically addresses the level of success registered in providing rural access. However, the researcher, in parallel, would like to incorporate another question which somehow offers a hypothesis in the aspect of to what extent the problem of rural access would have been alleviated if all Kebeles had been linked over the period 2010-2015. The answer to question 1 is actually a straightforward 'No, the majority of Kebeles in the Ethiopian rural Woredas have not been interlinked yet'. *Table 5.13* presents accomplishment level of Kebele connectivity.

*Table 5.13:* Rural Access as Measured in terms of Kebele Connectivity

No.	Region & Municipality	Number of rural Woredas	Number of rural Kebeles	Kebeles connected by all-weather roads in RSDP IV under URRAP		Kebeles connected by all-weather roads in RSDP V first year under URRAP		Kebeles connected by all-weather roads by June 2016	
				Number	%	Number	Number	%	
1	SNNP	134	3,808	2,531	66	5	2,536	67	
2	Amhara	129	3,217	2,030	63	59	2,089	65	
3	Oromia	295	6,478	6,028	93	30	6,058	94	
4	Tigray	35	714	565	79	2	567	79	
5	B/Gumuz	20	377	252	67	-	252	67	
6	D/Dawa	1	38	38	100	-	38	100	
7	Harari	3	-	25	-	-	25	-	
8	Gambella	11	198	87	44	-	87	44	
9	Somali	50	401	122	30	-	122	30	
10	Afar	29	371	193	52	-	193	52	
Total		707	15,602	11,871	76	96	11,967	<b>77</b>	

Source: ERA, 2016

Evident from *Table 5.12*, over 41% of the Ethiopian rural Kebeles are located within Oromia. A good performance in Oromia could lead to an overall better achievement. However, that is not how the access restraint of the nation should be assessed. Individual regional evaluations lead to a more realistic interpretation (W.T Consult, 2017). For instance, SNNP, B/Gumuz, Gambella, Somali and Afar still have severe limitations in rural access. That tends to manifest in lower productivity, market access, socio-economic services and the like. It is an implication that more attention in terms of technical and financial support should be diverted to these regions. Indeed, ERA, under RSDP V, has set this strategy of giving more support to weak regions as a guiding policy (ERA, 2015). The fact that some of these regions have shown little interest in URRAP, calling for a more

ferocious MDG support budget investment on schools, clinics etc. and none on roads, has led to some other complications which is beyond the scope of this research.

In line with the parallel question raised under Q1, a 77% overall Kebele connectivity had resulted in an RAI of 40.6% (W.T Consult, 2017). This figure is actually overestimated by ERA (2016) as 57%. Despite the wide disparity between these two values put forward by the Federal agency and its independent consultant, one can easily come to the conclusion that the envisioned URRAP, even if it were implemented completely, would not have resolved the access problem of the Ethiopian rural communities. In other words, 100% Kebele connection would not lead to a 100% RAI as a 77% Kebele connectivity has only resulted in an RAI of 40.6%. That is an implication of the fact that the rural community has settled in highly scattered patterns and the cost of bringing all these communities within 2kms reach of an all-weather road only through road construction could be too much which is not to say a Village-based approach could soon be required.

**Answer to Critical Question 1: Only 77% of the Ethiopian rural Kebeles had been connected up to 2016. The connection of Kebeles apparently could not guarantee an RAI close to 100%. The highly scattered settlement pattern of the rural community is, therefore, still a huge challenge in bringing it within 2kms reach of all-weather roads. Either a huge re-settlement program for the rural population shall take place or an increased amount of financial resources must be further expended on rural roads with a village-based approach and not Kebele-based. However, knowing that the majority of the Ethiopian land is fertile and suitable to crop production, the first option seems more viable at first glance.**

#### **5.2.1.7. Sustainability: Q2: Does the asset management of URRAP roads look promising?**

Roads always come with a sustained responsibility of maintenance. That is the most compelling reason for roads to be owned by a clearly specified organ. Without the proper ownership, the issue of maintenance becomes problematic as it requires huge financial and administrative resources. The asset management of URRAP still lacks clarity. Yes, during inception, it was envisioned to be owned by the rural community and Woredas. That, by itself is not that much flawed as the community would naturally feel a sense of ownership as it gradually absorbs the benefits of these rural roads.

The Ugandans are a living proof that this method can actually work for underdeveloped African countries (Leyland et.al, 1999). But as time went by, everyone witnessed the fact that Woredas and RRA's were finding it increasingly difficult to construct these roads even with the financial assistance of MoFEC, let alone come up with the financial and planning program to maintain those URRAP roads already constructed.

The maintenance aspect of URRAP roads could be broken down into two basic categories (ERA, 2011):

- i. Regular Maintenance: Road side activities, drainage, road surface (earth or gravel); and
- ii. Occasional (Periodic) Maintenance: road surface only (gravel or paved although sealed segments are rare under URRAP)

**Table 5.14:** Major Maintenance Work items expected on URRAP roads

Defect	Maintenance Activity
<b>Regular Maintenance</b>	
Trees and bushes growing on road sides	Brush Clearing (manual)
Uneven or eroded shoulder that doesn't drain properly	Shoulder rehabilitation/balding (manual/mechanized)
Shoulder erosion	Grass planting (manual/mechanized)
Obstructed Culvert	Culvert cleaning (manual)
Eroded or sloped ditch	Erosion damage repair with selected fill (manual)
Silted ditch	Ditch clearing (mechanized)
Potholed/rutted/uneven gravel surface	Blade, Reshape and compact earth (mechanized)
<b>Periodic Maintenance</b>	
Raveling, loss of gravel	Gravel resurfacing with selected material (mechanized)
Pot hole on paved sections	Multiple activities, both manual and mechanized (Refer the Manual)

Source: ERA, 2011

As indicated in **Table 5.14** above, these Woreda/URRAP roads require both manual and mechanized methods of maintenance for different types of expected defects. In reality, much of  
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the manual remedies are not demanding as long as Woredas manage to mobilize the community and assign appropriate supervisors to guide the activities. However, mobilizing the community has proven to be a herculean and at times an impossible task even during construction.

The majority of tools and low level equipment that the rural society uses on a daily basis could be directly used for maintenance activities of URRAP roads as indicated in *Figure 5.2*.



*Figure 5.2:* Range of Simple Tools and Control Aids sound for URRAP Roads' Maintenance  
(Source: ERA, 2011)

However, not all maintenance activities are manual with simple hand tool requirements as elaborated in *Table 5.14*. For those types of defects that necessarily need mechanized approach, a sustainable source of maintenance budget should be secured.

The worrisome fact is that only **535kms** of rural roads were maintained nationally during RSDP IV (ERA, 2016). Considering some of the existing URRAP roads have already spent well over 5 years since construction, evidences of poor maintenance are already emerging. With that, questions of equity regarding who should finance URRAP's maintenance have begun surfacing.

As an illustration of the seriousness in the backlogs already developing under the maintenance of URRAP projects, generalized findings from sample roads indicated in *Table 5.15* within the Oromia Region are presented. The investigation framework is clearly described in *Section 3.4.1.2*.

**Table 5.15:** Sample URRAP roads in Oromia Region for Inspection

No	Zone	Woreda	Road Name	Length (km)	Status as of July 2017
1		Sebeta	Bonde-Wale eka	5.17	On going
2	Finfine Surrounding Special Zones	Sebeta	Tafki-Kelaeh	14.57	Completed/provisionally accepted
3		Sebeta	Wele Eka - Gudda	9.98	On going
4		Woliso	Dilala-Dese-Jebo	9.36	Completed
5	South West Shewa	Woliso	Gurura-Birbirrsa Kenteso	7.50	Incomplete/Contract was terminated
		Woliso	Sentiele-Hale- Koya	7.60	Completed
6		Woliso	20m Bridge on Gurura-Kenteso road		Bridge completed /approach road ongoing
8		Seka Chokorsa	Seka –Ushane Buyo	19.80	Completed/provisionally accepted
9	Jimma	Shebe Sombo	Shebe-Walakela	16.00	6km completed and suspended since then
10		Shebe Sombo	Shebe-Hane	20.00	Completed/provisionally accepted
11		Metu	Metu-Madalu	6.20	Completed/not yet provisionally accepted
12		Metu	Metu-Ale Buya	7.50	Completed/provisionally accepted
13	Ilubabor	Metu	Maltu-Made- Chogi	6.50	Completed/not yet provisionally accepted
14		Nopa	Nopa-Ulomya- Hurumu	12.00	Completed/not yet provisionally accepted

15		Bedele	Odo-Medalle	4.31	Completed/not yet provisionally accepted
16		Bedele	Taba-Amberat-Madalle	4.13	Completed/not yet provisionally accepted
17	Buno Bedele	Chora	Tulu-Mute-Ale Debso	8.33	On going
18		Chora	12 m Bridge on Tulu-Ale-Debso road		Completed
19		Chora	Embero-Bongalk	5.00	Completed
20	East Wollega	Guto Gida	Nekemte-Negasa	9.06	Completed and Finally accepted
			<b>Total Inspected</b>	<b>173.01</b>	<b>18 roads</b>

Source: ERA, 2017

All of the completed projects were constructed in the fiscal years 2014-2017. It was estimated that over 60% of the inspected roads exhibited a combination of the following defects that largely emanated from lack of maintenance:

- Loss of central crown and heaving;
- Severe raveling and localized loss of gravel;
- Scoured culverts;
- Ditches and culverts plugged with debris; and
- Unprotected/eroded side ditches and shoulders.

It is relatively easy to imagine the level of damage sustained by roads constructed in earlier years, i.e. 2012/13/14 if those constructed in recent years are already becoming dysfunctional due to negligence of maintenance.

With regards to maintenance budget, the current trend is for Woredas to look for the assistance of RRAs and RRAs turning onto ERA in search of solution even though ERA and MoFEC clearly do not have the responsibility of coming up with the asset management finances for these Woreda roads since the very beginning of URRAP's planning phase. This relationship among national road

agencies is not constructive. ERA, which owns and administers Federal trunk and link roads is responsible for planning the national road network and it assigns RRAs the responsibility of administering and owning regional roads whereas WROs are endowed with the ownership of Woreda/URRAP roads. The overall traffic flow and movement of Federal trunk roads, in turn, depends to a great extent on Regional and Woreda roads. Overlooking or neglecting any one of these roads undermines the overall network strength and integrity. The fact that the maintenance of URRAP roads is not clearly undertaken by any entity could potentially lead to a serious loss in roads worth tens of thousands of kms. Considering the fact that these roads, length-wise, now occupy well over 40% of the national network, the stakes are higher than ever. **Table 5.16** hereafter illustrates the maintenance budget allocation ORF had been exercising throughout RSDP IV and the first year of RSDP V.

**Table 5.16:** Maintenance Budget Allocation of the ORF since URRAP Began in million ETB

<b>Disbursed</b>						
<b>Amount,</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>
<b>/Year</b>						
Federal Roads	972,277	855,562	973,134	1,031,735	868,038	835,096
Regional Roads	241,954	200,964	111,038	267,199	276,543	278,876
Urban Roads	68,037	74,097	51,369	143,404	124,950	144,889
Total	1,282,268	1,130,623	1,135,541	1,442,338	1,269,531	1,258,861
Growth rate	-	-11.8%	0.43%	27%	-11.98%	-0.84%

Source: Analysis Result based on ORF's official figures

There are two outstanding implications that could be drawn from **Table 5.16**:

- i. The revenue collected and disbursed by the ORF through fuel levy showed an erratic pattern of growth marked by negative rates, thus implying that maintenance budget has not increased linearly with the import of more cars in recent years. This leads to an increased maintenance financial pressure on the GoE in addition to construction,

- rehabilitation and upgrading. The idea of allowing roads to sustain themselves is therefore a long way from becoming a reality in Ethiopia.
- ii. Nearly 18% of the total budget raised by the ORF goes to RRAs. However, barely any of this goes to URRAP projects (as only 535kms of URRAP roads were maintained nationally in 2011-2015) clearly indicating that RRAs are not taking care of URRAP roads located within their respective Woredas. That could be partially understandable when one considers that RRAs are responsible for maintaining non-community rural and collector roads in their regions and their ability to generate and augment the ORF budget is limited. The question of why the ORF itself won't consider URRAP projects separately is already surfacing mainly because the rural Woredas that were supposed to program and carry out maintenance of rural roads are largely made up of subsistence farmers and currently receive little help from RRAs. Proposed levy on crop and food items transported on URRAP roads to raise funds for maintenance were abandoned for reasons of impracticality.

And so, it is safe to state that even though rural communities and Woredas supposedly own URRAP roads, and RRAs are expected to allocate maintenance budget to Woredas, the responsibility of planning, programming and carrying out maintenance of these roads has not been fully embraced by any entity so far.

**Answer to Critical Question 2: No; URRAP roads' asset management does not look promising currently as very few roads have been maintained so far and the responsibility of funding has not clearly been settled. However, these roads are not that difficult to maintain if Woredas get their communities mobilized, largely because manual means of maintenance are already theoretically developed and the funds required for the remaining mechanized repair methods are minimal.**

### **5.2.2. URRAP's Implementation**

As specified in *Section 3.4.1.2*, the implementation issues of Woreda roads under URRAP are dealt with on a case-study basis, particularly, the Oromia Region for the reasons given under the same section and depicted in *Tables 3.2* and *3.3*. The inspection focused on the following zones: South West Shewa, Jimma, Buno-Bedele, Ilubabor, East Wellega and the Special zone of Sebeta.

Findings regarding general administration/management, prioritization of roads, design issues, procurement of services, material/construction quality and supervision of projects have been discussed on a general basis, i.e. not based on how the findings in each respect are widely spread among sample zones. Therefore, the methodology described in *Section 3.6.2*, could not be flawlessly implemented. The researcher had no means of identifying which problems were rampant in each of the sampled zones. However, that does not discredit the discoveries as the findings could be concluded as vastly existent within the selected Oromia Region. Though implementation problems cannot be assigned a definite weight of importance, an un-scored condensed presentation of the identified problems can be easily made. Desk review has been augmented with primary data collected through interviews.

### **5.2.2.1. General Management Issues**

At the beginning of URRAP, four hundred and seventy (470) contractors and one hundred sixty (160) consultants were mobilized and trained for Woreda roads task in Oromia although their number has gradually kept on decreasing for different reasons (ERA, 2016). Between the fiscal years 2011 and 2015, three thousand one hundred and twenty five (3,125) projects were embarked upon. That automatically implies that each contractor was likely to have been awarded multiple projects. Note that 'award' in this context does not imply competitive bidding as these small scale contractors simply get projects assigned to them based on their geographical position (Woreda). Hence, they are sometimes called Woreda contractors. With the above figure of 470 contractors and number of rural Woredas in all eighteen of Oromia's zones equal to 265, an average of 2 contractors were endowed with the responsibility of constructing all URRAP roads within each Woreda, and each Woreda, on average, had just over 10 projects (3,125/265). That put Oromia's URRAP contractors in a rather decisive and important spot.

The fact that there is a quota (an annual plan of kms) which should be strongly pursued by WROs allows new projects with better lump sum amount (mainly because the Oromia Roads Authority just like other RRAs had a slight freedom to revise and increase the lump sum value fixed per km as the years went by) to get assigned to contractors whose hands are already tied with ongoing projects which begun in previous years. That gives contractors the option of shifting their full attention or at least mobilizing much of their resources to these more lucrative projects and abandon the previous unfinished ones that were given at lower rates. These contractors have also

earned a reputation of showing little to no interest in building structural elements such as small bridges and culverts as structural works are naturally more troublesome and financially more stringent as well as time consuming. Instead, they exert more pressure on simple graveling works. That is why road users sometimes encounter dead ends due to lack of structural facilities. In response, WROs through a largely disorganized effort, refused to grant new projects to contractors who were avoiding structural works. This trend was particularly true until 2014 after which the RRAs begun disbursing only ETB 1,500,000 per Woreda per year.

On some difficult terrains, where excavations were deep/in hard rock and fills very high, these small scale contractors had no option but to abandon projects. This problem was actually foreseen by ERA at the planning phase of URRAP as it stipulated that other more capable contractors with equipment intensive construction methods would be summoned in projects passing through rugged terrain (ERA, 2010). However, the financial arrangements were not clearly stated, i.e. whether these specialized contractors would be entitled to payments according to existing URRAP rates or better ones.

#### **5.2.2.2. Continuous Prioritization of Roads**

The selection of route for roads is always an on-going process as URRAP roads are constructed during every year and projects are identified continuously. Consultants in collaboration with Woreda and community representatives carry out the task of selecting and prioritizing roads for upcoming fiscal years. The following problems have been ubiquitously observed:

- There is virtually no feasibility study which consultants carry out;
- No one is sure whether routes are selected based on the Federal plan whose framework was outlined during the ERTTP largely because regions assert independence and discourage Federal level evaluation; and
- There aren't planning coordination among adjacent Woredas and that leads to a disorganized national road network, further moving away from a seamless connectivity.

#### **5.2.2.3. Design Issues**

URRAP consultants, at different stages, are normally expected to prepare design reports which include the following (ERA, 2017):

- Inception;

- Topographic survey;
- Soil and material;
- Hydrological/hydraulic structures; and
- Complete set of drawings, land acquisition plan and cost estimate.

Zonal offices and Woredas have described great concern over the repeated faulty designs, particularly with regards to drainage structures. Route selection, as a result of insufficient surveying activities, has also remained a major problem, leading to great quantities of earthwork. Questions of equity are also sporadically raised as routes that were supposedly less important were in some cases prioritized. Furthermore, when unstable expansive soils are encountered, consultants usually recommend a thicker surfacing (thicker than 15cms) and do not look for other options. The design provisions as to how to navigate different subgrade conditions is not satisfactorily in place. Small scale material investigation services that were envisioned have also not come into effect and material scrutiny is largely done through visual inspection.

