TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

PULCHOWK CAMPUS

Thesis No.: PUL079/MSURP/024

Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development

by

Suraj Chapagain

A THESIS

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE IN

URBAN PLANNING

DEPARTMENT OF ARCHITECTURE

LALITPUR, NEPAL

APRIL, 2025

COPYRIGHT

TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

PULCHOWK CAMPUS

DEPARTMENT OF ARCHITECTURE

CERTIFICATE OF THESIS APPROVAL

This is to certify they have read, and recommended to the Institute of Engineering for the acceptance, a thesis report titled "**Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development**" submitted by **Mr. Suraj Chapagain (079-MSUrP-024)** in the partial fulfillment of the requirements for the degree of **Masters of Science in Urban Planning**.

Supervisor/ Program Coordinator

Dr. Ajay Chandra Lal

Department of Architecture

IOE, Pulchowk Campus

Department of Architecture M.Sc. in Urban Planning Pulchowk Campus Institute of Engineering Tribhuvan University

Supervisor

Sudeep Sharma Paudyal

Assistant Professor, Department of Architecture

IOE, Thapathali Campus

External Examiner

Mr. Kishore Thapa

Former Secretary, Ministry of Urban Development

External Examiner

Mr. Kumar Prasad Lohani

Former Chairman

Housing Related Investigation Commission

April, 2025

DECLARATION

I hereby declare that the thesis entitled **"Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development"**, submitted to the Department of Architecture in partial fulfilment of the requirement for the degree of Master Science in Urban Planning, is a record of an original work done under the guidance of Dr. Ajay Chandra Lal, Institute of Engineering, Pulchowk Campus. This thesis contains only work completed by me except for the consulted material which has been duly referenced and acknowledged.

Suraj Chapagain

(079MSURP024)

ABSTRACT

The Butwal-Pokhara Siddharth Highway, a critical transportation corridor in Nepal, has significantly influenced regional development by enhancing connectivity, economic growth, and spatial transformation. This study examines the highway's impact on the towns of Waling and Galyang, focusing on spatial development patterns, economic linkages, and challenges in equitable growth. Using a mixed-methods approach, the research integrates quantitative data from surveys and economic indicators with qualitative insights from interviews and focus groups. Findings reveal that the highway has spurred commercial and residential development, increased land values, and improved access to markets, particularly benefiting urban centers like Waling and Galyang. However, disparities persist, with rural areas lagging due to inadequate infrastructure and limited investment. The study highlights the highway's role in fostering tourism, agriculture, and trade, while also identifying challenges such as outmigration, road safety concerns, and uneven development. Strategic interventions, including infrastructure upgrades, balanced urban-rural integration, and community engagement, are proposed to address these issues and promote sustainable regional growth. This research contributes to the academic discourse on transportation corridors and regional development, offering practical recommendations for policymakers to ensure equitable benefits from infrastructure investments.

Keywords: Transportation corridor, regional development, spatial transformation, economic growth, urban-rural integration, Butwal-Pokhara Siddharth Highway, Nepal, infrastructure, sustainable development, equitable growth.

ACKNOWLEDGEMENT

I would like to acknowledge my academic advisor Ajay Chandra Lal, PhD for assisting me to undertake this topic on the thesis and giving me the encouragement and constructive feedback. His guidance, suggestions, expertise has been instrumental in shaping the direction and scope of this study. I would also like to thank my supervisor Assistant Prof. Sudeep Sharma Paudyal. I express my deepest gratitude to all those who have supported me throughout the development of this research proposal.

I am also grateful to the faculty and staff of Department of Architecture, whose insights and support has provided the foundation for this research. Their contributions to fostering a stimulating academic environment are deeply appreciated.

I would like to express my heartfelt gratitude to Waling and Galyang Municipality for their cooperation and support. Their assistance in providing relevant data and local insights has greatly enhanced the quality of this research. Special thanks go to my colleagues for information, discussions and suggestions, which have helped to streamline this proposal in the direction. I am thankful for their thoughtful input and collaborative spirit.

Finally, I would like to acknowledge my family and friends for their everlasting supports, inspiration and endless encouragement, which have been a source of strength and motivation throughout this process.

Thank you all for your contributions to this Research.

Suraj Chapagain (079MSURP024)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

Transportation corridors have emerged as vital components in shaping regional development across the globe. These corridors, which typically consist of roadways, railways, and associated infrastructure, facilitate the movement of goods and people, thereby fostering economic integration and enhancing accessibility. The concept of transport corridors is not new; however, their significance has grown in light of globalization and urbanization trends that demand efficient logistics and connectivity solutions.

Globally, numerous examples illustrate how transport corridors catalyze regional development. The European Union's Trans-European Transport Network (TEN-T) is a prime example, designed to improve connectivity across member states. This network has been instrumental in promoting economic cohesion by reducing travel times and costs, thereby enhancing trade among countries (European Commission, 2018). Similarly, the New Silk Road initiative aims to connect Asia with Europe through a series of rail and road corridors, significantly impacting trade routes and economic opportunities in participating countries (Zhang et al., 2020). These international corridors highlight the potential for infrastructure investments to stimulate economic growth, create jobs, and enhance regional competitiveness.(Priemus & Zonneveld, 2003, n.d.)

In the context of Nepal, the development of transport corridors such as the Butwal-Pokhara Siddharth Highway exemplifies how infrastructure can influence regional dynamics. This highway serves as a critical link between two major urban centers, facilitating trade and tourism while promoting spatial development in surrounding areas. Research indicates that improved transportation infrastructure leads to increased economic activities and urbanization rates in adjacent regions (World Bank, 2018). However, it is essential to recognize that while these developments offer opportunities for growth, they also pose challenges.(Zhang et al., 2023)

Siddharatha Highway connects two distinct physiographic regions like Tarai and Hill. It connects Hill and Tarai in the Western Development Region. The Highway is 184 kilometers long which was completed in 1972. It connects two province Gandaki and Lumbini and four districts like Kaski, Syangja, Palpa and Rupandehi. The Highway is a milestone for the social and economic development of the western hilly region. It helps to provide opportunities of development to the remote areas that had previously no linkage to the mainstream of development. There are many potential development places along the highway and hence the movement of people towards the highway areas would take place (1632653594_54335138_Curriculum Development Journal_Vol26No40_2069.Pdf, n.d.).

The Western Central Corridor, particularly the Butwal-Pokhara Siddharth Highway, is a pivotal infrastructure project in Nepal that plays a crucial role in enhancing connectivity between key urban centers. This highway, which stretches, links Butwal, a significant commercial hub in the western region, with Pokhara, a major tourist destination and gateway to the Annapurna Mountain range. The strategic importance of this corridor extends beyond mere transportation; it serves as a catalyst for spatial development and economic growth within the region. As Nepal continues to navigate its path toward sustainable development, understanding the implications of this corridor on balanced regional development becomes essential for effective urban planning and policy formulation (Rondinelli, 1979).

The influence of highway seems vividly with its surrounding areas such as development of commercial agriculture and its related activities, agro-based industrial development etc. Out of 29 urban centers two urban centers like Tansen and Butwal were purposively considered. Tansen and Butwal have played the important role in economic, social and cultural development of many surrounding villages. Tansen is along the Siddhartha Highway in Palpa district. It is known as historically important town and also a tertiary getaway town. Therefore, this urban center is selected in the study. Butwal is a medium sized urban center. It is a secondary gateway town and is also fast-growing urban center along Siddhartha Highway. Its present location is the meeting place of two distinct physiographic regions: the southern Tarai plain and the Northern Chure hills. It still plays as an intermediary role for the flow of goods and services between the two physiographic regions. On the other hand, it contains large number and variety of functions. It has a great periphery area. It is also located at transport nodal point. Both Tansen and Butwal towns have distinct character. All these important components are the determinant factors for the selection of these two urban centers.

Enhancing Connectivity

At its core, the Butwal-Pokhara Siddhartha Highway significantly improves accessibility between two of Nepal's most important cities. Enhanced connectivity is vital for facilitating trade, tourism, and mobility among residents. Prior to the construction of this highway, travel between Butwal and Pokhara was often hindered by poor road conditions and lengthy detours. The new highway has reduced travel time considerably, making it easier for businesses to operate across these urban centers and allowing tourists to access Pokhara's attractions more conveniently. Improved transport infrastructure is known to correlate with economic growth; studies have shown that better connectivity leads to increased trade volumes and enhanced economic activities (Banister & Berechman, 2001).

Catalyzing Economic Growth

The economic implications of the Western Central Corridor are profound. By connecting Butwal and Pokhara, the highway stimulates local economies by attracting investments and fostering business development. The corridor has encouraged the establishment of various commercial enterprises along its route, including hotels, restaurants, retail outlets, and service industries that cater to both local residents and tourists. The influx of businesses not only creates job opportunities but also enhances the overall economic landscape of the region. Moreover, the highway facilitates agricultural trade by providing farmers with better access to markets in Butwal and beyond. This improved access allows for more efficient distribution of agricultural products, thereby increasing farmers' incomes and contributing to rural development. As highlighted by World Bank studies, infrastructure investment in rural areas can significantly enhance agricultural productivity and economic resilience (World Bank, 2018).

Spatial Development Patterns

The impact of the Butwal-Pokhara Siddharth Highway on spatial development is evident in the changing land use patterns along the corridor. As areas adjacent to the highway become more accessible, they attract residential and commercial developments. Urban planners must respond to these changes by implementing effective land use policies that manage urban sprawl while promoting sustainable growth. The phenomenon of urban expansion along transportation corridors is well-documented in urban studies. According to a study by Zhang et al. (2016), transportation infrastructure can lead to significant shifts in land use patterns, often resulting in increased urban density along major routes while promoting suburbanization in surrounding areas. In addition to facilitating trade and tourism, the corridor is anticipated to influence land use patterns and urbanization rates in key urban centers along its route, including Tansen, Galyang, Waling, and Putalibazar. As transportation costs decrease and accessibility improves, these towns are likely to experience an influx of businesses and residents seeking opportunities in proximity to the highway. In the case of Butwal and Pokhara, planners are tasked with balancing the need for growth with environmental sustainability and community well-being.

Implications for Balanced Regional Development

While the Western Central Corridor offers numerous benefits, it also raises critical questions regarding balanced regional development. Infrastructure projects can inadvertently exacerbate disparities between urban centers and rural areas if not managed properly. For instance, while Butwal and Pokhara may experience rapid growth due to their proximity to the highway, surrounding rural communities may lag behind if they do not receive similar investments in infrastructure and services. To address these challenges, urban planners must adopt a holistic

approach that considers the needs of both urban and rural populations. This includes developing policies that promote equitable access to resources and opportunities across regions. For example, creating satellite towns or investing in infrastructure projects in less accessible areas can help mitigate regional inequalities (ADB, 2019).

In conclusion, the Western Central Corridor serves as a vital artery for enhancing connectivity between Butwal and Pokhara while catalyzing spatial development and economic growth within Nepal's western region. The implications of this infrastructure project extend far beyond transportation; they encompass broader themes of regional equity, sustainable development, and collaborative governance. As Nepal continues its journey toward balanced regional development, understanding how such corridors influence urban planning strategies will be essential for policymakers and planners alike. By addressing potential disparities while promoting sustainable practices, stakeholders can harness the full potential of this corridor to create thriving communities across diverse landscapes.(n.d.)

1.1 Background

Infrastructure development is a fundamental driver of economic growth and spatial transformation, particularly in developing countries where connectivity can significantly influence regional dynamics. The Butwal-Pokhara Siddhartha Highway, a crucial transportation corridor in Nepal, exemplifies this phenomenon by linking two major urban centers—Butwal and Pokhara. This highway not only facilitates the movement of goods and people but also serves as a catalyst for economic activities and urban development in the surrounding areas. The strategic importance of the Butwal-Pokhara Siddharth Highway lies in its ability to enhance trade and tourism.

The Siddhartha Highway, completed in 1972, spans approximately 184 kilometers and serves as a vital connection between the Gandaki and Lumbini provinces, linking the districts of Rupandehi, Palpa, Syangja, and Kaski. Along this highway, several municipalities can be found, including Waling, Putalibazar, Galyang, Tansen, Bhirkot, Butwal, Siddharthanagar, and Pokhara. Additionally, rural municipalities such as Phedikhola, Bagnaskali, and Tinau are situated along the route.

In terms of traditional markets, notable ones include Butwal, Tansen, Waling, and Putalibazar. These markets have a long-standing history of trade and commerce in the region. Emerging markets along the highway include Galyang, Bayarghari,

Phedikhola, and Aryabhangjyang, which have developed more recently due to improved accessibility provided by the highway. This infrastructure not only facilitates transportation but also fosters economic growth and connectivity among various communities in the region.

1.1.1 Early Trade Routes

Before the construction of the Siddhartha Highway, the region was primarily traversed by foot trails used for trade and transportation. These trails facilitated movement between the Terai plains and the mountainous regions, allowing local traders to transport goods, including agricultural products and other commodities, between Nepal and neighboring India. The routes were essential for connecting various communities and fostering economic exchanges.

1.1.2 Economic Significance

The highway has become a vital economic artery for Nepal, significantly enhancing trade capabilities with India. It serves as a crucial route for transporting goods and agricultural products, thus supporting local economies along its path. The highway is known for its scenic views, including lush jungles, rice fields on steep slopes, and deep valleys, making it not only a trade route but also a popular travel corridor for tourists. (Sharma & Ulak, n.d.)

1.1.3 Modern Use

Today, Siddhartha Highway is one of Nepal's busiest highways, accommodating around 1,250 commercial vehicles daily. It continues to play an essential role in connecting various towns such as Butwal, Tansen, Waling, Syangja, and Pokhara, facilitating both local travel and international trade. In summary, the Siddhartha Highway's transformation from foot trails to a major highway illustrates its importance in enhancing connectivity and economic development in Nepal.

Moreover, the corridor's impact extends beyond immediate economic benefits; it also has implications for regional equity. While urban centers like Butwal and Pokhara may thrive due to their strategic locations along the highway, there is a risk that surrounding rural areas may not experience similar levels of growth unless targeted investments are made. Addressing these disparities will require comprehensive planning efforts that consider both urban and rural development needs. In conclusion, the Butwal-Pokhara Siddharth Highway represents a significant opportunity for economic growth and spatial transformation in Nepal. By facilitating trade and tourism while influencing land use patterns and urbanization rates in key towns along its route, this corridor has the potential to reshape the region's economic landscape. However, realizing these benefits will necessitate careful planning and policy

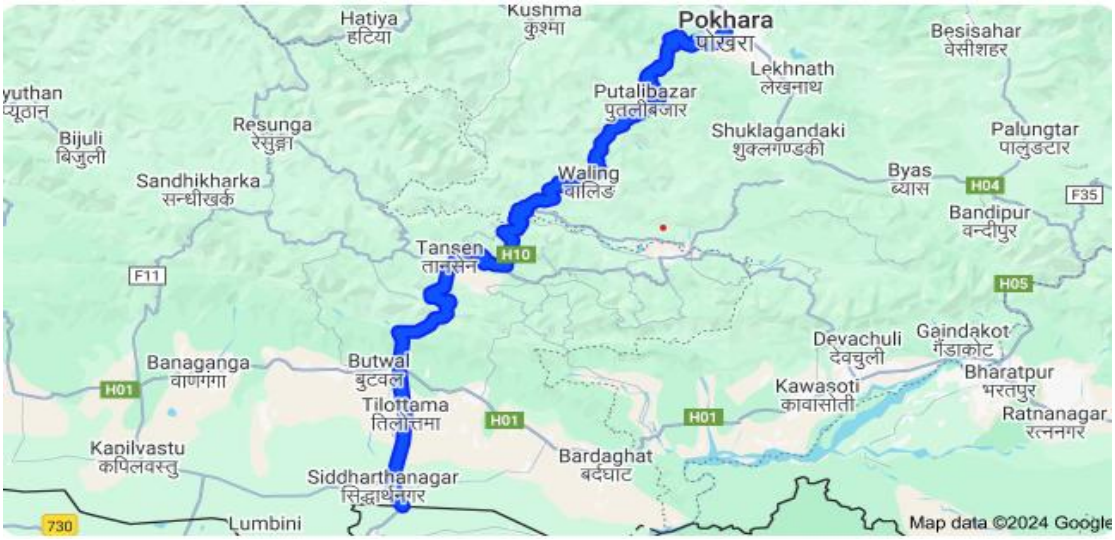


Figure 1 Google Map Of Siddhartha Highway

interventions aimed at promoting balanced regional development.

1.2 Rational of The Study

1.2.1 Problem Statement

The Butwal-Pokhara Siddharth Highway, part of the Western Central Corridor, is a significant infrastructure project in Nepal designed to enhance connectivity between two major urban centers. While the anticipated benefits of this highway include increased trade, improved access to services, and economic growth, there is a notable lack of empirical research examining its actual impact on spatial development and economic growth in the region. The construction of major highways in Nepal, such as

the Butwal-Pokhara Siddhartha Highway, represents a significant investment aimed at catalyzing economic growth and enhancing regional development. However, despite these efforts, there is a notable discrepancy between the anticipated benefits and actual outcomes. The expected financial returns and economic stimulation have not materialized as envisioned during the planning stages. This gap raises critical questions about the effectiveness of infrastructure investments in achieving their intended objectives.

One of the primary concerns is that while these highways have improved connectivity and access to markets, healthcare, education, and employment opportunities for local communities, they have not generated substantial economic returns or stimulated sustainable economic activity at the scale anticipated. Factors contributing to this disparity may include inadequate infrastructure maintenance leading to safety issues and inefficiencies in transportation logistics. Additionally, challenges such as narrow roads with sharp bends on routes like Siddhartha Highway deter suppliers from delivering goods efficiently due to safety risks and increased operational costs.

Furthermore, while improved connectivity has facilitated outmigration from rural areas seeking better opportunities elsewhere—such as larger cities like Butwal or Pokhara—it also underscores underlying issues such as limited job prospects locally that push residents away rather than retaining them within their communities. This trend highlights a need for strategic interventions that address both spatial development patterns by promoting balanced urban-rural integration and fostering sustainable economic growth through enhanced infrastructure quality.

In this context, research focusing on Western-Central Corridor regions can provide valuable insights into how infrastructure investments can be optimized to achieve more effective spatial transformation and stimulate robust regional economies. By analyzing existing gaps between investment expectations versus actual outcomes along corridors like Siddhartha Highway, researchers can identify key factors hindering full potential realization—whether related to physical infrastructure limitations or broader socio-economic dynamics—and propose targeted solutions aimed at maximizing benefits from future investments.

Ultimately, understanding these dynamics will enable policymakers to develop more effective strategies for leveraging highway projects as catalysts

for transformative regional development across Nepal's diverse landscapes—enhancing connectivity while ensuring equitable distribution of benefits across different regions connected via these corridors.

This absence of comprehensive studies raises critical concerns regarding the equitable distribution of benefits derived from such infrastructure investments. Without data and analysis, there is a risk that certain areas may experience disproportionate advantages, exacerbating existing disparities between urban and rural regions or among different urban centers (McCartney, 2022)

Infrastructure development often leads to significant changes in land use patterns and economic activities; however, understanding these dynamics requires thorough investigation. The limited empirical evidence regarding the Butwal-Pokhara corridor's impact on local economies and spatial configurations makes it challenging for policymakers to assess whether the benefits are reaching all segments of the population. This gap in knowledge is particularly concerning in a context like Nepal, where regional disparities are pronounced and can hinder overall national development (World Bank, 2018).

1.2.2 Need for Research

Given the identified gaps in understanding the spatial and economic implications of the Western Central Corridor, this research is essential for several reasons. First, it aims to fill the knowledge void regarding how this specific highway influences regional development dynamics. By examining both quantitative data (such as economic indicators) and qualitative insights (like stakeholder perceptions), the study will provide a comprehensive analysis that can inform policymakers about the actual impacts of the corridor. Understanding these dynamics is crucial for crafting strategies that promote balanced regional development. Policymakers need empirical evidence to ensure that infrastructural improvements benefit all areas equitably, particularly in regions that may be at risk of being left behind. Research findings can guide investment decisions and planning efforts to enhance connectivity while addressing potential inequalities (World Bank, 2018). Moreover, this study will contribute to the academic discourse on urban planning and regional development in Nepal. It will provide valuable insights into how transportation corridors can serve as catalysts for change while highlighting the importance of inclusive planning practices that consider

diverse regional needs (ADB, 2019). By situating this research within broader discussions about infrastructure development and regional equity, it will enrich existing literature and offer practical recommendations for future projects.

1.2.3 Importance

While there is a growing body of literature exploring the impacts of transportation corridors on urban development globally, specific research focusing on Nepal's context—particularly regarding the Butwal-Pokhara corridor—is scarce. Previous studies have demonstrated that transport infrastructure can significantly influence economic activities and land use patterns in various settings (Banister & Berechman, 2003). However, these findings often do not translate directly to Nepal due to unique socio-economic conditions and developmental challenges faced by the country. This study aims to address this gap by providing a detailed analysis of how the Butwal-Pokhara Siddharth Highway influences local economies and spatial configurations. By focusing on this specific corridor, the research will contribute valuable insights into the broader discussions surrounding infrastructure development and regional equity in Nepal. (Zhang et al., 2020)

1.2.4 Research Objectives

1. To analyze the changes in spatial development patterns resulting from the construction of the Butwal-Pokhara Siddharth Highway.
2. To evaluate the economic growth stimulated by improved connectivity along this corridor.
3. To identify and propose strategic interventions that enhance regional integration and promote sustainable urban and rural development along the highway corridor.

1.2.5 Research Questions

1. What are the significant spatial changes observed along the Butwal-Pokhara Siddharth Highway since its construction?
2. How has economic activity evolved in regions adjacent to this corridor?
3. What strategic interventions can be proposed to enhance sustainable development along this corridor?

CHAPTER TWO: METHODOLOGY

The methodology for the research titled "Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development" will be structured around the philosophical paradigms of ontology, epistemology, and methodology, employing a mixed-methods approach that integrates both quantitative and qualitative techniques. This approach allows for a comprehensive understanding of the impacts of the Butwal-Pokhara Siddharth Highway on regional development.

The research design will consist of two main components: a quantitative component and a qualitative component. Each component will contribute to a holistic understanding of the corridor's impact.

2.1 Quantitative Component

Data Collection: Quantitative data will be collected through structured surveys targeting residents and businesses along the Butwal-Pokhara corridor. The surveys will measure perceptions of economic growth, changes in land use, and transportation efficiency. Questions will be designed to gather numerical data that can be statistically analyzed, focusing on aspects such as employment rates, business performance, and traffic volume. Economic data collection from government reports and local businesses to assess growth indicators before and after highway construction.

Statistical Analysis: The collected data will be analyzed using statistical tools such as regression analysis to explore relationships between corridor development indicators (e.g., traffic volume, economic activity) and outcomes (e.g., employment rates). This analysis aims to quantify the impact of the highway on economic growth and spatial development, providing empirical evidence to support or refute hypotheses regarding its benefits.

2.2 Qualitative Component

Interviews: Semi-structured interviews will be conducted with various stakeholders, including local government officials, urban planners, business owners, and residents. These interviews aim to gather insights into their experiences with the corridor, exploring how they perceive its impact on their communities and economic opportunities.

Focus Groups: Focus group discussions will be organized with community members to explore collective perceptions about changes in spatial development and economic opportunities resulting from the corridor's construction. These discussions will facilitate dialogue among participants, allowing for diverse viewpoints to emerge.

Case Studies: Detailed case studies of specific towns along the corridor (e.g., Butwal, Tansen, Waling, Putalibazar) will be developed to illustrate the diverse impacts on urban planning and regional development. These case studies will provide contextual depth to the quantitative findings, highlighting unique local dynamics and challenges.

2.3 Data Integration

The findings from both quantitative analyses and qualitative insights will be integrated to develop a comprehensive understanding of how the Western Central Corridor acts as a catalyst for spatial and economic transformation. This integration is crucial for triangulating data sources, enhancing the validity of the research findings.

