

THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

MINISTRY OF TRANSPORT

ETHIOPIAN ROADS AUTHORITY



THE
ROAD SECTOR DEVELOPMENT PROGRAM

PHASE V

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Acronyms and Abbreviations

ADCs	Animal Drawn Carts
AADT	Annual Average Daily Traffic
AC	Asphaltic Concrete
ADB	African Development Bank
ADLI	Agricultural Development Led Industrialization
AFCAP	African Community Access Program
APL	Adoptable Program Lending
BADEA	Bank of Arab for Economic Development in Africa
BMS	Bridge Management System
CoST	Construction Sector Transparency Initiative
DBST	Double Surface Treatment
DCI	Domestic Construction Industry
DEds	District Engineering Divisions
DFID	Department for International Development, U.K.
DMO	District Maintenance Organizations
DRMCs	District Road Maintenance Contractors
EAHS	Emergency Access to Health Services
EFY	Ethiopian Fiscal Year
ERA	Ethiopian Roads Authority
ERTTP	Ethiopian Rural Travel and Transport Program
ETB	Ethiopian Birr
EU	European Union
GDP	Gross Domestic Product
GIS	Geographical Information System
GOE	Government of Ethiopia
GTP	Growth and Transformation Plan
HDCs	Hand Drawn Carts
HDM	Highway Development and Management Model
ICT	Information Communication Technology
IDA	International Development Association
ILO	International Labor Organization
IMT	Intermediate Means of Transport
JICA	Japanese International Corporation Agency
JSDF	Japanese Social Development Fund
KfW	Kreditanstalt Fur Wiederaufbau

MCA	Multi Criteria Analysis
MDGs	Millennium Development Goals
MOFED	Ministry of Finance and Economic Development
MPI	Material Project Information
NDF	Nordic Development Fund
NR	Not Reported
NRSC	National Road Safety Committee
NRSCO	National Road Safety Coordination Office
OFID	OPEC Fund for International Development Plan for Accelerated and Sustained Development to
PASDEP	End Poverty
PHRD	Policy and Human Resource Development
PMS	Pavement Management System
PPPA	Public Procurement and Property Authority
QAP	Quality Assurance Plan
QMS	Quality Management System
RAI	Rural Access Index
RED	Road Economic Decision Model
ROW	Right-of-Way
RRAs	Regional/Rural Roads Authorities
RRC	Road Research Centre
RSDP	Road Sector Development Program
RSDP I	Road Sector Development Program Phase I
RSDP II	Road Sector Development Program Phase II
RSDP III	Road Sector Development Program Phase III
RSDP IV	Road Sector Development Program Phase IV
SFD	Saudi Fund for Development
SLUF	Sustainable Land Use Forum
SMEs	Small and Medium Enterprises
SMTP	Short and Medium Term Plans
SNNPR	Southern Nations and Nationalities Peoples Region
TA	Technical Assistance
TPO	Transport Poverty Observatory
TRL	Transport Research Laboratory
U.K.	United Kingdom
URRAP	Universal Rural Road Access Program
USD	United States Dollar

VKM	Vehicle Kilometer
WBGRSF	World Bank and its Global Road Safety Facility
WIDP	Wereda Integrated Development Plan
WTTPs	Wereda Travel and Transport Plans

EXECUTIVE SUMMARY

The Government of Ethiopia has placed increased emphasis on the improvement of the quality and size of road infrastructure in the country. To address constraints in the road sector, mainly low road coverage and poor condition of the road network, the Government formulated the Road Sector Development Program (RSDP) in 1997. RSDP has been implemented over a period of eighteen years and in four successive phases.

Over Eighteen years of RSDP a total of 118,553 km of road physical works consisting of rehabilitation and upgrading of trunk and link roads, construction of new link roads, rural roads and district roads and maintenance of federal and regional roads have been carried out by Ethiopian Roads Authority (ERA), Regional Roads Authorities (RRAs) and Woreda Road offices (WRO) and the community and municipalities. Total disbursement over eighteen years of RSDP was ETB 218.7 billion. In addition to road physical works series of policy and institutional reforms have been implemented in the sector, which have enhanced implementation capacity of road projects and effectiveness of Road Asset Management.

RSDP has been financed from domestic sources including GOE, Road Fund Office and community, and foreign sources including bilateral and multilateral financial institutions

After implementation of RSDP over the past 18yrs achievement in improving the size and quality of road network is remarkable. The road network of the country increased from 26,550 km in 1997 to 110,414 km in 2015. As a result of the increase in the size of road network average, distance to nearest all weather road decreased from 21 km in 1997 to 5.5 km in 2015. Road Density per 1000 sq km increased from 24.1 km in 1997 to 100.4 km in 2015. The size of paved road network of the country increased from 3,708 km in 1997 to 14,055 km in 2015. The condition of the road network also shows significant improvement. The proportion of road network in good condition increased from 22% in 1997 to 70% in 2015.

Despite remarkable achievement in the size and quality of the country's road network in the four phases of RSDP still much remains to be done. Therefore, the fifth phase RSDP is prepared as part of continued effort to increase the size and improves the quality of the road networks of the country.

The rationale for RSDP V is the country's and road sector's vision. The country's vision is to reach low middle income country by 2025. The road sector vision is to increase the size and improve the quality of the road network to the level of low middle income countries so that the country achievement its vision to reach low middle income country by 2025.

The Government of Ethiopia acknowledges that the size and quality of the country's road network has to reach the low middle income country's level at the end of RSDP V i.e 2020. The size and quality of road network that the country needs to have at the end of RSDP V is estimated by bench marking the size and quality of road network of India, China, Brazil and South Africa when they join middle income country categories.

The bench marking Shows that Ethiopia needs to have 220,00 km road network and road density per 1000 sq.km of 200 km so that road network reach the level of low middle income country at the end of RSDP V.

However, it is realized that because of financial and institutional capacity constraint; the road network of the country could not be increased to 220,000 km by 2020 from the current 110,414 km (2015).

Therefore, taking financial and institutional capacity constraint in to account the target for the country's road network at the end of RSDP V is set at 215,000 km and the target for road density per 1000 sq.km is set at 196 km.

RSDP V comprises road physical works of 16, 566 km by Federal Government Consisting of:

- 1285 km rehabilitation of trunk roads,

- 577 km upgrading of trunk roads,
- 3442 km upgrading of link roads,
- 6050 km construction of link roads
- 329 km of Expressway roads and
- 5063 km heavy maintenance of roads

RSDP V also comprises construction of 8,060km rural roads and construction of 90,000 km of Woreda roads.

The total cost of RSDP V is estimated to be ETB 334.5 billion, of which ETB 264.7 billion is for federal roads, ETB 69.8 billion is for regional and woreda roads. RSDP V will be financed by Government and foreign sources. Of the total cost of RSDP V; 76.5% will be covered from local source of which Government of Ethiopia will cover 73.8% of the cost of the program including matching fund and the Road Fund will cover 2.7% and the remaining 23.5% of the cost the program will be covered by foreign sources. Government of China is the major foreign financier which will cover 10.4% of the cost of the program followed by the World Bank and African Development Bank which will cover 7.1% and 2.5% of the cost of the program respectively.

Institutional capacity building activities will be carried out to enhance the capacity of implementing institutions which are Ministry of Transport, ERA, regional roads agencies and woreda road offices:

At ERA level, modernizing engineering procurement, design and contract administration and Road Asset Management will be carried out under ERA's Modernization and Transformation initiative. Capacity building of local contractors and consultants will be carried out focusing on road project management.

Human Resource Plan is prepared for professionals, sub professionals/Middle Level technicians, Equipment operators and others to implement the program.

The plan focuses on high and middle level professionals. High level professionals account for 14%, of which 25 - 30% need to have second degree and the rest is planned to include first degree holders. Sub professional account for 33% and their education level ranges from first degree up to level four. Training need for implementing RSDP V is identified and the cost of the training is estimated.

Like other sectors, the road sector has problems. To address the problems and accelerate the growth of the sector and its contribution to national economic growth; policies and strategies have been adopted and implemented during the past four phases of RSDP and continues to be implemented during RSDP V.

Opportunities in the sector are identified which contribute to successful implementation of RSDP V. These opportunities are:

- Increasing financial and technical assistance from international community including foreign Governments and international financial institutions,
- Increasing Government Revenue,
- The growing interest of foreign contractors and consultants to participate in Road Sector Development Program ,
- Sustainability of RSDP,
- Improved capacity of local contractors and consultants, and
- Improved institutional capacity of ERA.

RSDP V also identifies threats that may have negative impact on implementation including shortage of finance, shortage of foreign exchange, and poor quality of design of road projects. RSDP V identifies ways to cope up with threats and ways to make use of opportunities.

As RSDP V consists of construction of so many road projects; effective Monitoring and Evaluation Mechanism is in place including monthly progress reports, evaluation of

progress of road projects, site visit, rapid evaluation system and RSDP Monitoring Indicators.

Sectoral issues to be addressed under RSDP V are also identified. Maintenance of roads is a major focus area under RSDP V. As the country's road network rapidly grows in size and quality per year; maintenance need is also growing rapidly. However, revenue and allocation of fund for maintenance of roads is short of the maintenance need of the rapidly growing gravel and paved road network, which led to the deterioration of some road sections.

Therefore, RSDP V gives attention to increase the revenue and allocation of fund for maintenance of roads by the Road Fund Office by implementing the Road Financing Study.

Expanding alternative express way to the existing already congested highways and to highways approaching congestion is another issue under RSDP V. Studies show that alternative express ways to the existing high ways are the best way to deal with traffic congestion and its negative impacts on the economy.

Regional integration and coordination of corridor operations is another issue to be addressed under RSDP V. Nearly all import –export corridors have been upgraded with the highest standard asphalt in the past four phases of RSDP. Upgrading of the remaining import export corridors will be competed under RSDP V.

However, coordination of corridor operations still remains to be done by Ethiopia and its neighboring countries of Djibouti, Kenya and Sudan. Coordination of operations on Djibouti, Berbera, Port Sudan and Mombasa corridors needs setting up joint institutions with responsibility of coordinating operations on the corridors by Government of Ethiopia, Somali Land, Sudan and Kenya.

Therefore, establishment of joint institutions such as corridor Authority and Border post and transport service agreement will be given priority under RSDP V.

Section 1

1. Eighteen years performance of RSDP and five years performance of the fourth phase of RSDP

1.1. Eighteen Years Performance of RSDP

Cognizant of the importance of roads to accelerated and sustained economic growth and poverty reduction; Government has been engaged in extensive construction, upgrading and maintenance of roads since 1997 under four successive phases of RSDP.

The Government of Ethiopia has completed implementation of the four phases of RSDP and the fifth phase of RSDP has been prepared as part of the Second Growth and Transformation Plan to be implemented over the period of 2016 – 2020. A great deal of road physical works has been carried out during implementation of the four phases of RSDP. Table 1 shows road physical works carried out during the four phases of RSDP.

