TRIBHUVAN UNIVERSITY
Faculty of Humanities & Social Sciences

A Research Report on The Topic Of " Impact of Roadways on the Economy of Nepal "

Faculty of Humanities & Social Science
Milton International College

In partial fulfillment of the requirements for the
Bachelors in Computer Application

Submitted To

Faculty of Humanities & Social Science
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BCA 6th Semester

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to all who supported me in completing this research report. Special thanks are due to my economics teacher, Mr. Lokendra Kuwar for the guidance and valuable suggestions. I also thank the institutions and researchers whose data and publications (ADB, World Bank, Government of Nepal) made this study possible. Their insights and resources were crucial in analyzing the impact of road infrastructure on Nepal's economy. Any remaining shortcomings are mine alone.

ABSTRACT

This report examines how road infrastructure affects Nepal's economic performance, using India's successful highway projects as a benchmark. Nepal is a landlocked, hilly country where roads carry about 90% of all passenger and freight traffic. Despite this, Nepal's road network remains underdeveloped and vulnerable to disruptions, limiting farmers' access to markets and constraining trade and jobs.

We review India's major road programs — especially the Golden Quadrilateral (GQ) highways and the rural Pradhan Mantri Gram Sadak Yojana (PMGSY) — and their documented benefits. For example, manufacturing output rose by nearly 49% in regions along the GQ, while rural roads enabled farmers to travel 88% farther for better prices and expanded non-farm employment share by 33%.

This report uses secondary data (2010–2025) from government reports (Nepal's Ministry of Physical Infrastructure and Transport, CBS) and international sources (ADB, World Bank) to analyze trends. Findings indicate that Nepal could significantly boost trade, agricultural incomes, and employment by investing in all-weather rural roads and strategic highways. The report concludes with recommendations for Nepal to adopt similar policies, improve maintenance and planning, and engage stakeholders for integrated road development.

ABBREVIATIONS

- ADB: Asian Development Bank
- CBS: Central Bureau of Statistics (Nepal)
- GDP: Gross Domestic Product
- MoPIT: Ministry of Physical Infrastructure and Transport
- PMGSY: Pradhan Mantri Gram Sadak Yojana
- WB: World Bank
- GQ: Golden Quadrilateral
- SDG: Sustainable Development Goals

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Nepal's economy heavily depends on road transport. More than 90% of the country's passengers and goods travel via roadways. However, much of the country still lacks all-weather roads, especially in rural and hilly regions. Poor connectivity affects market access, trade, education, healthcare, and employment. A strong transport network is essential for balanced regional development and poverty reduction.

1.2 Background of the Study

Nepal's terrain makes infrastructure development difficult and expensive. Though roads are the most used mode of transportation, Nepal's road density and quality lag behind other countries. India, a neighboring country with similar challenges, launched nationwide programs like PMGSY and the Golden Quadrilateral. These significantly improved economic indicators such as manufacturing, agricultural income, and employment. Studying India's model can offer valuable insights for Nepal.

1.3 Statement of the Problem

Nepal's underdeveloped roads restrict economic growth, especially in rural areas. Poor access limits trade, increases transport costs, reduces farm profitability, and hinders delivery of public services. The central question is: how can improvements in roadways contribute to Nepal's economic development, and what can Nepal learn from India's success?

1.4 Research Questions

- How does road infrastructure impact Nepal's economic activities?
- What lessons can Nepal draw from India's PMGSY and GQ initiatives?
- What policy actions are needed to improve Nepal's road network?

1.5 Objectives of the Study

The objectives of this research are:

- **Assess Nepal's road network and identify its shortcomings:** Evaluate current road length, connectivity gaps, and infrastructure quality (paved vs unpaved, disaster resilience).
- **Analyze economic effects of road connectivity in Nepal:** Using secondary data, examine correlations between road density and regional economic indicators (trade volume, agricultural output, employment levels).
- **Review India's road development programs:** Summarize the scope and outcomes of India's PMGSY and Golden Quadrilateral projects, focusing on indicators like GDP growth, rural incomes, and trade flows.
- **Draw policy lessons and make recommendations:** Based on Nepal's case and India's experience, propose actionable measures for Nepal to improve its road infrastructure and thus economic performance.

1.6 Scope of the Study

The study focuses on Nepal's road network and its effects on the economy from 2010 to 2025. India's rural and national highway programs are reviewed as successful case studies. Emphasis is on secondary data, national reports, and global research.