#### **5.2.2.4. Procurement of Services**

The Oromia Regional Office took up the responsibility of procuring both consultants and contractors upon open vacancies. Any group claiming to consist of Resident Engineer, Material Engineer and Chief Surveyor with the minimum criteria set by the Oromia Roads Authority (ORA) was eligible for selection. The downside of creating massive job opportunities is the fact that an indefinitely varying level of skill, experience and competence could lead to a great deal of resource inefficiency. Trainings to these groups were administered by ERA. In addition, consultants were required to hire works' inspector, junior surveyor, laboratory technician, and other intermittent staff like hydrologist, sociologist as well as environmentalist all of which basically never happened due to insufficient budget.

As for contractors, the ORA randomly put together individuals into a single small scale contracting enterprise. As a result, individuals who did not have similar professional competence and/or experience, commitment and even motive were pooled together. That gave way to massive disorganization and conflict of interest, leading to gross underperformance in the first two years under RSDP IV.

### **5.2.2.5. Material Availability and Quality**

Constructing rural roads with gravel surface requires good quality quarries within a short radius of the actual site, largely because the small lump sum amount fixed per km does not allow contractors to transport construction materials from distant sources. One of the issues encountered in the Oromia Region was inability to compensate/pay quarry and land owners for the use of materials which resulted in owners refusing to assist the roads material-wise anymore. Combined with the fact that in some Woredas, sufficient quarry was not discovered, contractors were forced to look for material resources elsewhere. Surfacing materials are still mainly inspected only visually by the consultant. To make matters worse, compaction efforts are not tested through field density after surfacing works get completed even though spreading and compacting works are from time to time jointly inspected by the client's (WRO's) and consultant's representatives. The appropriate Atterberg limit tests are also still not conducted on subgrades and earth fills, leading to the use of excessively plastic and/or unsuitable materials.

### **5.2.2.6. Supervision**

URRAP's consultants are responsible for all site supervisory tasks in accordance with the contract agreement. The following are some of the tasks indicated in the contract:

- Prepare working drawings as per site conditions;
- Control construction quality as per the technical requirements;
- Inspect contractors' act concerning safety procedures/regulations;
- Perform material testing and approval;
- Prepare supervision checklist;
- Record day to day site activities;
- Review and monitor contractors' work program and track work performance against the outlined program;
- Check and approve contractors' payment requests; and
- Submit monthly, quarterly and annual progress report to the client, i.e. the WROs.

Findings indicated that consultants have been underperforming in supervision activities as they are hardly paid their monthly wages and supposedly cannot afford to arrange transportation to their staff members regularly. The fact that some consultants do not reside sufficiently/reasonably close to project sites worsens this problem. The supervision contract, according to the agreement, lasts

only for ten months per year with monthly wages and the remaining two months are dedicated to upcoming roads' designs with professional fees based on length of km of road designed. In a significant number of Woredas, these consultants are expected to carry out their responsibilities for over two years with a ten-month wage. However, insufficient budget is not the only cause of improper site supervision according to the client. WROs have expressed concerns over the competence and commitment of consultants and their staff. ERA has also identified consultants' lack of management skills as one of the basic problems in the implementation of URRAP (ERA, 2016).

### **5.3. Road Network Development Indicators**

#### **5.3.1. Relevance: Q1: Are the current proposed values of indicators truly reflective of the progress made?**

This is one of the most challenging areas of concern for transport planners. It is so not only for Ethiopia and other underdeveloped nations, but to the rest of the world as well. Not much effort has been exerted in the field until recently. Countries' road network status was included in the World Bank's World Development Indicators merely a decade ago (the original data were sourced from the International Roads Federation) (Iimi et. al, 2016). The included status indicators mainly had to do with road density assessed on a national level. Experts have long argued that these indicators were actually meaningless because they could not provide any granularity of local connectivity. Furthermore, the indicators showed no signs of change even after massive resources were spent on road infrastructure.

*Note:* This research is not referring to MDG/SDG indicators which are by nature holistic and not strictly direct in assessing road network expansion and quality.

Over the last decade, a number of institutional researches were carried out in search of a meaningful road network development indicator and some of the discoveries include:

- Conventional RAI;
- Service Delivery Station RAI;
- Spatial Access Measure;
- Road Network Agglomeration;
- Road Network Growth Model with Central Business District (CBD) attraction;

- Geographical Analysis of Road Transportation; and
- Specialized Road Condition Assessment.

However, not each one of the aforementioned discoveries are applicable to countries dominated by rural communities. Some of the models, such as road network growth model with CBD attraction are actually more robust for urban area. And still some other models such as spatial access measure are more suitable to isolated analysis such as measuring a given village's access to nearby health center or some other socio-economic service. The most justifiably applicable indicators for Ethiopia include: conventional RAI (which measures the proportion of population living within 2kms reach of all-weather roads); service delivery station RAI (which measures the proportion of the rural population that lives within 2kms reach of bus terminals and market areas); and geographical analysis of road transportation (which presents progress made on a regional basis).

#### **5.3.1.1. Geographical Analysis**

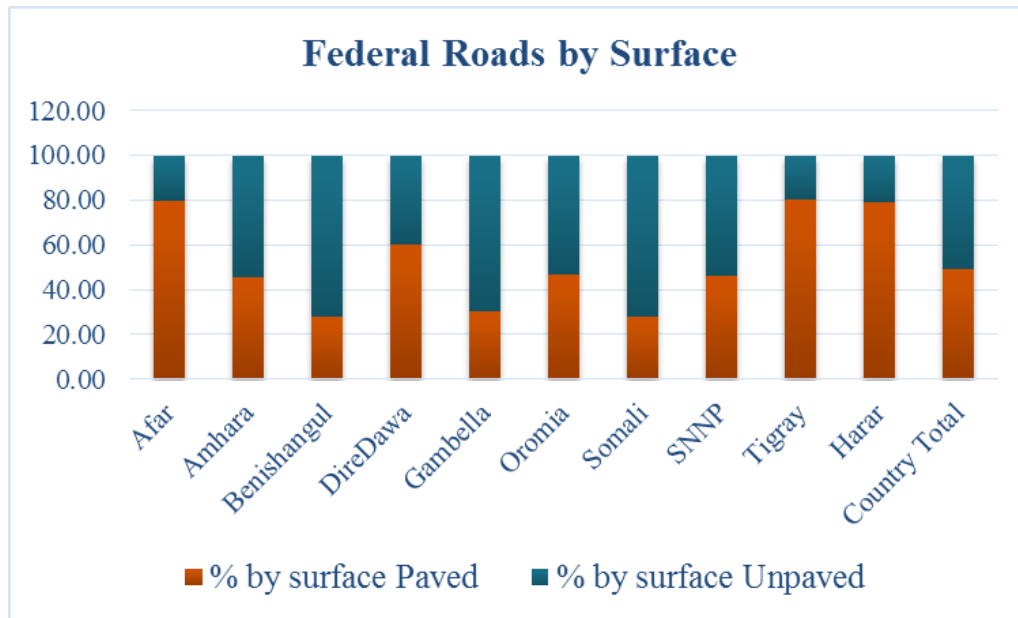
This is among one of the simplest and yet informative road network development indicators in the Ethiopian context. As mentioned in the last section of the previous paragraph, it analyzes the distribution of roads on regional basis (proportion of paved roads, population size and regional land area) but sets a common margin. For instance, Ali and Maeza (2015) used the top twenty percentile as high, the next twenty percentile as medium and the remaining bottom sixty percentile as low for road density based on area and population size. But such analysis does not necessarily imply the lower ranked regions are performing poorly or have low importance on the national network. Therefore, ranking should be interpreted with what is actually known about these regions on the ground.

**Table 5.17:** Status of Federal Roads by Region and Surface by the end of RSDP IV

It No.	Region & Municipality	Road Count	Length by surface (km)		% by surface		Total Length (km)	Average length of road (km)
			Paved	Unpaved	Paved	Unpaved		
1	Afar	31	1,490	376	79.85	20.15	1,866.00	60.19
2	Amhara	122	2,795	3,348	45.50	54.50	6,143.00	50.35
3	B/Gumuz	12	199	508	28.15	71.85	707.00	58.92
4	D/Dawa	4	27	18	60.00	40.00	45.00	11.25
5	Gambella	8	158	363	30.33	69.67	521.00	65.13
6	Oromia	163	4,160	4,798	46.44	53.56	8,958.00	54.96
7	Somali	25	717	1,835	28.10	71.90	2,552.00	102.08
8	SNNP	77	1,978	2,303	46.20	53.80	4,281.00	55.60
9	Tigray	35	1,990	497	80.02	19.98	2,487.00	71.06
10	Harari	3	37	10	78.72	21.28	47.00	15.67
	Country Total	480	13,551	14,056	49.09	50.91	27,607.00	57.51

Source: Analysis Result

One of the most important and traditional indicators is the proportion of paved roads as it is a direct measure of the intensity of traffic and hence, economic activity. A regional break down of this indicator is illustrated in *Figure 5.3* hereafter.



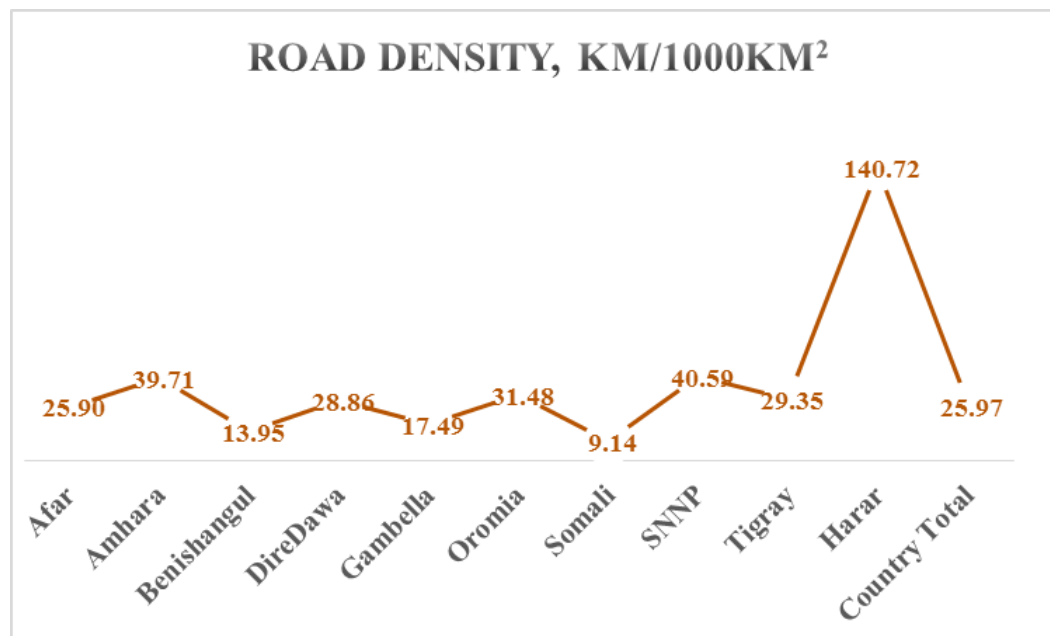
**Figure 5.3:** Breakdown of Federal roads by Region and Surface at the end of RSDP IV. (Source: Analysis result)

However, this figure is not complete by itself as regions with higher percentage paved roads do not necessarily have greater roles on the national network compared with the ones below them. For instance Harari and Tigray Regions have higher percentages of paved roads compared with Oromia and even SNNP from which major food items for local and international consumption are transported or that of D/Dawa which is found along the import-export corridor. Therefore, this is one simple evidence suggesting that ranking one indicator separately on a regional basis cannot clearly depict actual conditions on the ground. On the following page, a regional break down of road density is presented in **Figure 5.4** and **Table 5.18**.

**Table 5.18:** Status of Federal Roads' Density by Regional Land Size at the end of RSDP IV

It No.	Region & Municipality	Land area (km <sup>2</sup> )	Total Federal roads length (km)	Road density (km/1000km <sup>2</sup> )
1	Afar	72,053	1,866.00	25.90
2	Amhara	154,709	6,143.00	39.71
3	B/Gumuz	50,699	707.00	13.95
4	D/Dawa	1,559	45.00	28.86
5	Gambella	29,783	521.00	17.49
6	Oromia	284,538	8,958.00	31.48
7	Somali	279,252	2,552.00	9.14
8	SNNP	105,476	4,281.00	40.59
9	Tigray	84,722	2,487.00	29.35
10	Harari	334	47.00	140.72
	Country Total (excluding Addis Ababa)	1,063,125	27,607.00	25.97

Source: Analysis Result



**Figure 5.4:** Federal Roads' Density by Regional Land Size at the end of RSDP IV (Source: Analysis result)

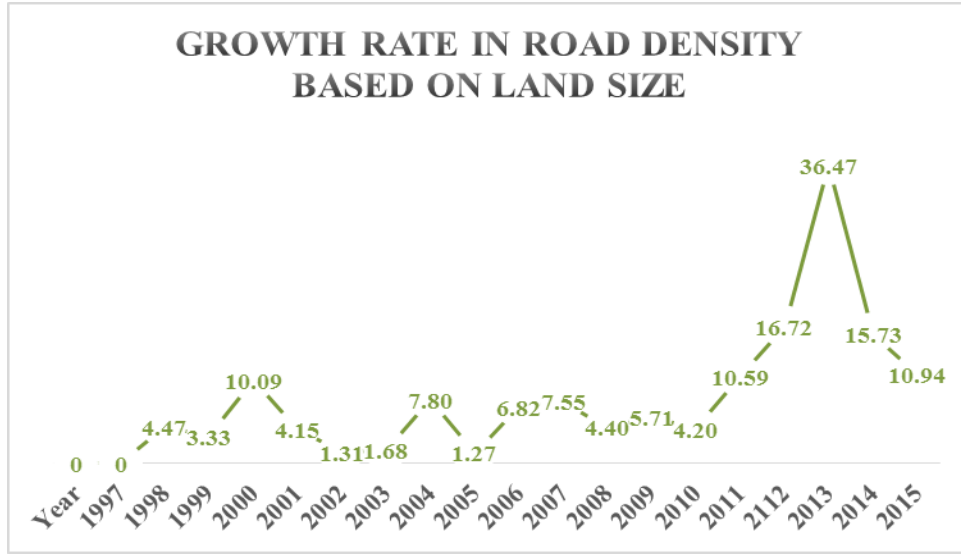
The regional road density is in harmony with the socio-economic reality on the ground as Somali, B/Gumuz and Gambella Regions with less health, educational and other administrative services' coverage, in fact, have lower road densities compared with other regions. Harari's road density spiked because the Region has an extremely compact territory. Additionally, it is sufficiently clear that the density of roads based on only Federal roads is much lower compared with the density based on all roads (Federal + Regional + Woreda/URRAP). **Table 5.19** shows how important the role of Woreda/URRAP roads has become in the last few years, particularly after the commencement of RSDP IV, raising the density of Federal roads from 25.97km/1000km<sup>2</sup> (as indicated in **Table 5.18**) to a total roads' density of 100.4km/1000km<sup>2</sup> (as indicated in **Table 5.19**) by 2015.

**Table 5.19:** Change in Road density Observed Nationally over RSDP I - RSDP IV

Year	Road Network (km)						Growth Rate (%)	Road Density (km/1000 persons)	Road Density (km/1000 km <sup>2</sup> )	
	Federal Paved	Federal Gravel	Regional	Woreda/ URRAP	Municipality					Total
					Paved	Gravel				
1997	3,708	12,162	10,680				26,550	4.5	0.46	24.14
1998	3,760	12,240	11,737				27,737	3.3	0.46	25.22
1999	3,812	12,250	12,600				28,662	10.1	0.47	26.06
2000	3,824	12,250	15,480				31,554	4.2	0.50	28.69
2001	3,924	12,467	16,480				32,871	1.3	0.50	29.88
2002	4,053	12,564	16,680				33,297	1.7	0.49	30.27
2003	4,362	12,340	17,154				33,856	7.8	0.49	30.78
2004	4,635	13,905	17,956				36,496	1.4	0.51	33.18
2005	4,972	13,640	18,406				37,018	6.6	0.51	33.60
2006	5,002	14,311	20,164				39,477	7.5	0.53	35.89
2007	5,452	14,628	22,349				42,429	4.5	0.55	38.60
2008	6,066	14,363	23,930				44,359	5.5	0.56	40.30
2009	6,938	14,234	25,640				46,812	4.2	0.57	42.60
2010	7,476	14,373	26,944				48,793	10.7	0.58	44.39
2011	8,295	14,136	30,712	854			53,997	16.8	0.66	49.09
2112	9,875	14,675	31,550	6,983			63,083	36.3	0.75	57.30
2013	11,301	14,455	32,582	27,628			85,966	15.8	1.0	78.20
2014	12,640	14,217	33,609	39,056			99,522	10.9	1.1	90.50
2015	13,551	14,055	30,641	46,810	1,693	3,664	110,414	1.2	1.2	100.40

Source: ERA, 2016

Between the beginning of RSDP I and the end of RSDP III, the change in road length, hence density, showed a limited growth annually. But, with the introduction of URRAP at the beginning of RSDP IV, significant rise in road density was observed between 2011 and 2015, especially in 2013 as shown in *Figure 5.5* hereafter. However, one should note that gravel and rural roads showed negative growth rates between 2014 and 2015.



