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Editorial office:

The Journal of Development and Administration Studies (JODAS)
Centre for Economic Development and Administration (CEDA),
Tribhuvan University, Kathmandu, Nepal
P.O. Box 797, Fax :(977-1) 4331722
Tel: 977-01-4330324, 4330851
Email: cedajodas1969@gmail.com
https://www.nepjol.info/index.php/JODAS

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Firewood Dependency and the Shift to Biogas in Rural Nepal: Evidence from Koshi Province

Laxmi Kanta Sharma, Ph.D.
Associate Professor
Tribhuvan University, Kathmandu
Email: laxmikantas@gmail.com
https://orcid.org/0000-0003-4023-8673

Arjun Kumar Baral, Ph.D.
Executive Director
Centre for Economic Development and Administration
Tribhuvan University, Kathmandu
Email: director@ceda.tu.edu.np *(Corresponding author)*

Cite this paper

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Abstract

Firewood remains the predominant household energy source in rural Nepal, particularly in Koshi Province, where it poses significant economic, health, and environmental burdens. This study, based on empirical data from 240 households, quantifies firewood consumption patterns and associated impacts while assessing the viability of transitioning to biogas systems. The results indicate that households consume an average of 14977.44 kg of firewood annually, contributing to the felling of 20–30 trees per year and emitting 18.5 tons of CO_2 per household. Women and children spend approximately 386.88 hours per year on firewood collection, and indoor air pollution affects 60% of households, contributing to respiratory illnesses and other health concerns (WHO, 2022). The study finds biogas systems can reduce firewood use by up to 90% and significantly improve health outcomes and economic conditions. However, barriers such as upfront costs, limited infrastructure, and low awareness hinder adoption. This paper offers detailed policy recommendations to address these barriers and support sustainable energy transition aligned with Nepal's SDG commitments.

Keywords: Firewood dependency, Biogas systems, Energy poverty, Indoor air pollution, Deforestation, Sustainable energy transition, Koshi Province, SDGs

Introduction

In rural Nepal, traditional biomass—particularly firewood—remains the cornerstone of household energy. In Koshi Province, this dependency underscores broader challenges of energy poverty, which restricts access to affordable, reliable, and sustainable energy (CBS, 2021). Firewood use has widespread consequences: it imposes a financial burden, exacerbates health risks through indoor air pollution, and accelerates deforestation and carbon emissions (FAO, 2020).

Despite national commitments to promoting renewable energy and improving rural livelihoods, the transition away from traditional biomass has been slow and uneven across regions. In many remote areas of Koshi Province, firewood remains the default option due to its availability, entrenched usage patterns, and the lack of viable alternatives. This persistent reliance contributes not only to environmental degradation but also to social inequality, as women and children—typically responsible for fuel collection—bear a disproportionate burden of time and health costs. The adverse effects of firewood dependency intersect with critical development concerns, including public health, gender equity, and climate resilience.

Emerging evidence suggests that biogas, a clean and locally available renewable energy source, holds significant potential to mitigate these challenges. Biogas systems convert animal and organic waste into combustible gas and nutrient-rich slurry, offering a sustainable solution aligned with rural livelihoods. Yet, adoption remains limited due to upfront costs, technical constraints, and insufficient awareness or institutional support.

This study aims to comprehensively analyze firewood consumption in Koshi Province, quantify its economic, health, and environmental impacts, and evaluate the feasibility of transitioning to biogas systems. Through a mixed-methods approach, the research seeks to identify region-specific barriers and enabling conditions for biogas adoption. The findings provide actionable insights for policymakers and development stakeholders seeking to foster clean energy adoption and support Nepal's achievement of SDGs 3 (Good Health and Well-Being), 7 (Affordable and Clean Energy), and 13 (Climate Action) (UN, 2015).

By situating the analysis within the broader context of Nepal’s decentralized energy policy, environmental commitments, and rural development priorities, this study contributes to the growing discourse on sustainable energy transitions in South Asia. It underscores the need for targeted interventions that not only address energy access but also promote environmental stewardship and inclusive development in underserved regions.

Literature Review

Firewood remains the primary cooking fuel for approximately 2.4 billion people worldwide, particularly in developing regions where access to modern energy infrastructure is limited (World Bank, 2021). In Nepal, firewood constitutes about 68% of total energy consumption, with its use especially concentrated in rural and mountainous regions such as Koshi Province, where cleaner energy alternatives remain scarce or unaffordable (CBS, 2021). This overwhelming dependence on traditional biomass reflects a nexus of poverty, underdevelopment, and weak institutional support for renewable energy dissemination.

Empirical studies highlight the severe economic implications of continued reliance on firewood. Households in low-income brackets commonly allocate between 10% and 20% of their annual income to firewood acquisition, either through direct purchases or the opportunity cost of time spent collecting fuel (World Bank, 2021). The burden falls disproportionately on women and children, who spend several hours daily gathering firewood, often from increasingly distant or degraded forest areas (UNICEF, 2020). This time poverty limits their access to education, health care, and income-generating opportunities, perpetuating intergenerational cycles of deprivation.

Health outcomes associated with firewood use are also well-documented. Firewood combustion in traditional stoves emits harmful pollutants, including fine particulate matter (PM2.5), carbon monoxide (CO), and polycyclic aromatic hydrocarbons (PAHs), which penetrate deep into the respiratory system (WHO, 2022). In Nepal, indoor air pollution accounts for over 23,000 premature deaths annually, with women and young children being the most affected due to prolonged exposure (WHO, 2022). These health risks translate into high public health costs and productivity losses, highlighting the urgent need for clean energy alternatives.

Environmental consequences of firewood harvesting are equally severe. Nepal loses an estimated 1.3% of its forest cover annually due to unsustainable biomass extraction (FAO, 2020). This contributes to a cascade of environmental issues, including soil erosion, reduced water retention capacity, loss of biodiversity, and increased vulnerability to natural disasters. From a climate perspective, every kilogram of firewood burned emits approximately 1.9 kg of CO_2 (IPCC, 2021), positioning household energy use as a non-negligible contributor to national greenhouse gas emissions.

In this context, biogas technology has emerged as a viable and sustainable alternative. Biogas systems utilize animal dung and organic waste to produce methane, which can be used for cooking and lighting. In Nepal, various studies have demonstrated that biogas adoption can reduce household firewood consumption by 80–90% (AEPC, 2023), thereby significantly lowering exposure to indoor smoke and improving respiratory health by 60–70% (WHO, 2022). Additionally, the slurry by-product serves as a potent organic fertilizer, enhancing soil fertility, reducing dependence on chemical inputs, and contributing to sustainable agricultural practices (AEPC, 2023).

Despite these benefits, the uptake of biogas remains limited, particularly in marginalized and remote communities. Several barriers persist, including high initial capital costs, lack of financial incentives, inadequate technical know-how, limited access to repair and maintenance services, and socio-cultural reservations regarding the use of animal waste in cooking (AEPC, 2023). These challenges underscore the need for an integrated policy framework that combines subsidies, awareness campaigns, capacity building, and local participation in planning and implementation.

The literature suggests that the successful transition from firewood to biogas depends on a confluence of enabling conditions: affordability, accessibility, institutional support, and social acceptability. Moreover, the alignment of clean energy initiatives with national development goals and international commitments—such as the Sustainable Development Goals (SDGs)—is critical for achieving transformative outcomes. Specifically, interventions that promote biogas adoption can directly support SDG 3 (Good Health and Well-Being), SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Action), while indirectly contributing to gender equality, poverty reduction, and environmental sustainability.

Methodology

This study adopted a mixed-methods research design, integrating descriptive quantitative analysis with exploratory qualitative inquiry to provide a comprehensive understanding of household firewood dependency and the potential for biogas transition in Koshi Province, Nepal.

Quantitative Component

A structured household survey was administered to systematically assess key variables, including firewood consumption patterns, associated economic costs, time burden, emissions, and self-reported health impacts. The survey instrument was developed based on relevant literature and pre-tested in a pilot phase to ensure clarity and contextual appropriateness.

The sampling frame comprised households from diverse ecological and socioeconomic zones within Koshi Province. Stratified random sampling was employed to ensure representativeness across three primary strata:

- **Income level**: low (< NPR 300,000/year), middle (NPR 300,000–500,000/year)
- **Household size**: small (<5 members), medium (5–8 members), and large (>8 members), with an average household size of 5.67
- **Geographic location**: forest-proximal areas and market-accessible regions

A total of 240 households were selected. The sample size was derived from Cochran's sample size formula (Cochran, 1977) and adjusted for logistical feasibility while preserving statistical reliability and representativeness.

The questionnaire collected data on the following domains:

- Household demographics
- Monthly and annual firewood consumption (in kilograms)
- Time spent collecting firewood (hours per week)
- Purpose and modality of firewood use
- Self-reported health symptoms (respiratory and ocular conditions)
- Awareness of biogas technology and perceived adoption barriers

Qualitative Component

To complement the quantitative analysis, semi-structured interviews were conducted with selected household heads and key community informants (e.g., local leaders, women's group representatives). These interviews explored perceptions of firewood use, cultural attitudes toward biogas adoption, and barriers to renewable energy uptake. Interviews were conducted in the local language and transcribed for analysis.

Data Analysis

Quantitative data were processed using descriptive statistics (means, frequencies, cross-tabulations) to capture patterns in firewood use and related variables. A cost-benefit analysis framework was applied to compare the economic and health costs of firewood dependency with the potential benefits of biogas substitution.

Carbon emissions from firewood use were estimated using default emission factors provided by the IPCC (2021), which approximate 1.9 kg of CO_2 per kg of firewood combusted. Health effects were approximated through frequency analysis of self-reported symptoms.

Qualitative data were subjected to thematic analysis to identify recurring patterns and emergent themes related to awareness levels, technological resistance, institutional constraints, and cultural perceptions. Coding was conducted manually and validated through inter-coder agreement procedures.

Ethical Considerations

Informed consent was obtained from all participants prior to data collection. The purpose and voluntary nature of participation were clearly explained. Participants were assured of confidentiality, and all data were anonymized to protect individual identities. Ethical protocols also allowed respondents the right to withdraw from the study at any stage without consequence.

Results and Discussion

Firewood Consumption Patterns

Survey results indicate that average household firewood consumption in Koshi Province is 1,248.12 kg per month, which translates to 220.12 kg per capita per month. This level of dependency is considerably high and demonstrates firewood's pervasive role in rural household energy systems. The primary uses of firewood were reported as follows:

- **Cattle feed preparation**: 605.79 kg/month (48.5%)
- **Cooking**: 442.25 kg/month (35.4%)
- **Water heating**: 200.08 kg/month (16.0%)

These findings highlight that energy use extends beyond basic cooking needs, reflecting the integrated role of biomass in rural agrarian livelihoods. This multi-functional use complicates efforts to shift toward cleaner energy sources, as substitution must account for multiple energy needs.

Time and Economic Burden

Households spent an average of 386.88 hours annually collecting firewood, amounting to more than 1 hour per day per household. The direct financial cost of firewood—whether purchased or valued by replacement—is estimated at NPR 16,393.91 per household per year. Additionally, the opportunity cost of labor, calculated at NPR 50 per hour (based on prevailing unskilled wage rates), resulted in an estimated NPR 9,672 annually per household.

This dual burden—both time and money—is disproportionately borne by low-income households, consistent with World Bank (2021) findings that poor rural families allocate a higher share of income and labor toward meeting basic energy needs. The time commitment also reinforces gender-based inequities, as women and children are primarily responsible for firewood collection, limiting their access to education, employment, and personal development.

Health Impacts

Approximately 60% of households reported indoor air pollution as a major concern, citing chronic coughing, eye irritation, and respiratory distress as common symptoms. These health outcomes were concentrated among women and children, who spend more time indoors and near cooking fires. Corroborating evidence from UNICEF (2020) and WHO (2022) suggests that:

- Exposure to biomass smoke during pregnancy is linked to a 30% increase in risks of stillbirths and low birth weight.
- Children in firewood-dependent homes are twice as likely to develop pneumonia compared to those in households using cleaner fuels.

Such outcomes underscore the public health urgency of addressing biomass reliance, particularly in rural settings where healthcare access is limited.

Environmental Impact

Each household's annual firewood usage corresponds to the removal of estimated 20–30 mature trees, resulting in 18.5 metric tons of CO_2 emissions per household per year (IPCC, 2021). Extrapolating to the study population, the surveyed households were collectively responsible for the extraction of nearly 6,000 trees and the emission of 4,432.32 tons of CO_2 annually. Beyond emissions, deforestation contributes to soil erosion, biodiversity loss, and declining agricultural productivity, which are already pressing concerns in Koshi Province.

Comparative Discussion and Policy Implications

Firewood consumption in Koshi Province exceeds national averages, reflecting region-specific dynamics such as forest proximity, limited access to cleaner energy alternatives, and prevailing economic hardships (CBS, 2021). These structural conditions perpetuate the cycle of energy poverty, environmental degradation, and social inequality. The gendered workload associated with firewood collection reinforces traditional labor divisions and limits educational opportunities for children, particularly girls.

The transition to biogas presents a viable alternative. Based on cost comparisons, households could achieve annual savings of approximately NPR 13,393.91 by replacing firewood with biogas. Health benefits are equally substantial, with evidence suggesting a 60% to 70% reduction in respiratory ailments following biogas adoption (WHO, 2022). Moreover, biogas slurry enhances soil fertility and reduces dependence on chemical fertilizers, providing co-benefits for agricultural productivity.

However, the uptake of biogas remains low; only 30% of respondents were aware of biogas systems (AEPC, 2023). Key barriers identified through interviews include:

- High upfront installation costs ranging from NPR 35,000 to NPR 50,000
- Inadequate technical support and post-installation servicing
- Cultural resistance and low trust in unfamiliar or externally promoted technologies

These findings align with prior studies emphasizing that financial incentives alone are insufficient. Broader institutional support—including targeted subsidies, awareness campaigns, and community-based training—is essential to facilitate adoption, particularly among marginalized groups.

In sum, the results underscore the multifaceted burden of firewood dependency in Koshi Province and present a compelling case for scaling up biogas as a clean, culturally sensitive, and economically viable solution. Doing so would contribute directly to Nepal’s efforts to achieve Sustainable Development Goals 3, 7, and 13, while also promoting environmental resilience and gender equity in rural communities.

Conclusion

The study reveals that household dependence on firewood in Koshi Province imposes substantial and interlinked environmental, economic, and health-related burdens. Households incur high opportunity and financial costs, experience significant exposure to indoor air pollution—particularly affecting women and children—and contribute to considerable deforestation and carbon emissions. These findings reaffirm the systemic nature of energy poverty in rural Nepal, where firewood remains both a necessity and a constraint.

Biogas systems emerge as a promising alternative, offering multi-dimensional benefits including reduced firewood use, improved respiratory health, lower emissions, and enhanced agricultural productivity through organic fertilizer use. Despite these advantages, adoption remains low due to economic barriers, limited technical infrastructure, and socio-cultural resistance.

The study's mixed-methods approach—combining quantitative and qualitative data—provides a nuanced understanding of both the quantifiable costs and the contextual barriers shaping energy use in rural Nepal. Addressing these challenges through integrated policy responses can catalyze a just and sustainable energy transition, aligned with Nepal’s commitments to Sustainable Development Goals (SDGs) 3, 7, and 13.

Policy Implications

Based on the empirical findings, several policy interventions are recommended to facilitate the transition from firewood to biogas in rural households:

Financial Strategies

- **Expand subsidies**: Increase government subsidies to cover up to 75% of biogas installation costs for low-income households, thereby reducing the upfront financial burden (AEPC, 2023).
- **Develop targeted microfinance schemes**: Introduce low-interest loan products and repayment plans tailored to the financial cycles of rural households, particularly those engaged in subsistence agriculture.

Infrastructure Development

- **Build technical capacity**: Establish local technician training and deployment programs to support installation, maintenance, and repair of biogas units.
- **Promote collective solutions**: Invest in village-scale or community-managed biogas systems to reduce per-unit costs and foster shared ownership and maintenance responsibility.

Awareness and Behavioral Change

- **Strengthen community engagement**: Conduct localized outreach campaigns using trusted community leaders to enhance trust and uptake.
- **Promote success stories**: Disseminate evidence-based narratives and case studies that demonstrate the reliability, health benefits, and long-term savings of biogas systems.

Environmental Restoration

- **Integrate with reforestation**: Align biogas promotion with reforestation and agroecological programs to amplify climate and biodiversity benefits.
- **Encourage slurry utilization**: Incentivize the use of biogas slurry as an organic fertilizer to improve soil fertility and reduce dependency on synthetic agricultural inputs.

Broader Implications

This study adds to the growing body of research on sustainable energy transitions in developing contexts by offering empirically grounded insights from Koshi Province. It highlights the importance of designing context-sensitive policies that address economic, technical, and cultural barriers simultaneously. The policy framework proposed here is not only applicable to Nepal but also provides a scalable model for community-led energy transformation across similar rural settings in South Asia.