Table 1: Performance of RSDP to date

Program	Road Physical Works (km) Performance			Financial Performance		
	Plan	Accomplish	% of Accomplish	Plan	Accomplish	% of Accomplish
RSDP I (1997 – 2002)	8,908	8,709	98	9,812.9	7,284.5	74
RSDP II (2002 – 2007)	8,486	11,589	141	15,985.9	18,112.9	113
RSDP III (2007 – 2010)	14,686	12,395	93	34,643.9	34,957.8	101
RSDP IV (2010 – 2015)	97,517	85,859	88	125,409.1	157,082.8	125
Total/Average	129,597	118,969	92	185,851.8	217,438.0	117

As it can be seen from table 1, a total of 118,969 km of road rehabilitation, upgrading and construction and heavy maintenance of roads has been carried out during the four phases of RSDP. Total disbursement during the four phases of RSDP was ETB 217.4 billion.

After implementation of the four phases of RSDP achievement in all indicators is remarkable. The road network of the country increased from 26,550 km in 1997 to 110,414 km, which represent 316% increase in 18 years. As a result of the increase in road network, road density per 1000 sq.km increased from 44km in 1997 to 100.4km. In addition, areas further than 5km from an all-weather road decreased from 64% in 1997 to 37% in 2015. Also, average distance to the nearest all-weather road decreased from 21km in 1997 to 5 km in 2015.

1.2. Assessment of Implementation of the fourth phase of RSDP (RSDP IV)

During the past five years of implementation of RSDP IV, 85,859 km of roads were rehabilitated, upgraded, constructed and maintained of which 13, 632 km of roads were federal roads, 9,814 km of roads were regional roads and 62,413 km of roads were woreda (URRAP) roads.

Total disbursement for rehabilitation, upgrading, construction and maintenance of federal, regional and woreda roads in the past five years of implementation of RSDP IV was ETB 157.1 billion, of which ETB 117.9 billion was for federal roads, ETB 12.2 billion regional roads and ETB 26.7 billion was for woreda roads. Table 2 shows the implementation of RSDP IV in the past five years against the five year plan.

Table 2: Implementation of RSDP IV against the five year plan

Major Activities	Five year plan	Implementation	
		In km	In percent
Rehabilitation of roads	728	575	79
Upgrading of Trunk roads	1,089	1,268	116
Upgrading of link roads	3,934	3,231	82
Construction of Trunk and link roads	4,331	3,895	90
Heavy maintenance of roads	4,700	4,664	99
Sub total	14,782	13,632	92
A. Construction regional roads	11,212	9,814	88
B. Construction of woreda roads	71,523	62,413	87
Grand total	97,517	85,859	88

As it can be seen from table 2, out of 13,632 km of road works carried out by Federal Government, 575 km was rehabilitation of trunk roads, 1,268 km was upgrading of trunk roads, 3,231 km was upgrading of link roads, 3,895 km was construction of trunk and link roads and 4,664 km was heavy maintenance of roads.

Implementation by Federal Government during the past five years of RSDP IV was 92% against physical plan. Overall, implementation of RSDP IV (federal, regional and Woreda) in the past five years was 88%. Impact of RSDP IV is shown in table 3.

Table 3: Impact of GTP (Targets and Accomplishment of GTP)

No.	Indicators	2002 base year	2010/11		2011/12		2012/13		2013/14		2014/15	
			Plan	Accomp.	Plan	Accomp.	Plan	Accomp.	Plan	Accomp.	Plan	Accomp.
1	Length of federal and regional road network (km)	48,800	51,636	53,143	54,818	56,100	58,211	58,338	61,771	60,466	64,522	63,604
2	Length of all-weather road (km)	0	9,568	854	24,299	6,983	40,044	27,628	55,790	39,056	71,522	46,810
3	proportion of kebeles Connected by all-weather roads	39	48	42	63	52	78	63	93	68	100	69
4	Average distance to the nearest all-weather road	3.7	3.0	3.4	2.3	2.9	1.6	2.1	1.6	1.8	1.8	1.7
5	Areas farther than 5 km from all-weather road	64.1	57.3	61.2	48.7	56.4	34.3	45.8	34.3	40.5	29	37
6	Areas farther than 2 km from all-weather road (%)	83.7	80.0	82.2	75.0	79.5	70.0	73.2	65.2	69.6	61	67
7	Road density per 1000 km ²	44.5	55.6	49.1	71.9	57.4	89.3	78.2	106.9	90.5	123.7	100.1
8	Road density per 1000 population pop	0.64	0.78	0.66	0.98	0.75	1.18	1.00	1.37	1.13	1.54	1.3
9	Proportion of road network in acceptable condition	81.0	81.3	81	83.0	86	84.6	86.0	85.9	86.0	86.7	87
10	Proportion of road projects constructed by local contractors	58	61	58	64	63	68	66	70	71	73	78
11	Vehicle kilo meter of travel (in millions)	9.6	10.1	12.1	10.6	14.4	11.1	14.7	11.7	13.6	12.3	17.3

1.3. Road Sector Development problems

Despite significant achievements of the road sector, there are also impediments encountered during implementation of RSDP, the major impediments encountered are discussed below.

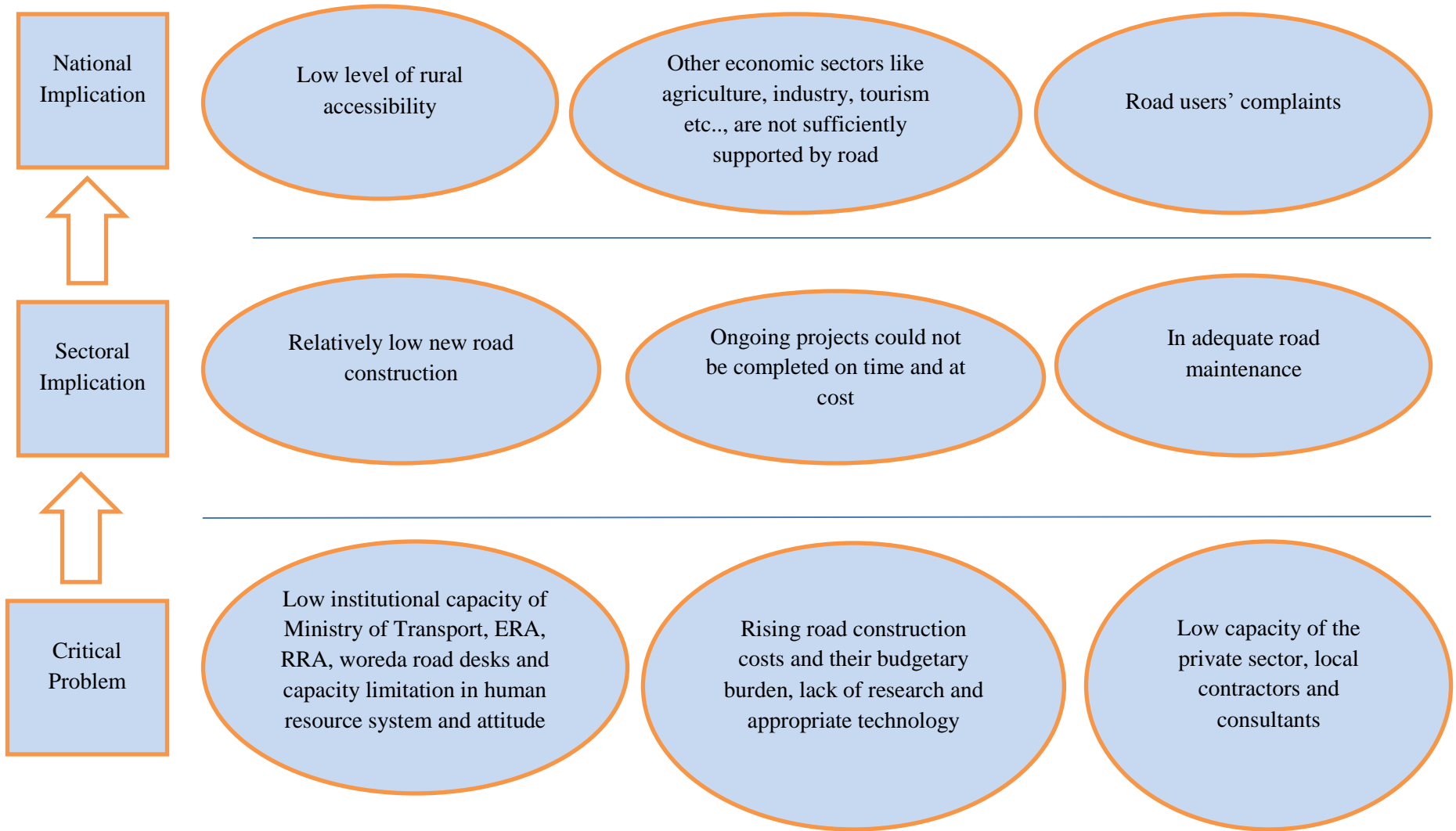
Institutional Capacity:- Implementing institutions at different level have their own capacity limitation. ERA has institutional capacity limitation in the Procurement of Engineering Service, Contract Administration of Construction and Design Project and Road asset Management. The domestic construction industry particularly; local contractors and consultant do not have sufficient competence in project management which is responsible for poor quality of road projects design and other related problems.

In addition, road sector professionals and technicians lack competence and professional ethics. The fact that implementation of road projects could not be completed on time and at cost and with desired quality is evidence of the institutional capacity limitation in the sector. Therefore, institutional capacity building of the road sector will be a priority in RSDP V.

Rising Road Construction Costs and Budgetary Burden: This is the result of lack of competitiveness in the road sector, lack of use of and choice of appropriate technology, limited participation of local peoples and the private sector, failure to look for viable alternative financing options etc., which in turn are creating budgetary burden on the Government.

Budgetary burden caused by rising road construction costs has reduced the scale of road development in the country. Therefore, during RSDP V attention will be given for implementation of strategies stabilizing road construction costs in the country. Critical problems, their causes and consequences are shown in chart 1.

Figure 1: Critical problems, their causes and consequences



Section 2

2. RSDP V

2.1. Introduction

RSDP V gives priority to the construction of new trunk and link roads by Federal Government to improve access to crop surplus and economic development potential areas and densely populated rural areas in the country. RSDP V also gives priority to heavy maintenance of roads by federal, regional road agencies to improve the condition of the existing road network. In RSDP V upgrading of trunk and link roads will also be carried out by Federal Government. Construction of rural roads and all weather community roads will be carried out by regional government and woredas respectively.

2.2. Rational of RSDP V

2.2.1 Country Vision

Road infrastructure development is crucial for any country's socio - economic development. A road is not an end by itself but a means for achieving social and economic development. Road sector development plan is in one way or the other a reflection of other sectoral development plans.

The country's vision to reach low middle income country by 2025 is the basis of all sectoral development plans. All sectoral development plans have to consider the levels of social, economic and infrastructural development of middle income countries.

Therefore, RSDP V needs to consider the country's vision to reach middle income country category.

2.2.2 Road Sector Development Vision

The Road Sector Development Vision is to ensure access to standard and safe road to all people living in rural and urban areas and open up all development potential areas in the country thereby support the accelerated and sustained economic growth; so that the country will reach middle income country category by 2025.

