Chapter I	POSITION PAPER – TRANSPORTATION

- The road network in the State is currently deficient and requires improvement in terms of absolute road km and quality
- Economic development has been limited to certain corridors only and large parts of the State are still bereft of good connectivity
- As per the projections contained in this position paper, Chhattisgarh requires Rs. 900-1200 crores per annum over the next 10 years to increase and upgrade its road network
- The State must prepare a comprehensive Road Policy to articulate service standards, specify the role of Government and suggest a strategy for involvement of the private sector
- The State must earmark revenue sources to put in place a dedicated funding mechanism and should consider setting up a State Level Road Fund
- The Government should take up on a priority basis the development of two north-south and four east-west high speed road corridors for improving road connectivity
- The Government must revive some of the proposed railway projects for connecting the mineral rich southern districts with a rail network
- There is a need to improve air transport linkages between important cities and metros in the country. Opportunities for creating airstrips in important cities in the State and operating air taxies in public-private partnership should be explored

Section 1: Introduction

Objective

This position paper aims to capture the existing scenario relating to the transportation sector in the State. The current network of railways in the State is very limited and there are only two proposed projects, both of which have not progressed. Therefore this position paper lays a greater emphasis on improving the road network.

The objectives of this position paper are to:

- review the current scenario in the road sector in terms of
  - road length, quality and district wise coverage
  - current and expected expenditure levels for the sector
- estimate future investment requirements for development of the road sector in the State over the next ten years and identify options for bridging the gap
- map the initiatives in terms of policy and institutional frameworks being adopted by other States for development of the road sector
- highlight key imperatives for road sector development and an action plan for the way forward

A secondary objective of this sector paper is to map the existing scenario relating to railways and air transport, and to identify steps for increasing their coverage.

Structure and Coverage

This sector paper is structured into six sections. The first five sections relate to the road sector, the sixth section relates to railways and air transportation.

The first section gives an overview of the road network in the State and the current institutional framework for road sector development and maintenance in Chhattisgarh.

The second and third sections assess the demand for roads from a social and economic point of view. This includes an analysis of the current development pattern in terms of the districtwise road network and the requirement of roads from the point of view of promoting industrial and agricutural development in the State.

The fourth section presents a framework for estimation of road sector fund requirements. This section identifies the extent of funds that would be available from the State and Central government and therefore the funding gap that needs to be bridged from other sources.

Section five presents the way forward in terms of the need for a policy framework and an institutional mechanism for attracting external funding and also private sector participation. It highlights the experiences of other States in this regard. It also presents the rationale for a road sector fund and an indicative framework for prioritisation of projects in the sector. Finally it presents the action plan for the way forward.

The final section presents the current status of railways and air transport in the State. It attempts to identify action points for catalysing growth in these two sub-sectors.

Section 2: Current Scenario

Overview of the Section

This section presents the current status of the road, railway and air transport sectors in Chhattisgarh and a comparison with other States. This section also presents an overview of the institutions responsible for the development and maintenance of roads in Chhattisgarh.

Importance of Transportation Sector

It is well established that proximity and access to a transportation link like a major road spurs economic activity and raises the standard of living of the community. The availability of good transportation links is an important factor determining the location of industries and also increases the potential of other service industries like tourism, hospitality, logistics, etc.

Roads have been the preferred mode of transport for both people and freight. It is estimated that in India about 85% of passenger traffic and 60% of freight traffic uses road transport. The increased reliance on roads is primarily on account of easy access on the one hand and lack of growth in railways on the other. The railway network increased by only 17% between 1950-51 and 1995-96 (the average increase in length was less than 200 kms per year). The road network increased almost eightfold during the same period.

Freight traffic, typically bulk items like minerals and metals are transported through railways. On the other hand, most of the commercial non-bulk traffic is transported through the road network.

Overview of Road Network

The road network in any State consists of the following types of roads:

- National Highways – National highways provide connectivity between the union capital and the State capitals, major ports and strategic defence locations in the country
- State Highways – State highways connect the State capital with the district centres, other important cities, towns and minor ports within a State
- Other Roads – Apart from the above, roads are also classified as district roads, other district roads, village roads and municipal roads

According to the Ninth Plan document, out of the total road length in India, national highways and State highways constitute 2% and 3.5% of the total network respectively. However, these roads carry approximately 75% of the total traffic in India.

As on December 31, 2000, Chhattisgarh had a total road network of 35,388.54 km of which 24,005.73 km. was metalled and 11,382.81 km. (32%) was unmetalled. This makes the road density per hundred square kilometres at 17.7% and 8.4% for metalled and unmetalled roads respectively.
This density does not compare well with the all India average of 40.5% and 32.5% for metalled and unmetalled roads respectively.

Table I.1 on the following page shows the break-up of road network by category of road and by surface type in Chhattisgarh.

Table I.1

Road Network in Chhattisgarh

Category of Road	BT Road	WBM	Sub total	Dirt Road	Total	% of total road network
National Highway (km)	1791	0	1791	36	**1827**	5%
State Highway (km)	1606	407	2013	61	**2074**	6%
District Roads (km)	2398	631	3029	66	**3095**	9%
Village Roads (km)	3938	13234	17172	11220	**28392**	80%
Total (km)	**9733**	**14272**	**24005**	**11383**	**35388**	100%

Source : PWD

As can be seen from the table, village roads constitute about 80% of the road network in the State – reflective of the agrarian and rural economy of Chhattisgarh. Out of the total of 19,607 villages in the State only 7,805 (40%) villages till December 31, 2000 had been connected by metalled roads.

Development of rural roads is likely to receive a fillip with the announcement of Pradhan Mantri Gram Sadak Yojna (PMGSY). PMGSY is a centrally sponsored scheme with the objective of linking every village of more than 500 people, with all weather roads by 2007. By 2003 it aims to connect all villages of more than 1000 people with all weather roads. Table I.2 given below shows a comparison of the road networks in Chhattisgarh vis-à-vis those in other States.

In Chhattisgarh about 20% of the national highways are double lane. As compared to this, about 70% of the National highways are double lane or better in India.

Table I.2

Comparision with Other States

	Area	NH	SH	Others	Total	Avg. Road Length
	Sq.km				In km	Per 100 Sq.km
Chhattisgarh	135,100	1,827	2,074	31,487	35,388	**25.53**
Maharashtra	307,690	2,972	32,380	155,701	191,053	62.09
Tamil Nadu	130,058	3,788	4,216	51,136	59,140	45.47
Karnataka	191,791	3,500	10,000	111,500	125,000	65.18
Gujarat	196,024	1,570	19,655	49,384	70,609	36.02

Source: PwC Analysis

There are 9 national highways in the State. Out of all these highways only NH 6 and NH 43 are double lane roads. All other national highways, except for a portion of NH 200 that is double lane, are single lane. Out of the 9 national highways, NH 200, 78 and 202 were State highways till January 1999. Similarly NH 12A, 216 and 217 were State highways till October 2000.

It can be clearly seen that the current road network in Chhattisgarh is inadequate and needs to be strengthened in terms of coverage and also in terms of quality.

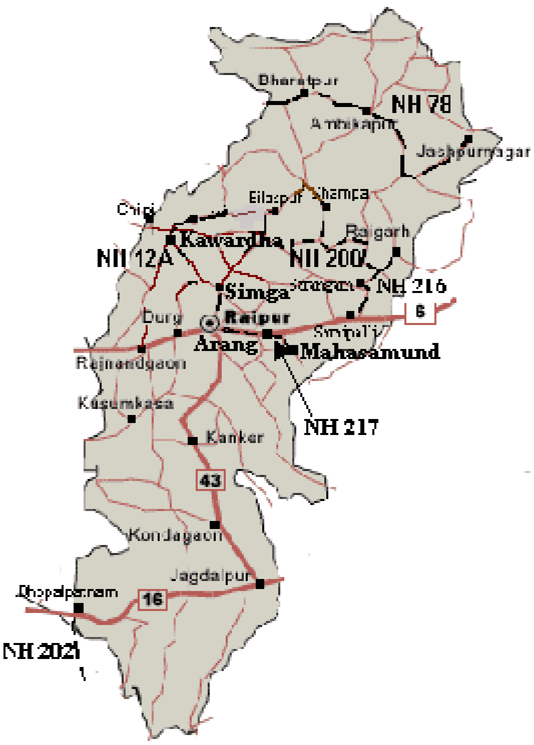
Figure I.1 on the following page shows the network of national highways in the State. The new national highways have been shown by dotted lines.

Institutional Framework - Roads

There are various agencies responsible for construction and maintenance of the road network in Chhattisgarh. The role and coverage of each agency is summarised below:

- ***Public Works Department (PWD):*** PWD is the primary agency responsible for development and maintenance of State highways, major district roads and other district roads. The construction and maintenance of national highways are the responsibility of NHAI. The NHAI executes its work through the State PWD and there is a separate division responsible for managing the works related to national highways
- ***Rural Engineering Services:*** RES is part of the Rural Development Department and is primarily responsible for construction and maintenance of village roads. Some village roads are under the responsibility of the PWD and some roads are being transferred to the

Figure I.1



Panchayat Department for maintenance

- ***Municipal Corporations:*** The municipal corporations in big cities like Raipur, Durg, Bhilai, Bilaspur, etc., are responsible for development and maintenance of city roads within their jurisdiction

Chhattisgarh Infrastructure Development Corporation (CIDC) has been formed for promoting infrastructure development in the State. Currently, it is responsible for implementing the Pradhan Mantri Gram Sadak Yojna (PMGSY) and the Durg-Bhilai-Raipur project.

Overview of Railway Network

Railways form a very important aspect of the transportation network as it serves to carry a large quantity of minerals (especially coal and iron ore) within and outside the State. The South Eastern (SE) Railway headquartered at Bilaspur operates the railway network in Chhattisgarh. The total network maintained by SE Railway consists of 1038.39 route kilometres (out of this 949.28 km is broad gauge and the balance 89.11 km is narrow gauge). 90% of the above coverage is in the State of Chhattisgarh, with the balance being in Orissa.

Apart from the above, the railways also services approximately 50 sidings in the State – important to ensure smooth movement of freight traffic.
Although a very important means of transport, railways has a fairly limited coverage in the State as can be seen in Figure I.2.

