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## **Customers' Satisfaction on Buying Goods at Bhatbhateni Supermarket in Nepal: Evidence from Structural Equation Modelling**

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### **Abstract**

**Purpose:** Satisfaction is the sense of fulfillment that occurs when a desire, need, or expectation is met. BBSM is a well-known retail store that prioritizes customer satisfaction. Customers who are satisfied are more likely to stay loyal, buy more, and refer their friends. This study analyzes the satisfaction of customers on buying goods at BBSM.

**Design/methodology /approach:** Exploratory research design was opted to analyze customer's satisfaction on buying goods where data has been collected by using KOBO Toolbox through structure questionnaire at BBSM, in Kathmandu Valley. Affective Cognitive Consistency is the theory that best for this study. SEM is used for data analysis which includes both inferential and descriptive analyses. Moreover, 280 samples were collected by using convenience sampling. However, all customers who shops at BBSM were considered as population for this study.

**Findings:** Findings of this study revealed that respondents considered supermarket as a single roof to purchase goods and services; results indicates BBSM customer's increasing as of accessibility of product variety and accessibility; they are also satisfied buying goods at BBSM. SEM result indicates that customer service, product promotion and product presentation are significant where shopping convenience-convenient, understanding customer expectation and increased competition are major challenges related to improving customer satisfaction at BBSM.

**Conclusion:** The BhatBhateni is the oldest supermarket in Nepal, and in order to compete in the market, it needs to start using customer-focused marketing strategies where customer visits BBSM due to product differentiation and product availability. Thus, customer satisfaction in BBSM was found to be more than satisfied as of age group, gender and occupation along with price of the goods BBSM charge, variety of products availability and service delivery.

**Recommendation:** The research recommends that the BBSM should have provide online shopping facility, should have adopt modern technology and upgrading infrastructure and BBSM should turn towards social media usage.

**Key words:** Kathmandu Valley, Products and Services, Customers' Satisfaction on Buying Goods, BhatBhateni Supermarket (BBSM), SEM,

**JEL Classification:** L81, N35, C83, D18

### **Introduction**

Customer satisfaction is characterized as the percentage of total customers whose recorded experience with a company, its products, or services (rating) exceeds stated satisfaction goals (Farris et al., 2010; Bhandari et al., 2021). Moreover, it is also a critical problem for retail management (Jakpar et al., 2012; Maqsood et al., 2021), which has been related to a variety of important outcomes such as sales efficiency, customer retention, and loyalty (Shakya, 2019). Pradhan (2016) discussed the subjective assessment of the different results and interactions associated with using or consuming the product/service. The most

important metric for determining consumer repurchase intent and loyalty is satisfaction; which is the feeling of fulfillment that occurs when a desire, need, or expectation has been met. Karki (2018) described customer satisfaction as a critical component of any company that must be prioritized in order to retain good public relations, long-term profitability, and customer loyalty (Karki, 2018). Similarly, retaining clients is less expensive than acquiring new ones and contributes to a higher consumer lifetime value. Furthermore, customer loyalty can be used to determine how satisfied consumers are with a supermarket's services and goods. Keeping consumers happy is extremely beneficial to businesses. Customers who are satisfied are more likely to remain loyal, buy more, and refer their mates (Witzel, Jensen, Kulikovskaja, 2017).

Supermarket is one of the most well-known shopping outlets, offering a wide range of products and services at reasonable prices. In developed countries, malls and supermarkets underwent a rapid transition in 1990. Supermarket transformation has been concentrated in major areas such as Latin America, Southeast Asia, China, and South Africa. There are different ways to promote supermarkets by offering delivery, creating loyalty programs, digitizing coupons, social media, local foods, clothes, etc. (Devkota et al., 2022; Adhikari et al., 2023). Rising sales and attracting more customers are age-old trends that impact any retail store likewise, customers may be attracted to supermarkets in a variety of ways. When consumers are given a variety of choices to choose from, they are more likely to react positively (Reardon & Hopkins, 2006).

In the context of Nepal, the idea of supermarkets started in the mid-1980s with the establishment of Bluebird Supermarket having a Rs. 500,000 investments. Moreover, there are several supermarkets (marts, superstores, and department stores), especially in Kathmandu valley where BhatBhateni Super Market (BBSM) is a leading retail store having a aim to reduce costs and increase profits while recognizing customer loyalty (Dolan & Humphrey, 2000). BhatBhateni is establish by Mr. Min Bhahadur Gurung in 1984 as a as a 'single shutter' 120 sq. ft. cold store has currently across 18 sites with a total sales area of 1,000,000 sq. ft. This supermarket is unique as it provides 4,500 full-time staff where 95% are women. Moreover, it is focused on improving sales efficiency in order to increase customer loyalty and responsiveness where consumers are pleased with the wide range of products available, the price and quality of the products, as well as the cleanliness and friendliness environment provided by BBSM (Moustier et. al., 2010).

Today, Customer satisfaction is critical and crucial for both service and industry survival in the marketplace such as Banks (Rai et al., 2019; Paudel et al., 2020; Paudel & Devkota, 2022), Taxi Services (Oli et al., 2022), Airlines (Thapa et al., 2020) and even in Cross-border purchase (Paudel et al., 2018). The number of supermarkets in Kathmandu Valley and other Nepalese cities is growing by the day, resulting in fierce competition. BBSM needs to widen its product range because it has less choices of products in stock. The price of clothing should be kept to a minimum, and the quality of clothing should be considered. Rather than focusing on their own benefits, BBSM should concentrate on the desires and satisfaction of their customers.

Evaluating customer satisfaction serves as a crucial integrated value chain, acting as a primary catalyst for any organization. This involves identifying customer needs, assessing satisfaction with service delivery, and continually appraising the significance of service and product attributes to customers. Likewise, the retail sector in Nepal is witnessing a huge revamping exercise as traditional markets make way for new formats such as departmental stores, hypermarkets, supermarkets and specialty stores. The retail industry in Nepal is at the cross roads and it has emerged as one of the most dynamic and fast paced industries with several players entering the market. Consumers prefer the supermarkets than other retail stores, because all items, varieties and choices are available in the supermarket. Supermarkets face challenges in enhancing customer satisfaction, with a critical focus on gaining a deeper understanding of the attributes that matter most to customers.

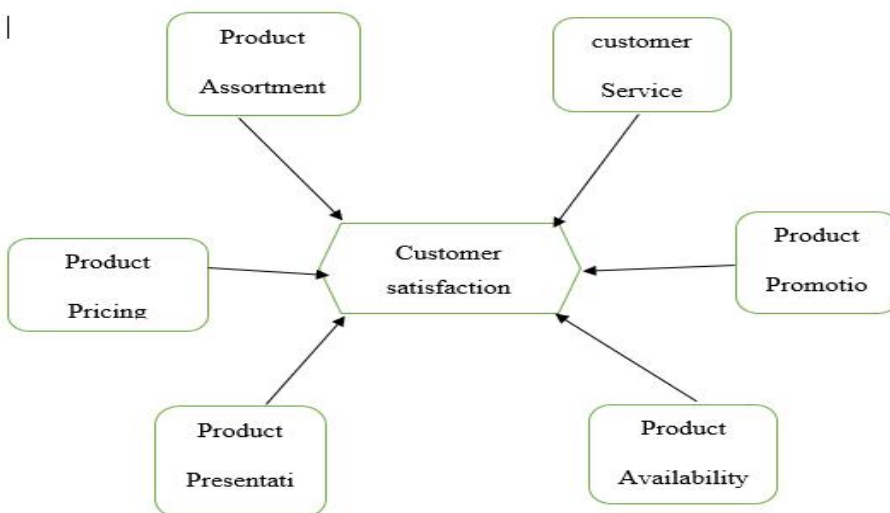
Supermarkets play a crucial intermediary role between manufacturers and customers in the market. In the modern era, their challenges include improving customer satisfaction and gaining a better understanding of the attributes most valued by customers. To stay competitive, it's vital for supermarkets to enhance customer satisfaction by focusing on key attributes. Determining factors influencing customer satisfaction is debatable, but empirical evidence is needed to statistically identify these factors. Existing research has not fully addressed various aspects, leaving questions unanswered, such as satisfaction levels with pricing, services, and product variety at BhatBhateni Supermarkets (BBSM). Additionally, this study aims to analyze post-COVID-19 customer satisfaction, exploring variations among age groups, gender, and occupations. Using an exploratory research design, the study gathers information from various sources, models, theories, and previous evaluations to better understand the supermarket's objectives.

**Conceptual Framework**

This study has explained different theories. They are: buyer’s behavior theory, social judgement theory, motivational theory, affective cognitive consistency theory and normative theory. The initial theory is the buyer’s behavior theory which explains the tendency of a consumer to buy goods and services without planning ahead is known as impulsive purchasing. Similarly, the theory of social judgment is a meta-theory that drives cognitive-perspective studies, which shows how the situations are viewed upon and termed to be a paradigm that studies human judgment. Moreover, SJT attempts to explain how likely a person is to change their opinion. Additionally, affective cognitive consistency theory explores the relation between attitudes and beliefs. Cognitive consistency theories are based on Gestalt psychology concepts. Likewise, normative theory aims to make moral judgments of customers which claims about how supermarkets should be designed. Thus, what are the various factors determining the customer satisfaction of the supermarket are the major apprehension in order to create better value addition of customers in supermarket. Customer satisfaction has superior power and influences on any firms marketing strategy. In today’s highly competitive marketing environment, the shopping behavior of consumers have experienced a remarkable change and is putting many obstacles for supermarket. In, general, customer satisfaction has several micro and macro level aspect and understanding of several determinants of customer satisfaction plays a pivotal role in enhancing the level of customer satisfaction. Thus, the factors determining customer satisfaction is affected by large number of variables on the basis of the above theory.

From the above theoretical review, Affective Cognitive Consistency theory is termed to be a best fit for this study as this theory helps to explores the relation between attitudes and beliefs. In the basis of this theory researcher developed a conceptual model. Moreover, the researcher determined the required supermarket knowledge in relation to the conceptual framework developed by various scholars in order to obtain the key conceptual themes in the field of supermarket. The figure 1 shows the conceptual framework based on Affective Cognitive Consistency Theory and current Supermarket literature.

Figure 1: Conceptual Framework



Source: Modified from Sharif (2012)

The above framework explains the various factors that determines customer satisfaction within the supermarket. It consists of six independent variables (i.e., product assortment, product pricing, product presentation, product promotion, product availability and customer services). In this framework customer satisfaction is treated as dependent variables and customer satisfaction is explained by six independent variables. In order to obtain answer to all the research question presented in the previous section of this research work, the following hypotheses were framed:

### **Product Assortment and Customer Satisfaction**

The link between product assortment and customer satisfaction is crucial for retail success. A well-managed assortment, reflecting customer preferences, positively impacts satisfaction through diverse choices. Customers value a comprehensive selection catering to individual tastes. Conversely, a limited assortment may result in dissatisfaction, risking lost sales and a negative customer experience. Quality and relevance further influence satisfaction, fostering trust and loyalty. This symbiotic relationship underscores the need to understand and manage assortments, recognizing the importance of meeting diverse customer expectations for positive experiences and sustained success in a competitive market.

H1: There is a positive and significant relationship between the use of product assortment strategies and customer satisfaction.

### **Product Pricing Strategies and Customer Satisfaction**

The relationship between product pricing strategies and customer satisfaction is complex, influencing how customers perceive a product's value. Effective pricing, aligned with expectations, positively impacts satisfaction, fostering trust through fair and transparent practices. Strategic pricing, with discounts and promotions, provides tangible benefits. The perceived link between price and quality influences satisfaction and loyalty. Flexible pricing, catering to diverse needs, requires balance to avoid confusion. In summary, a multifaceted approach considering customer perceptions, transparent pricing, and alignment with expectations enhances satisfaction, builds trust, and fosters long-term loyalty, suggesting retailers should consider entire categories when pricing to address customer preferences and competitiveness.

H2: There is a positive and significant relationship between the use of product pricing strategies and customer satisfaction.

### **Product Presentation and Customer Satisfaction**

The connection between product presentation and customer satisfaction is crucial for a positive shopping experience. This involves visual aesthetics, packaging, and arrangement, where a well-presented product significantly contributes to satisfaction by capturing attention and fostering professionalism. Clear displays assist in informed decisions, while appealing and functional packaging enhances the overall experience. Organized layouts in physical stores or intuitive online designs reduce frustration and increase satisfaction. Consistency across channels reinforces brand identity and trust. Conversely, disorganization may lead to confusion and reluctance to purchase, reflecting a commitment to a positive shopping experience and influencing customer satisfaction and loyalty. Shelf space considerations underscore the importance of strategic presentations in retailing.

H3: There is a positive and significant relationship between the use of product presentation strategies and customer satisfaction.

### **Product Promotion Strategies and Customer Satisfaction**

The interaction between product promotion strategies and customer satisfaction significantly shapes consumer perceptions and brand loyalty. This includes advertising, sales promotions, and public relations, where effective strategies heighten satisfaction by creating excitement and connecting buyers to the brand. Tangible benefits from discounts, offers, and loyalty programs enhance satisfaction. Aligning with customer preferences demonstrates understanding, fostering positive brand relationships. Success relies on authenticity, and misleading promotions can lead to disappointment. A balanced, transparent approach is crucial for customer perception and loyalty. Examining promotion types and impact reveals promotions as quick fixes that, while exciting customers, may undermine long-term retail strategy. Retailers strategically weigh and implement promotions based on competition and customer dynamics.

H4: There is a positive and significant relationship between the use of product promotion strategies and customer satisfaction.

**Product Availability and Customer Satisfaction**

The link between product availability and customer satisfaction is vital for business success. Consistent accessibility positively impacts satisfaction by reducing frustration and increasing completed purchases. This connection is essential for building customer trust, as businesses that reliably provide needed products foster confidence and loyalty. Conversely, stockouts or prolonged unavailability can disappoint customers, negatively influencing satisfaction and prompting them to seek alternatives. In e-commerce, accurate and real-time information about product availability is crucial. Businesses investing in efficient supply chain management enhance loyalty and positive recommendations. In summary, maintaining a well-stocked inventory and effective supply chain practices contribute to positive customer experiences, building trust, satisfaction, and long-term success in the market.

H5: There is a positive and significant relationship between the use of product availability strategies and customer satisfaction.

**Customer Service Strategies and Customer Satisfaction**

The relationship between customer service strategies and satisfaction is crucial, shaping the overall customer experience and brand loyalty. Effective strategies, with responsive representatives and clear communication channels, enhance satisfaction by addressing customer needs throughout the purchasing journey. Personalized and customer-centric approaches deepen the brand-customer connection, increasing satisfaction and repeat business. Consistent, high-quality service across touch points strengthens brand image and customer trust. Inadequate service can lead to dissatisfaction, negatively impacting a brand's reputation. Businesses prioritizing customer service excellence foster satisfaction, loyalty, and positive word-of-mouth, contributing to long-term success and competitiveness. BBSM aims to improve customer satisfaction through customer-driven services, recognizing service as a crucial differentiator for long-term competitive advantage.

H6: There is a positive and significant relationship between the use of customer service strategies and customer satisfaction.