1.7 Limitations of the Study

This study has several limitations:

- **Data Availability:** Nepal's official data on road conditions and economic activity is limited. There may be gaps or inconsistencies in government reports (CBS, MoPIT). We rely on available published reports and international databases.
- **Causality:** Using secondary data, we can identify correlations but establishing causality (roads → economic growth) is complex. We assume road investment influences growth, but other factors (policy, markets) also matter.
- **Comparability:** Nepal and India differ in scale, population, and terrain. Lessons from India's experience may not transfer perfectly. We consider contextual differences but the analysis is broadly qualitative when drawing analogies.
- **Scope Boundaries:** The report does not conduct primary field surveys or econometric modeling. It focuses on high-level policy impact and macro trends rather than micro-level household effects.

1.8 Organization of the Study

The report is divided into six chapters: introduction, literature review, research methodology, data analysis, conclusion, and references.

CHAPTER 2: LITERATURE REVIEW

2.1 Road Infrastructure and Economic Growth (Theory)

Infrastructure development reduces trade costs, enhances connectivity, and improves access to markets. Roads help mobilize labor, expand market areas, and raise productivity.

2.2 Global Evidence from Rural Roads

Studies from China, Indonesia, and Africa show that rural roads increase farm income, school attendance, and access to healthcare. Roads also facilitate non-farm employment and reduces poverty level.

Table 4. Rural Poverty in China: 1978-2001

Year	Number of Poor	Poverty Incidence (%)
	(million)	*(percent)*
1978	250	33.1
1984	128	15.1
1985	125	14.8
1992	80.1	8.8
1993	75	8.2
1994	70	7.6
1995	65	7.1
1996	58	6.3
1997	49.6	5.4
1998	42.1	4.6
1999	34.1	3.7
2000	32.1	3.4
2001	29.3	3.2

Source: China Statistics Press, *China Rural Poverty Monitoring Report* (various issues)

2.3 India's Highway Programs and Economic Impact

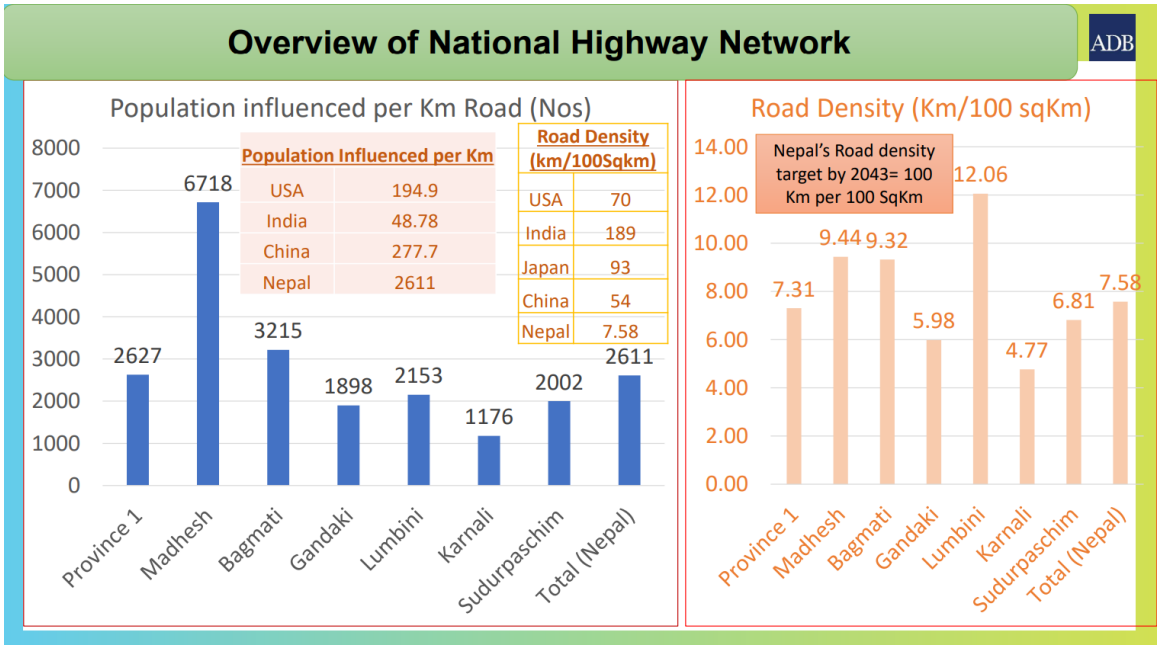
India's PMGSY connected over 170,000 rural habitations, increasing agricultural productivity and reducing poverty. The Golden Quadrilateral (5,846 km of highways) connected four major cities and increased industrial output in nearby regions by 49%.