Figure I.2

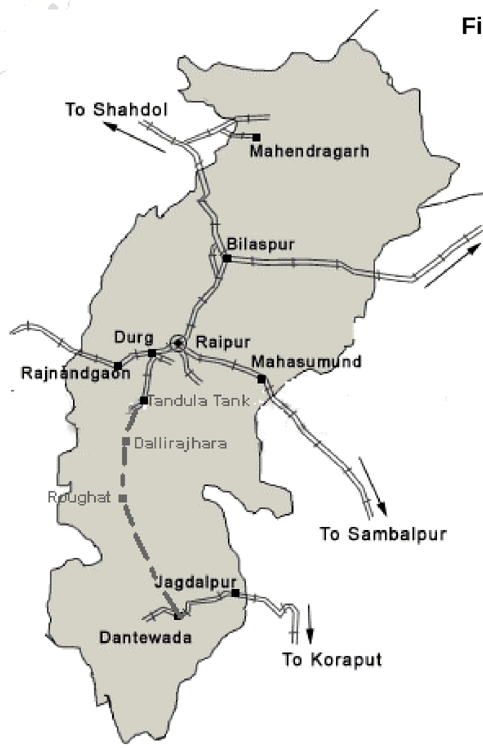


Table I.3, shows the allocation of funds for various projects in the State of Chhattisgarh during the year 2001-02.

There are two new projects envisaged in Chhattisgarh during 2001-02. There are two new projects envisaged in Chhattisgarh during 2001-02.

The dotted line from Durg to Jagdalpur via Dallirajhara and Roughat is a proposed project. This project was primarily envisaged to transport iron ore to the Bhilai Steel Plant (BSP). Since the land identified by BSP in Jagdalpur for mining has not been allotted to them, work on this line has been stopped. This project is extremely crucial as it would help connect the southern parts of the State. The districts of Bastar, Dantewada and Kanker have unexplored mineral resources and if the proposed railway link is completed it would facilitate in transportation of mineral resources to the industrial centres in Raipur, Durg and Bilaspur.

The State should also take necessary steps to ensure completion of Bishrampur-Ambikapur rail link.

Due to the strategic importance of railways for Chhattisgarh, particularly for improving the utilisation of its mining potential, the State should consider setting up a joint working committee to work with the railways for developing new routes and facilitating speedy implementation of proposed projects.

Table I.3

Name of Work	Allottment of funds Rs Crore
Dallirajhara-Jagdalpur-New Line (235 km)	0.01
Bishampur-Ambikapur-New Line (90 km)	10.00
Akaltara-Champa 3rd line (25.6 km)	3.00
Urkura-Raipur-Sarona (doubling)	0.10
Korba-Saragbundia-Patch (doubling) - 15 km	0.10
Champa-Saragbundia (doubling)	5.00
Saron-Bhilai - 3rd line	10.0
Bilaspur-Urkura	14.0
Korba -Gevra Road	12.0
Upgradation of Korba Yard Reception and Dispatch Facilities	0.2
Upgradation of Balpur Crossing Station	0.07
Raipur improvement to goods shed and store depot	0.55
Workshop upgradation of Raipur	1.65
Upgradation of Raipur passenger amenities	0.49
Total	**57.17**

Source: Chief Engineer (Construction), SE

Table I.4 shows the locations of the various airports/ airstrips in the State.

Table I.4

Sl.No.	City	Maintained by
1	Mana - Raipur	Airport Authority of India (AAI)
2	Jagdalpur	State Government
3	Nandini - Bhilai	Bhilai Steel Plant
4	Ambikapur	State Government
5	Raigarh	State Government
6	Jashpur	State Government
7	Bilaspur	State Government (owned by AAI)
8	Korba	Chhattisgarh State Electricity Board
9	Sarangarh	State Government

Source: AKVNraipur.com

Overview of Air Transport

The air transportation network in the State is quite limited. There is only one major airport in the State, in the capital city of Raipur. The airport is situated over 543.41 acres of land and has one main runway. This airport serves as the gateway to places like Bilaspur, Bhilai, Raigarh, Ambikapur, Koriya, Jashpurnagar and Rajnandgaon.

The main airport at Raipur is connected with New Delhi and Nagpur by daily flights and with Mumbai & Bhubaneshwar by tri-weekly flights. The Mana airport at Raipur possesses the following communication and navigation facilities

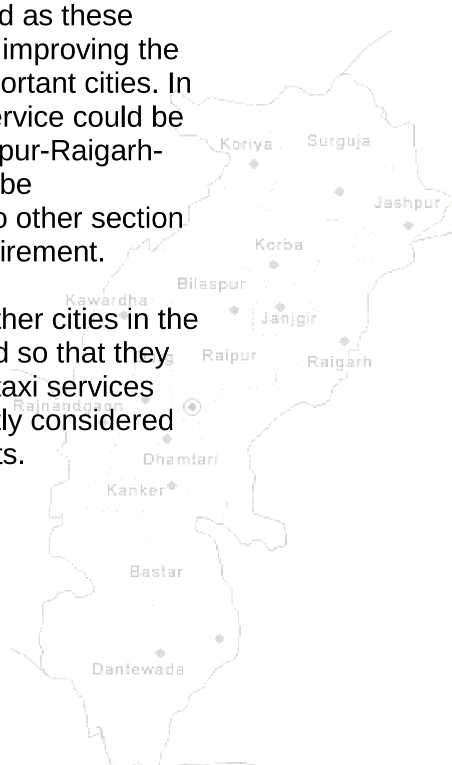
- Very high frequency omni range
- Non-directional beacon
- Distance measuring equipment
- Precision approach path indicator
- Night landing facilities

However, the airstrip is only suitable for handling B737 and smaller type of aircraft, and the apron space at the airport is suitable only for parking two B737s simultaneously. The airport therefore needs to be upgraded.

To facilitate introduction of new routes, the government may consider waiving landing charges and other related expenses.

The option for operating air taxies should also be considered as these would go a long a way in improving the connectivity between important cities. In the initial stage such a service could be considered along the Raipur-Raigarh-Bilaspur section. It could be subsequently extended to other section depending upon the requirement.

The airstrips located in other cities in the State should be upgraded so that they could be used by the air taxi services and could be subsequently considered for location of new airports.



Section 3: Development Needs

Overview of the Section

This section evaluates the requirement of roads from a social and economic point of view. It also identifies the need for roads to improve the value of agricultural and industrial output.

Analysis of Road Requirements

The requirement of roads has been analysed from three points of view:

- District-wise availability of roads for overall social development
- Availability of roads for marketing agricultural produce
- Availability of roads for industry/ mining

District-wise Road Availability

All districts in the State should have good connectivity to ensure that people across the State have access to economically and culturally important towns and cities. Figure I.3 shows district wise road density per 100 sq.km. The average road density in the State is 25.5 km per 100 sq.km. Districts like Korba, Koriya, Bastar, Raigarh, Surguja and Dantewada have very low road density and there is a need to increase road length in these districts. The break-up of district wise kutcha and pucca roads is given in ***Annexure I.1***.

Figure 1.3

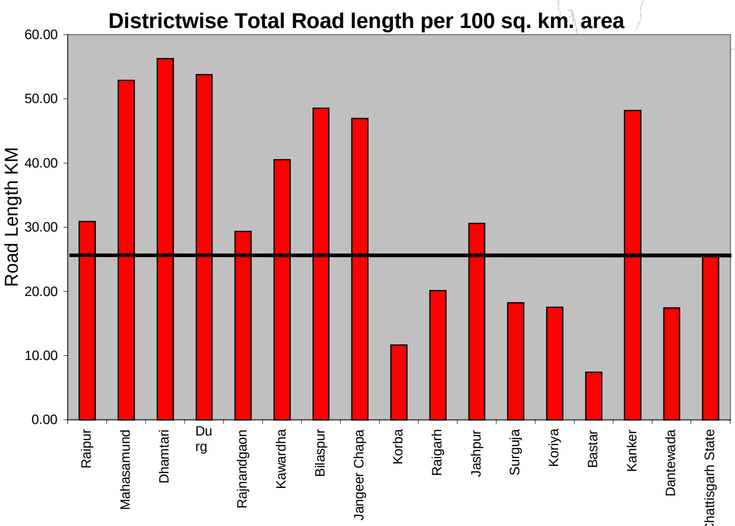


Table I.5 shows the status of villages connected through all-weather roads.

Table I.5

Population wise Villages connected by BT roads	<500	500-1000	1000-1500	>1500	Total
Total Villages	12224	5054	1467	862	19607
Villages connected with BT topped roads	2868	2844	1233	860	7805
Remaining Villages	9356	2210	234	2	11802

Source: PWD

As can be seen from the above table, about 60% of the total villages are not connected by an all-weather BT top road.

Road Requirements for Agriculture

Agriculture is the predominant economic activity in the State and availability of appropriate road linkages from villages to agriculture markets, tehsil and district headquarters would ensure that farmers receive better value for their agricultural produce.

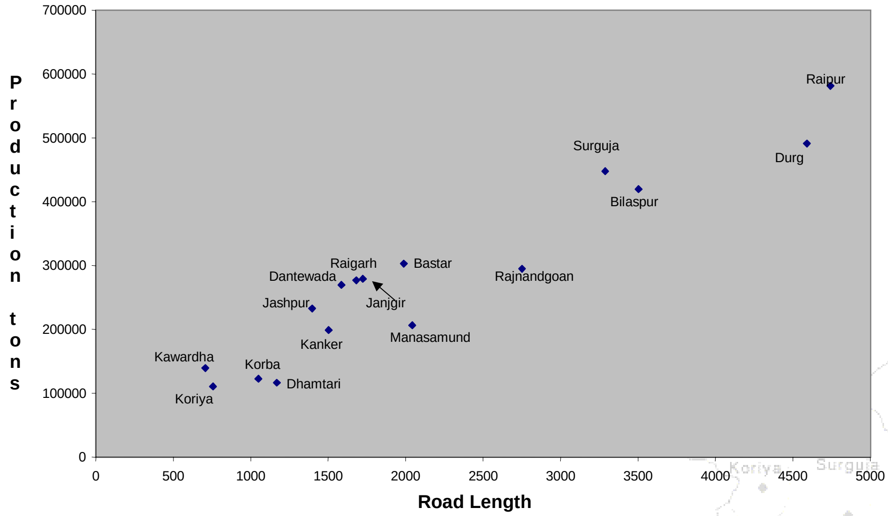
Figure I.4 on the following page, shows district wise road length vis-à-vis agricultural production in the district.