**Variable and Its Definition**

This section outlines the analysis variables and the developed hypothesis. They are:

Table 1: Observed Variables and Its Description

Construct	Observed Variables	Variable Notation	Explanations
Product Assortment	New product	AS1	Finding new product in the store
	Wide assortment	AS2	Wide assortment of product to satisfy purchasing needs
	Balanced Mix	AS3	Balanced mix of local and foreign products and brands
	Value	AS4	Value of sales increase with a greater product assortment
	Different quantities	AS5	Different quantities of goods are offered
	Stocked product	AS6	Stocks product according to consumer needs
Product Availability	Product Available	AV1	Product available at this store but not anywhere else
	Finding items	AV2	Items out of stock on regular basis
	Merchandise	AV3	Good availability merchandise
	Satisfactory	AV4	Very satisfactory compared to another store
	Expectation	AV5	Product range meeting expectation
	Product line	AV6	Enough product to choose from product line
	Product Value	PR1	Paying more than the product value



<b>Construct</b>	<b>Observed Variables</b>	<b>Variable Notation</b>	<b>Explanations</b>
Product Pricing	Total Value	PR2	Total value is more than the value of individual items
	Comparison	PR3	Provides lowest pricing compared to other superstores
	Pricing	PR4	Satisfied with the pricing level
	Customer value	PR5	Establishing a position of customer value through pricing
	Offering	PR6	Satisfied with the pricing and quality ration offered by the store
Product Presentation	Easily	PE1	Finding products easily without lot of searching
	Display	PE2	Product displays in this supermarket to be attractive and appealing
	Comfortable	PE3	Move comfortably around the supermarket
	Sufficient	PE4	Sufficient number of size and colors of product
	Frequently	PE5	New products are presented frequently
	Catching	PE6	Big or eye-catching display in supermarket
	Presentation	PE7	Satisfied with product presentation in the supermarket
Product Promotion	Appropriate	PO1	Promotion undertaken by supermarket to be appropriate
	Frequency	PO2	Frequency of promotion at adequate level
	Effective	PO3	Promotions effective in capturing customer attention
	Discount	PO4	Discount provided induced to buy more
	Motivate	PO5	Coupon or points motivate to buy more
Customer Service	Staff	CS1	Finding service staff when needed
	Knowledge	CS2	Staff store knowledge to answer questions and queries
	Content	CS3	Content with customer complaint program
	Standards	CS4	Adequate safety and hygiene standards
	Service	CS5	Receive service you deserve while shopping
Customer Satisfaction	Variety	CST1	Good variety of products
	Better	CST2	Better prices than another store
	Regular & Active	CST3	Regular and active with promotions
	Shelf Presentation	CST4	Shelf presentation is practical and attractive
	Want	CST5	Product I want are available
	Prompt	CST6	Prompt and adequate customer service
	Parking	CST7	Parking is never a problem
	Available & helpful	CST8	Staff are always available and helpful
	Atmosphere	CST9	Atmosphere is pleasant and organized
	Hygiene and Cleanliness	CST10	Hygiene and cleanliness high

### Study Area, Population and Data

This study employs an explanatory research design, commonly used in social sciences to test causal theories. The research focuses on Kathmandu Valley. As the capital of Nepal, Kathmandu Valley, hosting major industries, serves as a business hub. The number of supermarkets in the valley is higher than out of valley in the current context there are 18 BBSM in Nepal and 13 BBSM are located in Kathmandu, Lalitpur and Bhaktapur which is located in 18 locations in Nepal and has 4,500 full-time workers. The

sample size taken for study was 280 which is calculated by the formula  $n_0 = \frac{z^2 pq}{l^2}$ . The sample was selected by Convenient sampling among the people who are shopping at BhatBhateni supermarket in Kathmandu valley (Sekaran & Bougie, 2009). Structured questionnaires, implemented through Kobo Toolbox, facilitated data collection from July to September 2021. Analysis involved both descriptive and inferential methods, using SPSS and AMOS software.

## Result and Discussion

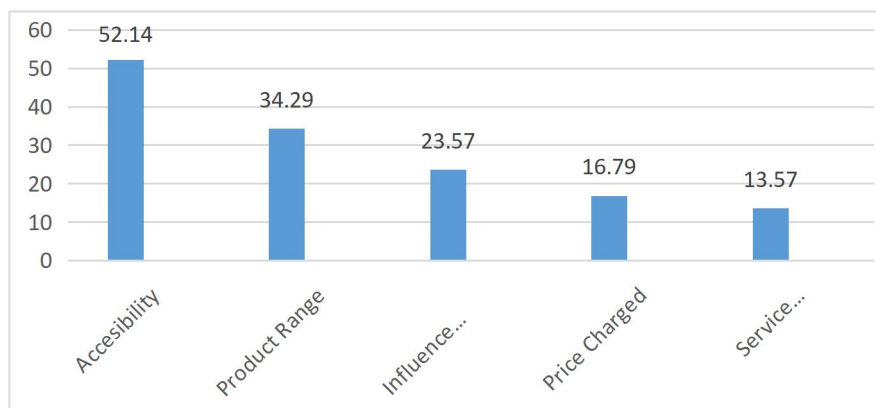
### *Socio-demographic characteristics*

The study revealed that majority of the respondents were female (52.86%) and are single which means that men do not purchase or consume at BBSM as like female customers. Similarly, majority of the respondents belongs to 21-30 age group having educational qualification of bachelor's degree (72.91%) indicating that students are more attracted towards BBSM's products and service. Similarly, it was revealed that 43.92% of respondents earns NRs.20,000 per months indicating only 2.5% of respondents earns between NRs. 81000-100000 and above NRs. 100000 respectively. Moreover, majority (60) respondents were non-government employee with least of 12 respondents working as a government employee as their profession. Thus, it can be concluded that BBSM has been attracting female customers aged between 21-30 who usually earns NRs. 20,000 and are non-government employee with bachelor's degree as their academic qualification.

### **General Understanding on Customer Satisfaction on Buying Goods at BBSM**

This section contains the general understanding about customer satisfaction on buying goods at BBSM. The study revealed that 45.36% respondents purchases goods in BBSM frequently where only few (1.43%) respondents purchases goods rarely in BBSM which indicates that majority of the respondents usually purchases goods from BBSM.

Figure 2: Reason for Choosing BBSM



Source: Field study

Figure 2 revealed about the reasons for choosing BBSM. The result indicates that majority of the respondents chooses BBSM to purchase their goods and products is due to accessibility (52.14%), product range (34.29%), influence from family & friends (23.57%), price charged (16.79%) and service delivery process (13.57%) where respondents was asked to choose multiple answers. Similarly, Consumer involvement is a state of mind that motivates consumers to identify with product and service offerings, their consumption patterns and consumption behavior. This study revealed that bulk of respondents (32.5%) has been purchasing goods from 3-5 years at BBSM where only 9.29% of surveyed respondents has been purchasing goods and products from BBSM since less than 1 years and are satisfied with the location of BBSM and find responsiveness of staff is good (58.21%) respectively.

In this study, respondents were also asked about the quality management approach of BBSM. The result indicates majority of the respondents said there are good approach of BBSM for quality management (60.71%) and rest of them said there are fair approach for quality management. Likewise, professionalism and commitment are an attitude and the ways to communicate with others. This study concludes that

majority of BBSM’s users rate good for professionalism and commitment of BBSM while dealing customers.

**Challenges in Customer Satisfaction**

***Challenges in improving Customer Satisfaction at BBSM***

This study asked respondents whether there are challenges in customer satisfaction or not? It was reported that 60% respondents felt there are no any challenges regarding the customer satisfaction while purchasing goods and product at BBSM.

The study revealed that 18.57% of the respondents had faced the shopping convenience convenient store where 10% said about the challenges about understanding customer expectation. Likewise, 9.29% of the respondent had faced increased competition, 8.93% of respondents said about employing skilled customer service professionals and 8.93% of respondents said about adoption of modern technology. Similarly, financial constraint and consistency are 8.21% & 7.86% respectively. Likewise, 6.79 said about infrastructure & logistic management, 6.07% said about employee’s etiquette. Proactive customer complaint response and others are 5.71 and 6.07 respectively, it shows customers of BBSM in Kathmandu valley facing challenges and problem (above mentioned) while shopping at BBSM in Kathmandu valley which occurs rarely (42%).

**Managerial Solution Regarding to the BBSM**

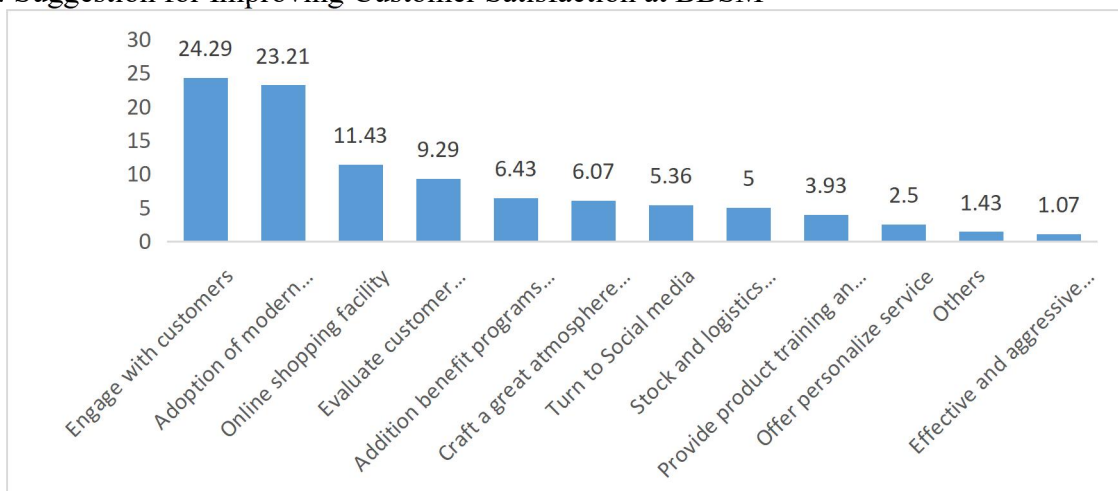
***Challenges Manageable to BBSM***

Similarly, this study had also asked respondent whether the mentioned challenges are manageable or not. It indicated that 87% of respondents finds they are manageable whereas only 13% respondents find the challenges not manageable. The result demonstrates that 40% of respondents choose regular customer satisfaction survey of the BBSM to increase the performance of BBSM. Likewise, the other strategy of overcome challenges of creating a customer-first culture is 29.20%, offering proactive customer service is 24.29%, online shopping facilities is 23.21%, providing additional benefits is 21.07%, easy checkout is 21.07%, customer complaint management system is 16.43%, employee coaching is 15%, enhancing infrastructure and logistics management is 10.36%, promoting aggressively is 5.36% and 8.57% of the respondent says that the do the others types strategy except these different to reduce the challenges of the BBSM. Finally, this study observed that the 29.64% believe that general manager and store manager/supervisor equally responsible to manage such challenges.

***Reason Why Such Situation Cannot be Managed***

Out of 280, only 36 respondents said that BhatBhateni supermarket cannot be managed properly in the Kathmandu valley. As per the satisfaction of customers, ideology varies from one to another. The result indicates that unsystematic management, no space left for parking, high value of goods, problem related to social culture, poor technology and political problem are common problem which makes challenges unmanageable. Moreover, irresponsible staff, narrow thinking due to these things it cannot be manageable (see figure 3).

Figure 3: Suggestion for Improving Customer Satisfaction at BBSM



Source: Field Study

**Inferential Analysis**

**Summary Statistics and Explanatory Factor Analysis**

The summary statistics indicate that respondents' mean ranges from 3.6286 to 4.0393, with a median of 5. Negative skewness is observed, ranging from -0.042 to -0.783, indicating a longer tail on the left side of the distribution. Kurtosis values from 0.024 to 1.929 suggest a high peak kurtosis, indicating a platykurtic distribution as the data is less than 10. The KMO value of 0.834 and Bartlett's test (p-value = 0.000) confirm data validity and reliability. Herman Single Factor test suggests that CMB does not significantly affect the data (Gaskin, 2021).

**Confirmatory factor analysis and Measurement Model**

Confirmatory factor analysis assesses how measured variables correspond to the number of constructs (Kumari, 2021). Hair et al. (2010) propose criteria for model acceptability: CMIN/df<5, RMR<0.08, GFI>0.80, CFI>0.90, TLI>0.90, IFI>0.90, and RMSEA<0.08. This study's latent variables meet these criteria, indicating a well-fitting model. The measurement model examines relations between hypothetical frameworks and observed variables, ensuring reliability and convergent validity. Convergent validity requires AVE>0.5, CR>0.7, and CR>AVE. Discriminant validity necessitates AVE>ASV & MSV and  $\sqrt{AVE}>R$  (Lam & Maguire, 2012). All constructs fulfill all the above criteria. Hence, the dataset is revealed to be reliable and valid. These conditions have been met during the data analysis. Thus there is no any issues related to validity and reliability (see table 2 and 3).

Table 2: Validity Test

Construct	Indicator	Factor Loading	CRONBACH'S ALPHA	CR	AVE	MSV
Product Assortment	AS4	.869	0.890	0.891	0.733	0.100
	AS5	.892				
	AS6	.887				
Product Availability	AV1	.900	0.908	0.909	0.770	0.144
	AV2	.873				
	AV3	.865				
Product Pricing	PR1	.896	0.922	0.922	0.798	0.151
	PR2	.904				
	PR3	.884				
Product Presentation	PE1	.822	0.866	0.870	0.627	0.311
	PE2	.851				
	PE3	.838				
	PE6	.623				
Product Promotion	PO2	.715	0.860	0.863	0.612	0.241
	PO3	.777				
	PO4	.814				
	PO5	.830				
Customer Service	CS1	.742	0.876	0.877	0.644	0.163
	CS3	.760				
	CS4	.883				
	CS5	.888				
Customer Satisfaction	CST8	.732	0.767	0.767	0.525	0.311
	CST9	.739				
	CST10	.851				

Table 3: Latent Construct Correlation

	CS	AS	AV	PR	PE	PO	CST
CS	0.802						
AS	0.207	0.856					
AV	0.276	0.263	0.878				

PR	0.274	0.275	0.291	0.893			
PE	0.234	0.275	0.330	0.274	0.792		
PO	0.330	0.316	0.379	0.388	0.491	0.782	
CST	0.404	0.188	0.202	0.178	0.585	0.438	0.724

**Hypothesis Testing**

As White-Davis et al. (2018) hypothesis helps to predict and outlines the researchers' anticipated outcome of the study. The alternative hypothesis is accepted when the P value is lesser than 0.05 indicating that the relationship between the variables in the hypothesis is significant (Serdar, 2019). In our study only three hypotheses with the independent variable i.e., Customer Service (CS) and Product Promotion (PO) and Product Presentation (PE) are accepted as the P-value in those hypotheses were below 0.05 which means there are significant relationship between dependent variable i.e., Customer Satisfaction and independent variables i.e., Customer Service, Product Promotion and Product Presentation. The remaining three hypothesis are rejected which means that the relationship between customer satisfaction and the remaining independent variable are insignificant (see table 4). Figure 4 shows the path analysis which includes dependent and independent variables as well as error terms. Moreover, there are seven latent variables and each latent variables have several observed variables. The final variables observed were given to each of the latent variables by evaluating its model and after that by assessing each of the observed variables the error variables were assigned.

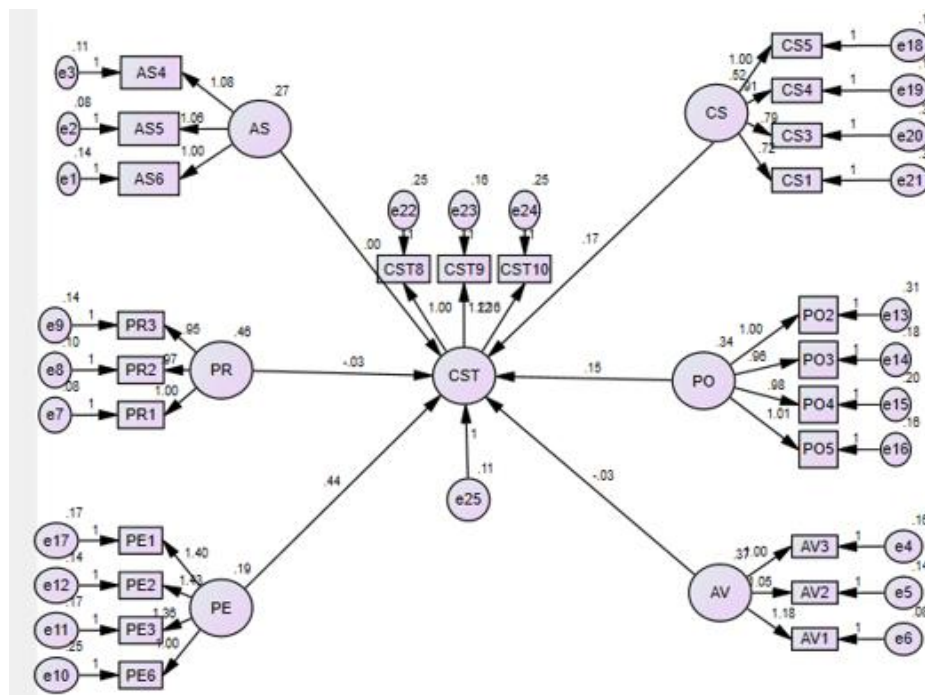


Fig 4: Structural model

Table 4: Hypothesis Testing

Hypothesis	Estimate	S.E.	C.R.	P-Value	Significant/ Insignificant
H1: Customer Satisfaction → Product Assortment	-0.001	.050	-0.011	.991	Insignificant
H2: Customer Satisfaction → Product Pricing	-0.032	.038	-0.840	.401	Insignificant
H3: Customer Satisfaction → Product Presentation	.444	.077	5.727	***	Significant
H4: Customer Satisfaction → Product Promotion	.149	.048	3.100	.002	Significant
H5: Customer Satisfaction →	-0.032	.042	-0.747	.455	Insignificant

Hypothesis	Estimate	S.E.	C.R.	P-Value	Significant/ Insignificant
Product Availability					
H6: Customer Satisfaction → Customer Service	.171	.039	4.400	***	Significant

**Discussion**

The correlation between the variables was established and evaluated using the reliability test and multiple linear correlation. Table 4 shows that almost all hypotheses with p values less than 0.05 were accepted. Since 3 hypotheses were determined to be insignificant. Thus, the sample size for this study could not have been adequate, and the questionnaire's design might have been faulty, making the hypotheses unimportant.