The conceptual framework outlined above provides a structured approach for investigating the impacts of the Western Central Corridor on regional development through various philosophical lenses. By integrating positivist, post-positivist, and interpretivist paradigms within a mixed-methods methodology, this research aims to deliver a nuanced understanding of how infrastructure influences spatial dynamics and economic growth in Nepal's western region. This comprehensive approach ensures that both objective measurements and subjective experiences are considered

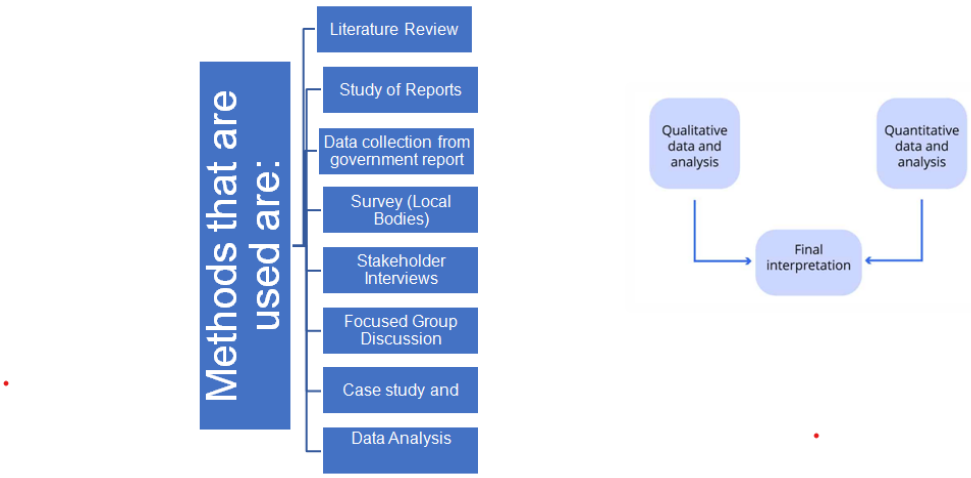


Figure 2 Methods used

in assessing the corridor's transformative potential. (Rehman & Alharthi, 2016)

2.4 Conceptual Framework of Research

The conceptual framework for the thesis proposal "Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development" is designed to guide the investigation of how the Butwal-Pokhara Siddharth Highway influences urban planning, economic growth, and spatial development. This framework will incorporate various philosophical paradigms—positivist, post-positivist, and interpretivist—each offering distinct perspectives on the nature of knowledge and research methods.

2.4.1 Paradigm

A paradigm provides a conceptual framework for understanding and interpreting the social world. It encompasses a fundamental belief system and theoretical framework that includes assumptions about ontology, epistemology, methodology, and methods. In the context of the thesis proposal "Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development," this paradigm will guide the research process, shaping how the impacts of the Butwal-Pokhara Siddharth Highway on regional development are understood and studied.(Rehman & Alharthi, 2016)

2.4.1.1 Ontology

Ontology refers to the assumptions about the nature of reality and existence. In this research, the ontological perspective posits that the impacts of the Western Central Corridor on spatial and economic transformation can be objectively measured and observed. This implies that there are tangible effects resulting from the corridor's development, such as changes in land use, economic activities, and urbanization patterns in Butwal, Pokhara, and surrounding areas. (Saunders et al., 2015)

The ontological framework for this study will involve identifying and categorizing essential qualities related to regional development influenced by the corridor. These qualities may include economic indicators (e.g., employment rates, business growth), spatial metrics (e.g., land use changes, urban density), and social factors (e.g., community perceptions of development). Understanding these foundational aspects

will provide a comprehensive view of how the corridor contributes to regional transformation.

2.4.1.2 Epistemology

Epistemology concerns assumptions about knowledge—what constitutes valid knowledge and how it can be communicated (Rehman & Alharthi, 2016). In this research, epistemological considerations will shape how knowledge about the impacts of the Western Central Corridor is acquired and validated. The study will adopt a mixed-methods approach that combines quantitative data analysis with qualitative insights to provide a holistic understanding of the corridor's effects. The epistemological stance taken in this research acknowledges that knowledge is constructed through both empirical observation (quantitative data) and subjective interpretation (qualitative data). This dual approach allows for a more nuanced assessment of how the corridor influences economic growth and spatial development. For instance, while statistical analyses may reveal trends in economic indicators, qualitative interviews with local stakeholders can provide context to those trends by capturing lived experiences and perceptions related to the corridor's impact.

2.4.1.3 Methodology

Methodology is “an articulated, theoretically informed approach to the production of data” (Rehman & Alharthi, 2016). It refers to the study and critical analysis of data production techniques.

2.4.2 Positivist Paradigm

Positivism is based on the idea that reality exists independently of human perception and is shaped by fixed, universal laws. According to this perspective, social events are governed by specific principles, and through the use of scientific approaches, these principles can be discovered and expressed as objective truths. While such empirical methods are highly effective in studying the physical world, their effectiveness tends to diminish when applied to complex social phenomena (Rehman & Alharthi, 2016). Since my research is also based on social phenomena which is more of subjective approach. So, this is not the paradigm of my research.

Ontology: In the positivist paradigm, ontology is grounded in the belief that reality is objective and can be observed and measured. It assumes that there is a single, tangible reality that exists independently of human perception. In the context of this research, the impact of the Western Central Corridor on spatial and economic transformation can be quantified through measurable indicators such as economic growth rates, land use changes, and transportation efficiency.

Epistemology: The epistemological stance of positivism emphasizes empirical observation and the use of quantitative methods to derive knowledge. Researchers operating within this paradigm seek to establish causal relationships through statistical analysis and hypothesis testing. For this study, data will be collected through surveys, economic reports, and spatial analysis using Geographic Information Systems (GIS) to objectively assess the corridor's impacts.

2.4.3 Interpretivist Paradigm

Interpretivism is a “response to the over-dominance of positivism” (Grix, 2004, p. 82). Interpretivism rejects the notion that a single, verifiable reality exists independent of our senses. Interpretive ontology is anti-foundationalist. It refuses “to adopt any permanent, unvarying (or foundational) standards by which truth can be universally known” (Guba & Lincoln, 2005, p. 204). Interpretivists argue that reality is not singular or objective but is shaped through social interactions and experiences. They maintain that truth is something people construct, rather than something that exists independently to be uncovered. Since our understanding of the world is always filtered through perception, we cannot access reality in its pure form. From an interpretive standpoint, knowledge is inherently subjective, and any observation of the external world is influenced by the observer's beliefs, background, and interpretive framework. As Flick states, “Perception is seen not as a passive-receptive process of representation but as an active constructive process of production” (2004, p.89). People engage with one another and with their broader social environment, assigning meanings and labels to various social experiences. Researchers following an interpretive approach typically focus on collecting qualitative information. While they may use numerical data at times, it is not their primary emphasis. Common methods for gathering qualitative insights include open-ended interviews—ranging from fully

structured to semi-structured or informal conversations—along with observations, field notes, personal reflections, documents, and other narrative sources.

Ontology: The interpretivist ontology posits that reality is socially constructed and subjective. It emphasizes understanding individuals' meanings and interpretations of their experiences within specific contexts. For this study, understanding how local communities perceive the changes brought about by the Western Central Corridor is crucial for assessing its impact on regional development.

Epistemology: In interpretivism, knowledge is derived from understanding human behavior and social phenomena through qualitative methods. Researchers aim to explore meanings, experiences, and social contexts rather than establishing causal relationships. This research will involve in-depth interviews, focus groups, and participatory observations to gather insights into how different communities along the corridor experience transformation.

2.4.4 Post-Positivist Paradigm

The post-positivist paradigm asserts that our understanding of reality is inherently imperfect and probabilistic. This approach is often employed in research to transform extensive qualitative data into quantitative data, subsequently analyzed using statistical methods. Post-positivists argue that individuals possess free will and creativity, but their expressions of creativity tend to follow discernible patterns and predictability. While a tangible world exists driven by natural causes, human perception is limited, making it impossible to fully grasp this reality accurately. According to Guba (1990), the concept of an "ultimate truth" is unknowable. In the realm of factors influencing travel choices, multiple realities are at play, demanding an objective examination. Post-positivism, often used in the social sciences, is an evolved version of positivism that maintains the idea of objective reality and values the use of experimental approaches. However, it is not a single, uniform perspective. Post-positivists acknowledge that discovering absolute truth is not possible; instead, they focus on finding explanations that are context-specific and appropriate for particular circumstances. They are open to revising understandings as new evidence emerges. While post-positivism accepts that the world is shaped by overarching laws, it recognizes that their effects may vary depending on the situation. As a result, researchers in this tradition aim to identify patterns or theories that apply in specific

contexts, while being cautious about overgeneralizing their findings (Biedenbach & Muller, 2010, p. 5). So, this is the paradigm of my research.

Ontology: The post-positivist ontology recognizes that while an objective reality exists, it can only be imperfectly understood due to human biases and limitations. This perspective acknowledges that multiple interpretations of reality may exist based on different contexts and experiences. In this research, while objective data will be collected, it will also consider contextual factors that may influence how different stakeholders perceive the corridor's impacts.

Epistemology: Post-positivism incorporates both quantitative and qualitative methods to gain a more comprehensive understanding of phenomena. It allows for hypothesis testing while also being open to revising theories based on new evidence. This research will utilize mixed methods, combining quantitative data from surveys with qualitative interviews from local stakeholders (e.g., residents, business owners) to capture a richer understanding of the corridor's effects on regional development.

Given the complexity of regional development issues surrounding the Western Central Corridor, a post-positivist paradigm is recommended for this research. This approach allows for a comprehensive analysis that incorporates both quantitative data (to measure economic impacts) and qualitative insights (to understand stakeholder perceptions). By employing mixed methods, researchers can achieve a more nuanced understanding of how the corridor serves as a catalyst for spatial and economic transformation while addressing potential disparities in regional development.

CHAPTER THREE: LITERATURE REVIEW

Development dynamics refer to the various patterns, mechanisms, and drivers that contribute to the advancement, transformation, and evolution of a specific area. This concept covers a wide spectrum of dimensions including social, economic, political, environmental, and cultural elements that collectively influence the developmental path of a region. In contrast, urban development dynamics concentrate on the specific processes and trends that affect cities and urban centers. These dynamics consider the distinctive features and challenges associated with urban life—such as demographic changes, land management, infrastructure expansion, housing needs, transportation systems, sustainability, economic functions, and community interactions. While general development dynamics can apply to both urban and rural contexts, urban development dynamics are tailored to understanding and managing the complexities of cities and towns. They also involve the roles of different stakeholders, urban policies, planning strategies, and governance practices that guide city growth and quality of life. To evaluate such dynamics, various indicators are used to track progress and change over time. This research will offer a concise overview of urban development dynamics. Here are the indicators used to analyze these dynamics:

a. Economic development
    - Gross Domestic Product (GDP) and GDP growth rate
    - Employment rates and unemployment rates
    - Income levels and poverty rates
b. Infrastructure development
    - Physical infrastructure
    - Connectivity and transportation (road networks, public transport, etc.)
    - Housing availability and affordability
    - Access to basic services (water, sanitation, electricity, etc.)
    - Land use patterns and urban sprawl
c. Social infrastructure
    - Demographic dynamics
    - Population growth rate and demographic changes
    - Education indicators (literacy rates, enrollment rates, etc.)
    - Health indicators (life expectancy, infant mortality rate, etc.)

d. Environmental indicators
    - Carbon emissions and air quality
    - Water and natural resource consumption
    - Waste management and recycling rates
    - Biodiversity and ecosystem health
e. Institution and governance
    - Quality of governance and institutions
    - Transparency and corruption levels
    - Implementation of urban planning and zoning regulations
    - Public participation and citizen engagement

These metrics enable decision-makers, academics, and other stakeholders to evaluate how well development initiatives are performing and to pinpoint specific areas in need of enhancement across both broader development and urban settings.

3.1 Regional planning theories

The term “region” in planning can be understood through various lenses, including geography, climate, population traits, administrative setup, settlement structure, political relevance, and stages of development. Certain regions may be naturally endowed with fertile land, scenic beauty, rich cultural heritage, or plentiful natural resources. Regional planning, at its core, involves the strategic organization of spatial development to promote equitable distribution of social and economic gains across different areas. One of its key roles is to connect grassroots-level planning with national development strategies. Within the framework of multilevel planning, regional planning refers to the coordination of human activities across areas larger than individual cities, aligning them with national spatial units to enhance social and economic cohesion and support national growth. Its primary objective is to identify and develop the untapped potential of overlooked regions—especially those neglected in traditional sectoral plans—and to stimulate their progress in pursuit of balanced and inclusive development (Bhandari, 2022).

3.1.1 Growth pole and axis

In the 1950s, French economist François Perroux introduced the idea that economic growth does not happen evenly across a region but tends to concentrate around

specific "growth poles" or clusters. These poles are typically anchored by dominant industries, which in turn attract and foster the development of related sectors. These connections form through both direct and indirect interactions—for example, a central industry might buy inputs from supporting firms (upstream connections) or sell outputs to dependent sectors (downstream connections). This dual role means that the core industry functions as both a client and a provider within its network.

The growth pole theory is founded on several key assumptions. One central idea is that primary industries spark a ripple effect, stimulating the growth of other firms by/ opening up new economic opportunities. Another important assumption is the establishment of intricate relationships among firms, both leading toward and stemming from the core industry. These inter-industry connections are vital for driving the economic momentum of the pole. Growth poles also benefit from agglomeration economies, where the concentration and interlinkages of firms amplify productivity and innovation. However, with the rise of global supply chains, some aspects of the growth pole theory have been called into question. The traditional model assumed geographic proximity, but today's interconnected global economy means that the growth and influence of a core industry may extend well beyond the

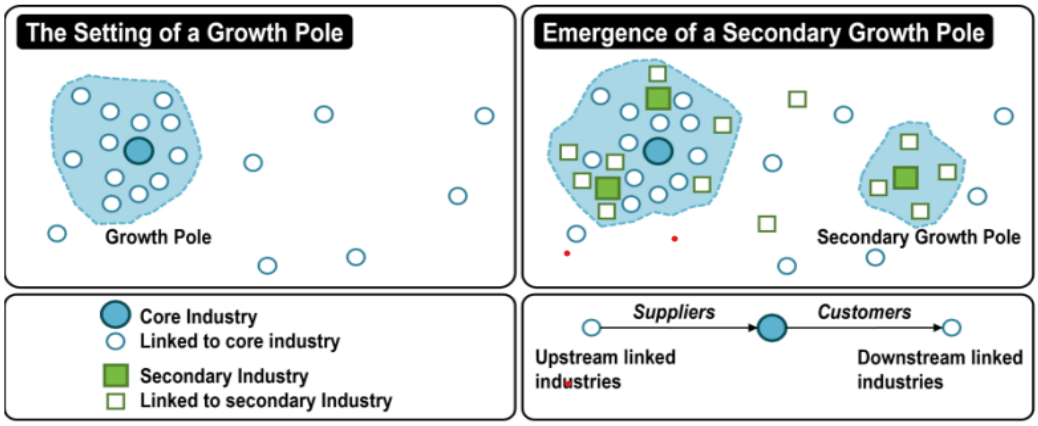


Figure 3 Growth pole Theory

immediate region (Rodrigue,

3.1.2 Gateway Model

Gateway is the unique positional characteristic that gives fairly clear image of a city explaining its town and their hinterland. This concept is rather fit well in the region, characterized by heterogeneous resource potentials such as Nepal (Pradhan, 56). The

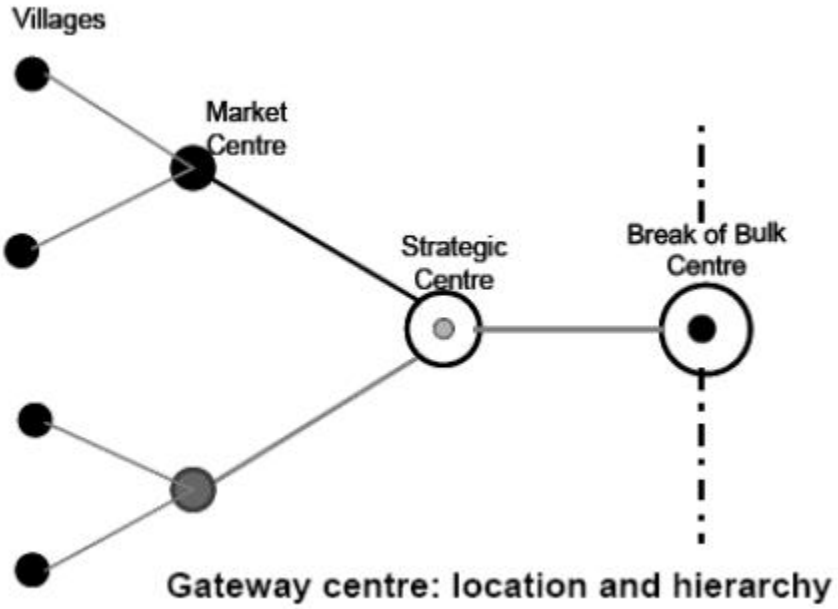


Figure 4 Gateway center: Location and hierarchy

derived word for the gateway is doorway into a building or one set in a city wall. Gateway is in contrast to a central place that would appear to lie in the shape of the city's service areas. The gateway city is located eccentrically towards one end. Gateway enjoys a maximum extended range to one side as in figure.

Gateway cities often develop in the contact zones between areas of differing intensities or types of production along or near economic shear lines. The entrance into an extended hinterland is of the essence of a gateway and the city tend to be located on a site of considerable transportation significance, either at a bulk break- ing point or at a node of transport line. Functionally, the gateways towns tend to get developed in response to longer distance trade. Such towns derive advantage of di- verse productive regions and population. The employment structures of gateways towns are heavily oriented to transportation and wholesaling. Un-direction expansion which radiates outward along the lines of communication is the feature of this model. It too has hierarchical of gateway centers in varying orders which are often termed as 'dendritic market network'. This phenomenon occurs in the region characterized by

under-developed economic and transportation system (Pradhan, 57). In due course of time the gateway centres may be replaced by many large central places. Major terai towns along the Indo-Nepal boarder can be considered as primary gateway centres with the growth from the railway heads.

3.1.3 Central place theory

Central Place Theory focuses on understanding the distribution, size, spacing, and roles of settlements that serve as hubs for providing goods and services to nearby areas. The theory suggests that the most efficient layout for these central locations forms a triangular grid, resulting in hexagon-shaped market areas around each center. These theoretical frameworks help explain how and why services are located within a

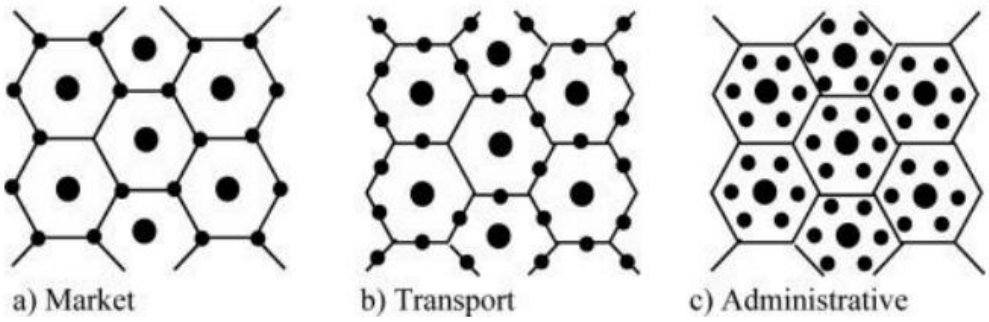


Figure 5 Central place theory: center and hexagonal network

system of interconnected towns and cities (Malczewski, 2009).

Central Place Theory suggests that development initiatives and investments should be strategically focused on a select number of key growth centers, arranged in a functional and hierarchical system—such as villages, service hubs, and district headquarters. Regional development is envisioned to evolve around these core areas, where the surrounding economic activities naturally cluster.

To establish this hierarchy of growth centers:

- Settlements with a minimum population size serve as potential candidates.
- Locations with the highest prospects for future economic expansion are identified as major growth centers.
- A ranking is then formed among these centers, considering their scale and spheres of influence.

Nonetheless, Central Place Theory is most applicable in regions that are relatively uniform in terms of productivity and are primarily linked through local trade. The theory emphasizes that the spatial organization of a region is largely shaped by service-oriented (tertiary) functions and their geographic positioning.

3.2 Forward and backward linkage theory

Forward and backward linkage theory" refers to a concept in economics that analyzes how different industries within an economy are interconnected through the flow of goods and services, where "forward linkage" describes the impact an industry has on downstream industries by supplying them with intermediate goods as inputs, while "backward linkage" refers to the influence an industry has on upstream industries by demanding inputs from them to produce its own goods; essentially, it examines how the output of one industry becomes the input for another, creating a chain of

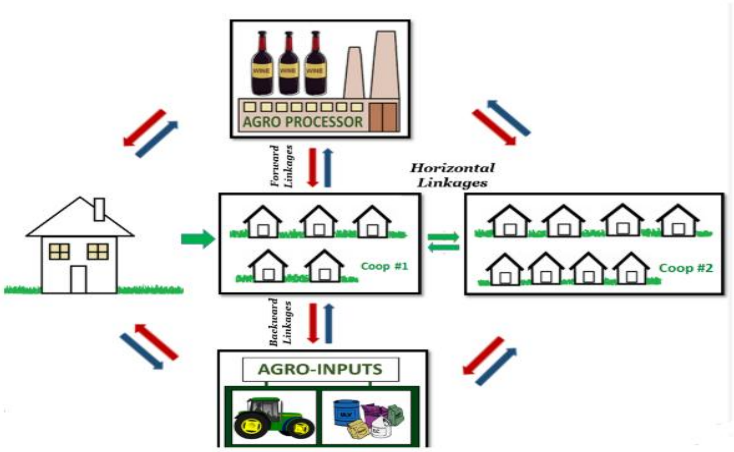


Figure 6 Forward and Backward linkage

dependencies within the production process.

Key points about forward and backward linkages:

Forward linkage:

When a company produces a product that is used as an input by another industry further down the production chain, creating a "forward linkage.".

Example: A steel mill producing steel sheets that are then used by car manufacturers to build car bodies.

Backward linkage:

When a company needs to purchase inputs from other industries to produce its own goods, creating a "backward linkage."

Example: A textile factory requiring cotton from cotton farmers to produce fabric.

Importance of linkage theory:

Economic development:

Understanding linkages helps policymakers identify key industries that can stimulate broader economic growth by strategically investing in sectors with strong forward and backward linkages, creating multiplier effects across the economy.

Industrial clustering:

Regions with high inter-industry linkages tend to have greater economic agglomeration, where businesses benefit from proximity to suppliers and customers.

Global value chains:

Analyzing linkages is crucial for understanding how countries participate in global production networks, identifying opportunities to upgrade their position within the value chain.