Districts having higher agricultural production have a greater road length. Thus the overall road length in each district broadly corresponds to the district's agricultural production.

For analysing the true impact of roads in improving the market value of agricultural output it is important to analyse the agricultural output that is traded in the various mandis across the State.

Figure I.4

Agricultural Production Versus Road Network



About 80% of mandis are located near national or State highways and only 20% of mandis are located near district and other roads. This suggests that there is need for good connectivity in the hinterland to ensure that agricultural surplus reaches the mandis.

Table I.7

Location of Agricultural Mandis		
National Highway	State Highway	Other Roads
19	26	14
11		
		Source: PwC Analysis

There are 70 agriculture mandis in the State. The district wise list of mandis is given in Table I.6 below:

Table I.6

Districtwise Agricultural Mandis	
Raipur	11
Mahasamund	5
Dhamtari	3
Durg	3
Rajnandgaon	7
Kawardha	2
Bilaspur	7
Jangeer Chapa	4
Korba	1
Raigarh	4
Jashpur	4
Surguja	6
Koriya	2
Bastar	4
Kanker	3
Dantewada	4
Chattisgarh State	**70**
Source: Agriculture Marketing Board	

According to officials in the Mandi Board, about 20-25% of the total agricultural output is for self-consumption and the balance represents marketable surplus that should be traded in the mandis. Table I.8 shows the inflow into various mandis in the State vis-à-vis the agricultural production during 98-99 and between April to December 2000.

Table I.8

Mandi Statistics			
	Production	**Inflow into mandis**	**Percentage**
		Tons	
98-99	4354000	2172200	50%
Apr 2000-Dec 2000	5649600	1571800	28%
Source: Agricultural Mandi Board			

If there were better roads across the State, accessibility to these mandis would increase leading to increase in trading of agricultural products. These mandis should be located at points where they are easily accessible by road. Table I.7 shows the location of 64 mandis along national, State and other roads. Of the 64 mandis, 11 are located close to both national and State highways.

The inflow into the mandis as a percentage of the total production in the State has gone down from 50% to 28%. One of the reasons for this could be the inadequate network of roads resulting in local sale of produce rather than transporting it to the mandi. This is highlighted by the point that only 20% of the mandis are located near other roads viz., district and village roads, and about 36% of village and district roads are dirt roads where vehicles like trucks and tractor trolleys would not be able to ply.

Road Requirement for Industry/ mining

The presence of a comprehensive road network in the State is important for the transportation of industrial raw materials, intermediate and finished goods.

Chhattisgarh is a mineral rich State and has significant deposits of important minerals like iron-ore, coal, limestone, bauxite, dolomite, etc. These minerals are important raw materials for industrial units, both within and outside the State. The following table shows the district wise production of major minerals in 1999-2000.

Table I.9

Major Mineral Production	
Districts	**Production (Tons)**
Bilaspur	484,213
Korba	37,751,113
Raigarh	291,512
Surguja	2,530,057
Koriya	4,605,000
Bastar	23
Kanker	1,925
Dantewada	11,289,000
Durg	9,230,898
Raipur	8,234,000
Rajnandgoan	2,454
Jangeer	2,047,000

Source: Dir. of Mining and Geology

These minerals are transported to processing units within and outside the State. There are railway sidings that primarily cater to the transportation of coal and iron ore. Most of the other minerals rely on roads for transportation, as the railway network is limited. Besides, they are mined in smaller quantities and consumed within the State. This highlights the importance of roads for the industrial/mining sector.

Figure I.5 shows the location of major industrial centres and other large industrial units in the State. Most of the industries are concentrated in the central districts of Raipur, Bilaspur, Durg and Raigarh.

Figure I.5

Data relating to unexplored potential of mineral resources was received from the Directorate of Mining and Geology, Chhattisgarh. This data is given in ***Annexure I.2***. It can be observed that there are large reserves of minerals like limestone, iron-ore, bauxite and dolomite in the districts of Bastar, Dantewada, Kanker and Janjgir. A comparison of average road length in these districts is given in Table I.10

Table I.10

Districtwise Road Length	
Road Length (per 100 sq.km)	
Bastar	7.40
Dantewada	17.42
Kanker	48.17
Janjgir - Chhampa	46.94
Chhattisgarh	25.5

Source: PWD

The road length in the districts of Bastar and Dantewada are very low compared to their mineral potential. It is important to develop roads in these districts so that the minerals mined in these districts could be transported to processing units across the State.

Apart from mineral potential, industrial power consumption is another important variable for analysing the extent of industrialisation within districts in Chhattisgarh. Table I.11 shows district wise industrial power consumption vis-à-vis pucca road length.

Pucca road length has been considered instead of total road length, as kutcha roads are most often unsuitable for heavy vehicular traffic.
Districts like Raipur, Durg, Raigarh and Bilaspur are the most industrialised and consume nearly 60% of industrial power. However, the proportion of pucca road length in these districts is very low. Since industrial traffic is unlikely to use kutcha roads, it is possible that the low coverage of pucca roads is a constraint to further industrialisation in these districts. Improving the quality of roads in these districts could also help in the development of ancillary units and facilitate development of industrial corridors.

Table I.11

Industrial Power Consumption Vs. Road Length		
	Industrial consumption	**Pucca road length**
Raipur	25.40%	15%
Mahasamund	3.92%	5%
Dhamtari	4.66%	3%
Durg	16.88%	11%
Rajnandgaon	7.70%	7%
Kawardha	1.41%	2%
Bilaspur	10.47%	11%
Janjgir	7.77%	6%
Korba	3.11%	3%
Raigarh	6.68%	5%
Jashpur	1.52%	5%
Surguja	4.52%	10%
Koriya	1.37%	2%
Bastar	3.18%	6%
Kanker	0.85%	4%
Dantewada	0.57%	4%

Source: PwC Analysis

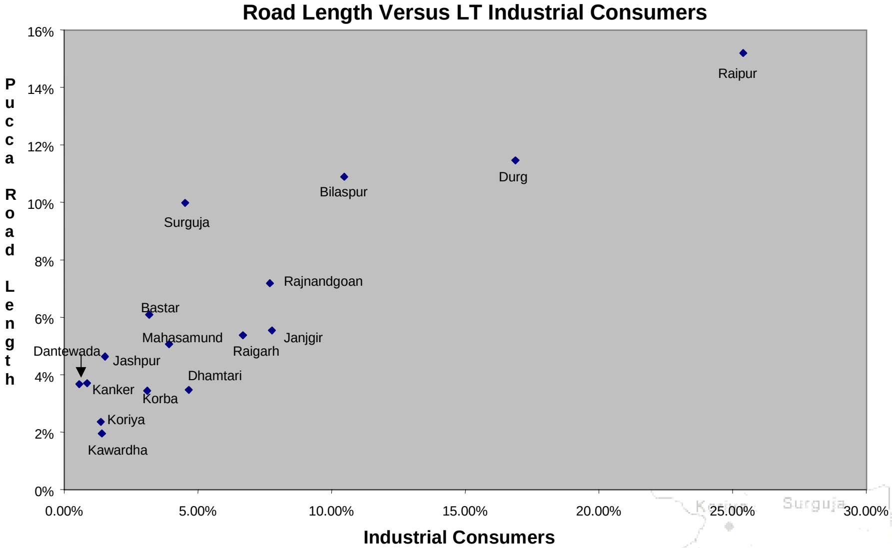
The spread of industrial activity in districts could also be analysed by looking at the number of industrial consumers in each district. There are about 18,348 industrial consumers with about 2% HT consumers and the balance LT consumers. Analysing the district wise spread of LT consumers would be useful in analysing the spread of industrial activities in each district. Figure I.6 (on the following page) maps the percentage of LT industrial consumers against pucca road length. Districts like Kawardha, Koriya, Korba have a higher proportion of industrial consumers relative to their road length. It highlights the need to enhance the network of pucca roads in these districts so that the industrial units have better access to processing centres and markets within and outside the State.

Summary of Road Requirements

It has already been emphasised that improvement of road network is important for enhancing the value of

Figure I.6

Road Length Versus LT Industrial Consumers



agricultural and industrial output in the State.
Improvement of the road network is also likely to have a multiplier effect on the SDP. The following example shows how improvement in the road network could potentially enhance the SDP. Figures have been used illustratively rather than to calculate actual increase in SDP.

Between April and December 2000, all agricultural mandis in the State generated an income of Rs. 16.53 crores. The mandis charge 2% of the traded value as their fee. Thus the total value of agriculture output traded during the period would be about Rs. 826 crores. Assuming that the trading pattern is likely to be the same for rest of the year, the total value of output that is likely to be traded would be about Rs. 1100 crores.

The volume of output traded in agricultural mandis is about 28% of the total production during the corresponding period (April –December 2000). As per estimates of Mandi Board officials this could be increased to about 75% with the rest of the production being for self-consumption.
With better road linkages, the value of agricultural output being traded could go upto Rs. 2950 crores (assuming that 75% of the output is traded) representing an increase of about Rs. 1850 crores.
Assuming that agricultural products traded in the mandis command about 10% premium over those being traded outside the mandis, the additional value generated by better access to mandis would be about Rs. 185 crores. Further, assuming a Marginal Propensity to Consume (MPC)[1] at about 0.8, the value of income multiplier would be 5. Thus, by improving road connectivity, the income to the farmers could increase by about Rs. 900 crores, representing about 4% of the NSDP (1999-2000).

Enhancing the road network is also likely to have a similar impact on improving yield from minerals.

[1] MPC refers to the change in consumption as a result of change in income. MPC of 0.8 means that 80% of income is spent on consumption. In the second round 80% increase in income would be again spent on consumption. This cycle would continue till the value of additional income becomes negligible.
Multiplier refers to the number of times by which income goes up as a result of increase in consumption. Multiplier is measured by (1/1-MPC).

Section 4: Investment Requirements

Overview of the Section

This section tries to identify the investment requirement for the road sector in Chhattisgarh. The investment requirement has been estimated for both construction and maintenance of roads. This section also looks at supply side issues, viz. an overview of the funding scenario for the road sector in India and an analysis of the State government budget and current availability of funds. This section identifies the extent to which central and State government resources could fund future requirements. Finally, an attempt has been made to analyse the funding gap that would need to be bridged by other sources.