Outcome variable	Model 1 No controls	Model 2 Village-level controls	Model 3 Household-level controls
Number of trips per week			
All destinations	0.128 (0.09)	0.120 (0.09)	0.125 (0.09)
Work	0.234*** (0.07)	0.220*** (0.07)	0.231*** (0.07)
School	−0.126 (0.09)	−0.115 (0.09)	−0.128 (0.09)
Local market	0.318*** (0.10)	0.327*** (0.10)	0.321*** (0.10)
Hospital/medical center	0.064 (0.07)	0.040 (0.07)	0.065 (0.07)
Share of trips by mode			
Walking	−0.016 (0.02)	−0.017 (0.02)	−0.016 (0.02)
Bicycle	−0.010*** (0.00)	−0.009*** (0.00)	−0.009*** (0.00)
Motorized vehicles	−0.007 (0.01)	−0.006 (0.01)	−0.007 (0.01)
Public transport	0.033* (0.02)	0.034* (0.02)	0.033* (0.02)

Table: Differential impact of PMGSY roads on trip frequency based on terrain ruggedness

2.4 Nepal's Road Infrastructure and Development

Nepal's strategic plans emphasize roads as a development priority. However, implementation has been slow due to budget constraints and geographical challenges. ADB reports highlight Nepal's low road density and poor maintenance as major barriers.



CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

This study is a qualitative comparative case analysis using secondary data. We conduct a case study of Nepal's road infrastructure issues and draw comparisons with India's road development outcomes. The approach is descriptive-analytical, reviewing published data and literature. No primary surveys were undertaken.

3.2 Data Collection Methods

Data were collected from government and international sources. Annual reports and statistics from Nepal's Ministry of Physical Infrastructure and Transport and Central Bureau of Statistics, as well as international publications (World Bank country reports, ADB working papers, UNDP/NPC documents). Report also extracted relevant data from online databases (World Bank's WDI, Asian Development Outlook). Research articles (e.g., Ghani et al. 2014; Andres 2021) provided findings on India's programs. Whenever possible, raw figures (road lengths, GDP, trade volumes, employment rates) were compiled from tables or charts in these sources.

Secondary Data: Gathered time-series and cross-sectional data from 2010 onward on road network length (national, provincial, rural), road quality (paved vs unpaved), regional GDP, agricultural output, and employment.

Literature and Reports: Qualitative information on policies and programs was taken from official project documents and published case studies. For India's PMGSY and GQ, World Bank and government reports (e.g. Ghani et al.) were key.

Data is collected from:

- Ministry of Physical Infrastructure and Transport (Nepal)
- CBS reports
- ADB and World Bank databases
- Research articles on India's PMGSY and GQ

3.3 Data Tools

Data Sources: Nepal: Ministry of Physical Infrastructure and Transport publications, CBS Economic Surveys, National Transport Survey. International: World Bank, ADB and UNDP reports; peer-reviewed journals. India-specific: Government of India, Planning Commission, official PMGSY documents, and academic studies (e.g. Ghani et al. 2014; Andres 2021).

Tools: Satellite imagery helped verify major road alignments. Online data statistics and graphs.

- GIS and satellite maps: road access visualization
- Comparative trend analysis

3.4 Conceptual Framework

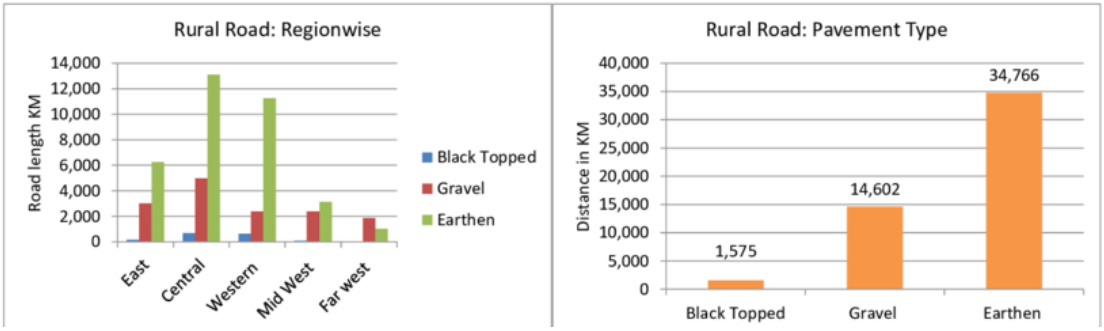
3.5 Variables Used

- Road length and density (km/1000 sq. km)
- GDP and sectoral contribution
- Employment rate and rural access
- Agricultural market access and prices