**Figure 5.5:** Total Roads' Density Increment (in %) by Year for Ethiopia (Source: Analysis result)

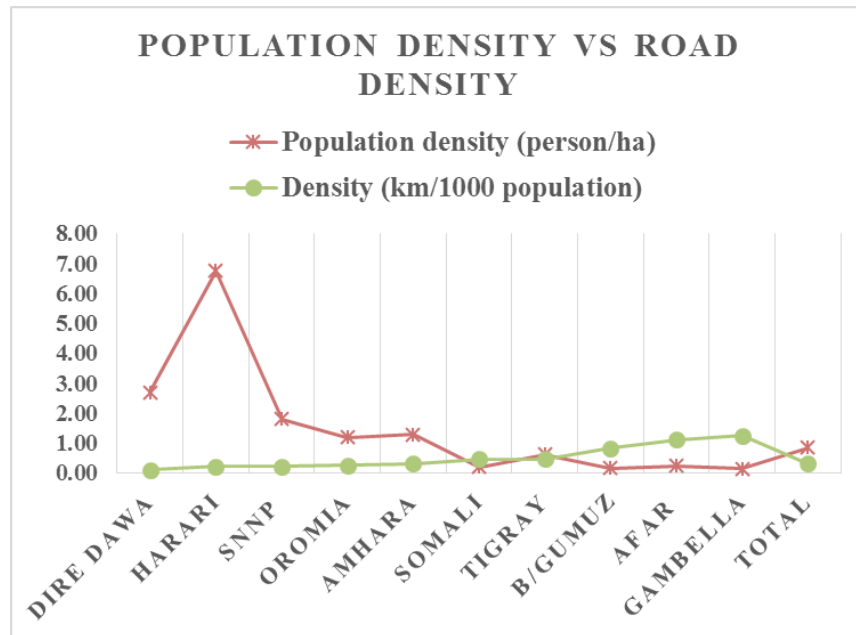
**Table 5.20:** Federal Roads' density based on Regional Population at the end of RSDP IV

No.	Region/ Municipality	Area (km <sup>2</sup> )	Population as of 2015 (number)	Population Density (person/km <sup>2</sup> )	Federal Roads (km)	Density (km/1000 persons)	Total Woredas (number)	Rural Woredas (number)	Rural Woredas (%)
1	D/Dawa	1,559	418,460	268	45	0.11			0
2	Harari	334	225,433	675	47	0.21			0
3	SNNP	105,476	18,883,912	179	4,281	0.23	150	134	89.33
4	Oromia	284,538	33,966,516	119	8,958	0.26	295	265	89.83
5	Amhara	154,709	19,800,053	128	6,143	0.31	137	128	93.43
6	Somali	279,252	5,451,653	20	2,552	0.47	53	53	100.00
7	Tigray	84,722	5,253,367	62	2,487	0.47	47	34	72.34
8	B/Gumuz	50,699	848,345	17	707	0.83	20	20	100.00
9	Afar	72,053	1,683,858	23	1,866	1.11	30	30	100.00
10	Gambella	29,783	420,291	14	521	1.24	13	12	92.31
	Total	1,063,125	90,776,590	85	27,607	0.30	745	676	90.74

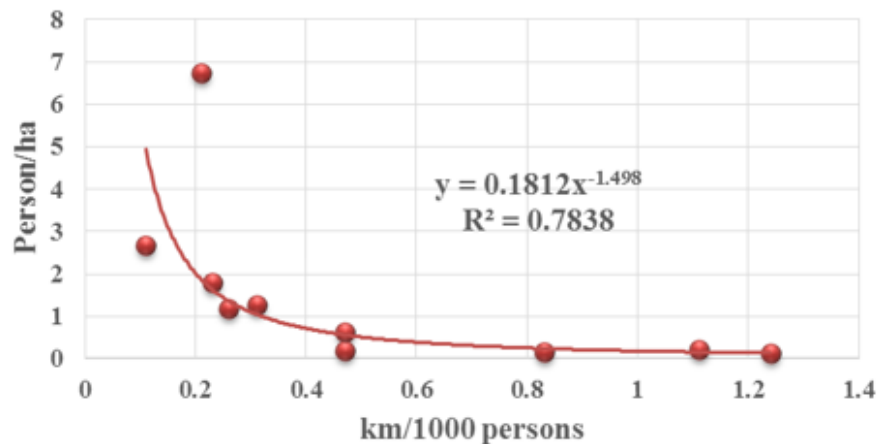
Source: Analysis Result

As opposed to density based on land size, road density based on population could be seriously misleading as the poor socio-economic performing regions of Afar, Gambella and B/Gumuz are leading the way as illustrated in *Figure 5.6*. Evident from *Table 5.20*, sparsely populated regions have greater road density as expected. That is particularly caused by the fact that sparsely populated regions such as Afar and Somali have a vast land area with a surprisingly low population size. Gambella, on the contrary, has a compact area but is still marked by the lowest population density in Ethiopia. The level of urbanization, on

the other hand seems ubiquitous for all regions with the exception of D/Dawa and Harari which are completely urban and thus seemingly does not affect road density. In conclusion, the level of association between road density and population density for the Ethiopian regions is not that strong as illustrated in **Figure 5.7** due to the presence of some outliers such as Harari and D/Dawa.



**Figure 5.6:** Federal Roads' Density Vs Regional Population Density at the end of RSDP IV (Source: Analysis result)



**Figure 5.7:** Relationship between Road and Population Density in Ethiopia at the end of RSDP IV (Source: Analysis result)

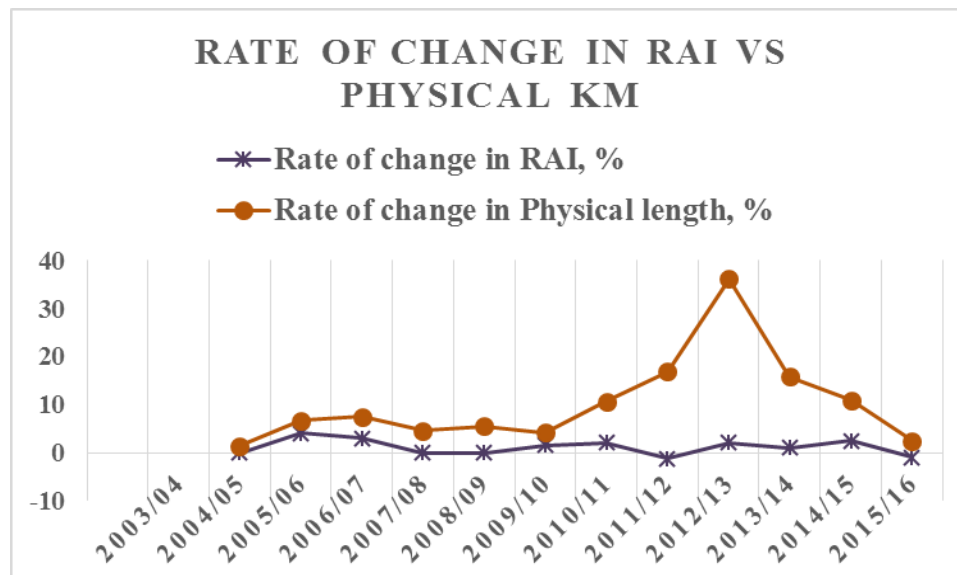
### 5.3.1.2. Other Indicators: RAI and Physical Length

Among the critical points scholars raise for their doubtfulness of currently existing road network development assessment is the fact that the relationship between indicator values and financial resources invested in roads is not in harmony which is the exact case in Ethiopia. Road indicators such as RAI tend to stay stagnant even after huge resources are expended on construction and maintenance of roads. Another indirect reflection of the investment made is the physical length of roads. In *Table 5.21* below, the change in rates of RAI on one hand and physical km on the other are presented. The results, as expected, are in some disharmony where changes in physical length are remarkable and growth rates in RAI are largely stagnant and negative at times.

*Table 5.21:* Comparison of rate of change in RAI Vs Physical km

Year	Conventional RAI (%)			Total Road Length (km)	Rate of change in RAI (%)	Rate of change in Physical length (%)
	Rural	Urban	Total			
2003/04	31	95.7	41.4	36,496		
2004/05	31	95.7	41.4	37,018	0.00	1.43
2005/06	32.2	96.6	43.1	39,477	4.11	6.64
2006/07	33.2	97.6	44.4	42,429	3.02	7.48
2007/08	N/A	N/A	N/A	44,359	N/A	4.55
2008/09	35.5	99.4	46.9	46,812	N/A	5.53
2009/10	36.7	99.8	47.6	48,793	1.49	4.23
2010/11	37.8	99.8	48.6	53,997	2.10	10.67
2011/12	38.56	92.33	48.02	63,083	-1.19	16.83
2012/13	38.92	92.87	48.98	85,966	2.00	36.27
2013/14	39.7	93.33	49.5	99,522	1.06	15.77
2014/15	40.3	93.9	50.7	110,414	2.42	10.94
2015/16	40.6	94.3	50.2	113,066	-0.99	2.40

Source: Analysis Result



*Figure 5.8:* Rate of Change in RAI Vs Physical Length in Ethiopia (Source: Analysis result)

**Answer to Critical Question 1: The current road network indicator values are somewhat contradictory among themselves and lack a clear relationship. They only make sense when treated/interpreted together and supplemented with other socio-economic indicators.**

### **5.3.2. Relevance: Q2: Are the targeted network indicator values adopted from other lower middle income countries justifiable?**

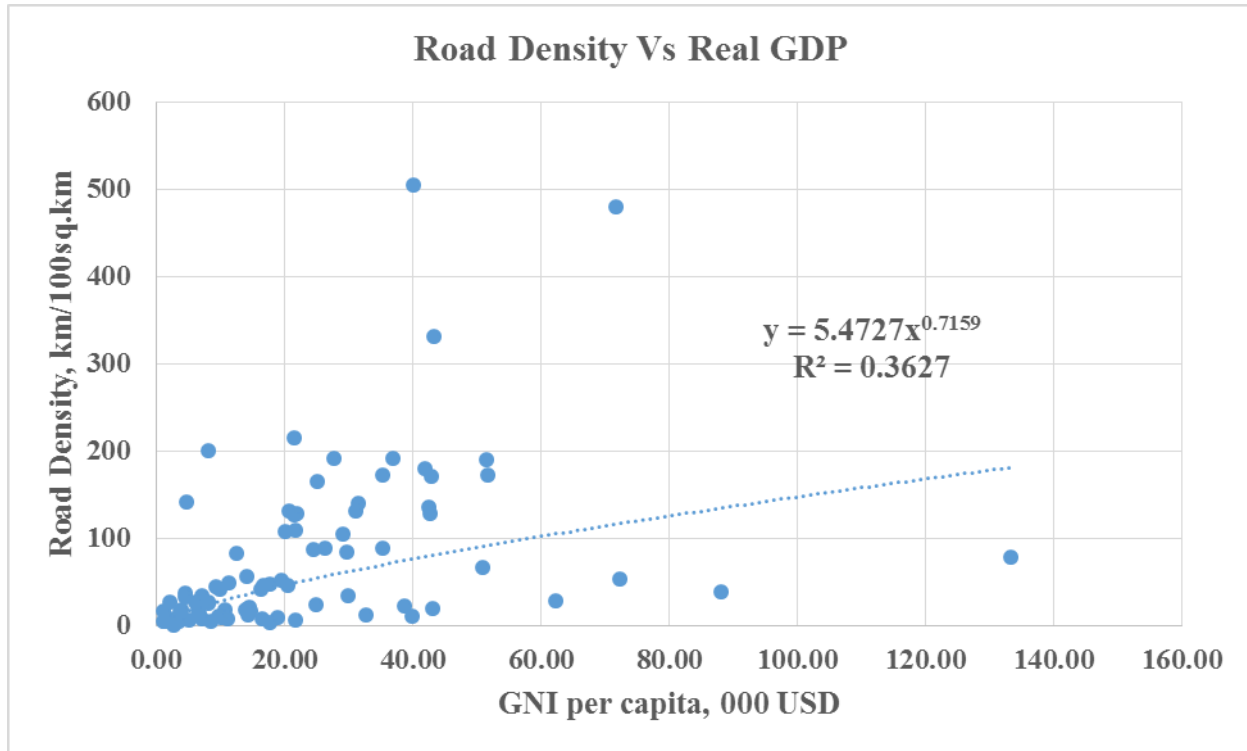
One of the most controversial statements of RSDP V revolves around the concept that since China, India, Brazil and South Africa joined the list of lower middle income countries with an average road density of 200 km/1000km<sup>2</sup>, Ethiopia would also stand a very good chance of achieving the same feat with a road density of 196km/1000km<sup>2</sup>. That, however, is an overly simplified planning approach which fails to even mention import-export balance, trade strategies, financial policies, level of urbanization, settlement and productivity. *Table 5.22* presents a list of eighty five representative countries' road densities and gross national income (GNI) per capita as surveyed in 2011. The year chosen actually has no influence on the outcome as the researcher's particular interest is simply to analyze how real GDP interacts with road density. Any other year could work too.

**Table 5.22:** Road Density and Real GDP of selected Countries, 2011

Country	GNI per capita (USD)	Road Density (km/100km <sup>2</sup> )	Country	GNI per capita (USD)	Road Density (km/100km <sup>2</sup> )
Argentina	16,560	8.7	Kenya	2,072	27.7
Armenia	7,182	26.1	Korea Rep	29,111	106
Australia	39,999	10.6	Kuwait	88,172	39.3
Austria	42,597	136.6	Lao PDR	3,837	17.3
Azerbaijan	14,593	21.9	Latvia	20,075	107.8
Belarus	16,414	41.7	Lithuania	21,583	127.0
Belgium	40,211	504.5	Madagascar	1,348	6.4
Bhutan	6,564	21.8	Malaysia	20,555	47.0
Bolivia	5,197	7.5	Mauritania	2,680	1.1
Brazil	14,031	18.6	Moldova	4,516	37.9
Brunei Darussalam	72,342	54.2	Montenegro	14,241	57.2
Bulgaria	14,793	17.6	Morocco	6,489	13.1
Burkina Faso	1,435	5.6	Myanmar	3,599	5.6
Chile	19,033	10.3	Namibia	8,584	5.5
China	9,944	42.8	Netherlands	43,286	331.5
Colombia	10,822	18.8	New Zealand	29,936	35.2
Costa Rica	12,456	83.0	Nicaragua	3,995	18.1
Croatia	19,555	52.0	Norway	62,242	29.0
Cyprus	31,538	140.6	Oman	43,228	19.5
Czech Republic	25,225	165.7	Pakistan	4,454	33.0
Denmark	42,963	171.6	Panama	14,393	20.3
El Salvador	7,151	34.7	Paraguay	7,098	8.0
Estonia	21,957	129.3	Peru	10,212	10.0
Ethiopia	1,147	4.9	Poland	20,789	131.8
Finland	38,705	23.1	Portugal	24,887	24.1
France	37,019	191.6	Qatar	133,338	78.6

Country	GNI per capita (USD)	Road Density (km/100km <sup>2</sup> )	Country	GNI per capita (USD)	Road Density (km/100km <sup>2</sup> )
Georgia	6,137	27.1	Romania	16,825	46.8
Germany	41,907	180.2	Russian Federation	21,789	6.4
Greece	26,261	88.6	Senegal	2,138	7.6
Guatemala	6,721	14.8	Serbia	11,445	49.5
Guinea	1,095	17.6	Seychelles	21,653	110.4
Honk Kong SAR, China	51,497	191.0	Singapore	71,702	480.6
Hungary	21,497	216.0	Slovak Rep.	24,623	88.4
Iceland	32,803	12.5	Slovenia	27,782	192.6
India	4,841	142.7	Spain	31,092	131.9
Indonesia	8,201	26.1	Sweden	42,701	128.8
Iran, Islamic Rep.	14,310	13.1	Switzerland	51,770	173.1
Israel	29,652	84.1	Tanzania	1,578	9.1
Jamaica	8,169	201.3	Tunisia	9,826	11.9
Japan	35,335	89.7	Turkey	17,814	47.3
Jordan	11,222	8.1	Ukraine	8,102	28.1
Kazakhstan	17,719	3.6	United Kingdom	35,265	172.3
			United States	50,863	66.7

Source: CIA World Factbook and International Roads Federation



**Figure 5.9:** Relationship between Road Density and Real GDP for selected Countries in 2011  
(Source: Analysis result)

The best fit was found through power regression with a robustness of  $R^2=0.3627$  which indicates that the correlation between economic status and road density is extremely weak as illustrated in **Figure 5.9**. The pattern is expected to undergo an increased disarray with the inclusion of more countries. A country with higher GNI per capita does not necessarily have a greater road density compared with another country of lower GNI per capita. And the assumption that some value of road density could be taken as a guarantee for a certain level of economic performance is too simplified and ignorant of the more important factors that are more strongly associated with the economy.

In **Table 5.23**, we take a look at lower middle income countries that were benchmarked in the RSDP V. Note that only road densities were included in the RSDP. The remaining data, i.e. proportions of urban population were incorporated for the purposes of this research and see if higher urbanization could possibly mean greater road density on a general basis. The data sourced dates back to 2005 when all of these nations used to belong to the World Bank's list of lower middle income countries.