Estimation of Demand for Road Development

It may be noted that the investment requirement is normally a reflection of strategic objectives. These requirements would differ depending upon the strategic objectives to be achieved. For instance, the State may accord higher priority to strengthening the arterial road network consisting of State and national highways along its industrial corridors rather than improving the overall road length. Such a strategy would reflect a relatively high importance to industrialisation. Alternatively, the State may prioritise the village road network by connecting them to district and tehsil headquarters thereby improving social development as well as integrating the rural economy with rest of the State.

Each of the above scenarios is likely to result in different investment requirements. Moreover, once these overall objectives have been determined, the investment requirements would be driven by a detailed project identification exercise.

For the purpose of this position paper, the investment requirements have been calculated to illustrate how certain priorities/ objectives would translate into investment requirements. If these priorities/ objectives were to change the investment requirements would also change.

The demand for roads would be based on social and economic requirements. The requirement of roads for social development is primarily based on improving access to villages and connecting them through all weather roads. It also involves improving connectivity of villages to tehsil, block and district headquarters. This would enable remote villages to access health and education facilities available in larger towns and cities.

The economic requirement for roads is dependent upon the linkages required for transportation of agricultural and industrial goods. This is primary based on traffic forecasting and estimating traffic flows between origin and destination points[2].

Methodology

Investment requirement for roads has been calculated for construction and maintenance. Estimation of requirement

[2] Due to unavailability of data on traffic volumes for various national and State highways and traffic flow between various origin and destination points, demand estimation based on traffic forecast has not been done.

for construction has been done under two components:

- **Component 1**: Strengthening of existing network of roads
- **Component 2**: Increasing the road network

The requirement has been estimated over 10 years and it has been broken up into three phases. These phases are given below:

- Phase I between 1-3 years
- Phase II between 3-7 years
- Phase III between 7-10 years

The number of phases and years in each phase are purely indicative. Breaking up the investment requirements into phases helps identify specific milestones at the end of each phase and to determine the investment requirements to achieve these milestones.

Fund requirements for maintenance has also been calculated for ten years using standard benchmarks for different categories of roads.

A combination of benchmarking to all India figures and those of other States has been used for determining road requirement across various categories of roads for Chhattisgarh. The benchmarking has been done to determine both the needs for upgradation as well as the requirement for new roads. Benchmarking against other States is useful from the point of view of identifying strategies adopted by other States for bridging the investment gap.

Case studies have been prepared in the subsequent sections highlighting the steps taken by other States for improving their road sector.
Apart from benchmarking, the estimation broadly reflects the requirements for agriculture and industry identified in the earlier sections.

Construction and upgradation

Component 1

The current network of roads in terms of quality and surface coverage leaves a lot to be desired and therefore emphasis has been laid on improving the current network of roads.

The key assumptions and rationale are given below:

All roads

- All the existing NH, SH and District roads and at least 50% of village roads in the State would be converted into BT top roads by the end of the 10th year

National highways

- The three most important national highways, viz., NH 6, NH 200 and NH 78 would be converted into four lane roads
- All other national highways would be converted into two lane roads by the end of the 10th year

State highways

Strengthening the network of State highways is critical as these provide connectivity to the national highways.

- Currently more than 20% of the State highways are either WBM or Kutcha roads. These would be converted into BT top single lane roads by the 3rd year
- Durg, Bilaspur and Raipur are the three most important industrial districts in the State. Since the State highways in these districts are likely to carry heavy traffic, the total road length of State highways in these districts have been assumed to be converted into two lane by the end of 10th year. It has been further assumed that this conversion would be carried out equally between all phases
- Currently about 8% of the State highways are double lane. It has been assumed that this would be brought upto at least 20% by the end of the 5th year to match up with the current national average

District Roads

- More than two-thirds of district roads are BT roads. It has been assumed that the remaining roads would be converted equally in the first and second phases. Since district roads link the village roads with district and tehsil headquarters, it is important to upgrade these roads in conjunction with upgradation of village roads

Village Roads

- Upgradation of village roads has already been taken up under the Pradhan Mantri Gram Sadak Yojna (PMGSY). The target of upgradation of village roads has been taken up as per this programme
- By the end of the 7th year (second phase) all villages with population of 500 or more would be connected by BT roads (all weather roads)
- PMGSY has indicated targets only for villages with population of 500 or more. For the purpose of estimates it has been assumed that by the end of 10th year at least one-third of villages with a population of less than 500 would be connected by BT roads. This would ensure a focus on linking even those villages with a population of less than 500

Table I.12 below shows how the composition of the road network in Chhattisgarh will change at the end of each Phase of Component 1. For example, the existing mix of single lane and double lane national highways is 65:35. As per the Table below this will change to 0:65:35 for single lane, double lane and four lane roads respectively, by the end of Phase II. This indicates that all BT single lane national highways will be upgraded to either double lane or four lane roads by the end of Phase II.

Table I.12

Upgradation of Existing Roads (Component 1)

	Existing	Phase I	Phase II	Phase III
National Highways				
BT -Single	65%	33%	0%	0%
BT-Double	35%	50%	65%	48%
BT- Four	0%	17%	35%	52%
State Highways				
BT -Single	69%	82%	72%	62%
BT- Double	8%	18%	28%	38%
BT- Four	0%			
WBM	20%	0%	0%	0%
Kutcha	3%			
MDR and ODR				
BT -Single	77%	89%	100%	100%
BT- Double	0%	0%		
WBM	20%	10%	0%	0%
Kutcha	2%	1%		
Village/rural Roads				
BT -Single	14%	27%	42%	54%
WBM	47%	39%	31%	25%
Kutcha	40%	33%	27%	21%

Source: PwC Analysis

Component 2

This component refers to the increase in road network in terms of total road km. The key assumptions and rationale are given below:

All Roads

- For estimating the growth rate, the Compounded Annual Growth Rate (CAGR) of the total road network in India over the last ten years has been used as the benchmark
- Roads in India have grown at a CAGR of about 6.4% over the last 10 years. It has been assumed that the road length in Chhattisgarh should at least grow at this national average for the next ten years in order to improve its road length. This would mean that about 30,700 km of total roads would be added in Chhattisgarh over the next ten years. This would take the road density at the end of 10 years to about 49 km per 100 sq.km – viz. 67% of the existing national average

National highways

- The CAGR of national highways in India over the last 10 years has been 5.9%. There is a need for the development of arterial roads consisting of national and State highways. Therefore, the road length of national highways in Chhattisgarh has also been assumed to grow at a CAGR of 5.9% over the next 10 years

State highways

- The CAGR of State highways in India over the last 10 years has been about 1%. This low rate of growth is primarily attributable to the fact that State highways have been upgraded to national highways.

  State highways constitute about 6% of the total road network in Chhattisgarh. In Gujarat this is 28%, Maharashtra-17% and Karnataka-8%. Since there is a need to increase the network of State highways in Chhattisgarh, it has been assumed that State highways would grow at the same CAGR as national highways i.e., 5.9% over the next ten years

District and Village Roads

- The balance new roads (apart from national and State highways) have been assumed to be constructed in district roads and village roads
- The existing proportion between district and village roads has been assumed for new roads
- All new village roads to be constructed would be either WBM or Kutcha roads. This is because these are likely to be constructed in very remote areas and are not likely to cater to heavy traffic. In the case of new village roads to be constructed the ratio of WBM and Kutcha roads has been assumed to be the same as the existing ratio

Table I.13 given on the next page shows the status of Component 2 (new roads), at the end of each phase[3].

[3] Note: It has been assumed that new roads created in the categories of national highways, State highways and district roads would consist of upgradations. For instance, certain State highways would get upgraded as national highways, district roads as State highways and so on. New village roads would be constructed afresh and therefore the increase in the total road length over the next ten years (currently – 35,388 km, at the end of 10th year – 65,115 km) is equal to the new village roads constructed.

Table I.13

New Roads Created (COMPONENT 2) in Km				
	Phase I	Phase II	Phase III	Total
National Highways	324	524	475	**1323**
State Highways	693	1119	1014	**2826**
MDR and ODR	715	1101	1029	**2845**
Village/rural Roads	7299	12125	11305	**30728**

Source: PwC Analysis

Table I.14 given below shows the status of total roads at the end of 10th year under each phase.

Table I.14

Total Road Network				
	Existing	Phase I	Phase II	Phase III
	(in kms)			
National Highways	1827	2151	2675	3150
State Highways	2074	2442	3037	3576
MDR and ODR	3094	3809	4910	5939
Village/ rural Roads	28392	34283	44188	53449
TOTAL ROAD NETWORK	**35387**	**42686**	**54810**	**66115**

Source: PwC Analysis

The detailed methodology and assumptions for estimation of road requirement including investment requirement and related assumptions are given in ***Annexure I.3*** to the report. The investment requirements have been calculated using standard benchmarks for construction/ strengthening cost per km of various types of roads. Table I.15 shows the cost for various types of construction/ strengthening.

Based on the estimated strengthening/ construction and the cost for different categories, the total cost of improving the road network in the State under both components is estimated at about Rs. 10,531 crores over 10 years. Table 1.16 gives phase wise break-up of the cost. Details of the phase wise cost are given in ***Annexure I.3***.

Maintenance Requirement

Apart from estimating the investment requirement for roads, the recurring requirement for maintenance has also been estimated.

Regular maintenance of roads is important to maintain roads in good condition. Maintenance of roads has been a highly neglected area in India and this has led to the huge deficiency in the quality of road network. Efforts like establishment of the Central Road Fund are steps in the right direction to ensure that funds are dedicated for upkeep and maintenance of roads.

Table I.15

Cost per construction Type	
Description	Rs in lakh/ km
New BT road-Four lane	800
New BT road-Double lane	400
New BT road-Single lane	100
New WBM road	15
New Kutcha Road	9
BT road- Single to Double lane	50
BT road- Double to Four lane	200
Kutcha road to WBM road	8
WBM road to BT road -Single lane	4
Kutcha road to BT road -Single lane	11

Source: PwC Analysis

Table I.16

Investment Requirement (Rs. Crore)				
	Phase I	Phase II	Phase III	TOTAL
				Rs. Crore
National Highways	1736	1814	1490	5039
State Highways	178	186	178	541
MDR and ODR	32	40	22	94
Village/ rural Roads	1231	1901	1725	4857
Total	**3176**	**3940**	**3415**	**10531**

Source: PwC Analysis

Maintenance can be broadly categorised into:

- Ordinary repairs, and
- Renewal

Ordinary repair refers to normal upkeep of surface, repairing of pot holes and road edges, culverts, bridges, road signs, direction boards, etc.