2.2.3 The optimum road network size, type and condition for Ethiopia to reach middle income country Group

Today's middle income countries were at similar level of economic development as of Ethiopia today before 40 years ago. Today's middle income countries have adapted different policy and strategy to develop. However, today's middle income countries commonly have given priority to infrastructure development particularly to road network development, which is believed to have significant contribution to their development.

A number of indicators can be used to assess the sector's achievement like output, performance, quality, institutional set-up and also yardstick comparison with other countries. Among these indicators; the following are the major ones.

Output indicators

These indicators measure the sectors performance with regard to provision of road and condition

- Road Density per 1000 sq.km
- Road Density per 1000 people
- Percentage of Roads in good condition and
- Percentage of paved roads

Quality and efficiency indicators

The indicators measure performance during construction with regard to quality and capacity. These are:

- variation because of design defects
- level of rework during construction
- number of defects during and after substantial completion or hand-over/

Organizational Setup Indicator

These indicators primarily measure the sector's institutional set-up. And the outcomes are shown indirectly using different indicators.

In addition to the indicators mentioned above, there are other indicators to evaluate the benefit of constructed roads with regard to accessibility:

- Average travel time (hour) or average distance (km) to all weather road
- Proportion of area more than 5 km from all-weather road
- Proportion of Population within 2 km access from all-weather road

2.2.3.1 Road Density per 1000 sq.km

With the current 110,414 km of road network, the road density per 1000 sq.km is 100.4 km. This is equal to the average road density of poor countries. Nevertheless, as indicated before the country's vision is to reach at the low middle income countries by 2025. In order for the country to reach the average road density of middle income countries, our country's road network has to increase to more than 200,000 km.

Yet, the average road density of the middle income countries is high and could not be achieved by 2025. Hence, realistic analysis of road density of middle income countries is needed. Rather than considering the current average road density of middle income

countries, the road density of benchmarked countries' when they join low middle income countries is considered.

Among the benchmarked countries; China joined the low middle income country in 1999 and India in 2007. Thus; China, India and South Africa are taken as benchmark countries for Ethiopia to set its road network size. For rural roads, India is taken as benchmark country due to its outstanding accomplishment in rural roads and similarities in rural population.

Based on this, the Indian program "Pradhan Mantra Gram Sadak Yojana (PMGSY)" which started in 2000 is well known and is still taken as a good model worldwide in expanding rural road and transport. This program is directly supported and monitored by the Prime Minister. The program aimed at connecting areas with population of 1000 and above (and in hotter areas and mountainous areas above 500 population) with all-weather road. The overall goal of the program is directed by a vision of 2021 which aimed at step by step connecting of areas with population up to 250 with an all weather road. In general, the program incorporates construction of more than 365,000 km of new roads and upgrading of 370,000 km of road.

Major lessons learned

- **Setting a long term sustainable goal (Vision 2021):** sector companies (especially consultants and contractors) have built their capacity and grown with sustainability of programs.
- **Objectives set under the strategic plan should be explicit and fair to beneficiaries:** For instance; objectives like "connecting areas with population of 1000 and above in the first five years, connecting areas with population of 500 and above in the second five years, and connecting areas with population of 250 and above in the third five years, with a standard road network."
- **Priority given for road asset management:** During the consecutive years of implementation, the road network keeps on increasing and the budget for the

improved road asset management also increases. And as a principle, new roads that will not be maintained should not be built.

- **Construction of new roads and upgrading the existing ones:** should go hand in hand: As of the beginning of the program, construction of new roads and upgrading of existing roads is undertaken simultaneously.
- **Sharing cost among Central and Regional governments:** Almost all costs of the first five year programs are covered by the central government but the costs of the next consecutive programs are shared between the central and regional governments. This reduces the budget pressure on the federal government as well as improves the ownership among regional and all local administrative levels. The cost sharing principle is also supportive of good performing regions and regions in need of special support.
- **Considering construction of asphalt roads as alternative:** In India, most of the roads constructed under rural road expansion program are covered with asphalt. This increases the initial construction cost and needs a well-established maintenance scheme and capital as well. Thus, while deciding to construct the roads with asphalt; maintenance scheme and capital are taken into consideration.

Table 4: The status of benchmarked countries is presented in the table below.

Country	Land Area('000 Sq.km)	Population (in'000)	Rural/Urban popu. ratio	Average economic growth of last 10 years (in %)	Government Type
Ethiopia	1,100	94,100	80/20	9.8	Federal; Developmental State
Brazil	8,514	200,362	15/85	3.8	Federal; Developmental State
China	9,572	1,357,380	47/53	10.2	Federal; Developmental State
South Africa	1,221	52,982	36/64	3.4	Federal; Developmental State
India	3,166	1,200,000	68/32	7.6	Federal; Developmental State
South Korea	100	50,220	18/82	3.8	Developmental State

Among the bench marked countries; China, India, Brazil and South Africa joined middle income country with an average road density of 200 km per 1000 sq.km.

The road density of other low middle income countries is similar with road density of bench marked countries as shown in table 5.

Table 5: Road density of low middle income countries

No.	Country	Road Density (km.per1000 sq.km)	No.	Country	Road Density (km.per1000 sq.km)
1	Algeria	50	23	Namibia	50
2	Djibouti	120	24	Swaziland	210
3	Egypt	90	25	Indonesia	190
4	Iran	110	26	Philippines	570
5	Iraq	100	27	Thailand	110
6	Jordan	80	28	Vanuatu	90
7	Morocco	130	29	Armenia	270
8	Tunisia	120	30	Azerbaijan	520
9	Bolivia	60	31	Belarus	450
10	Brazil	200	32	Bulgaria	380
11	Colombia	100	33	Georgia	290
12	Ecuador	150	34	Kazakhstan	30
13	El Salvador	410	35	Macedonia	330
14	Guatemala	130	36	Moldova	390
15	Guyana	40	37	Serbia	160
16	Honduras	120	38	Turkmenistan	50
17	Nicaragua	140	39	Ukraine	290
18	Paraguay	70	40	Angola	40
19	Peru	60	41	Cameron	110
20	Surinam	30	42	Cape Verdi	250
21	china	200	43	Congo	50
22	Fiji	190	44	Lesotho	200
Average		200 Km per 1000 km ²			

As it can be seen from table 5, more than 70% of the low middle income countries' road density is less than the average road density. Moreover, if we exclude three countries which have road density more than double of the average (i.e 200), we get an average

road density of 150 km per 1000 sq.km. This will further support the road density goal of 200 km per 1000sq.km which is estimated based on benchmarked countries.

However, it is realized that because of financial and institutional capacity constraint; the network of the country could not be increased to 220,000 km and the road density per 1000 km² could not reach 200 km by 2020 from the current 110,414 km (2015). Taking the financial and institutional constraint into account; the size of the road network to be achieved at the end of RSDP V is set at 215,000 km and the road density per 1000 km² is set at 196 km.

2.2.3.2 Road Density per 1000 people

Road density per population also demonstrates that Ethiopia's road density will be nearly same as countries like China and South Korea. Road density per 1000 population should increase, at the end of 2020 from the current 1.3 km per 1000 population to 2.1 km per 1000 population. Even though this figure is less than the average of low middle income countries; achieving the goal is satisfactory by itself.

2.2.3.3 Percentage of Roads in good condition

While evaluating the performance of a road sector; in addition to network size and density, considering the conditions of the road network is important. Therefore, taking benchmarked countries as a base, at the end of RSDP V the percentage of road network in good condition should reach at 80% from the current 72%. Above all increasing the percentage of roads in good condition should be given priority because it has an immense benefit for the nation. For instance not only it improves accessibility but also provide efficient transportation service and reduce vehicle operation costs.

2.2.3.4 Percentage of Paved Roads (Paved/unpaved ratio)

The other issue raised together with quality of road network is proportion of asphalt roads. It is clear and believed that asphalt surfaced roads have multidimensional benefit including, travel time saving, reduced vehicle operating cost; and reduced

transportation cost and comfort. In this regard, currently the length of asphalt road in the country is 15,244 km and it accounts only 13.8% of the total road network of the country. Thus, out of the total road network which is believed to be large; 215,000 km, at the end of RSDP V, the proportion of asphalt surfaced road will be 12%.

2.2.3.5 Variation because of design defects

At present one of the reasons for variation in costs is design changes due poor design. It is believed that, identifying and solving the root problems of design defects will bring a visible change to the sector. Thus, based on our current performance and adopting best practice of benchmarked countries, the target for variation at the end of RSDP V is set at 2%.

2.2.3.6 Minimizing Level of rework during construction

One of the indicators that show the quality of work during construction is the level of rework. The target for rework at the end of RSDP V is 2%.

2.2.3.7 Number of defects on and after substantial completion or hand-over

Defects that are seen after substantial completion or after handover of projects show work quality, level of supervision during construction and contract implementation capacity. The target for defects is <20.

2.2.3.8 Organizational setup

As stated earlier organizational stand is evaluated indirectly using other indicators. Summary of targets for RSDP V which are set based on benchmarked countries is shown in table 6.

Table 6: Targets of RSDP V

Indicators	Ethiopia (In2007)	Brazil	China	South Africa	India	South Korea	Ethiopia (In2012)
Total road network	110,414	1,581,181	4,106,387	364,131	4,690,342	105,931	215,000
Road Density per 1000 sq.km/	100.4	200	195	227	1012	894	196
Road Density per 1000 population	1.3	7.9	2.9	6.1	3.7	2.1	2.1
Roads in good condition	70	84	87	82	81	92	80
%ge of Cost increment due to variation	8	4	2	6	5	2	2
%ge of delay due to variation	22	12	8	14	10	5	10
%ge of rework during construction	9	4	1	3	2	0	2
retention works during and after handover	70	24	14	18	22	8	<20
Organizational stand	Modern, Energetic and capable						

2.3. Governing Principles of RSDP V

Governing principles of RSDP V emanate from Macroeconomic indicators, development policies and strategies, lessons derived from implementation of past RSDPs and experience of other countries. Governing principles of RSDP V are equity, sustainability, convenience and safety, productivity and competitiveness.