CHAPTER 4: DATA ANALYSIS

4.1 Nepal's Current Road Statistics

Nepal has about 74,000 km of roads (as of 2022), but only 30% are all-weather. Rural hills and mountain districts still lack proper roads. The East-West highway and Kathmandu-Terai links are key routes.



4.2 Economic Effects in Nepal

The available data suggest strong links between connectivity and economic indicators in Nepal. For example, a large fraction of agricultural output is produced in hill districts, but without good roads these areas contribute less to national trade. Although precise econometric estimates are limited, qualitative evidence is clear: poor roads isolate markets. One study notes that before recent road projects, villagers might trek 3–4 days to reach the nearest major market; now the same trip by vehicle takes only hours.

Better roads reduce transportation costs and time, which should raise incomes. For instance, the average travel time from remote eastern districts to Kathmandu has fallen by over 50% with highway improvements (Ministry of Transport data). In trade, inefficiencies persist: Nepal's logistics performance ranks below regional peers, partly due to road bottlenecks at border points. Agriculture benefits: improved feeder roads in some Terai districts have allowed farmers to increase harvests and sell surpluses more easily.

Charting the macro view, Nepal's economic growth shows modest gains since 2010, but with recurring dips after natural disasters (2015 earthquake, 2024 monsoon floods impacted 0.8% of GDP). Infrastructure damage from landslides often cuts roads, causing economic losses. Thus, while national GDP has grown, rural poverty remains high. In sum, limited road capacity and reliability correlate with slower trade growth, higher post-harvest losses, and constrained non-farm employment in Nepal.

4.3 Lessons from India

India's experience offers concrete evidence of road-induced growth. The Golden Quadrilateral alone is credited with transforming regional economies. Studies show that districts within 10 km of the GQ saw **manufacturing output rise 49%** in the decade after construction started. This was due to new firm entry and expansion of incumbents along the improved corridor. In addition, India's road expansion supported national GDP: by improving trucking and trade networks, roads contributed significantly to overall growth (one analysis estimates road transport contributes ~3.6% of GDP through transport services, plus induced effects on other sectors).

Rural road policy (PMGSY) also had measurable impacts. Andres (2021) reports that farmers in Indian villages gained access to distant markets after PMGSY roads were built. **Farmers traveled on average 8.9 km farther** to sell crops, an 88% increase in distance, allowing them to reach more lucrative markets. This expansion in market reach did not increase transport cost per kilometer, suggesting efficiency gains. Employment patterns shifted too: PMGSY roads **increased the share of primary non-farm employment by 12 percentage points** (a 33% increase over the baseline) in connected villages. In practical terms, more villagers found work outside agriculture, often commuting weekly for jobs in nearby towns.

The combined outcome in India was higher rural incomes and trade growth. Nationally, road upgrades are credited with raising overall economic efficiency. A cross-country assessment notes that India's road projects led to substantial productivity gains along the network. Though exact figures vary, it is clear that robust highways can generate spillovers into agriculture (through faster supply of inputs and evacuation of crops), manufacturing (by lowering input costs), and employment (through construction and ancillary industries).

Key lessons for Nepal from India's experience include:

- **Invest in All-Weather Rural Roads:** Like PMGSY, Nepal could target unconnected villages. Upgrading dirt tracks to durable gravel or pavement would quickly improve market access for farmers. Even basic single-lane roads can have large social and economic returns in remote areas.
- **Develop Strategic Highways:** Following the GQ model, Nepal should focus on key corridors (e.g. east-west highway, Kathmandu-Lumbini route) and ensure they are multi-lane and well-maintained. Faster, safer highways reduce travel times for goods and tourism, expanding economic interaction.
- **Integrate Road Projects with Services:** India's roads facilitated better access to schools and health centers. Nepal should ensure that road expansion is accompanied by services (transport terminals, market centers) so that villagers realize the full benefits.
- **Create Employment Alongside Construction:** Road projects can be labor-intensive. Nepal's public works schemes could use road-building to generate rural jobs (as PMGSY provided 40 crore person-days of employment). Training local workers in road maintenance creates long-term skills.