*Table 5.23: Status of Benchmarked Countries*

<b>Country</b>	<b>Road density (km/sq.km)</b>	<b>% urban</b>	<b>Country</b>	<b>Road density (km/sq.km)</b>	<b>% urban</b>
Albania	0.63	55	Iraq	0.1	68
Algeria	0.05	69	Jamaica	1.94	54
Angola	0.04	42	Jordan	0.08	82
Armenia	0.27	62	Kazakhstan	0.03	53
Azerbaijan	0.68	53	Kiribati	0.92	43
Belarus	0.45	76	Lesotho	0.2	26
Bolivia	0.06	67	Macedonia	0.34	57
Bulgaria	0.39	74	Micronesia	0.34	22
Cameroon	0.11	53	Moldova	0.39	45
Cape Verde	0.25	64	Morocco	0.13	59
Colombia	0.1	76	Namibia	0.05	45
Congo	0.05	41	Nicaragua	0.14	58
Cuba	0.55	77	Paraguay	0.07	58
Djibouti	0.12	77	Peru	0.06	77
Dominica Republic	0.26	77	Philippines	0.67	44
Ecuador	0.15	63	Samoa	0.82	19
Egypt	0.09	42	Serbia	0.16	55
El Salvador	0.48	66	Sri Lanka	1.48	18
Fiji	0.19	53	Suriname	0.03	65
Georgia	0.29	53	Swaziland	0.21	21
Guatemala	0.13	50	Thailand	0.11	49
Guyana	0.04	28	Tonga	0.91	23
Honduras	0.12	53	Tunisia	0.12	67
Indonesia	0.19	52	Turkmenistan	0.05	49
Iran	0.11	73	Ukraine	0.29	69

Source: International Roads Federation and CIA World Factbook

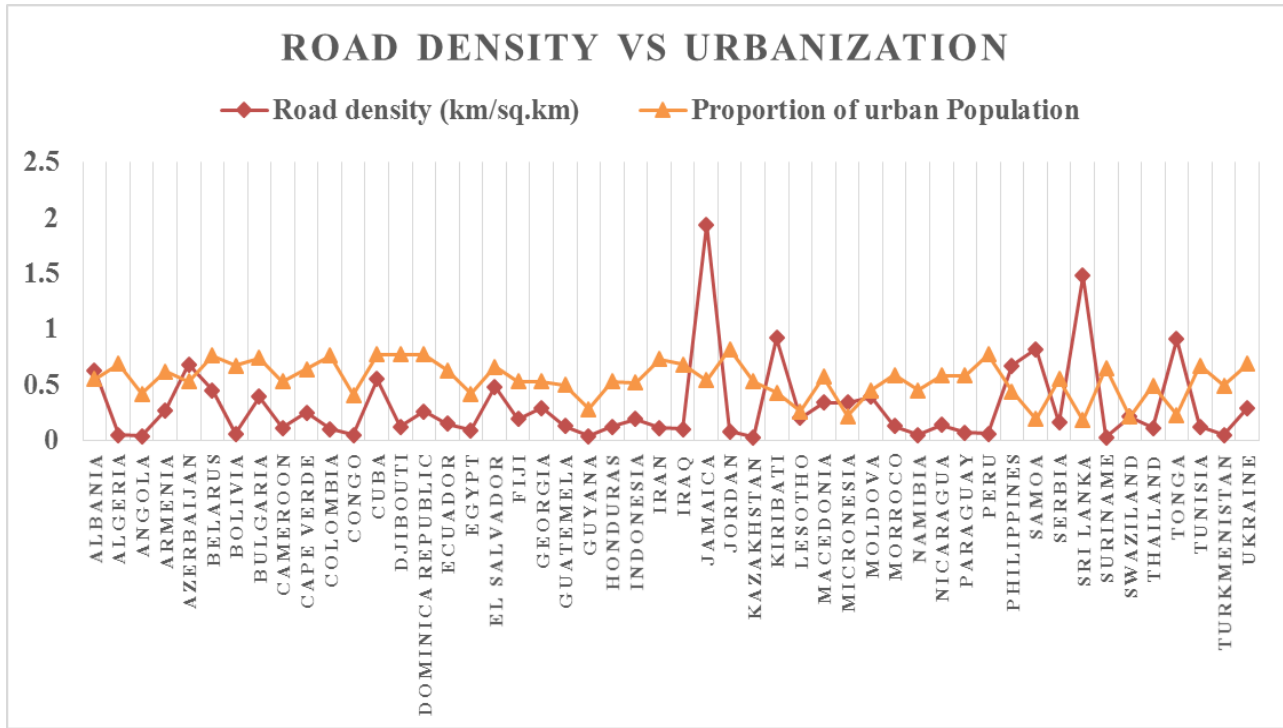


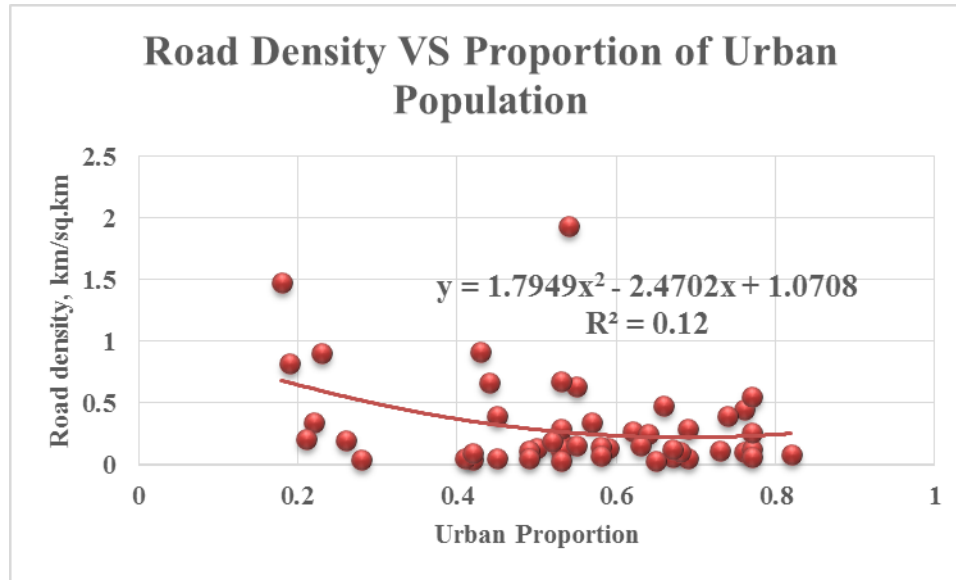
Figure 5.10: Interaction of Road Density with Urbanization Level for Benchmarked Countries (Source: Analysis Result)

Table 5.24: Statistical Indicators for Lower Middle Income Countries listed in Table 5.23

Statistical Indicator	Urban Proportion (fraction)	Road density (km/km <sup>2</sup> )
Mean	0.544	0.309
St. Deviation	0.167	0.367
Mode	0.530	0.050
Median	0.545	0.155

Source: Analysis Result

Based on Table 5.24, 0.3km/km<sup>2</sup> could be fairly taken as the average of lower middle income countries' as opposed to 0.2km/km<sup>2</sup> which has been adopted by ERA. On the other hand, higher urbanization does not necessarily imply greater road density as one might initially expect as illustrated in Figure 5.11.



*Figure 5.11:* Correlation of Road Density and Level of Urbanization for Benchmarked Countries  
(Source: Analysis Result)

**Answer to Critical Question 2:** No; targeting some value of road density should not be marked as a guarantee for a predetermined economic status mainly because the level of association between road density and real GDP is weak and such fixation on one singular factor overlooks trade, export-import balance, fiscal policies and the like which are more strongly associated with the economy. Furthermore, road density makes crude assumptions such as even distribution of roads across national territory and assigns equal weight of importance to all kinds of (paved, gravel and earth) roads, thereby leading to wrong traffic activity and hence, faulty economic extrapolations.

### 5.3.3. Effectiveness: Q1: Which indicators are more suitable and are they consistent among themselves?

Ethiopia does not have the luxury of choosing among several road network indicators as sufficient baseline data collection and rigorous indicator value calculations have not been attended to until very recently. **RAI** and **road condition** evaluations are probably the two only direct indicators which might be subject to different analyses. **Road density** based on land area and population size is basically determined from the physical length of roads which is significantly dictated by ERA, RRAs and WROs, with little room for anyone else to suggest a different value. More or less, the analysis carried out in *Section 5.3.1.1* remains valid. As an additional note, the researcher would

like to point out that a new inventory assessment of physical length determination was carried out by ERA through its independent consultant in 2016 and the results have been left out of this thesis for reasons of large discrepancy with the data that has been disseminated throughout the country.

*Note:* As mentioned in *Section 1.7* and *Section 5.3.1*, this research does not deal with those MDG/SDG indicators which are indirect measures of progress made in the transportation sector and hence, access to different socio-economic and administrative services.

The questions of how reliable and consistent current assessments of road network size and quality are still not completely solved. As expected, the values of the most important indicators have kept on showing significant differences throughout the RSDP when treated by different entities.

### 5.3.3.1. RAI

For rural based countries, RAI remains one of the most accurate connectivity measures. The measure has evolved from field/ground survey to satellite survey between the years 2006 and 2016. The World Bank Group's experts now have presented a reduced version of the formula for determining RAI. The most important factors can be decomposed into four as follows (Imi et.al, 2016):

- Number of beneficiaries (*AccessPop*) per km;
- Share of roads in good condition (*GoodRdKm*);
- Rural road density (*TotalRdKm/RuralArea*); and
- Population density (*RuralPop/RuralArea*).

$$\begin{aligned}
 \text{RAI} &= \frac{\text{AccessPop}}{\text{RuralPop}} \quad (1) \\
 &= \frac{\text{AccessPop}}{\text{GoodRdKm}} + \frac{\text{GoodRdKm}}{\text{TotalRdKm}} + \frac{\text{TotalRdKm}}{\text{RuralArea}} + \frac{\text{RuralArea}}{\text{RuralPop}} \\
 &= \text{Beneficiaries} * \text{Quality} * \text{RdDen} / \text{PopDen}
 \end{aligned}$$

Since equation (1) is an accounting identity, it cannot be readily estimated. However, it puts two realities firmly into rest from policy point of view in terms of how to achieve an RAI of 1:

- Extend road networks and classify previously unclassified roads, i.e. improve *RdDen*; and

- Improve the quality of existing roads through maintenance and rehabilitation, i.e. improve *Quality*.

A modification of equation (1) is presented in equation (2) using natural logarithm whereby important policy measures of *RdDen* and *Quality* are further asserted.  $RAI_{ic}$  is rural access measured in region/Woreda *i* of country *c*.

$$\ln RAI_{ic} = \beta_0 + \beta_1 \ln RdDen_{ic} + \beta_2 \ln Quality_{ic} + \beta_3 \ln PopDen_{ic} + \beta_4 \ln PopConc_{ic} + \beta_5 \ln Urban_{ic} + v_c + \varepsilon_{ic} \quad (2)$$

The only four new terms in equation (2) are:

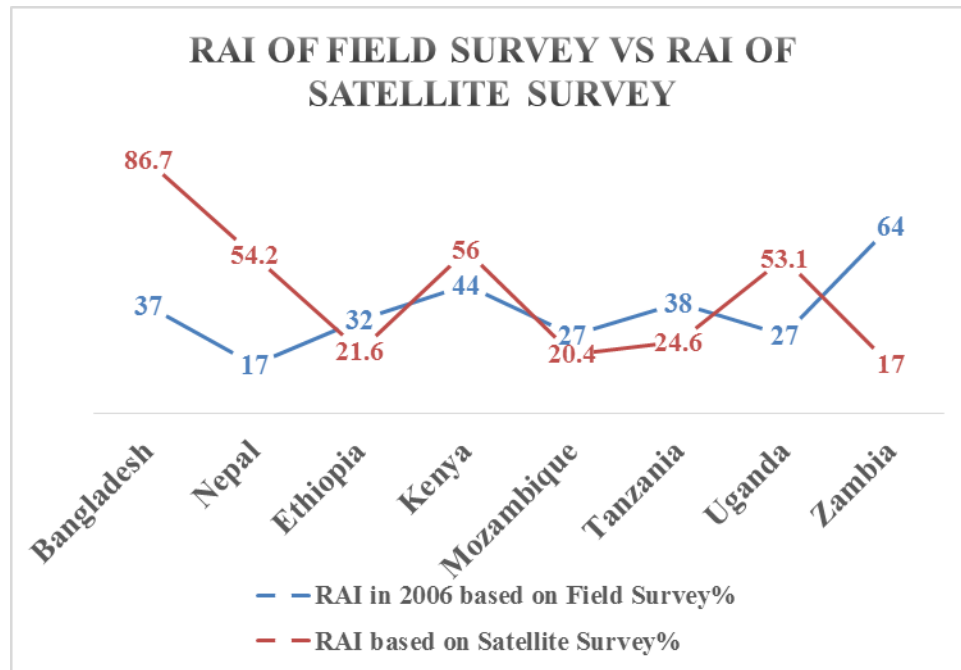
- *PopConc* which represents the share of people who live within 2kms reach of the road network in the total population in rural areas;
- *Urban* which represents the usual urbanization rate (proportion of urban population out of the total population); and
- The last two terms represent corrective values.

Based on the above, 691 Woredas from Ethiopia and 691 districts from each one of the following countries were assessed: Kenya, Mozambique, Nepal, Tanzania, Uganda, Zambia and Bangladesh. In cases where urbanization was too small, it was neglected.

**Table 5.25:** Old and New RAI estimates of the World Bank Group for Selected Countries

Country	RAI in 2006 based on Field Survey (%)	RAI based on Satellite Survey (%)	Year of Assessment for Satellite Survey	Change in RAI (%)
Bangladesh	37	86.7	2015	134.32
Nepal	17	54.2	2015	218.82
Ethiopia	32	21.6	2015	-32.50
Kenya	44	56	2009	27.27
Mozambique	27	20.4	2010	-24.44
Tanzania	38	24.6	2014	-35.26
Uganda	27	53.1	2015	96.67
Zambia	64	17	2011	-73.44

Source: Iimi et. al, 2016



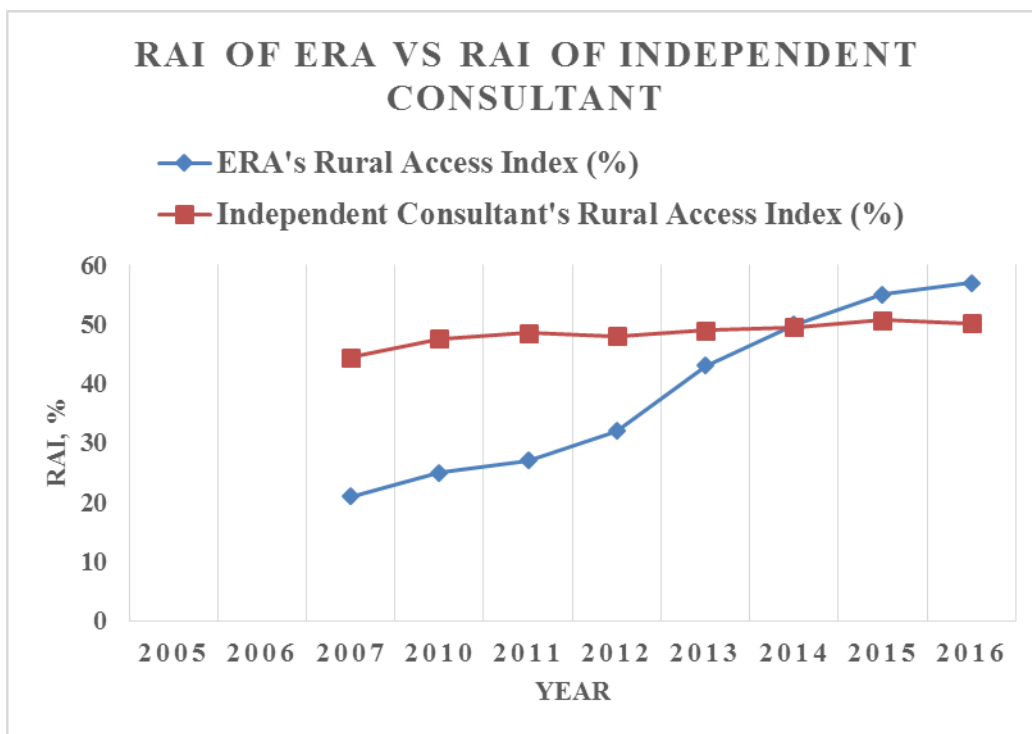
**Figure 5.12:** Behavior of RAI in 2006 and Variable Years for Selected Countries (Source: Analysis Result)

Based on *Table 5.25* and *Figure 5.12*, Zambia showed a sharp fall in RAI followed by Tanzania and Ethiopia. The two possible reasons for Ethiopia's dramatic fall in RAI could be attributed to the following two reasons:

- The Bank's experts might have not incorporated Woreda/URRAP roads into their calculation, thereby assuming great growth in population on one hand and a relatively stagnant increment in road network on the other; and
- The fact that road quality was assessed through high-resolution satellite images could have led to an under estimation in the physical size of roads which actually qualify as 'roads' because surface condition is partially subjective and controversial. Some roads in really poor surface condition could be counted as roads whereas still some others might be assumed to have been damaged and lost beyond counted as roads, thereby directly influencing the value of road density as well as proportion of roads in good condition.

In the following sections, values put forward by ERA and its independent consultant for different road network development indicators are illustrated and compared.

As elaborated on the previous page, it needs to be noted that RAI is a relatively robust road network measure which incorporates both physical length and state of condition (quality of roads). Constructing new roads and expanding the network alone does not improve RAI as road quality should be ensured through regular maintenance. RAI measure works on the consensus that a large network in poor surface condition is as good as a small network in good condition. RAI assessments carried out by ERA and its independent consultants are largely field-survey based which only took few samples into consideration as reaching out the entire rural community remains impossible because of financial restraints. But nowadays, as more refined all-inclusive satellite based surveys are available, there is plenty of room for stakeholders to carry out modern and holistic assessments.