Renewal of surface is needed every 4 – 12 years depending upon traffic and weather, local circumstances, specifications, etc.

The key assumptions for estimation of investment requirements for road maintenance are given below:

- The maintenance cycle would be annual
- For the purpose of estimation of requirement, a renewal cycle of 5 years has been assumed for all BT roads
- Maintenance expenditure in the current context refers to expenditure that would be incurred once roads have been improved. Since the first component in the earlier section referred to improving the quality of road network, it has broadly addressed the gaping need related to bringing the existing network of roads to good motorable quality
- Maintenance expenditure has not been divided into existing roads and improved roads

The annual expenditure estimated on maintenance of different categories of roads is given in Table I.17.

Based on these estimates, the total maintenance expenditure is expected to be about Rs. 500 crore by the tenth year. The methodology and calculation with respect to phase wise requirement of funds for maintenance is given in ***Annexure I.3***.

Funding Mechanism for Roads in India

Having analysed the investment requirement for roads, it is important to analyse the availability of funds from government and other sources in order to plan and execute the programme for strengthening the road network in the State.

Roads are primarily funded through budgetary allocations. Currently the total allocation, Central and State, available to the road sector in the country is about Rs. 11,000 crores per annum.

A Central Road Fund was established in 1997-98 for providing a dedicated funding mechanism for the development and maintenance of roads. This source is primarily being funded by cess on petrol and diesel. It is estimated that about Rs. 5000 crores would be generated annually through this fund. 50% of the proceeds of the additional excise duty on diesel would be allocated for rural roads. This fund would flow to the State Government under the PMGSY. Out of the remaining amount, the allocation from this fund would be as follows:

- 57.5% for development and maintenance of national highways
- 27% for State roads
- 3% for inter-State and roads of economic importance
- 12.5% for railway safety works like rail over bridges, manning of level crossings, etc.

In addition to Central and State governments, Multi-lateral agencies like The World Bank (WB), Asian Development Bank (ADB), etc. – extend funds for development of National and

State roads through loans, grants and other funding facilities. WB is funding the Third National Highway Project under which $ 516 million has been sanctioned. This project would be implemented between 2000-06.
WB is also funding the State Highway Projects in Tamil Nadu, Andhra Pradesh, Karnataka and Gujarat.
Apart from Government and multi-lateral institutions, the private sector is increasingly seen as an alternative for funding road sector development in the country. However, private funds are likely to be available only for the improvement of economically viable roads, mainly national and State highways, rail over bridges, expressways, etc. It is estimated that the current private sector participation in the road sector in the country is only about Rs. 800-900 crores, which represents less than 10% of the total funds being spent annually by the Central and State Governments on the road sector.

The options for meeting these funding requirements are summarised below:

- State's own resources
- Central government allocation
- Private sector participation
- Financial institutions and multilateral agencies

Since Government (Central and State) represents the most important source of funding for roads, the capacity of government funds to sustain investment requirements in the future needs to be analysed.

Summary of Existing Works in Chhattisgarh (2000-01)

Table I.18 given below summarises the status of existing works in the road sector in Chhattisgarh.

Table I.18

Expenditure on Roads (2000-2001)

	Development		Maintenance	
	Budget 2000-2001	Expenditure upto Jan 2001	Budget 2000-2001	Expenditure upto Jan 2001
				All Amounts in Rs. Crore
State Plan	26.69	16.62	50.34	40.98
Tribal Sub Plan	16.27	10.64		
Special Plan	1.62	0.62		
Project under CRF	KM	Amount		
National Highways	55	11.12		
Other Roads	515.28	55.52		

Source: PWD, Government of Chhattisgarh

Rs. 88 crores was sanctioned under PMGSY for the year 2000-01 towards the end of the year for converting about 554 km of village roads into all weather roads. This amount is likely to be spent in 2001-02. It is estimated that a further Rs. 110 crores are likely to be allocated during the 2001-02 for this purpose.

Components of the State plan and tribal sub-plan are funded by National Agricultural Bank for Reconstruction and Development (NABARD) in the form of loan to the State government. Funds received from CRF also go towards funding the State plan.

In order to supplement its own resources for development of the road network, the State government has in the recent past taken steps to build roads in public-private partnerships using the Build – Operate – Transfer (BOT) route.

The Durg Bypass was completed in October 2000. The initial concession is

Table I.19

Budget for 2000-2001		
		All Figures in Rs. Crore
Demand for Grants	Plan	Non-Plan
State Plan - General		
National highways		0.14
State Highways	47.67	30.20
District and other Roads		40.10
State Highways - Bridges	7.77	
Others	9.86	6.32
Total	**65.30**	**76.76**
Tribal Sub-Plan		
State Highways - Bridges	9.57	
District and other Roads	17.12	
Others	0.30	
Total	**26.99**	
Special Plan		
District and other Roads	4.72	
Total	**4.72**	
Total Plan	**97.01**	**76.76**

Source: State Budget, 2001-02

for a period of 15 years after which the project would be expanded to four lanes for a further concession period of 15 years. Besides the above, the status of other BOT projects is as follows:

- ***Raipur-Bhilai project:*** Bids have been invited for alignment studies for making 26.6 km along the route four-lane. The project is estimated to cost about Rs. 81 crores
- ***Raipur-Bhanupuri-Bilaspur:*** Ministry of Surface Transport (MoST) has already approved the conversion of this 115.9 km long route into a two-lane road under BOT arrangement. This project is estimated to cost about Rs. 53 crores
- ***Ambikapur-Raigarh-Pathalgarh:*** Repair of 109.6 km long stretch has been given on contract to the private sector for a period of 8 years and 10 months at a cost of Rs. 15.09 crores

Budget for 2001-02

The budget for 2001-2002 under the various demand heads is given in Table I.19 and discussed below.

Plan expenditure is primarily for new works to be taken up as part of the annual plan. Maintenance expenditure is the most important component of non-plan expenditure and accounts for about Rs. 70.43 crores. Table I.20 shows the maintenance expenditure budgeted for different categories of road in Chhattisgarh during 2001-02.

Table I.20

2001-02 Repair and Maintenance (Non-Plan)				
				Rs. Crore
	National Highway	State Highway	Other Roads	**Total**
Ordinary Repairs	0.12	10	18	**28.12**
Overhauling/Renewal	0	8	12.5	**20.5**
Laying Bitumen Top	0	3.75	2.5	**6.25**
Special Repairs	0.02	3	2.5	**5.52**
Strengthening of pavement	0	3	1.6	**4.6**
Widening of pavement	0	2.2	3	**5.2**
Central Road Fund			0.25	**0.25**
Total Expenditure	**0.14**	**29.95**	**40.35**	**70.44**

Source: PWD budget, 2001-02

Table I.21 given below shows funding sources for the total plan and non-plan expenditure.

Table I.21

Funding Sources	Rs. Crore
Central Assistance	51.67
NABARD	22.95
Railway Safety Fund	1.54
Primarily State Funds	*97.61*
Total Requirement	**173.8**

Source: PwC Analysis

Estimation of Funding Gap

Based on our estimates, the funding requirement for roads has been identified at about Rs. 10,531 crores for development expenditure over the next ten years. The maintenance expenditure would be about Rs. 500 crores per annum by the tenth year. Even accounting for a 10% variance in the above estimates, the actual requirement could vary between Rs. 10,000-12,000 crores over the next ten years.

This translates to an annual requirement of about Rs. 900-1000 crores – a minimum five fold increase over the current year budget. Attracting such enormous funding requires systematic approach to planning and execution of works.

Table I.22 compares the annual allocation during 99-00 for other States. It also shows allocation per km of road length and per sq. km. of area.

Allocation per km of road length as well as per sq. km. of area in Chhattisgarh is low as compared to the allocation by other States like Andhra Pradesh, Gujarat, Tamil Nadu and Punjab. Even if the same allocation per km of road length were to continue in Chhattisgarh, the annual allocation would be about Rs. 324 crores by the end of 10th year (based on estimated road length of about 65,115 km). This would require the annual budget to grow at a CAGR of 7% over the next ten years. If the annual allocation per km in Chhattisgarh were to increase to match that of Gujarat's by the end of the 10th year, the annual allocation would need to be about Rs. 768 crores. This translates into a CAGR of about 18% for the next ten years.

The above growth rates are significant, especially in the present context of stagnant or very low growth rate of allocations to this sector.

Accordingly, the capacity of Central and State Government resources to meet the investment requirement needs to be analysed.

State's own resources

There is an urgent need for the State to augment its own sources to increase allocation to the road sector. It has been highlighted in the previous sub-section (Table I.19) that out of the total requirement of Rs. 173.8 crores during 2000-01 the State government is

Table I.22

Comparision of State Budgets

	Plan	Non-Plan	Total	Allocation per km road	Allocation per sq.km of area
					Rs. Lakh
Andhra Pradesh	73845	60978	134823	2.49	0.49
Gujarat	49055	34408	83463	1.18	0.43
Karnataka	24884	27371	52255	0.42	0.27
Maharashtra	55831	387	56218	0.29	0.18
Punjab	17500	14995	32495	0.59	0.65
Tamil Nadu	48385	21427	69812	1.18	0.54
Chhattisgarh (2001-02)	**9707**	**7676**	**17383**	**0.49**	**0.13**

Source: CMIE & PwC Analysis

Note: The budget for all states except Chhattisgarh is for 1999-00

expected to fund about Rs. 97.61 crores – about 56%. If the State Government is expected to fund a similar proportion of future requirements, it should allocate about Rs. 400-500 crores per annum. This represents a quantum jump and even a 20% annual growth rate in the State Government's allocation is unlikely to this requirement.

Central Government Allocation

The Central Government allocation for the road sector is primarily through the CRF wherein funds are allocated for repair and improvement of national highways, State highways and district roads.