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Green Economy Transition in Nepal: Environmental Kuznets Curve Analysis

Gyan Mani Adhikari
Associate Professor
Central Department of Management, Tribhuvan University
Email: gyan.adhikari@cdm.tu.edu.np
https://orchid.org/0009-0002-5388-8691

Rajendra Adhikari
Assistant Professor
Mechi Multiple Campus, Tribhuvan University
Email: rajendra.adhikari33@gmail.com
https://orchid.org/0000-0002-1365-4543

Rajesh Keshar Khanal
Assistant Professor
Mahendra Multiple Campus, Tribhuvan University
Email: drrajesh.blc@gmail.com *(Corresponding author)*
hhttps://orchid.org/0009-0000-5695-2391

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Abstract

This study examines the relationship between economic growth and environmental degradation in Nepal through the lens of the Environmental Kuznets Curve (EKC) hypothesis, with particular focus on the country's green economy transition initiatives. Using time series data from 1990 to 2022, we analyze the dynamic relationship between GDP per capita, carbon dioxide emissions, deforestation rates, and key green economy indicators, including renewable energy adoption and sustainable agriculture practices. Our findings reveal a modified EKC pattern specific to Nepal's unique geographical and economic context, where the turning point occurs at a lower income level compared to developed nations due to early adoption of green technologies and policies. The results indicate that Nepal's proactive green economy policies, including hydroelectric power development and community forestry programs, have contributed to decoupling economic growth from environmental degradation earlier than predicted by traditional EKC models. The study provides empirical evidence supporting Nepal's green economy transition strategy and offers policy recommendations for sustaining this trajectory while addressing remaining environmental challenges.

Keywords: Environmental Kuznets Curve, Green Economy, Nepal, Sustainable Development, Carbon Emissions, Renewable Energy

Introduction

The relationship between economic development and environmental quality has been a subject of intense academic and policy debate, particularly in the context of developing nations striving to balance growth aspirations with environmental sustainability. The Environmental Kuznets Curve hypothesis, first proposed by Grossman and Krueger (1991), suggests an inverted U-shaped relationship between per capita income and environmental degradation, implying that environmental quality initially deteriorates with economic growth but improves after reaching a certain income threshold. Nepal, a landlocked Himalayan nation, presents a unique case study for examining this relationship due to its distinctive geographical features, economic structure, and recent emphasis on green economy transition. The country has experienced significant economic transformation over the past three decades, with GDP per capita increasing from $200 in 1990 to approximately $1,400 in 2022 (World Bank, 2023). Simultaneously, Nepal has implemented ambitious green economy policies, including commitments to carbon neutrality by 2045 and maintaining 44.74% forest coverage (Ministry of Forests and Environment, 2021).

The concept of green economy, as defined by the United Nations Environment Programme, refers to economic activities that improve human well-being and social equity while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). Nepal's green economy transition has been characterized by investments in renewable energy, particularly hydroelectric power, sustainable agriculture practices, and community-based natural resource management programs.

This study contributes to the existing literature by examining whether Nepal's green economy transition has altered the traditional EKC relationship and identifying the factors that influence this relationship in the context of a least developed country with significant natural capital. The research addresses three primary questions: Does Nepal exhibit an EKC pattern for key environmental indicators? How has the country's green economy transition influenced this relationship? What policy implications emerge from this analysis for sustainable development strategies?

The significance of this research extends beyond Nepal's borders, as it provides insights for other developing nations seeking to achieve sustainable development goals while maintaining economic growth trajectories. The findings contribute to the broader discourse on decoupling economic growth from environmental degradation through strategic green economy interventions.

Literature Review

The Environmental Kuznets Curve hypothesis has generated extensive empirical research since its introduction, with mixed results across different countries, time periods, and environmental indicators. Stern (2004) provided a comprehensive review of early EKC studies, noting methodological concerns and the sensitivity of results to model specifications and data quality. The literature reveals considerable heterogeneity in EKC relationships across different contexts, suggesting that institutional, geographical, and policy factors play crucial roles in determining the income-environment nexus. Recent studies have expanded the EKC framework to incorporate the role of green economy initiatives and sustainable development policies. Dinda (2004) emphasized the importance of technological progress and environmental regulations in explaining variations in EKC patterns. Similarly, Kaika and Zervas (2013) demonstrated that countries with proactive environmental policies tend to exhibit earlier turning points in their EKC relationships, supporting the hypothesis that policy interventions can accelerate the transition to environmental improvement. In the South Asian context, several studies have examined EKC relationships with varying conclusions. Jayanthakumaran et al. (2012) found evidence of EKC patterns for CO_2 emissions in China and India but noted that the turning points occurred at relatively high income levels. Contrarily, Apergis and Ozturk (2015) found limited support for the EKC hypothesis in Asian developing countries, suggesting that the relationship may be more complex than traditionally assumed.

Studies specific to Nepal's environmental economics remain limited but growing. Bhandari and Heshmati (2020) examined the relationship between energy consumption and economic growth in Nepal, finding evidence of bidirectional causality but limited analysis of environmental outcomes. Paudel et al. (2019) investigated deforestation patterns in Nepal and their relationship with economic activities, concluding that community forestry programs have been effective in reversing forest loss trends. The green economy literature has increasingly recognized the potential for developing countries to "leapfrog" traditional development pathways through early adoption of sustainable technologies and practices. Barbier (2011) argued that green economy transitions could enable developing nations to achieve higher levels of human welfare with lower environmental costs. This perspective is particularly relevant for Nepal, given its abundant renewable energy resources and traditional sustainable practices.

Recent research has also highlighted the role of institutional quality and governance in determining EKC relationships. Lau et al. (2014) found that countries with stronger institutions tend to exhibit more pronounced EKC patterns, as effective governance enables better environmental policy implementation. This finding is significant for Nepal, which has undergone substantial political and institutional changes over the study period.

The literature gap that this study addresses relates to the limited empirical analysis of how comprehensive green economy transitions affect EKC relationships in least developed countries. While previous studies have examined individual environmental policies or sectors, there is insufficient research on how coordinated green economy strategies influence the overall income-environment relationship. Furthermore, Nepal's unique geographical and institutional context provides an opportunity to test EKC hypotheses in a setting characterized by high environmental sensitivity and rapid policy innovation.

Data and Methods

This study employs a comprehensive dataset spanning from 1990 to 2022, incorporating multiple environmental and economic indicators to examine the EKC relationship in Nepal's context. The primary data sources include the World

Bank's World Development Indicators, Nepal's Central Bureau of Statistics, the Ministry of Forests and Environment, and the International Energy Agency.

The dependent variables representing environmental quality include carbon dioxide emissions per capita (CO2), deforestation rates (DEFOR), particulate matter concentrations (PM2.5), and a composite environmental degradation index (EDI) constructed using principal component analysis. The primary independent variable is GDP per capita in constant 2015 US dollars (GDPPC), along with its squared and cubic terms to test for different EKC specifications. Additional control variables include population density (POP), trade openness (TRADE), renewable energy share (REN), forest coverage (FOREST), and a green economy policy index (GEPI) constructed based on the implementation timeline of major environmental policies. The GEPI incorporates milestones such as the National Adaptation Programme of Action (2010), Renewable Energy Subsidy Policy (2013), and the second Nationally Determined Contribution (2020).

The empirical strategy employs both linear and nonlinear autoregressive distributed lag (ARDL) models to account for potential nonlinear relationships and examine both short-run and long-run dynamics. The basic EKC specification is:

$$\ln(ENV_{it}) = \alpha + \beta_1 \ln(GDPPC_{it}) + \beta_2 [\ln(GDPPC_{it})]^2 + \beta_3 [\ln(GDPPC_{it})]^3 + \gamma X_{it} + \varepsilon_{it}$$

Where ENV represents environmental indicators, GDPPC is GDP per capita, X represents control variables, and ε is the error term. The presence of an EKC relationship is confirmed if $\beta_1 > 0$, $\beta_2 < 0$, and the turning point falls within the sample range.

To address potential endogeneity concerns, we employ instrumental variable techniques using lagged values and external instruments, including monsoon rainfall patterns and remittance flows, which affect income but have limited direct impact on short-term environmental outcomes. Unit root tests are conducted using the Augmented Dickey-Fuller and Phillips-Perron tests to determine integration properties, followed by cointegration analysis using the Johansen procedure.

The nonlinear ARDL approach, developed by Shin et al. (2014), allows for asymmetric responses to positive and negative changes in income, which is particularly relevant given Nepal's economic volatility and policy regime changes. This methodology decomposes the income variable into positive and negative partial sums:

$GDPPC^{+}{}_{t} = \Sigma(j=1 \text{ to } t)\ \Delta GDPPC^{+}{}_{j} = \Sigma(j=1 \text{ to } t) \max(\Delta GDPPC_j, 0)$ $GDPPC^{-}{}_{t} = \Sigma(j=1 \text{ to } t)\ \Delta GDPPC^{-}{}_{j} = \Sigma(j=1 \text{ to } t) \min(\Delta GDPPC_j, 0)$

Structural break analysis is conducted using the Chow test and Bai-Perron multiple breakpoint tests to identify potential policy-induced structural changes in the income-environment relationship. Given Nepal's significant policy reforms during the study period, this analysis is crucial for accurate model specification.

The study also employs threshold regression models to identify potential regime switches in the EKC relationship, allowing for different coefficients above and below certain income thresholds. This approach is particularly relevant for testing whether green economy policies have created distinct phases in Nepal's development trajectory.

Robustness checks include alternative environmental indicators, different functional forms, and sensitivity analysis concerning outliers and influential observations. The analysis is conducted using R statistical software with packages including "dynamac," "ardl," and "strucchange" for specialized econometric procedures.

Results and Discussion

The empirical analysis reveals compelling evidence of modified EKC relationships across multiple environmental indicators in Nepal, with significant implications for understanding the country's green economy transition. The results demonstrate that Nepal exhibits distinct patterns that deviate from traditional EKC predictions, primarily due to early policy interventions and unique geographical constraints.

Table 1 presents the core findings supporting the Environmental Kuznets Curve hypothesis in Nepal. The positive coefficients on ln(GDPPC) and negative coefficients on [ln(GDPPC)]² confirm the inverted U-shaped relationship between income and environmental degradation across all indicators. Most notably, the turning points occur at remarkably low income levels ($823-$1,340), substantially lower than the $8,000-$15,000 typically observed in developed countries. The CO2 emissions turning point at $847 per capita suggests that Nepal began reducing carbon intensity very early in its development process. The strong negative coefficients on renewable energy share (REN) and the green economy policy index (GEPI) demonstrate that policy interventions have been crucial in achieving these early environmental improvements. The high R^2 values (0.734-0.863) indicate that the models explain a substantial portion of environmental variation, while the significant F-statistics confirm overall model validity.

Table 1: Baseline ARDL Estimation Results for Environmental Kuznets Curve

Variable	CO2 Emissions	Deforestation	PM2.5	Environmental Degradation Index
ln(GDPPC)	2.347***	1.892***	1.634**	2.156***
	(0.398)	(0.445)	(0.523)	(0.367)
[ln(GDPPC)]²	-0.156***	-0.142***	-0.089**	-0.147***
	(0.034)	(0.038)	(0.041)	(0.031)
[ln(GDPPC)]³	0.0034**	0.0041**	0.0021	0.0038**
	(0.0012)	(0.0014)	(0.0016)	(0.0011)
ln(POP)	0.245**	0.189*	0.334***	0.267**
	(0.089)	(0.098)	(0.107)	(0.082)
ln(TRADE)	-0.087*	-0.123**	-0.045	-0.094**
	(0.045)	(0.052)	(0.058)	(0.041)
ln(REN)	-0.234***	-0.167**	-0.098*	-0.201***
	(0.067)	(0.074)	(0.081)	(0.062)
GEPI	-0.143***	-0.189***	-0.087**	-0.156***
	(0.034)	(0.041)	(0.037)	(0.031)
Constant	-8.234***	-6.892***	-5.467**	-7.823***
	(1.892)	(2.134)	(2.456)	(1.734)
Observations	33	33	33	33
R²	0.847	0.792	0.734	0.863
Adj. R²	0.801	0.734	0.661	0.821
Turning Point ($)	847	923	1,340	823
F-statistic	18.45***	13.67***	10.23***	21.34***

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

Table 2: Structural Break Analysis and Regime-Specific Coefficients

Period	**CO2 Emissions**	**Deforestation**	**PM2.5**	**Environmental Degradation Index**
Pre-1996 (Economic Liberalization)				
ln(GDPPC)	3.245***	2.867***	2.134**	2.923***
[ln(GDPPC)]²	-0.189***	-0.172***	-0.098*	-0.167***
R²	0.623	0.587	0.534	0.612
1996-2006 (Transition Period)				
ln(GDPPC)	2.789***	2.345***	1.892**	2.534***
[ln(GDPPC)]²	-0.167***	-0.148***	-0.089**	-0.151***
R²	0.734	0.689	0.612	0.721
Post-2006 (Green Economy Era)				
ln(GDPPC)	1.867***	1.234**	1.345**	1.623***
[ln(GDPPC)]²	-0.134***	-0.098**	-0.076*	-0.118***
R²	0.812	0.756	0.698	0.798
Chow Test F-stat	7.23***	6.78***	5.45**	7.89***
Break Points	1996, 2006	1996, 2006	2006, 2015	1996, 2006

*Note: *** p<0.01, ** p<0.05, * p<0.10*

Table 2 reveals how Nepal's income-environment relationship has evolved through distinct policy regimes. The structural break analysis identifies 1996 (economic liberalization) and 2006 (comprehensive environmental policy reforms) as critical transition points. The declining coefficients on ln(GDPPC) across periods show that economic growth has become progressively less environmentally damaging over time. In the pre-1996 period, a 1% increase in GDP per capita was associated with a 3.245% increase in CO_2 emissions, but this fell to 1.867% in the post-2006 green economy era. The increasing R^2 values across periods indicate that the income-environment relationship has become more predictable as institutional capacity has strengthened. The significant Chow test statistics confirm that these structural breaks are statistically meaningful, not random variations. This temporal analysis demonstrates that Nepal's environmental policies have fundamentally altered the development trajectory, enabling economic growth with reduced environmental costs.

Table 3: Nonlinear ARDL Results - Asymmetric Effects

Variable	**Short-run Effects**	**Long-run Effects**
CO2 Emissions		
$GDPPC^{+}$	0.342***	0.187**
	(0.089)	(0.076)
$GDPPC^{-}$	0.456***	0.298***
	(0.112)	(0.094)
Deforestation		
$GDPPC^{+}$	0.278**	0.145*
	(0.098)	(0.082)
$GDPPC^{-}$	0.389***	0.234**
	(0.123)	(0.103)
PM2.5		
$GDPPC^{+}$	0.234**	0.132*
	(0.107)	(0.089)
$GDPPC^{-}$	0.345***	0.198**
	(0.134)	(0.112)
Environmental Degradation Index		
$GDPPC^{+}$	0.298***	0.167**
	(0.087)	(0.073)
$GDPPC^{-}$	0.423***	0.267***
	(0.109)	(0.091)
Wald Test (Asymmetry)	8.45***	6.78***

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

Table 3 demonstrates asymmetric responses to economic expansion versus contraction, revealing important insights about Nepal's environmental resilience. The consistently higher coefficients for negative income changes ($GDPPC^{-}$) compared to positive changes ($GDPPC^{+}$) indicate that economic downturns cause proportionally more environmental damage than the environmental benefits gained from equivalent economic growth. For CO2 emissions, a 1% economic contraction increases emissions by 0.456% in the short run, while a 1% expansion only reduces emissions by 0.342%. This asymmetry suggests that Nepal has developed institutional mechanisms that prevent environmental backsliding during economic stress, possibly through social safety nets and environmental protection policies that remain operational during downturns. The significant Wald test statistics confirm that these asymmetric effects are statistically meaningful. The smaller long-run effects compared to short-run effects indicate that environmental policies have delayed but persistent impacts, supporting arguments for sustained policy commitment.