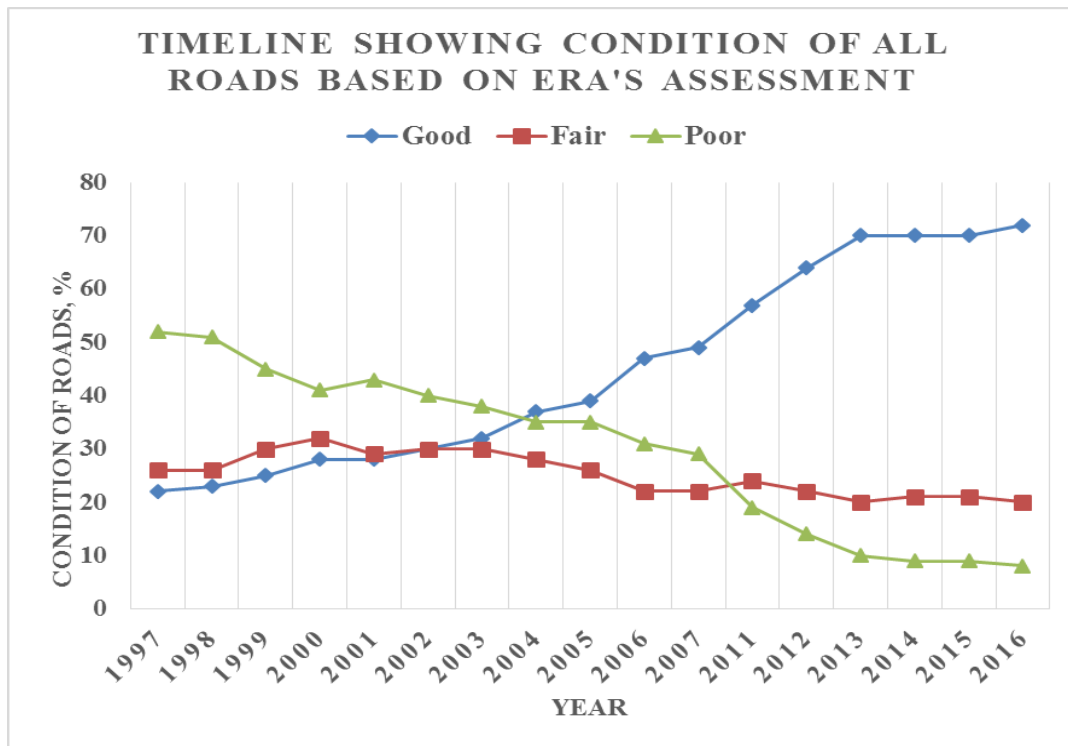
**Figure 5.13:** RAI's Behavior between 2007 and 2016 for Ethiopia (Source: Analysis Result)

As can be seen from **Figure 5.13**, there is significant disparity between the two entities' measurements for RAI, particularly during the first four years before eventually closing the large gap between them. The consultant's RAI measures for 2007-2012 seem over-estimated as the findings of the World Bank Group at the time indicated that Ethiopia's RAI was below 25%. Be that as it may, its estimation suggests that RAI remained relatively stagnant between the years

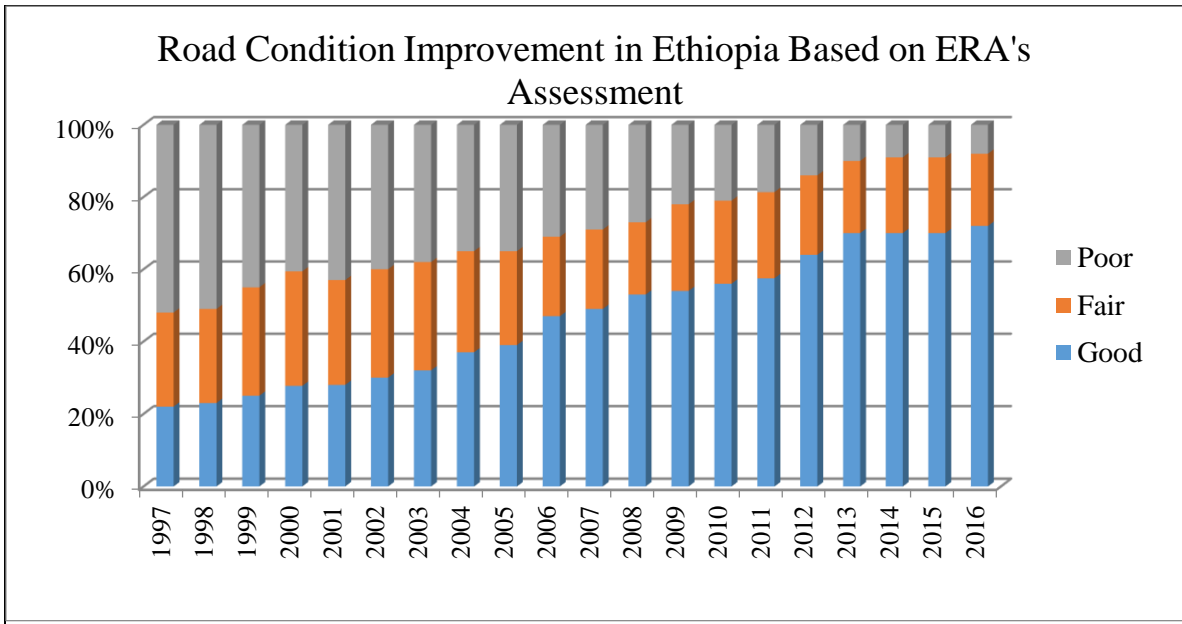
2012 and 2016. On the other hand, ERA's estimation shows a surprisingly steady rise in RAI over the same period, leading to one of the first highly noted inconsistencies.

### 5.3.3.2. Road Condition

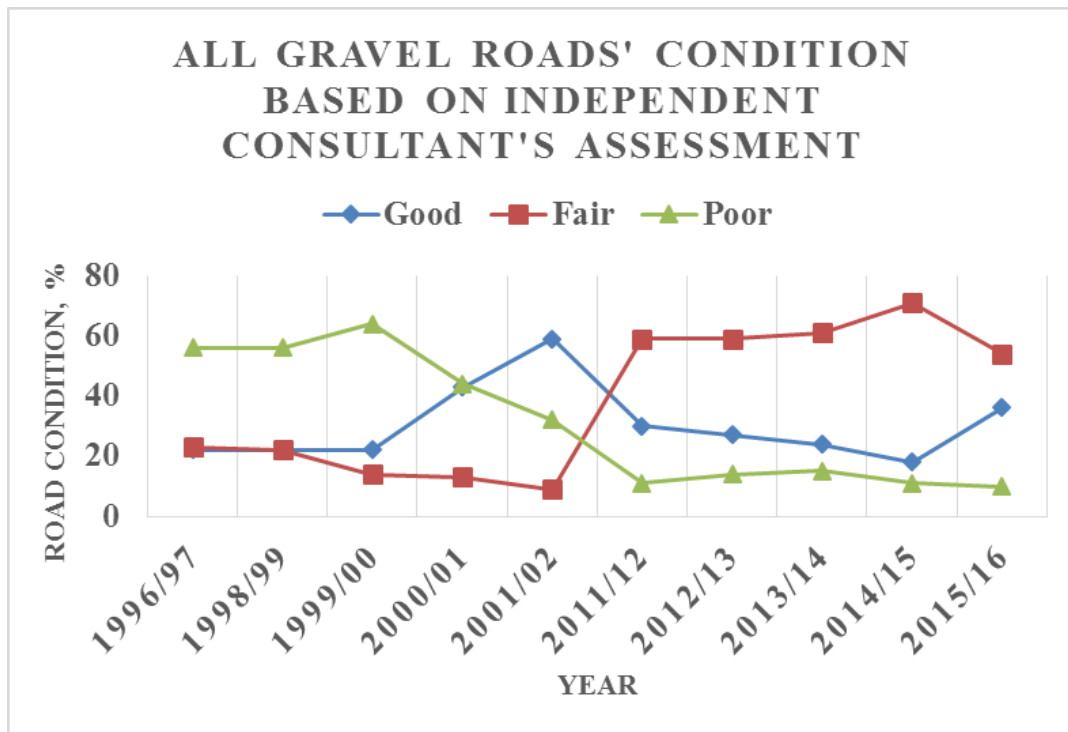
The condition of roads plays important roles by attracting or repelling traffic and thus, serves as an input to RAI along with road density. Road condition has a delicate relationship with VOC and travel time costs. Other literature may be referred in this regard. In *Figures 5.14* and *5.15*, the trend of roads, quality-wise, as assessed by ERA, is presented for the RSDP.



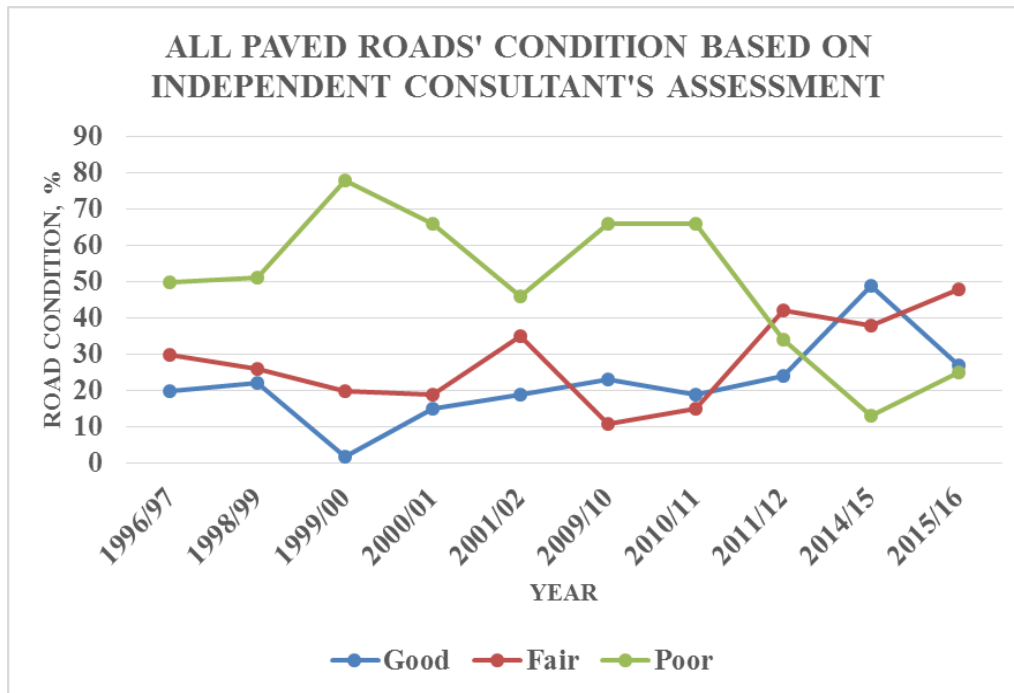
**Figure 5.14:** Trend in Quality of Ethiopia's Roads throughout the RSDP based on ERA's Assessment (Source: ERA, 2016)



**Figure 5.15:** Progressive Share of Road Conditions throughout the RSDP based on ERA's Assessment (Source: ERA, 2016)

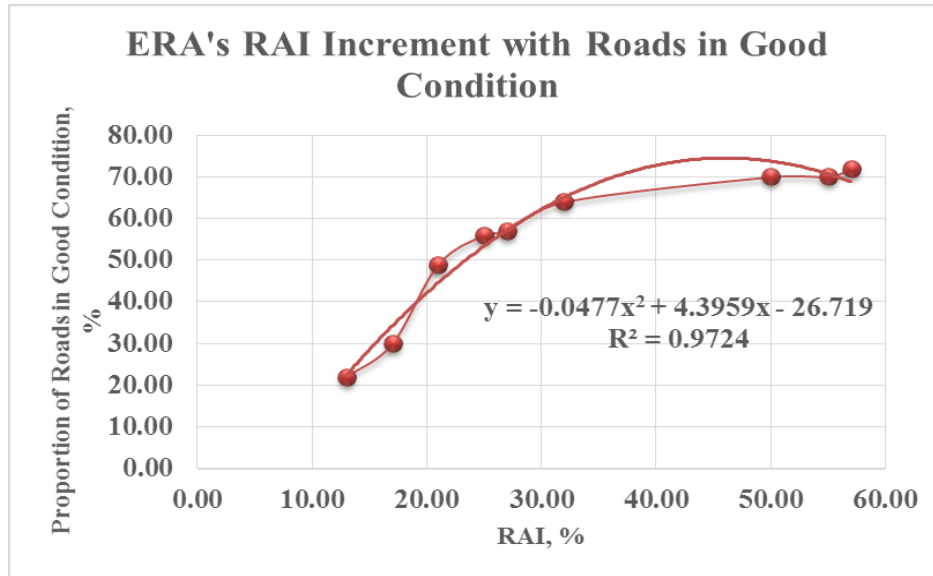


**Figure 5.16:** Trend in Quality of Ethiopia's Gravel Roads throughout the RSDP based on Consultant's Assessment (Source: WT Consult, 2017)



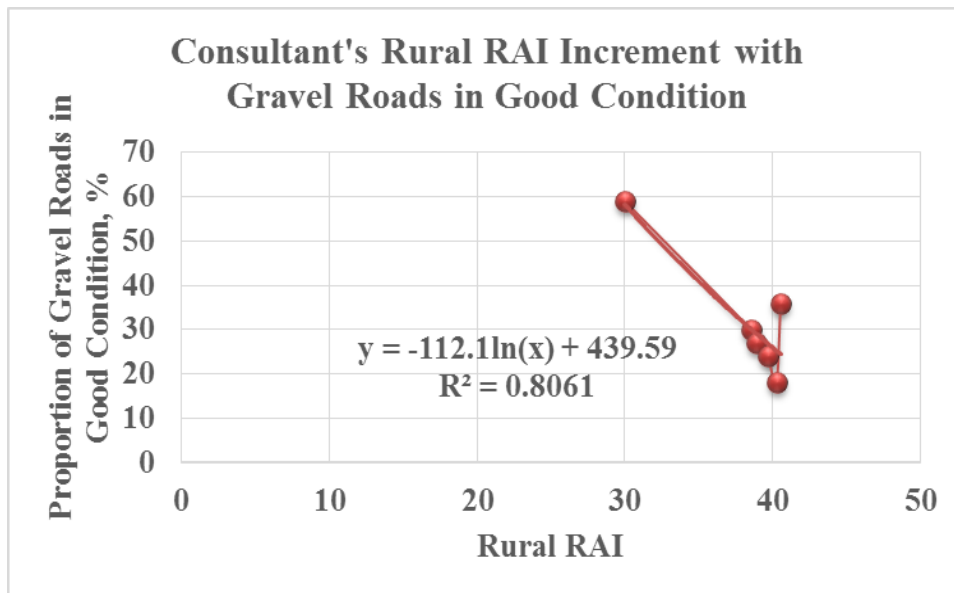
**Figure 5.17:** Trend in Quality of Ethiopia's Paved Roads throughout the RSDP based on Consultant's Assessment (Source: WT Consult, 2017)

Evident from *Figures 5.14* and *5.15*, proportion of roads in good condition, according to ERA, showed a steady linear growth whereas roads in poor condition also decreased linearly. The proportion of roads in fair condition remained relatively stagnant. On the contrary, the consultant's analysis presents a different pattern. Both gravel and paved roads' conditions behaved in an unpredictable manner increasing and decreasing irregularly. Furthermore, the percentage of paved roads in good condition showed a sharp fall between the years 2014/15 and 2015/16. An average condition of all roads could not be determined from *Figures 5.16* and *5.17* largely because paved and gravel roads did not have the same physical length each year and the level of importance in terms of traffic attraction is also incomparable. In spite of this limitation, it is possible to observe that the values suggested by the two entities show very large differences. However, the values of RAI and roads in good condition put forward by ERA are in very good harmony between themselves as illustrated in *Figure 5.18* whereas those of the consultant's appear to be only in moderate harmony as depicted in *Figure 5.19*.



**Figure 5.18:** Consistency between RAI and Proportion of Roads in Good Condition as per ERA (Source: Analysis Result)

As expected theoretically, the value of RAI increased with an increment in proportion of roads in good condition.



**Figure 5.19:** Consistency between RAI and Proportion of Roads in Good Condition as per Consultant (Source: Analysis Result)

The inconsistency of **Figure 5.19** could be explained by the following two facts: fewer data sets were available and included in the regression because RAI and roads' condition assessments were

not simultaneously carried out for the majority of years before 2011 by the consultant; and consistency between RAI and surface condition was tested for gravel roads in good condition by assuming that rural roads largely have gravel/generally unpaved surface in Ethiopia.

**Answer to Critical Question 1: There are not too many direct indicators to choose from as very few of them are recognized globally and those that are available in the Ethiopian context, i.e. RAI and condition of roads have shown wide disparity when treated by different agencies. The level of consistency between these indicators as per each entity, on the other hand, is fair.**

## **5.4. Financial Arrangement and Local Sectors' Involvement**

### **5.4.1. Relevance: Q1: How important and influential has donors' intervention been throughout the RSDP?**

The role of donor support to the road infrastructure and overall economic growth in Ethiopia as well as other underdeveloped nations has remained a topic of intense debate over the last 25 years during which foreign direct investments and assistance spread significantly in multiple African countries. Empirical studies which were conducted in the past have produced mixed results. Some researchers showed that foreign donor interventions produce negative effects on the economy of the host nation whereas others have concluded that it has a positive impact. Still, few others have argued that donor interventions have no impact on growth (Ekenayake and Chatrna, n.d; and Abuzeid, 2009).

Nevertheless, it would be a bit difficult to imagine whether or not Ethiopia would have reached this stage without donor support in the transport sector. As depicted in **Table 5.26**, 19% of the total RSDP expenditure, between RSDP I and the first year of RSDP V, came from foreign bilateral and multilateral DPs, thereby roughly implying that one fifth of the success registered over the last 19 years should be attributed to donor intervention. On top of direct financial support, DPs have been continuously offering technical assistance to different stake holder agencies in Ethiopia, particularly ERA (AfDB, 2015; Clifton et.al, 2016; and ERA, 2016).