Development of rural roads is being funded through the PMGSY wherein about Rs. 88 crores was allocated for Chhattisgarh towards the end of 2000-01. It is understood that this plan is likely to continue for the next seven years with an annual increase of about 20%.

According to the PWD budget, the total allocation from the centre is about Rs. 46.12 crores and this amount has been allocated for national, State and district

roads in Chhattisgarh. Inflows to the CRF are expected to increase annually by about 20%.
Table I.23 summarises the estimated funds availability from the Centre[4].

Table I.24 given below summarises the total funds that could be generated from Central and State Government sources. This is under the optimistic assumption that the State as well as central allocation could increase by 20% annually. The estimated requirement includes funds required for construction/ strengthening as well as maintenance.

Table I.23

Estimated Central Funding (Rs. Crore)

	Phase 1 (Till 2003)	Phase 2 (2003-7)	Phase 3 (2007-10)
PMGSY	384	980	
CRF	201	513	722
Total	586	1493	722
Requirement	**3196**	**3940**	**3415**
Centre's Share	**18%**	**38%**	**21%**

Source: PwC Analysis

Table I.24

Estimation of Funding Gap

	Phase I	Phase II	Phase III
	Rs. Crore		
Central Government	586	1493	722
State Government	426	1086	1528
Total - Government	1012	2579	2250
Estimated Requirement	3196	3940	3415
Funding Gap	**2184**	**1361**	**1165**
	68%	**35%**	**34%**

Source: PwC Analysis

Even under the optimistic assumption, there is likely to be significant investment gap, especially in the initial years. Therefore, it becomes important to look at other sources for bridging the investment gap.

These sources include external agencies and private sector. The following section identifies the key imperatives for attracting private sector participation and draws upon the experiences of other States in obtaining multi-lateral funding.

[4] Allocations under PMGSY and CRF have been assumed to grow at 20% per annum. Under the PMGSY funds are expected to be allocated till 2007. Since no estimates are available as to how these funds would flow after 2007, they have not been taken into consideration for projections.

Section 5: The Way Forward

Overview of the Section

This section analyses the need for a comprehensive policy for roads and draws on experiences of other States like Gujarat and Maharashtra with specific reference to road sector policies. It also presents an analysis of areas where private sector participation could be invited along with mechanisms that could improve the attractiveness of projects for the private sector. It captures the existing scenario with respect to external funding and presents the concept/ need for dedicated funding for the sector through a road fund. Finally, it presents a framework for prioritisation of projects. This section also presents the way forward for railway and air transport sectors.

Need for a Policy Framework

It is important to augment government resources through private sector participation, institutional financing and multilateral funding institutions. Before seeking investment from these sources it is important to put in place an appropriate policy framework that would act as a guide for all participants - the State, private sector and the external agencies.

Preparation of such a road policy should be reflective of the State's priorities. A road sector policy should contain the following:

- Objectives over a 10-20 year time frame
- Funding requirement
- Institutional framework for development of road sector – clarifying the role of State Public Works Department (PWD), infrastructure development agencies and private sector
- Policy framework for private sector participation – investment limits, approval mechanism
- Identification of projects for private sector participation
- Strategy for funding maintenance works
- Upgradation of technology and revamping construction procedures

Box I.1 on the following page illustrates the road sector policy of Gujarat. The policy presents the vision for the State as far as the road sector is concerned. It highlights the key priorities and reflects the change in management of the sector from allocation based funding to need based funding. It also emphasises the utilisation of modern construction methods. To this effect, Gujarat proposes to use the Road Management System for strengthening financial and operational management of the road sector.

Lack of sufficient project development initiative is one of the most important issues currently facing the infrastructure sector in general and road sector in particular. Realising this, Gujarat has created Gujarat State Road Development Corporation (GSRDC) that undertakes project development activities related to the road sector.

Rajasthan has also set up a project development company, viz., Project Development Corporation Limited (PDCOR Ltd.), with the prime objective of implementing infrastructure projects in Rajasthan on a commercial format. To enable the government departments to utilise the project development services of PDCOR without going in for the tendering route, an amendment has been effected in the General Finance and Accounting Rules (GFAR). PDCOR

Box I.1: Vision 2010 – Gujarat

Gujarat has formulated Vision 2010 plan for catalysing infrastructure development in the State. The estimated investment for Road sector is about Rs. 19951 crore over the next ten years. Private sector is expected to contribute about 27% and agencies like NABARD, World Bank, etc. are expected to contribute 33%. The road policy highlights the need to adopt need based planning rather than resource based planning. The policy has set four primary objectives, which include:

- Establishment of high service levels
- Adoption of superior construction methods
- Adoption of scientific principles in resource allocation and
- Delivering high standards of safety

The road policy also includes an inventory of existing roads, the identification of corridors that need to be developed and prioritisation of links. The Road policy has also taken significant steps for attracting private sector participation in the State through:

- Amendment of Bombay Motor Vehicles Act 9 of 1994 to permit levy of tolls
- Enactment of the Gujarat Infrastructure Development Act, 1999 that provides an enabling framework for private participation in infrastructure projects

Gujarat State Road Development Corporation in Feb 1999 is expected to facilitate the following activities

- To undertake road projects with private sector participation
- To raise financial resources in the capital market
- To undertake feasibility studies
- To commercialise use of land along the road side and
- Work towards increasing efficiency and speed of implementation.

Apart from the above Gujarat has also enacted a BOT law, the first of its kind in the country along with standardisation of basic documents relating to BOT and SPV based projects. The State has also formulated detailed guidelines for private sector participation including land acquisition, mode of selection, finalisation of toll mechanism, settlement of disputes, additional benefits, maintenance and management of projects, legal requirements, etc.

takes up project development work - including identification of prima-facie commercially viable projects, preparation of detailed feasibility and investment banking reports, obtaining required government approvals and identification of private parties which can own and execute these projects.

Chhattisgarh Infrastructure Development Corporation (CIDC) could play the role of such a project development agency and initiate steps for catalysing private sector participation in the road sector.

Chhattisgarh should consider framing a comprehensive road sector policy addressing all the components highlighted earlier. This would help in identifying and targeting alternative options for funding the investment requirement. It would also help clarify the role of existing institutions in the State in road sector development.

Private Sector Participation

As indicated in the earlier section, the private sector could play an important role in bridging the investment requirement in the road sector.

Private sector participation in road development has the following advantages:

- Supplementing government resources for investment in the road sector
- Speeding up project execution
- Improvement in quality of construction and management techniques

However, private sector participation in roads would get a fillip only if there is an appropriate legislative and policy framework that facilitates participation. It is also important to note that private sector would typically be interested in commercially viable projects only. The Rakesh Mohan Committee report has recommended the BOT model for toll roads only when the vehicle load is more than 15,000 pcu/day.

While private sector participation may not be feasible for large-scale development of road sector and may not completely bridge the funding gap, there would be less strain on government if commercially viable projects were taken up by the private sector.

Even if the project revenues are not sufficient to cover the cost of the project various revenue enhancement tools could be used for making the project viable. Box I.2 encapsulates the options for enhancing the return on road sector projects. Detailed explanation for each of the options is given in ***Annexure I.4***.

Box I.2: Options for enhancing return of road projects

1. **Alternative tolling mechanism –**
   - Shadow toll
   - Annuity
2. **Financial incentives**
   - Grants for construction and Operation and Maintenance (O&M)
   - Low interest rate loans
   - Revenue shortfall loan
   - Least Present Value of Return (LPVR) method
3. **Guarantees and assurances**
   - Credit enhancement through government guarantee for repayment of loans
4. **Ancillary revenues along project highway** – Transport terminals such as garages and service stations, restaurants, motels, publicity and advertising space, etc.
5. **Fiscal incentives** – Rebates/ exemptions/deferment from Income tax, import duties on equipment, stamp duties, service tax and any other tax as applicable.

To attract private investment in roads with less traffic, NHAI has introduced the Special Purpose Vehicle (SPV) mechanism wherein an SPV is floated by NHAI to obtain funding. The SPV invests almost the entire equity, with a small contribution by the EPC contractor. This financial structure enhances project credibility. Moradabad, Durg and Kishangarh projects have been structured as SPVs to promote private funding.

Documented experience of private sector participation in India and other countries however shows that even private sector participation is unlikely to bridge the funding gap and on the contrary in several cases places strain on government funds in the form of

Box I.3: Experience of Private Sector Participation in roads in other countries

France
Limited access, grade-separated expressways known as "Autoroutes" have been developed in France for the last 30 years. To tide over the problem of low traffic growth rate, each concessionaire company has a mix of profitable routes and relatively less profitable routes within its own network. Government support is in the form of long-term loans bearing Government guarantee, interest-free loans for land acquisition, etc.

Thailand
The Rapid Transit Authority of Thailand (ETA) implemented projects successfully by providing land and extensive traffic data to the concessionaire to estimate revenue earnings. The Government also granted incentives in the form of tax holidays and custom duty exemptions for machinery. However, political interference in the setting of toll rates below the levels specified in the Concession Agreement, led to failure as the foreign investors were forced to sell out to local parties.

China
Most of China's toll road projects are relatively small, and are made viable by guaranteed returns. They are implemented through joint ventures rather than limited recourse financing. But purely private initiative projects were found to be failures because of increased construction costs and construction delays. Many projects depended on income from property development in the interchange areas.

Mexico
Investors who promised a quick transfer of roads to the government were favoured, and they negotiated toll rates that would earn a return within the concession period. As a result, toll rates were high; traffic did not materialise and cost overruns averaged more than 50 percent of projected costs. In order to overcome these problems, the Government had to take several steps, the most significant ones being extension or reduction of the concession period, banning of heavy traffic on the old road network and encouraging joint ventures to make long stretches of toll roads financially viable.

USA
The role of the private sector is limited to financing toll roads through capital markets. Toll road authorities issue debt instruments known as "revenue bonds", which are serviced entirely by toll revenues collected by the issuing authority. Toll roads account for less than 10 percent of the expressway system, none of which is operated by a private concessionaire

guarantees, shadow tolls and other fiscal incentives. Box I.3 highlights the experience of other countries in private sector participation in roads.

The experience shows that there are some success stories and failures as well. Moreover, the primary driver for private sector participation is economic viability of projects. Most of the low traffic corridors would have to be developed by government.

Experience of other countries shows that there should be clear guidelines for private sector participation and the contract should clearly delineate the responsibilities of government and the private party.