Table 4 reveals that customer satisfaction has significant impact on product presentation (H3). It reveals that there is a strong relationship between product presentation and customer satisfaction. The way a product is presented is so important that it may either draw customers in or turn them away. A product presentation may make the difference between success and failure regardless of the category where customers may readily locate things on their own if they frequently visit the store since they become familiar with the placement of the merchandise. Similarly, H4 reveals that there is significant impact between customer satisfaction and product promotion which indicates that customers buying decisions were influenced by promotions. Customers presumably used the available promotional communications to their advantage in order to maximize the value of their purchasing experience. This may occur as a result of the targeting of relevant media outlets (such regional newspapers and magazines, which are read by the majority of consumers). Likewise, H6 is significant. It indicates that a beneficial relationship between good customer service (caused by positive employee attitudes brought on by suitable hiring and training) and the increased level of shoppers due to satisfied and delighted customers.

Moreover, regarding client satisfaction with their purchases at BBSM in the Kathmandu valley, there is a high level of reaction from the respondents. The majority of consumers concur that they discover new products at BhatBhateni supermarket, where they also concur that BBSM has a large selection of goods to meet their shopping needs. Customers also thought the product displays were nice and alluring. As a result, it can be said that the majority of survey participants were pleased with how BBSM presented its products. The majority of respondent’s state that consumers are happy with product advertising and that they can always locate a service staff member in this shop since they are knowledgeable enough to address their questions. Therefore, customers were happy with the way products were presented, how they were promoted, and how they were treated. This leads us to the conclusion that the respondents have expressed a high degree of satisfaction with their shopping experience at the BhatBhateni supermarket in the Kathmandu valley.

This study can assist other researchers when conducting similar kinds of research works. There are numbers of prospective matter to be researched from the findings generated from this research work. This study considers only six independent variables which are product assortment, product pricing, product presentation, product promotion, product availability and product service. So, there are also other factors which directly affect the customer satisfaction.

**Conclusion**

Customer satisfaction fosters loyalty, retention, positive word-of-mouth, employee satisfaction, and profit growth, while mitigating negative word-of-mouth and increasing feedback. Nepal's BhatBhateni, the oldest supermarket, requires customer-centric marketing and innovation for competitiveness. The study, 'Customer satisfaction on supermarket - evidence from BhatBhateni supermarket and departmental store,' evaluates satisfaction and its dimensions. BBSM prioritizes customer satisfaction, aiming for loyalty and increased purchases. Using exploratory research design, the study employs a structured questionnaire via KOBO Toolbox for data collection. Inferential analysis with AMOS and SPSS, and descriptive analysis using KOBO Toolbox, Excel, charts, figures, and tables were conducted. Affective Cognitive Consistency theory guided the study in various BBSM locations in Kathmandu Valley. Convenience

sampling collected 280 samples from BhatBhateni customers for SPSS statistical analysis, revealing a moderate overall satisfaction level among respondents.

The majority of the visitors were female in the 21-30-year young age who have completed their bachelor's according to the socio-demographic results. The study also looked at the major variables and how the data gathering tools were created and used. Data is entered and tabulated in Microsoft Excel, and data is analyzed with STATA software. Similarly, multiple analytical methodologies were utilized to examine the study data, including descriptive analysis, visitor opinion of the banana restaurant or perception of it, and inferential analysis use for the factor influencing to the restaurant.

All the organizations felt challenges in the adoption of new product development practices and respondents also provided some of the suggestions to improve performance of supermarket. The findings of the study can be used to design various strategies, particularly for the growth of buying goods of supermarket in Nepal. It would eventually lead to Product presentation and product assortment have a significant impact on customer satisfaction. Personnel service has a significant impact on customer satisfaction. The organization should focus on its shortcomings by improving its services and availability. The remaining dimension, which is important to customer satisfaction, should be improved to better serve the customer.

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## Import, Inflation, Educational Enrolment and GDP Per Capita Growth in Nepal

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### Abstract

From 1981 through 2020, the author of this research examined imports, Inflation, student enrolment, and GDP per capita income in Nepal. Each variable's level and first difference indicate that it is not stationary. The study showed both the dependent variable and the explanatory variables, as well as their properties and patterns. The GDP per capita is stationary at the first difference, and other explanatory variables such as import, School Enrolment are also stationary at the first difference, while Inflation is stationary at the level. This research showed the dependent and explanatory variables' short- and long-term cointegration. Import and school enrolment are significant in the long run at one percent level and five percent level respectively. However, Inflation is insignificant in the long run. The Error Correction Modal (-1) coefficient of 0.098 indicates that the Gross Domestic Product ( GDP) per capita divergence from the equilibrium level is corrected by 9 percent the following year. The probability values for the heteroscedastic and serial correlation tests are more than 0.05. Serial correlation and heteroscedasticity tests show no serial correlation, the data are homoscedastic, and residual data is typically distributed. CUSUM and CUSUM of SQUARES tests determined the model's stability.

**Key Words:** *GDP Growth, School Enrolment in Education, Autoregressive Distributed Lag Model, Unit Root Test, Stability Test*

### 1. Background of the Study

Import, inflation, educational enrollment, and GDP per capita growth are important factors that can impact the economic development and well-being of a country. In the case of Nepal, it is crucial to understand the relationship between these variables in order to formulate effective policies and strategies for sustainable development.

Import is an important indicator of economic activity and can have a significant impact on GDP growth. However, there is limited research available on the specific relationship between imports and GDP per capita growth in Nepal. Inflation refers to the general increase in prices of goods and services over time. While there is research available on the relationship between inflation and economic growth in general, there is limited research explicitly analyzing the relationship between inflation and GDP per capita growth in Nepal.

Educational enrollment refers to the number of students enrolled in educational institutions. Factors such as poverty, lack of awareness about the benefits of education, and high costs of education can contribute to low educational enrollment rates in Nepal (Dewey, 2015). Additionally, factors such as malaria, menstruation, and lack of money have been found to be significant determinants of primary school dropout and absenteeism, particularly among orphans and female students in rural areas of Nepal (Dewey, 2015). Therefore, addressing these barriers and promoting educational enrollment can contribute to economic development in Nepal. GDP per capita growth is an important indicator of economic progress and can have a significant impact on the well-being of the population. Increasing GDP per capita can have positive effects on various aspects of development, including health outcomes (Vincens & Stafström, 2015).

An import is a good or service that is purchased from another country and brought into the native nation. Imports play a crucial role in the internationalization process of firms, allowing them to lower costs, access products and services not available domestically, and take advantage of import opportunities (Jeníček & Krepl, 2018). Domestic producers of similar products and services lose business to foreign competitors when they cannot meet consumers' needs quickly or cost-effectively. There is disagreement among economists and policy experts as to whether imports are beneficial or detrimental. Imports' dynamic relationship with economic growth has yielded conflicting findings in several research. One-way,

two-way, and no-causal relationships are the broad buckets into which these results fall. International trade liberalization is associated with faster economic growth, according to the arguments of Romer (1990), Grossman and Helpman (1991), and Rivera Batiz and Romer (1991).

Each year, the inflation rate is calculated using a standard basket of products and services. If inflation occurs, or if the cost of producing goods and services rises, then the purchasing power of the currency will decline. Inflation is caused by a disparity between the monetary supply and its demand. Therefore, there is a limit on how much one may purchase with a certain amount of cash.

The problem is determining the link between GDP per capita and imports, Inflation, and educational enrollment. The numbers included in this review came from the World Bank's website, making them secondary data. This current study condition expresses that the domestic product is increasing in GDP per capita, but imports are increasing daily in our nation, which is the biggest challenge of the Nepalese economy. Similarly, Inflation rate is the next difficulty since it fluctuates or changes with time. Finally, the third problem of the analysis is education, and the study's enrollment fluctuates from time to time based on the data. This study included components such as import, Inflation, educational enrollment, and GDP per capita, which covered a broad range of topics. As a result, studying and determining the relationship between these factors is more complicated. Consequently, there is a significant research gap between the current situation and our study topic. Thus, this research addresses a research vacuum by achieving the study's purpose and providing crucial ideas to policymakers.

The fundamental purpose of this research is to analyze the connection between GDP per capita and such economic indicators as imports, Inflation, and educational enrollment. This study's specific purpose is to determine the nature and trend among Import, Inflation, Educational Enrolment, and GDP Per Capita Growth. This research examines the relationship between GDP per capita and import, Inflation, and student enrollment in both the short and long term.

The research has been done based on two main ideas:

- i.  $H_0$ : Import, Inflation, and educational enrolment do not significantly affect GDP per capita.
- ii.  $H_1$ : Import, Inflation, and educational enrolment significantly affect economic GDP per capita.

## 2. Literature Review

A complete summary of earlier studies on a subject is a literature review. Finding gaps in the literature or debates, creating a combination that organizes what is known rather than simply reporting it, and discussing potential consequences and future research possibilities are the key goals of a review of the literature. Significant macroeconomic variables like real GDP, Inflation, importance, and school enrollment are taken in this research topic. These variables are significant for every economy because these variables show the strength and status of every economy in general; imports have hurt a country's GDP per capita income. Similarly, Inflation harms a country's economic performance and GDP per capita. As a result, depreciation may substantially influence the daily lives of ordinary people. A nation must maintain a healthy balance between imports and exports. A nation's GDP, exchange rate, and inflation rate can all be impacted by its import and export activities.

Adhikari (2014) finds that Inflation is only injurious when it is galloping or higher. The results also demonstrate that Inflation's effects on economic growth are not uniform. Currently, when Inflation rises, economic agents do not have the time to respond to high Inflation. As a consequence, rising Inflation will dampen efforts to expand the economy. When there had been significant Inflation in the prior era, and the economic agents had time to adapt over a year, Inflation helped the economy expand. Multiple authors, including Barro (1991), Cosier and Selody (1992), and Fischer (1993), have shown that nations with more excellent inflation rates have lower real growth rates over the long term. As the gap between imports and exports widens, Nepal's trade imbalance rises to worry proportions. Imports have increased dramatically, but exports have become more challenging to compete (NPC, 2016).

Landlocked Nepal is bordered on three sides by India and the north by Tibet. Ninety per cent of Nepal's commerce with its massive neighbor, India, occurred before the 1950s, and this trade dates back to far before the 1950s. Since 1951 A.D., however, Nepal has expanded its trade relationships with numerous countries. These countries include the United States, Germany, Japan, Malaysia, Singapore, Thailand, Kuwait, France, Bangladesh, and Spain. As a result of rising imports and a stagnant export sector, Nepal's trade imbalance has ballooned in recent years (Kafle, 2017). Education is a

multidimensional process, but as Afzalet et al. (2012) illustrate, only countries can develop by committing resources to it. Education helps alleviate poverty by boosting production, as shown by the research, demonstrating the inextricable link between poverty and education and between education and economic development.

Andres & Hernando (1997) identified a nonlinear correlation between Inflation and economic growth, concluding that Inflation has a significant negative effect on growth. Their main policy claim was that a 1% drop in Inflation would increase production by 0.5% to 2.5%. Three separate studies by Barro (1991), Cosier and Selody (1992), and Fischer (1993) all come to the same conclusion: nations with higher inflation rates have slower real growth over the long term. Paudyal (2014) examined the effects of macroeconomic factors on Inflation in Nepal from 1975 to 2011. The actual Gross Domestic Product, deficits, prices in India, total money supply, and exchange rate are all considered. The Wickens-Breusch Single Equation Error Correction model's regression findings revealed that all factors considered are significant over the long term. This empirical study claimed that after the political shift in 1991, prices in Nepal became very dependent on those in India. It is due to a poorer domestic production supply that is compensated by an increase in Indian imports. After 1991/92, the movement of Nepali prices is quite similar to that of Indian prices. However, due to the shifting circumstances of lower import duties under the preferential trade agreement with India, certain local items could not compete with Indian goods in the home market. As a result, imports from India increased further, influencing Nepalese prices through Indian pricing. As a result, Indian prices have become increasingly dominant over local prices.

Afzalet et al. (2012) analyse the connection between education and economic development, demonstrating that nations can only develop by investing in education. Education helps alleviate poverty by boosting production, as the research shows, establishing a direct connection between schooling and economic development. Williams (1967) claims that education affects a country socially and economically. Higher salaries and a lowered crime rate are two advantages of improved education, contributing to economic progress. People who have received an education appreciate their country's ideals, are aware of its laws, are disciplined and capable of recognizing their responsibilities, and are socially responsible for their country's advancement. Gyimah-Brempong et al. (2006) studied 34 African countries and found that higher education had a disproportionately significant and substantial impact on GDP per capita growth rates. Growth rates for higher education are 0.09, three times more than physical capital investment.

Inflation is a helpful barometer of economic activity. The study suggests that excessive Inflation slows the rise of GDP per capita in many nations, whereas low Inflation prevents resources from being used to their maximum potential. The effect on GDP per capita growth is especially relevant to consider in the case of Nepal. The researcher has been considering the potential impact of the rising number of college students on the country's economic growth. As studied in the literature above, Imports have had a favorable influence in certain nations while having adverse effects in others, as shown by the extant research. When considering the importance of imports to the economy, Nepal should also do research. Researchers in this circumstance pose questions that must be investigated, yielding valuable information to policymakers, other researchers, and even students interested in the subject.

### **3. Methodologies to Research**

The effects of shifts in imports, inflation, and levels of education on GDP per capita are quantified and analyzed. In order to reach its conclusions, this study employs the scientific method and data analysis techniques. Due to the retrospective nature of the data, the study approach used is also retrospective. The econometric study of the relationship between imports, inflation, student enrollment, and GDP per capita reveals a significant positive relationship between all four variables. In the first step, the data are analyzed to check whether the variables are steady. Subsequently, the series' co-integration is investigated. The researcher has examined for a connection between the explanatory and dependent variables. The short-run correlation between the variables is calculated using the error correction model (ECM).

### **Nature and Source of Data**

No primary sources were used in the compilation of this material. This analysis uses data from the World Bank report, which spans the years 1981 and 2020, to determine how imports, inflation, and education levels have impacted GDP per capita.

### Data Collection, Organization, and Processing Procedure

The suggested model is estimated using data from the last 40 years, and the information is converted to a logarithmic scale. Data analysis and model estimation is performed using Microsoft Excel and E-views 12.

### Tools and Methods of Data Analysis

The model used quantitative methods, econometric instruments, and descriptive statistics to examine the data. A variety of statistical methods including tables, graphs, diagrams, percentages, ratios, averages, and others are used in the investigation. The integrity of relationships between variables is tested using unit root and co-integration tests. Empirical research employs the Autoregressive Distributed Lag (ARDL) method, which has recently been applied in papers such as Bista (2017), Hoque (2017), and Yakob (2017). These checks are also used to verify the model's capacity to establish a strong connection between serial and residual stability. Among them are the CUSUM test, in addition to linear and serial correlation.

### Model Specification

Time-series data are used in the estimation process of the model. The import quantity, inflation rate, and student population are the independent variables, while the GDP per capita is the dependent variable. Based on the research framework developed by Gujarati, Porter, and Gunasekher (2015), an econometric model is constructed for this study. Below is the econometric model developed using the data in this study.

$$\text{GDP per capita} = f(\text{Imports, Inflation, edu\_enrol}) \dots \dots \dots (1).$$

A linear version of the equation may be expressed as follows:

$$\text{GDP per capita} = \alpha + \beta_1 \text{ import} + \beta_2 \text{ inflation} + \beta_3 \text{ edu\_enrol} + \varepsilon$$

By placing the natural log on both sides, the equation can be expressed in its natural log form,

$$\ln \text{ GDP per capita} = \alpha + \beta_1 \ln \text{ import} + \beta_2 \ln \text{ inflation} + \beta_3 \ln \text{ edu\_enrol} + \varepsilon$$

Where  $\alpha$  is the constant term,  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  are the coefficients of the variables. edu\_enrol is the educational enrolment, and  $\varepsilon$  is the error term or residual.