- i. **Equity:** Improving rural accessibility and reducing and ultimately eradicating poverty is one of the major objectives of road sector development. Fair distribution of roads among different regions in the country is essential for economic growth and poverty reduction. As it is the case with the past RSDPs' fair distribution of roads among different regions in the country; this will also be maintained in RSDP V. New trunk and link road construction projects are fairly distributed across regions based on population, area and other criteria to ensure equitable distribution of federal roads.
- ii. **Sustainability:** Sustainability of development efforts in all sectors is crucial to achieve the development objective of the country. Without sustainability of economic and social activities; economic growth and social development cannot be achieved. Sustainability of roads and road projects has to be ensured through

timely and adequate maintenance of roads by road agencies. Road agencies need to be sufficiently principled to make sure that they can carry out timely and adequate maintenance before they build new road. Road agencies give priority to not only construction of new roads but also to maintenance of existing roads to preserve the existing road infrastructure under their respective administration. In parallel with ensuring sustainability of roads, RSDP V gives due attention to the sustainability of capacity of more than 150 big local contractors and consultants in the road sector and also sustainability of more than 1000 small and medium contractors and consultants that are participating in the implementation of URRAP. Sustainability of institutional capacity building of road agencies at Federal, Regional and woreda level is also given attention in RSDP V.

iii. Quality: Due to implementation of successive phases of RSDP, the road network of the country has shown substantial quality improvement. Growth of traffic on trunk and link roads and the demand of the public for better roads and change of technology are factors behind for steady improvement in the quality of roads during the past program phases. Likewise, priority is given to improving the quality of the road network in RSDP V. Accordingly, more alternative express ways to existing trunk roads radiating from Addis Ababa will be built by Federal Government to reduce travel time, cost and accident. Moreover, roads having higher level of traffic will be upgraded with asphalt standard to reduce transportation cost and travel time.

iv. Productivity and Competitiveness: Productivity in the construction industry in general and the road industry in particular is low, due to low productivity of construction labor and equipment. Low productivity of local contractors and consultants prevented them from tendering for big and complex road construction projects and consultancy services. Low productivity of local contractors and consultants is also contributing to rising road construction costs in the road sector. To address the low productivity and competitiveness in the sector, 16 projects have been implemented since 2010. The projects will be revised

and effectiveness of implementation will be improved under RSDP V to help raise the productivity and competitiveness of the domestic construction industry.

2.4. Targets

RSDP V Consists of 16,746 km of roads physical works by Federal Government which includes:-

- 1285 km of rehabilitation of trunk roads,
- 577 km of upgrading of trunk roads,
- 3,442 km of upgrading of link roads,
- 329 km of construction of expressways,
- 6,050 km of construction of link roads
- 5,063 km heavy maintenance of roads on High Case Scenario and 50,000 km on Base Case Scenario in addition to routine/term maintenance on all roads
- 8,060 km of construction of rural roads on High case scenario (4200 km with Base Case Scenario)
- 90,000 km of construction of regional and woreda rural roads

The List of Federal road projects that will be constructed during RSDP V is attached as annex. Targets of RSDP V are shown in table 7.

Table 7: Targets of RSDP V, High Case Scenario

Indicator	Target					
	2015	2016	2017	2018	2019	2020
Length of federal and regional road network	110,414	129,000	151,000	174,000	195,000	215,000
Average travel time to the nearest all weather road (hour)	1.7	1.4	1.2	1.1	0.9	0.9
Areas more than 5 km from all weather roads (%)	36.6	31.0	25.3	20.6	17.0	14.2
Road density per 1000 sq.km	100.4	117.3	137.3	158.2	177.3	195.5
Road density per 1000 population (km)	1.3	1.4	1.6	1.8	2.0	2.1
Proportion of roads in good condition (fair and good)	70	72	74	76	78	80
Proportion of asphalt roads (%)	14	14.2	14.4	14.6	14.8	15

Table 8: Targets of RSDP V, Base Case Scenario

Indicator	Target					
	2015	2016	2017	2018	2019	2020
Length of federal and regional road network	110,414	119,000	130,000	142,000	156,000	171,000
Average travel time to the nearest all weather road (hour)	1.7	1.4	1.2	1.1	0.9	1.1
Areas more than 5 km from all weather roads (%)	36.6	33.9	30.7	27.5	24.2	21.1
Road density per 1000 sq.km	100.4	108.2	118.2	129.1	141.8	155.5
Road density per 1000 population (km)	1.3	1.3	1.4	1.5	1.6	1.7
Proportion of roads in good condition (fair and good)	70	72	74	76	78	78

2.5. Cost Estimate and Financing Plan

2.5.1. Cost Estimate

The total cost of RSDP V is estimated to be ETB 334.5 billion, of which ETB 264.7 billion is for federal roads. Table 9 shows the breakdown of cost of RSDP V by federal, regional and woreda roads and by type of activity.

Table 9: Break Down of cost of RSDP V by Federal Government, Regional and woreda Administrations (Mill ETB)

No.	Activity	2016	2017	2018	2019	2020	Total
1.	Federal Roads	34,166.9	41,589.5	51,091.7	66,847.9	71,045.8	264,741.8
1.1	Rehabilitation of Trunk Roads	1576.8	2230.0	2154.5	1652.3	655.7	8269.3
1.2	Upgrading of Trunk Roads	3,076.7	2,740.2	1,625.5	1,499.3	971.1	9,912.8
1.3	Upgrading of Link Roads	9,838.9	11,052.9	12,951.1	13,798.4	12,683.3	60,324.4
1.4	Construction of Link Roads	14,698.7	19,705.3	24,663.6	31,889.1	39,682.9	130,639.5
1.5	Construction of expressways	2225.8	2516.6	6103.2	14,144.9	12,896.6	37887.1
1.5	heavy maintenance of Roads	317.7	650.0	682.5	716.6	752.5	3,119.3
1.6	Routine Maintenance of road	619.2	750.0	825	907.5	998.3	4,100.0
1.7	Construction and Maintenance of Bridges	630.1	693.1	762.4	838.7	922.5	3,846.8
1.8	Feasibility study and EIA	110.7	116.3	122.1	128.2	134.6	611.8
1.9	Policy and Capacity Building	892.6	937.2	984.0	1,033.2	1,084.9	4,931.9
1.10	Ordinary Budget	180	198.0	217.8	239.6	263.5	1,098.9
2.	Regional Roads	4,087.1	4,873.9	4,837.7	4,683.7	4,208.6	22,691.1
2.1	Road construction	3,627.5	4,392.5	4,330.0	4,150.0	3,650.5	20,150.0
2.2	Road maintenance	459.6	481.4	507.7	533.7	558.6	2,541.1
3.	Woreda Roads	8,351.1	10,237.8	10,255.4	9,725.7	8,511.5	47,081.6
3.1	Road construction	8,117.0	9,922.6	9,841.0	9212.9	7,906.5	45,000.0
3.2	Road maintenance	234.1	315.2	414.4	512.9	605.0	2081.6
	Total (1+2+3)	46,605.1	56,701.2	66,184.9	81,257.3	83,765.9	334,514.4

2.5.2. Financing Plan

RSDP V will be financed by Government and foreign sources. Of the total cost of RSDP V, 76.5% will be covered from local sources of which Government will cover 73.8% of

the cost of the program including matching fund and the Road Fund will cover 2.7% of the cost of the program. The remaining 23.5% of the cost of RSDP V will be covered by foreign sources. Government of China is major foreign financier which will cover 10.4% of the cost of RSDP V, followed by the World Bank and African Development Bank which will cover 7.1% and 2.7% of the cost respectively. Table 9 shows financing plan of RSDP V.

Table 10: Financing Plan of RSDP V

No	Source of Finance	Cost (in million Birr)	%ge Share
1	Government	195,356.3	73.8
2	China	27,585.6	10.4
3	World Bank	18,835.9	7.1
4	Road fund	7,219.2	2.7
5	African Development Bank	6,544.4	2.5
6	Korea	3,098.7	1.2
7	Kuwait	1,663.4	0.6
8	OFID	1,576.4	0.6
9	Bank of Arab	886.6	0.3
10	Saudi Fund	739.1	0.3
11	Others	617.8	0.2
12	Japan	438.1	0.2
13	Abu Dabi Fund	180.4	0.1
14	European Union*	*	*
Total		264,741.8	100.0

*The finance from the European Union is Sectoral Budget; thus, the amount is not presented as it is not identified currently.

2.5.3. Measures taken to Reduce Foreign Exchange Requirement

As the participation of local contractors in road sector development increases foreign exchange requirement is expected to decrease. Foreign exchange is required for road projects financed by Government and executed by foreign contractors to import

construction equipment, spare parts, steel, asphalt, design and laboratory equipment, dynamite, vehicles, tire and office equipment.

During RSDP V a total of USD 715.0 million is required for road projects financed by Government and executed by foreign contractors. Table 10 shows foreign exchange requirement of RSDP V.

Table 8: Foreign exchange requirement of RSDP V

Foreign exchange	2016	2017	2018	2019	2020	Total
Requirement (in million USD)	110	130	145	155	175	715

Table 9: Cost of RSDP V by Source of Finance (in Million Birr)

No.	Source	2016	2017	2018	2019	2,020	Total
1	World Bank	4168.4	3456.6	4441.9	3896.5	2872.5	18835.9
2	African Development Bank	1923.8	1958.5	1406.2	833.0	422.9	6544.4
3	Japan	87.3	121.0	86.9	130.4	12.5	438.1
4	China	1396.3	1190.1	3524.4	10662.7	10812.1	27585.6
5	Korea	489.0	640.0	660.5	822.5	486.6	3098.7
6	BADEA	202.7	234.8	269.7	142.5	37.0	886.6
7	Saudi Fund	167.6	233.9	202.1	94.7	40.8	739.1
8	OFID	332.8	374.1	476.3	300.8	92.3	1576.4
9	Kuwait Fund	241.4	238.9	215.3	450.0	517.7	1663.4
10	Abu Dhabi	60.1	60.3	50.3	9.8	0.0	180.4
11	Road Fund Office	936.9	1400.0	1507.5	1624.1	1750.7	7219.2
12	Government of Ethiopia	24048.8	31563.9	38127.3	47751.5	53864.8	195356.3
13	Others	111.8	117.4	123.3	129.4	135.9	617.8
Total		34,166.9	41,589.5	51,091.7	66,847.9	71,045	264,741.8

2.6. Identification of Road Projects

Road upgrading projects

RSDP V comprises upgrading of trunk and link roads with asphalt standard, which are identified for upgrading in RSDP IV but were not implemented due to shortage of finance.

RSDP V also consists of upgrading of additional trunk and link roads which are identified for upgrading. Road upgrading projects are identified based on the following criteria.

- Traffic Level,
- Road condition,
- Investment potential on agriculture and other economic sectors and
- Regional integration with neighboring countries

New Road Construction Projects

RSDP V also comprises construction of new link roads with gravel standard. And construction of link roads, which were identified for construction in RSDP IV but were not implemented due to shortage of finance will be carried out. Also in RSDP V, construction of additional link roads which are identified for construction will be carried out. These additional link roads are identified based on the following criteria.

- Woreda Connectivity,
- Population on Project Influence Areas and
- Food and cash crop surplus production or potential natural resource on the woredas.

2.7. Implementation Plan of Federal Road projects

Implementation plan of federal road projects is shown in table 12.