As highlighted earlier, development of a detailed road policy delineating the corridors where private sector participation is feasible could hasten the process of involvement of the private sector.

It is estimated that currently projects worth Rs. 800-900 crores have been taken up by the private sector in India. Most of these projects are in the nature of bypasses, ROBs, bridges etc., which require relatively less investment and are for short distances.

There are very few mega road sector projects in the country. The Mumbai-Pune Expressway, being implemented by the Maharashtra State Road Development Corporation (MSRDC), is being funded through debt in the form of subordinate loan from Mumbai Metropolitan Region Development Area and State government guaranteed bonds. The State Government has also provided land to MSRDC for development of two townships, the surplus from which is expected to meet the shortfall in cash flow of the expressway.

Maharashtra has identified various categories of projects that could be awarded to the private sector. These include:

- Rail Over Bridges (ROBs)
- Bypasses around towns
- Construction of flyovers
- Construction and repair of major bridges
- Construction of new roads

It has also developed detailed guidelines and procedures for road projects through private sector participation. Some of the steps taken by Maharashtra to catalyse private investment in roads are given in Box I.4.

To summarise, private sector participation in India is limited to smaller

Box I.4: Maharashtra – Road Sector Initiatives

- To make some of the road projects feasible the government may participate by sharing up to 40% of the project cost in some cases
- To provide concessions and to make available some other sources of income to entrepreneurs. Some of the sources of income apart from the tolls, will be as below :
  - To permit display of advertisement by the roadside approved location and to permit the entrepreneurs to generate income from the same
  - Permission to erect Petrol Pumps, Hotels, Motels, etc. at approved locations by the roadside
  - Permission to retain income generated from tree plantation to be permitted by the roadside
  - Income generated from the commercial exploitation of land acquired by the government as per the requirements at proper locations and to be given to the entrepreneurs on long lease
  - To give on nominal lease rent the land required for the project after acquiring the same, along with the quarries and connecting roads and the entrepreneurs to be permitted to use them for constructing the project
- To make suitable provisions in the bid documents for covering risk beyond their control in relation to the investment made by the entrepreneurs
- A special cell has been formed in the State Government to look after the works to be done in projects to be taken up through private sector participation
- To enable the entrepreneurs to collect and retain the toll fees, the Bombay Motor Vehicle Tax Act, 1958 has been suitably amended

As in Gujarat, Maharashtra has also established ***Maharashtra State Road Development Corporation***, with the following objectives:

- To implement private sector participation projects in road and other related sectors.
- To generate funds through private sector participation for development of roads and bridges.
- To commercially exploit government lands in possession of the Public Works Department.
- To function as a consultant or to appoint consultants for preparing plans and estimates of the projects, feasibility reports, environmental impact studies, surveys, supervision, etc., and to obtain equity financial participation from different financial institutions or other corporations, etc.

projects where the project economics are sound and amenable to private sector involvement.

In Chhattisgarh the private sector could potentially play a role in the following types of road projects:

- ♦ Projects along industrial and busy traffic corridors. These could include strengthening of roads such as two-laning and four-laning of existing roads
- ♦ Construction of bypasses around important cities
- ♦ Projects involving strengthening road network for agricultural mandis
- ♦ Due to restricted railway network, the opportunities for construction of ROBs are limited. However, private sector involvement could be considered for construction of ROBs along Raigarh-Raipur and Raipur-Bilaspur
- ♦ Construction of bridges, culverts, etc.

For utilising the full potential of the private sector to develop the road network, Chhattisgarh should consider the following:

- ♦ Put in place a policy for private sector participation in the road sector
- ♦ Identify specific projects in which the private sector could participate
- ♦ Clearly communicate the incentives available to the private sector
- ♦ Enunciate the policy for short-listing and approval of private parties

External Funding Agencies

External Funding Agencies like World Bank (WB), Asian Development Bank (ADB), etc. constitute a very important source of funding for the infrastructure sector. WB is funding the Third National Highway Project at a total cost of USD 516 million. This project envisages four/six laning of stretches along high traffic corridors on NH 2 in Uttar Pradesh and Bihar. WB is also funding the State highway projects in Tamil Nadu, Karnataka, Andhra Pradesh and Gujarat. WB funding is provided to the central government in single currency loan (dollar denominated) and it is extended to the States as a rupee loan.

ADB is funding the development of Surat-Manor highway at a cost of USD 180 million. This project is expected to ease the congestion of freight and passenger traffic between the industrial and agricultural areas of Gujarat and other west coast ports. The loan is repayable over 25 years with a five-year grace period.

It may be noted that significant project preparatory activities are required before funding agencies approve large-scale investments. Most importantly there should be an effort on the part of the State government to initiate policy reforms, institute structural changes and take measures to facilitate private sector participation. The case study presented in Box I.5 (overleaf) highlights the objectives, project components of the Gujarat State Highway Project.

As can be seen, there is significant emphasis on institutional strengthening and improving design capabilities. Also, a holistic approach has been adopted wherein management, planning and institutional aspects are addressed. The

Box I.5: Gujarat State Highway Project

Introduction

This project was prepared by the Government of Gujarat (GOG) for removing structural and capacity deficiencies of its core road network. It addressed key issues like:

- Promoting a more rational and efficient approach to road investment planning, management and maintenance at the State level
- Improving GOG's institutional capabilities in the sector
- Improving resource mobilisation to ensure financial sustainability of the SH network
- Upgrading capabilities of the private engineering and construction industry to meet growing demand for high quality highways, engineering and construction services
- Improving the riding quality and capacity of selected congested segments of the SH network

Project cost and implementation

The project is expected to cost about $533 million with the WB contributing 75% and the rest from GOG. The State Roads and Building department (R&BD) would be responsible for implementation of the project. A dedicated ***Project Implementation Unit*** (PIU) has been established within the R&BD to manage the preparation and implementation of the project with the assistance of an internationally experienced ***Project Coordinating Consultant*** (PCC). The project lends significant emphasis on improving design, engineering and management skills. It also has component on institutional strengthening measures for transforming the R&BD from a “provider” to “manager” of infrastructure service.

Benefits:

- Greater efficiency in the State's transport operations
- More effective planning, investment, implementation and maintenance
- Better assimilation of modern high quality engineering & construction methods & capabilities
- Possibility of follow-up funding programmes with the successful completion of this project

Risks involved:

- The State's continued commitment to Bank lending conditions and requirements
- The State's ability to meet the counterpart funding requirements on time
- The State's inaction in improving long term funding levels
- Inaction and resistance to the necessary institutional reforms and strengthening measures

Measures Adopted by Gujarat

- One of the first States to submit a “Road Sector Policy Letter” outlining its commitment to improve the management and funding of its road sector
- One of the first States to conclude a “Participation Agreement” with the central government to access funds under a WB Technical Assistance Project
- Funded the pre-feasibility study focussing on investment needs of the core State highways
- High degree of continuity in the project management team at the State level
- Familiarity of the implementing agency, (R&BD) with WB operational procedures having successfully implemented the Gujarat Rural Roads Projects
- The State has committed an annual 10% increase in maintenance funding for roads
- The State hired the services of internationally reputed consultants to undertake a comprehensive institutional development study for R&BD and has started implementation of some recommendations such as more focus on rural network management, strengthening legal expertise, appointment of Human Resource Development (HRD) manager for greater focus on staff related issues, etc.

emphasis on Project Implementation Unit and Project Co-ordinating Consultant for executing the project clearly highlights the importance of an appropriate institutional framework before undertaking such an exercise.

Given the huge requirements, both in terms of funds as also in terms of execution capability, emphasis has been laid on improving the capabilities of the private construction industry.

According to the World Bank Project Appraisal Document for GSHP, project preparation including detailed engineering design along with social, environmental and institutional aspects should be completed during project appraisal. It also suggests that institutional strengthening measures should be implemented in the early phase so that project management capacity is enhanced.

It is important to note that Gujarat has taken many progressive steps that facilitated its selection for the project. Any funding from such institutions requires adhering to a schedule of reforms. Funding agencies normally would not fund the whole requirement and would insist on some component of the funding being committed by the State government.

As can be seen, considerable emphasis is laid by external funding institutions on institutional and policy framework, professional approach to management and commitment on part of the State government to enhance funding for the sector on a sustainable basis.

State Level Road Fund

Establishing a State level road fund could ensure dedicated funding for the road sector. The most important aspect relating to establishment of such a fund would be to earmark sources that would contribute to this fund. Establishment of such a fund also helps correlate the income received from roads and transportation sector in the form of taxes on motor vehicles, tax or cess on fuel, etc., to the expenditure/allocation for the road sector. Ideally, these sources are expected to grow over a period of time reflecting the overall level of economic activity in the State and therefore lead to higher allocations to the fund. The sources of funds could include:

- Taxes on motor vehicles and motor vehicle registration fees
- Tax, surcharge, cess on motor fuel
- Tax or surcharge on commercial vehicles and certain category of heavy vehicles
- Surplus income from sale of government property (on certain categories of property)

It is important to determine the nature and mechanism by which the road fund would provide funding for projects. It could be used for augmenting the budgetary allocation for maintenance expenditure. Alternatively, the road fund could also provide seed capital for facilitating commercialisation of projects and meet the equity shortfall. In the second scenario, the fund needs to have a significant corpus and sound decision making procedures.

Depending upon the objective, the fund could be managed by the government agency or department responsible for development and maintenance of the road sector or by an independent agency responsible for project structuring, executing and bringing private sector participation into the sector.

A few States in India like Tamil Nadu and Karnataka are considering the idea of setting up a road fund for improving the maintenance expenditure on roads.

Box I.6 provides examples of two separate funds in Japan and New Zealand.

Chhattisgarh could consider the option of setting up a State level road fund for ensuring dedicated funding to the road sector.

Box I.6: Roads Funds

TransFund New Zealand

The TransFund in New Zealand is used for financing the road sector investment in the country. An independent board consisting of members from the government as well as the public manages it. The revenue for the fund comes from excise on fuel, motor vehicle registration fees, weight-distance charges paid by diesel vehicles, revenues from sale of surplus property and interest earned on road fund account. TNZ is responsible for preparing an annual land transport plan, act in advisory capacity to government, approve projects within plan and fund the approved projects through various road agencies.