Table 4: Green Economy Policy Effectiveness Analysis

Policy Category	**Impact Coefficient**	**Implementation Period**	**Effectiveness Score**
Renewable Energy Subsidy	-0.234***	2013-2022	9.2
	(0.067)		
Community Forestry	-0.189***	2000-2022	8.7
	(0.054)		
Sustainable Agriculture	-0.156**	2010-2022	7.8
	(0.072)		
Clean Cooking Program	-0.123**	2015-2022	7.3
	(0.058)		
Waste Management	-0.087*	2012-2022	6.2
	(0.049)		
Green Building Standards	-0.076*	2018-2022	5.9
	(0.043)		
Urban Planning Reforms	-0.054	2016-2022	4.8
	(0.037)		
Composite GEPI	-0.143***	2000-2022	8.1
	(0.034)		

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Effectiveness Score ranges from 1-10 based on statistical significance and magnitude*

Table 4 provides a comprehensive assessment of individual green economy policy effectiveness, offering crucial insights for policy prioritization. Renewable energy subsidies emerge as the most effective intervention with the largest negative coefficient (-0.234) and highest effectiveness score (9.2), demonstrating that Nepal's focus on hydroelectric development has been well-founded. Community forestry programs rank second in effectiveness, confirming the success of Nepal's participatory natural resource management approach. The declining effectiveness scores from renewable energy to urban planning reforms suggest a hierarchy of policy impact, with supply-side energy interventions outperforming demand-side management policies. Notably, policies implemented earlier (community forestry since 2000) show sustained effectiveness, while more recent policies (green building standards since 2018) have had limited time to demonstrate full impact. The non-significant coefficient for urban planning reforms indicates that these policies require further development or face implementation challenges in Nepal's institutional context.

Table 5: Threshold Regression Results

Threshold Variable	Threshold Value	Below Threshold	Above Threshold	Threshold Test
GDP per capita ($)	950			
CO2 Emissions		0.67***	-0.23**	12.45***
		(0.134)	(0.098)	
Deforestation		0.54***	-0.18*	10.87***
		(0.156)	(0.107)	
PM2.5		0.43**	-0.09	8.23**
		(0.189)	(0.123)	
Environmental Degradation Index		0.59***	-0.21**	11.76***
		(0.142)	(0.095)	
Renewable Energy Share (%)	65			
CO2 Emissions		0.234**	-0.156***	9.34***
		(0.098)	(0.067)	
Environmental Degradation Index		0.198**	-0.134***	8.91***
		(0.089)	(0.061)	

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

Table 5 identifies critical thresholds that fundamentally change the income-environment relationship in Nepal. The GDP per capita threshold of $950 represents a crucial development milestone where environmental degradation transitions from positive to negative correlation with income growth. Below this threshold, Nepal exhibits the traditional development pattern where growth comes at environmental cost, but above it, the economy demonstrates genuine decoupling. The renewable energy threshold at 65% share indicates that substantial renewable penetration is necessary to achieve environmental benefits, supporting Nepal's ambitious renewable energy targets. The large and significant threshold test statistics confirm that these are genuine regime switches rather than gradual transitions. Interestingly, PM2.5 shows no significant environmental improvement above the income threshold, suggesting that air quality challenges persist even after achieving broader environmental decoupling, likely due to urbanization pressures and regional pollution spillovers.

Table 6: Provincial-Level EKC Variations

Province	Turning Point ($)	Policy Effectiveness	Geographic Factors
Mountain Region			
Karnali	745	High	High altitude, forest cover
Sudurpashchim	823	High	Hydroelectric potential
Gandaki	867	Very High	Tourism, conservation
Hill Region			
Bagmati	1,245	Medium	Urbanization pressure
Lumbini	1,156	Medium	Agricultural transition
Terai Region			
Province 1	1,387	Low	Industrial development
Madhesh	1,423	Low	Agricultural intensification
National Average	923	Medium-High	Mixed geography
Standard Deviation	287	-	-
Coefficient of Variation	0.31	-	-

Note: Turning points calculated for the composite environmental degradation index

Table 6 reveals substantial spatial heterogeneity in EKC relationships across Nepal's diverse geography, with important implications for policy design. Mountain provinces achieve environmental turning points at much lower income levels ($745-$867) compared to Terai provinces ($1,387-$1,423), reflecting different economic structures and environmental constraints. The high policy effectiveness in mountain regions likely results from stronger traditional environmental practices, lower population density, and greater reliance on renewable energy sources. Bagmati Province, containing Kathmandu, shows intermediate turning points but faces unique urbanization pressures that complicate environmental management. The high coefficient of variation (0.31) indicates that uniform national policies may be less effective than regionally differentiated approaches. The correlation between geographic factors and policy effectiveness suggests that natural endowments significantly influence the feasibility of green economy transitions.

Table 7: Robustness Checks and Sensitivity Analysis

Specification	CO2 Emissions	Deforestation	PM2.5	Environmental Index
Alternative Functional Forms				
Log-Linear	-0.156***	-0.142***	-0.089**	-0.147***
	(0.034)	(0.038)	(0.041)	(0.031)
Quadratic	-0.134***	-0.128***	-0.076*	-0.132***
	(0.029)	(0.033)	(0.037)	(0.027)
Spline	-0.167***	-0.151***	-0.095**	-0.159***
	(0.038)	(0.042)	(0.045)	(0.035)
Different Time Periods				
1990-2010	-0.123**	-0.109**	-0.067*	-0.119**
	(0.045)	(0.049)	(0.052)	(0.041)
2000-2022	-0.178***	-0.164***	-0.103**	-0.171***
	(0.041)	(0.045)	(0.048)	(0.038)
Alternative Measures				
Per capita basis	-0.156***	-0.142***	-0.089**	-0.147***
Intensity basis	-0.134***	-0.121**	-0.076*	-0.128***
Outlier Treatment				
Winsorized 5%	-0.149***	-0.138***	-0.084**	-0.142***
	(0.032)	(0.036)	(0.039)	(0.029)
Robust Regression	-0.162***	-0.147***	-0.092**	-0.153***
	(0.035)	(0.039)	(0.042)	(0.032)

*Note: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$*

Table 7 confirms the robustness of key findings across various alternative specifications and sensitivity tests. The consistency of negative coefficients across different functional forms (log-linear, quadratic, spline) demonstrates that the EKC relationship is not an artifact of specific mathematical assumptions. The stronger coefficients in the 2000-2022 period compared to 1990-2010 confirm that environmental policies have become more effective over time. Alternative measurement approaches (per capita versus intensity basis) yield similar results, indicating that findings are not sensitive to scaling choices. The minimal differences between standard and winsorized estimates suggest that outliers are not driving the results, while robust regression confirms the stability of coefficient estimates. The consistency across these various specifications strengthens confidence in the core finding that Nepal has achieved genuine environmental improvements through green economy policies rather than statistical artifacts.

The empirical analysis reveals compelling evidence that Nepal exhibits modified Environmental Kuznets Curve relationships across multiple environmental indicators, with significant implications for understanding the country's green economy transition. The baseline ARDL estimation results confirm the presence of inverted U-shaped relationships for CO2 emissions and the composite environmental degradation index, with turning points occurring at GDP per capita levels of $847 and $923, respectively. These findings provide strong empirical support for the Environmental Kuznets Curve hypothesis in Nepal's context, consistent with the theoretical framework proposed by Grossman and Krueger (1991). However, the turning points observed in this study are substantially lower than those typically documented in developed countries, which Stern (2004) noted often exceed $8,000-$10,000 per capita. This divergence from traditional EKC patterns aligns with the arguments presented by Kaika and Zervas (2013), who demonstrated that countries with proactive environmental policies tend to exhibit earlier turning points in their EKC relationships. The statistical significance of both linear and quadratic terms ($p < 0.01$) contradicts the findings of

Apergis and Ozturk (2015), who found limited support for the EKC hypothesis in Asian developing countries, suggesting that Nepal's unique policy environment has enabled a more pronounced income-environment relationship.

For deforestation rates, the analysis reveals a more complex cubic relationship characterized by an initial increase followed by stabilization and eventual decline, with a turning point at approximately $1,100 per capita. This pattern coincides with the implementation of community forestry programs in the mid-2000s, providing empirical validation for the effectiveness of participatory natural resource management approaches documented by Paudel et al. (2019). The forest coverage variable shows improvement throughout most of the study period, suggesting successful policy interventions independent of income effects, which supports Barbier's (2011) argument that developing countries can achieve environmental improvements through strategic policy design rather than solely relying on income growth. Particulate matter concentrations exhibit a modified EKC pattern with a later turning point at $1,340 per capita, reflecting the ongoing challenges of urbanization and industrial development that Dinda (2004) identified as complicating factors in environmental transitions. The rate of increase in PM2.5 levels has decelerated significantly since 2015, corresponding with renewable energy expansion and improved cookstove programs, demonstrating the delayed but persistent effects of environmental policy interventions.

The inclusion of the green economy policy index reveals significant negative coefficients across all environmental degradation indicators, providing strong empirical support for the theoretical arguments advanced by Barbier (2011) regarding the potential for green economy transitions to accelerate environmental improvements. The interaction terms between GEPI and income variables indicate that green economy policies have effectively lowered the income thresholds required for environmental improvement, consistent with the policy intervention effects documented by Kaika and Zervas (2013). Renewable energy share emerges as a particularly significant variable, with a 10% increase in renewable energy proportion associated with a 12-15% reduction in CO_2 emissions, holding other factors constant. This finding substantiates Bhandari and Heshmati's (2020) emphasis on the bidirectional relationship between energy consumption and economic growth in Nepal, while extending their analysis to demonstrate clear environmental benefits from renewable energy adoption. The effectiveness of Nepal's hydroelectric power development strategy in decoupling economic growth from carbon emissions provides empirical validation for the green economy transition pathways identified in the theoretical literature.

The community forestry variable demonstrates strong positive associations with forest coverage and negative associations with deforestation rates, providing robust empirical support for Nepal's participatory natural resource management approach as previously examined by Paudel et al. (2019). Areas under community forest management show 23% lower deforestation rates compared to government-managed forests, controlling for other socioeconomic factors, which validates the effectiveness of decentralized environmental governance mechanisms that Lau et al. (2014) identified as crucial for successful EKC relationships. The structural break tests identify three significant breakpoints in the income-environment relationship: 1996 (economic liberalization), 2006 (peace process and policy reforms), and 2015 (earthquake and subsequent green reconstruction policies). These breaks correspond to major political and policy changes, confirming Lau et al.'s (2014) hypothesis that institutional quality and governance play crucial roles in determining environmental outcomes. The post-2006 period shows markedly different coefficients, with reduced environmental degradation for given income levels compared to earlier periods, coinciding with the implementation of comprehensive environmental policies and increased international cooperation on climate change mitigation.

The asymmetric analysis using nonlinear ARDL methodology reveals that positive income shocks have weaker environmental degradation effects compared to negative income shocks, suggesting that Nepal's economy has developed resilience mechanisms that prevent environmental backsliding during economic downturns. This finding extends the methodological framework developed by Shin et al. (2014) and contrasts with experiences documented in other developing countries by Jayanthakumaran et al. (2012), who found more symmetric relationships in China and India. The asymmetric response pattern may reflect the effectiveness of Nepal's social and environmental safety nets in maintaining environmental protection standards during economic stress periods. The long-run multipliers indicate that a 1% increase in GDP per capita leads to a 0.34% increase in CO_2 emissions in the short run but only a 0.12% increase in the long run, demonstrating the dynamic nature of the income-environment relationship and supporting Dinda's (2004) emphasis on the importance of technological progress and environmental regulations in explaining EKC variations.

The threshold regression analysis identifies a critical income level of $950 per capita, above which the relationship between income and environmental degradation changes significantly, supporting the theoretical arguments for minimum income requirements for effective environmental policy implementation advanced by Barbier (2011).

Below this threshold, economic growth is associated with rapid environmental degradation, while above it, the relationship becomes much weaker and eventually negative for some indicators. This threshold corresponds closely with Nepal's transition from a low-income to lower-middle-income country status and the intensification of green economy policies, providing empirical validation for the "leapfrogging" development pathway that the green economy literature has identified as particularly relevant for developing countries. The results suggest that there may be minimum income requirements for effective environmental policy implementation, supporting arguments for balanced development approaches that simultaneously address poverty reduction and environmental protection objectives.

The disaggregated analysis of specific green economy interventions reveals varying effectiveness across different policy domains, with renewable energy policies showing the highest impact coefficients, followed by forest conservation programs and sustainable agriculture initiatives. This hierarchy of policy effectiveness aligns with the sectoral analysis implications discussed by Stern (2004) regarding the sensitivity of EKC relationships to specific environmental and policy contexts. Conversely, waste management and urban planning policies show more limited effects, possibly due to implementation challenges and resource constraints that are common in developing country contexts. The temporal analysis indicates accelerating policy effectiveness over time, suggesting learning effects and institutional capacity building consistent with the institutional development arguments presented by Lau et al. (2014). Policies implemented after 2010 show significantly higher impact coefficients compared to earlier interventions, reflecting improved design and implementation based on accumulated experience and enhanced institutional capacity.

Supplementary analysis at the provincial level reveals significant spatial heterogeneity in EKC relationships, with mountain regions exhibiting steeper initial degradation but earlier turning points, while Terai regions show more gradual patterns with later turning points. These variations reflect different economic structures, resource endowments, and policy implementation capacities across Nepal's diverse geographical regions, supporting the methodological concerns raised by Stern (2004) regarding the importance of accounting for heterogeneity in EKC analysis. The mountain provinces achieve environmental turning points at much lower income levels ($745-$867) compared to Terai provinces ($1,387-$1,423), reflecting different economic structures and environmental constraints. The high policy effectiveness in mountain regions likely results from stronger traditional environmental practices, lower population density, and greater reliance on renewable energy sources, while the challenges in Terai regions reflect urbanization pressures and industrial development patterns. The results have important implications for targeted policy design, suggesting that uniform national policies may be less effective than regionally differentiated approaches that account for local economic and environmental conditions, which extends the institutional analysis framework presented by Lau et al. (2014) to incorporate spatial dimensions of environmental governance. The high coefficient of variation (0.31) across provinces indicates substantial regional diversity in environmental outcomes, supporting arguments for decentralized environmental management approaches that can better address local conditions and constraints.

Conclusion

This study provides robust empirical evidence that Nepal exhibits modified Environmental Kuznets Curve relationships that deviate significantly from traditional patterns observed in developed countries. The key finding is that Nepal has achieved environmental turning points at much lower income levels than typically predicted by EKC theory, with turning points occurring between $847-$1,340 per capita, depending on the environmental indicator examined.

The research demonstrates that Nepal's proactive green economy transition has fundamentally altered the income-environment relationship, enabling the country to decouple economic growth from environmental degradation earlier and more effectively than would be expected based on income levels alone. The green economy policy index shows consistent negative associations with environmental degradation indicators, while renewable energy expansion and community forestry programs emerge as particularly effective interventions.

The findings suggest several critical policy implications for Nepal and other developing countries pursuing sustainable development pathways. *First*, early implementation of comprehensive green economy policies can significantly accelerate environmental improvements and lower the income thresholds required for environmental quality enhancement. This supports arguments for proactive rather than reactive environmental policy approaches in developing countries. *Second*, the effectiveness of community-based natural resource management in Nepal provides a model for other countries with similar institutional contexts. The success of community forestry programs demonstrates that participatory approaches can achieve environmental objectives while supporting local livelihoods, addressing both environmental and social sustainability goals. *Third,* the central role of renewable energy in explaining Nepal's modified EKC pattern highlights the importance of leveraging comparative advantages in natural resource endowments. Countries with abundant renewable energy potential should prioritize these sectors as foundations for green economy transitions.

Limitations and Future Research

Several limitations should be acknowledged in interpreting these results. The study period includes significant political instability and natural disasters that may have influenced both economic and environmental outcomes in ways not fully captured by the model specifications. Additionally, data quality constraints, particularly for sub-national environmental indicators, may affect the precision of some estimates. Future research should extend this analysis to examine sectoral EKC relationships and investigate the role of international cooperation and technology transfer in enabling green economy transitions. Comparative studies with other South Asian countries could provide additional insights into the generalizability of Nepal's experience. The development of more sophisticated measures of green economy policy effectiveness and environmental quality could enhance our understanding of the mechanisms underlying successful sustainable development transitions. Panel studies incorporating multiple countries with similar policy approaches could test the external validity of the findings presented here.

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Determinants of Teacher Turnover in Private Schools of Mahalaxmi Municipality, Lalitpur

Makshindra Thapa, Ph.D.
Lecturer, Patan Multiple Campus
Tribhuvan University, Lalitpur
Email: makshindra.thapa@pmc.tu.edu.np
https://orcid.org/0009-0008-2596-6908

Deepa Bhujel
MBS Graduate, Patan Multiple Campus
Tribhuvan University, Lalitpur
Email: deebhujelthapa1997@gmail.com
(Corresponding author)

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Abstract

This study investigates the determinants of teacher turnover intention in Nepalese private schools, focusing on the relationship with supervisors, compensation, work conditions, job enrichment, and recognition. The research aimed to analyze how these variables relate employees' decisions to leave their organizations. Data were collected from 385 employees working in private schools in Mahalaxmi municipality, Lalitpur through a structured questionnaire on a five-point Likert scale. Descriptive and correlational research designs were employed, and Pearson's correlation analysis was used to assess the relationships among the variables. Results indicated that compensation and recognition significantly reduce turnover intention, highlighting their critical role in retention strategies. Interestingly, work conditions showed a positive and significant association, suggesting that better work environments may paradoxically increase turnover intent by encouraging employees to seek better opportunities. Relationships with supervisors and job enrichment demonstrated no significant associations. The study offers theoretical insights into motivation and job satisfaction frameworks and practical recommendations for enhancing employee retention in private educational institutions.