Table 10: Implementation plan of Federal road project (km) (2016 - 2020)

No	Type of work	2016	2017	2018	2019	2020	Total
1	Rehabilitation of Trunk Roads						
	Ongoing projects	200	400	328	242	60	1230
	New road projects	-	-	7	23	25	55
2	Upgrading of Trunk Roads						
	Ongoing road projects	206	181	94	26	-	507
	New road projects	-	-	10	30	30	70
3	Upgrading of Link Roads						
	Ongoing road project	611	455	311	134	40	1551
	New road projects	29	85	356	621	800	1891
4	Construction of Expressways						
	Construction of new road projects	5	45	75	84	120	329
5	Construction of link roads						
	Ongoing projects	781	620	368	132	30	1931
	New projects	-	86	526	1359	2148	4119
5	Heavy maintenance of roads	733	850	893	937	984	4397
	Asphalt Roads	20	150	158	165	174	667
	Gravel Roads	733	850	893	937	984	4397
	Total	2,585	2,872	3,126	3753	4,411	16,747

2.8. Capacity Building

- Building the Capacity of Implementers:** A capacity building work is going to be done in such a way that it will fill the gap of human power, organizational, operational and attitudinal change of implementing institutions which are Transport Minister, ERA and regional and woreda road agencies. Modernizing engineering procurement, design and contract administration and road asset management will be carried out under ERA's modernization and transformation initiative which will be the main instrument to achieve the goal.

- **Building the Capacity of Local contractors and Consultants:** A capacity building of private sector especially local consultants and contractors will be done focusing on improving road project management. In addition, multidimensional works will be done to improve the capacity, ethics and attitudinal change of professionals participating in the sector. And this will be done together with the sector's main actors like Contractors, Consultants, Universities and Testing Centers etc.
- **Road Sector and University cooperation:** In RSDP IV, a strong cooperation is created between the road sector and higher educational institutions in research, consultancy service and technology transfer. And this cooperation will continue in RSDP V.
- **Strengthening ERA's training centers and improving Their role in the Sector:** The two training centers of Alemgena machine based training center, Chanco and Ginchi labor based training centers were playing a vital role in providing capable middle and lower level technicians to the sector. In RSDP V, the training centers will be capacitated with kaizen and will be part of the new modernization and transformation initiative so that they will become centers of excellence.
- **Strengthening the Road sector's research center and Increasing its role in the sector:** Supporting the road sector with research has a benefit of increasing quality, decreasing cost and reducing project duration. Therefore, in RSDP IV; a road research center is established. Thus, in RSDP V; the center will become one of influencing institution by increasing its capacity in every aspect especially its human power.
- **Working closely with the Diaspora in Technology and knowledge transfer:** Apart from efficient use of local capacity; it is believed that working closely with the Diasporas in technology and knowledge transfer has immense benefit in modernizing the sector. Recently, there is Ethio-Engineers Group established by

Ethiopian Diasporas in America. And in RSDP V, this will be taken as benchmark and will be scaled up.

2.9. Human Resource Need and Employment creation

3.9.1 Estimation of Human Resource need of RSDP V

In order to achieve the goals of RSDP V, the role of human power is immense. Thus considering the multidimensional developmental works and other related issues in the sector; a human power plan is prepared talking into account the following factors.

- Migration of experts to foreign countries,
- Human power that leaves the sector due to retirement and death,
- Work plan and amount of the RSDP V and,
- Local contractors' participation in foreign countries' market which increases the demand of human resource in the sector.

Table 13 shows Manpower need of RSDP V.

As shown in table 13 below, human power need for RSDP V is presented in five categories consisting of Professional, Sub Professional/Middle level Technicians, Heavy Construction and light Machinery Operators, Road Construction Transporting Material and Social Science; which in turn consists of professions from second degree up to first level.

The sector's human power need is prepared based on the nine regions' and the two city administrations' road and bridge construction and maintenance experience in RSDP IV.

The road sector's human power plan mainly focuses on high and medium level professionals. The high level professionals account for 14% of the total human power need. Out of this, 25-30 percent should have second degree and the rest with first degree.

Table 11: Human Resource Need of RSDP V

Item No.	List Of Occupation	Summary of Required Manpower for Road Sector (2008-2012)						
		Educational Level						Total Man Power/100Km
		2nd Deg	1st Deg	Lev IV	Lev III	Lev II	Lev I	
1	Professional							
1.1	Civil Engineers	1494	2897					4391
1.2	Surveyors	371	902					1273
1.3	Material Engineers	191	374					565
1.4	Equipment Engineers	213	453					666
	Sub Total	2269	4626					6895
2	Sub Professional/Middle level Technicians							
2.1	Structure Foreman		37	76	1			114
2.2	Construction Foreman		402	927	45			1374
2.3	Surveyors		273	613	30			916
2.4	Mechanic		1096	2167	120			3383
2.5	Electrician		588	1167	65			1820
2.6	Material Quality Inspector		153	448	16			617
2.7	Welder and body man		833	1698	84			2615
2.8	Machinist		330	598	35			963
2.9	Laboratory Technicians-Soil		105	248	15			368
2.1	Other skilled person		1844	3530	210			5584
	Sub Total		5661	11470	621			17752
3	Construction Heavy and light Machinery Operators							
3.1	Earth Moving							
3.2	Dozer			118	363	530	714	1725
3.3	Loader			177	303	484	663	1627
3.4	Grader			89	355	430	648	1522
3.5	Excavator			49	164	249	405	867
3.6	Steel Wheel Roller			50	126	192	298	666
3.7	Pneumatic Roller			28	84	138	213	463
3.8	Vibrating Roller			98	239	365	468	1170
3.9	Lifting equipment -Crane			22	64	128	249	463
	Sub Total			631	1698	2516	3658	8503
4	Road Construction Transporting Material							
4.1	Trucks			1020	1677	2193	3161	8051
5	Social Science							
5.1	Management	687	1402	1867	3178	20	30	7184
5.2	Finance/Accounting	304	723	1163	1755	11	21	3977
5.3	Information Technology	75	169	246	379	4	7	880
	Sub Total	1054	2350	3187	5001	35	58	11685
	Grand Total	3323	12637	16308	8997	4744	6877	52886

Sub Professional/Middle level Technicians/ account for 33% and their education level ranges from first degree up to level four. Apart from this, machine operators and construction materials transporters account for 16% and 15% respectively and their education level ranges from level one up to level four. The supporting staffs for road construction professionals like financial administration, human power administration and IT account for 22% and their educational level ranges from first degree up to level one.

Table 14 shows the human power plan of the nine regions and the two city administrations.

Professionals at craftsmen level account for 3% of the total human power and the rest is anticipated to be daily laborers.

RSDP V will create employment opportunity for citizens. On average, 400,000 permanent and temporary jobs will be created during implementation of RSDP V.

Table 12: Human Resource plan by Regions

		Required Manpower for Trades and Craft Road Sector (2008-2012)											
		Afar	Amhara	Benshangul -Gumuz	Gambel a	Oromiya	SNNP	Somal i	Tigray	Harari	Addis Ababa	Dire Dawa	SUM (2008- 2012)
		Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	Total Man Power	
1	Craftsman												
1.1	Mason	60	170	140	40	215	145	40	155	38	138	120	1,260
1.2	Carpenter	60	170	140	40	215	145	40	155	38	138	120	1,260
	Sub Total	120	340	280	80	430	290	80	310	75	275	240	2,520
2	Laborer	4,150	12500	12,500	8,500	14,200	12,500	4,150	12,500	8,500	9,500	4,080	103,080
	Grand Total	4,270	12,840	12,780	8,580	14,630	12,790	4,230	12,810	8,575	9,775	4,320	105,600

2.10. Improving the capability of institutions and professionals within the sector

One of the main challenges faced under the road sector development program is lack of capacity of experts. Studies show that in professional areas like design, contract administration, engineering procurement and project management; knowledge and skill gap of experts is higher and lack of ethics also exists.

In the past few years; ERA has provided a serious and standardized training for its senior staffs and to project managers and senior staffs of the private sector to fill gaps in project management. Thus, based on the study undertaken in 2014 by foreign consultants with financing from the World Bank; extensive training will be needed in RSDP V to improve knowledge and skill of experts as shown in table 15.

Table 13: Training need in the sector

No	Types of Training	Number of trainers per year					Total
		2015/16	2016/17	2017/18	2018/19	2019/20	
1	Policy and Planning	29	132	62	155	81	459
2	Traffic/ Transport Planning and management	66	130	85	151	108	540
3	Road design and management	33	74	81	101	87	376
4	Road Asset Management	69	58	116	83	120	446
5	Road Construction management	36	44	65	109	78	332
6	Road safety	107	199	188	258	147	899
7	Road sector labor management	30	58	71	83	76	318
8	Transport operation and management		113	70	201	80	464
9	Contract administration	74	84	140	163	150	611
10	Engineering procurement procedures	54	139	125	202	129	649
11	Ethics, Transparency and good governance	86	359	237	482	191	1355
12	Human resource administration		88	24	156	17	285
13	Consultant management		91	99	234	87	511
14	Social and Environmental management	56	53	101	128	109	447
15	Financial Administration	14	39	15	63	17	148
16	Administrative capacity and transformation leadership	9	78	58	110	27	282
17	Public and private sector's support	6	18	2	25	2	53
Total		669	1757	1539	2704	1506	8175

2.11. Improving Training Efficiency

- **Organizational Capacity**

Organizational capacity building with respect of training efficiency refers to improving the capacity of ERA's training centers through competent and efficient professionals, modernizing the system and improving quality and quantity of the training in order to accommodate the increasing training need of the country and neighboring countries.

- **Provision of Training**

In addition to the existing trainings given by the centers; attention will be given to incorporate and provide new trainings which are believed to contribute to the sector's productivity. This will be done in collaboration with higher education institutions and the private sector.

- **Dissemination of high level knowledge, skills and experiences**

The centers will be organized in such a way that they will be able to organize national and international workshops to share experience on road construction and outputs of researches from post graduate programs of civil engineers.

2.12. Changing Implementation Practice of Rural Roads

2.12.1 Changing the practice of project financing

Under RSDP IV; URRAP plays a vital role in expanding the network size and increasing accessibility with the support of the federal government by initiating and financing the program.

The intention of the Government was to connect all the kebeles to the nearest all weather road. In RSDP V; attention will be given to kebeles which are not connected under RSDP IV and to rural areas with high population and economic potential. These roads have immense benefit in changing the living condition of the communities to better standard, increasing accessibility to public services and reduce poverty.

In RSDP V, new financing strategy of cost sharing and performance based financial support will be implemented. Accordingly,

- The cost of the program will be covered by Federal Government, Regional Governments and through community participation,
- The budget support of the federal government should be based on performance of Regions,
- Regions which performed well under RSDP IV will get better support,
- There will be a mechanism at federal level to encourage regions and communities on the level of its contribution to the program and
- For regions with special needs, the support will be in a way that will scale up their capacity.

2.12.2 Integrating Regional and Woreda's Implementation plan

In RSDP V, regional roads which connect woredas with each other and with zonal centers are built separately from URRAP roads. But in RSDP V; regional roads plan and implementation will be integrated with Woreda's plan.

2.12.3 Awarding Projects with Competitive Bidding

Under RSDP IV, URRAP projects were given to contractors and consultants directly without competitive bidding. This was done to build the capacity of contractors and consultants established specifically for construction of URRAP roads. Even if this approach has its own benefit, competitive bidding is better for efficient use of scarce resources. Thus, in RSDP V; projects will be given with competitive bidding.