Japan Road Improvement Special Account

In Japan there is an elaborate system of earmarking road related taxes into a special account and allocation of this fund between national and local taxes to finance the maintenance, improvement and construction of national, provincial and local roads. Revenues into the fund are supplemented by general tax revenues. At the national level this fund is called the Road Improvement Special Account. Funds from the account are provided to road authorities on cost sharing basis. The tax allocations were decided after investment programmes were prepared to ensure that the fund generated sufficient funds. The road fund acts like a line of credit. Once the overall spending limits have been approved by Parliament, the Ministry of Construction can draw down the funds, regardless of the actual revenue in the road fund account at the Central Bank (i.e., the government provides working capital).

The indicative sources that could contribute to this fund are:

- Sales tax and registration fee on motor vehicles
- Sales tax on motor fuel
- Income generated from agricultural mandis
- Royalty income from minerals
- Land revenue

Income from agricultural mandis could be significantly improved if these mandis are better accessible by road. With improvement in roads trading of agricultural produce would increase leading to higher income for mandis.

New sources in the form of additional taxes or surcharge should only be levied if there is enough evidence to suggest that it would not depress economic activity and would be a buoyant source in the long run.

The size and quantum of the road fund would depend upon the exact sources to be earmarked, their proportion and buoyancy. Moreover, allocation to such a road fund from the overall resources of the State government cannot be looked at in isolation of the requirements of other sectors and the ability of the State to tap its full resource potential. A more detailed study should be undertaken to analyse the viability of setting up a road fund.

Prioritisation of Projects

Given the importance of infrastructure investment to development vis-à-vis the scarcity of resources and competing demands from various sectors, it becomes extremely important to allocate available resources in the most beneficial manner amongst various sectors and within a sector, amongst various projects. Prioritisation would ensure that the available funds are being spent in the most optimum manner.

In view of the above, it is necessary to ensure that the projects selected for investment are thoroughly evaluated to determine the economic and social benefits offered by the project and the ease with which the project can be implemented.

It would also help to rank projects on the basis of their criticality and facilitate allocation of government funds to the most critical projects. Projects could be ranked on a scale of 1-3 or 1-5 depending upon the importance being attached to objective criterion. Alternatively, groups of comparable projects could be taken up and the number of projects could be ranked sequentially as mutually exclusive projects. Projects with higher rank could be taken up initially.

By evolving an appropriate prioritisation framework, the State would be able to balance the resources between economically viable projects and those that are economically unviable but socially justified. In order to develop such a framework it would be necessary to have identified the overall objectives and broad priorities for the State government.

While the most important consideration for selection of projects should be the economic benefits offered, these benefits are difficult to arrive at, as the realised benefits do not necessarily reflect in cash inflows. Hence, in the case of the road sector, conventional Financial parameters like Economic Rate of Return (ERR), Net Present Value (NPV) etc. which are used as a basis to evaluate projects for investment decisions are difficult to arrive at.

Mathematical models, however, are available to arrive at the NPV, IRR for road sector projects. Road Investment Decision Model (RIDM) developed by the Indian Road Congress is one such model. In order to arrive at the cash inflows this model uses traffic estimates (PCU per Day), road/pavement deterioration rate, etc.

While application of these models would be desirable, they are seldom applied as decision making involves consideration of objective and subjective criteria.

With this background, an effort has been made to develop a preliminary framework that could assist in the prioritisation of projects and hence determine investment priorities.

The parameters that would affect the prioritisation decision of road projects would be different for the different categories of roads depending on whether they are district/rural roads or NH/SH. While both the categories of roads meet some common objectives like improving connectivity, aiding industrial development of the region, they differ in other objectives. District/Village roads cater to needs of people in remote villages and primarily improve the accessibility to district/tehsil headquarters, nearby mandis, etc.; the SH/NHs are aimed at linking the district/

tehsil headquarters to the larger cities/ towns. The SH/NHs form the arterial network in the State and significantly influence industrial development.

Table I.25 presents the indicative framework for rural and district roads and Table I.26 presents the indicative framework for National and State highways.

The benefit of using such a framework is that it could be modified to meet various requirements. The ranking criteria could be applied for both new projects as well as improvement of existing roads. Instead of ranking each project, minimum values could be determined below which projects would not be approved.

This could also be used for monitoring projects that have been left out, to identify when such projects could be taken up for funding. ***Annexure I.5*** is a working illustration of the framework.

Table I.25

Rural and District Roads (Illustrative)

Villages connected	No. of villages that the road passes through	Higher rank for more villages connected
Impact on people	Population in the area	Higher rank for larger population likely to use the road
Capital Investment	Investment/km of road length	Higher rank for lower investment/km (based on terrain)
Labour Commitment	Investment/km of road length	Higher rank if there is local employment generation potential
Access to Mandis/Markets	No. of mandis and markets connected	Higher rank for larger no. of mandis/ markets connected or larger the size of mandi connected higher the rank
Vehicular Traffic	No. of PCUs expected to ply on the road per day	Higher rank for higher PCU's
Access to Government Institutions	No. of Govt. Agencies (hospitals, District/ Tehsil HQ,Courts etc. connected by the road	Higher rank for larger and important institutions being connected
Environmental Impact	Environmental impact of the project	Higher rank for lower the impact on the environment inflicted by the project#
Impact on the tribal population	Tribal population in the area	Higher rank for higher proportion of tribal population likely to use the road

This should be done through an appropriate Environment Impact Assessment

Table I.26

National/ State Highways (Illustrative)

PARAMETER	DRIVER	CRITERIA OF EVALUATION
Vehicular Traffic	No. of PCUs expected to ply on the road per day	Higher rank for higher PCU's
Impact on Industry	No. of industrial units connected by the roads	Higher rank for more the no. of industrial units connected. Alternatively, quantum of investment or industrial employment could also be used
Cities/ Towns connected	No. of cities/towns passing through the road	Higher rank for larger no. of cities/towns connected.
Capital Investment	Investment/km of road length	Higher rank for lower investment/km (based on terrain)
Access to Mandis/Markets	No. of mandis and markets that have been connected	Higher rank for Larger no. of mandis/ markets connected
Inter-connections	No. of Village/ District roads connected by the NH/SH	Higher rank for larger the no. of Village/ District roads connected by the NH/SH
Tourism Potential	Connection to a popular tourist location	Higher rank for easier access to tourist location
Inter-modal transport	Connection to a railway line/siding, airport, logistics centre	Higher rank for connecting inter-modal transport linkages
Environmental Impact	Environmental impact of the project	Higher rank for lower the impact on the environment impact of the project#

This should be done through an appropriate Environment Impact Assessment

Action plan

From the above sections there are certain key imperatives that emerge for Chhattisgarh. With an enormous investment requirement of over Rs. 10,000 crore over the next 10 years, generating/attracting such resources requires a multi-pronged approach. Figure I.7 highlights the key aspects that need to be addressed for long-term development and sustainability of the road sector.

Figure I.7

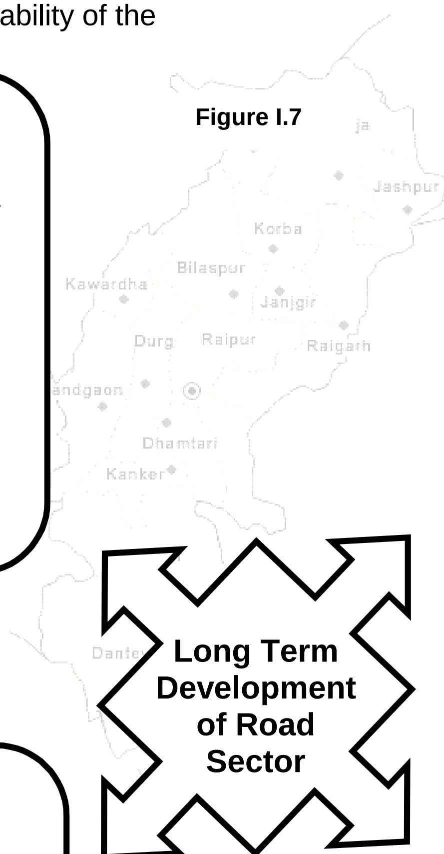
Road Sector Policy

Development of a road sector policy highlighting, inter alia:

- Objectives over 10-20 year timeframe
- Investment requirements and current gap
- List of priority works and projects
- Institutional framework and areas where private sector is invited
- Role of the State Government, and enabling institutions

Institutional Mechanism

- Focus on project development through a specialised project development company
- Institute mechanism for dedicated funding for the road sector (explore the option of a road improvement and maintenance fund)
- Institute and follow rational mechanism for prioritisation of projects



Private Sector Participation

- Clear identification of corridors/ projects for PSP along with pre-feasibility
- Incentives provided by the State government
- Bidding criteria, evaluation and selection procedures
- Model agreements

Capacity building

- Transformation from a road provider to a road manager
- Project management and project design focus
- Emphasis on maintenance works

Way forward - Railways

There is urgent need for developing crucial rail linkages, especially in the northern and southern parts of the State. Reviving the Durg-Jagdalpur project via Raughat and Dallirajhara is of critical importance, as it would help connect the southern parts of the State through a railway network. The districts of Bastar, Dantewada and Kanker have unexplored mineral resources and if the proposed railway link is completed it would facilitate in transportation of mineral resources to the industrial centres in Raipur, Durg and Bilaspur.

The State should also take necessary steps to ensure completion of Bishrampur - Ambikapur rail link.

Due to the strategic importance of railways for Chhattisgarh, particularly for improving the utilisation of its mining potential, the State should consider setting up a joint working committee to work with railways for developing new routes and facilitating fast the implementation of proposed projects.

Way forward – Air Transport

With formation of the new State business and commercial activity in the region is likely to increase. Therefore, good air transportation linkage with all the metros is important to ensure that business travellers can easily travel to the State. To facilitate introduction of new routes, the Government may consider waiving landing charges and other related expenses.

The option for operating air taxies should also be considered as these would go a long a way in improving the connectivity between important cities. In the initial stage such a service could be considered along the Raipur-Raigarh-Bilaspur section. It could be subsequently extended to other section depending upon the requirement. The option of allowing various private taxi operators to jointly run such a service should also be explored.

The airstrips located in other cities in the State should be upgraded so that they could be used by the air taxi services and could be subsequently considered for location of new airports.