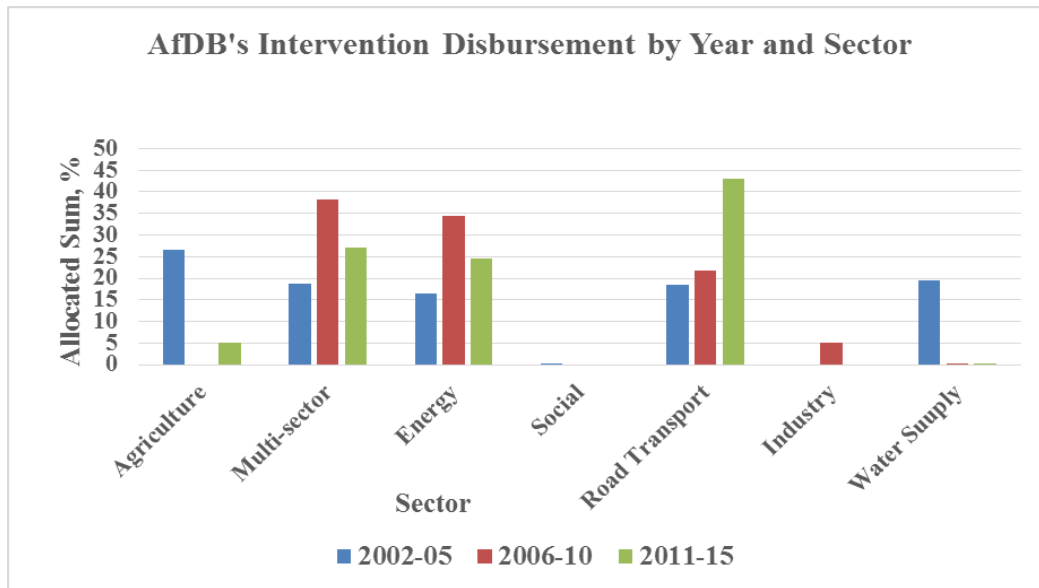
At the beginning of the RSDP, the **grant** portion of financial assistance used to be higher but as the years went by, and DPs assessed that Ethiopia had been slowly building a better economy, a greater proportion of the incoming support began to consist of **loans** which are due to be paid back

in over forty years (numerous project appraisal reports of AfDB and the World Bank Group). Experts in the field have expressed great concern over the nation's long term capacity to absorb these debts and pay back in time without severe damage to the economy. The transport sector has been receiving an ever increasing attention by both DPs and GoE and its contribution to the overall national debt is significant.

On the other hand, the level of influence of DPs on Ethiopia's transport planning policies is believed to have gradually decreased. In the days of the IHA, the nation could barely afford to construct roads and had to rely on the World Bank Group for funding the construction of most roads. Rural roads which Ethiopia's experts believed were necessary at the time remained unbuilt for some time largely because the Bank was unwilling to invest on community and rural roads. Over half a century later, the country had gradually strengthened its internal revenue generation and can now assume a much better control of the national road network development policies by funding roads which seem least attractive to DPs and by engaging in policy dialogue. Furthermore, the nation, through its linchpin geo-political position in East Africa, has further asserted its importance for the majority of donors and those entities represented by these donors. The funds are guaranteed to keep on coming as long as the GoE exhibits an acceptable level of performance by achieving the objectives of DPs' partnership strategies in the sector. It is now a popular belief among experts that Ethiopia enjoys an appreciable level of autonomy in the formulation of transport planning policies and strategies.

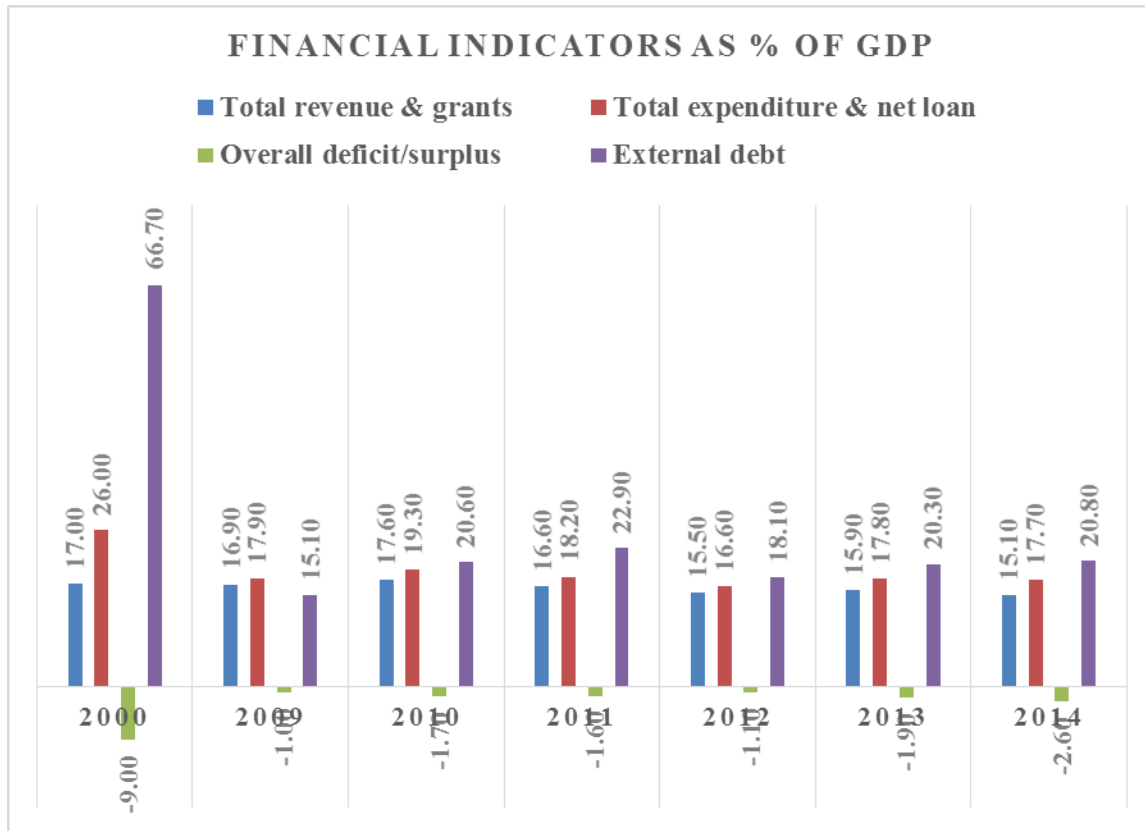
The GoE also made some good moves that now allows it to better organize all donors' intervention by channeling conversations and policy dialogues through MoFEC. The transport sector intervention is also controlled by an informed decision made through MoFEC after thorough consultations with ERA and TSWG. That paves the way for a more integrated and seamless network development by eliminating fragmented interventions made by donors and Non-Governmental Organizations (NGOs) in random regions.

A typical breakdown of the assistance trend exercised by one of the most prominent DPs, i.e. AfDB during the period RSDP II through RSDP IV is illustrated in *Figure 5.20*. It is evident that the road sector intervention witnessed a steady and drastic increment over the years whereas the remaining sectors either decreased continuously or showed some increment followed by a decrease in allotment.



**Figure 5.20:** AfDB's Assistance Allocation by Sector during RSDP II-RSDP IV (Source: AfDB, 2015)

In **Figure 5.21** hereafter, we take a close look at some chosen macro-economic indicators so as to get a better picture of how vast loans and development assistances alter the economy. The figure illustrates that Ethiopia is still struggling with debts that are equivalent with a fifth of its GDP.



**Figure 5.21:** Ethiopia's Macro-economic Indicators' Performance between 2000 and 2014  
(Source: AfDB, 2016 and IMF: World Economic Outlook, 2014)

**Answer to Critical Question 1: Donors' intervention has contributed to 19% of the total financial accomplishments of the RSDP, not to mention other indirect technical assistances. The, GoE, as it generated more revenue from within in recent years, has been able to exercise more autonomy in transport planning policy formulations. DPs' influence on the Ethiopian transport sector policy is now generally believed to be minimal and the prospect of securing more fund from donors is promising.**

**5.4.2. Sustainability: Q1: How has the trend in dependence on financial assistance behaved over the RSDP period?**

Financial arrangement is one of the most important strategies of the RSDP. In the first ever RSDP document which was prepared by ERA in January 1996, financial programming for a ten year, (1997-2007) double-phased road reformation program was outlined (ERA, 1996). The document was clouded with uncertainties and to a surprising level, was hopeful of donors' intervention. The country's own financial muscles were no match for the ambitious development program.

Fortunately, donors rallied behind the RSDP and the program got embarked upon in 1998. As the years passed by, the level of dependence on donor intervention showed a steady decrease as shown in *Table 5.26*. However, the decrease is mainly in terms of proportion, not in amount. The committed amount of budget has been increasing for the following reasons:

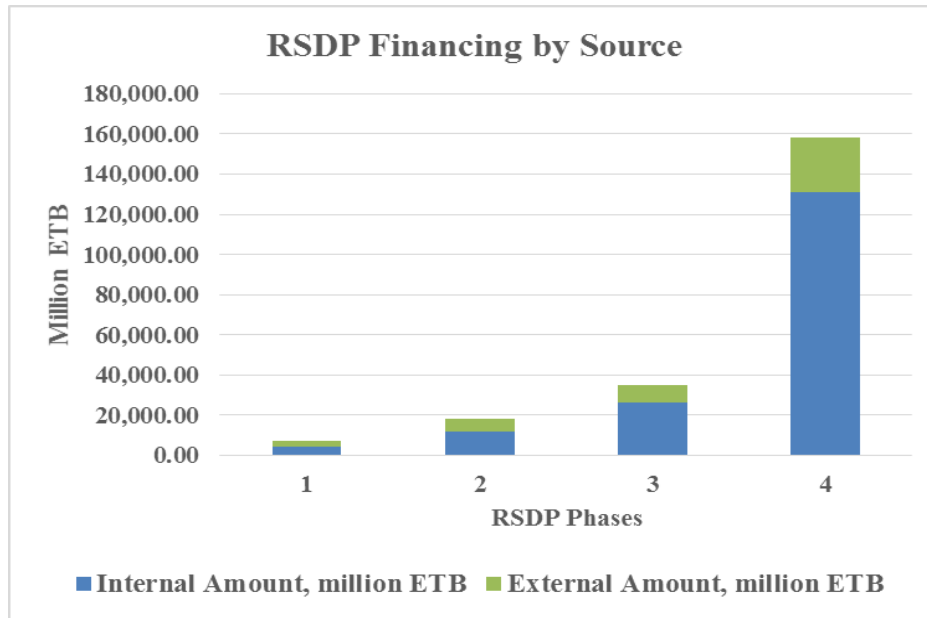
- More road projects kept on being undertaken as the phases of the RSDP progressed;
- The USD showed remarkable rise in value over RSDP IV; and
- The cost of constructing roads, through the years, rose for different reasons.

*Table 5.26* and *Figure 5.22* illustrate the share of internal and external financial contributions throughout the RSDP.

**Table 5.26:** Overview of the RSDP's Financial Arrangement based on Source for 1997-2016

Phases of RSDP	Financing from Internal		Financing from External		Total
	Sources		Sources		
	Amount (million ETB)	%	Amount (million ETB)	%	
RSDP I	4,433.7	60.9	2,850.9	39.1	7,284.55
RSDP II	11,497.4	63.5	6,615.5	36.5	18,112.86
RSDP III	26,298.2	75.2	8,659.6	24.8	34,957.77
RSDP IV	130,949.9	83.0	27,383.6	17.0	158,333.50
RSDP V ( First Year)	42,474.9	89.4	5,045.4	10.6	47,520.30
Undiscounted Total	215,654.0	81.0	50,555.0	19.0	266,209.00

Source: ERA, 2016



**Figure 5.22:** Financial Arrangement by Source for RSDP I-RSDP IV (Source: Analysis Result)

**Table 5.27:** Overview of the Sector's Financial Arrangement in million ETB by Individual Financier throughout the RSDP

Financier	RSDP I	RSDP II	RSDP III	RSDP IV	RSDP V (First Year)	Total RSDP (19 years)	%
GoE	3,455.5	8,056.7	20,584.5	121,817.6	41,212.2	195,126.5	73.3
World Bank	1,432.9	3,135.3	2,544.2	8,648.2	2,084.4	17,844.9	6.7
Road Fund*	978.2	2,555.8	5,030.1	6,383.6	1,262.7	16,210.5	6.1
China	-	-	1,252.7	8,558.2	1,405.0	11,215.9	4.2
European Union **	678.1	1,662.6	3,255.2	3,612.2	-	9,208.1	3.5
African Development Bank	506.4	517.8	496.4	3,787.9	1,045.9	6,354.3	2.4
Community	-	884.8	683.5	2,748.7	-	4,317.1	1.6
Japan	164.9	380.0	307.1	1,317.7	-	2,169.7	0.8
OFID	0.3	293.3	213.6	108.7	178.4	794.3	0.3
BADEA	-	59.9	175.2	457.1	108.5	800.7	0.3
Germany	27.7	302.6	67.0	45.2	-	442.5	0.2
Saudi Fund for Development	-	39.3	123.2	199.7	117.3	479.4	0.2
Kuwait Fund	-	-	49.9	437.1	80.9	567.9	0.2
Various	40.6	224.8	175.1	207.0	0.6	648.1	0.2
Abu Dhabi	-	-	-	4.6	24.4	29.0	-
<b>Total (Undiscounted)</b>	<b>7,284.6</b>	<b>18,112.9</b>	<b>34,957.8</b>	<b>158,333.5</b>	<b>47,520.3</b>	<b>266,209.0</b>	<b>100</b>

\* ETB 281.1 million is disbursement for Municipality from the ORF.

\*\*Sector Budget Support contribution is considered.

Source: ERA, 2016

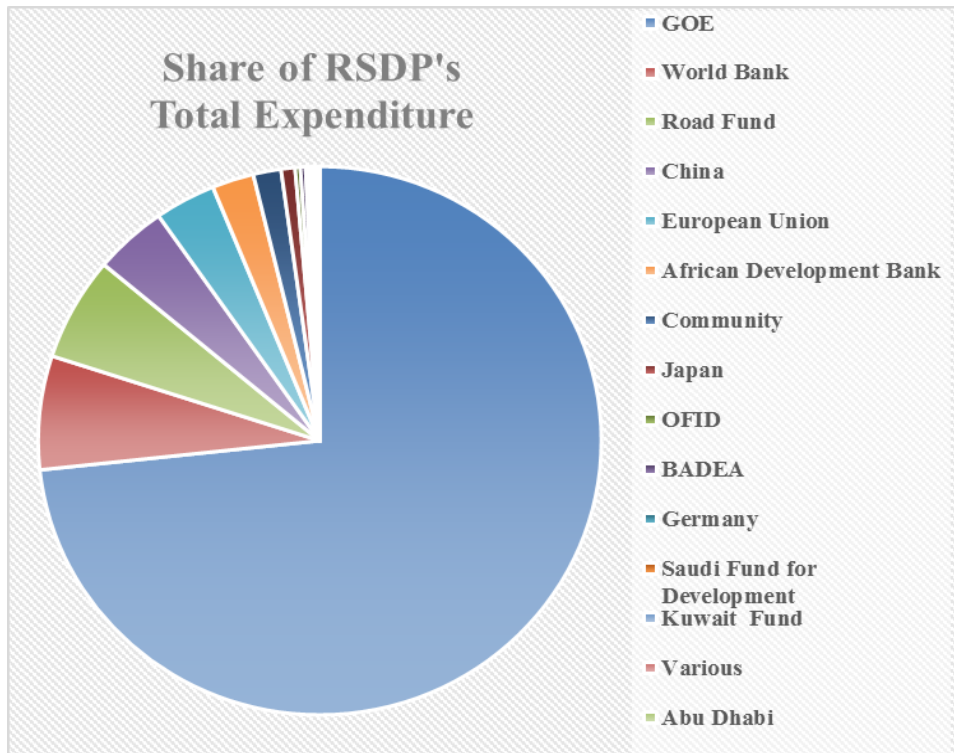


Figure 5.23: Pie Chart Representation of each Financier's Share throughout the RSDP (Source: Analysis Result)

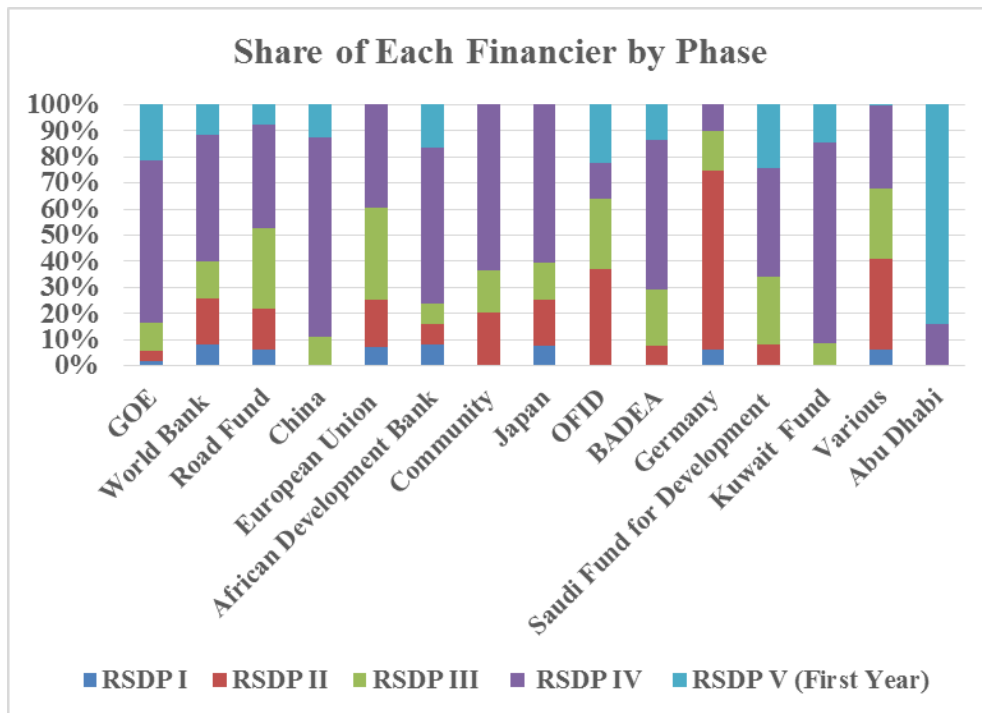


Figure 5.24: Proportion Dedicated by Each Financier per phase of the RSDP (Source: Analysis Result)

The rising presence of China begun re-shaping the donor landscape during the 4<sup>th</sup> phase of the RSDP. By 2016, it was concluded that Ethiopia was second only to Ghana in amount of infrastructure finances received from China (Maria Ana d'Orey et.al, 2017). Throughout the RSDP, the approach of most traditional DPs such as AfDB, World Bank and EU has remained:

- Support the road sector in the frame-work of a SWAp, i.e. simultaneously attending to food security, health, educational coverage and all the remaining MDGs;
- Fund road projects that are likely to generate and attract massive AADT;
- Strengthen the capacity of the government's sectoral executing agencies;
- Assess the relative success of previous investments and exercise a phase-by-phase loan granting; and
- Associate interventions with the promotion of transparent and democratic governmental leadership.