3.3 Regional connectivity

“Nepal in the mid-1970s is not just very poor country that appears to be increasingly unable to provide adequately for its now rapidly growing population- that would be a misleading oversimplification and in some respects an under-statement, of the problems that exists. The country is now in a period of crisis, whose major components, over the next decade, will include serious over population relative to employment opportunities, ecological collapse in the densely populated and highly

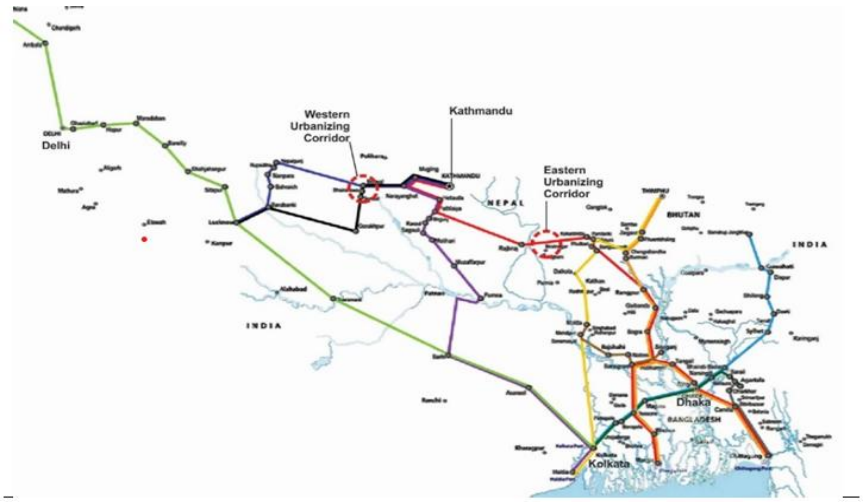


Figure 7 : SASEC Regional Transport Corridors: 9 (Kathmandu-Kolkata), 10 (Kathmandu- Lucknow), 8 (Kathmandu-Chittagong) (Bank, 5 March 2019)

vulnerable hill areas… and the elimination of certain important ‘natural’ resource. both in the hills and in the plains. These will be associated with an increasing inability to pay for imported commodities with growing food shortages, and consequently with the development of widespread unrest in both rural and urban areas, which together will threaten the viability of the prevailing political system and even Nepal’s position as an independent state.” (Piers Blakie & Mishra*, 1980)

3.4 Transportation System

Transportation provides the skeleton upon which communities are built. Transportation is the essential element that makes a community more than just a grouping of residents, businesses, recreational facilities and places of worship linked by a shared set of values. Transportation serves the crucial role of linking people to their jobs, schools, children's ballgames, and other community activities.

Transport or transportation is the movement of people and goods from one place to another. The term is derived from the Latin trans ("across") and portare ("to carry").

Transportation encompasses multiple components, including infrastructure, vehicles, and operations. Infrastructure refers to the physical networks, such as roads, railways, air routes, waterways, canals, and pipelines as well as terminals like airports, train stations, bus terminals, and seaports. Vehicles, including cars, bicycles, buses, trains, and airplanes, travel along these networks. Operations involve how these vehicles are managed within the system, governed by specific procedures, laws, regulations, and transportation policies. There are different modes of transportation system.

- Road transport
- Rail transport
- Cable transport
- Air transport
- Conveyor transport
- Human-powered transport
- Hybrid transport
- New Mobility Agenda
- Ship transport
- Space transport

3.4.1 Road Transport

There are two types of major modes of transport in Nepal i.e. i) Road and ii) Air ways. However, there is a small mode of railways and ropes, but these are in very small scale and should rehabilitate. The only to reach the many small towns and municipalities is road network. Road ways are safe, easy, cheap, better geographical coverage and for the betterment of national integrity. So the government chose the road construction as the first priority for national development since 1956. The total length of the road in 1951 AD was 276 km which is increased to 16834.49 km (4780.91 km black topped, 4519.84 km gravel, 7533.74 km earthen) by 2004. At the end of 2004 60 district headquarter are connected through the road way to the national strategic road network.

According to the Economic Survey 2022/23 published by the Ministry of Finance, as of mid-March 2023, the total length of Nepal's national road network reached 34,100 kilometers, which comprises national highways and other strategic roads.

According to the Statistics of National Highway SNH-2020/21 there are 80 National Highways in Nepal, with a total length of 11178.92 km, 620.17 km (385.36 mi) more was added to the National Highway System in 2022/23, making a total length of the national highway of 11,799.09 km (7,331.61 mi).

3.4.2 Rail Transport

Janakpur Jayanagar railway (51 Km) is only one railway service in Nepal established in 1936 A.D. It is very viable of railway transportation in the Tarai region for the overall development of the country.

3.4.3 Cable Transport

Kathmandu to Hetauda is the first Ropeway in Nepal, established in 1964 A.D. Lack of proper operation, repair and maintenance; it is not functioning in these days. There is high potential for the development of Ropeways for the transportation of people and good in the mountainous country like Nepal. Government's policy of encouraging the private sector participation in transport development, a private company is operating a cable car service from Kurintar (Chitwan) to Manakamana (Gorkha) spanning 3.1 Km.

3.4.4 Air Transport

Air lines service for Nepal is the very old mode of transportation in Nepal. There is great importance of Airways in the mountainous country like Nepal. The Civil Aviation Authority was established in 1957. There are altogether 51 airports (35 in operation, 12 airports are not in operation and 4 under construction) all over the country, which covers 40 districts.

3.4.5 Road Network Development in Nepal

Road development history in Nepal is not too long. Nepal had no road worth mentioning until 1951, when the total length of road was only 376 km. The road network gradually increased from this meagre length to more than 17000 km in 2004, which is exclusive of village roads constructed by the local bodies. Earlier focus was agencies. on the expansion of road network through the financial assistance of various donor

While developing road network, only economic parameters were considered for selection of road construction projects without giving much consideration to the social aspects. Many roads constructed were of seasonal type earthen standards, and these roads lacked reliability.

The Department of Roads is a government organization responsible for the overall planning, construction and maintenance of road network in Nepal. In 1951, the year of Democracy in Nepal, the total road length in the country was only 376 km. Before 1951, there were four organizations responsible for construction and maintenance of roads in Kathmandu, construction and maintenance of all engineering works outside Kathmandu valley, repair of roads in Kathmandu valley. In 1951, Public Works Department was established for the construction and maintenance of all civil engineering works in the country. The organization and its functions frequently changed until 1970/71. Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR) were formed to play coordinating role for the construction and maintenance of local and agricultural roads under the Ministry of Local Development (MOLD).

The roads in Nepal are divided into two categories viz. Strategic Road Network and Local Road Network. Strategic Road Network (SRN) comprises of National Highways and Feeder Roads and other roads of national importance. Department of Roads is now responsible for the planning, development and maintenance of Strategic Road Network.

3.5 Economic Benefits of Transportation

There are a wide range of economic benefits conveyed by transportation systems, some direct (income related) and some indirect (accessibility related), impacting, transport supply and demand and at the microeconomic (sector-wise) and macroeconomic (whole economy) levels. the matter remains about what is the extent of the economic benefits or specific modes and locations (European Conference of Ministers of Transport). Economic development is linked with transitions in passenger mobility from non-motorized (mainly walking) to motorized forms of transportation. The initial stage of this transition involves the development of collective forms of transportation (tramways, subways, buses) while individual forms of transportation (main-ly the automobile) become more prevalent at a later stage as shown in figure. This is particularly linked with the growth of individual incomes where at some point individual motorized mobility becomes affordable. While in developed countries this transition took place over several decades, if not a century, many developing countries are experiencing a fast mobility transition, which is placing pressures on the transport

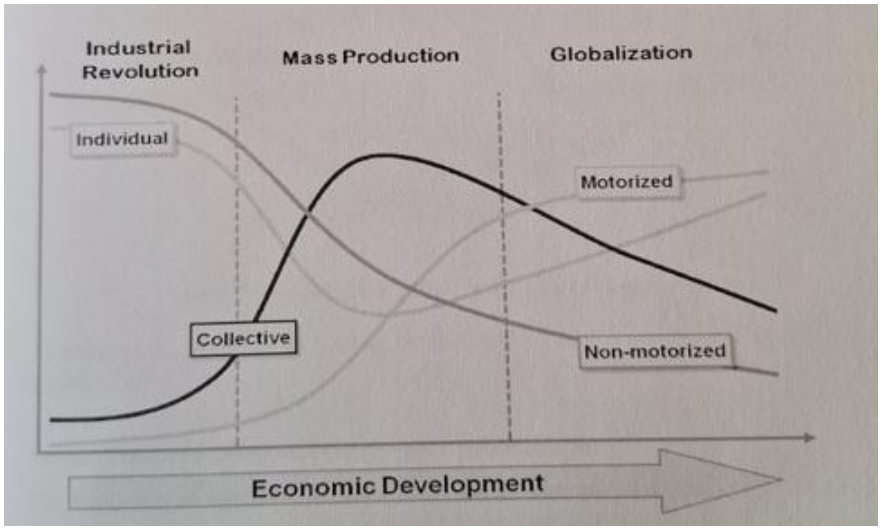


Figure 8 Passengers Mobility Transition

system to cope.

3.6 Transportation Impacts on Market Opportunities

Transport improvements can impact both commodity and labor markets by making resources, parts, customers and labor more accessible. The outcome is an increase of the efficiency and market effectiveness of existing firms, leading to an expansion of

output and employment. For a regional economy, this implies growth as its fig. Transport improvements can also influence the locational behavior of firms, attracting investments at locations of improved accessibility. Although investing in the improvement of the regional transport system is likely to have direct and indirect

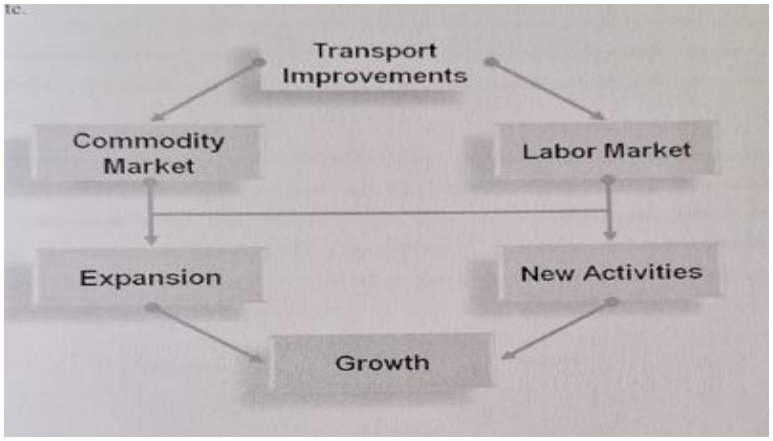


Figure 9 Transport Impact on Market Opportunities

consequences on the regional economy, the distribution of these impacts is difficult to evaluate.

3.7 Dynamics of Corridor Development

The development of corridors is heavily influenced by movement systems, or 'kinetic fields' – territories over which people regularly move within a given period of time. In regional economic terms, a one hour travel-time defines a daily labour marketshed, and 2-3 hour travel time defines the territory over which most daily inputs are sourced by firms and consumers in a region's principal settlement. Kinetic fields are defined by: 1) attractor spaces (where people want to regularly go) and 2) physical links (how people get to where they want to go, generally with the least expenditure of time and effort). Kinetic fields are therefore mostly linear in the form of large and small corridors: instead of spreading outwards concentrically, they follow the best transport links (least cost) to places providing for economic, social, and cultural interactions. While this might seem obvious, many policymakers around the world overlook this basic principle and promote growth poles and new towns in places that are not where people (and firms) actually want to be.(ADB, 2019)

The implications for corridor development are that, as transport linkages extend farther out from central areas with higher land costs, firms will have wider choices of place to locate their operations. They will balance higher generalized transport costs

with lower-cost land farther out from urban centers, and thereby accelerate the growth and development of urbanizing corridors. The spatial distribution of transactions costs varies by stage of a corridor's development. While there are many differences among corridors around the world – including in geography, population size, physical size, level of urbanization, extent and structure of economic activities, transport linkages, and infrastructure stock – international experience suggests that there are four broad stages in the development of regional corridors.

3.8 Corridors and Connections in Nepal

As noted earlier, Nepal's National Urban Development Strategy identified urbanizing cluster and corridors across the country, including the EUC and WUC. They exist across Nepal but all are anchored on the Kathmandu Valley which has over 3 million residents and the highest concentration of firms . The EUC has a population of approximately 2.17 million and the WUC a population of just over 2 million. They are connected by Nepal's east-west highway. WUC is only 270 km from the Kathmandu Valley (approx. one-day drive) and EUC is 365 km from the Valley (a longer but still one-day drive). Both corridors therefore are connected to Nepal's largest market in and around Kathmandu, and these connections are gradually improving.

However, cross border markets in northern India are many times larger than the Valley, and are gradually becoming better connected to both the EUC and WUC. There are approximately 184 million consumers within a 300 km radius of Siddharthanagar and 194 million within 300 km of Biratnagar. Because of their closer proximity to northern India, the EUC and WUC 300 km radius markets are larger than Kathmandu's (157 million within 300 km). While there are obviously huge differences in purchasing power, the 300 km radius markets for New York City are 47 million, for Tokyo 67 million, for Seoul 58 million, and for Beijing 108 million. If WUC and EUC can develop as Stage 2 and 3 corridors, they could have – if cross border trade constraints allow – access to very large consumer markets for food products, herbal products and pharmaceuticals, building materials, and a myriad of other products. In addition, these accessible populations are potentially very large markets for low-cost recreational and heritage tourism in both corridors, and for health and education services. Although less accessible to the Terai corridors, China is also emerging as a major market for Nepal and, hence, for the WUC and EUC.

China’s Belt and Road Initiative, reviewed earlier in this report, could facilitate access from the two corridors to large but very distant markets in China, Central Asia, and Europe. Such access will depend on large and long-term investments in rail connections to Nepal along the Silk Road land route which could strengthen the proposed ‘Trans Himalaya Economic Corridor’ from China to India through Nepal. (Bank, 5 March 2019).

CHAPTER FOUR: STUDY AREA INTRODUCTION

The case study for the thesis proposal titled "Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development" will focus on key towns along the Butwal-Pokhara Siddharth Highway. This highway serves as a vital link between two major urban centers in Nepal, facilitating economic growth and spatial development in the surrounding areas. The selected towns—Butwal, Tansen, Galyang, Waling, and Putalibazar—each exhibit unique characteristics and have experienced varying degrees of transformation due to their proximity to this corridor.

4.1 Syangja District

Syangja district, which lies in the Gandaki Province of Nepal, which is located at latitude 28°4'60" North and longitude 83°52'0" East. With elevations ranging from roughly 300 meters to several thousand meters above sea level, it is mostly a hilly terrain that occupies 1,164 square kilometers. Putalibazar is the district headquarters, albeit it was once known as Syangja Bazaar. The districts of Kaski, Tanahun, Palpa, and Parbat are all adjacent to Syangja. Syangja is connected to important cities like Pokhara and Butwal via the Siddhartha highways. Within the district proper, Waling and Bhirkot are the closest noteworthy towns. The region is a growing ecotourism attraction because of its natural beauty, historical significance, and cultural diversity.

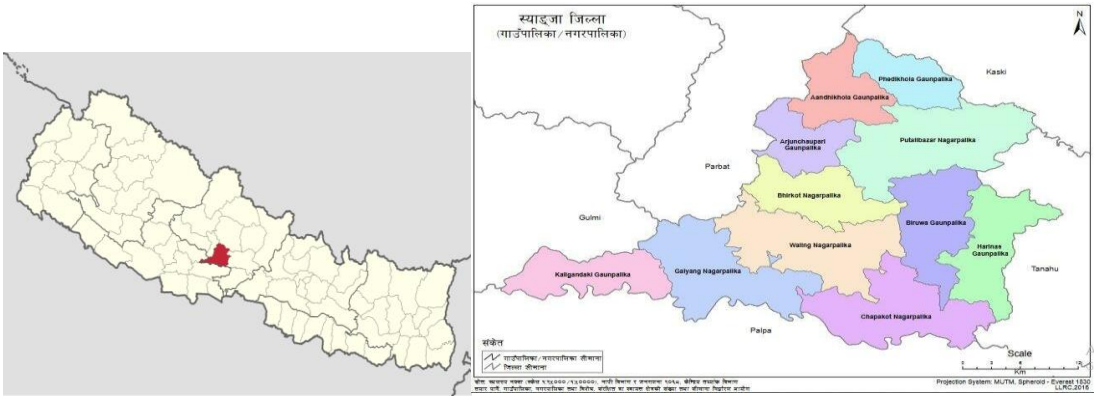


Figure 10 Map of Syangja district showing all local body

Case studies

i. Waling
ii. Galyang of syangja district

4.1.1 Waling

Waling is positioned as a developing residential area that has been promoted by the municipality as the "Pink City" due to its planned urban development initiatives. The town's growth has been significantly influenced by its location along the Siddharth Highway, which has attracted new residents seeking access to better services and amenities (Nepal Rastra Bank, 2020). As Waling continues to develop, urban planners face challenges related to managing growth sustainably while ensuring that infrastructure keeps pace with population increases.

Waling Municipality, a town and municipality in the western hills area of Nepal, is situated in the center of Syangja. On January 24, 1997 (2053/10/11 BS), it was created through the union of the three VDCs that existed at the time: Waling, Dhanubase, and Pekhubaaghkhor. Majhakot Shiwalaye VDC, Eladi VDC, Jagat Bhanjyang VDC, Chhangchhangdi VDC (Ward No. 1, 4-6), Malyangkot VDC (Ward No. 4), Tindobate VDC (Ward No. 2-5), Kalikakot VDC (Ward No. 1, 2, 9), Pelakot VDC (Ward No. 5-6), Thumpokhara VDC (Ward No. 13, 14), and Sworek VDC (Ward No. 2, 4-8) were added to the municipality's area as a result of the local government's restructuring on March 10, 2017 (2073/11/27 BS). The Aadhikhola valley is where it is situated, and The old Andhikhola River divides it in half.Because to its custom of painting nearby homes pink, Waling is known as the Pink City. Under the Smart City program, the Nepali government has identified Waling as one of the cities with promise for future growth. Waling was named the Clean City of Nepal for the fiscal year 2017 (2073 BS) and was given an award for the nation's best municipality.The Waling Bazaar is 800 meters above sea level, whereas the municipality is 731 to 1,600 meters high. Its geographic boundaries are Longitude 83° 41' 36.852" to 83° 50' 18.456" on the east and Latitude 28° 3' 2.412" to 27° 55' 26.58" on the north.

4.1.2 Galyang

Galyang serves as a local business junction and is strategically located along the corridor, connecting various rural areas to larger urban centers. This town has become a critical point for trade and commerce, facilitating the movement of goods between surrounding villages and major cities like Butwal and Pokhara. The development of Galyang as a business hub highlights the importance of transportation infrastructure in enhancing local economies and promoting regional integration.

Galyang is a municipality in central Nepal's Gandaki Province's Syangja District. The government of Nepal established a new local administration system with 744 local units on March 12, 2017. Village councils have taken the role of VDCs with the introduction of this new local administrative framework. Among these 744 local municipal units is Galyang. Malunga, Jagatradevi, the (1-6,9) Wards of Pakwadi, the (1,6-9) Wards of Tindobate, Tulsibhanjyang, Nibuwakharka, Pindikhola, Batuwa, and the (1-4,7-9) Wards of Pelakot are combined to form Galyang.Eleven Wards make up Galyang. Its borders are Palpa District to the south, Kaligandaki and Gulmi District to

Figure 12 Connectivity of Case Area

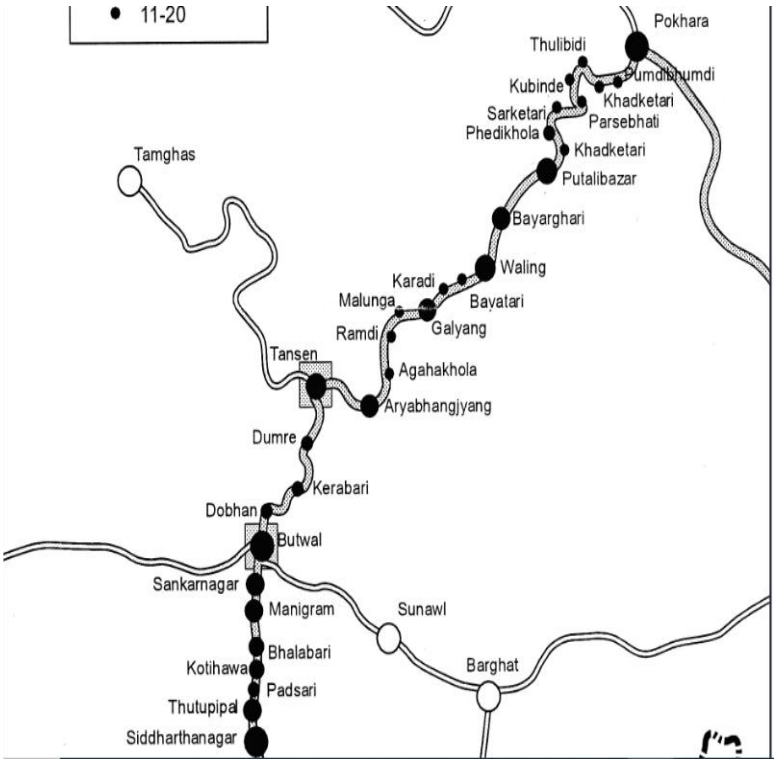


Figure 11 Major market and emerging center along highway

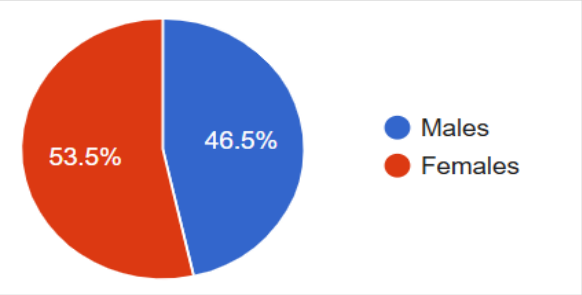
the west, Parbat District to the north, and Chapakot Municipality & Waling to the east.

4.2 Demography

4.2.1 Population

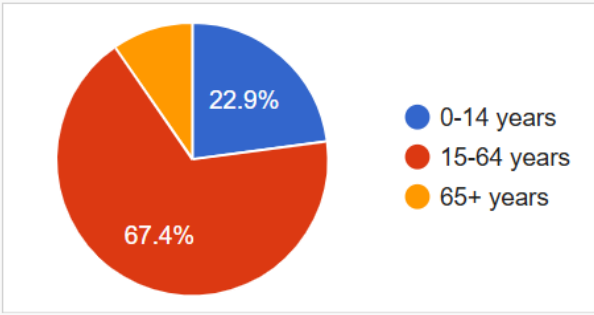
Waling

According to secondary data, the total population of Waling municipality was 56,864 in 2001, 51243 was in 2011 and 50,488 was in 2021. The average household size is and the population density is 393.2/km^2 altogether 13,424 total household. According to census 2021, 46.5% are males and 53.5 % are female. This shows that the rate of female population is higher than the male. The annual population change is -0.18% from 2011 to 2021.