2.12.4 Project Delivery Method

Project delivery methods are methods which provides the different options/ways/ in which a project can be delivered. It deals with whom, when and how design, construction, maintenance and operation management works are undertaken. Major project delivery strategies are discussed below.

- **Design-Bid-Build (DBB)** - It is literary known as Traditional Projects Delivery Strategy, under which the client primarliy undertakes the design study and then get into a competitive bidding of contractors. The winning contractor will build the road based on previously prepared design.

- **Design-Build (DB)** – Under DB project delivery strategy, the client first prepares concept design of the project and then hire a contractor that will undertake the detail design work together with the construction. That is, detail design and construction work is given to a single contractor. This method will get rid of problems arising from design defects.
- **Design-Build-Maintain (DBM)** – Under this strategy, in addition to designing and building the project; the contractor is given a responsibility to maintain the road for a certain period of time. Under this modality, payment is made based on performance and quality; which encourage the contractor to worry about quality of work.
- **Design-Build-Maintain-Operate (DBMO)** – Under this strategy; the contractor is expected to design, build, maintain and administer the road for a certain period of time. Such kind of strategies are applicable for toll roads.

Among the strategies discussed above, the most common strategy practiced at federal and regional levels is DBB. But recently there is an increasing number of DB projects. On the contrary, DBM and DBMO strategies are not common both at federal level and regional level. But, in RSDP V, it is planned to implement selected projects with DBM strategy. It is believed that applying such strategy in URRAP roads will improve the performance as well as preserving the road asset.

2.12.5 Building the capacity of Contractors and Supervision Consultants established under URRAP

In RSDP IV, there are about 240 and 1000 small and medium level supervision consultants and contractors respectively which are established for URRAP roads. The capacity of these associations is going to be strengthened through different trainings and organizational change.

2.12.6 Participating METEC

A strategy is going to be introduced which will widely Participate METEC in rural road construction of border areas and less developed cities.

Section 3

3. Road Sector policies and Implementation strategy

3.1. Policies

Like other sectors, the road sector has deep rooted and multifaceted problems that have lasted for many years. To address these problems and accelerate the growth of the sector and its contribution to national economic growth; policies and strategies have been adopted and implemented during implementation of the past four RSDPS and will continue to be implemented during RSDP V. The policies and strategies are presented below.

Policy 1: Upgrade the standard and Improve condition of the existing roads to reduce transportation cost and encourage growth of Agricultural, Industrial, Mining, Tourism and Trade sectors and attain sustainable national economic growth.

Strategies:

- ERA will upgrade existing link roads with asphalt standard and rehabilitate asphalt roads with asphalt concrete,
- ERA will carry out heavy maintenance on the existing paved and gravel roads which are in poor condition and routine maintenance on the existing paved and gravel roads which are in good condition,
- RRAS will carry out heavy maintenance on rural roads which are in poor condition and routine maintenance on rural roads which are in good condition,
- Woreda Road Desks will carry out maintenance on URRAP roads,
- The Road Fund Office will increase allocation of fund to road agencies for maintenance of roads by substantially increasing its revenue from road users' charges as proposed by Road Financing study,
- Toll charges will be introduced on express ways to generate revenue to recover their construction cost and cover their maintenance costs and other operational costs and

- Axle load control will be strengthened to prevent premature damage of roads.

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.

Strategies:

- ERA will construct new link and trunk roads that provide short cut and improve connectivity and efficiency of the road network,
- ERA will construct new access roads that open up economic development potential and crop surplus areas,
- Ensure economic viability of road projects before they are implemented.

RRAS will construct the following roads:-

- Roads that connect to zonal administrative centers (capitals) and Roads that connect Weredas with each other and roads that connect Weredas capital with other development potential areas in the woreda.

Policy 3: Improve Implementation capacity of the sector

Strategies:

- Upgrade the capacity of contract administration and Design management and other work areas through ERA's Modernization initiative and implementation of in house studies,
- Upgrade the contract administration capacity of woreda road desks and reinforce them with key personnel and equipment,
 - Strengthening training (long term and short term),
 - Improve the capacity of road technicians and
 - Increase the participation of local contractors and consultants in road sector development.

Policy 4: Minimize and Mitigate social and environmental impact of road projects.

Strategies:

- Identify and mitigate environmental impact of road projects through environmental and social impact assessment,
- Identify impact of HIV transmission on project workers and local people and include mitigation measures in the construction contract of the project and monitor their implementation.

Policy 5: Integration with other infrastructure institutions and other stake holders

Strategies:

- Strengthen cooperation among infrastructure institutions,
- Participate all stake holders to review and comment on the plan before its implementation through national conference and regional conferences as necessary,
- Organize stakeholder's workshop to review progress of implementation of the plan,
- Promote sense of partnership with international financiers,
- Update local authorities on the status of preparatory activities of construction projects,
- Participate local people during road project planning and implementation,
- Strengthen cooperation with Revenue and Customs Authority to ease customs clearance procedure on imported equipment of road construction projects and
- Strengthen cooperation with local authority to Facilitate Row clearance during planning and implementation.

Policy 6: Expand Express ways

Strategies:

- Construct alternative express ways to the existing roads with high level of traffic and congestion,

- Introduce toll charges on express ways while keeping existing alternative roads free roads to those who are unwilling to pay toll charges,
- Construct alternative express ways with long term loans from Foreign Commercial and Development Banks and
- Enhance institutional capacity of public toll roads enterprise.

Policy 7: Improving the participation and capacity of women and youth in Road Sector Development.

Strategy:

- Increasing the number of women in ERA's leadership from the current 11% to 25% by 2020.
- Organize women and youth in small and medium scale contractors and consultants,
- Revise procurement rules to encourage the participation of women and youth in road sector development,
- Increase the number of women in ERA beyond the current 35% and
- Create employment opportunity for more than 100,000 women and youth per year especially in rural roads program.

Policy 8: Strengthening Good Governance

Strategy:

I. Preparation of Plan

- Prepare Governance plan based on lesson learned during RSDP IV and targets for RSDP V with full participation of ERA's employees, customers and stake holders.

II. Ensure Good Governance

- Provide training on change management to improve attitude and performance of employees,
- Strengthening implementation of Balanced Score Card (BSC),
- In addition to capacity building ensuring accountability will be given priority to minimize rent seeking and strengthening good governance.

III. Strengthening Customers Charter

Implement ERA's customer's charter.

IV. Ensure Customers and Stakeholders Satisfaction

In order to satisfy increasing customers demand the following activities will be carried out:-

- Review ERA's customers charter
- Undertake Assessment of customers satisfaction
- Filling the gaps in customers satisfaction

V. Implementation of BSC

Strengthening of setting organizational strategic goals, performance standard and incentives for best performance

VI. Strengthening Monitoring Evaluation and Feed Back Mechanism.

- Provide support in preparation and implementation of plan
- Monitor implementation of plan with stakeholders' participation
- Review plan document based on the findings of monitoring of implementation plan.
- Prepare updated progress reports and distribute them to stake holders

Section 4

4. Opportunities and Threats

4.1. Opportunities in the Sector

4.1.1. Increasing financial and technical assistance from international community including foreign Governments and international financial institutions

Successful implementation of RSDPS in the past 18 years and appreciable improvements in the sector against all indicators and double digits economic growth in the past 9 years and others successes are reasons for the international community, showing increasing interest to participate in road sector development of the country.

4.1.2. Increasing Government Revenue

As the economy continues to grow at double digit, Government's revenue is also growing faster every year. Consequently; the Government's capital budget especially for the road sector is growing rapidly which enabled the Government to finance increasing number of road projects including big road projects.

4.1.3. Growing Interest of Foreign contractors and Consultants to participate in the road sector development Program

Cognizant of rapidly increasing size of road construction and the wider support government is extending, and other reasons, foreign contractors and consultants are showing strong interest to participate in road sector development in the country.

4.1.4. Sustainability of RSDP

The Preparation of RSDP V; as continuation of RSDP IV creates the opportunity to continue the large scale construction of roads and different capacity building activities in the road sector. Much more construction of roads will be carried out in RSDP V than RSDP IV in the sector.

4.1.5. Better capacity of local contractors and consultants

During the past 18 years; capacity of road agencies, local contractors and consultants has been enhanced. Shortage of capital and experience of local contractors has been moderately addressed. Consequently, local contractors are now in a position to undertake construction of not only small and medium size road projects but also large projects with more than a billion birr contract price.

Local consultants have been able to undertake nearly all consultancy services, financed by Government and have been participating in consultancy services carried out by foreign consultants as local associates.

4.1.6. Better institutional capacity of ERA

4.1.6.1 Restructuring and Modernization of ERA

To cope up with rapidly increasing number of road construction and upgrading projects with successive phases of RSDP; reform in the role and organizational structure of ERA has been introduced. The reform is intended to build Institutional capacity of ERA to efficiently implement road projects and effectively manage road asset.

✓ Re-establishment of ERA as Regulatory Institution

ERA is reestablished as regulatory Federal Government institutions in July 8, 2011 under proclamation 247/2011. Consequently, ERA's operations Department which was responsible for carrying out routine and heavy maintenance of federal roads and construction of road projects with more than 10 thousand employees was established as independent public contractor named as Ethiopian Road Construction Corporation (ERCC). ERA's withdrawal from operational activities made it smaller and efficient in the administration of construction and other contracts and Road Asset Management and road network planning.

ERCC operates as profit making public parastatal. ERA awards projects to ERCC road projects that would be too expensive if awarded to private contractors for reasons like difficult terrain and remoteness. ERA has also awarded to ERCC most of the routine and heavy maintenance of federal roads through direct negotiation. In the future, ERCC will participate in bidding to win construction project with local private

contractors to increase the number of its road construction projects. ERCC's 60 years' experiences in the construction of both gravel and asphalt roads as force account of ERA would enhance its competitiveness in bidding. ERCC as government parastatal plays crucial role in stabilizing cost of road construction in the sector.

✓ **Restructuring of Construction Contract Administration**

To enhance capacity in construction contract administration; ERA has been reorganized under six Contract Administration Directorates. Of the six contract Administration Directorates; five are organized geographically as North, South, West, East and Central region contract administration Directorates which assume responsibility to administer construction and design contracts under their respective jurisdiction and another Directorate is organized to administer Design and Build contracts. After ERA is organized under six contract administration Directorates; the number of contract engineers, team leaders and directors has substantially increased and hence the efficiency of contract administration has substantially improved.

✓ **Other New Directorates**

A quality Assurance Directorate has been set up to ensure Road Safety and quality of design implementation process as per the established standards and procedures.

Research and Development Directorate has been set up for providing the necessary material and manpower resources to undertake research projects on key areas in the road sector in order to reduce construction costs and improve quality. Training Directorate has also been established to administer ERA's training center and training needs of employees. Women's Affair Directorate has been formed to administer gender issues.

✓ **Restructuring of Road Asset Management**

To enhance the capacity of road asset Management; the previous Road Network Management Directorate has been upgraded to Department level headed by Deputy Director General reporting to the Director General. The Department has Road Network and Bridge management Directorate under its direct supervision. The Directorate in turn has 10 Road Network Branch Directorates in different parts of the

country which directly administer roads under their jurisdiction. This restructuring has improved effectiveness of road asset management.