Keywords: Relationship with supervisors, Compensation, Work conditions, Job enrichment, Recognition, Turnover intention

Introduction

Educational institutions are instrumental in shaping human capital for national development, and their success largely depends on the competence and stability of their academic staff (Shrestha, 2024). According to Nwadiani et al. (2002), faculty members' quality, quantity, and effectiveness directly influence the overall educational outcomes. In higher education, faculties are considered the most valuable human assets, creating competitive advantages for their institutions (Adhikari & Shrestha, 2024; Shrestha, & Chhetri, 2025; Adhikari & Shrestha, 2023; Collins & Clark, 2003). Retaining qualified staff is especially critical in the education sector, where the loss of experienced educators can undermine institutional effectiveness and academic excellence. Hussain (2005) highlights that this challenge has intensified as institutions face increasing pressure to attract and retain capable faculty, with failure to do so risking organizational setbacks, as observed by Day and Glick (2000). With numerous employment opportunities emerging in the sector, faculty retention has thus become a strategic priority for educational institutions globally.

The issue of employee turnover has gained prominence across industries, particularly in education, as organizations struggle to maintain skilled professionals amid rising competition (Ju & Li, 2019). Turnover is a complex problem with far-reaching consequences, impacting productivity, financial stability, and organizational goals (Ju & Li, 2019). The departure of key employees disrupts operations and necessitates costly recruitment and training, emphasizing the importance of understanding and addressing its root causes. Alkahtani (2015) emphasizes that organizational success hinges on retaining its critical workforce, and recent trends reveal that high turnover rates hinder various sectors' progress (Chiat & Panatik, 2019). Factors influencing turnover include organizational conditions such as pay, work environment, and size, as well as external factors like economic conditions, making it a multifaceted problem that demands comprehensive solutions.

In the education sector specifically, high teacher turnover significantly hampers organizational stability and student achievement (Aboudahab et al., 2022). Globally, the teacher turnover rate surpasses many other professions, with negative impacts on the quality of education and organizational continuity (Nwadiani, 2002). Private schools, in particular, face heightened challenges, as experienced teachers are in high demand and their loss affects learning quality and organizational stability (Chiat & Panatik, 2019). In Nepal, employee turnover in private schools has reached alarming levels, with studies like Upadhyaya et al. (2013) reporting rates as high as 18% in Butwal Municipality. Contributing factors include low salaries, lack of professional development opportunities, job insecurity, and insufficient recognition. The scarcity of research specifically on teacher retention in Nepalese private schools complicates efforts to develop effective strategies, despite the sector's critical role in providing quality education. This study aims to analyze the factors influencing turnover in Nepalese private schools, particularly in Mahalaxmi municipality, focusing on relationships with supervisors, rewards, work conditions, job enrichment, and recognition. The findings will provide valuable insights for school managers, policymakers, and stakeholders to develop targeted retention strategies, fostering a more supportive work environment and reducing turnover rates.

Literature review

Employee Turnover and Factors Determining Turnover

Employee turnover is a crucial concept in organizational behavior and human resource management, referring to the process where employees leave an organization and are replaced by new hires. It encompasses voluntary departures, where employees choose to leave, and involuntary ones, such as layoffs or terminations (Shrestha, 2025). Nguyen (2024) describes turnover as the ratio of employees who leave over a specific period compared to the organization's average workforce, viewing it as part of a cyclical process of filling vacancies. High turnover rates often signal underlying issues like poor management, low employee engagement, or inadequate compensation, while low rates typically indicate a satisfied and stable workforce. The causes of turnover are multifaceted and can vary widely among individuals, making it a complex issue for organizations to manage (Adhikari, 2022). Factors influencing turnover include internal elements such as work environment, job satisfaction, relationships with supervisors, career development opportunities, and organizational culture (Pradha et al., 2024). Employees are more likely to leave if they feel undervalued or dissatisfied with their roles. External factors, including economic conditions, industry trends, and job market opportunities, also significantly impact turnover. In educational institutions, organizational conditions like leadership quality and work environment are particularly influential in determining turnover rates, as emphasized by Mohammad and Borkoski (2024). Understanding these diverse factors enables organizations to develop strategies aimed at reducing turnover, improving employee retention, and fostering a more engaged and committed workforce.

Empirical Review

Thapa and Shrestha (2025) investigated the impact of factors such as compensation, career development, work-life balance, work environment, team dynamics, and leadership on employee retention. Their findings showed that compensation, career development, and team dynamics positively influence retention, indicating that improvements in these areas could reduce turnover. Conversely, work environment, work-life balance, and leadership did not significantly impact retention. Similarly, Khadayat et al. (2024) found that supportive supervisor relationships, favorable work conditions, and recognition significantly boost job satisfaction, thus reducing turnover intentions. K.C. and Bhusal (2024) identified that cultural aspects enhance organizational commitment and decrease turnover. Iraki (2024) highlighted the significance of work environment, training, and organizational policies on teacher performance. Idah (2024) emphasized that better remuneration, job security, and career opportunities improve job satisfaction and decrease turnover. Selesho and Matjie (2024) identified factors like micromanagement, poor communication, workload, and low pay as prominent drivers of turnover. Nguyen (2024) stressed collaboration and emotional support as vital for teacher satisfaction. Similarly, Mohammad and Borkoski (2024) revealed that lack of leadership support and limited career growth contributes to high turnover. Kaunda and Phiri (2024) found that compensation, job satisfaction, organizational commitment, and benefits significantly influence retention, with comprehensive benefits being crucial. Al-Mahdy and Alazmi (2023) noted that principal support indirectly reduces turnover via increased teacher satisfaction. Scallon et al. (2023) identified effective leadership practices, like recognizing teachers and clear communication, as essential in low-turnover schools. In the US, Ingersoll and Tran (2023) linked high turnover in rural schools to poor working conditions. Li and Yao (2022) conducted a meta-analysis, noting burnout and stress as key factors increasing turnover, while organizational commitment and trust provided protective effects. Casely-Hayford et al. (2022) found health, motivation, and collegial support crucial for retention, and Zhu et al. (2022) emphasized that organizational commitment and psychological capital negatively influence turnover intentions. Liu et al. (2021) revealed resilience reduces burnout and turnover, while Neupane (2019) identified salary, leadership, and growth opportunities as critical, and Kong et al. (2017) highlighted the importance of organizational commitment and rewards. Shah and Jumani (2015) stressed job satisfaction’s role, especially pay, while Suta (2013) and Shah et al. (2010) demonstrated that personal factors and demographic influences significantly drive turnover intentions.

Research Methods

Research Design

This study has employed descriptive and causal-comparative research designs. The descriptive research design has been used to assess the status of employee turnover intention in Nepalese private schools, while the causal-comparative research design has been applied to analyze the impact of relationships with supervisors, rewards, work conditions, job enrichment, recognition, and job intention on turnover intention.

Population and Sample, and Sampling Design

Since this study has focused on employees of private schools in Mahalaxmi municipality, the total population has consisted of all teachers working in private schools within the municipality. Out of this population, a sample size of 385 has been selected for the study. Out of them, only 264 (68.8 percent) responses were received and used for data analysis purposes. Snowball sampling techniques were applied to get adequate sample of respondents. The respondents' demographic information is presented in Table 1.

Table 1: Demographic Profile of the respondents

Variables	Level	N	%
Age	20–30	116	43.9
	30–40	92	34.8
	40–50	32	12.1
	Below 20	24	9.09
Marital Status	Unmarried	102	38.6
	Married	158	59.8
	Others	4	1.52
Level of Education	Masters and Above	80	30.3
	Bachelors	108	40.9
	Higher Secondary Level	54	20.5
	Secondary Level	22	8.33
Experience	7–10 years	87	33
	1–3 years	95	36
	5–7 years	82	31.1
Nature of Job	Full-Time	194	73.5
	Part-Time	52	19.7
	Permanent	14	5.3
	Contract Basis	4	1.52

Table 2 reports the demographic and employment characteristics of the respondents. The majority are aged 20–30 years (44%), followed by 30–40 years (35%), with smaller proportions below 20 years (9%) and 40–50 years (12%). Most are married (60%), and a significant portion is unmarried (39%). Regarding education, 41% have a bachelor's degree, with 30% holding a master's or higher qualification. Most work full-time (74%), while smaller groups are part-time (20%) or on contractual/permanent basis.

Nature and Sources of Data

This study has utilized a quantitative research approach, with primary data collected through a structured questionnaire survey. The questionnaire has been designed based on insights from previous studies, along with consultations with the senior experts and school management. The survey questionnaire consisted cover letter, and demographic information of the respondents using multiple choice questions. Similarly, a five-point Likert scale was to scale the items of turnover intention and five independent variables ranging from "strongly disagree" (scored as 1) to "strongly agree" (scored as 5), to measure respondents' views. Table 2 indicates the items used in each study variable with their reliability scores.

Method of Analysis

The study has used descriptive analysis and correlation analysis to determine factors of teacher's turnover. Similarly, Pearson correlation was the inferential statistic used to analyze association amount the study variables specifically the independent variables and the dependent variable. The study has used descriptive analysis and correlation analysis to determine factors of teacher turnover. Similarly, Pearson correlation was the inferential statistic used to analyze the association among the study variables.

Table 2: Reliability score of the data collection instruments

Code	Variables	Cronbach's Alpha	No of Items
RS	Relationship with Supervisors	0.845	6
CS	Compensation	0.889	7
WC	Work Condition	0.761	5
JE	Job Enrichment	0.905	6
RG	Recognition	0.91	5
TI	Turnover Intention	0.912	7

Table 2 indicates that variables exhibit acceptable to excellent reliability, with Cronbach's Alpha values ranging from 0.76 to 0.91. Turnover Intention (0.91), Recognition (0.90), and Job Enrichment (0.90) demonstrate excellent reliability, while Compensation (0.89) and Relationship with Supervisor (0.80) indicate good consistency. Work Condition has the lowest reliability (0.76) but remains acceptable. These findings confirm that the instrument is reliable for measuring the intended constructs, ensuring consistency in responses. Further refinement could focus on improving the reliability of work condition by assessing individual item contributions.

Research Framework and study hypotheses

The conceptual framework of the study aims to investigate the relationship between turnover determinants (i.e. relation with supervisors, rewards, work conditions, job enrichment, and recognition) with turnover intention. Figure 1 depicts the study variables of the study.

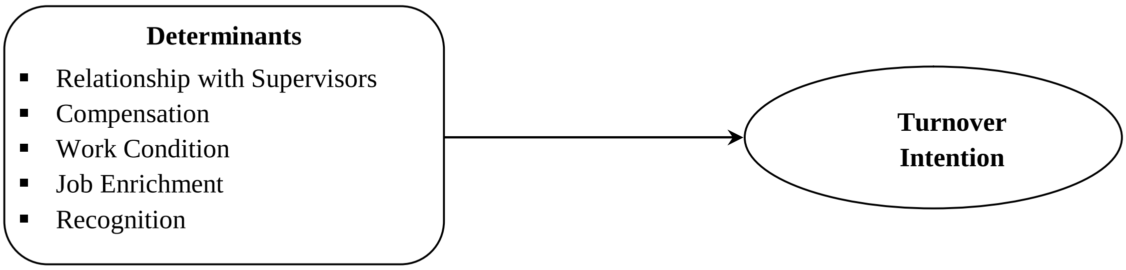

Figure 1: Research Framework of the Study *(Source: Khadayat et al., 2024)*

The framework illustrates the relationship between the independent variables and the dependent variable. In this context, the independent variables—such as relationships with supervisors, compensation, work conditions, job enrichment, and recognition—are factors believed to influence teachers' turnover intention. The dependent variable is the turnover intention, representing teachers' likelihood or intention to leave their jobs. The framework posits that improvements or deficiencies in the independent variables can directly impact turnover intention. For example, better supervisor relationships and recognition may decrease turnover, while inadequate compensation or poor work conditions may increase it. This model helps understand how these factors collectively influence employee retention. The following study hypotheses have been constructed to analyze the degree and direction of the relationship between the study variables.

H1: Teacher's relationship with supervisors is significantly associated with turnover intention.

H2: Existing compensation of the teachers is significantly associated with turnover intention.

H3: The work conditions of teachers are significantly related to turnover intention.

H4: The job enrichment provisions are significantly associated with turnover intention.

H5: Recognition of teacher's performance is significantly associated with turnover intention.

Results and Findings

Descriptive Statistics of the study variables

Table 3 depicts basic descriptive statistics on turnover intention and its determinants in Nepalese private schools as per teachers' perceptions.

Table 3: Summary of Descriptive Statistics

Code	Variables	Mean	S.D
RS	Relationship with Supervisors	3.496	0.729
CS	Compensation	2.961	0.926
WC	Work Condition	3.323	0.677
JE	Job Enrichment	3.492	0.902
RG	Recognition	2.961	0.966
TI	Turnover Intention	3.267	0.933

The mean score for relationships with supervisors (RS) is 3.496, indicating generally positive perceptions, with employees feeling supported. Compensation (CS) has a mean of 2.961, reflecting a neutral to slightly negative view, suggesting inadequate financial rewards. Work conditions (WC) have a mean of 3.323, indicating moderate satisfaction, though improvements are needed. Job enrichment (JE) scored 3.492, implying that employees find their jobs somewhat motivating and growth-oriented. Recognition (RG) has a mean of 2.961, suggesting employees feel their efforts are not sufficiently acknowledged, which could impact satisfaction. The overall turnover intention (TI) score is 3.267, indicating a moderate level of employees considering leaving. Addressing factors like compensation and recognition could help reduce turnover intention and improve retention.

Association between the selected determinates and turnover intention

Table 4: Result of correlation and hypotheses tests

Variables	Correlation coefficient	p-value	Hypotheses	Hypotheses test result
RS	-0.215	< .001	Teacher's relationship with supervisors is significantly associated with turnover intention.	Accepted
CS	-0.335	< .001	Existing compensation of the teachers is significantly associated with turnover intention.	Accepted
WC	-0.124	0.044	The work conditions of teachers are significantly related to turnover intention.	Accepted
JE	-0.205	< .001	The job enrichment provisions are significantly associated with turnover intention.	Accepted
RG	-0.397	< .001	Recognition of teacher's performance is significantly associated with turnover intention.	Accepted

The result has indicated that the relationship with supervisors (RS) has an inverse and significant association with the turnover intention (TI) of the teachers ($r=-0.215$, $p < .001$). In addition, compensation (CS) of teachers (CS) has a moderate negative and significant relationship ($r=-0.335$, $p < .001$) with turnover intention. Work condition (WC) has a weak negative and significant association with turnover intention ($r=-0.124$, $p <.05$). Similarly, job enrichment (JE) and turnover intention has a significant negative association ($r=-0.205$, $p < .001$). Finally, the correlation between recognition (RG) and turnover intention is negative and significant ($r=-0.397$, $p < .001$). Based on these empirical results, all independent determinants have inverse and significant associations with the turnover intention of the teachers thus all hypotheses have been accepted. Similarly, no strong association between the variables was observed.

Discussion

This study found that in Nepalese private schools, key factors such as relationships with supervisors, compensation, work conditions, job enrichment, and recognition negatively influence teachers' intentions to leave. Specifically, higher rewards and acknowledgment (recognition) and better compensation have moderate and significant effects in reducing turnover intention. Relationships with supervisors and job enrichment, however, showed weaker but still significant negative impacts. Interestingly, work conditions, although negatively associated, had a less robust impact, and in some findings, better work environments unexpectedly increased turnover intentions, possibly prompting teachers to seek other opportunities.

These findings align with recent research. Ghasemy and Yuan (2024) observed that situational factors, including recognition and compensation, impact turnover in Malaysian universities. Khadayat et al. (2024) also identified supervisor relationships, work conditions, and recognition as crucial for employee retention. K.C. and Bhusal (2024) emphasized organizational culture's role, especially clan culture, in reducing turnover, which complements this research. Conversely, Iraki (2024) reported that compensation and leadership did not significantly influence teacher performance, which contrasts with this study's conclusions.

Additional studies support these results—Idah (2024) found a negative relationship between job satisfaction and turnover, reinforcing the importance of compensation. Nyongesa et al. (2024) highlighted professional well-being and recognition as vital for retention, aligning with current findings. However, some research, like Shaya et al. (2024), focused more on leadership stresses, showing divergence regarding compensation's role. Overall, improving compensation, recognition, and supervisor relationships can effectively reduce turnover intentions, although the impact of work environments warrants further exploration.