Gender (C 2021)	
Males	23,482
Females	27,006

Figure 15 Gender population distribution of Waling



Age Groups (C 2021)	
0-14 years	11,560
15-64 years	34,038
65+ years	4,890

Figure 14 Age group population distribution

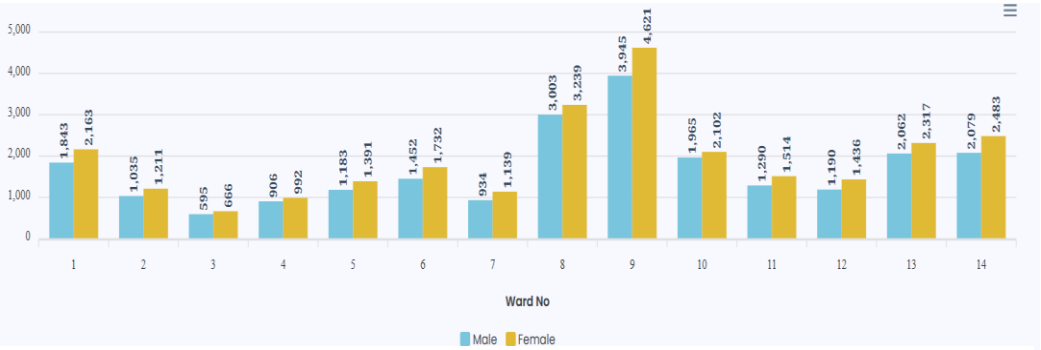


Figure 13 Ward wise Population distribution of Waling of census 2021

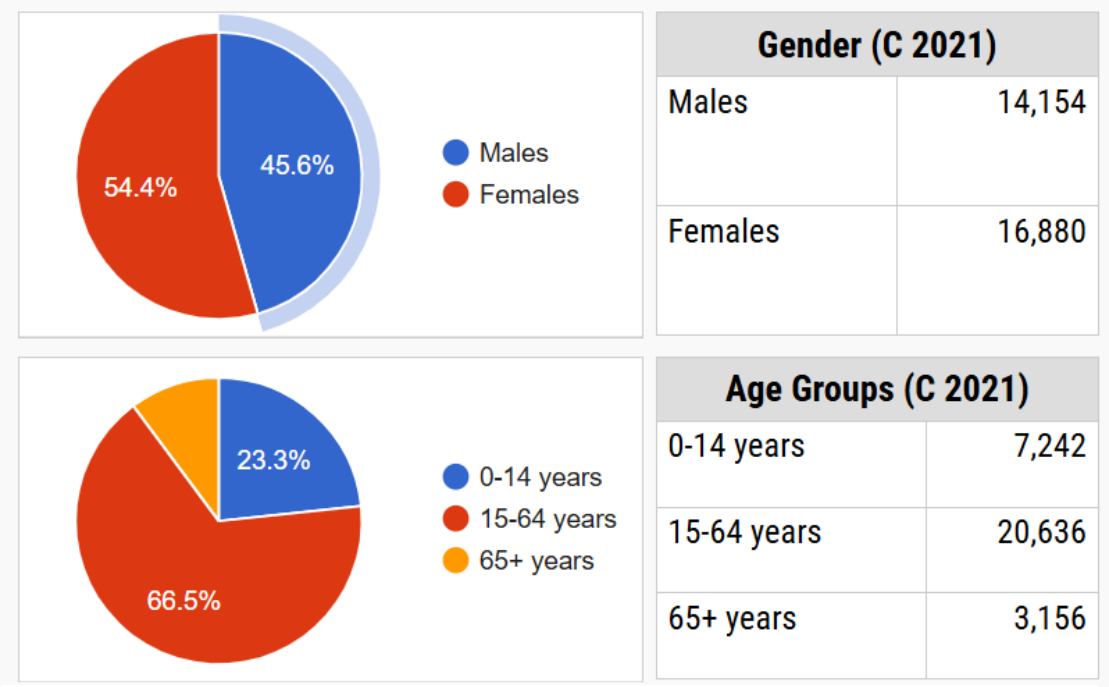
Ward Wise Population Distribution

Table 1 Ward Wise Population Distribution of waling of 2011 & 2021

Ward	Population		Change % per year
	2011	2021	
1	3702	4006	0.821177742
2	2469	2261	-0.842446335
3	1555	1261	-1.890675241
4	2428	1898	-2.182866557
5	2892	2574	-1.099585062
6	3300	3184	-0.351515152
7	2600	2073	-2.026923077
8	5888	6242	0.601222826
9	6191	8566	3.836213859
10	3157	4067	2.88248337
11	3088	2804	-0.919689119
12	3581	2626	-2.666852834
13	4376	4379	0.006855576
14	6016	4562	-2.416888298

Galyang

According to secondary data, the total population of Galyang municipality was 43,827 in 2001, 37,809 was in 2011 and 31034 was in 2021. The average household size is and the population density is 252.9/km^2 altogether 7933 total household. According to census 2021, 45.6% are males and 54.4 % are female. This shows that the rate of female population is higher than the male. The annual population change of galyang municipality is -1.9% from 2011 to 2021.



Gender (C 2021)	
Males	14,154
Females	16,880

Age Groups (C 2021)	
0-14 years	7,242
15-64 years	20,636
65+ years	3,156

Figure 16 Gender population and age group population distribution of Galyang

4.2.1.1 Ward Wise Population Distribution

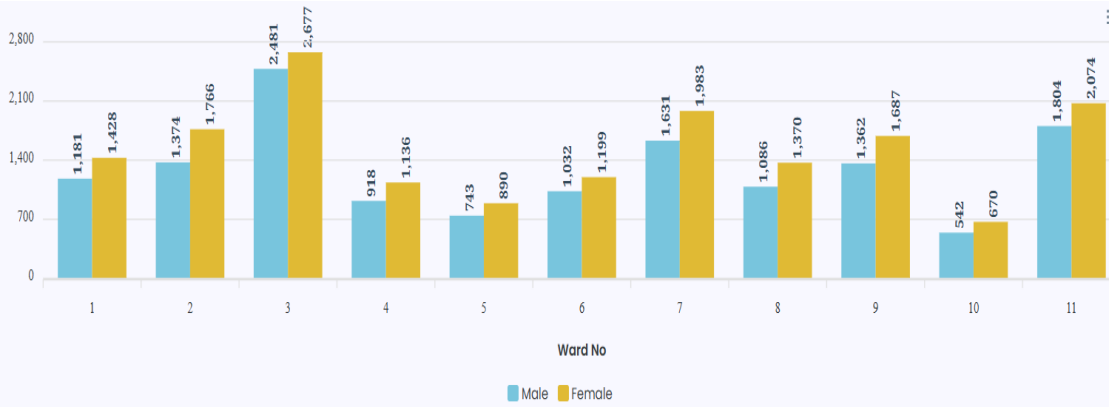


Figure 17 Ward wise Population distribution of Galyang of census 2021

Table 2 Ward wise population distribution of Galyang of 2011 & 2021

Ward	Population		Change % per year
	2011	2021	
1	3230	2609	-1.9226
2	3632	3140	-1.35463
3	5068	5158	0.177585
4	2856	2054	-2.80812
5	2572	1633	-3.65086

6	3403	2231	-3.44402
7	4519	3614	-2.00266
8	2562	2456	-0.41374
9	3738	3049	-1.84323
10	1790	1212	-3.22905
11	4439	3878	-1.2638

4.2.2 Ethnicity

Waling

The Brahmin community constitutes the largest ethnic group, making up 31.3% of the population. Following them are the Magar community at 19.4%, Gurung community at 13.8%, Kshetri at 9.6%. Additionally, smaller communities such as Mijar, Vishwakarma, and Pariyar further enhance the cultural richness of the area, though their proportions are less significant.

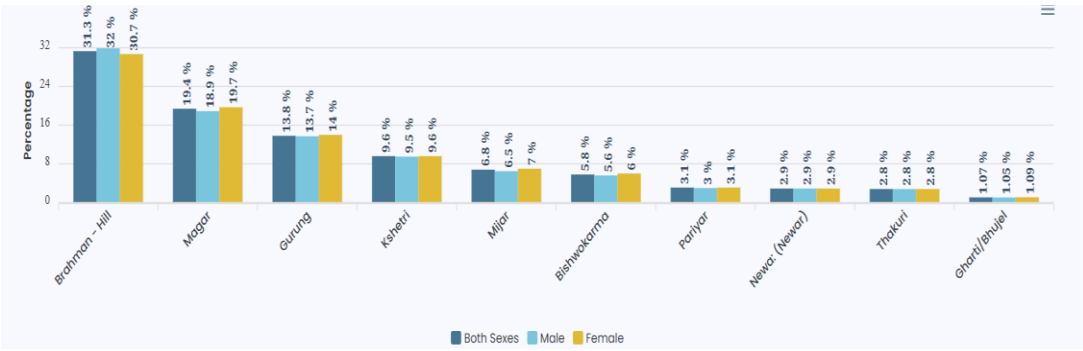


Figure 18 Population by major ten caste/ethnic-groups and sex of waling

Galyang

The Brahmin community constitutes the largest ethnic group, making up 39.8% of the population. Following them are the Magar community at 39.4%, Bishwokarma community at 7.8%, Newar at 3%. Additionally, smaller communities such as Kshetri,

Pariyar, Gurung further enhance the cultural richness of the area, though their proportions are less significant.

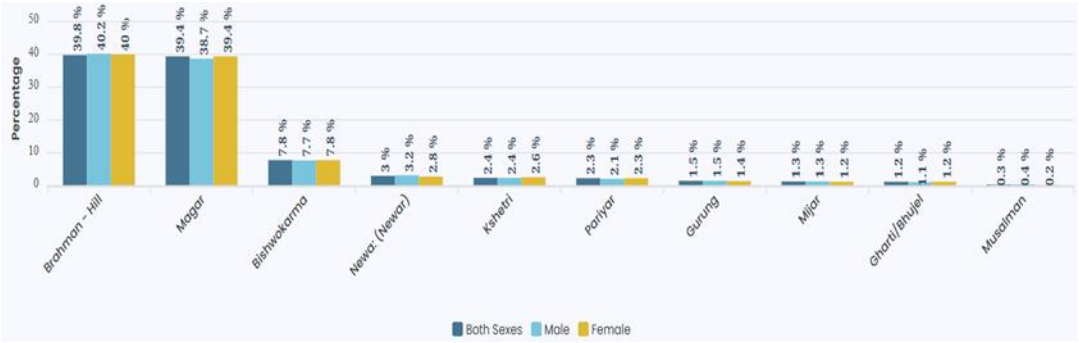


Figure 19 Population by major ten caste/ethnic-groups and sex of Galyang

4.2.3 Religion

Hindu and Buddhism are the main religion adopted in syangja district followed by other religions like Islam, Christian, Kirat etc. After the introduction of people's movement and democracy, there has been a phenomenon of religious conversion on the rise. Conversion to Christainity has been sweeping a large part of the population

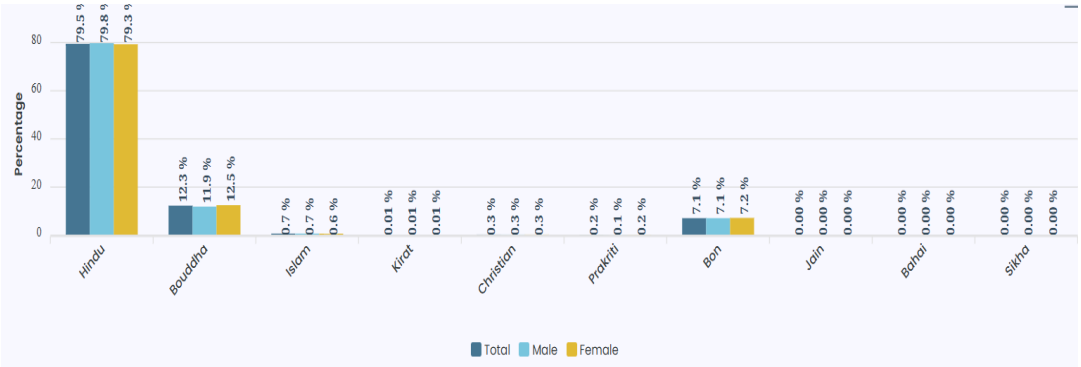


Figure 21 Population by major ten Religion and sex of Waling

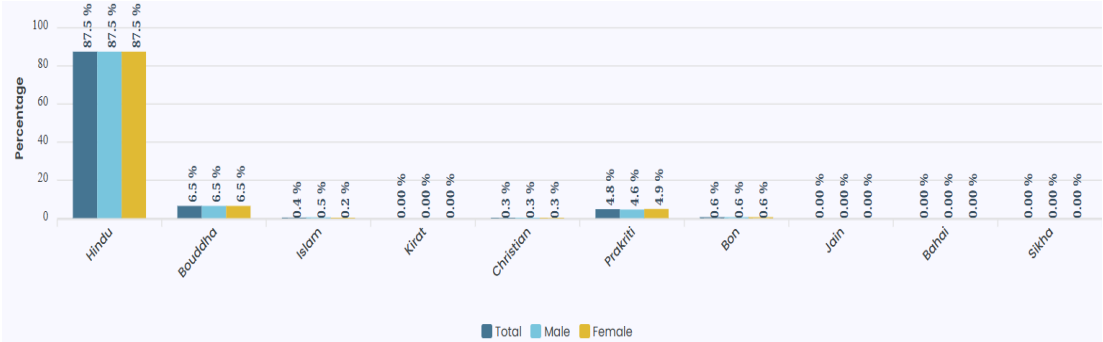
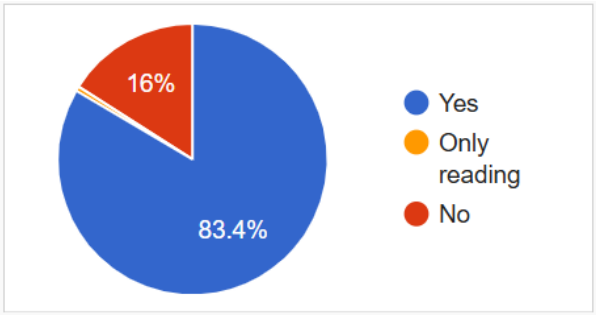


Figure 20 Population by major ten Religion and sex of Galyang

of the dalit and indigenous community of rural area.

4.2.4 Education

The literacy rate is 83.4% of the total population in Waling municipality. About 90.8% of the male are literate and only 77.1% of the female are literate according to CBS 2021.



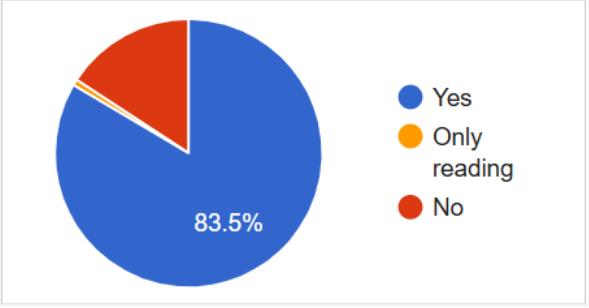
Literacy (A5+) (C 2021)	
Yes	39,334
Only reading	261
No	7,546

Figure 22 Literacy population distribution of Waling

The literacy rate is 83.5% of the total population in galyang municipality. About 90.6% of the male are literate and only 77.5% of the female are literate according to CBS 2021.

4.2.5 Migration

Migration patterns in Waling Municipality show that a significant portion of the population, 71.1%, has migrated from within the same municipality. 17.4% of the population has moved from other municipalities within the same district, indicating a degree of internal migration within Syangja. A smaller portion, 8.3%, has migrated



Literacy (A5+) (C 2021)	
Yes	23,962
Only reading	210
No	4,530

Figure 23 Literacy population distribution of Galyang

from other districts. In waling bazar, that a significant number of people have come from nearby town and parbat district, contributing to the area's population growth.

Additionally, a substantial portion of the population has migrated from within the same municipality, but from different wards, reflecting internal movement as people settle in waling for its growing opportunities and strategic location along the Siddhartha Highway. Likewise, 78.2% has migrated from within same municipality in galyang , 9.1% population has moved from other municipalities within same district and 8.3% has migrated from other districts.

The out-migration trends from Waling and Galyang reveal distinct patterns shaped by regional connectivity and livelihood opportunities. Residents of Waling predominantly migrate to Pokhara, Butwal/Bhairahawa, and Nawalparasi, drawn by Pokhara's tourism-driven job market and other urban facilities and Butwal/Bhairahawa's industrial and educational facilities. In contrast, Galyang's out-migration flows primarily toward Butwal/Bhairahawa, Nawalparasi, and Kapilvastu, reflecting its stronger economic linkages with the Terai's agricultural and trade hubs. Both municipalities share common drivers for migration: better accessibility via the Siddhartha Highway, pursuit of quality education, formal employment opportunities, and improved access to healthcare and urban amenities. These patterns underscore how highway connectivity, while facilitating movement, has not yet generated sufficient local economic alternatives to retain populations, particularly youth and skilled workers, in their home municipalities. The concentration of migrants in these specific destinations highlights the uneven distribution of development benefits across the region, with urban centers absorbing human capital from peri-urban and rural hinterlands.

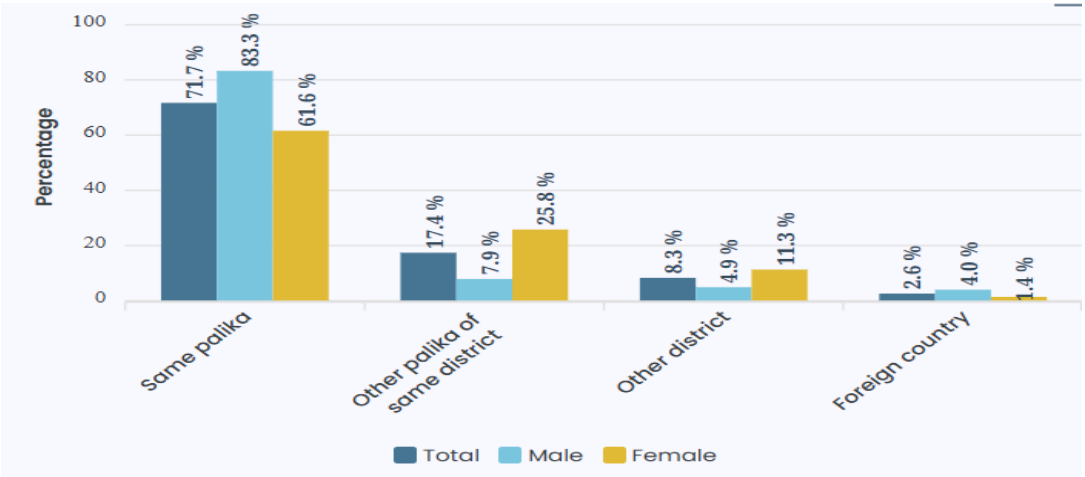


Figure 24 Population by former place of residence of Waling

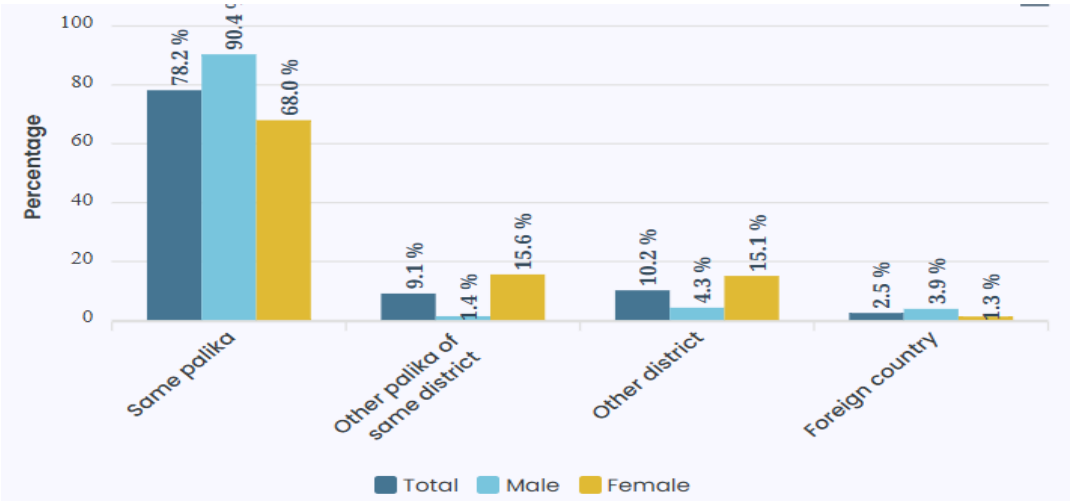


Figure 25 Population by former place of residence of Galyang

Pull Factors and Push Factors

Table 3 Pull and Push Factors

Pull Factors	**Push Factors**
Access to employment opportunities in larger cities like Butwal, Pokhara, and Kathmandu.	Limited job opportunities in rural areas along the highway.
Improved access to better educational institutions and healthcare services in urban centers connected by the highway.	Lack of quality education and limited public services, healthcare facilities in rural areas.
Enhanced connectivity for trade with India and China through improved transportation infrastructure.	Difficulty accessing markets for local products due to limited infrastructure before highway construction.
Attraction of tourists from India using this route for destinations like Pokhara and Mustang, boosting local economies through tourism-related jobs.	Limited economic benefits from tourism reaching rural communities directly affected by outmigration.
Government plans for upgrading roads (e.g., double-lane road) which could attract more businesses.	Narrow roads with sharp bends hinder efficient transportation, deterring suppliers from delivering goods efficiently.

4.3 Land Transaction

According to local people and the land brokers the value of land differs considerably within the settlement and outside the settlement. Due to the development pressure along the main road in Bazar Area the vacant land along the roadside is of high value. Plotting has been started by private land developers in many of the land parcels and sold in high price.

Table 4 Land value according to access to road

Location	**Commercial Price per meter along Motarable Road (Waling)**
Land Along the main Road	10 lakhs
Land Along the Lateral Road	7 lakhs
Inside area	4 lakhs

Table 5 Tax collection from land revenue office (Real estate Business Transaction)

Fiscal Year	**No. of Transaction (Waling)**	**Tax Collection (Waling)**	**Tax Collection (Galyang)**	**Tax Collection (Whole office)**
2077/78	349	25,00,000	5,00,000	6,45,42,200
2078/79	389	95,00,000	21,40,000	5,47,68,219
2079/80	203	1,05,00,000	25,00,000	4,32,53,101
2080/81	236	1,27,00,000	34,00,000	6,35,77,216
2081/82 (upto mangsir)	126	27,00,000	7,00,000	1,36,00,000

4.4 Economic Linkage

Waling and Galyang municipalities in Syangja District exhibit robust economic linkages with the central city and its surrounding hinterlands. These areas serve as crucial local market centers, fostering growth alongside the expansion of road networks. The economic synergy is evident in the trade of local agricultural products, particularly oranges and other horticultural goods, which are exported through these key growth centers. Conversely, industrial products, machinery goods, and

construction materials are transported from major market centers to Waling and Galyang via buses, trucks, jeeps, and other vehicles on a daily basis.

This interconnectivity not only enhances the local economy but also supports regional development by facilitating access to diverse markets for both producers and consumers. The strategic location of Waling as a financial hub within Syangja further amplifies its role in managing these economic exchanges efficiently. As road infrastructure continues to improve, it is likely that these small growth centers will experience sustained economic growth by leveraging their position within the broader regional trade network.

Moreover, initiatives like subsidies for milk production in Galyang Municipality have shown positive impacts on local income levels, indicating potential for similar interventions across various sectors to bolster economic resilience. Sirausa of galyang municipality is popular for orange business, Normally 2-3 lakh transaction of orange in season from single family specially from sirausa, choka (ward-7), syalbas(ward-5). Overall, this integrated approach ensures that both rural agricultural communities and urban industrial sectors benefit from enhanced connectivity and market access.

The main key growth centres surrounding to the Waling bazaar are:

1. Chapakot
2. Biruwa
3. Chinnebass
4. Huwas (parbat)
5. Sorek
6. Malyankot
7. Keware bhanjyang
8. Pidikhola-Setibeni

The main key growth centres surrounding to the Galyang bazaar are:

1. Hogi (Palpa)
2. Motichaur
3. Pidikhola
4. Pelakot
5. Tulsibhanjyang

6. Mirmi
7. Jimma
8. Sirausa

4.5 Road Linkage

An important factor in promoting economic growth and development is the road networks that link Waling Bazaar and Galyang Bazaar to nearby marketplaces. These roads, which comprise fair weather roads, clay roads, and blacktopped roads, connect Waling with Galyang both forward and backward. Forward links include distributing locally produced items to larger markets, whereas backward linkages refer to the supply of inputs like raw materials or services required for production.
Key Road Networks

- Siddhartha Highway: By connecting Waling and Galyang with other important cities like Pokhara and Lumbini, this major route plays a critical role in promoting regional trade and economic integration. By improving connectivity between metropolitan areas, it serves as a backbone infrastructure that supports development throughout the entire district.
- Waling-Chappot Road: By giving access to other marketplaces in the Syangja District, this route links Waling with nearby towns like Chapakot, fostering local commerce.
- Waling-Huwas (Parbat) Road: By linking Waling and Parbat District, this road promotes interdistrict trade and broadens the market reach outside of Syangja.
- Galyang-Pelakot-Pedikhola Road: This road system helps local farmers in Galyang Municipality by making it easier to move produce from rural areas to Pelakot and other market centers.
- Galyang-Mirmi Road: This crucial route in Galyang improves communication between urban regions and rural agricultural areas, which are where items are processed or sold later on in supply chains.