✓ **Modernization of ERA**

Besides of undergoing reform in organizational structure; ERA is in the process of modernizing itself to ensure organizational excellence in order to better satisfy its customers' needs. To achieve this, modernizing the core processes like Engineering Procurement, Design Management, Contract Management, Asset Management, Quality Assurance and Performance Monitoring; and key enablers such as Engineering Innovation and Research, Right of Way Management, Project Handover, Human Resource Development and Management, Financial Management, Facility Management, etc. is underway. Also modernization of axle load control is ongoing.

This; beyond improving the efficiency and effectiveness of the Authority will be decisive to enhance transparency and accountability. The overall process of modernizing and transforming ERA will be guided by the Road Map developed particularly for this purpose. Accordingly, most of the studies undertaken by in-house capacity on the above mentioned areas are now being finalized and hence will progress to implementation soon. The overall transformation of ERA to the envisioned level of excellence may take from three to five years.

✓ **Salary Increase**

To address the problem of staff turnover ERA has reviewed its salary scale in 2013. As per the revised scale, salary of top and middle management has increased by 79.2% whereas salary of engineers has increased by 88.3%.

4.1.6.2 ERA Management System

ERA Management system (ERAMS) is a tool mounted on a computer server in ERA Data Centre and accessed either by the Internet or Internet over a secure website. It is available to assist in management of projects and Contracts at all levels from Project Engineers performing their duties on individual contracts, through executive chain to the Director General. ERAMS provides centrally connected data storage, designed to allow additional systems to link with the data previously stored.

ERAMS provides a mechanism by which all works of the design and supervision consulting firms and contractors can be subjected to a systematic and consistent review by management at all levels. Therefore, ERAMS substantially improves performance of design and construction contracts of road projects through readily available information for closer monitoring by management at all levels. ERAMS is not fully completed at present. However, ERA is using most of the modules to access information about on-going design and construction projects. Impacts of ERAMS on day to day activities of ERA are summarized below:

- Almost all of ERA's Projects and their data are under the system and is available in softcopy irrespective of further refinement,
- The system is used as centralized data system for the status of projects,
- All the top management are able to access and consistently review the Contractors' and Consultants' Project Performance,
- Different summary and detail reports are available on the system for research, analysis and future decision making in relation to cost and time overrun and others issues,
- The system is already available to review the historical rate of different projects,
- Easily accessible and helps to monitor the physical and financial progress of contracts,
- Although the system is not yet finished, ERA has started to use the report from the system for administrative purposes,
- More than half way is gone in using rate - build up for contract estimation and award processes which show a few points of achievements of ERAMS.

4.1.6.3 Balanced Score Card

ERA has introduced Balanced Score Card (B.S.C) in all its directorates since 2013 as part of Government Civil Service Reform Program under the guidance and supervision of System Development Directorate. Under B.S.C, strategic goal is set for ERA and strategic goal for all Directorates directly emanate from strategic goal of ERA. Strategic goal of all teams emanate from strategic goal of Directorates and goals for individual workers originate from team's strategic goal. All Directorates, Teams and individuals daily activities focus on attaining the strategic goal of ERA.

B.S.C provides rapid review mechanism of work at all levels. Groups known as 1 to 5 (one leader and five members) have been formed under all Directorates and Teams to review progress on daily basis. Each leader of the group holds meeting with the other group members every day to discuss progress of its individual members in carrying out plan in to action. Each group discusses and addresses problems encountered by each member of the group each day. The group report problems that could not be addressed at group level to the Directorate for solution. Moreover, group leaders hold weekly meeting with the Director to discuss and address problems that could not be solved by the group. The Directorate in turn report problems that could not be addressed at Directorate level to be addressed by the management of ERA.

The management of ERA holds weekly meeting to discuss and address problems reported by each Directorate. B.S.C also provides performance evaluation mechanism at organizational, Directorate, Team and individual level and provides incentive mechanism for outstanding performance. Therefore, B.S.C allowed ERA to discuss and address problems encountered in translating plan in to action sooner rather than later at group, Directorate and top management level which in turn has significant impact on improving ERA's overall annual performance.

4.1.7. Establishment of Toll Roads Enterprise

Ethiopian Toll Roads Enterprise has been set up to administer Addis- Adama Express way including toll collection and traffic management.

The objectives of the Enterprise are:-

- To provide toll road services to road users
- To operate and ensure the maintenance of toll roads
- To operate service stations constructed within the boundaries of toll roads
- To undertake other related activities necessary for the attainment of its objective

The enterprise has the three Directorates: - Tolling Management, Toll operation and Engineering; and Human Resources and Finance. There are eight teams reporting to the three Directorates and another three teams reporting to the General Manager. As per organizational structure, the enterprise has a total of 486 employees.

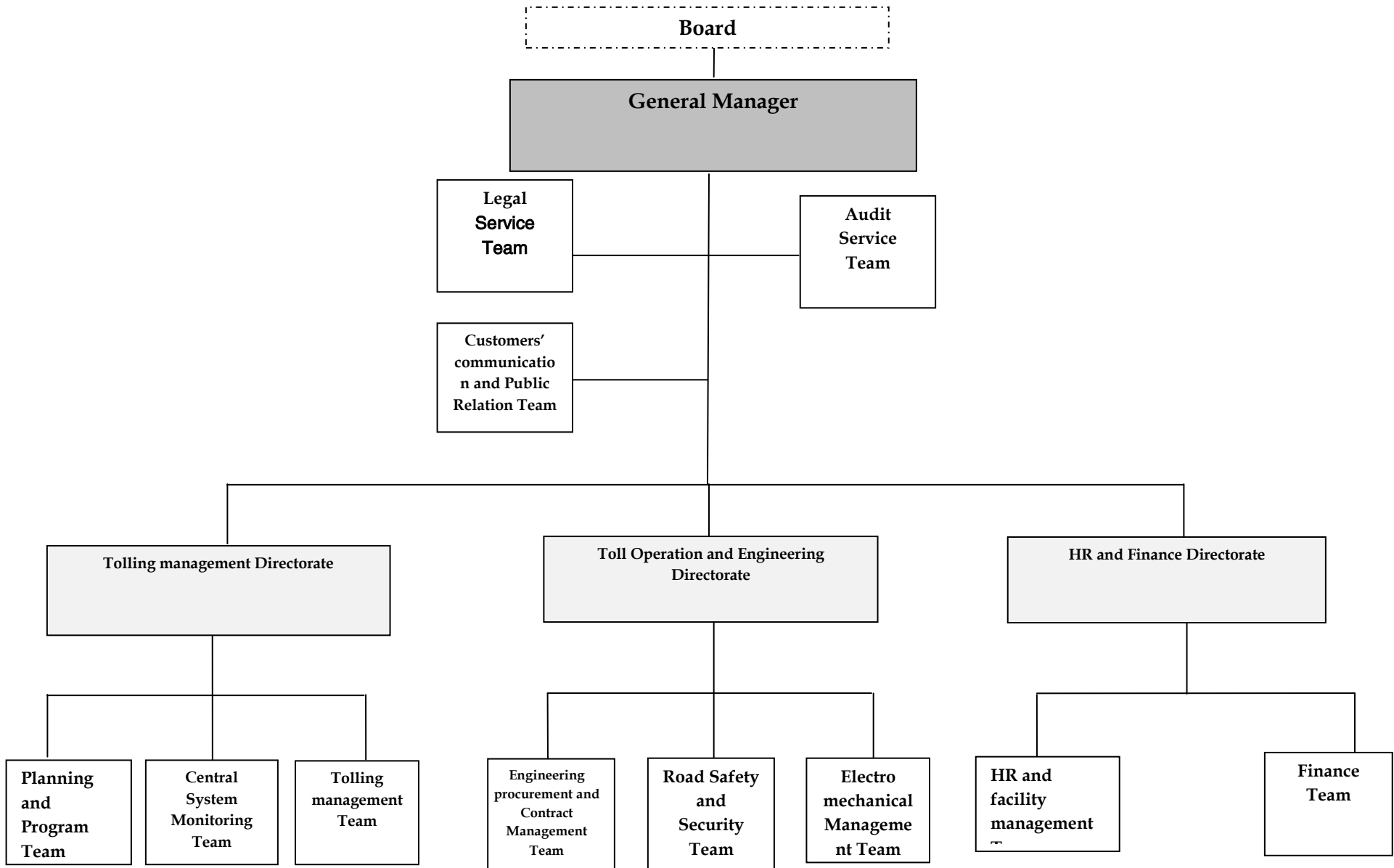
The enterprise is administered by Board of Directors appointed by the Government and the day to day operation is administered by General Manager.

The express way is built to operate as toll road while the existing Addis – Adama road remain a free high way. The expressway reduces travel time from Addis Ababa to Adama by 90 minutes.

One of the responsibilities of the enterprise is to collect toll from vehicles operating on the express way. The enterprise charges ETB 0.66 per km for Cars, Utilities, Small Buses, Large Buses, Small Trucks and Medium Trucks, ETB 0.79 per km for Heavy Trucks and ETB 0.92 per km for Truck with Trailers.

The Organizational Structure of the enterprise is shown below

Figure 2: Organizational Structure of ERA



4.2. Threats

4.2.1 Shortage of Finance

As preparation of RSDP V considers increasingly higher Government revenue; sufficient fund is expected to be available for the implementation of the plan.

However, as tax collecting capacity of the Government is still inadequate, revenue may not be collected on time and hence temporary shortage of money may happen any time.

4.2.2 Shortage of Foreign Exchange

In RSDP V; many road projects are planned to be constructed with government's finance. The foreign exchange requirement of road projects financed by Government will be covered from the country's foreign exchange earnings from its export of goods and services. The country's foreign exchange earning has been growing every year and continues to grow in the coming years. The growth of country's export earning depends on the growth of volume and price of export goods and services, which in turn depends on the economic growth of countries importing Ethiopia's goods and services like the Middle East, Europe, Far East and North American countries. And the economy of these countries has been growing slowly in recent years after years of recession and the growth is expected to improve slowly and hence Ethiopia's export earning is also expected to grow. But if the economy of these countries fails to grow for any reason, Ethiopia's export to these countries and foreign exchange earnings will also be affected.

4.2.3 Poor quality of Design Projects

As design study of so many road projects takes place under RSDP V, involving old and experienced consultants only will not be sufficient and hence it is essential to involve new and inexperienced consultants to carryout design study of some road projects.

Therefore, design study of road projects that will be carried out by inexperienced consultants may have some quality problems.

4.3. Capacity to use opportunities and cope with threats

4.3.1 Readiness to use the increasing international financial support

Foreign Governments and international financial institutions only offer financial support for implementation of those road projects which are economically viable and environmentally friendly. ERA already has list of road projects with good economic viability and with minimum environmental and social impact, which are suitable for international finance.