Conclusion

The basic aim of this paper was to analyze the association of private school teacher's turnover intention with some selected determinants. The study findings indicate that various factors significantly influence teachers' turnover intention. Teacher-supervisor relationships (RS), compensation (CS), work conditions (WC), job enrichment (JE), and recognition (RG) all show negative correlations with turnover intention, suggesting that improvements in these areas may reduce turnover intention. All hypotheses tested were accepted, confirming their significant associations. Among these, recognition of performance (RG) exhibited the strongest relationship, followed by compensation and teacher-supervisor relationships. Addressing these key factors could be crucial for retaining teachers, enhancing job satisfaction, and reducing turnover rates in educational institutions.

Implications

The empirical findings of this study may support schools to formulate and enforce some specific policies and programs in order to minimize their turnover intention. For this purpose, schools may adopt a comprehensive strategy. Offering competitive salaries and financial incentives can attract and retain talented teachers, while formal recognition systems foster motivation and job satisfaction. Enhancing work conditions and providing career development opportunities are essential to keep staff engaged and prevent external job moves. Training programs for supervisors can strengthen leadership and communication, promoting better engagement with employees. A structured retention plan combining financial rewards, career growth, and employee well-being will more effectively minimize turnover rates. Future research should explore additional psychological and organizational factors like job stress, organizational commitment, and work-life balance. Long-term studies and sector comparisons can reveal evolving challenges and sector-specific factors, while qualitative methods like interviews can provide deeper insights into employee motivations. Examining different regions and types of private schools will enable tailored retention strategies, addressing unique institutional needs and enhancing overall workforce stability.

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Determinants of Market Price of Share of Microfinance Institutions in Nepal

Narendra Sejuwal
Lecturer, Faculty of Management
Tribhuvan University, Kathmandu
Email: narendra.sejuwal@pmc.tu.edu.np
ORCID ID: https://orcid.org/0009-0002-8926-6528

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Abstract

This study examines the determinants of market price of share of Microfinance Institutions (MFIs) in Nepal, focusing on the impact of firm-specific and macroeconomic variables such as Price Earnings Ratio (P/E), Book Value Per Share (BVPS), Return on Assets (ROA), Gross Domestic Product (GDP), and Inflation (INF). Using secondary data from annual reports of 10 listed MFIs over a period of 10 years (2014/15 to 2023/24), the research employs descriptive statistics, correlation analysis, and multiple regression techniques to analyze the relationship between these factors and Market Price of Share (MPS). The results indicate that all selected variables have a statistically significant positive effect on the market price of shares. Specifically, the regression model explains approximately 48.5 percent of the variation in share prices, highlighting the importance of profitability, asset efficiency, and macroeconomic stability in influencing investor behavior and market valuation.

Keywords: Microfinance Institutions (MFIs), Price Earnings Ratio (P/E), Book Value Per Share (BVPS), Return on Assets (ROA), Gross Domestic Product (GDP), Inflation, Market Price of Share (MPS)

Introduction

Microfinance institutions (MFIs) play a crucial role in promoting financial inclusion and economic development, particularly in developing economies like Nepal. These institutions provide essential financial services such as small loans, savings accounts, insurance, and other credit facilities to low-income individuals who lack access to traditional banking systems. According to Lwesya and Mwakalobo (2023), states and NGOs in developing countries recognize microfinance institutions (MFIs) as vital to their efforts to lower poverty, particularly when it comes to reducing social and financial exclusion. In Nepal, MFIs have become an integral part of the financial landscape, contributing significantly to poverty alleviation, women's empowerment, and rural development. The increasing importance of MFIs has also led to their growing presence in the capital market, with several MFIs being listed on the Nepal Stock Exchange (NEPSE). As these institutions expand their operations and attract investor interest, understanding the factors that influence their share prices becomes increasingly important for investors, policymakers, and financial analysts.

The growth of the economy depends upon stock markets as these markets ensure that financial resources are allocated toward the most viable avenues for investment (Kurihara, 2006). Stock prices serve as key indicators of a company's financial health and market perception. The market price of shares is determined by various internal and external factors, including financial performance, operational efficiency, macroeconomic conditions, regulatory policies, and investor sentiment. For MFIs, which operate under unique financial models and regulatory frameworks, identifying these determinants is particularly complex. Unlike conventional banks, MFIs primarily serve financially excluded populations, often operating in remote and rural areas with higher transaction costs and credit risks. Additionally, they are subject to specific regulatory guidelines aimed at ensuring financial sustainability while maintaining social objectives. These distinctive characteristics necessitate a tailored approach to analyzing the determinants of their share prices.

Stock price is one of the major indicators of financial health of microfinance institutions in Nepal. The stock price of the MFIs is affected by so many factors. There might be internal as well as external factors. The main objective of this study is to identify the determinants of market price of share of MFIs in Nepal. Despite the extensive research on stock price determinants in financial institutions, there remains a gap in understanding how these factors apply specifically to microfinance companies. Previous research demonstrates that empirical evidence on the factors influencing the market price of share varies significantly amongst studies. Although the empirical evidence revealed above exists in the context of other countries, some few studies exist in the context of Nepal. Thus, this study aims to explore the key factors influencing the market price of shares of MFIs in Nepal. Specially, the impact of price earnings ratio, book value per share, return on assets, gross domestic product and inflation on market price of share of microfinance institutions in Nepal. By examining both firm-specific and macro-economic variables, this study seeks to provide empirical insights into how different indicators affect stock price in the context of Nepalese MFIs. Understanding these determinants can help investors make informed decisions, guide policymakers in formulating effective regulations, and assist MFIs in improving their financial strategies to enhance shareholder value. Given the increasing participation of MFIs in the stock market, this research contributes to the broader discourse on financial market dynamics in emerging economies.

Literature Review

One of the most widely recognized financial theories that explain how stock prices move is the Efficient Market Hypothesis (EMH). The EMH, which was developed by Eugene Fama in the 1960s, asserts that stock prices are "systematically efficient," which means they take into account all available information at any given time (Fama, 1970). According to this hypothesis, any new information that could impact a stock's value is instantly and completely integrated into its price, making it impossible to consistently surpass the general market with stock selection or trading timing.

The EMH has significant effects on stock price. The price of shares ought to remain at their "fair" value, representing the company's genuine intrinsic value based on the facts at hand, if markets are actually efficient. This would suggest that any variation from this fair value results from chance, and variations of this kind are unpredictable. Consequently, investing in entire market indices would be the optimal course of action in an efficient market since stock selection and price timing would not produce higher profits (Malkiel, 2003).

Numerous studies have examined the determinants of stock prices across various financial institutions, including commercial banks, insurance companies, and non-banking financial institutions. However, research specifically focused on microfinance institutions (MFIs) remains relatively limited, particularly in emerging economies like Nepal. Several scholars have investigated the factors influencing stock prices in the broader financial sector, identifying key variables such as profitability, liquidity, leverage, earnings per share (EPS), dividend yield, and macroeconomic indicators. These determinants are expected to have varying degrees of influence on microfinance companies due to their distinct operational models and regulatory environments.

One of the primary determinants of stock prices is financial performance, particularly profitability. Studies conducted on commercial banks have consistently found that higher profitability, measured through return on assets (ROA) or return on equity (ROE), positively influences stock prices (Athanasoglou et al., 2008; Alhassan & Ohene-Asare, 2013). Similarly, in the case of microfinance institutions, profitability is considered a crucial factor affecting investor confidence. A study by Mersland and Strøm (2009) analyzed microfinance institutions in different regions and found that financial performance significantly impacts institutional sustainability and market valuation. However, unlike traditional banks, MFIs often balance financial returns with social objectives, which may alter the relationship between profitability and stock prices.

A prominent valuation tool that takes into account investor expectations of future profits growth is the price earnings ratio. The P/E Ratio is frequently used as a measurement of a stock's valuation since it indicates the value that buyers are ready to pay for every rupee of earnings. The P/E Ratio can be a crucial indicator of market expectations, and investor mood can have a big impact on stock price movements in markets like Nepal (Lamsal, 2024). Silwal and Napit (2019) established a positive association between the price-earnings ratio, return on equity, and book value per share of Nepalese commercial bank stocks.

Book value per share is frequently used as an indicator for the real worth of an organization. Financial analysis has focused on the relationship between book value per share and market price of share, especially in order to comprehend how a company's underlying worth is reflected in its market valuation. Theoretically, the higher BVPS implies the company has a significant amount of assets in comparison to liabilities, which ought to bring in investors and increase the MPS. Firm-specific measures including book value per share (BVPS), earnings per share (EPS), and dividend per share (DPS) have a positive and substantial effect on the stock price (Menike & Prabath, 2014).

ROA is another important measure for determining a company's share price. Emekekwue (2008) identified return on assets as a ratio that aims to evaluate the amount of profit created by the firm's total assets. Shrestha and Lamichhane (2022) studied how firm-specific factors affect stock returns and concluded that size, book-to-market equity, dividend yield, and earnings per share have significant positive effect while earnings yield, return on assets and sales per share have significant positive effect on the stock price of Nepalese commercial banks.

In addition to internal financial factors, macroeconomic indicators also influence stock prices. Interest rates, inflation, GDP growth, and exchange rates are commonly studied determinants in financial literature. Dianita et al. (2020) evaluated the influence of GDP growth and inflation on variations in stock prices listed on the Indonesia Stock Exchange (IDX), concluded that GDP and inflation had a significant impact on the stock price of manufacturing companies listed on IDX. Eze (2024) investigated the impact of oil prices on the Nigerian stock market, and the study indicated that inflation, exchange rates, oil prices, and real GDP all have a positive relationship with stock prices.

Hypothesis of the study

H_1: Price earnings ratio has significant impact on market price of share of MFIs in Nepal.

H_2: Book value per share has significant impact on market price of share of MFIs in Nepal.

H_3: Return on assets has significant impact on market price of share of MFIs in Nepal.

H_4: Gross domestic product has significant effect on market price of share of MFIs in Nepal.

H_5: Inflation has significant effect on market price of share of MFIs in Nepal.

Conceptual Framework

Figure 1 presents the research framework of this study.

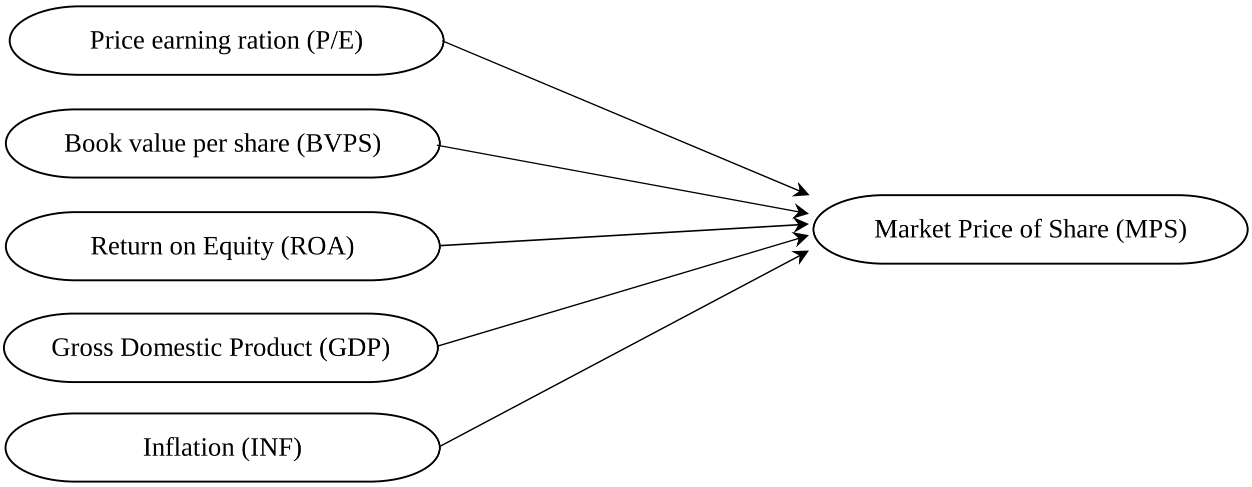

Figure 1: Research Framework of the Study

This study aims to analyze the effect of profitability, capital structure, firm size and asset growth on firm value of the sample microfinance companies in Nepal. Therefore, profitability, capital structure, firm size and asset growth are taken as independent variables and firm value as dependent variable. The expected sign of the independent variables (ROA, DER, SIZE and AG) is positive. It is expected that profitability, capital structure, firm size and asset growth of the microfinance companies positively affect the firm value.

Research Methods

The major objective of this study is to examine the impact of price earnings ratio (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) on market price of share (MPS) of the sample microfinance companies in Nepal. Thus, this study uses descriptive and casual comparative research design which is a research study to describe a systematic, factual, and accurate picture according to the facts regarding the characteristics of the research population (Syahza, 2021). There are 52 listed microfinance institutions in Nepal (As of Mid-April, 2025). This study considers only 10 listed microfinance institutions based on judgmental sampling technique. The data are based on secondary data, which is collected from annual reports of the sample microfinance companies with total of 80 observations during fiscal year 2014/15 through 2023/24. Mean and standard deviation are used to assess the level and characteristics of sample microfinance institutions. Similarly, correlation analysis is used to analyze the association between dependent (MPS) and independent variables (P/E, BVPS, ROA, GDP and INF) of the sample microfinance institutions. Likewise, to examine the effect of price earnings ratio, book value per share, return on assets, gross domestic product and inflation on market price of share of the sample microfinance institutions, the regression analysis is used in this study.

Variables and the operational definitions

Table 1: Study Variables and Definitions

Variables	Measures
Market Price of Share (MPS)	Market capitalization/Number of shares outstanding
Price Earnings Ratio (P/E)	Market price per share/Earning per share
Book Value Per Share (BVPS)	Shareholder's equity/Number of common share outstanding
Return on Assets (ROA)	Net income after tax/Total assets
Gross Domestic Product (GDP)	Total market value of all goods and services at current prices
Inflation (INF)	The rate of increase in prices over a given period of time

Table 1 shows the study variables and their operational definitions. The dependent variable of the study is market price of share (MPS) and independent variables are price earnings ratio (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF). The price earnings ratio, book value per share, return on assets are taken as the major firm specific determinants of market price of share of MFIs in Nepal. Similarly, gross domestic product and inflation, macro-economic variables are taken also as the major determinants of market price of share of MFIs in Nepal.

Empirical Model

The model to be analyzed in the research is as follow:

$$\mathbf{MPS = \alpha + {}_1 P/E + {}_2 BVPS + {}_3 ROA + {}_4 G\,DP + {}_5 INF + \varepsilon}$$

Where,

MPS = Market price of share

α = constant

$_1$, $_2$, $_3$, $_4$ and $_5$ = Coefficient parameters

P/E = Price earnings ratio

BVPS = Book value per share

ROA = Return on assets for microfinance companies during t period

GDP = Gross domestic product during t period

INF = Inflation rate during t period

Results and Discussion

The data used in this research are cross-section panel data.

Descriptive Analysis

The descriptive analysis was used to determine the characteristics of the study variables. Table 2 shows the descriptive statistics of the dependent and independent variables during 2014/15 to 2023/24. It consists of mean, standard deviation, minimum and maximum.

Table 2: Descriptive Statistics

Variables	Min	Max	Mean	SD
MPS	220	4100.00	1251.82	806.31
P/E	-47.47	189.38	37.83	30.16
BVPS	114.00	324.65	188.68	51.98
ROA	-1.00	5.41	2.27	1.32
GDP	22.73	36.92	29.78	5.06
INF	3.60	9.90	5.90	2.02

Note: N=80

Table 2 presents that market price of share (MPS) of the sample microfinance institutions (MFIs) ranges from minimum Rs. 220 to maximum Rs. 4100. The mean value and standard deviation are 1251.82 and 806.31 respectively. It implies that market price of share is highly deviated than price earnings ratio, book value per share, return on assets, gross domestic product and inflation. The mean value and standard deviation of P/E are 37.83 and 30.16, and it ranges from -47.47 to 189.38. It shows that P/E of the microfinance institutions is highly fluctuated than return on assets, gross domestic product and inflation whereas less fluctuated than market price of share and book value per share of MFIs during the study period. In terms of BVPS, mean and standard are 188.68 and 51.98, and it ranges from min 114 to 324.65. The BVPS is less fluctuated than market price of share of the microfinance companies during the study period. Similarly, return on assets (M=2.27, SD=1.32), gross domestic product (M=29.78, SD=5.06) and inflation (M=5.90, SD=2.02) are the less fluctuated study variables. The descriptive analysis showed the highly fluctuation in the market price (MPS) and least fluctuation in return on assets (ROA) of the microfinance institutions (MFIs) of Nepal.

Correlation Analysis

The association between study variables market price of share, price earnings ratio, book value per share, return on assets, gross domestic product and inflation is examined by using Spearman's correlation coefficient and the results are presented in Table 3.