## 4. Data Presentation and Analysis

### 5. Descriptive Statistics of Data

All of the standard deviations, skewness, kurtosis, and Jarque-Bera statistics, as well as the mean, median, maximum, and lowest values, are shown in the following Table 4.1.

**Table 4.1:**

*Descriptive Statistics of the Central Tendency Data*

Date: 09/02/22 Time: 20:33  
 Sample: 1981 2020

	LOGGDP P...	LOG SCH...	LOG IMPORT	LOG INFLAT...
Mean	4.646746	0.834936	1.461286	0.896253
Median	4.636782	0.736172	1.484392	0.891090
Maximum	4.912670	1.233295	1.617730	1.426147
Minimum	4.431120	0.498244	1.274326	0.487182
Std. Dev.	0.140090	0.231572	0.099165	0.214992
Skewness	0.311953	0.368340	-0.508792	0.161269
Kurtosis	2.009170	1.653645	2.011617	2.524017
Jarque-Bera Probability	2.285005 0.319020	3.925615 0.140464	3.353965 0.186937	0.550985 0.759198
Sum	185.8699	33.39743	58.45143	35.85014
Sum Sq. Dev.	0.765378	2.091403	0.383513	1.802644
Observations	40	40	40	40

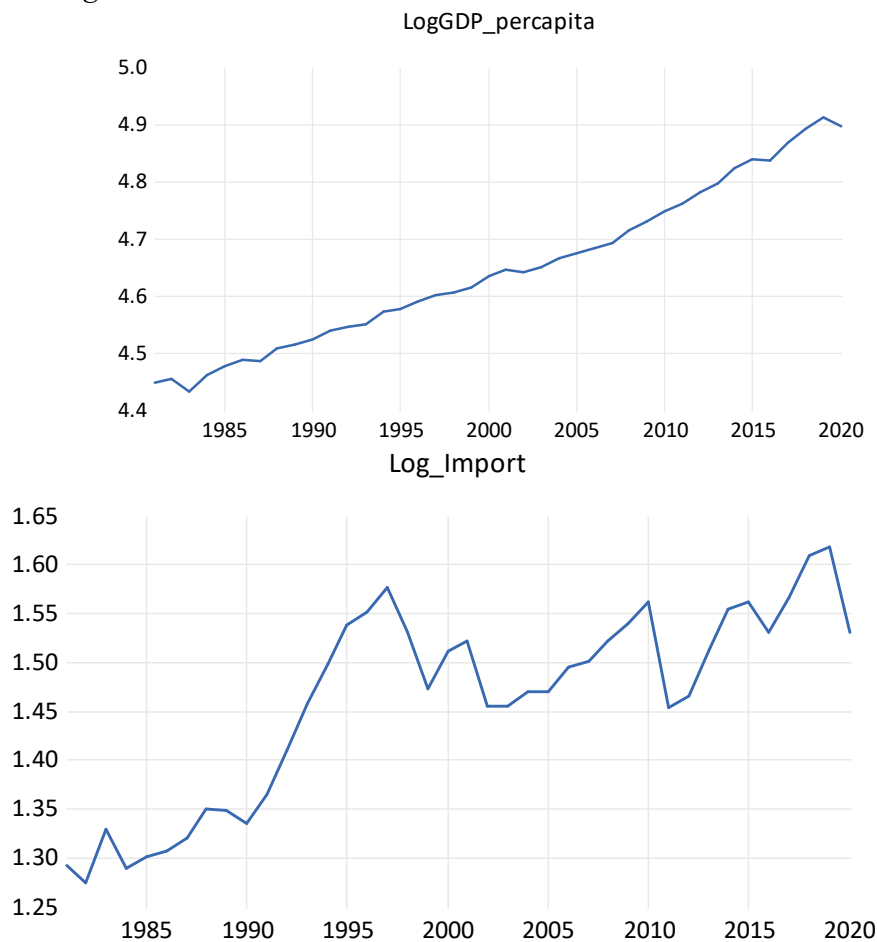
Except for imports, the distribution in Table 4.1 is skewed to the right (long right tail), as shown by the positive skewness values. Imports have a negatively skewed, or leftward skew. The probabilities values of Jarque-Bera are greater than 0.05 so all the variables are normally distributed. As the kurtosis values are less than three ( $K < 3$ ), then the distribution of all variables is platykurtic.

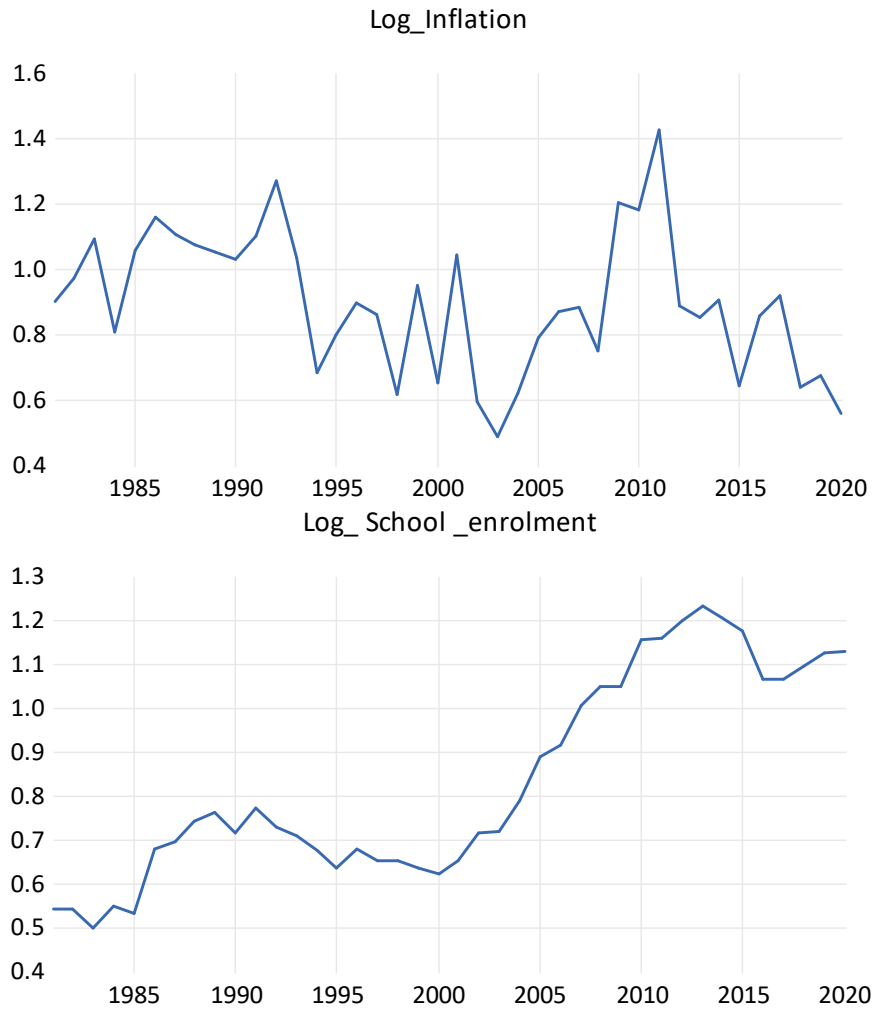
It is a way to check whether a variable in a time series maintains its initial value. The process for determining this is called a "unit root test.". When a time series does not change over time, we say it is stationary. It means that it has constant values. Regression often needs to be corrected when non-stationary variables are used, like in time series analysis. It means that unit root tests consider the possibility that the unit roots are linked to the first changes in the time series. These tests tell people if there is a mean that is not zero and a clear linear trend over time. The ADF test will be used to determine what happened in this situation. Dickey and Fuller (1979) developed this technique to test whether or not time series data had a unit root. The data should be transformed into a first difference to make them stationary at the subsequent level if they do not become fixed at the previous level. In the initial contrast, the researchers used a Unit Root Test, which produced the result depicted in **Figure 4.1**.

In this study, the Unit Root Test analysis determines if the variables under investigation are stable. Figure 4.1 shows the graph of the variables data at level, whether stationary or not.

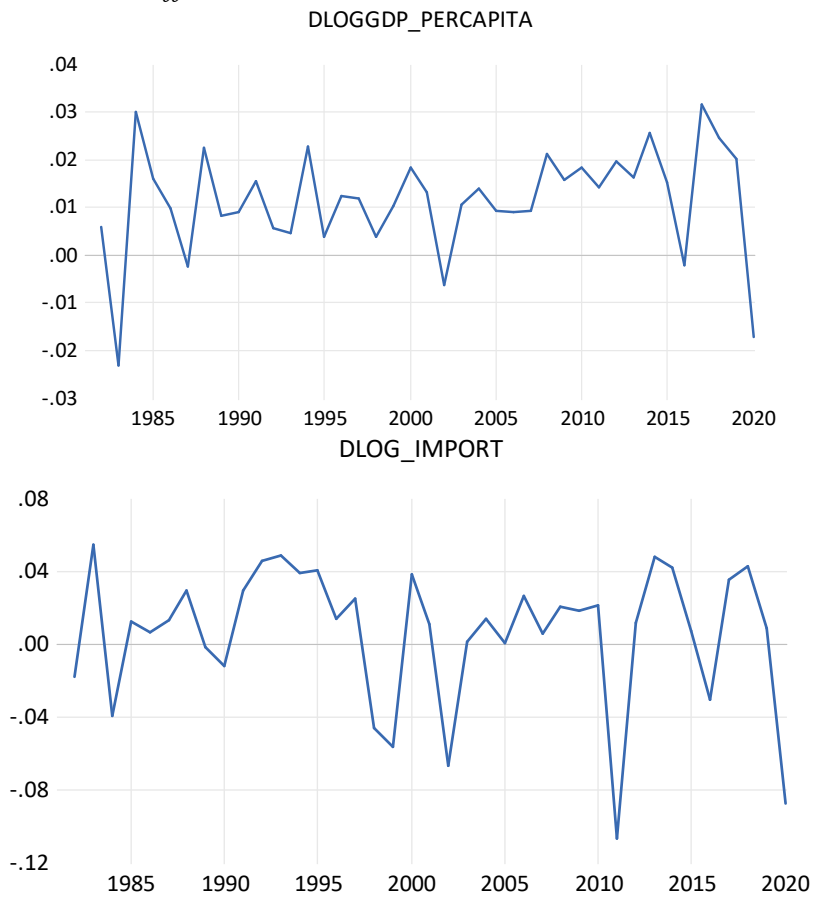
**Figure 4.1:**

*Unit Root Test Figure at Level Data*





**Figure 4.2:**  
*Unit Root Test Graph at First Difference Data*



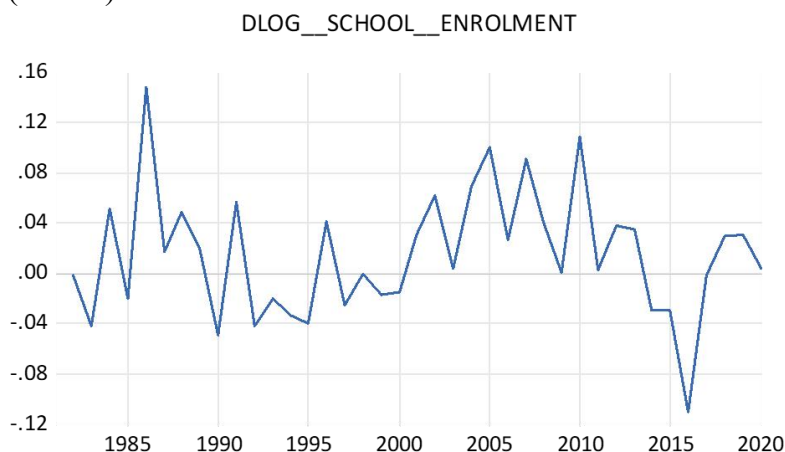


Figure 4.1 demonstrates that, except for Inflation, the variables are not stable at a constant value. Figure 4.2 shows that, at the first difference, GDP per capita, import, and student enrollment are stable. Consequently, it is impossible to classify the data.

**Table 4.1:**

*Unit Root Test at Level*

Null Hypothesis: LOG INFLATION has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	<b>-3.862984</b>	<b>0.0234</b>
Test critical values:		
1% level	-4.211868	
5% level	-3.529758	
10% level	-3.196411	

\*MacKinnon (1996) one-sided p-values.

**Table 4.2:**

*Unit Root Test Result at First Difference*

Null Hypothesis: D(LOG SCHOOL ENROLMENT) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	<b>-5.558052</b>	<b>0.0000</b>
Test critical values:		
1% level	-3.615588	
5% level	-2.941145	
10% level	-2.609066	

\*MacKinnon (1996) one-sided p-values.

**Bounds/Wald (F-Test) Test**

Pesaran et al. (2001) have developed the ARDL co-integration approach to analyse time series data. Using the bound test for co-integration is a novel consideration. The bound test shows how the variables will be linked in the long run. The Wald test makes all the lag variable's coefficients equal to zero. According to Devkota (2019), the Wald test's decision criteria are as follows: If F- statistics are more prominent than I(1), the critical values and co-integration exist. There is no co-integration if F-



statistics is less than the lower (1) critical value. If F-statistics are between the upper and lower critical levels, co-integration cannot be determined.

**Table 4.3:**

***Bounds/Wald (F-Test) Test Result***

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	10.86378	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	39	Finite Sample: n=40		
		10%	2.592	3.454
		5%	3.1	4.088
		1%	4.31	5.544
		Finite Sample: n=35		
		10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816

To choose more models, the researchers used the S.C. approach. Table 4.3 shows the results of the bound test. It took 10.86378 to figure out the value of F-statistics, and the upper bounds are 3.2, 3.67, 4.08, 4.66. F-value 10.86378 is higher than I (1) at each significance level. So, there is long-run co-integration between the dependent and explanatory variables.

**The ARDL Approach for Co-integration and Estimation**

The study used ARDL estimation to examine how the variables were linked in the short and long term. Initial findings are provided in the following table:

**Table 4.4:**

***Long Run Regression Estimation***

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_INFLATION	-0.082562	0.092077	-0.896664	0.3762
LOG_IMPORT	0.604626	0.262603	2.302428	0.0276
LOG_SCHOOL_ENROLMENT	0.49956	0.106772	4.678767	0
C	3.523411	0.386128	9.124974	0

The above table 4.4 shows that L.N. \_School \_Enrolment and Ln\_ Import, are significant at a per cent significance level. The remaining variables, such as L.N. \_ Inflation, is insignificant in the long run. This result shows the vital role of Imports and school enrolment in increasing the GDP per capita of Nepal in the long run. If Import increases by one per cent, it increases the GDP per capita by 6 per cent in the long run. Similarly, the school enrolment is grown by one unit the GDP per capita of Nepal is up by 0.49 units. According to the above result, Inflation is not significant in the long run in the case of Nepal.

**Table 4.5:**

*Short Run Result*

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.098792	0.012679	-7.79162	0
R-squared	0.201662	Mean dependent var		0.011466
Adjusted R-squared	0.201662	S.D. dependent var		0.01121
S.E. of regression	0.010016	Akaike info criterion		-6.343968
Sum squared resid	0.003812	Schwarz criterion		-6.301313
Log likelihood	124.7074	Hannan-Quinn criteria.		-6.328664
Durbin-Watson stat	2.163496			
* p-value incompatible with t-Bounds distribution.				
F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	10.86378	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

It is shown in Table 4.5 that at a 1 per cent significance level, the co-integration is significant with the proper negative sign. This negative sign and the statistical significance of the error correction coefficient (cont Eq-1) imply that the variables under examination are associated in the long run. The ECM (-1) coefficient of 0.098 indicates that the GDP per capita divergence from the long-run equilibrium level is corrected by 9 per cent the following year. Table 4.5 shows the real value adjusted R square of 0.201662 or 20 per cent, and R square is less than D-W (2.163496 for D-W), proving no autocorrelation exists.

**Table 4.6:**

Breusch-Godfrey Serial Correlation L.M. Test

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 1 lag

F-statistic	1.005382	Prob. F(1,33)	0.3233
Obs*R-squared	1.153050	Prob. Chi-Square(1)	0.2829

Because the F statistic is 1.005382 and the corresponding P-value is 0.3233, the observed R-squared value is 0.2829, more than 0.05. It indicates that the study rejects the null hypothesis of serial

correlation and concludes that there is no autocorrelation, as shown quite clearly in Table 4.6. Multi-collinearity is not discussed since there is no serial correlation.