A Viewpoint on Urban Planning

From the perspective of urban planning:

- Enhancement of Accessibility: By better linking towns with the surrounding hinterlands, these highways increase accessibility within towns.

- Drivers of Economic Growth: These networks stimulate economic growth by making it simpler to move products and services between various places.
- Setting Priorities for Infrastructure Development: By identifying important routes like the ones listed above, planners can effectively prioritize infrastructure improvements.
- Integrating Regional Networks: Local economies are guaranteed to profit from bigger-scale trade opportunities through integration into larger regional networks (such as the Siddhartha Highway).

  All things considered, these road networks play a major role in improving both intra-regional connectivity and inter-regional commerce flows in the towns of Waling and Galyang in Syangja District.

Table 6 Road Linkage of Waling

S.N.	**Name of Road**	**Length**	**Types of Pavements**	**Remarks**
1.	Waling – Chapakot	22 km	Blacktopped	District Road
2.	Waling – Huwas	20.4 Km	Blacktopped	District Road
3.	Waling – Setibeni	26 km	Blacktopped + Gravel	Province road
4.	Waling- Sorek(Bhirkot)	10 Km	Blacktopped + Gravel	District Road
5.	Waling- Chinnebas(Harinas Ga. Pa.)	23 Km	Blacktopped + Gravel	District Road
6.	Waling- Mankamana Biruwa Ga.Pa.	16.1 Km	Blacktopped + Gravel	District Road
7.	Waling (Rambachha)-Mansyankot	14.5 Km	Blacktopped + Gravel	District Road

Source: Traffic police and Yatayat samiti

Table 7 Road Linkage of Galyang

S.N.	Name of Road	Length	Types of Pavements	Remarks
1.	Galyang - Jimma – Chapakot	22 km	Blacktopped	District Road
2.	Galyang – Motichaur	13 Km	Blacktopped	District Road
3.	Galyang – Pelakot-Pidikhola	18 km	Blacktopped + Gravel	District Road
4.	Galyang- Mirmi	16 Km	Blacktopped	District Road
5.	Galyang- Hogi(Palpa)	20 Km	Blacktopped + Gravel	
6.	Galyang- Tulsibhanjyang	6.8	Earthen Road	District Road
7.	Galyang- Nibuwakharka Mohandada	17.99	Earthen Road	District Road

Source: MTMP report, Traffic police and Yatayat samiti

CHAPTER FIVE: DATA ANALYSIS

5.1 Physical Infrastructure of Siddhartha Highway

5.1.1 Road Infrastructure

The Siddhartha Highway serves as a vital lifeline for the development of the Western Development Region, particularly in Gandaki, Lumbini, and Dhaulagiri zones. However, it poses significant challenges due to its narrow width of six meters and sharp bends, making travel time-consuming and hazardous. In Waling Municipality, efforts have been made to widen the road to 11 meters with 14-meter widths at bends to improve safety and efficiency. Conversely, Galyang Municipality has not shown similar initiative in road widening or implementing safety measures despite having a narrower seven-meter highway width through Galyang Bazaar. Furthermore, both Waling and Galyang lack proper bus stops along this critical route. The absence of robust safety measures on Siddhartha Highway is concerning given its importance for regional connectivity; addressing these issues could significantly enhance travel conditions across these regions.

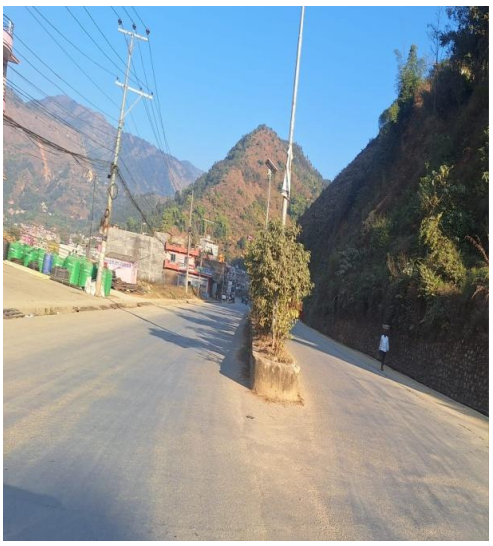


Figure 26 Highway section in Waling

Figure 27 Highway section in Galyang

5.1.2 Bus Park

Figure 28 : Ongoing Buspark construction in Waling

Waling and Galyang have long been recognized as gateways for the surrounding hinterlands and transit hubs, particularly after the construction of the Siddhartha Highway. However, despite their strategic importance, both municipalities lacked a dedicated bus park until recently. In Waling, efforts to address this gap are underway with ongoing construction of a bus park. Conversely, in Galyang, only a Detailed Project Report (DPR) has been completed without further progress on actual construction.

The absence of formal bus parks in these areas poses significant challenges for vehicular movement and regional development. Both Waling and Galyang experience substantial daily inflows and outflows of vehicles due to their role as transit points between major cities like Pokhara and Lumbini. A well-designed bus park would not

only streamline traffic management but also enhance safety by providing designated spaces for buses to load/unload passengers efficiently.

Moreover, having organized bus parks can boost economic activities by facilitating smoother transportation services for commuters traveling through these regions. It would also contribute to urban planning improvements by reducing congestion within city centers. As Waling moves forward with its bus park project, it is crucial that Galyang follows suit to fully leverage their positions as key transit hubs along the Siddhartha Highway. This infrastructure development will be pivotal in supporting regional connectivity and fostering growth across surrounding hinterlands.

5.2 Land use

In Waling Municipality, Syangja, the construction of buildings over several fiscal years reflects changes in land use patterns and urban development. From FY 2076/77 to FY 2080/81, the number of buildings constructed has seen fluctuations: 561 in FY 2076/77, slightly increasing to 563 in FY 2077/78, then decreasing significantly to 323 by FY 2078/79 and further dropping to around half that number by FYs 2079/80 and 2080/81 with totals of 181 and 173 respectively.

5.2.1 Land Use Context

Residential and Mixed-Purpose Buildings: The majority of these constructions are residential or mixed-purpose buildings with a maximum height of up to six floors (approximately a maximum height of about ten meters). This indicates a shift towards denser urban living as opposed to agricultural uses.

Impact of Siddhartha Highway: The development of Waling as an urban center was catalyzed by the construction of the Siddhartha Highway. This major infrastructure project has connected Waling more effectively with larger cities like Pokhara and Lumbini, enhancing its role as a commercial hub rather than solely an agricultural area.

Agricultural Land Reduction: There is less agricultural land within the city limits due to increasing urbanization driven by infrastructure projects like highways1. As agriculture diminishes within city boundaries, more land is allocated for residential or commercial purposes.

Land Requirements for Building Construction: Since 2079 before this period required only about two-and-a-half annas (approximately one-sixteenth) for building plans; however, from FYs after this point onwards (starting from around late-2019), four annas became compulsory for such purposes. This change likely aims at ensuring better planning standards while accommodating growing demand for housing without compromising on space efficiency.

Table 8 Built-up Scenario of Waling

Fiscal Year	No. of building constructed (pass)	Building Dwg. Pass Tax
2076/77	561	32,49,645.46
2077/78	563	75,62,856.38
2078/79	323	55,10,092.81
2079/80	181	46,63,152.02
2080/81	173	37,07,295.17

Source: Waling Municipality

Figure 29 Built up area along road in waling

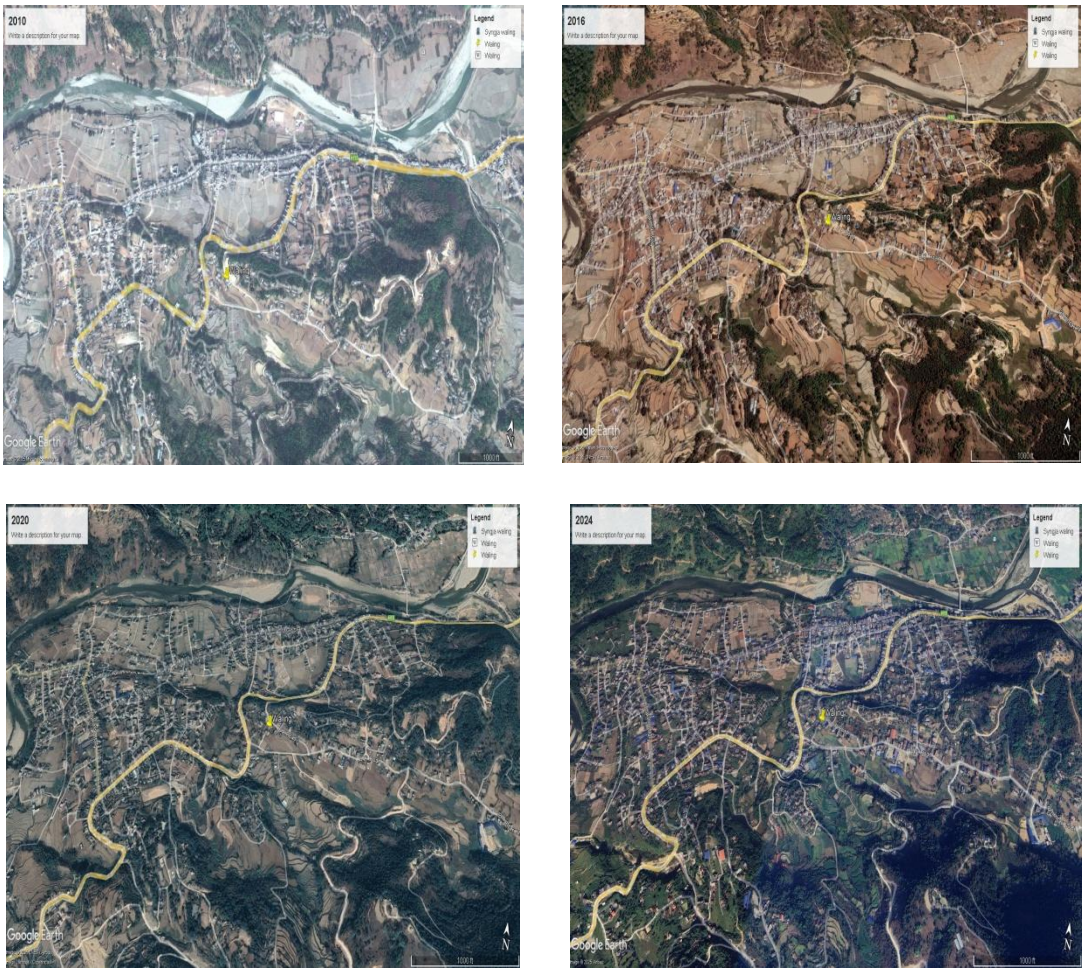


Figure 30 Google Earth Images of 2010, 2016, 2020, 2024 of Waling

Built-up Scenario of Galyang

In Galyang Municipality, the built-up scenario post-2073 has been marked by limited formal development. Only three building drawings have been approved and completed with a completion certificate, while six applicants have received drawing approvals but not completed their projects. Many more applicants have registered for building permits but failed to proceed further due to challenges posed by Building Standard Norms (NBC:205) and the lack of lagat katta beyond the Siddhartha Highway. This situation is exacerbated by residents' reluctance to adhere to legal provisions when constructing homes, leading to informal development patterns. The land use pattern in Galyang reflects a mix of rural and urban characteristics, with agricultural areas still prevalent alongside emerging urban centers. The municipality's connectivity via major highways like Siddhartha Highway present opportunities for growth; however, these are hindered by regulatory compliance issues and inadequate infrastructure support outside main roads.

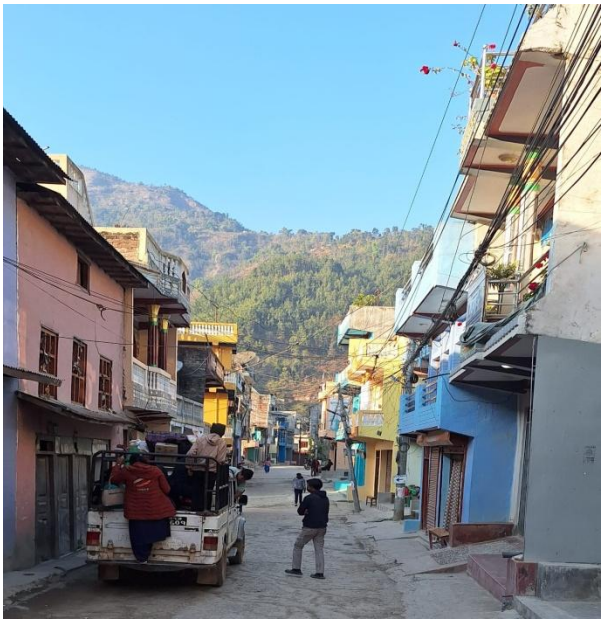
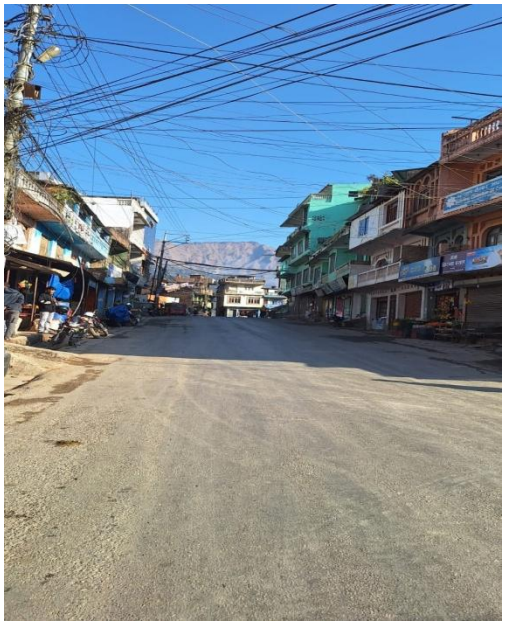




Figure 31 Built up area along road in Galyang

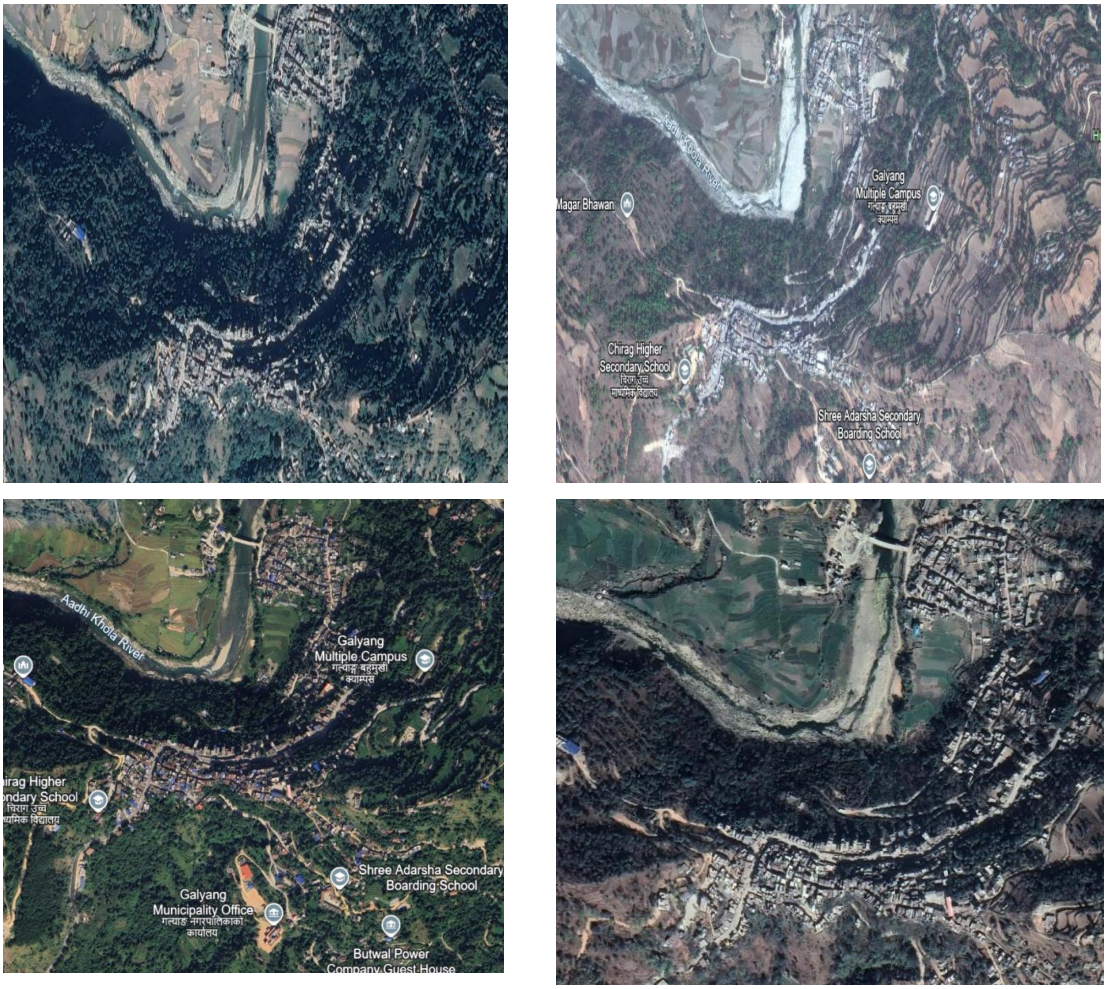


Figure 32 Google Earth Images of 2010, 2016, 2020, 2024 of Galyang

5.3 Internal Source/Income of Municipality (Tax)

Table 9 Income of Municipalities

Fiscal Year	Amount (Rs.) Waling	Amount (Rs.) Galyang
2076/77	4,20,25,789.08	1,78,18,000.00
2077/78	5,20,71,278.88	1,15,73,871.95
2078/79	4,95,03,837.96	1,54,77,640.87
2079/80	5,05,94,489.87	2,14,61,402.47
2080/81	4,08,66,129.48	1,41,24,379.19

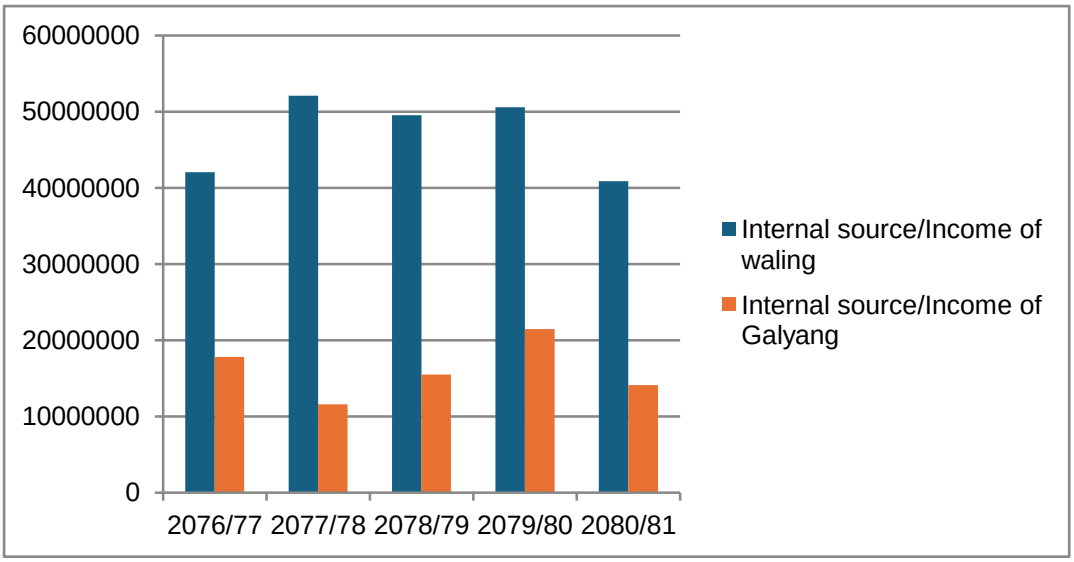


Figure 33 : Comparison of internal source/ Income between Waling and Galyang

5.4 Functional Changes

The word function includes different types of activities like, commercial, social, financial, developmental and administrative activities which are associated with market town. The functional base of waling is explained in terms of number, types of functional establishments in different years within the waling and galyang. At the time when the road network was just constructed, there were no any services like commercial, financial, administrative, instutional as well as industrial activities. Within the three decades, Waling is developed as the sound gateway of syangja district of western development region.These type of activities provides convenience to the people and exerts its influence over hinterlands.

During the study the functional activities are broadly classified into i) Commercial organization ii) Industrial organization iii) Institutional organization.

5.4.1 Commercial Organization

Commercial activities are categorized into whole seller, retailing, catering and personal services. Furthermore, commercial activities are breakdown as follows.

1. Whole seller
    - General Store
    - Clothes
    - Dealer
2. Retailing
    - General shops
    - Clothes
    - Medical
    - Cosmetics/Fancy
    - Utensils
    - Books and stationary
    - Meat
    - Kirana shop
3. Catering
    - Tea, snacks and sweets
    - Restaurant
    - Hotel and lodge
4. Professional service
    - Tailoring
    - Photo Studio
    - Barbar Shop

Figure 34 Commercial Activities in Waling and Galyang

5.4.2 Industrial organization

Industrial activities are categorized into small industries/mills, bakery factory etc. The small industries consist of small-scale domestic industries like bakery factory, dalmot factory, iron grills water / diesel mills and agro based industries etc.

5.4.3 Institutional organization

Institutional organization consists of different government services as well as non-government organization which are increasing with the rate of development of road network and play as gateway for surrounding hinterland. Most of the service provider office related with public are located in waling and facilities Kaligandaki, Galyang, Chapakot, Waling, Biruwa and some part of harinas and bhirkot local bodies. The existing Institutional organization in waling area follow:

1. Area administrative office

2. Forest office
3. Nepal telecom
4. Land revenue office
5. Survey office
6. Department of road (division office for highway maintenance)
7. Waling municipality
8. Police office
9. Nepal electricity office
10. Banking institutions

5.5 Commercial Establishment

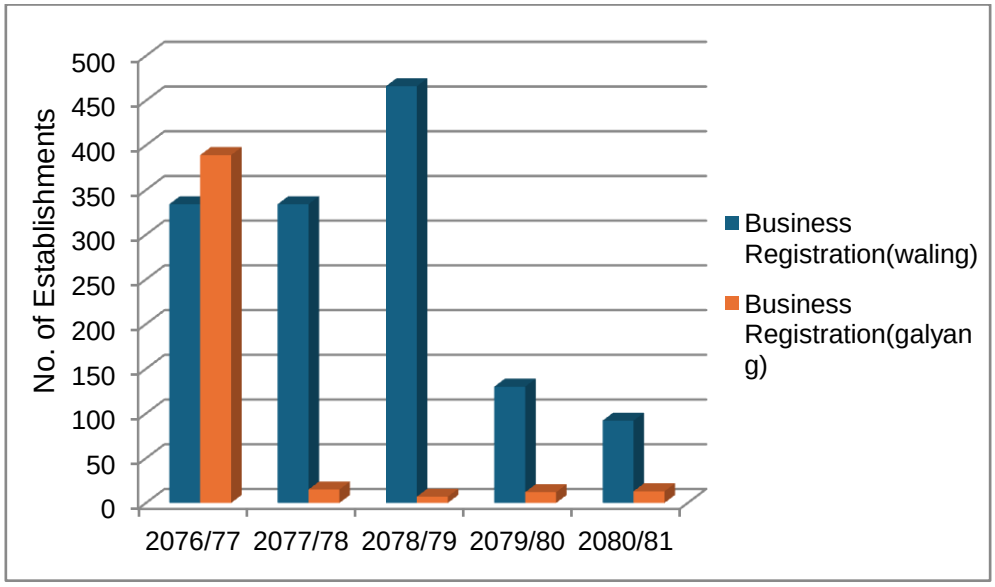


Figure 35 Commercial Establishments inside Municipality

The data on business registrations in Waling and Galyang municipalities over several fiscal years reveals interesting trends. In the fiscal year 2076/77, Waling saw 334 new business registrations, while Galyang had a slightly higher number at 389. However, there was a significant drop in Galyang's registrations to just 15 in the following year (2077/78), whereas Waling maintained its previous year's level of 334. This drastic decline in Galyang suggests potential regulatory changes or economic factors that may have discouraged new businesses from registering.