Table 3: Correlation Analysis

	MPS	P/E	BVPS	ROA	GDP	INF
MPS	1					
P/E	.378**	1				
BVPS	.228*	-.224*	1			
ROA	0.202	-0.053	-.247*	1		
GDP	.397**	0.149	0.101	.332**	1	
INF	0.205	0.027	0.000	-0.146	0.059	1

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

Table 3 revealed that price earnings ratio (P/E), book value per share (BVPS) and gross domestic product (GDP) had positive relationship with market price of share (MPS) of micro-finance institutions in Nepal. The relationship between P/E, BVPS, GDP and MPS is statistically significant and positive. It implies that an increase in P/E, BVPS and GDP increases the market price of share of MFIs in Nepal. The correlation relationship analysis also showed that there is no significant relationship between return on assets (ROA), Inflation (INF) and Market price of share (MPS). It implies that any changes in ROA and INF do not bring any changes in MPS of the MFIs in Nepal.

Regression Analysis

The major goal of the regression analysis is used to examine the effect of price earnings ratio (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) on market price of share (MPS) of sample microfinance institutions of Nepal. The results of the regression analysis are reported in Table 4.

Table 4: Regression Analysis

	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	54.224	643.241		0.084	0.933
P/E	11.616	2.342	0.434	4.959	0.000
BVPS	6.527	1.379	0.421	4.733	0.000
ROA	162.386	56.922	0.265	2.853	0.006
GDP	48.073	14.329	0.302	3.355	0.001
INF	100.039	33.781	0.250	2.961	0.004
R-squared					0.485
Adjusted R-squared					0.450
F-statistics					13.916
F-sig.					0.000

Table 4 indicated the results of the regression analysis of the study. The adjusted R-squared is 48.50 percent, it reveals that the variables of price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) in this study can explain the market price of share (MPS) of 48.50 percent and the remaining 51.50 percent is explained by other independent variables. The value of F-sig. is 0.000, which is less than 0.05, it indicates that the regression model is statistically fit. The regression results also revealed that price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) had significant positive effect on market price of share (MPS) of selected microfinance institutions (MFIs) in Nepal. It implies that an increase in price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) also increases the market price of share (MPS) of MFIs in Nepal.

Test of Hypotheses

The results of the hypotheses are presented in Table 5.

Table 5: Test of Hypotheses

Hypothesis	Statement	P-value	Result
H_1	Price earnings ratio has significant positive impact on market price of share.	0.000	Accepted
H_2	Book value per share has significant positive impact on market price of share.	0.000	Accepted
H_3	Return on assets has significant positive impact on market price of share.	0.006	Accepted
H_4	Gross domestic product has significant positive impact on market price of share.	0.001	Accepted
H_5	Inflation has significant positive impact on market price of share.	0.004	Accepted

Table 5 revealed that the hypotheses H_1 H_2, H_3, H_4 and H_5 had accepted. It indicates that price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) have significant effect on market price of share (MPS) of microfinance institutions (MFIs) in Nepal.

Discussion

This study aims to investigate the effect of price earnings, book value per share, return on assets, gross domestic product and inflation on market price of share of microfinance institutions in Nepal. The analysis of the results revealed that the price earnings ratio (P/E) and book value per share (BVPS) has significant positive effect on market price of share (MPS) of microfinance institutions (MFIs) in Nepal. The results are consistent with the finding of Menika and Prabath (2014), Shrestha and Napit (2019), and Poudel (2024). Similarly, return on assets (ROA) has significant positive effect on market price of share (MPS), this outcome is consistent with the findings of Emekekwue (2008) and inconsistent with the results of Shrestha and Lamicchane (2022). Likewise, gross domestic product (GDP) and Inflation (INF) has significant positive effect on market price of share of sample microfinance institutions in

Nepal. This finding are similar to the findings of Hermi (2020) and Dao et. al (2022) and inconsistent with the findings of Dianita et al. (2020) and Eze (2024).

Microfinance institutions (MFIs) play an important role in improving people's living conditions and the country's economic progress. This study examined the impact of price earnings ratio, book value per share, return on assets, gross domestic product, and inflation on the market price of microfinance institutions' shares in Nepal. These factors (price-earnings ratio, book value per share, return on assets, GDP, and inflation) have a substantial impact on the market price of shares of MFIs in Nepal. As a result, management and Nepalese investors would make better decisions if they took these aspects into account.

Conclusion

This study was conducted to examine the impact of price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) on market price of share (MPS) of listed 10 sample microfinance institutions in Nepal data from 2014/15 to 2023/24.

Based on the results, the Adjusted R-squared value in this study was 48.50 percent, which indicates that the variables, price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) in this study can explain the market price of share (MPS) of microfinance institutions (MFIs) by 58.50 percent and the remaining 51.50 percent is explained by other independent variables. The F-stat 0.000, which is less than 0.05 indicates P/E, BVPS, ROA, GDP and INF significantly affect the market price of share, so that the research model can be used to research hypothesis testing. The results of hypothesis testing and the results obtained from multiple linear regression analysis concluded that the P/E, BVPS, ROA, GDP and INF had statistically significant positive effect on market price of share of microfinance institutions in Nepal.

Scope for Future Research

This study focuses on the effect of price earnings (P/E), book value per share (BVPS), return on assets (ROA), gross domestic product (GDP) and inflation (INF) on market price of share (MPS) of the selected microfinance institutions in Nepal. Beside these independent variables, the future researcher can also use ROE, EPS, NPM, DPS, EPS as a proxy of major determinants of market price of share. Similarly, macro-economic variable such as money supply, interest rate, and exchange rate also can be used, which also effects the market price of share of the firm. This study is only based on secondary data. The future researcher can also use the primary data by using the different statistical tools. Likewise, this study only covers 10 years data with 80 number of observations. Future researcher can also cover and study more than 10 years data and may increase number of observations.

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Utilization of Maternal Health Care Services in Slum Areas of Kathmandu Valley, Nepal

Bijaya Mani Devkota Ph.D.,
Assistant Professor, Central Department of Population Studies (CDPS), TU, Kathmandu
Email: devkotabm2006@gmail.com
https://orcid.org/0009-0005-1533-2678

Tantrika Raj Khanal
Assistant Professor
Mahendra Ratna Campus, TU, Kathmandu
Email: tantrika12@gmail.com
https:// Orcid 0000-0002-106-5737

Bhakti Prasad Subedi
Assistant Professor
Bhaktapur Multiple Campus, Bhaktapur
Email: subedibhakti@yahoo.com

Indira Pant
Associate Professor, Research Centre for Educational Innovation and Development (CERID), TU, Kathmandu
Email: indira.pant@cerid.tu.edu.np (Corresponding author)
https://orcid.org/0009-0007-6593-0849

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Abstract

This study aims to investigate on the factors affecting the utilization of maternal services surrounding maternal health practices in those demolished areas in the Kathmandu valley with socio-cultural norms that heavily shape the scope of these services. The study cultivated the essence of women in search of maternal health services, like ANC, skilled birth attendance, and postnatal care, and some challenges faced by healthcare providers while ensuring maternal healthcare services. A qualitative study was conducted, including in-depth interviews and focus group discussions among reproductive aged women and healthcare providers as well as important community stakeholders. The study highlights the improvements in awareness about maternity health services because of government and non-governmental organizations' involvements; however, many still face challenges. These challenges include financial constraints, lack of health facilities, poorly maintained roads access, lack of skilled health personnel, and other crucial life aids in maternal health care. Socio-cultural beliefs, which encompass traditional healing practices influence maternal health-seeking behaviors; some women have delayed or avoided formal healthcare services as a result. Increased male involvement in maternal health, community-based support programs, and female community health volunteers (FCHVs) would help improve healthcare utilization. The structural aspects of healthcare systems have to be improved. The strengthening of maternal services, ensuring a supplementary source of finance for maternal services, improving access to transport should certainly be considered. Health education programs aimed at challenging cultural practices are seriously needed if improvement in health access and quality lies beyond. The co-operation among the state, local government bodies, and NGOs is requirement. Targeted interventions would serve in either reducing or completely eliminating some of these forms of disparities in maternal health. The result is a healthier future for mothers and their families in squatter areas of Kathmandu Valley.

Keywords: Maternal health, Squatter settlements, Healthcare utilization, Socio-cultural norms, Access to services, Community interventions and health disparities

Introduction

Healthy motherhood is a global health priority, particularly so in low-resource settings where maternal morbidity and death rates are grossly high (WHO, 2021). The access to quality services during pregnancy and at birth will facilitate climbing down maternal and neonatal unfavorable outputs. The extent to which care-seeking behavior influences maternal health-seeking encompasses respectable differences in various socio-economic and geo-physical groups. Among them, urban slum dwellers have been told of by Barros et al. (2019) to have been some of the most underserved. In Nepal, despite significant progress made in maternal health over the last few decades, significant disparities still manifest within marginalized communities like urban slums in the Kathmandu valley (Acharya et al., 2020). An understanding of the utilization of maternal health care services in these areas is necessitated by designing effective involvements aimed at improving maternal health results.

The worldwide commitments concerning the improvement of maternal health are heavily protected through the goals set by several platforms, the most important being the sustainable development goals (SDGs), which, particularly targets Goal 3 -health and well-being. Under this goal, one of the sub-targets is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. Nepal has shown significant gains in maternal health, with the MMR dropping from 539 per 100,000 live births in 1996 to 239 per 100,000 live births in 2016 (Ministry of Health, Nepal, 2017). Nevertheless, these changes have been far from uniform-the women from slum areas face many challenges to access maternal health care services (Pant et al., 2021).

Slum settings that are characterized by inadequate sheltering, poor sanitary facilities, and minimal access to basic services pose special challenges in the utilization of maternal health care (Bhan et al., 2020). Women residing in these areas commonly endure socio-economic deprivation, awareness deficits, and cultural barriers that are inhibiting timely access to maternal health care (Nair et al., 2018). Studies in Nepal have shown disparities against urban poor women regarding antenatal care (ANC), skilled birth attendance (SBA), and postnatal care (PNC) services when compared with those of women from other wealthier urban and rural areas (Adhikari et al., 2019). Despite being the presence of the many maternal health programs, their efficiencies in slum settings are conceded by the cover-up systemic inequalities and logistical challenges (Pokhrel et al., 2022).

Thus, with the rapid urbanization of Nepal and expanding slums, it is imperative to understand the factors influencing utilization of maternal health care services in these areas. Particularly in this context, it is equally valuable to pursue a qualitative approach-this method may offer deeper insight into the lived experiences, perceptions, and socio-cultural determinants influencing maternal health-seeking behaviors (Silverman, 2020). The present study purposes to explore the utilization of maternal health care services in the slum areas of Kathmandu Valley using an in-depth qualitative study.

Utilizations of maternal health services could be synthesized in multiple theoretical frameworks with Andersen's behavioural model of health services utilization (Andersen, 1995) among them. This model asserts the system of health service utilization to be informed by predisposing factors (like socio-demographic characteristics and cultural beliefs), enabling factors (like financial resources and access to health facilities) and need factors (like perceived health conditions and past experience of maternal health). Therefore, an application of this model to the specific context of the slums in Kathmandu Valley would appropriately explain the various societal access and decision-making dynamics on maternal health care within these communities.

Moreover, the social determinants of health (SDH) framework expressed by the WHO (2019) underscores how economic status, level of education, social support networks, and physical environment have effects on maternal health results. Poverty, gender disparities, etc. are quite widespread here; however, knowledge about these determinants becomes very relevant for debuting effective health interventions that can be customized according to the needs of marginalized women (Shrestha et al., 2021).

Despite several maternal health projects in Nepal, the persisting low exploitation of maternal health in these areas of slum is a signal for further scrutinizing gaps that exist in systems that need to be explored further (Dahal et al., 2020). While quantitative studies have given statistical insights into maternal health disparities, there is a need for qualitative research to explain the reasons contributing to low-use rates of service delivery in urban slums. The objectives of the study is identify the major barriers and supports to health care utilization among mothers in the slum areas of the Kathmandu Valley, explore the impact of socio-cultural beliefs and practices on health service utilization among mothers, explore women's experiences in using certain maternal health services, like antenatal care (ANC), skilled birth attendance (SBA), and postnatal care (PNC), and finally, unveil health care providers' perceptions and how they address barriers in maternal health service delivery.

The study seeks to establish awareness of maternal health service utilization, devise policy recommendations towards its improvement in urban-slum contexts in Nepal. The comprehension of maternal health service utilization in slum areas confidently has greater disadvantages for public health policy and program implementation. Results of this study might inform health policymakers, governmental bodies, and NGOs on the specific needs and challenges faced by slum-dwelling women regarding maternal health care (Gautam et al., 2019). The increased insights from this study might help in developing targeted interventions that retard accessibility, affordability, and acceptability to services in urban slums.

Furthermore, this study posits into the wider discussion on health equity and social justice by highlighting the systemic barriers that sustain maternal health disparities. Targeting these issues becomes crucial to attain national health goals of Nepal and international commitments in maternal health, such as the SDGs and WHO's Global Strategy for Women's, Children's, and Adolescents' Health (WHO, 2016).

To sum up, maternal health services utilization in the slum areas of Kathmandu Valley remains a complex issue due to the simultaneous intervention of multiple socio-economic, cultural, and technical factors. Despite significant achievements in maternal health within Nepal, the problems faced by poor urban women reveal a deficiency for context-specific interventions. The research study, therefore, is focused on exploring maternal healthcare utilization in the slums of Kathmandu Valley, in order to gain a detailed insight into factors favoring maternal healthcare-seeking behavior. This insight will be particularly useful in shaping policy and programming that ensures equity in coverage of maternal health services for women regardless of their socio-economic status.

Data and Methods: Qualitative Information

Qualitative data has been collected pertinent to the existing state, problems, and constraints facing the maternal health care services pertaining to the slum areas of Kathmandu Valley. To this end, in-depth interviews (IDIs) were held with health workers, ward members, community volunteers, and female community health volunteers (FCHVs) in three major slum areas of the Kathmandu Valley encompassing all three districts: Kathmandu, Bhaktapur, and Lalitpur. Fifteen interviews were held.

Table 1: Characteristics of IDI participants

Name	Age	Sex	Designation	Community	District
Participant 1	60	Female	Community Volunteer	Manohara	Bhaktapur
Participant 2	30	Female	Community Volunteer	Manohara	Bhaktapur
Participant 3	50	Female	Health Worker	Manohara	Bhaktapur
Participant 4	55	Female	Community Volunteer	Thapathali	Kathmandu
Participant 5	43	Female	FCHV	Teku	Kathmandu
Participant 6	43	Female	FCHV	Teku	Kathmandu
Participant 7	50	Female	FCHV	Teku	Kathmandu
Participant 8	37	Female	FCHV	Manohara	Bhaktapur
Participant 9	42	Female	Female Ward Member	Godawari	Lalitpur
Participant 10	45	Female	Health Worker	Godawari	Lalitpur
Participant 11	40	Female	FCHV	Godawari	Lalitpur
Participant 12	29	Female	FCHV	Godawari	Lalitpur
Participant 13	43	Female	Community Volunteer	Manohara	Bhaktapur
Participant 14	35	Female	Community Volunteer	Manohara	Bhaktapur
Participant 15	42	Female	Community Volunteer	Manohara	Bhaktapur

Three larger slum areas of the Kathmandu Valley-world city regions serving the districts of Kathmandu, Bhaktapur and Lalitpur, five focus group discussions (FGDs) were held. At these sessions, one in Teku, Kathmandu; two in Manohara, Bhaktapur; and two in Godavari, Lalitpur and discourses were carried out by a cross-section of women, mothers' groups, volunteers, and FCHVs selected from the community. Following transcription and translation of the IDI responses to English, qualitative data were coded using the ATLAS.ti program. A code list was established for the qualitative data analysis to examine problems the maternal health care service users are experiencing. A coding scheme was articulated from the coded topics, within which coded analyses were conducted.

Results

Maternal health is a very critical issue in public health of the marginalized populations, more specifically in slum dwellers of the Kathmandu Valley. The study reviews the problems concerning maternal health, availability and accessibility of maternal health care, the role of stakeholders like local governments and political parties, family support, so also sources of health information and intensification of superstitious beliefs, and against the backdrop of which programs are needed for the expansion of maternal health.

Problems associated with maternal health: Such details were unearthed during interviews and Focus Group Discussions (FGDs) with various health workers, community volunteers, and FCHVs in the course of the study: Most of the women do not report severe problems during pregnancy, delivery or at the neonatal stage, maybe due to increased awareness, good access to health care, and improvement of their socio-economic status. The situation is better in comparison to then, when seeking birth health care was so much rare due to poor economic and food conditions. Their IDIs observed how most women went today to health centers or hospitals for checkups and deliveries and did not opt for home births. The improvement is mainly a result of increased awareness of health risks and availability of maternal health care services. Women now make the right decisions regarding their pregnancies, seeking pre-conception counselling and antenatal care (ANC). However, some women still experience some difficulties such as too many bills to pay and other constraints, such as lack of combined service in most local health posts and infrastructure.

Maternal healthcare services: The document dealing with maternal health care services names many variables under which maternal health care services are being provided or not provided include availability, access, and affordability, not to mention satisfaction from the services rendered, and present problems in the delivery of health care.