**Table 4.7:**

Heteroscedasticity Test, Breusch-Pagan -Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

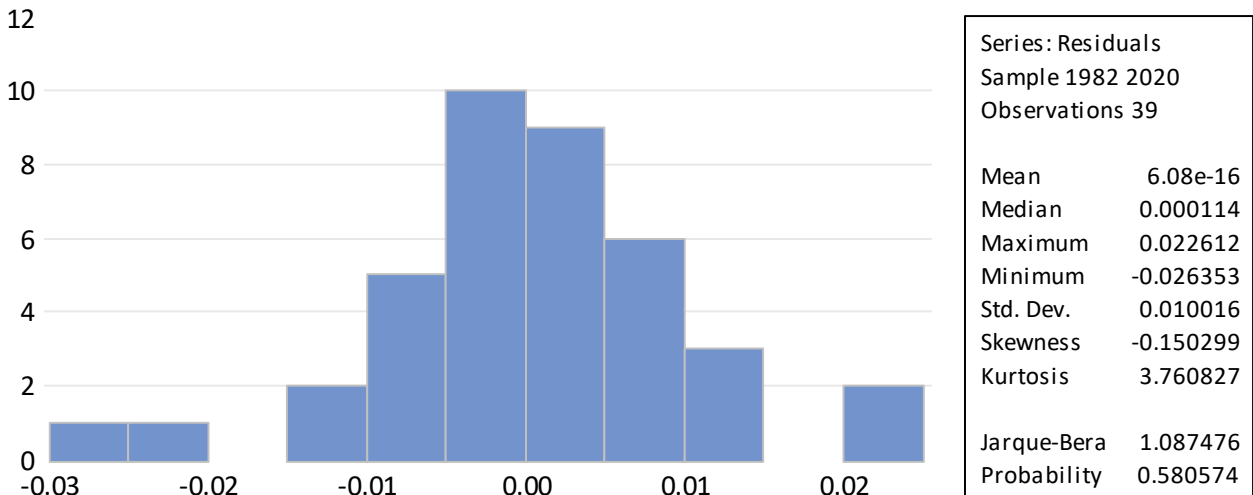
Null hypothesis: Homoskedasticity

F-statistic	0.616460	Prob. F(4,33)	0.6539
Obs*R-squared	2.642033	Prob. Chi-Square(4)	0.6194
Scaled explained SS	4.444349	Prob. Chi-Square(4)	0.3492

The corresponding P-value for the Breusch Pagan-Godfrey test is 0.61, which is more than 5 percent, indicating that the data disturbance factor in the model is homoscedastic.

**Figure 4.1:**

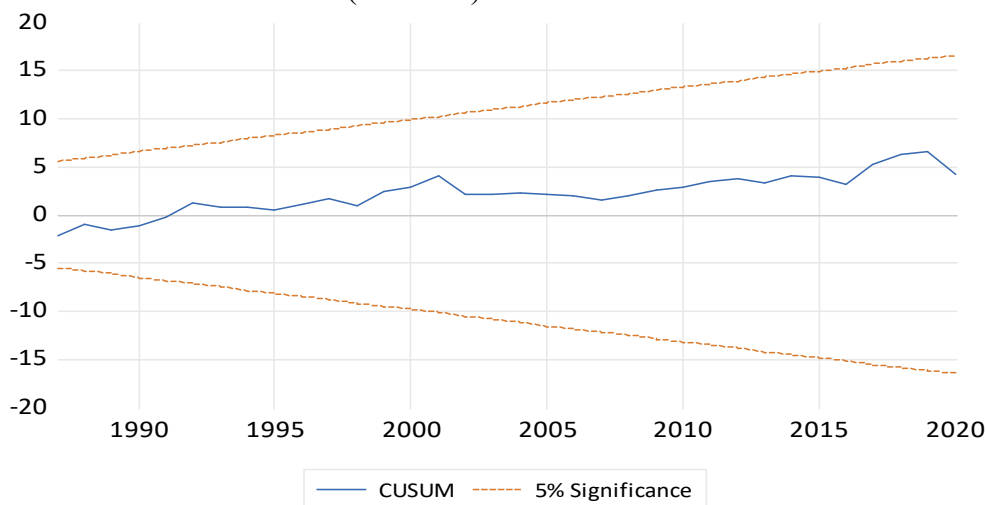
Normality Test



Above, we have a visual representation of the statistical findings from the Jarque-Bera test; the J-B value is 1.08, the P-value is 0.58 (or 58%), and the J-B value is 108%. The P-value is more than 0.05 so the result clearly shows that the residual values are normally distributed.

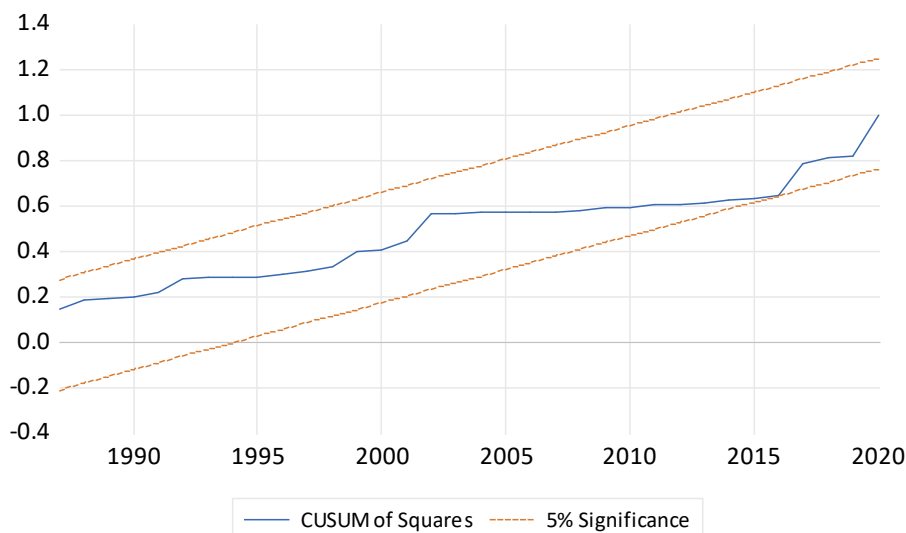
**Figure 4.2 :**

Cumulative Sum of Recursive Residuals (CUSUM)



**Figure 4.3 :**

cumulative sum of the square of residuals (CUSUMQ).



The CUSUM and CUSUM of SQUARE tests were used to examine the model's reliability. The null hypothesis of parameter stability cannot be rejected if the plot of CUSUM falls inside the 5% critical limit. Figures 4.2 and 4.3 indicate that the lines have a 5% significance level. The appropriate long-run and short-run coefficient line plots for the 1981-2020 study period demonstrate the consistency and dependability of our model. The researcher knows the model has respectable statistical and economic properties by passing these diagnostics.

## 6. Major Finding

The research evaluated the correlation between imports and price increases. Error Correction Model (ECM) for GDP per capita and the number of school students. The GDP per capita was the dependent variable, while all other factors were treated as controls. The long term inflation rate is insignificant, and the coefficient is also negative. Short-term investment is discouraged because of the underlying structural problem. The long-term impact of imports and student enrollment was considerable at 5%. The value of the import coefficient was 0.60. In other words, a 1% rise in imports results in a 60% rise in GDP per capita. The coefficient of school enrollment was also determined to be 0.49 in the long run. It states that an increase of only one percentage point in student enrollment is associated with a 49 per cent rise in GDP per capita.

The  $\text{ConiEq}(-1)$  value is negative and statistically significant at the 1% level, as determined by the Error Correction Model. This statement shows that the short-run model has been fitted and included in the long run.  $\text{ConiEq}(-1)$  equals 0.09. This annual 9 per cent adjustment brings the economy closer to the long-run balance. The serial correlation and heteroscedasticity tests have probability values greater than 0.05. The residual data is usually distributed, and the serial correlation and heteroscedasticity tests returned negative results. The CUSUM and CUSUM of SQUARE tests were used to examine the model's reliability. If the CUSUM plot is inside the 5% critical range, we cannot reject the null hypothesis of parameter stability, indicating that the model is robust and stable.

## 6. Conclusion

Import and educational enrolment affect GDP per capita over the long and short term. Hence these factors are interconnected. Therefore, there is a relationship between the variables. Except for Inflation, all of the variables in the data are stationary at the initial difference, making it clear that the data is of the mixed type. In such a situation, the ARDL model helps observe the interaction. The short- and long-run co-integration cannot be analysed using the Ordinary Least Squares (OLS) method. Short-term changes in imports and student enrolment have more significant effects on GDP per capita than Inflation does over the long term.

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## Antenatal Care Service Practice and Its Associated Factors Among Mothers in Nawarajpur Rural Municipality, Siraha

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### Abstract

**Introduction:** Antenatal care (ANC), which refers to the care given to a woman during her pregnancy, plays a crucial role in reproductive health care. ANC serves as a valuable platform for delivering effective health interventions that can significantly decrease avoidable maternal and newborn deaths. It's clear that receiving timely antenatal care provides an opportunity to prevent the primary causes of maternal fatalities and reduce fetal and neonatal deaths associated with obstetric complications.

**Objectives:** To find out the proportion of antenatal care service utilization and identify the associated factors of its' among mothers who gave live birth in the past year in Nawarajpur rural municipality, Siraha district.

**Methods:** A descriptive cross-sectional study was done among mother having under one child chosen within the geographical boundary of Nawarajpur rural municipality, Siraha district among the sample of 187.

**Major findings:** Among the 187 The respondents' average age was 22.14 years. More than one-fourth, or 27.3%, of the respondents had completed at least secondary school. Primary school, at 24.1%, and higher secondary school, at 5.9%, were the next most educated levels. More than four-fifth of the respondents i.e. 81.28% were house wife and most of them (95.2%) were Hindus. It was found that the level of education of the mother ( $p < 0.0001$ ), respondent's husbands education ( $p = 0.0001$ ), age during marriage ( $p = 0.018$ ) and age during first child ( $p = 0.02$ ) were most important contributing factors for ANC utilization.

**Conclusion:** The research discovered that 94.65% of the participants availed themselves of ANC services in their recent pregnancy. Notably, 55.93% of women had four or more ANC check-ups during their last pregnancy, a rate surpassing national data. The study identified the mother's level of education ( $p < 0.0001$ ), the husband's education ( $p = 0.0001$ ), the age at marriage ( $p = 0.018$ ), and the age at the birth of the first child ( $p = 0.02$ ) as the most significant contributing factors to ANC utilization.

**Keywords:** *Antenatal care, pregnancy, reproductive health, immunization, motherhood*

## 1. Introduction

### 1.1 Background

Antenatal care (ANC) is a crucial aspect of reproductive health care, encompassing the care provided to a woman during her pregnancy (Our et al., 2010). ANC plays a vital role in enhancing the survival and well-being of infants. It achieves this directly by reducing the occurrences of stillbirths and neonatal deaths. Moreover, ANC serves an indirect role by establishing a crucial entry point for health interactions with woman at a pivotal stage in the continuum of care.

In Nepal, only 45% of women receive ANC from medical professionals (Department of Health Services, 2073/74). ANC can help prepare women for delivery, detect and treat conditions that may pose risks, and provide vital services like immunization, HIV testing, and malaria prevention. WHO has recommended four pillars for safe motherhood, including ANC, which indirectly saves lives by establishing good health before childbirth (UNICEF, 2018). Utilization of ANC is influenced by socio-demographic factors, accessibility, knowledge, and the quality of care services provided. Factors such as distance, occupation, education, economic status, and cultural beliefs also affect ANC utilization (Paudel et al., n.d.). This

study aims to assess the patterns and determinants of ANC utilization among married women of reproductive age in Siraha, Nepal.

On a global scale, 86 percent of pregnant women seek antenatal care with a skilled health professional at least once. However, the number drops significantly, with only three in five (62 percent) receiving a minimum of four antenatal visits. In regions grappling with elevated rates of maternal mortality, such as sub-Saharan Africa and South Asia, an even smaller percentage of women receive at least four antenatal visits, with rates standing at 52 percent and 46 percent, respectively (UNICEF, 2018).

The annual report of Nepal by the Department of Health Services, 2073/74 indicates that only 45% of women in Nepal receive antenatal care from a medical professional, either from doctors nurses or midwives (Department of Health Services, 2073/74). According to the NDHS 2016, the infant mortality rate (IMR) was 32 deaths per 1,000 live births, and under-five mortality was 39 deaths per 1,000 births, meaning that one in every 39 children born in Nepal during this time died before turning five (Ministry of Health and Population, 2016).

The summary highlights the low utilization of antenatal care (ANC) services by pregnant women aged 15-49 in Nepal. In the year 2073/74, only 45% of pregnant women received all four recommended ANC visits, and 84% of them received ANC from skilled providers like doctors, nurses, or auxiliary nurse midwives for their most recent birth. Doctors were the primary service providers (43%), closely followed by nurses or auxiliary nurse midwives (41%). The low utilization of ANC services in Nepal is a concerning public health issue as it can lead to unsafe, premature, and problematic deliveries. In Siraha district, specifically, the utilization of ANC services is only about 39%, making it essential to investigate the underlying factors contributing to this low uptake.

## 1.2 Objectives

### General objective:

i) To determine the percentage of antenatal care service utilization and pinpoint the factors that impact the utilization of these services among mothers who have given live birth in the last year in Nawarajpur rural municipality, Siraha district of Nepal.

### Specific objectives:

- i) To identify the socio-demographic characteristics of mother who gave live birth in the past one year.
- ii) To evaluate the extent of antenatal care service utilization.
- iii) To identify the factors that influence the utilization of these services.

## 2. Literature Review

Yadufashije et al. (2017) conducted a study to evaluate the barriers to antenatal care seeking in African women. This study utilize systematic review of six articles in terms of the results and the relevance of recommendation made, thereafter further recommendations were made by the reviewers. This study showed that lack of knowledge to ANC, beliefs, poverty and accessibility to ANC services in African societies are their main barrier of ANC.

Marius et al. (2015) conducted a study to identify the factors associated with the low utilization of antenatal care services during the first trimester of pregnancy in a rural setting in southern Benin, specifically in the Athieme municipality. The research, carried out from April 14 to July 14, 2014, involved 301 pregnant women, 29 husbands, and 21 health workers. It found that low education level of pregnant women, OR= 3.3 [95%CI= (1.534:7.071)]; misunderstanding or having incorrect information about when it's best to start attending antenatal care services during pregnancy, OR=5.131 [95%CI= (1.972:13.353)]; adequate knowledge of the benefits of the antenatal care service, OR=4.031 [95%CI= (1.401:11.594)]; participation in the behavior change communication sessions, OR=0.059 [95%CI=



(0.028:0.125)]; adequate patient-welcome in antenatal care services, OR= 0.162 [95%CI= (0.051:0.513)] (Edgard-Marius et al., 2015).

Nisar et al. (2016) conducted a study to explore the factors that either support or hinder the use of antenatal care services in rural and urban areas of two selected districts in Pakistan. This qualitative investigation involved in-depth interviews with 20 participants, including pregnant women, lady health workers, and doctors providing antenatal care. Additionally, focus group discussions were held with women who had a child aged 5 years or younger. The research took place in a rural community in the district of Swabi and a tertiary care hospital in urban Islamabad, Pakistan. The study identified common obstacles to seeking antenatal care services at health facilities. These barriers included financial constraints, the belief that there were no significant health issues during pregnancy, difficulties in reaching the health facility, restrictions imposed by husbands or mothers-in-law, being occupied with household chores, lack of prior experience with antenatal care visits, and the perception of healthcare providers or services being unavailable.

Taylor et al. (2017) conducted a study aiming to uncover barriers to antenatal care uptake among women in Malawi. The verbatim transcripts of interviews with 28 participants were analyzed to identify themes, and posters in health facilities were also examined. The findings revealed that attitudes toward pregnancy, inefficiencies in hospitals, promotion of antenatal care at health facilities and within communities, and the involvement of spouses or significant others all played a role in causing delayed attendance for antenatal care among urban Malawian women.

Paudel et al. (2016) conducted a study to determine the prevalence and factors associated with the regular use of antenatal care (ANC) services among mothers with children under one year of age in rural communities in Nepal. This cross-sectional study was carried out in Banke District, Nepal, involving a sample of 364 pregnant women who had delivered within the last 12 months. Face-to-face interviews were conducted using a semi-structured questionnaire. The study found that the number of ANC visits increased with decreased distance from a health center (AOR=2.197, 95% CI=1.165-4.144), reduced traveling costs (AOR=2.573, 95% CI=1.062 –4.484), decreased waiting time for service (AOR=2.940, 95% CI =1.445-5.981), improved quality of ANC services (AOR =2.099, 95% CI=1.247-3.536), and increased satisfaction with the service (AOR =1.942 , 95% CI =1.212-3.110). Additionally, an increased positive perception about ANC also correlated with a higher number of ANC visits.