4.3.2 Capacity to utilize increasing Government capital budget for the road sector

The Government of Ethiopia has been allocating increasingly significant amount of capital budget for road sector development since 1997. Government's allocation of capital budget depends not only on the sector role to support economic growth but also on the sector's capacity to utilize allocated budget. The sector has not only fully utilized the increasing capital budget allocated by Government but also requested and fully utilized additional budget every year. Therefore, the sector has the capacity to fully utilize increasing large capital budget that will be allocated by Government during RSDP V.

4.3.3 Capacity to utilize increasing interest of foreign contractors and consultants to participate in road sector development

The sector has the institutional capacity to effectively and efficiently evaluate foreign contractors' and consultants' technical bidding documents and to recruit the best contractor and consultant to undertake construction of road projects, supervision and other consultancy services. Moreover, the sector has the institutional capacity to effectively and efficiently administer construction contracts awarded to foreign contractors and consultants.

Sufficient engineering services' procurement and construction contract administration capacity of the sector boost confidence of foreign and local contractors to participate in road sector development in the country.

4.3.4 Capacity to cope with Threats

Shortage of budget can be minimized if road construction projects are completed on time and at awarded cost. With steadily enhanced construction contract administration capacity in the sector; the number of road construction projects that are completed on time and at cost is increasing. Therefore, construction contract administration capacity will be strengthened by further modernizing working systems.

It is well known that 16 projects, which are adopted to stabilize construction costs in the road sector, have been implemented since 2010/11. Implementation of the 16 projects will be enhanced and will be made more effective to achieve cost stabilization objective which helps to avoid shortage of budget. The growing international financial support is important to avoid shortage of foreign exchange during implementation of RSDP V. Thus, Construction of big and expensive road projects will be undertaken with financing from foreign Governments and international financial institutions. Experience and performance of local consultants will be considered in awarding road design projects to avoid the problem of poor design of road projects. Design study of small and simple road projects will be awarded to new and inexperienced consultants as these projects do not have complex technical challenges while design study of medium and large road projects will be awarded to old and experienced consultants.

Section 5

5. Monitoring and Evaluation

5.1 Road sector's monitoring and Evaluation process

As RSDP V consists of construction of so many road projects; effective monitoring and evaluation is crucial for the successful implementation of the plan. Institutions at all levels have to follow up implementation of road projects through progress reports, site visits and discussions and address problems encountered during implementation on time. Ministry of Transport, Project Engineer, Supervision Consultants and ERA's top and middle level management monitors and evaluate progress of road projects on monthly basis.

5.1.1 Progress Reports of Projects

Progress of road construction projects is reported to ERA headquarters by supervision consultants who monitor construction at site. Based on consultant's monthly progress reports; Planning and Program Management Directorate prepares and submit summary of monthly progress reports to ERA's Management, Government and Financers.

5.1.2 Evaluation

ERA's Management holds weekly meeting to discuss on progress reports and discuss and address problems encountered during construction of road projects sooner.

5.1.3 Site Visit

Project Counterpart engineers visit regularly the site of construction projects. ERA's top and middle level officials and officials from Ministry of Transport visit sites as necessary to see the status of the ongoing construction and give instruction to the project management towards improving performance.

5.1.4 Rapid Evaluation System

It is an assessment of the quality of construction of road projects based on the views of stakeholders like local people, local administration, road users and financiers. The finding of the assessment is used to improve planning of future road projects.

5.2 RSDP Monitoring Indicators

Performance of RSDP and MDG Transport Indicators has been conducted by local consultant. This assessment focuses on the impact of RSDP on road, road related and transport indicators and provides its findings on each indicator on yearly basis. The findings serve as basis for future actions to Government and financiers.

Section 6

6. Sectoral Issues

6.1 Maintenance of Roads

The road network of the country is rapidly growing as new asphalt and gravel, rural and community roads are built by ERA, RRAS and WRO respectively every year. Parallel with rapid expansion of asphalt, gravel, rural and community roads; maintenance need is also growing rapidly. The Road Fund Office has been collecting revenue mainly from fuel levy and other sources and allocating fund to road agencies for maintenance of roads since 1997. The revenue and allocation of the Road Fund Office has steadily been increasing every year since its establishment but has never been adequate to meet the maintenance need of the rapidly growing road network of the country.

In fact, the gap between maintenance need of the road network and allocation of fund has been widening from year to year and as a consequence more and more roads left without maintenance every year. Unless the worsening of shortage of fund; maintenance of roads is addressed as early as possible. Otherwise, deterioration of road infrastructure will get even worse and worse.

Therefore, the Road Fund office should generate and allocate sufficient fund for maintenance of roads by implementing the recommendations of Road Financing study.

6.2 Independence of Local contractors

Having been established just in the past 20 years; local contractors had shortage of capital and insufficient experience in the management of road construction projects. Hence, Government has provided a number of special support schemes to local contractors including 20% advance payment as per contract agreement and

additional advance payment beyond contract agreement so that they can buy construction materials without financial constraint.

With this special support, Government has awarded 376 road construction projects to local contractors with contract price of ETB 65 billion over the past 18 years. Therefore, they are now in much better position in terms of capital and experience to undertake construction of road projects awarded to them without special support from Government.

On the other hand, under the special support scheme; Government has been providing to local contractors when financial burden has experienced. Thus, this will continue in the RSDP V also.

6.3 Expanding Express Ways

As the economy is growing and quality and condition of roads is improving, traffic movement is also increasing. Especially traffic flow on roads radiating from Addis Ababa is increasing rapidly and will soon get congested.

Traffic on Addis Adama road is already congested and travel time, cost and accident have increased significantly.

Therefore, to address the traffic congestion and thereby reduce travel time, cost and accident on the existing Addis Adama road, alternative express way has been built and opened to traffic.

Likewise, traffic on the other roads radiating from Addis Ababa will soon get congested and travel time, cost and accident will increase. Therefore, alternative express ways to all other existing roads radiating from Addis Ababa should also be built and operated as toll roads.

6.4 Regional integration and coordination of corridor operations

As land locked country; Ethiopia uses the ports of neighboring countries for its export and import of goods. Currently more than 90% of Ethiopia's export and import of goods is through the port of Djibouti. Ethiopia also uses port of Berbera in Somali Land and Port Sudan for some of its import and export. Ethiopia has also planned to use port of Lamu in Kenya for some of its export and import.

Government has recognized the need for upgrading all of its import and export corridors with asphalt concrete in order to reduce transport cost and travel time of export and import goods.

In line with this, the country has upgraded nearly all of its import and export corridors with asphalt concrete. The Djibouti corridor which extends from Addis Ababa to Galafi through Awash (705 km) was rehabilitated with asphalt concrete under early phases of RSDP. Under the fourth phase of RSDP; alternative express way is built from Addis Ababa to Adama as part of modernizing the Djibouti corridor. An Express way from Adama to Awash (130 km) which is an extension of Addis Adama express way is planned to be constructed under the fifth phase of RSDP. Depending on the growth of import and export traffic; express way will be constructed from Awash to Galafi in the future.

Upgrading of Dire Dawa - Dewele road with asphalt concrete which is part of the Djibouti corridor is going on and will to be completed during the fifth phase of RSDP. Upgrading of Meiso - Dire Dawa road with asphalt concrete which is also part of Djibouti corridor will be under taken under the fifth phase of RSDP.

The Government of Ethiopia has also fully upgraded the Berbera Corridor extending from Awash to Togochalle (471 km) with asphalt concrete under the second and third phases of RSDP. In addition, the Government has also fully upgraded Addis Ababa - Gonder-Metema road (202 km) which is part of Port Sudan corridor with asphalt concrete under the second and third phases of RSDP. Further, the

Government has rehabilitated Modjo – Hawassa road (192 km) with asphalt concrete under the first phase of RSDP. Rehabilitation of Hawassa – Hagremariam – Moyale (494 km) which is an extension of Modjo – Hawassa road has been under taken under the fourth phase of RSDP and going to be completed under the fifth phase of RSDP as part of Addis Ababa – Mombasa corridor Development project financed by the African Development Bank. As part of modernizing the Mombasa corridor an alternative express way is going to be constructed under the fifth phase of RSDP with joint financing from the World Bank, African Development Bank, Korean and Chinese EXIM Banks.

The Djibouti, Berebera, Port Sudan, and Mombasa corridors have already been upgraded with the highest standard asphalt and the reaming parts are being upgraded by Government. However, Galafi – Djibouti which is part of the corridor needs to be rehabilitated with asphalt concrete by Government of Djibouti. Also Togochale – Berbera roads inside Somali Land needs to be rehabilitated with asphalt concrete by Government of Somali Land. The major problem preventing rehabilitation of the two roads by Government of Djibouti and Somali Land is shortage of finance.

In addition to upgrading road infrastructure on import – export corridors, Government has also given priority to upgrading and constructing regional trade roads with neighboring countries. Accordingly, Government has completed construction of Gambella – Jikawa road (111 km) with asphalt standard and construction of Mizan – Dima road (92 km) with asphalt standard is going on to promote trade between Ethiopia and South Sudan.

Government of Ethiopia is also upgrading Assosa – Kurmuk road with asphalt standard to promote trade between Ethiopia and Sudan.

Government of South Sudan needs to construct extension roads from Jikawa and road with similar standard inside its tertiary to promote trade between the two

countries. Government of Sudan also needs to construct extension road from Kurmuk to its tertiary.

However, coordination of operations on Djibouti, Berbera, Port Sudan, and Mombasa corridors remains to be done.

Coordination of operations on the corridors needs setting up joint institutions with responsibility of coordinating operations on the corridors by respective Governments.

Corridor Authority for joint Management of the bi national corridors needs to be set up. The creation of corridor Authority would improve integrated management of the corridors. Such an Authority recognized and formed by both state would provide simple institutional arrangement with the ability to interact with institutions of both countries and promoting the interest of the corridor for improving efficiency of the corridor flow.

Corridor Authority for joint management of the Djibouti corridor is in the process of setting up by Government of Ethiopia and Djibouti.

Corridor Authority for joint management of the corridors of Berbera, Port Sudan and Mombasa needs to be set up by the Government of Ethiopia along with Somali Land, Sudan and Kenya governments respectively.

Coordination of operations on bi national corridors also needs investment in border crossing. Hence Border posts have to be setup between Government of Ethiopia and Government of Djibouti, Somali Land, Sudan and Kenya. Border posts are physical transit zone between neighboring countries that allows the creation of common border infrastructure which are operated jointly by the two countries. The objective of Border posts are:-

- Facilitate customs integration by removing duplicated procedures,
- Facilitate inter - institutional coordination,

- Reduce transit time and cost, and
- Ensure security

Therefore Border posts are needed to be set up at Galafi, Dewelle, Moyale, Togochalle, Metema and Humera to facilitate the flow of goods between Ethiopia with Djibouti, Kenya, Somali Land and Sudan respectively. Coordination of operations on the corridors also needs Transport service Agreements between Ethiopia with Djibouti, Somali Land and Sudan. There is transport service agreement between Ethiopia and Kenya and this has to be implemented by the two countries.

Attachment

Detail Physical and Financial Plan of RSDP V