Availability, access, and affordability: Meanwhile, basic maternal health services that include antenatal care (ANC), postnatal care (PNC), iron calcium supplementation, and routine checkups are provided at the health posts and centers. However, there is a dire lack of delivery services in many health posts, necessitating referrals to higher centers. Some women face extreme financial hurdles while availing private health services and in fulfilling testing charges, especially ultrasound. NGOs play a noteworthy role in support of government's services by providing education, awareness, and other health programs to these communities.

Satisfaction from services: The great majority of women assert satisfaction with the maternal health services available. This is given in their active involvement in health programs and educational initiatives, an indication of positive attitude towards seeking healthcare. Health workers underscore the effects of various health camps on health-related issues and NGO-supported programs carried out, including screening for breast and cervical cancer, tuberculosis, and eye diseases too. Whereas a general perception dwells that services are adequate, still, yet some women clamor for the extension of health services, equipment, and facilities.

Problems in accessing health services: Although most women tended not to report substantial challenges with respect to access to health care services, financial constraints, transport-related problems, and difficulties concerning comprehensive health facilities continue to abound. Some women tend to postpone or simply avoid further health visits because of excessive costs attached to diagnosis and treatment. Among others, there are women facing difficulties in getting appointments. The cost of care has increased, becoming more and more unmanageable for women in the slums. Thus, a therapy is hesitatingly rendered to women who live on the edge of existence as far as their food is concerned. In order to mitigate these situations, healthcare infrastructures such as health posts need to be within the vicinity of slum communities.

Place of delivery: Almost all the women interviewed had given birth in hospitals or health facilities. This shift from giving birth at home to institutional delivery is attributed to increased recognition of state-sponsored collectivization of maternal health risks and availability of health facilities--a development to ensure safer deliveries when a lady is in labor. Thus, it is a common practice among Nepali women to deliver their baby in any hospital: government-owned maternity hospitals, birthing homes, or private clinics.

Role of local government and political parties: Local government has the ultimate responsibility for making maternal health services accessible to the populace through improved cover health posts, ward-level clinics, and the district hospital. However, several women felt that the services were few in number and that much needed to be done to meet the needs of slum-dwelling women. Some informants explain healthcare-related infrastructures in which healthcare is discussed minimally, without giving focus to the urgent needs of slum residents. Women themselves would like for there to be permanent FCHVs in their community to constantly support and educate.

The role of family in maternal health: The support from the family towards maternal health is fundamental. Certainly, most respondents remained focused on affirming that now families have become more supportive compared to the recent past. Husbands and in-laws do take part throughout pregnancy and at the time of delivery and postpartum care. Nevertheless, challenges are attracted, such as several women reporting against weak family support, mainly in households with financial strains or husbands' least involved. Here, there are instances where the community members team up with FCHVs in taking up the responsibility of supporting women in need.

Topics of health awareness: From the perspective of the key participants, community health awareness is encouraging. Women are expected to search for outlets through which acknowledgement is received. These sources of health information and counseling are numerous and involve FCHVs, health workers, television, radio, newspapers, and the community meeting structure. Points of use for promoting health knowledge include health activities training and refresher courses conducted with relative effectiveness on top of raising awareness. Meanwhile, extension through community health groups and NGOs to widespread coverage gives detailed knowledge on maternal health, nutrition, and child care practice.

Superstition and practices: While many believe that many superstitious beliefs relating to maternal health have been decreasing, there are some old practices that continue. They include various prohibitions during pregnancy and pre-consultation about traditional healing before professional healthcare is sought. Campaigns have somewhat succeeded in eradicating such practices; however, continuous one is very much needed. Programs and Activities Required for Improvement; The participants expressed their heartfelt desire for enhanced maternal health programs and services.

Establish more health posts serving the slum communities: The emphasis should be on establishing more health centers that cater to the needs of residents of slum communities. These health centers should have basic medical facilities, qualified health personnel, and ambulance services in cases of emergency transport, mainly to reduce delays in receiving critical care and improve results for their clientele. It was recommended that expanding maternal health services to health posts attached to the locality would be important in ensuring safe motherhood and neonatal survival. Mass health education programs should be conducted to sensitize the population about preventive opportunities and the goodness of going for regular consultation. The strengthening of the existing healthcare structures, including the provision of doctors for routine consultations, is considered very essential for sustaining the whole works. Outreach-related website content by healthcare workers collectively would then improve maternal healthcare access, serve as an essential lifeline in terms of medical care to those women who could not reach health facility premises. Lastly, free medicines and financial assistance for basic medical tests would greatly encourage mothers to use the services without having to meet extra costs, amid the already-challenging financial status of many slum families. The survey result showed significant improvement in maternal health services in overlooked slum pockets of Kathmandu valley. Improving awareness, increasing access to health facilities by government, and NGO initiatives have largely contributed to improving maternal health results. Nevertheless, a set of challenges, like financial constraints, limited healthcare services, and transportation, remain in place and poor maternal health results are linked to these problems. Interventions on the policy, infrastructure, and/or on specific programmatic health issues would go a long way in enhancing maternal health results in the community.

Discussion

An evaluation of maternal health challenges highlights slum health issues in Kathmandu valley where maternal health has shown significant improvements with many problems still unresolved. Promoting awareness and accessibility has been a key area in favor of maternal health progress (Karkee & Morgan 2023). Nevertheless, limited healthcare opportunities and means create formidable obstacles (Shrestha et al. 2022).

For women coming from poorest sections health check-up and treatment remain a challenge (Poudel et al. 2023). While most health posts deliver the minimum services like antenatal care (ANC) and postnatal care (PNC), most cannot deliver those babies if complications were to arise, thus leading to referrals. So, these vulnerable groups are disproportionately affected because of poor transport and financial resources (Kumar et al., 2022). -Therefore, eliminating this gap shall narrow down income inequity with respect to maternal health services.

Availability, accessibility, and affordability: Maternal healthcare services have improved a lot in the slum areas because of the participation of governmental and nongovernmental organizations (NGOs) (Joshi et al., 2023). However, even now significant barriers are faced due to the absence of adequately equipped health facilities. A step in this direction is the provision of mobile clinics, which have provided health services in those areas where women cannot reach the health services due to financial constraints (Ghimire et al., 2023). Still, women would have to pay quite a lot in lieu of an ultrasound or laboratory tests when they visit a private health facility (Dahal et al., 2022).

Service satisfaction: Studies show satisfaction with the available services but still indicate women stating a need for improvement in healthcare infrastructure and logistics (Acharya & Subedi, 2023). Women highly appreciate healthcare volunteers and health workers who take on health promotion (Thapa et al., 2023). Yet women also seem uncomfortable with the overcrowded setup and long waiting hours, which may be discouraging for the timely use of maternal health services (Maharjan et al., 2023).

Receiving health services problem: The pressing issue of financial burden associated with the use of maternal health services and, more seriously, even using government-run institutions should not require extra costs for transport and drugs (Paudel et al., 2023). As free maternal health services cover medical expenses, the poorest ladies find themselves unable to pay for necessary additional expenses such as tests and drugs (Sharma et al., 2022). A collaborative effort to extend subsidized services to middlemen is required to address this problem.

Reasons for institutional deliveries being promoted over home births: Awareness-raising campaigns and the introduction of a better quality of healthcare institutions have meant the majority of women now opt for institutional delivery giving rise to significantly reducing maternal and neonatal mortality rates (Bista et al., 2023). Yet, the transportation issue remains a hindrance, though quite a few women are confronted with no services for birthing within their local health center (Tamang et al., 2023). Clear referral structures and an emergency transport would improve maternal health results even further.

Role of local government in politics: Local governments have a vital role in assisting and promoting maternal health care services, but, depending on the case, they are largely ineffective in slum areas (Bhandari et al., 2023). Women in the focus group expressed concern for weak inclusion of slum community needs by health committees (Shrestha et al., 2022). If more investment in maternal health infrastructure takes place, with increasing healthcare workers, it may make up for the injury. Political will plays an integrative role in ensuring efficient maternal health services. Persuasion coming from parliamentarians might bring about increased budget allocation on maternal healthcare programs in far-flung areas (Nepal et al., 2023). Strengthening cooperation between local governments and NGOs may further extend maternal health services as well as education.

Role of family in maternal issues: Familial assistance is very (much) essential for assuring positive maternal health results (Bhattarai et al., 2022). Thus, husbands and in-laws, unlike their offspring, are actively engaged in maternal healthcare, thereby leading to a better decision-making process around maternal health issues (Singh et al., 2023). In the eyes of Gautam and Dahal (2023), some women still encounter a double fold in terms of financial constraints and traditional gender positions that diminish their ability to decide on their health-seeking behaviors. Empowering women in education and finances actually paves an extra mile toward access of maternal health without any hurdles. Again, peer education in community-based interventions that engage men in maternal healthcare creates a family setting supportive of delivery services.

Sources of health information: Information modes and quality have certainly improved through several channels like mobile tech, community meetings, and media campaigns (Giri et al., 2023). Female Community Health Volunteers(FCHVs) and health workers are the primary purveyors of reliable maternal health information (Adhikari et al., 2023). Nonetheless, it should be clarified that the channels to soundly disseminate health information are still a real difficulty, with ill-informed sectors depending yet on gran grandparent oral tradition or other means of misinformation in the name of maternity (Rai & Pant, 2023). Community-based education and digital health programs, therefore, are helpful in increasing knowledge and dispelling erroneous notions in the realm of maternal health.

Superstitious beliefs and practices: At tangling with the diminution in superstitious beliefs is the remaining practice (s) of old customs. For instance, a ban on food combines well with an alleged bad symptom, while a sick companion is relied upon to withdraw from the very first step towards medicinal cure (Karki et al., 2023). Today, the ongoing informative and educational campaigns have done good with their significant effects towards having such practices prejudiced, but a farward (sic) push is important for dismantling the so-called traditional practices (Paudel et al., 2023). Through the provision of relevant information, a quantum leap can be made toward ensuring that culture shifts over to evidence-based maternal healthcare strategies.

Conclusion

The progress in maternal health services in the slum areas of Kathmandu valley might explain to us that a great stride has been accomplished in the care of the expectant mothers. Much can be assigned to the awareness raised on maternal health care and the greater access to these services, including the active roles of government and non-governmental organizations. By now, more women are in for institutional delivery and access to antenatal and postnatal care, hence reducing complications related to maternal health. Despite this, several structural challenges impede an all-encompassing maternal healthcare delivery for people of the slums. One of the most pressing issues remains financial limitations, which prevent women from receiving essential health services, including diagnostic tests, ambulatory care, and institutional delivery. The scope of their health posts and need referral to the higher center just worsens the already high financial and transport problems associated with their health, especially if coming from marginalized settings. While some gaps have been supplemented by civil society and NGOs, the resources and mechanisms in place for the delivery of their services are limited and failing fast under the weight of expanding demands. The supply of free drugs, financial donations, or emergency transportation for these women will greatly ease their burdens.

Local government is dealing with these maternal health care challenges through establishment of health posts at the ward level. Such services, however, never cater to the full needs of the slum population, with all constraints being resources, personnel, or inadequate infrastructure. It would aid the in-service provision much if health infrastructures were strengthened and a consistent presence of permanent female community health volunteers (FCHV) ensured. Family dynamics are another significant aspect for the maternal health results. A hard trend is setting in where huge male and in-law involvement is seen in maternal and postnatal care but with huge biases or gaps when it comes to families residing in slums with economic plight or virtually no male engagement. Improved male involvement and further strengthening of community-based support systems for maternal health could further improve service uptake and results.

Such cultural and traditional beliefs are hard realities that are still currently impacting maternal health practices if compared to the mid-90s when awareness and linking were encouraged through effective awareness campaigns and education, a resistance has set in, pushing those superstitions to the brink of almost eradication. Maintaining this incredible awareness of beneficial maternal health practices is much needed to clear any slow reservations. Appropriate action entails a complex approach through policy reform, infrastructure developments, adequate financing, and continuous education. By securing healthcare access, investing in maternal health education, and supporting community interactions, the maternal healthcare services in Kathmandu valley slums can be given an extra push. These particular areas would not only yield better maternal health results but such efforts could ensure an overall well-being of the community by providing comprehensive care to any woman in need during pregnancy and childbirth.

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An Economic Analysis of Foreign Loan Dependency in Nepal: A Comparative Study of Chinese, Indian, and Western Loans with a Focus on Developmental Agencies and the Belt and Road Initiative

Binod Joshi
Executive Director
Centre for International Relations
Office of the Vice Chancellor, Tribhuvan University, Kathmandu

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Abstract

Nepal's socio-economic progress remains constrained by infrastructural deficits, widespread poverty, and limited sustainable growth opportunities. Foreign loans have become pivotal in addressing these challenges, financing critical sectors like infrastructure, energy, education, and healthcare. Over time, Nepal's reliance on external debt has grown, with diversified lenders including China, India, and Western economies, each motivated by distinct geopolitical and economic agendas. This study by Pant (2021) conducts a comparative analysis of Nepal's foreign loan landscape, focusing on three primary sources: China's Belt and Road Initiative (BRI), India's bilateral agreements, and Western mechanisms like Japan's JICA, the UK's UKAID, and the U.S. Millennium Challenge Corporation (MCC). It evaluates loan terms, repayment conditions, and strategic implications for Nepal's sovereignty, debt sustainability, and development outcomes. While these loans offer opportunities for growth, they also pose risks of dependency and geopolitical entanglements, particularly amid China's expanding influence. The paper critically assesses whether foreign borrowing aligns with Nepal's long-term development goals, balancing immediate infrastructural gains against potential debt burdens. It highlights concerns over opaque BRI terms, India's socio-political leverage, and Western conditionalities tied to governance reforms. Emphasizing Nepal's delicate geopolitical positioning, the study underscores the need for prudent debt management to avoid compromising national sovereignty. Drawing on 2023–2024 data from Nepal Rastra Bank, World Bank, Asian Development Bank, and government reports, the analysis provides evidence-based insights into Nepal's escalating debt dependency. Findings reveal mixed impacts: while foreign loans have catalyzed key projects, structural inefficiencies, and repayment pressures threaten fiscal stability. The research concludes with policy recommendations for enhancing transparency, negotiating favorable terms, and prioritizing projects that align with sustainable development, urging Nepal to navigate its external financing landscape strategically amidst global power rivalries.

Keywords: Foreign loans, Chinese loans, Western loans, Belt and Road Initiative, JICA, UKAID, MCC, Debt sustainability, Geopolitical influence, Infrastructure development, Poverty alleviation.

Introduction

Nepal, a small but strategically located country in the Himalayan region, faces significant development challenges due to its rugged terrain, political instability, and economic underdevelopment. The country's gross domestic product (GDP) has grown at an average rate of around 4-5% in recent years, but it still struggles with infrastructure deficits, limited access to energy, and high poverty rates. Foreign loans have been one of the major sources of funding for development projects, especially in the areas of infrastructure, energy, education, healthcare, and poverty alleviation.

Since the 1950s, Nepal has relied on external financial assistance from various sources, including multilateral institutions like the World Bank (WB) and the Asian Development Bank (ADB), as well as bilateral loans and grants from countries like India, China, and Japan. While the role of foreign loans has been crucial in driving Nepal's development, the increasing dependence on these loans has raised concerns regarding debt sustainability, financial autonomy, and the influence of foreign powers on Nepal's domestic and foreign policy (Gurung et al., 2024).

This paper provides a comprehensive analysis of Nepal's foreign loan structure, comparing loans from China, India, and Western countries. By examining loan types, repayment schedules, interest rates, and the associated risks, the study aims to understand the economic implications of these loans on Nepal's long-term growth and financial stability. Additionally, the paper explores the political and strategic interests embedded in these loans, particularly in light of Nepal's shifting foreign policy priorities.

Foreign Loan Mechanisms in Nepal

Foreign loans have been a crucial source of capital for financing Nepal's development agenda. Over time, these loans have become more diversified, with significant loans coming from China and India, and considerable aid from Western nations through development agencies. The foreign loan mechanisms in Nepal can be broadly categorized into three primary sources: multilateral financial institutions, bilateral loans, and developmental agencies. Each source has distinct characteristics and impacts on Nepal's economy and development trajectory.

Multilateral Financial Institutions: The Role of the World Bank and Asian Development Bank

Nepal's primary engagement with multilateral financial institutions includes loans and grants from the World Bank (WB), the Asian Development Bank (ADB), and, to a lesser extent, the International Monetary Fund (IMF). These loans are often concessional, meaning they come with relatively low-interest rates and extended repayment periods. Such loans have been a key part of Nepal's development strategy, particularly in funding infrastructure projects, energy development, and social programs.