On the contrary, China has resorted to a very clear non-intervention and non-SWAp (as evident from their zero interest towards investing in sectors aside from infrastructure) policy whereby it leaves the GoE in total control of the partnership in the direction of infrastructure. The Chinese are believed to be interested in tapping the massive customer base in Ethiopia as well as other African countries, hence building roads. Maximizing the overall profit which could be gained by harmoniously combining the aid of donors that differ policy-wise is mainly the responsibility of the GoE.

**Answer to Critical Question 1: The level of dependence on donor intervention for funding roads in the RSDP, in terms of proportion out of the total, showed a gradual decrease. However, the scope of the road reformation program had grown ever ambitious as each RSDP phase progressed and the amount of finances secured from DPs kept on rising. The Chinese Government's recent involvement and approach in the sector's funding seems to be extremely different from that of the traditional donors' and the responsibility of exercising robust policy dialogue and making the most out of both groups of donors belongs primarily to the GoE.**

### **5.4.3. Sustainability: Q2: Has the participation of the local sector, particularly indigenous contractors, been appreciable?**

One of the greatest opportunities in massive national investment programs such as the RSDP is the immense room for domestic industries to build up their professional and financial muscles. As the monetary budget set for a significant number of large scale road projects consists of 30-40% payment to contractors via USD, there is a window of opportunity for curbing national foreign exchange deficit. In those projects which are funded by donors and strictly follow international competitive bidding, the proportion of payment with foreign currency is remarkable and at times exceeds 40%.

In the Ethiopian context, private local construction companies are post 1990s phenomena and have kept on building their capacity throughout the RSDP. ERA had been carrying out a small number of civil works particularly in areas where the private industry was unwilling to work through its previous own force account, which is now an independent public contractor, namely ERCC.

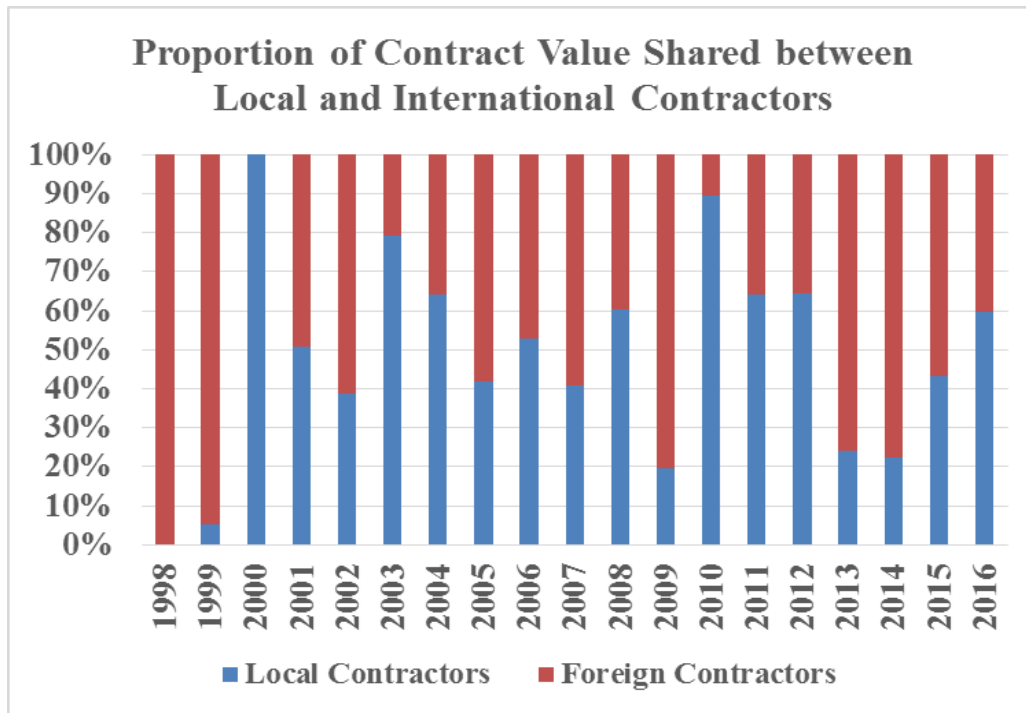
Of the 1,358 contracts (both construction & consultancy) awarded over the period 1998-2016 under the RSDP, 1,032 contracts were awarded to local companies of which 56% were for consultancy services, and 46% for road construction works. In terms of the financial amount of services entrusted, *Table 5.28* presents details of contracting services whereas *Table 5.30* deals with details of consulting services.

**Table 5.28:** Number and Value of Projects Awarded to Local and International Contractors over the RSDP

<b>Year</b>	<b>Number of projects awarded to Local Contractors</b>	<b>Number of projects awarded to International Contractors</b>	<b>Local Contractors' Project worth (million ETB)</b>	<b>Foreign Contractors' Project worth (million ETB)</b>	<b>Total Amount (million ETB)</b>
1998	0	1	-	310.98	310.98
1999	6	12	180.25	3,350.66	3,530.92
2000	4	0	93.46	-	93.46
2001	4	2	531.30	513.49	1,044.79
2002	11	1	252.21	395.58	647.79
2003	18	1	659.25	172.53	831.79
2004	17	2	514.12	286.37	800.49
2005	19	6	1,052.96	1,460.62	2,513.58
2006	19	7	3,773.91	3,356.40	7,130.31
2007	21	11	3,266.81	4,751.42	8,018.22
2008	29	10	7,527.30	4,952.53	12,479.83
2009	15	10	3,088.32	12,660.08	15,748.40
2010	29	2	6,428.22	745.40	7,173.61
2011	32	7	8,607.15	4,798.36	13,405.51
2012	32	3	8,470.92	4,676.23	13,147.15
2013	23	18	5,593.86	17,815.45	23,409.32
2014	58	13	4,941.05	17,248.95	22,190.00
2015	39	11	10,039.34	13,233.02	23,272.36
2016	80	6	17,719.64	12,035.56	29,755.20
<b>Total</b>	<b>456</b>	<b>123</b>	<b>18,848.63</b>	<b>24,935.02</b>	<b>43,783.66</b>
<b>Discounted NPV (at 12% and year 1998 )</b>					
<b>%</b>	<b>78.76</b>	<b>21.24</b>	<b>43.05</b>	<b>56.95</b>	<b>100.00</b>

Source: ERA, 2016

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**Figure 5.25:** Proportion of Contract Value Shared between Local and International Contractors (Source: Analysis Result)

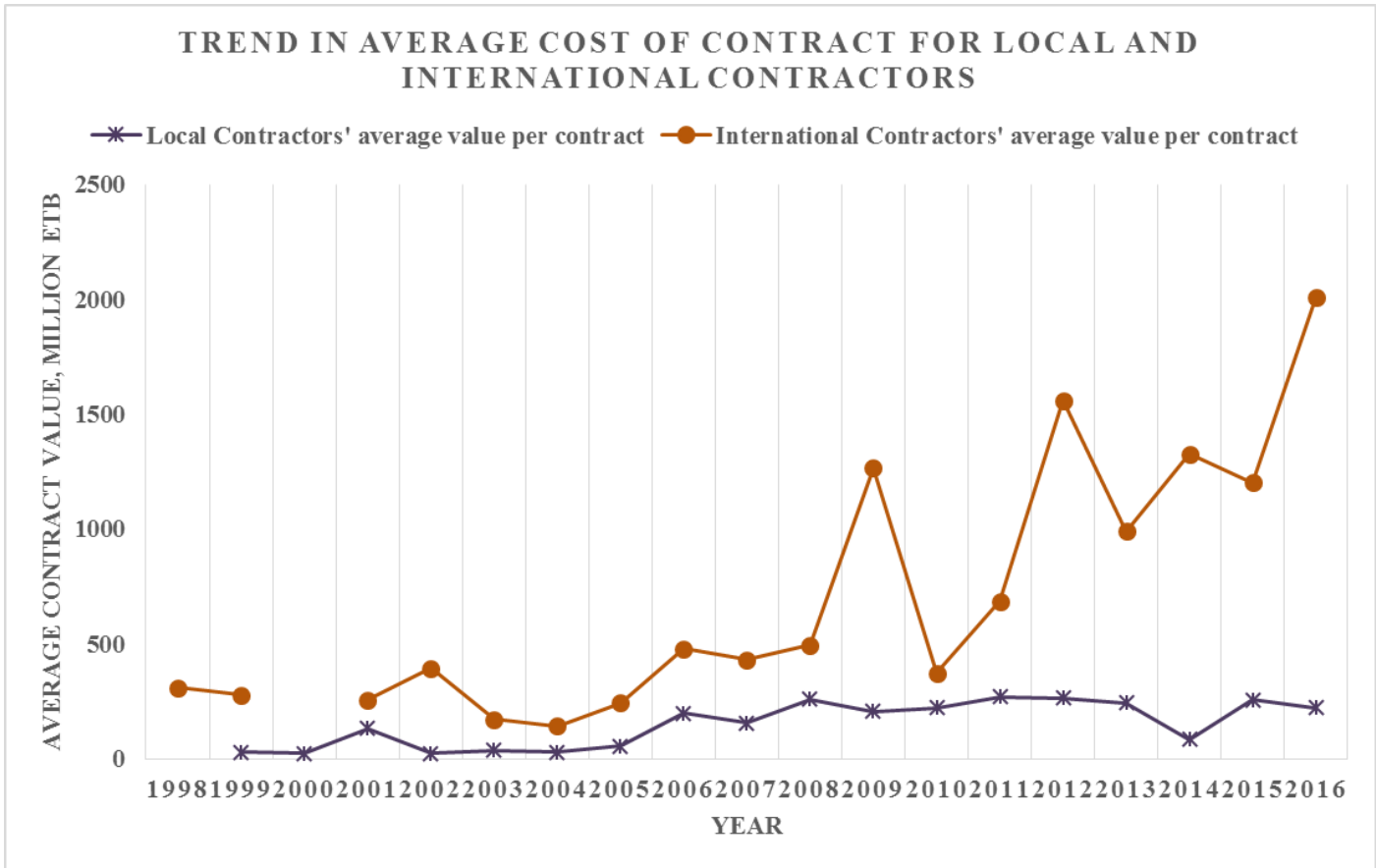
As depicted in *Figure 5.25*, when the RSDP was first launched, hardly any local contractor took part for two successive years. The number of projects awarded by year were also not uniform. For instance during 2009, there were relatively less number of new projects and there was a more or less even split between local and international firms. In the year 2000, on the other hand, very few contracts were available and all were coincidentally awarded to indigenous contractors. Generally speaking, the participation of local contractors, during 2013-2016, showed a steady rise.

However, *Table 5.28* indicates that although local contractors took up a sweeping 456 projects out of the total 579 (over 78%), they only secured 43.05% of the total financial amount, implying that they have been locked up in less prestigious road projects. Therefore, the increasing number of contracts awarded to local contractors cannot be taken as a sign of a definitive growth of local contracting firms' capacity. On the contrary, international contractors that naturally have higher capacity in terms of both financial and managerial technique, needed only 123 projects (less than 22%) to walk away with 56.95% of the total contracted amount in the RSDP. *Table 5.29* hereafter clearly shows the difference in the amount of average services' value for both types of contractors.

**Table 5.29:** Average Value of Contracts for Local and International Contractors throughout the RSDP

<b>Year</b>	<b>Number of projects awarded to Local Contractors</b>	<b>Number of projects awarded to International Contractors</b>	<b>Local Contractors' Project worth (million ETB)</b>	<b>Foreign Contractors' Project worth (million ETB)</b>	<b>Local Contractors' Average Value per Contract (million ETB)</b>	<b>International Contractors' Average Value per Contract (million ETB)</b>
1998	0	1	-	310.98		310.98
1999	6	12	180.25	3,350.66	30.04	279.22
2000	4	0	93.46	-	23.37	
2001	4	2	531.30	513.49	132.83	256.75
2002	11	1	252.21	395.58	22.93	395.58
2003	18	1	659.25	172.53	36.63	172.53
2004	17	2	514.12	286.37	30.24	143.19
2005	19	6	1,052.96	1,460.62	55.42	243.44
2006	19	7	3,773.91	3,356.40	198.63	479.49
2007	21	11	3,266.81	4,751.42	155.56	431.95
2008	29	10	7,527.30	4,952.53	259.56	495.25
2009	15	10	3,088.32	12,660.08	205.89	1,266.01
2010	29	2	6,428.22	745.40	221.66	372.70
2011	32	7	8,607.15	4,798.36	268.97	685.48
2012	32	3	8,470.92	4,676.23	264.72	1,558.74
2013	23	18	5,593.86	17,815.45	243.21	989.75
2014	58	13	4,941.05	17,248.95	85.19	1,326.84
2015	39	11	10,039.34	13,233.02	257.42	1,203.00
2016	80	6	17,719.64	12,035.56	221.50	2,005.93

Source: Analysis Result



**Figure 5.26:** Variation in Average Contract Amount between Local and International Contractors throughout the RSDP (Source: Analysis Result)

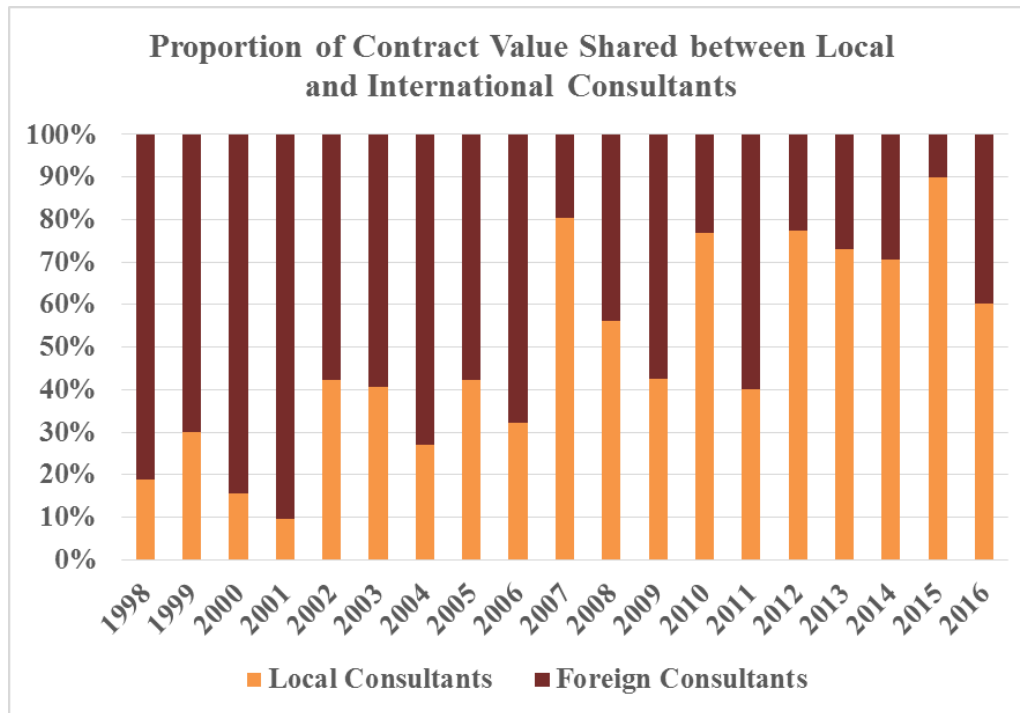
**Figure 5.26** clearly illustrates that international contractors are still pretty much in control of mega road projects which are worth more. It could be said that higher standard and lucrative asphalt road projects are under the monopoly of Chinese and other foreign contractors (See **Section 2.4.5** for details) whereas local contracting firms are mainly engaged in gravel roads and lower standard asphalt projects. The disparity registered during RSDP IV and in the first year of RSDP V was rather alarming and could be taken as a clear sign that the GoE still needs to keep on supporting local contractors through more efforts such as increased advance payments, good loan arrangements and national bidding system for internally funded projects. The upcoming **Table 5.30** and **Figure 5.27** present the proportion and value of consulting services shared between local and international firms.