In subsequent years, the trend continued with fluctuations. In Waling, business registrations increased to 466 in the fiscal year 2078/79 but then decreased significantly to 130 by the next year (2079/80) and further dropped to 92 by the fiscal

year 2080/81. Meanwhile, Galyang experienced minimal growth with only single-digit increases each year after its sharp decline in registration numbers starting from FY 2077/78. The consistent low registration numbers for new businesses in Galyang indicate challenges or barriers that might be hindering entrepreneurial activity compared to Waling. Overall, these patterns highlight areas where local policies could focus on supporting small businesses and entrepreneurship development across both municipalities.

Table 10 Commercial Establishment data

Fiscal Year	Business Registration(waling)	Business Registration(galyang)
2076/77	334	389
2077/78	334	15
2078/79	466	7
2079/80	130	12
2080/81	92	13

Source: Waling municipality and Galyang Municipality

5.6 National Economic Census 2018

5.6.1 Waling

The National Economic Census 2018 provides valuable insights into the business landscape and workforce distribution in waling, which primarily falls under Ward 1,6,8,9,10,13 of waling Municipality. According to the census, Ward 8 has the highest number of business establishments 360, making it the commercial hub of the region. Ward 1 follows with 184 establishments, indicating its significant role in economic activities.

In terms of employment, Ward 8 has the largest workforce 988 people engaged in various sectors, with 548 males and 440 females. This highlights the ward's strong economic presence and job opportunities. Ward 1, the second-largest employment center, has 466 engaged individuals, with 225 males and 241 females actively

contributing to the economy. The data also indicates that while male participation in

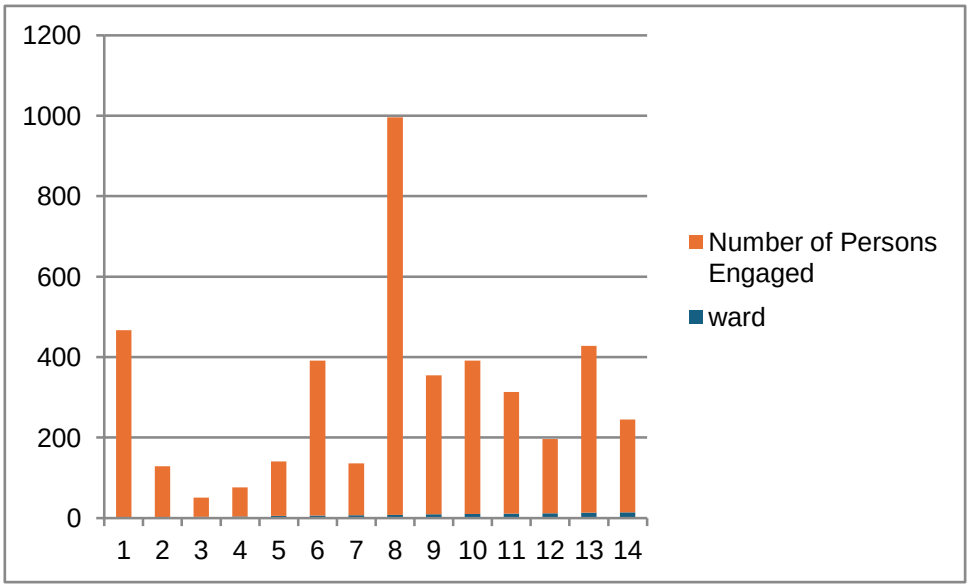


Figure 36 Number of Persons engaged in Commercial Activities of waling

the workforce is higher across all wards, female involvement is notable, especially in Ward 8. The census reflects the growing economic potential of waling, with Ward 8 and Ward 1 leading in business development and employment opportunities.

Table 11 Ward wise people's engagement in commercial activities of Waling

Ward	No. of	No. of Persons	Total Number of	Number of Persons
1	184	466	225	241
2	47	127	49	78
3	12	48	25	23
4	16	72	34	38
5	50	136	75	61
6	140	385	199	186
7	44	129	57	72
8	360	988	548	440
9	136	346	180	166
10	108	381	244	137
11	55	302	162	140
12	32	184	52	132
13	173	415	232	183

14	80	231	107	124

5.6.2 Galyang

The business landscape and workforce distribution in galyang, which primarily falls under Ward 1,3 of galyang Municipality. According to the census, Ward 3 has the highest number of business establishments 396, making it the commercial hub of the region. Ward 1 follows with 121 establishments, indicating its significant role in economic activities.

In terms of employment, Ward 3 has the largest workforce 932 people engaged in various sectors, with 525 males and 407 females. This highlights the ward's strong economic presence and job opportunities. Ward 1, the second-largest employment center, has 357 engaged individuals, with 186 males and 171 females actively contributing to the economy. The data also indicates that while male participation in the workforce is higher across all wards, female involvement is notable, especially in Ward 3. The census reflects the growing economic potential of waling, with Ward 3

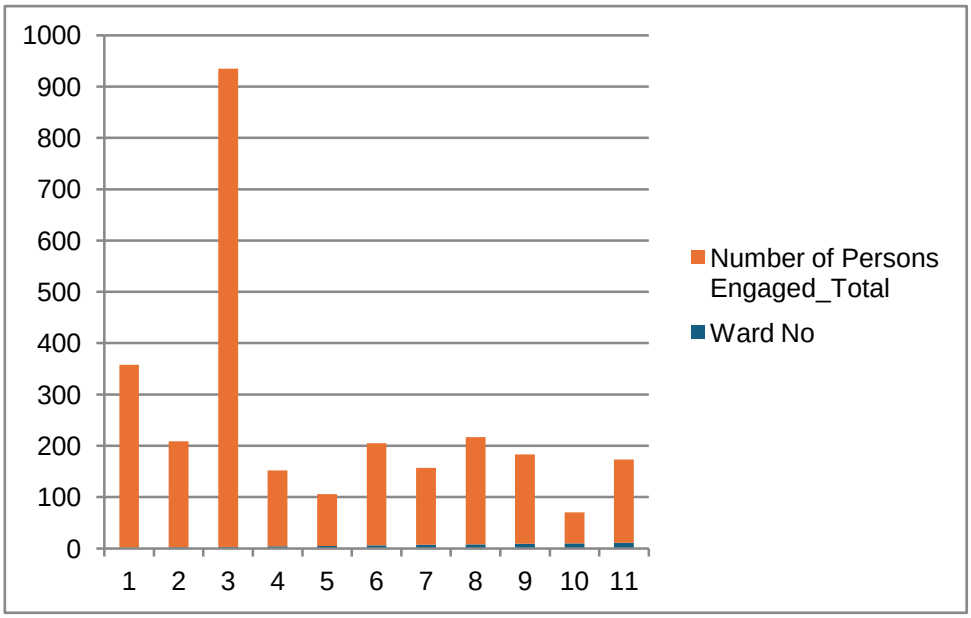


Figure 37 Number of Persons Engaged in Commercial Activities of Galyang

and Ward 1 leading in business development and employment opportunities.

Table 12 Ward wise people's engagement in commercial activities of Galyang

Ward No	No. of establishments	No. of Persons Engaged	Total Number of Persons Engaged	Number of Persons Engaged Female
1	121	357	186	171
2	79	207	99	108
3	396	932	525	407
4	51	148	89	59
5	34	101	51	50
6	85	199	108	91
7	73	150	67	83
8	87	209	107	102
9	68	174	98	76
10	27	60	32	28
11	65	162	80	82

5.7 Linkage Analysis

Market town emerges in response to the local population's need for goods and services. It typically includes a central marketplace and the surrounding hinterland. Each market town influences nearby areas, attracting people from those regions for shopping, employment, and access to various services. There is a mutual relationship between the market town and its hinterland, they are closely linked in function. Their interaction creates a dynamic of cause and effect, where changes in one, such as growth, decline, or transformation, can directly impact the other.

The connection between a town and its surrounding rural (hinterland) area is reflected in how they interact and fulfill their respective roles. Typically, a market town functions as a hub for economic, social, cultural, and administrative activities. In regions where agriculture is the primary livelihood, the town's main role is to support agricultural advancement by providing a variety of services. These include access to farming inputs, product marketing, household supplies, agricultural advisory services, health and education facilities, the spread of new ideas and technologies, and opportunities for non-agricultural employment.

The size and role of a town are largely influenced by the variety and quantity of service facilities it offers. Another key factor is its relative location—specifically, the distance between the market town and the surrounding settlements that rely on it, as well as its proximity to neighboring towns. Through its functional role, a market town becomes a point of interaction, facilitating the exchange of people, goods, services, technologies, ideas, and products with the communities around it.

The second key element in the rural–urban linkage system is the hinterland, which supplies essential resources such as food, labor, raw materials, and traditional goods like handicrafts, while also creating demand for the products and services offered by the town. Effective interaction between the town and its surrounding rural region depends heavily on transportation, communication networks, and the efficiency of service delivery related to urban functions.

A third crucial aspect in strengthening rural–urban connections is the mutual relationship itself—where both the market town and its hinterland serve as vital components that shape and sustain meaningful and productive linkages between each other.

5.7.1 Transportation Linkage Analysis

It deals with the road connectivity towards Waling, Galyang and its hinterlands. The types and condition of road pavement affects the activities and linkage between center town and key growth centers.

Linkage of waling with its hinterland

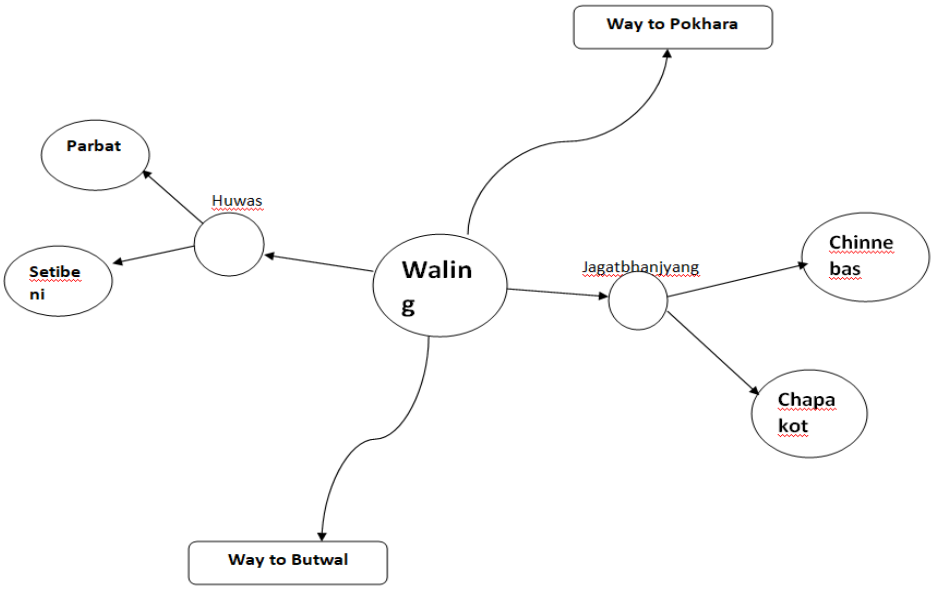


Figure 38 Transportation Linkage of Waling to its surroundings

Linkage of galyang with its hinterland

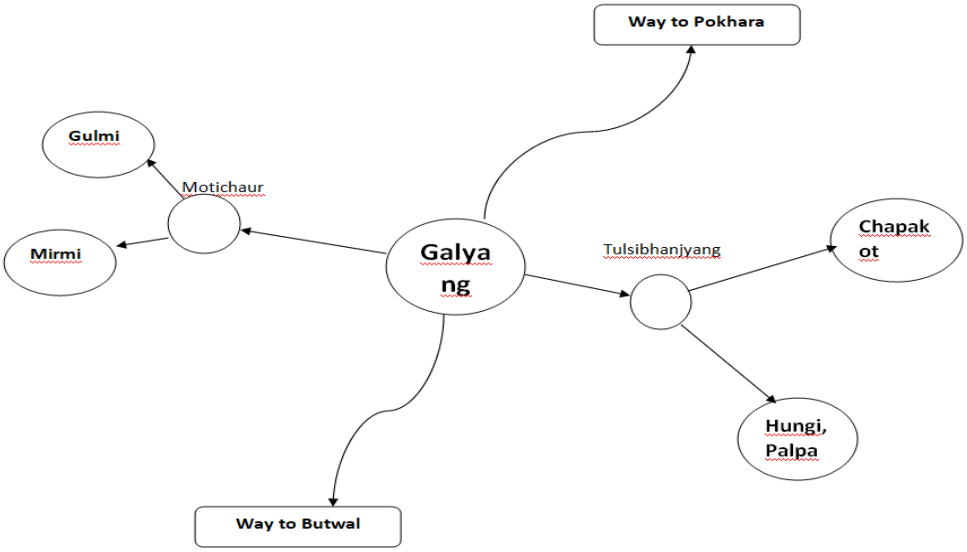


Figure 39 Transportation Linkage of Galyang to its surroundings

Daily traffic volume Analysis

Table 13 Daily traffic volume of waling

S.N.	Route	Types of vehicles	No. of trips	No. of passenger	Remarks
1	Waling – Huwas	Bus (from butwal)	3	120	Jeep carry goods of retailers from waling to local market
		Jeep	35	420	
2	Waling – Chapakot	Jeep	40	480	
3	waling – Butwal	Bus	5	300	
		Micro van	5	130	
4	Waling – Pokhara	Micro van	22	528	
		Bus	3	150	
5	Waling – Kathmandu	Micro van	6	120	
		Bus	4	200	
6	Waling- Sorek	Jeep	5	25	
7	Waling- Pidikhola-Setibeni	Jeep	8	80	
8	Waling- Malyankot	Jeep	13	130	
9	Waling- Harinas	Jeep	6	60	

Table 14 Daily traffic volume of Galyang

S.N.	Route	Types of vehicles	No. of trips	No. of passenger	Remarks
1	Galyang –Mirmi	Bus (from butwal)	3	120	Jeep carries goods of retailers from Galyang to local market
		Jeep	5	60	
2	Galyang – Chapakot	Jeep	6	72	
3	Galyang – Butwal	Bus	1	50	
		Micro van	5	130	
4	Galyang – Pokhara	Micro van	8	528	
5	Galyang – Kathmandu	Micro van	3	60	
		Bus	2	100	
6	Galyang- Hungi	Jeep	4	40	
7	Galyang- Pelakot-Pidikhola	Jeep	12	120	
8	Galyang-Motichaur	Jeep	7	70	
9	Galyang-Tulsibhanjyang	Jeep	5	50	

Source: Traffic police and yatayat samiti, Field survey

5.7.2 Economic Linkage Analysis

Economic linkage focuses on the flow of economic activities, particularly the supply and demand of agricultural goods, industrial products, and herbal resources. This study emphasizes the observation of how various items—such as agricultural produce, herbal goods, and livestock products—are transported from Waling and Galyang markets to their surrounding rural areas, as well as how goods are brought into Waling and Galyang from larger urban centers like Kathmandu, Pokhara, and Bhairahawa.

Table 15 Supply centers and Merchandise Goods

S.N.	Supply Sources	Materials
1	Kathmandu	Industrial products like Plastics, Garments, Watch, Ornaments,Medicines, Electronic Goods,Stationary, Sanitary Wares, Electrical Fittings, Cloths mainy fancy dress
2	Bhairahawa	Kirana goods, Seeds, Electrical goods, Construction Materials, Fruits, Clothings, Vegetables
3	Pokhara	Electronics goods, Fruits, Fancy dress
4	Waling Hinterland	Oranges, Lemons, Milk and Dairy, Honey and Vegetables supply to Waling, butwal, pokhara and local market centre.
5	Galyang Hinterland	Oranges, Milks, citrus fruits (lemons,limes), Medicinal Herbs (Turmeric, ginger, chiraito) supply to galyang , butwal, pokhara and local market centre.

Source: Field Survey, Janaury 2025

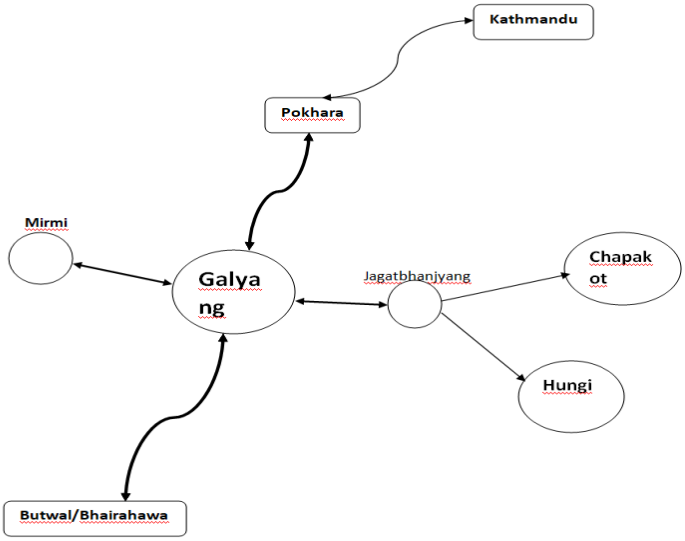


Figure 40 Economic Linkage of Galyang

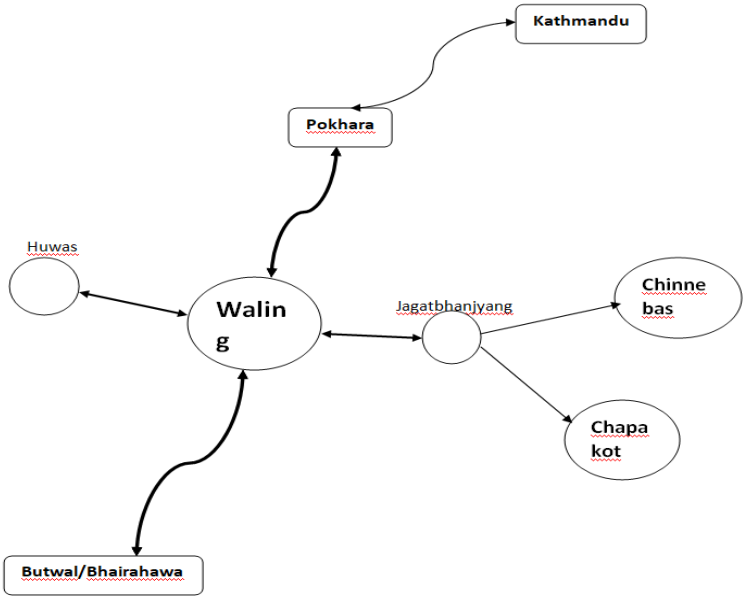


Figure 41 Economic Linkage of waling

5.8 Discussion

Based on the questionnaires and research objectives, here are key findings from the analysis of the Siddhartha Highway's impact:

5.8.1 Key aspects for development

5.8.1.1 Spatial Changes

The construction of the Butwal-Pokhara Siddhartha Highway has significantly influenced spatial development patterns in the study area, particularly in Waling and Galyang municipalities. The changes are evident in population dynamics, land use, infrastructure development, and urban form.

5.8.1.2 Population Dynamics

Waling Municipality: The population decreased from 56,864 in 2001 to 50,488 in 2021, with an annual decline rate of -0.18% between 2011 and 2021. This decline contrasts with the typical urban growth expected near major highways, suggesting outmigration to larger cities like Pokhara or Butwal despite improved connectivity.

Galyang Municipality: The population dropped sharply from 43,827 in 2001 to 31,034 in 2021, with an annual decline of -1.9%. This indicates that improved highway access may have facilitated rural-to-urban migration to more developed hubs rather than retaining residents locally.

Gender and Age Distribution: Both municipalities show higher female populations (53.5% in Waling, 54.4% in Galyang), possibly due to male outmigration for employment. Age distribution reveals a younger workforce in Waling (higher 15–59 age group), while Galyang has a more balanced distribution.

5.8.1.3 Land Use and Built-Up Area:

- Waling: The built-up area expanded significantly along the highway, with 561 buildings constructed in FY 2076/77, peaking at 563 in FY 2077/78, then declining to 173 by FY 2080/81. This trend reflects initial post-highway construction booms followed by stabilization. Google Earth images (2010–2024) show densification along the highway, with mixed-use buildings (residential/commercial) replacing agricultural land.
- Galyang: Limited formal development occurred, with only three building completions post-2073 due to regulatory hurdles (e.g., Building Standard

Norms). Informal construction dominated, particularly near the highway, indicating weak enforcement of land-use policies.

5.8.1.4 Infrastructure Linkages:

- Road Infrastructure:
  - Waling widened sections of the Siddhartha Highway to 11 meters (14 meters at bends) to improve safety, while Galyang's highway remains narrow (7 meters), hindering efficiency.
  - Both municipalities lack proper bus stops, exacerbating traffic congestion.
- Bus Parks: Waling is constructing a bus park to streamline transit, whereas Galyang has only a Detailed Project Report (DPR) with no implementation, reflecting disparities in infrastructure investment.

5.8.1.5 Urban Form:

Linear development along the highway is prominent, with commercial establishments clustering near the road. Waling's "Pink City" initiative exemplifies planned urban expansion, while Galyang's growth is more haphazard due to weaker governance.

The spatial changes reveal a paradox: while the highway improved accessibility, it did not spur sustained local population growth or equitable development. Instead, it accelerated outmigration and uneven urbanization, highlighting the gap between infrastructure investment and tangible regional benefits.

- Improved Access: The highway has significantly enhanced access to markets, healthcare, education, and employment opportunities for local communities.
- Increased Retail Presence: There has been an increase in retailer shops in villages along the highway.
- Land Use Changes: The extended road network has led to changes in land use patterns, with more areas being developed for ***commercial purposes.***

5.8.1.6 Urban Expansion

To manage urban expansion while controlling sprawl, Waling and Galyang require Containment policy. Waling's flat terrain with abundant vacant land calls for a densification strategy (300persons/hectare) rather than land pooling. This approach

would optimize existing urban space through vertical growth and mixed-use development, preventing unnecessary horizontal expansion.

For Galyang, a hillside market town, terraced housing should be prioritized to harmonize with the topography while minimizing land disturbance.

Both towns should implement:

- Strict urban growth boundaries
- Transit-oriented development near highway nodes
- Infill incentives to reuse vacant plots

This dual strategy ensures Waling grows compactly while Galyang adapts to its terrain, balancing development with sustainability.

5.8.2 Economic Growth

The highway's impact on economic activity is analyzed through commercial establishments, trade linkages, and hinterland connectivity.

- Enhanced Trade: The highway serves as a critical economic artery connecting Nepal with India and China.
- Increased Demand for Products: Improved connectivity has led to increased demand for various products due to easier access to markets.
- Business Dynamics: Initially, businesses saw an increase in activity post-construction but have since faced challenges due to direct sourcing from larger cities like Butwal and Pokhara.

5.8.2.1 Commercial Establishments (FY 2076/77 to 2080/81):

- Waling: Business registrations fluctuated, peaking at 466 in FY 2078/79 before dropping to 92 in FY 2080/81. Initial growth was driven by improved access, but later declines suggest saturation or competition from larger cities (e.g., Pokhara).
- Galyang: Registrations plummeted from 389 in FY 2076/77 to 13 in FY 2080/81, indicating limited local economic resilience. The lack of infrastructure (e.g., bus parks) and regulatory barriers stifled entrepreneurship.

Commercial Activities:

- Waling: Dominated by retail (general shops, clothing) and services (tailoring, hotels). Ward 8 emerged as the commercial hub with 360 establishments and 988 employed persons.
- Galyang: Focused on agriculture-linked businesses (orange trade, milk production). Ward 3 had 396 establishments but faced challenges in scaling due to poor transport links.