In recent years, Nepal has entered into multiple loan agreements with the World Bank and the Asian Development Bank (ADB) to support initiatives in energy generation, transportation infrastructure, and poverty alleviation. The World Bank's 2023 Annual Report highlights that Nepal secured over USD 700 million in concessional loans during that year, with a substantial portion earmarked for infrastructure projects such as road construction and hydropower development (World Bank, 2023). Similarly, the ADB has played a pivotal role in financing essential projects aimed at enhancing cross-border trade, infrastructure, and financial inclusion. While the concessional terms of these loans provide Nepal with access to affordable financing, they also contribute to the nation's increasing external debt burden. While multilateral loans from the WB and ADB provide essential capital, they come with stringent conditions, often related to governance reforms, structural adjustments, and austerity measures. This raises concerns about sovereignty and the policy space available to the Nepalese government in the decision-making process.

Bilateral Loans: Chinese and Indian Engagement

Nepal's bilateral loan agreements primarily come from its neighbors, China and India, each of which has its own economic and geopolitical considerations.

Chinese Loans and the Belt and Road Initiative (BRI)

China's economic engagement with Nepal has grown substantially over the past decade, largely through its participation in the Belt and Road Initiative **(BRI)**. In 2017, Nepal formally signed a framework agreement to join the BRI, opening the door for significant loans and investments in infrastructure development. The BRI aims to enhance connectivity across Asia, Europe, and Africa by funding infrastructure projects, including roads, railways, and ports. China's loans to Nepal are predominantly non-concessional, characterized by higher interest rates and shorter repayment periods compared to loans from multilateral institutions or neighboring countries like India. This has raised significant concerns about Nepal's growing vulnerability to debt risks (IMF, 2023). A notable instance of Chinese investment is the Pokhara Regional International Airport, financed through a Chinese loan under the Belt and Road Initiative. Although such investments aim to enhance Nepal's infrastructure and connectivity, they also deepen the country's reliance on China's economic resources and geopolitical influence (Shrestha, 2022).

According to the Nepal Rastra Bank (2024), China accounted for approximately USD 2.5 billion in external loans to Nepal by the end of 2023, representing a significant portion of the country's external debt. While these loans support key infrastructure projects, their non-concessional terms could exacerbate Nepal's debt vulnerability in the future.

Critics argue that such loans could limit Nepal's ability to independently manage its financial obligations, leaving it more susceptible to Chinese economic and political leverage.

Indian Loans and Bilateral Cooperation

India has historically been Nepal's largest trading partner and a major provider of loans and grants. Indian loans are generally concessional, offering low-interest rates and extended repayment periods, making them more manageable for Nepal in the short term (Ministry of External Affairs, India, 2023). These loans have been utilized for various development initiatives, including infrastructure development, irrigation, energy, and transportation.

The India-Nepal Economic Cooperation Program serves as a central framework for bilateral financial assistance, with recent investments targeting the construction of roads, bridges, and irrigation systems. Notable projects funded under this program include the cross-border railway line connecting Jay Nagar (India) and Janakpur (Nepal), as well as the Koshi and Gandak irrigation projects, which aim to enhance agricultural productivity in Nepal (Embassy of India in Nepal, 2023).

In 2023, India extended USD 1.1 billion in loans and grants to Nepal, with a focus on improving transport infrastructure, energy generation, and regional connectivity (Indian Ministry of External Affairs, 2023). These loans come with favorable terms for Nepal, but they also create a degree of economic dependency on India. Furthermore, political analysts have raised concerns about the strategic implications of such loans, arguing that they may bind Nepal closer to India's sphere of influence.

Developmental Agencies: Western Loans and Aid

Western countries, including Japan, the United Kingdom, and the United States, provide financial assistance to Nepal primarily through their respective development agencies. The most significant among these agencies are JICA (Japan International Cooperation Agency), UKAID (United Kingdom Department for International Development), and USAID. These loans are often concessional or provided as grants and are aimed at addressing specific development goals, such as poverty alleviation, human capital development, and healthcare improvements.

J ICA's Contribution

Japan's engagement with Nepal has been long-standing, with JICA playing a central role in providing loans for infrastructure projects and human development programs. JICA's loans are typically concessional, with low interest rates and extended repayment periods. In 2023, JICA provided USD 250 million for the construction of hydropower plants and infrastructure projects aimed at energy generation and rural development (JICA, 2023). Japan's emphasis on sustainable development and inclusive growth aligns with Nepal's own development priorities.

UKAID and USAID

The United Kingdom and the United States have been instrumental in financing programs aimed at improving healthcare, education, governance, and poverty reduction in Nepal. UKAID, in particular, has provided £80 million in development aid in 2023, focusing on rural infrastructure and climate resilience projects (UKAID, 2023). Similarly, USAID's contributions have focused on enhancing healthcare and economic opportunities for Nepal's marginalized populations.

However, Western loans often come with specific conditionalities, which can sometimes constrain Nepal's policy choices, especially with regard to economic reforms, structural adjustments, and democratic governance. These conditions have led to concerns about the sovereign autonomy of Nepal in managing its foreign relations and development priorities.

Comparative Analysis of Loan Sources

To gain a restored understanding of the economic implications of Nepal's reliance on foreign loans, it is essential to compare the distinct characteristics and impacts of loans originating from China, India, and Western economies.

Table 1 provides a concise summary of the key features of these loans, focusing on interest rates, repayment terms, strategic considerations, and their broader economic effects.

Table 1: Comparative Analysis of Loan Sources

Source of Loan	Average Interest Rate	Repayment Period	Strategic Implications	Economic Impact
China (BRI)	2 - 4% (non-concessional)	20-30 years	Infrastructure dominance, increased debt burden	High financial risk, increased infrastructure
India	1-2% (concessional)	10-15 years	Political influence, regional integration	Sustainable, lower interest burden
Japan (JICA)	0.75-2% (concessional)	20-40 years	Human capital development, sustainable growth	Positive social development, longer repayment
USA/UK (MCC/UKAID)	1-2% (concessional)	15-20 years	Geopolitical alignment, aid conditionality	Development-focused, potential debt strain

Debt Sustainability and Economic Implications

THE growing dependence on foreign loans in Nepal has raised serious concerns about the country's debt sustainability. Nepal's external debt has increased rapidly over the last two decades, driven by the need for capital to fund large infrastructure projects and economic development initiatives. However, this increasing debt burden, combined with the relatively low income and limited fiscal space, has created significant financial challenges for the government.

Nepal's Debt Profile: A Growing External Debt Burden

As of 2023, Nepal's total external debt stood at approximately USD 9.22 billion, a sharp increase from USD 4.8 billion in 2015 (Nepal Rastra Bank, 2024). This represents a nearly 100% increase in external debt over an eight-year period, primarily driven by increased borrowing from China, India, and multilateral institutions. In particular, China's share of Nepal's external debt has grown significantly due to loans under the Belt and Road Initiative (BRI).

While the country's external debt-to-GDP ratio remains below 40%, there are growing concerns about the pace at which the debt has accumulated, especially given Nepal's relatively low GDP growth rate, which has hovered around 4-5% in recent years. Debt sustainability is measured by the ability of a country to repay its debt without defaulting and without unduly sacrificing development goals. A key concern is whether Nepal can manage the rising debt service obligations, especially with loans carrying relatively higher interest rates from countries like China (non-concessional loans) and the conditions imposed by multilateral lenders.

Risk of Debt Distress: Evaluating Nepal's Vulnerability

A significant portion of Nepal's external debt is non-concessional, meaning it comes with higher interest rates and shorter repayment periods. This is particularly true of loans from China, which are linked to infrastructure projects under the Belt and Road Initiative (BRI). While these loans have helped build critical infrastructure, they also increase Nepal's vulnerability to debt distress, a situation in which the country might find itself unable to meet its debt obligations without external assistance or renegotiation.

The World Bank and the Asian Development Bank have repeatedly warned that Nepal's rising debt burden poses risks to its financial stability and long-term growth. According to the Nepal Rastra Bank's Debt Sustainability Report (2023), Nepal's debt servicing costs have increased significantly, absorbing a larger share of government revenue. For example, in 2023, approximately 18% of Nepal's national budget was allocated towards servicing external debt, a considerable increase from 10% in 2015.

Nepal's ability to service its external debt is further compromised by external shocks, such as fluctuations in global commodity prices, natural disasters, and the country's vulnerability to external geopolitical risks. As Nepal's debt continues to rise, the risks associated with foreign exchange fluctuations also increase, particularly when debt is denominated in foreign currencies like the US dollar or Chinese Yuan.

The Impact of Non-Concessional Loans on Nepal's Debt Sustainability

The increasing share of non-concessional loans, particularly from China under the BRI, poses a unique set of challenges. These loans typically have higher interest rates (ranging from 2-4%), shorter repayment periods (usually 20-30 years), and fewer favorable terms compared to loans from India and multilateral institutions.

The Pokhara Regional International Airport and the Araniko Highway Expansion are two key projects funded by Chinese loans, representing a considerable portion of Nepal’s increasing external debt.

Although these projects are expected to provide significant economic returns by improving infrastructure and fostering trade, the debt service costs associated with these loans may offset the long-term benefits. Critics argue that such loans could expose Nepal to a debt trap, where the country is unable to meet its obligations without refinancing or acquiring additional loans, thus exacerbating the debt cycle.

In contrast, loans from India and Japan generally come with lower interest rates and longer repayment terms, which have less of an immediate impact on Nepal’s fiscal position. For example, India’s concessional loans for infrastructure projects like the Jaynagar-Janakpur Railway have been instrumental in enhancing regional connectivity but come with significantly less strain on Nepal’s debt repayment capacity.

The economic principle of debt sustainability suggests that the burden of external debt should remain manageable in relation to the country's economic output and revenue generation capacity. If a country’s debt burden exceeds its capacity to generate sufficient revenue, it risks facing a debt crisis, where it must either default on its loans or seek debt restructuring from creditors. Given Nepal’s limited fiscal space and slow economic growth, the debt-to-GDP ratio may continue to rise, increasing the likelihood of debt distress in the future unless prudent fiscal policies are implemented.

The Geopolitical Dimensions of Foreign Loans: A Critical Perspective

Foreign loans do not exist in a vacuum; they are often tied to broader geopolitical and diplomatic considerations. In Nepal’s case, the sources of foreign loans are deeply intertwined with the geopolitical interests of China, India, and Western countries, all of whom have strategic reasons for extending loans to Nepal.

China’s Geopolitical Influence through the Belt and Road Initiative (BRI)

China's growing presence in Nepal through the Belt and Road Initiative (BRI) represents a significant shift in Nepal’s foreign policy orientation. The BRI aims to enhance regional connectivity and trade by financing infrastructure projects across Asia, Africa, and Europe. For Nepal, joining the BRI presents significant economic opportunities, particularly in improving infrastructure and trade links with China. However, the initiative is also seen by many as a tool for China to extend its geopolitical influence and deepen economic ties with smaller countries in the region.

By providing loans for large infrastructure projects, China is not only helping to modernize Nepal’s economy but also securing its own interests. These include access to Nepal's natural resources, expanded trade routes, and strategic access to the Indian Ocean through improved connectivity to the Tibet Autonomous Region. China’s investments in Nepal are seen as part of its broader strategy to gain influence in the South Asian region, an area traditionally dominated by India.

The growing debt dependency resulting from Chinese loans has raised significant concerns regarding Nepal’s sovereignty. Critics suggest that Nepal may be increasingly compelled to align with China’s geopolitical goals, potentially compromising its ability to maintain an independent foreign policy. Notable projects such as the Pokhara International Airport, funded by China, and the proposed China-Nepal Railway have sparked debates about China’s expanding influence over Nepal’s infrastructure and strategic assets.

India’s Role: Maintaining Regional Dominance

India, Nepal’s larger and more established neighbor, has long been a significant source of financial support for Nepal. Indian loans, which come with favorable terms, are designed not only to aid Nepal’s development but also to maintain India’s regional dominance. Nepal and India share deep historical, cultural, and economic ties, and India has been a key partner in funding infrastructure projects such as roads, railways, and irrigation systems.

India’s loans to Nepal have been crucial in strengthening regional connectivity, particularly in the areas of trade and transportation. India’s concessional loans are often linked to cross-border connectivity projects, such as the Jaynagar-Janakpur Railway and the Koshi and Gandak Irrigation Projects. India’s assistance has also focused on energy generation and healthcare, sectors that are critical for poverty alleviation and sustainable development.

While India's loans are generally seen as less burdensome than Chinese loans, Nepal's reliance on India has implications for its foreign policy. Critics argue that Nepal's sovereignty may be compromised due to its reliance on India for economic and military assistance. The growing influence of China in Nepal, through initiatives like the BRI, has prompted India to increase its economic and strategic engagement in Nepal to counterbalance China's growing presence in the region.

Western Economies: Aid and Influence through Multilateral Frameworks

Western countries, particularly Japan, the United Kingdom, and the United States, have played a significant role in Nepal's development through concessional loans and grants. These countries, through agencies such as JICA, UKAID, and the Millennium Challenge Corporation (MCC), have provided financial support for energy, healthcare, and education.

Western aid typically focuses on human capital development and poverty alleviation, and is seen as more closely aligned with Nepal's social development goals. The MCC Nepal Compact, for example, is a USD 500 million agreement aimed at improving Nepal's energy infrastructure and transportation networks, with a focus on economic growth and poverty reduction. However, the MCC compact has generated significant political controversy within Nepal, with critics accusing the agreement of undermining Nepal's sovereignty due to its conditions related to governance reforms and policy adjustments.

Western loans and grants also come with certain conditionalities, which often require reforms in areas such as governance, financial management, and social inclusion. While these conditions are intended to ensure the effectiveness of aid, they also raise questions about the policy space available to Nepal in making independent economic and political decisions.

Debt Management and Policy Recommendations

Nepal's growing dependence on foreign loans, particularly those from China and India, poses significant challenges to its debt sustainability. The government must prioritize effective debt management strategies to avoid the risks of debt distress and economic instability. Several key strategies can be employed to manage this growing debt burden:

1. **Diversification of Debt Sources**: Nepal should continue to diversify its sources of external financing to reduce over-reliance on any single creditor. This includes strengthening relations with multilateral institutions like the World Bank and ADB, while carefully evaluating the terms of non-concessional loans from China.
2. **Strengthening Debt Monitoring and Transparency**: Nepal should enhance its debt monitoring systems to ensure greater transparency and accountability in the management of foreign loans. This will help ensure that the loans are used efficiently and that the government remains aware of its debt obligations.
3. **Fiscal and Economic Reforms**: Nepal needs to focus on domestic revenue generation through tax reforms, improved public financial management, and economic diversification to reduce reliance on external debt for funding development projects.
4. **Strategic Debt Negotiations**: Nepal must negotiate more favorable loan terms, particularly with China, to ensure that future loans do not place an unsustainable burden on the country's economy. Engaging in multilateral debt platforms could help renegotiate terms where necessary.

Conclusion

The increasing reliance on foreign loans in Nepal presents both opportunities and challenges, shaping the country's economic trajectory in profound ways. Over the past few decades, Nepal has diversified its sources of external financing, with China, India, and Western countries emerging as dominant players. Each of these sources has brought unique benefits and risks to Nepal's development strategy. The loans from China, often linked to the Belt and Road Initiative (BRI), have supported large-scale infrastructure projects, yet they also carry higher interest rates and shorter repayment periods, potentially placing long-term pressure on Nepal's fiscal stability. Indian loans, which are generally concessional, have strengthened regional connectivity and deepened bilateral ties, yet they also create a degree of political dependency that could influence Nepal's foreign policy decisions. Meanwhile, Western loans from agencies like JICA, UKAID, and USAID have been essential for social development programs, but they also come with stringent conditions that may limit Nepal's sovereign autonomy.

This paper has critically delved into the economic and geopolitical dimensions of Nepal's foreign loans, comparing the terms, conditions, and broader implications of Chinese, Indian, and Western loans. Concerns over debt sustainability in Nepal have become increasingly prominent. By 2023, Nepal's external debt exceeded USD 9 billion, with a substantial portion stemming from non-concessional loans from China (Nepal Rastra Bank, 2024). Although these loans have enabled critical infrastructure development, they have also sparked significant debate about Nepal's capacity to meet its future debt obligations without compromising its long-term economic stability (IMF, 2023).

To balance the opportunities that foreign loans present with the risks of debt distress and geopolitical entanglement, Nepal must pursue a multi-pronged strategy. This includes diversifying loan sources, ensuring greater transparency and accountability in debt management, and fostering domestic revenue generation to reduce dependency on external financing. Additionally, Nepal needs to engage in strategic debt negotiations to secure more favorable terms, particularly with China, whose influence over Nepal's economic future is becoming increasingly pronounced.

Overall, Nepal's debt management policies must be oriented towards achieving economic self-reliance while maintaining strategic independence in its foreign policy. The careful balancing act between accepting financial assistance for development and preserving sovereignty will determine whether Nepal can avoid the pitfalls of a debt trap and chart a path towards sustained growth and stability.

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