Acharya (2018) conducted a study to identify the demographic and socio-economic factors affecting antenatal care services utilization in Nepal. The study utilizes secondary data analysis from the National Demographic Health Survey 2011. A total 4079 currently married women aged 15-49 who had given birth within 5 years preceding the survey date. The findings of the study indicate that a significant proportion (63.5%) of respondents belonging to relatively advantaged caste groups (Brahmin, Chhetri, Gurung, Thakali, and others) have 4 or more antenatal care (ANC) visits. Additionally, more than half of Hindu women (51.9%) achieved this level of ANC attendance, while only about 41 percent of women from other religious groups did the same. Furthermore, a higher percentage of women (71.7%) with secondary education attended at least 4 ANC visits. Among occupational categories, women engaged in manual labor (57.7%) and those who were not working (56.7%) utilized ANC services 4 or more times. In terms of specific occupations, 42.1% of women in agriculture had 4 or more ANC visits. Notably, 65.1% of women whose husbands are employed in service/trade had attended at least 4 ANC visits.

Khanal et al. (2015) carried out research to explore how common it is and what factors are linked to the insufficient use of antenatal care (ANC) services in Timor-Leste. The Timor-Leste Demographic and Health Survey (TDHS) 2009–2010 was a comprehensive study, nationally representative and multi-stage, that involved 11,463 households and 9,828 childbirths. Data on the last-born child were documented for 5,895 mother-child pairs. The study employed hierarchical logistic regression analysis to understand the factors influencing the under-utilization of ANC services. Significant factors positively associated with the under-utilization of ANC were low wealth status, no maternal education or primary maternal

education, no paternal education, and having a big problem with permission to visit health facilities (Khanal et al., 2015).

Muhwava et al. (2016) conducted a study to compare and contrast the utilization of the ANC and PNC service with demographic characteristics of women in Nepal, based on the Nepal Demographic Health Survey 2001 and 2006. The study involved analyzing data from cross-sectional household surveys conducted on 363 women in rural Western Cape and 466 women in urban Gauteng provinces of South Africa. The focus was on assessing the risk of alcohol-exposed pregnancies in these regions. Psychosocial factors associated with early ANC initiation in the urban site were employed and wanted pregnancy. For the rural site, early ANC initiation was significantly associated with being married but inversely associated with high religiosity. Adequate frequency of ANC attendance in the rural site was associated with wanted pregnancy and the father of the child being present in the respondent's life but inversely associated with having a previous miscarriage.

### **3. Methodology**

#### **3.1 Study Design**

Cross-sectional analytical study design was used for the study. This design provided a useful, time and cost efficient method for collecting information regarding the utilization of ANC among rural women mother having under one children were chosen within the geographical boundary of Nawarajpur rural municipality, Siraha district- Nepal.

#### **3.2 Sources of information**

Primary data and secondary data were used for the study. As primary data was taken from the filed survey from the respondents and the secondary data was extracted from published and unpublished articles, related thesis and books.

#### **3.3 Study area**

The study was conducted in Nawarajpur rural municipality, Siraha district, Eastern Nepal. This rural municipality consists of five wards.

#### **3.4 Study Population**

The study was conducted in mother having under one children within the geographical boundary of Nawarajpur rural municipality, Siraha district, Nepal. There were 447 new born cases.

#### **3.6 Sampling technique**

The name list of 447 mother who have gave live birth in past one year was collected from the office of vital registration and after that among them 187 mother were selected randomly from whole mother population by writing their name in paper and keeping it in box and then at last 187 name were withdrawn.

#### **3.7 Data Collection**

Semi structured face to face interview schedule were used to collect the data after informed consent to the mother having under one year children.

#### **3.8 Data management and analysis**

The obtained data was entered and analyzed by using SPSS version 16.0 and MS-Excel 2010. Data was analyzed using descriptive statistics such as frequency, percentage and inferential statistics such as chi-square test according to nature of data. The result was presented in tabular and narrative forms as per its necessity. Significant level was made in the p value <0.05 at 95% CI.

**3.9 Criteria for sample selection****Inclusion criteria**

- Mothers who gave live birth in the past one year in Nabarajpur rural municipality.
- Respondents who were willing to participate in the study.

**Exclusion criteria**

- Mothers who are not willing to participate in my study
- Patients who had hearing, speech or cognitive deficits that would impair understanding of the questions won't be included.

**4. Results and Discussion****4.1 Socio-Demographic characteristics of respondent**

In all, 187 participants (mean age  $\pm$  SD: 22.14  $\pm$  3.19 years) took part in the research. Ages 21 to 25 made up about 58.3% of the respondents, while 16 to 20 made up 29.9%. More than one-fourth (27.3%) of the respondents having completed at least secondary school, with primary (24.1%) and higher secondary school (5.9%) coming next. Just 0.5% of the respondents had a college degree. Nearly 81.28% of the respondents were housewives, and the majority of them (95.2%) identified as Hindu, with 4.8% identifying as Muslim. A significant proportion of participants (57.75%) were from nuclear families and had an average monthly income of 14625 Rupees. The spouses of nearly half (46%) of the respondents had only completed secondary school. The husbands of respondents made up about 38.5% of the total. (Table1).

**Table 1: Socio-Demographic characteristics of respondent (n=187)**

SN	Variable	Frequency	Percent
1	Age of respondent, (n= 187), Mean= 22.14, SD= 3.19		
	16-20	56	29.95
	21-25	109	58.29
	26-30	20	10.70
	31-35	1	0.53
	36-40	1	0.53
2	Education Status of respondent, n=187		
	Illiterate	69	36.90
	Literate	10	5.35
	Primary Level	45	24.07
	Secondary Level	51	27.27
	Higher Secondary level	11	5.88
	<b>University Degree</b>	<b>1</b>	<b>0.53</b>
3	Occupation of respondent (n=187)		
	Housewife	152	81.28
	Agriculture	24	12.83
	Government Service	1	0.53
	Private Service	5	2.68
	Business	4	2.14
	Others	1	0.54
4	Marital Status, n=187		
	Married	186	99.47
	Widow	1	0.53
5	Respondent's Husband's Education, n=187		

	Illiterate	26	13.90
	Literate	161	86.10
<b>6</b>	Respondent's Husband's Occupation, n=187		
	Agriculture	72	38.50
	Government Service	3	1.60
	Private Service	8	4.28
	Business	26	13.90
	Labour	63	33.70
	Other	15	8.02
<b>7</b>	Monthly Income, n=187, mean= 14625.79		
	<10000	63	33.69
	10000-20000	79	42.24
	20001-30000	34	18.19
	30001-40000	11	5.88
<b>8</b>	Type of family, n=187		
	Nuclear	108	57.75
	Joint	77	41.18
	Extended	2	1.07

#### 4.2 Obstetric history of the study respondents

More than half of the people surveyed (56.7%) got married between the ages of 15 and 19, with 46.7% marrying below the age of 15. Approximately three-quarters of the total respondents, or 76.47%, experienced pregnancy between the ages of 17 and 21, while 13.90% became pregnant before the age of 17. Concerning parity, 39.04% were on their second child, followed by 38.50% on their first, 18.72% on their third, and 3.74% on their fourth or more. Nearly one in twelve respondents encountered the challenge of abortion during previous pregnancies. Additionally, 5.35% of mothers experienced stillbirth, and 4.28% lost a baby during the neonatal period.

**Table 2: Obstetric history of the respondents**

SN	Variable	Frequency	Percent
<b>1</b>	Age during Marriage, n=187, Mean=17, SD=2		
	<15	62	33.2
	15-19	106	56.7
	>19	19	10.1
<b>2</b>	Age during first child, n=187, Mean=19, SD=2		
	<17	26	13.90
	17-21	143	76.47
	<21	18	9.53
<b>3</b>	No. of children, n=187		
	1	72	38.50
	2	73	39.03
	3	35	18.71
	4	6	3.20
	5	1	0.53
<b>4</b>	History of abortion, n=187		
	Yes	16	8.56
	No	171	91.44
<b>5</b>	History of Still birth, n=187		
	Yes	10	5.35
	No	177	94.65

6 History of neonatal death, n=187		
Yes	8	4.28
No	179	95.72

### 4.3 Place of ANC visit

Most of the respondents heard about the ANC service utilization from their relatives that is about 91.1 percent after that they heard during the visit of health institution and very few of them heard through social media.

**Table 3: Place of ANC visit**

Place of heard ANC	Frequency	Case Percent	Valid percent
Relatives and friends	163	91.1	56.2
During a visit to health institution	109	60.9	37.6
Through the media (TV, Radio, Social media)	18	10.1	6.2
<b>Total</b>	<b>290</b>	<b>162.1</b>	<b>100</b>

### 4.4 No. of ANC visit

More than half of the respondents i.e 59.67% of the respondents have gone to ANC visit according to protocol i.e 4 times or more than that, 22.66% have done 3 times visit of ANC, 13.26% have done two times visit and remaining 4.41% have done only one time ANC visit.

**Table 4: No. of ANC visit**

No. of ANC visit	Frequency	Percent
One time	8	4.41
Two times	24	13.26
Three times	41	22.66
Four times	60	33.14
More than four times	44	24.32
Don't know	4	2.21
<b>Total</b>	<b>181</b>	<b>100</b>

### 4.5 Time of ANC visit

About half of the respondent (49.73%) said that they should go for ANC visit in their second trimester 43.65% of the respondents said in first semester, 4.972 said in third semester and remaining 1.66 % didn't know when to go for ANC visit.

**Table 5: Time of ANC visit**

Trimester of Visit	Frequency	Percent
First trimester	79	43.65
Second trimester	90	49.73
Third trimester	9	4.972
Don't Know	3	1.66

**Total**

**181**

**100**

#### 4.6 ANC service utilization pattern

Most of the respondents i.e. 94.7% were registered for any of the antenatal health care service utilization during their last pregnancy. The main health services utilized during these visits included Tetanus toxoid immunization, as well as the consumption of iron and folic acid tablets. Of the women surveyed, 55.93% had made  $\geq 4$  visits to health institutions, while 44.07% had visited 1-3 times. In terms of timing, 44.1% of respondents attended during their first trimester, 51.4% during the second, and 4.5% during the third trimester. When it came to the choice of health care facility, 35.5% visited private clinics for ANC services, 31.2% went to primary health care centers, 21.7% to health posts, and the remaining 13.6% at private and government hospitals. A large majority, specifically 83.32%, utilized laboratory investigation services for routine examinations during their pregnancy. However, only 69.61% of participants consumed calcium and vitamin supplements during their last pregnancy.

**Table 6: ANC service utilization pattern**

SN	Variable	Frequency	Percent
1	ANC Check up , n=187		
	No	78	<b>44.08</b>
	Yes	99	<b>55.92</b>
2	IFA tablet use, n=181		
	Yes	172	<b>95.03</b>
	No	9	<b>4.97</b>
3	TT Use, n=181		
	Yes	174	<b>96.13</b>
	No	7	<b>3.87</b>
4	No. of TT, n=181		
	1	98	<b>56.32</b>
	2	72	<b>41.37</b>
	3	4	<b>2.31</b>
5	Calcium and vitamin use, n=181		
	Yes	126	<b>69.61</b>
	No	55	<b>30.39</b>
6	Laboratory Test , n=181		
	Yes	149	<b>82.32</b>
	No	32	<b>17.68</b>

#### 4.7 Proportion of ANC visit

More than half of the respondent (55.93%) have done four ANC according to protocol and 94.65% of the respondents have done at least one antenatal care visit which is the lower data than the national data which showed that 76% of four ANC according to protocol and. This data is presented in table and graph also.

**Table 7: Proportion of ANC visit**

No. of ANC	Frequency	Percent
<4	78	<b>44.07</b>
$\geq 4$	99	<b>55.93</b>
<b>Total</b>	<b>177</b>	<b>100</b>

#### 4.8 Accessibility of the ANC service

Table-8 showed that 71.82% used their foot as mode of transportation to visit the health institution, where as 5.53% of the respondent use bus as the mode of transportation to visit health institution and remaining 22.65% used other modes of vehicle such as bike, tempos etc. About three fourth (75.69%) of the respondents said that it took less than 30 minute to reach the health institution, where as 20.99% of respondent said that it took about 30 minute to reach the health institution and remaining (3.32%) said that it took more than 30 minute to reach health institution. About 72.38% of the respondents said that they paid for ANC check-up and remaining didn't pay for ANC check-up.

**Table 8: Accessibility of the ANC service**

SN	Variable	Frequency	Percent
1	Time to reach Health Institution, n=181		
	<30	137	75.69
	30	38	20.99
	>30	6	3.32
2	Mode of Transportation, n=181		
	Walking	130	71.83
	Bus	10	5.52
	Others	41	22.65
3	Pay for ANC , n=181		
	Yes	131	72.38
	No	50	27.62
4	How much , n=131		
	<1000	108	82.44
	1000-2000	14	10.69
	2001-3000	6	4.58
	>3000	3	2.29

#### 4.9 Factors associated with the ANC service use

The utilization of ANC services is influenced by various factors, encompassing socio-demographic characteristics, the mother's obstetric history, and the accessibility of health facilities, among other considerations. Education status of respondents, education of the husband, parity, age during marriage, age during first child and knowledge of mother on ANC were found to be significant contributors ( $p < 0.05$ ) of ANC service. (Table: 9).

The various factors related to the antenatal care service such as age of respondent, education status of the respondent, education level of the respondents, religion, occupation of the respondent, respondent's husband's education level, respondent's husband's education status, respondent's husband's occupation, parity, monthly income, age during marriage, age during first child, history of abortion, still birth and neonatal death. It was also confirmed that the level of education of the mother ( $p = < 0.0001$ ), respondent's husband's education ( $p = 0.0001$ ), age during marriage ( $p = 0.018$ ) and age during first child ( $p = 0.02$ ) were most important contributing factors for ANC utilization.

**Table 9: Factors associated with the ANC service use**

SN	Variables	Use of ANC		Chi-square value	P value
		Yes	%		

<b>1</b>	Age, Median age= 22, SD=3.19				
	<19 (38)	21	55.26		
	19-26 (133)	69	51.88		
	>26 (16)	9	56.25	0.213	<b>0.899</b>
<b>2</b>	Education status of respondent				
	Illiterate(69)	22	31.9		
	Literate(118)	77	65.3	19.461	<b>&lt;0.0001*</b>
	Education level				
	Illiterate (69)	22	31.88		
	Primary Level (55)	34	61.81		
	Secondary Level (51)	34	66.67	20.494	<b>&lt;0.0001*</b>
	Higher Secondary level (11)	8	72.72		
	University Degree (1)	1	100		
<b>3</b>	Occupation of respondent				
	Housewife (152)	80	52.63		
	Agriculture (24)	10	41.7		
	Government Service(1)	1	100		
	Private Service (5)	4	80	5.259	<b>0.385</b>
	Business (4)	3	75		
	Other (1)	1	100		
<b>4</b>	Type of family				
	Nuclear (108)	56	56.56		
	Joint (77)	41	41.41		
	Extended (2)	2	2.03	1.832	<b>0.400</b>
<b>5</b>	Husband's Education status				
	Illiterate(26)	3	11.5		
	Literate(161)	96	59.6	20.778	<b>&lt;0.0001*</b>
	Husband's Education level				
	Illiterate (26)	3	11.5		
	Primary Level (46)	24	61.8		
	Secondary Level (86)	50	58.1		
	Higher Secondary level (22)	15	68.2	28.023	<b>&lt;0.0001*</b>
	University Degree (7)	7	100		
<b>6</b>	Monthly income, mean= 14625				
	<10000(63)	27	42.9		
	10000-20000(79)	44	55.7		
	20001-30000(34)	21	61.8		
	30001-40000(11)	7	63.6	4.380	<b>0.223</b>
<b>7</b>	Husband's Occupation				
	Agriculture(72)	38	52.78		
	Government Service(3)	2	66.7		
	Private Service(8)	7	87.5	7.741	<b>0.171</b>
	Business(26)	17	65.4		
	Labour(63)	28	44.4		
	Other(15)	7	46.7		
<b>8</b>	Parity				
	<2(145)	74	51		
	2-3(35)	20	57.1	1.420	<b>0.492</b>



	>3(7)	5	71.4		
9	Age during marriage Median=17, SD= 2				
	Below 15(27)	10	37		
	15-19(127)	65	51.2		
	More than 19(33)	24	72.7	8.085	<b>0.018*</b>
10	Age during first child, Median= 18, SD= 2				
	<16 (26)	9	35.6		
	16 -19 (107)	54	50.5		
	>19 (54)	36	66.7	7.751	<b>0.02*</b>
11	History of abortion				
	Yes (16)	8	50		
	No (171)	91	53.21	0.061	<b>0.805</b>
12	History of stillbirth				
	Yes(10)	6	60		
	No(177)	93	52.54	0.211	<b>0.646</b>
13	History of Neonatal death				
	Yes(8)	3	37.5		
	No(179)	96	53.63	0.800	<b>0.371</b>
14	Time to reach health institution				
	<30 minute(137)	75	54.74		
	30 minute(38)	20	52.63		
	≥30 minute(6)	4	66.67	0.412	0.814

#### 4.10 Discussion

The study revealed that 94.65% of respondents made use of antenatal care (ANC) services in their recent pregnancy. Furthermore, it was observed that 55.93% of women underwent four or more ANC check-ups during their last pregnancy, surpassing the national data. This result is lower than the study in three VDC from Bardiya, Salyan and Pyuthan which found that about 60% have done  $\geq 4$  ANC visit during their last pregnancy (Gyawali et al., 2013). However, annual report 2073/74 also showed lower proportion of women from eastern development region to have received ANC in comparison to women from other four development region (Department of Health Services, 2073/74). Women whose husband worked in private sector had a higher level of ANC utilization compared to women whose husband worked in government service, agriculture, business, labour and others.