5.8.2.2 Connectivity to Hinterland:

- Transport Linkages:
  - Waling is well-connected to hinterlands via roads like Waling-Chapakot (22 km, blacktopped) and Waling-Huwas (20.4 km), facilitating trade in oranges and dairy products.
  - Galyang's roads (e.g., Galyang-Pelakot, 18 km) are partially gravel, limiting access for agricultural exports.
- Economic Linkages:
  - Waling supplies oranges to Pokhara and Kathmandu, while importing industrial goods from Bhairahawa.
  - Galyang's Sirausa ward thrives in orange trade (NPR 2–3 lakh/season per household), but inadequate roads hinder market expansion.
- Daily Traffic Volume:
  - Waling handles higher traffic (e.g., 300 passengers/day to Butwal via bus) compared to Galyang (50 passengers/day), reflecting its stronger economic integration.

The highway's economic benefits are uneven. While Waling leveraged connectivity for trade, Galyang's potential remains untapped due to infrastructure gaps. The lack of expected financial returns stems from:

- Narrow roads and sharp bends increasing transport costs.
- Insufficient hinterland linkages limiting market access for rural producers.
- Regulatory bottlenecks (e.g., land-use norms) stifling business growth.

5.8.3 Strategic Interventions for Regional Integration

To address disparities and enhance the corridor's impact, the following interventions are proposed:

5.8.3.1 High-Speed Connectivity Upgrades:

- Double-Lane Highway Expansion: Prioritize widening the Siddhartha Highway to 11 meters (like Waling's upgraded sections) to reduce travel time and accidents.
- Siddhababa Tunnel: Accelerate construction to bypass landslide-prone areas, improving reliability for freight and passengers.

5.8.3.2 Hinterland Connectivity Improvements:

- Road Quality Enhancements: Upgrade gravel roads (e.g., Galyang-Pelakot) to blacktopped standards to facilitate agro-product transport.
- Rural Feeder Roads: Develop last-mile connections to villages like Sirausa (Galyang) to integrate farmers into supply chains.

5.8.3.3 Rural-Urban Linkages:

- Agro-Processing Zones: Establish centers near Waling/Galyang to add value to oranges and dairy, creating local jobs and reducing raw material exports.
- Market Information Systems: Digital platforms to connect hinterland producers with urban buyers, reducing middlemen margins.

5.8.3.4 Employment-Linked Migration Policies:

- Skill Development: Train locals in logistics, tourism, and agro-processing to retain talent. Example: Waling's potential as a "Smart City" could focus on eco-tourism.
- Subsidies for Local Industries: Replicate Galyang's successful milk subsidy model for other sectors (e.g., orange packaging).
- Outmigration Concerns: Improved connectivity has also facilitated outmigration from rural areas seeking better opportunities to place mostly like Butwal/Bhairahawa, Pokhara, Kathmandu area.

5.8.3.5 Governance and Investment:

- Public-Private Partnerships (PPPs): Attract private investment for bus parks and cold storage facilities.
- Land-Use Reforms: Simplify building permits in Galyang to spur formal construction.

These interventions directly address the highway's underperformance by:

- Mitigating transport inefficiencies (e.g., narrow roads) that deter investment.
- Strengthening backward linkages to hinterlands, ensuring local economies benefit from trade.
- Balancing urban-rural growth to curb outmigration and create localized employment

5.8.4 Opportunities & Potential Sectors

- Tourism Growth Potential: Indian tourists frequently use this route for destinations like Pokhara and Mustang.
- Investment Opportunities: Key sectors include tourism development, agricultural production (e.g., oranges, syangja produce and export 1.12 billion of oranges in 2023), and infrastructure projects like new bridges in ramdi.
- Construction of waling Buspark infrastructure development will be pivotal in supporting regional connectivity and fostering growth across surrounding hinterlands.

The Siddhartha Highway has transformed spatial and economic landscapes, but its benefits are skewed. Waling's planned growth contrasts with Galyang's stagnation, reflecting governance and infrastructure gaps. Strategic interventions must prioritize equitable connectivity, rural-urban integration, and regulatory reforms to unlock the corridor's full potential. Without these measures, the highway risks perpetuating regional disparities rather than catalyzing inclusive development

Overall Impact:

The Siddhartha Highway plays a crucial role in regional development by enhancing connectivity. However, it faces significant challenges such as poor road conditions that require urgent upgrades. Strategic interventions focusing on infrastructure improvements can enhance economic growth while promoting sustainable urban-rural integration.

Here are additional detailed points summarizing key aspects:

- The construction of tunnels is seen as a solution to mitigate natural hazards affecting roads.
- Local businesses initially benefited but now face competition from larger cities.

- Increased accessibility benefits local employment opportunities.
- Tourism potential is high due to connections between international airports.
- Challenges include frequent closures during night hours due to maintenance needs.
- Stakeholders advocate for upgrading sections prone to landslides or damage.

These insights highlight both positive impacts (e.g., improved access) and negative aspects (e.g., outmigration) associated with the Siddhartha Highway's influence on regional development.

CHAPTER SIX: CONCLUSION

The study of the Western-Central Corridor, particularly the Butwal-Pokhara Siddhartha Highway, reveals a complex interplay between infrastructure development, spatial transformation, and economic growth. While the highway was envisioned as a catalyst for regional development, the findings highlight significant gaps between anticipated benefits and actual outcomes, aligning with the problem statement that despite substantial investments, expected financial returns and economic benefits have not fully materialized. The research objectives—analyzing spatial changes, evaluating economic activity, and proposing strategic interventions—provide a structured assessment of these discrepancies and pathways for improvement.

The highway has undeniably influenced spatial development, particularly in Waling and Galyang municipalities. Population trends indicate outmigration rather than localized growth, with both municipalities experiencing declines despite improved connectivity. This suggests that while the highway facilitates movement, it has not sufficiently created local employment or economic opportunities to retain residents. Land use patterns show linear urbanization along the highway, with commercial and residential developments clustering near the road. However, informal construction in Galyang and regulatory bottlenecks highlight governance challenges in managing growth. Infrastructure improvements, such as Waling's Road widening and ongoing bus park construction, demonstrate proactive planning, whereas Galyang's stagnation reflects uneven development due to weak policy enforcement and investment disparities.

The highway's economic impact is mixed. Commercial establishments in Waling initially surged post-construction but later declined, indicating market saturation or competition from larger cities like Pokhara. Galyang's persistently low business registrations underscore structural barriers, including poor road quality and limited access to markets. While Waling thrives as a trade hub (e.g., orange exports), Galyang's agricultural potential remains underutilized due to inadequate transport links to hinterlands. Daily traffic data confirms Waling's stronger economic integration, whereas Galyang's weaker connectivity restricts its growth. This aligns with the problem statement—infrastructure alone does not guarantee economic

returns without complementary investments in local industries, market access, and rural-urban linkages.

To address these gaps, the study proposes three key interventions:

- High-Speed and Reliable Connectivity: Expanding the highway to double lanes and completing the Siddhababa tunnel will reduce travel time and accidents, enhancing trade efficiency.
- Hinterland Integration: Upgrading rural feeder roads (e.g., Galyang-Pelakot) and establishing agro-processing zones can strengthen backward linkages, ensuring farmers benefit from urban markets.
- Employment-Linked Development: Skill development programs and subsidies for local industries (e.g., dairy, horticulture) can curb outmigration by creating jobs tied to the highway's economic spillovers.

These measures directly respond to the research objectives by:

- Balancing spatial development through planned urbanization and land-use reforms.
- Stimulating inclusive economic growth by addressing transport inefficiencies and market access.
- Enhancing regional integration via rural-urban partnerships and infrastructure upgrades.

The Siddhartha Highway has reshaped Nepal's western region, but its transformative potential remains incomplete.The disconnect between infrastructure and equitable development underscores the need for holistic policies that go beyond road construction to include governance reforms, local capacity building, and targeted investments. Without these, the corridor risks exacerbating disparities rather than fostering balanced regional growth. Future research should explore public-private partnership models and community-led development initiatives to ensure the highway delivers on its promise as a true catalyst for spatial and economic transformation.

CHAPTER SEVEN: RECOMMENDATIONS

The findings of this study highlight critical gaps in the expected economic and spatial benefits of the Butwal-Pokhara Siddhartha Highway. To address these challenges and align with the problem statement (lack of anticipated financial returns and regional development), the following recommendations are proposed, structured around the research objectives of analyzing spatial changes, economic activity, and strategic interventions.

7.1 Enhance Infrastructure Quality and Connectivity

Problem Link: The highway's narrow width, sharp bends, and poor maintenance hinder efficient transportation, reducing its economic impact.

Recommendations:

- Upgrade to Double-Lane Standards: Prioritize widening critical sections (e.g., Galyang Bazaar) to 11 meters, mirroring Waling's successful model, to improve safety and freight movement.
- Complete the Siddhababa Tunnel: Accelerate construction to bypass landslide-prone zones, reducing travel distance and ensuring year-round connectivity.
- Urban road facilities approach on city area through the highway.
- Develop Integrated Bus Terminals: Construct bus parks in Waling (ongoing) and Galyang (pending) to formalize transit hubs, reducing congestion and improving logistics.

7.2 Strengthen Rural-Urban Linkages

Problem Link: Weak connections to hinterlands limit agricultural market access, stifling local economies.

Recommendations:

- Improve Feeder Roads: Blacktop rural roads (e.g., Galyang-Pelakot, Waling-Sirausa) to integrate farmers with urban markets.
- Establish Agro-Processing Zones: Develop facilities near Waling and Galyang to add value to oranges, dairy, and herbs, creating jobs and reducing post-harvest losses.

7.3 Promote Local Economic Diversification

Problem Link: Over-reliance on low-value agriculture and outmigration due to limited employment.

Recommendations:

- Tourism Development: Leverage the highway to promote eco-tourism (e.g., Aadhikhola Valley trails) and heritage stays in Waling's "Pink City."
- Skill Development Centers: Train youth in logistics, hospitality, and agro-processing to align with corridor-driven job opportunities.
- Subsidies for SMEs: Offer tax breaks for businesses (e.g., packaging units, handicrafts) to stimulate local entrepreneurship.

7.4 Governance and Policy Reforms

Problem Link: Inconsistent land-use policies and weak enforcement impede planned growth.

Recommendations:

- Streamline Building Permits: Simplify approval processes in Galyang by adopting Waling's digital land-use mapping system.
- Build Economic Complex (Highway integrated business centers) with logistics, banking, and digital services.
- Zoning Regulations: Designate commercial, industrial, and residential zones along the highway to prevent haphazard urbanization.
- Community Participation: Form corridor development committees with local stakeholders to ensure inclusive planning.

The Siddhartha Highway's transformative potential can only be realized through targeted investments, policy coherence, and multi-stakeholder collaboration. By prioritizing infrastructure upgrades, rural-urban integration, economic diversification, and governance reforms, the corridor can evolve into a true engine of regional development. These recommendations directly address the problem statement's core issues while fulfilling the research objectives to foster sustainable spatial and economic transformation.

By adhering to this phased approach, the Western-Central Corridor can transition from a transport route to a development corridor, ensuring equitable benefits for Waling, Galyang, and their hinterlands.

REFERENCES

1632653594_54335138_Curriculum Development Journal_Vol26No40_2069.pdf. (n.d.). Retrieved November 21, 2024, from https://www.tucdc.edu.np/upload_file/files/post/1632653594_54335138_Curriculum%20Development%20Journal_Vol26No40_2069.pdf#page=69

(N.d.). Retrieved November 21, 2024, from https://www.cabidigitallibrary.org/doi/full/10.5555/19771836878

Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory, 18(4), 543-571.

Banister, D., & Berechman, J. (2003). Transport investment and economic development. Routledge. https://www.taylorfrancis.com/books/mono/10.4324/9780203220870/transport-investment-economic-development-david-banister-joseph-berechman

Kesar,H.Y.(2015).Importance of Transport Corridors in Regional Development: The Case of TRACECA, Bursa Technical University, Sosyoekonomi 24(24), DOI:10.17233/se.96735

Litman, T. (2020). Transportation and Environmental Policy. Victoria Transport Policy Institute.

McCartney, M. (2022). The China-Pakistan Economic Corridor (CPEC): Infrastructure, Social Savings, Spillovers, and Economic Growth in Pakistan. Eurasian Geography and Economics, 63(2), 180–211. https://doi.org/10.1080/15387216.2020.1836986

Nepal Rastra Bank. (2020). Economic Indicators Report: Waling Municipality Development Trends.

Priemus, H., & Zonneveld, W. (2003). What are corridors and what are the issues? Introduction to special issue: the governance of corridors. Journal of Transport Geography, 11(3), 167–177. https://doi.org/10.1016/S0966-6923(03)00028-0

Rehman, A. A., & Alharthi, K. (2016). An Introduction to Research Paradigms.

Rondinelli, D. A. (1979). Balanced Urbanization, Spatial Integration, and Economic Development in Asia: Implications for Policy and Planning. Urbanism Past & Present, 9, 13–29.

Sharma, B., & Ulak, P. (n.d.). (PDF) Engineering Geological Study of Road Tunnel Along Siddhartha Highway Between Butwal and Dobhan Siwaliks Group, West-central Nepal. Retrieved November 21, 2024, from https://www.researchgate.net/publication/380875351_Engineering_Geological_Study_of_Road_Tunnel_Along_Siddhartha_Highway_Between_Butwal_and_Dobhan_Siwaliks_Group_West-_central_Nepal

Zhang, L., et al. (2020). The Belt and Road Initiative: A Global Strategy for Economic Development? Journal of International Business Policy, 3(1), 1-16.

Zhang, T., Qiu, Y., Ding, R., Yin, J., Cao, Y., & Du, Y. (2023). Coupling coordination and influencing factors of urban spatial accessibility and economic spatial pattern in

the New Western Land-Sea Corridor. Environmental Science and Pollution Research, 30(19), 54511–54535. https://doi.org/10.1007/s11356-023-26121-2

APPENDIX A: QUESTIONNAIRE

Questionnaire for Customers

1. Age: _____
2. Gender: _____
3. Occupation: _____
4. Residence (Ward/Area): _____
5. Monthly Income Level:
    - Below NPR 10,000
    - NPR 10,000 - 20,000
    - NPR 20,000 - 30,000
    - Above NPR 30,000
6. How long does it take to get this town?

S.N	Mode of Transport	Travel time distance	Remarks
1	**On foot**		
2	**By bus**		
3	**Others (specify)**		

7. How often do you use the Siddhartha Highway?
    - Daily
    - Weekly
    - Monthly
    - Rarely
8. Rate the impact of the highway on your access to services (1 = No Impact, 5 = High Impact):
    - Access to markets:
    - Access to healthcare:
    - Access to education:
    - Access to employment opportunities:
9. What changes have you noticed in local businesses since the highway's construction?

10. Have you experienced any changes in your travel time since the highway was built?
11. Yes / No (If yes, please explain): _____
12. Do you sell any (your own) product while visiting this town?
13. What types of products do you purchase more frequently due to improved access?
14. Have you noticed any changes in prices of goods or services since the highway's completion?
15. Yes / No (If yes, please elaborate): _____
16. How has your overall quality of life changed since the highway was constructed?
17. In your opinion, what are the main benefits of the highway for your community?
18. What challenges or negative impacts have you experienced as a result of the highway?

Questionnaire for Businesses/Organizations

1. Business Name: _____
2. Type of Business: _____
3. Years in Operation: _____
4. Number of Employees Before and After Highway Construction:
    - Before: _____
    - After: _____
5. Where do the customers visit you? (Origin place of clients or destination places)

S.N.	Name of localities/Villages	Municipality/RM	Districts	Remarks
1.				
2.				
3.				

6. How often do the customers visit your business place/ Shop?

- Daily
- Weekly
- Monthly
- When need arises

7. What is the primary purpose of customer to visit to your businesses/shop along the Siddhartha Highway?
    - Personal Consumption
    - Retail Purchase for Resale
    - Other (Please specify): _____
8. Rate the impact of the highway on your business operations (1 = No Impact, 5 = High Impact):
    - Customer footfall:
    - Supply chain efficiency:
    - Delivery times:
9. What types of products or services have seen increased demand due to highway access?
10. Have you registered your business with local authorities since the highway was built?
11. Yes / No (If yes, please provide details): _____
12. Where do you get materials (merchandise or raw) for your business/organization/industry?

S.N.	Name of supply sources/District	Type of materials	Remarks
1.			
2.			
3.			
4.			

13. What is the mode of transport for your trade goods?
    - Truck

- Bus
- Porter
- Other (Specify)

14. How do you perceive competition in your sector since the highway's completion?
15. Increased / Decreased / Remained Same (Explain): _____
16. What challenges have you faced as a result of increased competition following the highway's construction?
17. What do you feel are the opportunities for your town development after the development of Highway?

Questionnaire for Institutions

1. Institution Name: _____
2. Type of Institution (e.g., government, NGO, educational): _____
3. Position of Respondent: _____
4. How has the Siddhartha Highway influenced regional development policies in Waling?
5. What are the observed changes in land use patterns since the highway's construction?
6. Rate the overall impact of improved connectivity on local economic activities (1 = No Impact, 5 = High Impact):
    - Local employment opportunities:
    - Business registrations:
    - Tourism development:
7. What strategic interventions do you propose to enhance sustainable development along the highway corridor?
8. Are there any challenges faced by institutions in promoting development linked to the highway?
9. Yes / No (If yes, please explain): _____
10. How do you assess community engagement in development planning related to the highway?

11. What measures are being taken to ensure that development along the highway is sustainable and inclusive?
12. In your view, what are the key factors contributing to insufficient economic returns from investments made in this infrastructure project?
13. How do you evaluate current policies affecting land use and economic activities along the corridor?
14. What role does local government play in facilitating economic growth linked to improved connectivity?
15. How your institution create environment for investment?
16. What are the processes to open company?

APPENDIX B: CONFERENCE PAPER

त्रिभुवन विश्वविद्यालय
Tribhuvan University
इन्जिनियरिङ्ग अध्ययन संस्थान
Institute of Engineering
थापाथली क्याम्पस
THAPATHALI CAMPUS
Accredited By University Grants Commission (UGC) Nepal, 2024

GPO Box- 280, Thapathali, Kathmandu
Tel: 01-5339766
E-mail: info@tcioe.edu.np
Website: www.tcioe.edu.np
गोश्वारा पो. नं. २८०, थापाथली, काठमाडौं
फोन: ०१-५३३५७६६

Date: April 21, 2025

To Whom It May Concern:

This is to certify that the paper titled **"Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development"** (Submission# **245**) submitted by **Suraj Chapagain** as the first author, which had been accepted for presentation after the peer-review process, has successfully been presented at the 16th IOE Graduate Conference held during April 18 - 20, 2025. Kindly note that the final revision of the papers and publication process of the conference proceedings is still underway and hence inclusion of the accepted manuscript in the conference proceedings is contingent upon timely response to further edits during the publication process.

Dr. Raj Kumar Chaulagain,
Convener,
16th IOE Graduate Conference

Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development

Suraj Chapagain [a], Ajay Chandra Lal [b], Sudeep Sharma Poudyal [c]

[a,b,c] Department of Architecture, Pulchowk Campus, IOE, Tribhuvan University, Nepal
[a] citizensuraj@gmail.com , [b] ajay@ioe.edu.np, [c] sudeepsharma@ioe.edu.np,

Abstract
The Butwal-Pokhara Siddharth Highway, a critical transportation corridor in Nepal, has significantly influenced regional development by enhancing connectivity and economic growth. This study examines the impact of the highway on Waling focusing on patterns of economic links and challenges in equitable growth. Using a mixed-methods approach, the research integrates quantitative data from surveys and economic indicators with qualitative insights from interviews and focus groups. Findings reveal that the highway has spurred commercial and residential development, increased land values, and improved access to markets, particularly benefiting urban centers like Waling. However, disparities persist, with rural areas lagging due to inadequate infrastructure and limited investment. The study highlights the highway's role in fostering tourism, agriculture, and trade, while also identifying challenges such as out-migration, road safety concerns, and uneven development. Strategic interventions, including infrastructure upgrades, balanced urban-rural integration are proposed to address issues of regional growth. This research contributes to the academic discourse on transportation corridors and regional development, offering practical recommendations for policymakers to ensure equitable benefits from infrastructure investments.

Keywords
Transportation corridor, regional development, urban-rural integration, infrastructure

1. Introduction

Transportation corridors are vital for regional development, fostering economic integration and accessibility. Globally, numerous examples illustrate how transport corridors catalyze regional development. Theransport Network (TEN-T) of the Eu(TEN-T) of the European Unionis a example designed to improve connection between member states. This network has been instrumental in promoting economic cohesion by reducing travel times and costs, thereby enhancing trade among countries (European Commission, 2018). Similarly, the New Silk Road initiative aims to connect Asia with Europe through a series of rail and road corridors, significantly impacting trade routes and economic opportunities in participating countries [1]. This is best demonstrated by the Butwal-Pokhara Siddharth Highway in Nepal, which acts as an essential conduit between two significant urban areas: Butwal, a business hub, and Pokhara, a well-liked tourist destination. The 184-kilometer route, which passes through the districts of Kaski, Syangja, Palpa, and Rupandehi, links the provinces of Gandaki and Lumbini. It was finished in 1972. By attracting residential and commercial development to easily accessible places, the highway also affects spatial development. To effectively manage this urban spread, urban planners must strike a balance between community well-being, environmental concerns, and growth . Improved accessibility attracts more business and residential interest in towns along the route, including Tansen, Galyang, Waling, and Putalibazar. But there are also drawbacks to progress. If not handled properly, the disparities between rural and urban areas can worsen. Without comparable investments, nearby rural communities may lag behind Butwal and Pokhara, which see rapid growth. As a result, a comprehensive strategy that strategically invests in less accessible places is required to promote fair access to resources and opportunities across all regions. In Conclusion, the Butwal-Pokhara Siddharth Highway is an essential conduit for western Nepal's economic expansion, geographical development, and connection [2]. To fully realize its potential and build prosperous communities throughout the various landscapes it connects, it is imperative to address possible inequalities and encourage sustainable practices.

1.1 Background

One of Nepal's most important transportation routes, the Butwal-Pokhara Siddharth Highway has a big impact on regional dynamics. The 184-kilometer route, which links the provinces of Gandaki and Lumbini, was finished in 1972 and links Butwal, a commercial center, with Pokhara, a popular tourist destination. Between these important metropolitan areas and the neighboring districts (Rupandehi, Palpa, Syangja, and Kaski), it is an essential conduit for trade, tourism, and general connectivity.

Foot trails served as the main mode of transportation before to the highway's construction, which restricted accessibility and trade. With the construction of the highway, communication was significantly increased, allowing the flow of people and commodities and increasing trade with India. Towns along the route, like Tansen, Waling has grown as a result of the increased accessibility, which has also boosted commercial activity and spatial development. Along with raising land values, the roadway has encouraged the growth of commercial agriculture and other industries. The road is now one of Nepal's busiest transit routes, with about 1,250 commercial cars using it every day [3]. However, there are obstacles to the

highway's construction, such as possible inequalities between rural and urban communities. Butwal and Pokhara might flourish quickly, but if the nearby rural villages don't receive targeted investments and fair access to resources, they might lag behind. To guarantee that the advantages of the roadway are shared fairly and encourage sustainable growth throughout the entire region, effective urban planning and well-rounded regional development policies are required.