**Table 5.30:** Number and Value of Projects Awarded to Local and International Consultants over the RSDP

<b>Year</b>	<b>No of projects Contracted to Local Consultants</b>	<b>No of projects Contracted to International Consultants</b>	<b>Total number of projects</b>	<b>Local Consultants' Service Amount (million ETB)</b>	<b>Foreign Consultants' Service Amount (million ETB)</b>	<b>Total Amount (million ETB)</b>
1998	7	9	16	7.81	33.52	41.33
1999	21	15	36	41.85	97.89	139.75
2000	5	7	12	11.70	63.53	75.23
2001	10	10	20	9.04	85.78	94.82
2002	20	11	31	33.77	46.26	80.03
2003	17	6	23	21.78	31.66	53.45
2004	18	16	34	32.56	87.46	120.02
2005	18	5	23	54.19	73.77	127.96
2006	46	26	72	145.51	305.99	451.51
2007	37	13	50	234.12	57.32	291.44
2008	46	12	58	213.13	166.63	379.76
2009	22	18	40	163.71	220.99	384.70
2010	11	8	19	663.59	198.82	862.41
2011	28	8	36	183.32	273.80	457.13
2012	83	7	90	462.58	134.78	597.37
2013	50	7	57	354.60	130.89	485.49
2014	37	9	46	290.95	121.19	412.13
2015	68	4	72	723.09	81.64	804.74
2016	32	12	44	281.34	186.06	467.39
<b>Total</b>	<b>576</b>	<b>203</b>	<b>779</b>	<b>947.97</b>	<b>840.23</b>	<b>1788.20</b>
<b>Discounted NPV (at 12% and year 1998)</b>						
<b>%</b>	<b>74.00</b>	<b>26.00</b>	<b>100.00</b>	<b>53.00</b>	<b>47.00</b>	<b>100.00</b>

Source: ERA, 2016

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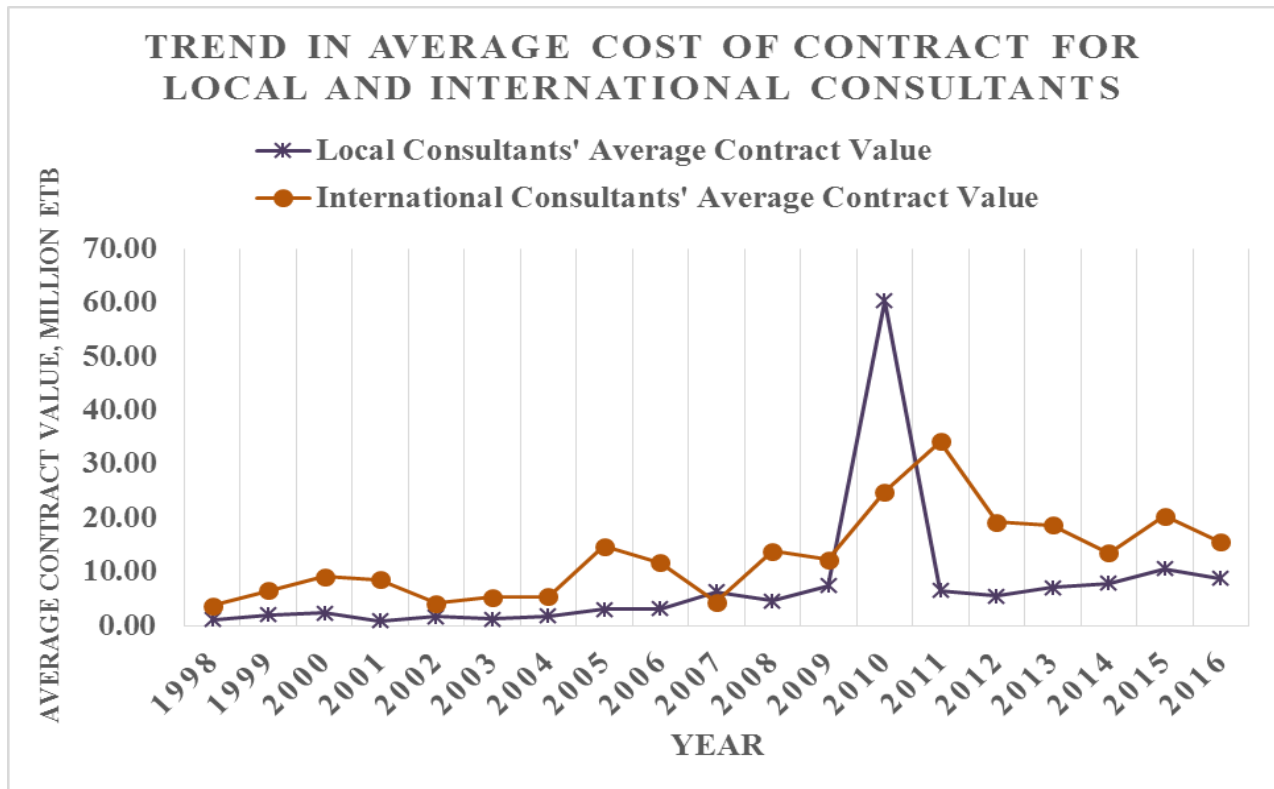
**Figure 5.27:** Proportion of Contract Value Shared between Local and International Consultants  
(Source: Analysis Result)

As opposed to the trend observed in local contractors' participation, indigenous consultants were relatively active even during the first two years of the 1<sup>st</sup> phase of the RSDP. There was marked improvement over the years, particularly after 2012 where local consultants, on average, had signed over 70% of the total services fee, although that is at the mercy of large numbers of contracts (quantity over quality of contracts). The difference in value per contract still remains a bit wide compared with international consultants. International consultants needed just 26% of the total number of contracts to end up with 47% of the total consultancy services' amount. This is an indication that indigenous consultants have still not tapped into the more lucrative professional services to an appreciable level. *Table 5.31* and *Figure 5.28* present this disparity in terms of average value of consultancy contracts.

**Table 5.31:** Average Value of Contracts for Local and International Consultants throughout the RSDP

<b>Year</b>	<b>No of projects Contracted to Local Consultants</b>	<b>No of projects Contracted to International Consultants</b>	<b>Local Consultants' Service Amount (million ETB)</b>	<b>Foreign Consultants' Service Amount (million ETB)</b>	<b>Local Consultants' Average Contract Value (million ETB)</b>	<b>International Consultants' Average Contract Value (million ETB)</b>
1998	7	9	7.81	33.52	1.12	3.72
1999	21	15	41.85	97.89	1.99	6.53
2000	5	7	11.70	63.53	2.34	9.08
2001	10	10	9.04	85.78	0.90	8.58
2002	20	11	33.77	46.26	1.69	4.21
2003	17	6	21.78	31.66	1.28	5.28
2004	18	16	32.56	87.46	1.81	5.47
2005	18	5	54.19	73.77	3.01	14.75
2006	46	26	145.51	305.99	3.16	11.77
2007	37	13	234.12	57.32	6.33	4.41
2008	46	12	213.13	166.63	4.63	13.89
2009	22	18	163.71	220.99	7.44	12.28
2010	11	8	663.59	198.82	60.33	24.85
2011	28	8	183.32	273.80	6.55	34.23
2012	83	7	462.58	134.78	5.57	19.25
2013	50	7	354.60	130.89	7.09	18.70
2014	37	9	290.95	121.19	7.86	13.47
2015	68	4	723.09	81.64	10.63	20.41
2016	32	12	281.34	186.06	8.79	15.51

Source: Analysis Result



**Figure 5.28:** Variation in Average Contract Amount between Local and International Consultants throughout the RSDP (Source: Analysis Result)

As illustrated in **Figure 5.28**, the difference in average contract amount for consulting is apparently not as alarming as the one observed under contracting (**Figure 5.26**). With the exception of the years 2007 and 2010, international consultants had managed to walk away with more profitable road projects but the prospect of local consultants catching up with them seems promising given the current trend.

**Answer to Critical Question 2:** In terms of total number of projects undertaken, both local consultants and contractors showed remarkable progress over the RSDP period. However, due to their financial and managerial restraints compared with international firms, they have largely been locked out of prestigious projects and the average value of contract for local entities lagged behind. International contractors and consultants, on the other hand, needed fewer projects to secure a greater share of the huge infrastructure investment of the RSDP as they have the capacity to win and undertake lucrative asphalt road projects.

## CHAPTER SIX

### 6. CONCLUSIONS, RECOMMENDATIONS AND PROPOSED FUTURE AREA OF STUDY

#### 6.1. Conclusion

As discussed in *Section 3.6.2*, conclusions are made based on findings in each one of the critical questions and evaluation criteria presented in *Table 3.10* whereas the ratings of judgment criteria are based on *Table 3.8*. The methods and guides discussed in the same section were carried out in Chapter 5 and a condensed summary of findings is presented below in *Table 6.1*.

*Table 6.1:* Summary of Guiding Questions and Relevant Findings

<b>Objective 1: Rural Connectivity/URRAP Planning</b>				
<b>Critical Questions</b>	<b>Judgment Criter(ion/ia)</b>	<b>Source</b>	<b>Rating</b>	<b>Main Findings</b>
<b>Quality 1: Relevance</b>				
Q1: Was the need for rural access sensed at the right time?	Timing	ii, iii, v, vi	MS	The issue of rural access dates back to the days of the IHA. Dependence on the World Bank Group, which at the time was not interested in rural roads, caused prolonged delays. Under RSDP II and III, the multi-sectoral ERTTP was tested in pilot zones but never reached the stage of full implementation because of financial, human and multi-sectoral administrative restraints. URRAP, the latest rural access program which unlike the ERTTP is uni-sectoral with its focus set only on roads, got launched under RSDP IV. In conclusion, the importance of rural access was sensed sufficiently early but implementation began significantly late.

Critical Questions	Judgment Criter(ion/ia)	Source	Rating	Main Findings
Q2: Were the goals set out at the beginning of URRAP in terms of indicators too ambitious/unrealistic?	Objectivity level	i, ii, iii, v, vi,vii	S	Goals set out in terms of physical length do not seem ambitious. However, the targeted RAI value was too unrealistic and could have resulted from faulty planning and defective assessment of baseline condition. The unsatisfactory implementation of URRAP is supposed to take the lion's share for poor accomplishments, not the overall goals set out for the program.
<b>Quality 2: Effectiveness</b>				
Q1: Were the allocation and disbursement of budget efficient?	Budget distribution	i, ii, iii, v	U	Budget allocation and disbursement were inefficient, largely due to a lump sum technique that disregarded availability of materials, traffic condition, terrain condition, inflation and the like. Some of the better performing regions' financial requests greatly exceeded what the Federal Government could have possibly disbursed. The organizational setup of financial flow from the MoFEC up to contractors has also been determined as inconvenient. There are signs that the planner, i.e. ERA and the implementing RRAs and WROs did not work seamlessly as one during URRAP's inception.
Q2: Were construction approaches sound and exercised as planned?	Suitability of construction methods and execution level	ii, iii, iv, v, vii	MS	The construction methodology chosen, i.e. labor-based approach has proven useful to other lower income countries and it is most probably the right one considering Ethiopia's massive manpower and limitations in public investments. However, the implementing agencies are still not capable of stringently executing these methodologies and unplanned equipment-intensive approach was apparently exercised in the sample Oromia Region.

Critical Questions	Judgment Criter(ion/ia)	Source	Rating	Main Findings
Q3: Are Woreda Road Desks truly capable of administering contract and owning URRAP?	Administrative Capacity	i, ii, iii, v	MU	Woreda Road Desks are struggling with efficiently carrying out the responsibility of owning and managing URRAP roads. ERA does not have the mandate to get involved besides technical assistance and given the current governance structure, the most promising way forward is to keep up efforts in building up the capacity of the implementing organs, particularly the RRAs and WROs.
Q4: Implementation problems as per <i>Section 3.6.2</i>	Multi-dimensional	i, ii, iii	MU	Among the vast range of existing implementation problems, the following areas were identified as moderately unsatisfactory in this research: general administrative issues; prioritization of roads; design issues; procurement of services; material quality assurance; and supervision. (see <i>Section 5.2.2</i> for details)
<b>Quality 3: Sustainability</b>				
Q1: Have the majority of Kebeles been linked within regional Woredas?	All-inclusive connectivity	ii, iii, v, vii	MS	Approximately, 77% of the Ethiopian rural Kebeles had been connected up to 2016. The connection of Kebeles apparently cannot guarantee an RAI close to 100%. The highly scattered settlement pattern of the rural community remains a huge challenge in bringing this community within 2kms reach of all-weather roads. Re-settlement programs for the rural population shall be seriously considered at this time in order to alleviate the pressure of costly budget to construct rural roads on the basis of village as opposed to Kebele since the latter is not significantly helping in improving access.

Critical Questions	Judgment Criter(ion/ia)	Source	Rating	Main Findings
Q2: Does the asset management of URRAP roads look promising?	Future service	i, ii, iii, v	U	URRAP roads' asset management does not look promising as very few roads have been maintained so far and the responsibility of funding and programming maintenance has not been fully embraced by any entity. However, these roads are not difficult to maintain if Woredas get their communities mobilized, largely because manual means of maintenance are already theoretically developed and the funds required are minimal.
<b>Objective 2: Road Network Development Indicators</b>				
<b>Quality 1: Relevance</b>				
Q1: Are the current proposed values of indicators truly reflective of the progress made?	Accuracy	ii, iii, iv, v, vii	MS	Geographical analyses of Federal roads by region showed that the current road network indicator values are somewhat contradictory among themselves and lack a clear relationship. They only make sense when interpreted/treated together and possibly supplemented with other socio-economic indicators.
Q2: Are the targeted network indicator values, especially road density, adopted from other lower middle income countries justifiable?	Outlined goal	ii, iii, iv, v, vi, vii	U	Some value of road density is unlikely to be a guarantee for some level of economic status as such an approach disregards trade, import-export and productivity which are more strongly related with economy. There is also no clear correlation between real GDP and road density alone. Road density makes crude assumptions such as even distribution of roads across national territory and assigns equal weight of importance to all kinds of roads (paved, gravel and earth), thereby leading to wrong traffic activity and faulty economic extrapolations.

Critical Questions	Judgment Criter(ion/ia)	Source	Rating	Main Findings
<b>Quality 2: Effectiveness</b>				
Q1: Which indicators are more suitable and are they consistent among themselves?	Consistency	ii, iii, iv, v, vi, vii	MS	There are not too many direct indicators to choose from as very few of them are recognized globally and those that are available in the Ethiopian context, i.e. RAI and Condition of Roads showed wide disparity when treated by different agencies. The level of consistency between these two indicators as per each entity, on the other hand, is fair.
<b>Quality 3: Sustainability-Not applicable</b>				
<b>Objective 3: Funding Arrangement and Local Sector's Participation</b>				
<b>Quality 1: Relevance</b>				
Q1: How important and influential has donor support been throughout the RSDP?	Contribution and influence	ii, iii, iv, v, vi, vii	S	Donors' intervention has contributed to 19% of the total financial accomplishments of the RSDP, not to mention other indirect technical assistances. The, GoE, as it generated more revenue from within in recent years, has been able to exercise more autonomy in transport planning policy formulations. DPs' influence on the Ethiopian transport sector policy is now generally believed to be minimal and the prospect of securing more fund from donors is promising. On the other hand, nationally owed external debt (not limited to the road sector), on average, has stood at about one fifth of the country's GDP in recent years.
<b>Quality 2: Effectiveness-Not applicable</b>				

Critical Questions	Judgment Criter(ion/ia)	Source	Rating	Main Findings
<b>Quality 3: Sustainability</b>				
Q1: How has the trend in dependence on financial assistance behaved over the RSDP period?	Self-sufficiency	ii, iii, iv, v, vii	S	The level of dependence on donor intervention for funding roads in the RSDP, in terms of proportion out of the total, showed a gradual decrease. However, the scope of the road reformation program had grown ever ambitious as each RSDP phase progressed and the amount of finance secured from DPs kept on rising. Other factors such as intense need of foreign currency and overall inflation might have also contributed to the indebted budget. The Chinese Government's recent involvement and approach in the sector's funding is significantly different from that of traditional donors' and the responsibility of exercising robust policy dialogue and making the most out of both groups of donors belongs to the GoE.
Q2: Has the participation of the local sector, particularly indigenous contractors, been appreciable?	Local sector's involvement	ii, iii, iv, v, vii	MS	In terms of total number of projects undertaken, both local consultants and contractors showed remarkable progress over the RSDP period. However, due to their financial and managerial limitations compared with international firms, they have largely been locked out of prestigious mega projects and the average value of contract for local entities kept on lagging behind. International contractors and consultants, on the other hand, needed fewer projects to secure a greater monetary share of the huge infrastructure investment made in the RSDP.

A weighted average rating of the attributes for each of the specific objectives has resulted in the following aggregated conclusions: Relevance-MS; Effectiveness-MU; and Sustainability-MS.

## 6.2. Recommendations

- Rural connectivity is a crucial part of a functional road network in Ethiopia's context and so, it might prove useful to progressively correct planning faults (such as incomplete assessment of base line conditions and unrealistic targets) that were committed in developing URRAP during the remaining years of RSDP V and potentially new programs.
- It is extremely important that the road network planning organ, i.e. ERA works closely with the rural roads' implementing agencies such as RRAs and WROs so that planning and execution could become seamless and harmonious. Clearly outlined public responsibilities and regulations with a legal framework shall be set up for these entities.
- Consensus towards programming and funding of Woreda/URRAP roads' maintenance shall be clearly reached before these rural roads get damaged beyond repair.
- Connecting Kebeles within regions has proven to be insufficient in terms of achieving an RAI close to 100%. The highly scattered rural population, without huge financial sacrifices and village-based approach, is unlikely to be brought within 2kms reach of all-weather roads unless re-settlement programs are possibly considered.
- Currently existing road network development indicators for the nation are far from complete and consistent. Therefore, there is a need to thoroughly and more aggressively take baseline data every year with the assistance of modern day technology, GIS surveillance and refined satellite images' assessment.
- Ethiopia has been partnering with different donors (the traditional West and China), especially, after 2010 and therefore, robust policy dialogue and finely crafted funding plans shall be exercised so as to make the most out of both groups of donors. That is particularly true for China as partnership policies and interventions are negotiated outside of the DAG.
- The participation of the local sector, especially indigenous contractors, is overshadowed by powerful international firms that continuously secure lucrative asphalt road projects. Therefore the GoE shall keep up its efforts towards supporting the local private sector through the provision of loans with good terms, availing foreign currency and exercising hastened (fairly not delayed) project payments.

### **6.3. Proposed Future Area of Study**

In countries such as Ethiopia which are marked by widely and irregularly dispersed rural communities making up over 80% of the entire national population, the cost of roads could be too much in order to expand the network in such a manner that brings RAI somewhere close to 100%. Therefore, it might be advisable to combine road construction with relocating people into larger settlement areas. This, in turn, is strongly linked with the availability of cultivable land as well as other sensitive and numerous socio-economic factors. The researcher believes a combination of economic and engineering investigations towards this approach could lead to a more sustainable and hastened way of achieving all-inclusive access.

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