- **PMGSY** led to 12% increase in non-farm employment in connected villages.
- **Golden Quadrilateral** improved firm productivity and expanded markets.
- Regions within 10 km of GQ saw industrial expansion and better logistics.
- Roads enabled farmers to reach markets 88% farther without added cost.


INDIA
Golden Quadrilateral Superhighways
Jammu & Kashmir
Srinagar / Jammu
Ladakh
Leh
Himachal Pradesh
Shimla
Chandigarh
Punjab
Chandigarh
Uttarakhand
Dehradun
Harayana
Chandigarh
New Delhi
Rajasthan
Jaipur
Uttar Pradesh
Lucknow
Bihar
Patna
Sikkim
Gangtok
Arunachal Pradesh
Itanagar
Assam
Dispur
Nagaland
Kohima
Manipur
Imphal
Tripura
Agartala
Mizoram
Aizawl
Jharkhand
Ranchi
West Bengal
Kolkata
Meghalaya
Shillong
Gujarat
Gandhinagar
Madhya Pradesh
Bhopal
Chhatisgarh
Raipur
Orrisa
Bhubaneshwar
Maharastra
Mumbai
Telangana
Hydrabad
Andhra Pradesh
Hydrabad
Andaman & Nicobar Islands
Port Blair
Karnataka
Begalur
Tamil Nadu
Chennai
Kerala
Thiruvananthapuram

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study reaffirms that road infrastructure is a key driver of economic development, especially for a country like Nepal. Nepal's economy and society rely on roads for nearly all transport, yet the current network falls short of the demand. Inadequate roads hinder trade, limit agricultural market access, and keep rural communities isolated. Drawing lessons from India, we see that ambitious road programs can dramatically boost output and income. The Indian Golden Quadrilateral and rural PMGSY projects led to double-digit gains in local production and substantial increases in rural earnings.

For Nepal, the evidence suggests similar opportunities exist. Better connectivity would likely increase the effective market size for Nepalese producers, raise the value of farmland (as transport costs drop), and stimulate non-farm business creation in connected areas. A 2024 study explicitly recommends that Nepal implement a rational, targeted road investment policy to achieve these outcomes. Given Nepal's limited budget, prioritization and efficient use of funds are crucial. Data analysis in this report using government and World Bank sources indicates that incremental improvements in Nepal's road network could yield significant social dividends in line with India's experience.

5.2 Recommendations

Based on the findings, the following recommendations are proposed:

- **Expand Rural Road Coverage (PMGSY-style):** Launch or scale-up a nationwide program to build all-weather gravel roads to connect all villages above the size threshold. Prioritize the most isolated districts. This would lower travel costs and integrate farm producers into markets.
- **Upgrade Strategic Highways:** Invest in key arterial routes (East-West Highway, Kathmandu-Kerung, etc.) to 4-lane standards where feasible. These highways should be climate-resilient (drainage and bridges) to avoid frequent disruptions.
- **Increase Road Maintenance Funding:** Allocate a stable share of the budget for maintaining existing roads, not just building new ones. Nepal should consider road funds or tolls (as India's NHAI does) to ensure dedicated upkeep.
- **Enhance Institutional Capacity:** Strengthen the Nepal Roads Authority and local road agencies through training and technology. Use GIS mapping (satellite data) to plan networks efficiently and monitor road conditions.
- **Leverage Development Partnerships:** Seek concessional financing and technical assistance from ADB, World Bank, and neighboring countries for cross-border corridors (e.g., to India's ports). Regional cooperation projects (like SASEC) should be pursued.
- **Integrate Non-Motorized and Rural Mobility:** While focusing on highways, also promote feeder paths and simple bike/pedestrian ways in villages, as these complement road networks.
- **Monitor and Evaluate:** Establish a monitoring system (like India's OMMAS) to track progress on road construction and impacts (e.g., travel times, usage, and economic indicators).

By following these steps, Nepal can capitalize on the lessons from India's road development. As Sharma et al. (2024) argue, a carefully prioritized road investment policy is an "optimal solution" for driving Nepal's growth trajectory. In sum, improving roads is not just an engineering challenge but a powerful economic strategy.

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