1.2 Rational of Study

1.2.1 Problem Statement A vital part of Nepal's Western Central Corridor, the Butwal-Pokhara Siddharth Highway seeks to improve connection between important cities. There are worries over the fair distribution of benefits, nevertheless, because there is a dearth of empirical studies analyzing its true effects on regional economic growth and spatial development [4]. Although the goal of highway projects like the Butwal-Pokhara Siddharth Highway is to promote economic expansion, the anticipated financial gains and economic stimulus have not always come to pass. The efficiency of infrastructure spending is called into question by this disparity. Need of Research Because of Nepal's distinct socioeconomic circumstances, existing research on the effects of transportation corridors frequently does not apply directly to the country. It is challenging to determine whether the benefits are reaching all facets of the community in the absence of thorough investigations, especially in an environment where regional discrepancies are noticeable. This research is essential to fill the knowledge void regarding how the highway influences regional development dynamics. The study will give lawmakers a thorough understanding of the corridor's true effects by looking at both quantitative and qualitative data. In order to establish plans that support balanced regional growth and guarantee that infrastructure investments benefit all areas equally, it is imperative to comprehend these dynamics. In order to improve connection while addressing potential disparities, the research will direct planning and investment decisions[5]. **Importance** This study will also contribute to academic discourse on urban planning and regional development in Nepal. It will fill a significant gap in the specific context of Nepal and its developmental challenges by shedding light on how transportation corridors can spur change and emphasizing the value of inclusive planning techniques. It will also enhance the body of existing literature and provide useful suggestions for upcoming projects. Because it fills in a major knowledge gap about the precise effects of the Butwal-Pokhara corridor, this study is essential for contributing to larger conversations about infrastructure development and regional justice [1].

1.3 Research Objectives

- To explore economic growth of Waling stimulated by Siddhartha Highway (NH-47)

1. To evaluate the market prospects and problems
2. To examine the corridor amenities contribution

2. Literature Review

Development dynamics refers to the patterns, processes, and factors that influence the overall progress, changes, and transformations within a particular area or context. It encompasses various aspects such as social, economic, political, environmental, and cultural dynamics that shape the development trajectory of a region. On the other hand, urban development dynamics specifically focus on the patterns, processes, and factors that shape the growth, transformation, and management of urban areas. Urban development dynamics take into account the unique characteristics and challenges of urban environments, including aspects such as population growth, land use planning, infrastructure development, housing[6], transportation, environmental sustainability, social dynamics, and economic activities. While development dynamics can be applied to any context, urban development dynamics specifically zoom in on the dynamics and complexities of urban areas. Urban development dynamics often involve aspects related to urbanization, urban planning, and the management of urban spaces and resources.

2.1 Regional planning theories

A planning concept's use of the term "region" might be interpreted in terms of its geographic characteristics, climatic characteristics, demographic characteristics, administrative structures, settlement patterns, political dimension and level of development. Some locations may be blessed with an abundance of natural resources, lush soil, stunning scenery, a distinct socio-cultural identity, etc. regional planning is thus essentially the planning of spatial development to ensure that the benefits of social and economic development are fairly among the areas.

2.1.1 Gateway Model

Gateway is the unique positional characteristic that gives fairly clear image of a city explaining its town and their hinterland. This concept is rather fit well in the region, characterized by heterogeneous resource potentials such as Nepal [7]. The derived word for the gateway is doorway into a building or one set in a city wall. Gateway is in contrast to a central place that would appear to lie in the shape of the city's service areas. The gateway city is located eccentrically towards one end. Gate- way enjoys a maximum extended range to one side.

2.2 Forward and backward linkage theory

Forward and backward linkage theory" refers to a concept in economics that analyzes how different industries within an economy are interconnected through the flow of goods and services, where "forward linkage" describes the impact an industry has on downstream industries by supplying them with intermediate goods as inputs, while "backward linkage" refers to the influence an industry has on upstream

industries by demanding inputs from them to produce its own goods; essentially, it examines how the output of one industry becomes the input for another, creating a chain of dependencies within the production process.

2.3 Corridors and Connections in Nepal

As noted earlier, Nepal's National Urban Development Strategy identified urbanizing cluster and corridors across the country, including the EUC and WUC. They exist across Nepal but all are anchored on the Kathmandu Valley which has over 3 million residents and the highest concentration of firms . The EUC has a population of approximately 2.17 million and the WUC a population of just over 2 million. They are connected by Nepal's east-west highway. WUC is only 270 km from the Kathmandu Valley (approx. one-day drive) and EUC is 365 km from the Valley (a longer but still one-day drive). Both corridors therefore are connected to Nepal's largest market in and around Kathmandu, and these connections are gradually improving. (Bank, 5 March 2019)

3. Methodology

This research employs a mixed-methods approach, integrating quantitative and qualitative techniques, to comprehensively understand the impact of the Butwal-Pokhara Siddharth Highway on regional development. The research will employ a methodological, ontological, and epistemologically based organized framework.

3.1 The quantitative component

The quantitative component involves structured surveys targeting residents and businesses along the corridor. In addition to gathering information on employment rates, company performance, and traffic volume, these surveys will gauge opinions regarding economic growth, land use changes, and transportation efficiency. Regression analysis and other statistical techniques will be employed to measure the highway's influence on spatial development and economic growth. To evaluate growth indicators before and after highway building, government reports and local business economic data will also be examined.

3.2 The qualitative component

The Qualitative component will gather in-depth insights through semi-structured interviews with local government officials, urban planners, business owners, and residents. Their perspectives on the corridor's effects on communities and economic possibilities will be investigated through these interviews. Community members will participate in focus groups to discuss how they all perceive changes in spatial development. Findings from both quantitative and qualitative components will be integrated to provide a comprehensive understanding of the Western Central Corridor's role as a catalyst for spatial and economic transformation. By fusing objective measurements with subjective experiences, this integration provides a nuanced perspective on the corridor's transformative potential and is essential for triangulating data sources and improving the validity of research findings [8]. To analyze the impact of the western-central corridor (Siddhartha Highway Butwal-Pokhara) on spatial development and economic growth, a qualitative and quantitative research approach was employed. Primary data were collected through structured and semi-structured interviews with key stakeholders, including customers, business owners, and representatives from various institutions. These interviews provided insights into economic activities, infrastructure development, and regional connectivity. Additionally, secondary data were obtained from government reports, policy documents, and previous studies related to regional development and transportation infrastructure. The collected data were analyzed to assess the corridor's role in fostering balanced regional development.

4. Study Area Introduction

The case study for the thesis proposal titled "Western-Central Corridor: Catalyst for Spatial and Economic Transformation in Regional Development" will focus on key towns along the Butwal-Pokhara Siddharth Highway. This highway serves as a vital link between two major urban centers in Nepal, facilitating economic growth and spatial development in the surrounding areas. The selected towns—Galyang, and Waling—each exhibit unique characteristics and have experienced varying degrees of transformation due to their proximity to this corridor.

Figure 1: Major market and emerging center along highway

4.1 Demography

The population of Waling has been experiencing a decreasing trend over the years, with figures recorded at 56,864 in 2001, 51,243 in 2011, and 50,488 in 2021, reflecting an annual decline of approximately -0.18 percent between 2011 and 2021. The municipality comprises a total of 13,424 households, with a population density of 393.2 individuals per square

kilometer. The gender distribution shows a higher proportion of females (53.5percent) compared to males (46.5percent). Ethnically, the population is diverse, with Brahmins making up the largest group (31.3percent), followed by Magars (19.4percent), Gurungs (13.8percent), and Kshetris (9.6percent). The predominant religions practiced in the area are Hinduism and Buddhism. The overall literacy rate stands at 83.4percent, with a higher literacy rate among males (90.8percent) compared to females (77.1percent). Migration patterns indicate that 71.1percent of residents have relocated within Waling, while 17.4percent have moved from other municipalities within Syangja, and 8.3percent have migrated from other districts.

In Waling Municipality, several key demographic trends are observed. Notably, the population is experiencing a declining trend. Additionally, the female population outnumbers the male population. Ethnically, Brahmin and Magar communities are dominant. Literacy rates are notable, with a gender gap favoring male literacy. Furthermore, most migration occurs within the municipality itself, indicating that residents tend to move locally rather than to distant locations. These observations highlight the need for targeted interventions to address population decline and gender disparities in literacy, while also considering the unique ethnic composition and migration patterns of Waling.

4.2 Pull Factors and Push Factors

Pull Factors: Employment in larger cities, access to better education and healthcare, enhanced trade connectivity, tourism-related jobs, and government road upgrades. Push Factors: Limited rural job opportunities, lack of quality education and healthcare, difficulty accessing markets, limited tourism benefits reaching rural communities, and hazardous road conditions.

4.3 Land Transactions

Land values in Waling vary significantly based on location, with roadside land in the Bazar area commanding high prices due to development pressure. Prices range from 10 lakhs per meter along the main motorable road to 4 lakhs in interior areas. Private land developers have begun plotting and selling land parcels at inflated prices. Tax collection data from the Land Revenue Office in Waling reflects real estate business transactions. Tax collection from real estate transactions in Waling has generally increased from fiscal year 2077/78 (25 lakhs) to 2080/81 (1.27 crore), but decreased in the latest data available up to the month Mangsir of 2081/82 (27 lakhs). However, note that the tax collection for the whole office, including Waling and surrounding hinterlands, decreased in the fiscal year 2078/79 and 2079/80 compared to the fiscal year 2077/78, but increased in the fiscal year 2080/81. This data indicates the economic activities associated with land transactions occurring in Waling.

Fiscal Year	Transactions No.	Tax (NRP)
2077/78	349	25,00,000
2078/79	389	95,00,000
2079/80	203	1,05,00,000
2080/81	236	1,27,00,000
2081/82 (up to Mangsir)	126	27,00,000

Table 1: Number of Transactions and Tax Collection in Waling

4.4 Economic Linkage

Waling serve as crucial local market centers, facilitating trade between the central city, surrounding hinterlands, and nearby town . While they import building supplies and industrial goods, they export regional agricultural products like oranges. Waling's economic clout is further enhanced by its status as a finance center. Local revenues could be increased via subsidies, such as those for milk production. Both urban industrial sectors and rural agricultural communities gain from this integrated approach. Chapakot, Biruwa, and Huwas (Parbat) are important growth hubs close to Waling.

S.N.	Road	Length	Pavement	Remarks
1	Chapakot	22 km	Pitched	District
2	Huwas	20.4 km	pitched	District
3	Setibeni	26 km	P+G	Province
4	Sorek	10 km	P+G	District
5	Chinnebas	23 km	P+G	District
6	Manakamana	16.1 km	P+G	District
7	Mansyankot	14.5 km	P+G	District

Table 2: Road Network in Waling

Road Linkage Road networks linking Waling to nearby marketplaces are vital for economic growth. Both forward (local product distribution) and backward (input supply) links are supported by these roads, which include fair weather, clay, and blacktopped roads. By linking Waling with larger cities, the Siddhartha Highway fosters regional economic integration and trade. Local and inter-district trade is promoted by the Waling-Chapakot Road and the Waling-Huwas (Parbat) Road. These road networks establish priorities for infrastructure development, improve accessibility, stimulate economic growth, and incorporate local economies into broader regional networks. To connect Waling Bazaar with significant commercial districts and so boost economic activity in the area, a system of well-maintained highways is necessary.

5. Data Analysis

5.1 Physical Infrastructure of Siddhartha Highway

5.1.1 Road Infrastructure

The Siddhartha Highway, crucial for regional development in Gandaki, Lumbini, and Dhaulagiri zones, faces challenges due to its narrow width and sharp bends. Despite a narrower seven-meter highway

portion through Waling Bazaar,waling has not adopted comparable widening or safety measures, but initiates to widened the road to 11 meters with 14-meter widths at bends for safety. Proper bus stations are absent from municipalities.

5.1.2 Bus Park

Waling are recognized as vital transit hubs along the Siddhartha Highway. To make up for the prior absence, Waling is building a bus park. The lack of bus parks creates problems for regional development and traffic control, leading to traffic jams and safety issues. By providing dedicated loading and unloading areas, formal bus parks would improve urban planning, increase economic activity, and ease traffic. Waling's bus park development in order to capitalize on its status as a major transit hub and promote regional connectivity and development.

5.2 Land Use

Waling Municipality: Building construction of buildings fluctuated between FY 2076/77 and FY 2080/81, declining in the latter years (561 in FY 2076/77 to 173 in FY 2080/81). Land Use Context: As a result of urbanization spurred by the Siddhartha Highway, there is a shift towards residential and mixed-use structures (up to six stories), indicating denser urban living and a decrease in agricultural area. Building Plan Requirements: In order to improve planning standards and space efficiency, the land requirement for building plans was raised from two and a half annas to four annas after FY 2079.

5.3 Functional Changes

Introduction: Waling functional bases have been impacted by the highway's construction, which has resulted in a rise in administrative, social, financial, commercial, and developmental activities. People benefit from these activities, which also have an impact on the hinterlands.

Commercial Organization: Retailing (general stores, clothing, dealers), wholesale (general stores, clothing, medical, cosmetics, utensils, books/stationery, meat, Kirana shop), catering (tea, snacks, and sweets, restaurants, hotels, and lodging facilities), and professional services (tailoring, photo studio, barbershop) are the categories of commercial activities.

Industrial Organizations: Small businesses, such as mills and bakeries, are classified as industrial activities. These comprise small-scale home businesses such as agro-based enterprises, iron grills, water/diesel mills, dalmot manufacturers, and bakeries. Government services and non-governmental groups make up institutional organizations, which are growing in number as the road network develops. Waling is served by these

5.4 Commercial Establishment

Waling: Business registrations fluctuated significantly between FY 2076/77 and FY 2080/81, starting at 334, peaking at 466 in FY 2078/79, and declining to 92 by FY 2080/81. Waling experienced volatile business registration trends, while Galyang faced a sharp and sustained decline, suggesting challenges hindering new business development compared to Waling.

Fiscal Year	Waling
2076/77	334
2077/78	334
2078/79	466
2079/80	130
2080/81	92

Table 3: Business Registration

5.5 National Economic Census 2018

Waling: Ward 8 is the commercial center, home to 360 businesses and 988 employees (548 men and 440 women).With 184 establishments and 466 employees (225 men and 241 women), Ward 1 comes next. Women make up a significant portion of the workforce, especially in Ward 8.

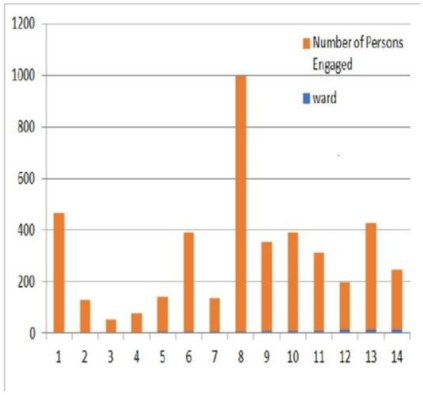


Figure 2: Person Engaged in Commercial Activities

5.6 Linkage Analysis Concept

Market towns develop to meet people's demands for goods and services, fostering a reciprocal relationship with their hinterlands. Providing farm inputs, marketing, household goods, extension services, healthcare, education, and off-farm jobs, they provide as hubs for economic, social, cultural, and political services, particularly in rural areas. Goods, ideas, products, and services can move freely between the town and its hinterland thanks to the transportation and communication networks.

5.6.1 Transportation Linkage Analysis

Examines how Waling is connected to their respective hinterlands by road. Linking town centers and neighboring growth points is significantly influenced by the type and condition of the roads. The road links between Waling and its neighboring important areas,

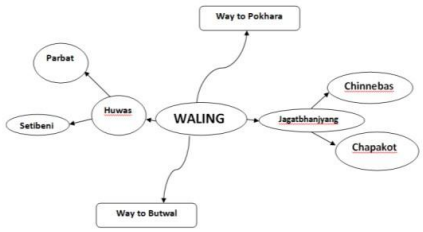


Figure 3: Transportation Linkage of Waling to its surroundings

such as Huwas, Chapakot, and Setibeni, are depicted in this map.

5.6.2 Daily traffic volume Analysis

S.N.	Route	Vehicle	Trips	Passengers
1	Huwas	Bus	3	120
		Jeep	35	420
2	Chapakot	Jeep	40	480
3	Butwal	Bus	5	300
		Micro Van	5	130
4	Pokhara	Micro Van	22	528
		Bus	3	150
5	Kathmandu	Micro Van	6	120
		Bus	4	200
6	Sorek	Jeep	5	25
7	Setibeni	Jeep	8	80
8	Malyankot	Jeep	13	130
9	Harinas	Jeep	6	60

Table 4: Daily Traffic Volume Analysis

Analysis of vehicles playing between Waling and nearby destinations. Waling's daily traffic volume reveals local jeep services to Huwas, Chapakot, Malyankot, and Setibeni, micro vans traveling to Pokhara and Kathmandu, and bus services to Butwal and Kathmandu. In summary, road networks provide Waling with substantial access to their hinterlands. Local transportation is made easier by jeeps, while buses and microvans connect to larger cities. As a reflection of their economic and social significance, different routes have different passenger and trip counts. These transportation systems facilitate the movement of people, products, and services between Urban center and surrounding regions.

5.6.3 Economic Linkage Analysis

Economical linkage deals about the economical activities, demand and supply of agriculture products, industrial products, and herbals. This research study concentrates about the observation of the transportation of different types of goods, agriculture products, herbals, livestocks products etc. from waling bazaar to its hinterlands and from central towns i.e. Kathmandu, Pokhara, Bhairahawa to waling.

6. Finding and Analysis

6.1 Key Aspects for Development:

Economic Growth Businesses face difficulties due to direct supply from larger cities, but there is also an increase in product demand and improved trading with China and India. The Siddhartha Highway has significantly influenced Waling's economic activities, though its impact remains uneven. Enhanced connectivity initially boosted commercial establishments, with business registrations peaking at 466 in FY 2078/79. However, registrations dropped to 92 by FY 2080/81, reflecting market saturation and competition from larger cities like Pokhara and Bhairahawa. Waling's economy is dominated by retail and service sectors, particularly in Ward 8, which hosts 360 establishments and employs 988 people. Strong hinterland linkages via roads like Waling-Chapakot and waling-Huwas facilitate trade in oranges and dairy products, connecting Waling to urban markets such as Pokhara and Kathmandu. Despite these advantages, challenges persist due to narrow roads, sharp bends, and insufficient infrastructure for rural producers, limiting economic returns. Daily traffic data highlights Waling's stronger integration compared to neighboring municipalities like Galyang. Addressing regulatory bottlenecks, upgrading transport infrastructure, and enhancing corridor amenities are critical to sustaining Waling's growth as a trade hub. Strategic interventions such as agro-processing zones, skill development programs, and improved road networks can further strengthen Waling's role along the Siddhartha Highway while fostering inclusive economic development.

Challenges include outmigration from rural areas, weight restrictions on bridges, narrow roads, and abrupt turns. Although the highway facilitates trade and access, it faces obstacles like outmigration and safety concerns and needs to be upgraded.

6.2 Opportunities and Potential Sectors:

- Tourism Growth Potential: High due to Indian tourists traveling to Pokhara and Mustang.
- Investment Opportunities: In tourism development, agricultural production (e.g., oranges), and infrastructure projects like new bridges and the Waling bus park.

7. Conclusion

The Siddhartha Highway (NH-47) has driven economic growth in Waling, evidenced by initial commercial surges post-construction and its role as a trade hub for orange exports. However, market prospects face challenges like infrastructure bottlenecks (narrow roads, delays in bus park completion) and competition from larger cities like Pokhara, leading to market saturation. Corridor amenities, such as Waling's road widening and ongoing bus park project, have improved safety and trade efficiency but require faster implementation to maximize benefits.To sustain growth, strategic

interventions—upgrading hinterland roads and skill development programs—are critical to curb outmigration and leverage Waling's role as a regional gateway.

8. Recommendation

To stimulate economic growth, prioritize completing the Siddhababa Tunnel and upgrading Highway NH-47 to double lanes, enhancing connectivity to markets like Pokhara,Bhairahawa. Address market challenges by improving feeder roads (e.g., Waling-Sirausa) and establishing agro-processing zones for oranges, reducing post-harvest losses. Enhance corridor amenities by accelerating Waling's bus park construction and implementing digital market platforms for farmers. Promote Waling's "Pink City" heritage and Aadhikhola eco-tourism to diversify local economies. Strengthen governance via zoning regulations and skill centers in logistics/hospitality to curb outmigration. These steps align infrastructure upgrades, market access, and amenities to transform NH-47 into a catalyst for Waling's sustainable growth.

References

[1] Jiatao Li, Ari Van Assche, Xiaolan Fu, Lee Li, and Gongming Qian. The belt and road initiative and international business policy: A kaleidoscopic perspective. *Journal of International Business Policy*, 5(2):135, 2022.

[2] David Banister and Joseph Berechman. *Transport investment and economic development*. Routledge, 2003.

[3] Bishwas Sharma and Prakash Das Ulak. Engineering geological study of road tunnel along siddhartha highway between butwal and dobhan siwaliks group, west-central nepal. *Archives of Advanced Engineering Science*, pages 1–13, 2024.

[4] Matthew McCartney. The china-pakistan economic corridor (cpec): infrastructure, social savings, spillovers, and economic growth in pakistan. *Eurasian Geography and Economics*, 63(2):180–211, 2022.

[5] Todd Litman. *Evaluating public transit benefits and costs*. Victoria Transport Policy Institute Victoria, BC, Canada, 2015.

[6] Hilal Yıldırır Keser. Importance of transport corridors in regional development: The case of traceca. *Sosyoekonomi*, 23(24):163–182, 2015.

[7] Dennis A Rondinelli. Balanced urbanization, spatial integration, and economic development in asia: Implications for policy and planning. *Urbanism Past & Present*, (9):13–29, 1979.

[8] Adil Abdul Rehman and Khalid Alharthi. An introduction to research paradigms. *International journal of educational investigations*, 3(8):51–59, 2016.

APPENDIX C: PLAGARISM CHECK REPORT

079 MSUrP024 _Suraj Chapagain.pdf

Tribhuvan University

Document Details

Submission ID
trn:oid:::3117:451316781

Submission Date
Apr 22, 2025, 9:42 AM GMT+5:45

Download Date
Apr 22, 2025, 10:17 AM GMT+5:45

File Name
079 MSUrP024 _Suraj Chapagain.pdf

File Size
4.5 MB

86 Pages

19,241 Words

115,299 Characters

iThenticate Page 1 of 91 - Cover Page Submission ID trn:oid:::3117:451316781

7% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text
- Small Matches (less than 10 words)

Exclusions

- 1 Excluded Source
- 1 Excluded Match

Match Groups

54 Not Cited or Quoted 7%
Matches with neither in-text citation nor quotation marks

1 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

7% Internet sources
2% Publications
0% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

- **54** Not Cited or Quoted 7%
  Matches with neither in-text citation nor quotation marks
- **1** Missing Quotations 0%
  Matches that are still very similar to source material
- **0** Missing Citation 0%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

7% Internet sources
2% Publications
0% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Internet	elibrary.tucl.edu.np 1%
2	Internet	www.npc.gov.np <1%
3	Internet	www.people.hofstra.edu <1%
4	Internet	en.wikipedia.org <1%
5	Internet	www.termpaperwarehouse.com <1%
6	Internet	link.springer.com <1%
7	Internet	www.rupp.org.np <1%
8	Internet	www.ite.org <1%
9	Internet	data.nsonepal.gov.np <1%
10	Internet	www.uni-due.de <1%

11	Internet	
sevgiligiyim.com		<1%
12	Internet	
www.researchgate.net		<1%
13	Internet	
mof.gov.np		<1%
14	Internet	
prosiding.appisi.or.id		<1%
15	Publication	
A. F. BURGHARDT. "A HYPOTHESIS ABOUT GATEWAY CITIES", Annals of the Associ...		<1%
16	Internet	
fastercapital.com		<1%
17	Internet	
wikimili.com		<1%
18	Internet	
www.drbairdonline.com		<1%
19	Internet	
idm.or.id		<1%
20	Internet	
www.coursehero.com		<1%
21	Internet	
www.loudoun.gov		<1%
22	Publication	
Sefolo, Essau Tabane. "Teacher Perceptions Regarding the Abolishment of Corpor...		<1%
23	Internet	
1library.net		<1%
24	Internet	
mafiadoc.com		<1%

25 Internet

www.diva-portal.org <1%

26 Internet

www.irejournals.com <1%

27 Internet

www.wikizero.com <1%