This study was conducted to identify to assess the proportion of antenatal care services utilization and identify the factors influencing antenatal care services utilization among mothers who gave live birth in the past one year. According to this study there are various factors affecting the utilization of the antenatal care these factors includes: education status of the respondents, education level of the respondents, education status of the respondent's husbands, education level of the respondent's husbands, age during marriage, the age during first child use of the IFA tablet, calcium tablet and laboratory test. These findings hold significance for researchers as they provide valuable insights for the development of intervention packages aimed at enhancing the coverage of antenatal care (ANC) services in low- and middle-income countries, such as Nepal.

The findings of this study are consistent with other studies carried out to investigate factors associated with ANC services utilization. The similar study was done in southern Benin which found that education

level of pregnant women as the one of the major factor associated with low utilization of the ANC service (Edgard-Marius et al., 2015). The another study which was conducted in Timor-Leste showed that maternal education as the one of the major factor of utilization of the ANC service (Khanal et al., 2015). The another study done in developing country showed that husband's education is also a significant factor associated with utilization of ANC services (Deo et al., 2015).

The mean age of the respondents were 22.14 years and about 63% of the respondents were literate. Most of the respondents were housewives where as their husbands were involved in agriculture about 39% and about 34% were labor. About 58% respondents live in nuclear family and 41% live in joint family. The similar study which was done in India the mean age was 24.14 and about and about 94% were literate. About 90% of the respondents were house wives where as their husbands were mostly involved in business ( about 46%). About 70% of the respondents lived in joint family in that study area (Paudel et al., 2013). In another study which was conducted by using NDHS data the mean age of respondents were 26 years where as about 77% of the respondents were literate. Most of the respondents (74.3%) are engaged in agriculture and most of the husbands are engaged in agriculture (40%) followed by service (31.2%), and then by labor (25.5%) (Khanal et al., 2015). in another occupation it showed that husband occupation also as the one of the most important factors related to the antenatal care visit ( Paudel et al., 2016) . From the study, the average monthly income of the respondents were Rs. 14625.

The mean ages of respondents' marriage were 17 years and the mean age during first child was 19 years. About 50% of the respondents married in 20-24 years of age group. The age during first child mostly 20-24 years (69%) (Paudel et al., 2013) .

It was confirmed that the level of education of the mother ( $p < 0.0001$ ), respondent's husbands education ( $p < 0.0001$ ), age during marriage ( $p = 0.018$ ), age during first child ( $p = 0.02$ ), use of IFA tablet during pregnancy ( $p = 0.045$ ), use of calcium tablet during pregnancy ( $p = 0.003$ ) and laboratory test during pregnancy ( $p = 0.001$ ) were most important contributing factors for ANC utilization in my study but in other study they showed that low wealth status, no maternal education or primary maternal education, no paternal education, and having a big problem in permission to visit health facility (Khanal et al., 2015) and in another study distance from a health center, decreased travelling cost, decreased waiting time for service, increased quality of ANC services and increased satisfaction of service. Increased positive perception about ANC also increased the number of ANC visits ( Paudel et al., 2016). In the rural setting, the frequency of antenatal care (ANC) attendance was positively associated with pregnancies that were desired and the active involvement of the child's father in the respondent's life. Conversely, there was an inverse association between ANC attendance and a history of previous miscarriages (Muhwava et al., 2016). The study found that education, family income, knowledge about antenatal care (ANC), distance from the residence to the health facility, and transportation cost were all significant contributors ( $p < 0.05$ ) to the utilization of ANC services (Paudel et al., 2013).

## 5. Conclusion

This study utilizes the cross-sectional study design which mean study at a point of study among 187 mothers who were selected by random sampling technique. The study showed that the mean age of the respondent were 22.14 years.

Approximately 58.3% of the respondents fell within the age range of 21-25 years, while 29.9% were between 16 and 20 years old. In terms of education, 27.3% of the participants had attained at least a secondary level of education, followed by 24.1% with a primary level and 5.9% with a higher secondary school level. Only a small fraction (0.5%) held a university degree. The majority of respondents, comprising 81.28%, identified as housewives, with the predominant religious affiliation being Hinduism (95.2%), followed by 4.8% who were Muslim. A significant proportion (57.75%) of the respondents belonged to nuclear families, with an average economic status ranging from 10,000 to 20,000 Rs/month. Concerning their husbands, 46% had achieved a secondary level of education, and 38.5% were employed as farmers. The proportion of the four antenatal care service utilization is found to be 55.93% which is higher than the national data (45%) and at least one visit was found to be 94.65% which was also higher than the national data (76%). From the study it is found that the level of education of the mother

( $p < 0.0001$ ), respondent's husbands education level ( $p < 0.0001$ ), age during marriage ( $p = 0.018$ ) and age during first child ( $p = 0.02$ ) were most important contributing factors for ANC utilization.

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## **Impact of Leadership Style on Organizational Commitment: A Case of Higher Education Institution**

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### **Abstract**

The study aims to explore the leadership styles (Transformational or Transactional) practices and to examine relationship between leadership styles and organization commitment in Nepalese higher education. The study used sample size of 51 campus chief, head of department and asst. campus chief to achieve the results. Independent sample T test, ANNOVA, Correlations and regression were used as research methods. To test hypothesis, correlations was used. For support regression was also analyzed. The major findings show transactional leadership practices more than transformational leadership in Nepalese higher education institutions. Study found that there was a positive relationship between leadership styles and organization commitment. This study was pioneer research in the field of higher education at campus level of Nepal by taking sample of head of department and campus chief.

**Key words:** Leadership Styles, Transformation and Transactional, Organization Commitment, Affective, Continuance, Normative, Higher Education Institutions, Leadership Practices

### **1. Introduction**

Higher education is provided by Nepalese educational leaders in a significant way. Their leadership style has a significant influence on the department's and campus's overall academic environment, as well as organizational dedication. The system and practices used on campus, including the many teaching and learning models, determine the overall quality of education, output, and outcome. The leadership styles of those in positions of authority determine whether or not the climate is conducive to quality education. In a similar vein, the leaders' approaches determine how well educational goals are accomplished. There is a link between leadership style and organization commitment since organization commitment is impacted by it as well.

Effective leaders can build and explain a vision and have an internal locus of control, honesty, enthusiasm, dedication, integrity, and a drive for continual development (Buhler, 1995). A charismatic leader who gives the organization's vision, mission, strategy, and objective is a transformational leader. A significant distinction was made by Burns (1978) between leaders who were focused on exchange and those who were focused on transformation; the latter group was known as Transformational Leaders. Transformational leadership has been proposed as the best approach to change management due to its idealistic impact, intellectual stimulation, inspiration, and customized consideration components. They serve as an example for followers, helping them to visualize the crucial goal and objective. Additionally, by delegating authority and power and keeping an eye on how it is used, they enable their followers to go above and beyond expectations (Hartog et al., 1997; Rosenbach, 2003).

Similar to this, transactional leaders prioritize an equal trade or transaction between themselves and their followers by concentrating on their shared self-interests (Rosenbach, 2003). They usually don't make any significant attempts to implement drastic changes, instead keeping the firm operating on a steady keel. According to Gibson et al. (2003), the transactional leader assists the follower in determining the necessary actions to achieve the intended outcomes, such as increased sales or services, lower production costs, and higher-quality output. As a result, human and organizational leadership is essential to organizational commitment. Recent leadership studies have examined the relationship between organizational commitment and leadership styles. According to Aydin et al. (2011), organizational

commitment also includes a strong desire to stay a part of the organization, identification with its goals and accomplishments, employee loyalty, and a readiness to put in a lot of work on its behalf. Affective, normative, and continuity commitments are the three dimensions that make up the multifaceted concept of organizational commitment. In higher education institutions, the impact of leadership on organizational commitment was investigated in this study.

We contend that the current system of leadership education has significant shortcomings while talking about educational leaders in the contemporary context. Instead of emphasizing a practical and comprehensive approach, the present leadership program places greater emphasis on academic and conceptual training (Nirenberg, 2003). In their efforts to train and develop leaders for the twenty-first century, academia and the business sector face a great challenge as a result of this study. We contend that a successful paradigm for leadership education should be interdisciplinary, have a global perspective, and include extensive ethical instruction.

## **2. Literature Review**

Fundamentally, human talent is the art of leadership. It has an impact on how people behave in the workplace. It serves as a set of rules and an example for employees on how to perform their jobs well in the workplace. According to Goethalsetal (2004), the field has evolved into a true multidisciplinary one, making contributions to the fields of political science, psychology, education, public administration, business, military, and international relations.

The great man theory, trait theory, behavior theory, contingency theory, influence theory, and relational theory are the six fundamental theories of leadership as outlined by Daft (2014). Despite much discussion and research on a wide range of topics, leadership is still a difficult and vague notion (Rosenbach, 2003). Three factors—motivation, personality, and ability—are identified by the trait theory of leadership as being important in predicting the success of a leader. Energy level, stress tolerance, self-assurance, emotional maturity, and honesty are examples of characteristics that make up personality. Contrarily, motivation entails persuasiveness, a strong drive for accomplishment, a limited need for connection, and a socialized power orientation. According to Yukl (1994) and Gibson et al. (2003), a good leader possesses cognitive, interpersonal, and technical skills.

### **2.1 Transformational leadership**

A transactional or laissez-faire leadership style is typically contrasted with a transformational one. A charismatic leader "has extraordinary power to influence followers and is able to obtain a special leader-follower relationship," making them an extension of the transformational leader (Huang et al., 2005, p. 35). Burns presents this thesis, drawing from his studies of political figures. He emphasized that when one or more people interact with others in a way that inspires and elevates followers to a higher moral standard, that is when leadership is transformed.

Leaders that embody transformational qualities are individuals who inspire their followers to effect significant and long-lasting change by appealing to higher ideals and moral principles. Burns contends that transactional leadership suggests a simple exchange connection between leaders and followers, while transformational leadership goes beyond that. Deeper degrees of connection as well as increased morality, dedication, and performance from both leaders and followers are provided by transformational leaders (Burns, 1978)

### **2.2 Transactional leadership**

With both rewards and penalties, leaders that practice transactional leadership encourage followers to comply. With transactional leadership, leaders can achieve performance goals, finish necessary tasks, maintain the status quo within the organization, inspire followers through mutual contracts, guide followers' behavior toward the accomplishment of predetermined goals, stress extrinsic rewards, steer clear of needless risks, and concentrate on enhancing organizational effectiveness (McCleskey, 2014, p. 118).

In 1978, Burns created the transactional leadership approach. When a person establishes a connection with others with the goal of exchanging valuables—which might be of an economic, political, or psychological nature—transactional leadership takes place. Burns pointed out that although there are goals shared by both sides, the partnership is limited to the sharing of worthwhile advantages. Furthermore, according to Burns (1978), it does not link leader and follower together in their mutual and ongoing pursuit of a higher goal.

As a result, Bass (1985) established transactional leadership theory and expanded on Burns' work. According to Bass, a transaction or exchange between leaders, coworkers, and followers is what defines transactional leadership. The discourse centers on the criteria and incentives that followers will get upon meeting certain conditions, as discussed by leaders and followers (Bass & Avolio, 1994). To meet the needs of both sides, transactional leaders trade valuable items with their followers (Ivey & Kline, 2010). According to Bass et al. (2003), followers comply with the leader's demands in return for recognition, incentives, or the avoidance of penalties for poor performance or unfulfilled goals.

Because it concentrates on achieving the particular objectives, transactional leadership is therefore feasible (Aarons, 2006). A transactional leader is a contingent compensation system that exchanges incentives for work, guarantees rewards for strong performance, and acknowledges achievements. The Aydin group (2013). According to Buon (2014), there is a difference between the transactional and transformational leadership styles.

### **2.3 Organizational commitment**

According to Mowday, Porter, and Steers (1982), "the strength of an individual's identification with and involvement in a particular organization" is organizational commitment. Organizational commitment is defined by Meyer and Allen (1991) as a psychological state that defines a person's connection with the company and influences his decision to stay or leave. This connection takes into account the person's moral commitment to remain in the organization, their emotional orientation toward it, and their estimation of the cost of quitting.

Organizational commitment is defined by workers' sentiments toward the company where they work (Robbins, 2009). Individuals' willingness to stick with an organization, their efforts toward the organization, and their acceptance of its goals and ideals are all examples of organizational commitment as a mindset. Employees' loyalty to their organizations is reflected in their organizational commitment, which is influenced by a variety of personal (such as age, length of service, and attribution), organizational (such as work design, leadership style, justice, and values), and other factors (such as the availability of other options when leaving the workplace). Three psychological factors—an individual's acceptance of the organization's principles and goals, their willingness to put out effort to attain the goals, and their desire to stay in the organization—are indicative of organizational commitment.

Allen and Meyer (1991) identified it has three basic components which are as follow.

#### **a. Affective commitment: -**

It connects the individual's sentimental bond with establishments. It indicates that the person wants to stay employed with the firm because they find the work to be fulfilling. These workers are committed and effective instructors. They are able to provide staff training in a seamless and efficient manner, which boosts worker morale and retention rates. They grow a sense of responsibility and make an effort to be productive at work all the time. Their top focus is their work. It encourages workers to remain devoted. individuals who wish to stick with the same individuals may regard and be more likely to stay with them (Meyer & Allen, 1991).

#### **b. Continuance commitment: -**

It is focused on how people perceive the danger and expense of leaving their existing companies. It indicates that the person is driven to stay at work because he has no other options and needs the strength to continue working for the business. He feels that quitting a job is expensive and represents a loss of the time and effort he has put into the organization, which may be lost if the company is gone. These workers are the opportunity seekers. They continue to work for the organization because to the personal advantages they have with it, not the organization itself. They labor for pay and perks. When they

discover a better choice, they are free to take it into consideration and leave the organization. On the other hand, even when these workers choose to quit the firm, they remain if there are significant exit costs (Gellatly et al., 2006).

**c. Normative commitment: -**

It is focused on the moral aspect, which is determined by an individual's sense of duty and accountability to the organizations. It indicates that the person wants to remain in the organization because they believe it to be the right thing to do. According to him, the company anticipates both loyalty and the outcome of being impacted by others (Parfyonova & Meyer, 2010). These employees are a benefit to any business. So, it is crucial to view staff as assets if you want your business to succeed or create a standard. Organizations have an obligation to keep these workers because they can provide them a competitive edge in the market by fostering normative and emotive connections among staff members (Meyer & Parfyonova, 2010).

## **2.4 Relationship between leadership styles and organization commitment**

According to Voon et al. (2010), a company needs a leadership style that fosters employee engagement in order to successfully implement its strategies, achieve its objectives, and get a competitive edge. Additionally, he discovered a robust and positive correlation between leadership and organizational commitment. Lok and Crawford (1999) discovered that the leadership style structure had less of an impact on commitment than the consideration of leadership style. Additionally, Lee (2004) discovered a strong correlation between organizational commitment and transformative leadership. Conversely, there is no meaningful correlation between transactional leadership and organizational commitment. Affective commitment and transformative leadership have a somewhat good association, according to Hayward et al. (2004). The association coefficients between normative and continuation commitment and transformative leadership were found to be lower. Additionally, they discovered no connection between emotional, normative, and continuous commitment and transactional leadership.

According to Bass and Avolio (1997), emotional and normative commitment are positively correlated with transformative leadership. Similarly, it was discovered that intellectual stimulation positively correlated with affective and normative commitments. Once again, transformational leaders who inspire their followers to think critically and imaginatively may have an impact on their followers' commitment, as demonstrated by Bass and Avolio (1997). They observed that by encouraging creative problem-solving and understanding followers' requirements, transformational leaders may inspire and boost followers' motivation and organizational commitment. The theory of transformational leadership by Burns (1978), which was expanded upon by Bass and Avolio (1997), lends additional weight to this argument. It posits that organizational commitment is influenced by four key components of transformational leadership: charismatic role modeling, individualized consideration, inspirational motivation, and intellectual stimulation.

Namubiru et al. (2017) further mentioned that the administration of Kyambogo University promotes cooperation and communicates with stakeholders on a regular basis. But they also pointed out that top administrators and the professionals working at the operational level—who deal with children directly on a daily basis—are separated by a great deal.

As the first study of the mediation effect of transformational leadership on the relationship between relational psychological contract, transactional psychological contract, and organizational commitment within a nonwestern context, Behery, Paton, and Hussain (2012) identified the paper as contributing to the literature. According to Benkhoff (1997), research on the relationship between leadership style and organizational commitment is crucial since research has shown that organizational commitment influences other organizational outcomes such as intentions to leave, sales, and profitability.

Yousef (2000) investigated the connections between organizational commitment and leadership conduct. The study discovered a strong correlation between organizational commitment and leadership conduct. When leaders exhibit consultative or participatory leadership conduct, their subordinates exhibit greater

job satisfaction, a strong commitment to their companies, and superior job performance. Employee organizational commitment and employee trust in leaders are positively impacted by ethical leadership conduct, according to Ponnu & Tennakoon (2009).

### **2.5 Leadership in higher education**

These days, research subjects on leadership in higher education are highly sought for. Despite the fact that HEIs have been the focus of several studies (Ivory et al., 2007; De Boer and Goedegebuure, 2009; Gigliotti and Ruben, 2017), research suggests that management and leadership at HEIs are significant issues that require careful consideration. An increasing number of businesses, particularly higher education institutions, are realizing the value of leadership development (Pfeiffer, 2009; Findlay et al., 2016).

Hewitt (2008) makes the case that exceptional leaders are a consistent feature of successful businesses in this regard, a point that may have weight in the context of higher education institutions. Companies that have prioritized leadership development appear to have benefited from the ability to assist leaders in using their enhanced leadership abilities to strengthen the business. According to Pfeiffer (2009) (also see Findlay et al., 2016), higher education institutions must make a comparable effort to cultivate leadership potential. This supports the idea that HEIs must give leadership a high priority.

The Association of Business Schools supports De Boer and Goedegebuure's (2001) claim that deans' leadership roles are becoming more and more important at many schools. On the other hand, opinions differ about what constitutes effective leadership, how to get it, and how to quantify it (Bennis & Nannus, 1985). The efforts made by certain universities and other higher education institutions to see the deans as the center of their modern administrative structure modernization efforts were emphasized by Bolden et al. (2009).

The first finding by Adserials, Charlseton, and Jackson (2017) was that there isn't just one leadership style that works best for spearheading the diversity agenda's implementation at colleges and universities. Instead, they use both transformational and transactional leadership approaches in a way that is similar to full-range leadership. Second, we discovered that effective leaders carefully consider a range of contextual factors before choosing to use a transactional or transformational strategy. This review of the literature highlights the paucity of studies relating organizational contextual characteristics, such as the stage at which the diversity agenda is being implemented, and leadership style.

Given the current protest movements against colleges' approaches to diversity and the revived interest in diversity leadership, most of the research on leadership styles is out of date and needs to be updated. The study on leadership styles dates back more than ten years. It is time to reconsider the approaches taken to resolve enduring and conspicuously evident institutional and societal injustices. Studies on the function of leadership in carrying out the diversity agenda demand that leaders other than presidents receive more attention. Black (2015) came to the conclusion that not all of the behaviors described in the body of established leadership literature are included in the higher education sector's existing frameworks of leadership. To effectively tackle the issues posed by the Higher Education sector, executives must possess both leadership and management abilities. Isolating these aspects will neither provide positive results or mitigate the perceived negative effects of managerialism inside educational institutions. For leaders in Higher Education, the framework derived from this research provides a sufficient variety of options. Academic staff members may find it difficult to adopt a "learner" role, thus it is important to help them understand the value and importance of personal leadership development by providing them with active, visible, and credible role models.

According to Teshome (2013), academic staff members have positive perceptions of organizational commitment, meaning that their scores suggest that some employees felt more of an obligation to stay rather than that they had to stay with the PHEIs. They also showed that transformational leadership is effective in significantly affecting employees' affective and continuance commitments, but not their

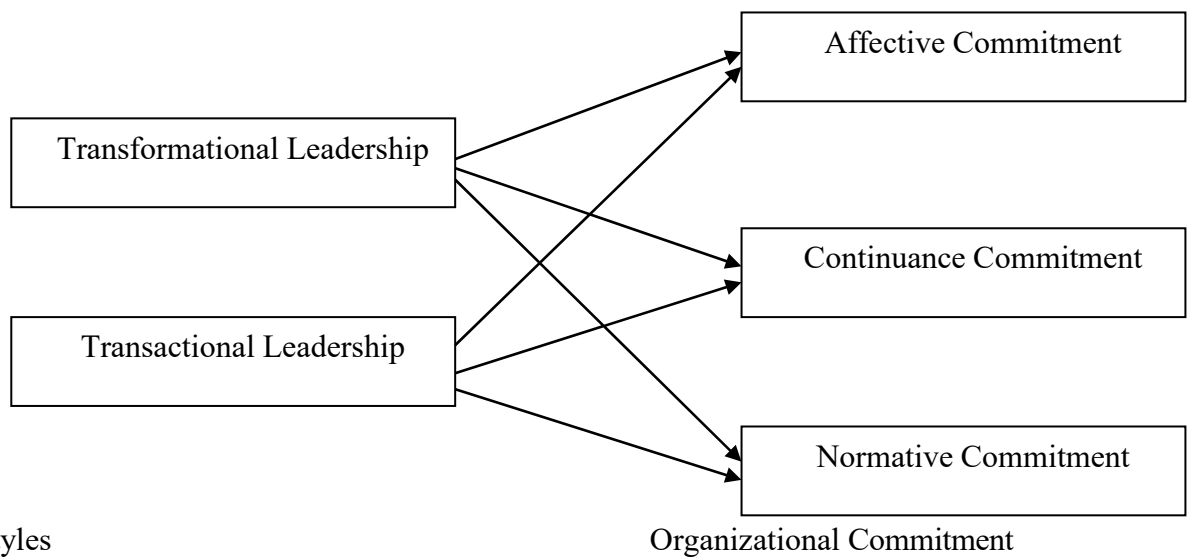


normative commitment, while transactional leadership is effective in significantly affecting employees' normative commitment. Laissez-faire leadership is significantly and negatively correlated with emotional employees' commitment, but it is not significantly correlated with either continuity or normative commitments, in contrast to transformational and transactional leadership.

**2. Objectives of the study**

The main objectives of the study are to:

- a. To explore the leadership styles (Transformational or Transactional) practices in Nepalese higher education.
- a. To examine relationship between leadership styles and organization commitment in Nepalese higher education



Leadership styles

Organizational Commitment

Independent Variables

Dependent Variables

- H1:** There is significant relationship between Transformational leadership and Affective commitment in higher education.
- H2:** There is significant relationship between Transformational leadership and Continuance commitment in higher education.
- H3:** There is significant relationship between Transformational leadership and normative commitment in higher education.
- H4:** There is significant relationship between Transactional leadership and Affective commitment in higher education

**4. Research Methodology**

In order to investigate leadership practices and determine the connection between organizational commitment and leadership styles in Nepalese higher education institutions, a descriptive and inferential research approach was employed. A questionnaire on a five-point Likert scale was utilized to get the respondent's viewpoint. The target population sample consists of Department Heads, Campus Chiefs, and Directors of TU's constituent campuses and departments, which are based in the Kathmandu Valley and assume responsibility for these roles (there are 21 constituent campuses and 46 central departments of the Kathmandu valley). Purposive sampling is the method employed here. One hundred and one questionnaires are sent out by email. 51 viable respondents were gathered. 50.495% response rate was obtained.

**5. Results and findings**

Table 1

Demographic Information

Descriptive Statistics	Frequency	Percent
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Gender	Male	40	78.4
	Female	11	21.6
Age	31-40	11	21.6
	41-50	12	23.5
	50 and above	28	54.9
Education	Masters	17	33.3
	M.Phil.	3	5.9
	Ph.D and Above	31	60.8
Type of Faculties	Management	14	27.5
	Humanities	19	37.2
	Education	4	7.8
	Science	14	27.5
Job Designation	Lecturer	19	37.25
	Asso. Professor	13	25.5
	Professor	19	37.25
Length of service	Below 10 Years	7	13.7
	11-20 Years	15	29.4
	21 and above	29	56.9
Tenure	First	39	76.5
	Second	7	13.7
	Third	5	9.8

The majority of responders are men, according to Table 1. The age group 50 and higher has the largest percentage, i.e., 28, 41–50 are 12 and 31–40 are 11, the lowest. Every responder is married. In a similar vein, thirty-one of the respondents have a Ph.D., seventeen have a master's degree, and three have an M.Phil., which is the lowest number. Correspondingly, the Length of Service is 29 for those over 21, 15 for those between 10 and 20, and 7 for those under 10. The first tenure for the campus chief, head of department, and assistant chief is 39, the second tenure is 7, and the third tenure is 5. Out of the 51 responders, 19 are professors, 13 are associate professors, and 19 are lecturers. Likewise, 19 faculty members come from the humanities, 4 from education, 14 from science backgrounds, and 14 from management.

## 5.2 Reliability Analysis

The capacity of a questionnaire to consistently assess data across different populations at different times is referred to as reliability. Reliability, according to Burns & Burns (2008), is the capacity of results to be repeated due to their consistency and stability. The internal consistency of items is measured using Cronbach's Alpha (Cooper, Schindler, & Sharma, 2012). According to Creswell (2008), reliability is the stability or consistency of measurements, or if repeating the test or measures would provide the same findings.

Table 2

### Reliability Statistics

Variables	Alpha	Items
Transformational Leadership	0.665	12
Transactional Leadership	0.753	8
Affective Commitment	0.632	6
Continuance Commitment	0.694	6

Normative Commitment	0.739	6
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Table 2 illustrates reliability of statistics of item scale. The Cronbach’s alpha for every proxy variable and independent variable is greater than 6 (Nunnally, 1978). It indicates that acceptance of degree of reliability.

Table 3  
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Transformational leadership style	51	3.50	4.67	4.0647	0.24718	-0.117	-0.390
Transactional leadership style	51	3.13	4.88	4.2224	0.44965	-0.506	-0.643
Organization Commitment	51	3.17	4.20	3.8368	0.21436	-0.567	0.357

Table 3 shows that description of the responses on transformational leadership style, transactional leadership style and organizational commitment. Descriptive Statistics shows that greater mean in transactional leadership i.e., 4.22 than transformational leadership i.e., 4.06. It means that the Skewness and Kurtosis value lies between ranges.

### 5.3 Correlation Coefficient Analysis

Correlation analysis is a statistical method used in research to identify the relationship between two variables and assess the strength of that association along a linear scale. Simply defined, correlation analysis determines the amount of change in one variable as a result of the change in the other. A high correlation suggests a robust relationship between the two variables, whereas a low correlation denotes a weak link.

Table 4  
Correlation Analysis

	Transformational leadership style	Transactional leadership style	Affective commitment	Continuance commitment	Normative commitment
Transformational leadership style	1	0.079	.322*	.281*	.310*
Transactional leadership style	0.079	1	.321*	.323*	0.049
Affective commitment	.322*	.321*	1	.468**	0.262
Continuance commitment	.281*	.323*	.468**	1	0.067
Normative commitment	.310*	0.049	0.262	0.067	1

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

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

Table 4 indicates that there appears to be a small but positive correlation ( $r=0.079$ ) between transactional and transformational leadership. At the 5% level of significance, there is a strong positive association ( $r=0.322$ ) between affective commitment and transformational leadership. Similarly, there is a strong positive link ( $r=0.281$ ) between dedication to continuity and transformational leadership. Normative commitment and transformational leadership have a strong positive association ( $r=0.310$ ). Affective commitment and transactional leadership have a strong positive association ( $r=0.321$ ). Additionally, there is a strong positive association ( $r=0.323$ ) between continuous commitment and transactional leadership. Although it is not significant, there does not appear to be a link ( $r=0.049$ ) between transactional leadership and normative commitment. At the 1% significance level, there is a positive correlation ( $r=0.468$ ) between affective and continuity commitments.

Regression Analysis

**Table 5.1**

**Model Summary (Affective Commitment)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.474 <sup>a</sup>	0.225	0.192	0.46783

a. Predictors: (Constant), Transactional leadership style, Transformational Leadership style

**Table 5.2**

**ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.043	2	1.521	6.951	.002 <sup>b</sup>
	Residual	10.505	48	0.219		
	Total	13.548	50			

a. Dependent Variable: Affective commitment

b. Predictors: (Constant), Transactional leadership style, Transformational Leadership

**Table 5.3 Coefficient**

		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.504	1.215		3.706	0.001
	Transformational leadership style	-0.736	0.268	-0.349	-2.740	0.009
	Transactional leadership style	0.404	0.148	0.349	2.737	0.009

a. Dependent Variable: Affective commitment

The R square is 22.5%, according to the model summary table 5.1. This indicates that leadership styles that are transformative and transactional account for 22.5% of the difference in emotional commitment. The regression model is fitted well at the 5% level of significance, according to ANOVA table 5.2 (p-value = 0.002). All independent variables, including transformational leadership style (p-value = 0.009) and transactional leadership style (p-value = 0.009), had very significant coefficients at the 5% level of significance, as shown in table 5.3.

**Table 6.1**

**Model Summary (continuance commitment)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.446 <sup>a</sup>	0.199	0.165	0.54535

Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 6.2**

**ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.542	2	1.771	5.954	.005 <sup>b</sup>
Residual	14.276	48	0.297		
Total	17.817	50			

a. Dependent Variable: Continuance commitment

b. Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 6.3**

**Coefficients**

Model	Un standardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	4.387	1.417		3.097	0.003
Transformational leadership style	-0.745	0.313	-0.309	-2.382	0.021
Transactional leadership style	0.461	0.172	0.347	2.677	0.010

a. Dependent Variable: Continuance commitment

The model summary table 6.1 shows that R square is 19.9%. It means that the 19.9% variation in continuance commitment is explained by transformational and transactional leadership style. The ANOVA table 6.2 shows that the regression model is fitted well at 5% level of significance (p-value = 0.005). The table 6.3 shows coefficient of all independent variables like transformational leadership style

(p-value = 0.021) and transactional leadership style (p-value = 0.010) are highly significant at 5% level of significance.

**Table 7.1**

**Model Summary (Normative Commitment)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.311 <sup>a</sup>	0.097	0.059	0.64273

a. Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 7.2**

**ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.120	2	1.060	2.566	.087 <sup>b</sup>
Residual	19.829	48	0.413		
Total	21.949	50			

a. Dependent Variable: Normative commitment

b. Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 7.3**

**Coefficients**

Model	Un standardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	0.703	1.670		0.421	0.676

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Transformational leadership style	0.825	0.369	0.308	2.237	0.030
Transactional leadership style	0.037	0.203	0.025	0.182	0.857

a. Dependent Variable: Normative commitment

The model summary table 7.1 shows that R square is 9.7%. It means that the 9.7% variation in normative commitment is explained by transformational and transactional leadership style. The ANOVA table 7.2 shows that the regression model is not fitted well at 5% level of significance (p-value = 0.087). The table 7.3 shows coefficient of all independent variables like transformational leadership style (p-value = 0.030) and transactional leadership style (p-value = 0.857) are not highly significant at 5% level of significance.

**Table 8.1****Model Summary (Organization Commitment)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.499 <sup>a</sup>	0.249	0.218	0.18957

a. Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 8.2****ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.573	2	0.286	7.967	.001 <sup>b</sup>
Residual	1.725	48	0.036		
Total	2.298	50			

a. Dependent Variable: Organization Commitment

b. Predictors: (Constant), Transactional leadership style, Transformational leadership style

**Table 8.3****Coefficients**

Model	Un standardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	1.928	0.492		3.916	0.000
Transformational leadership style	0.311	0.109	0.359	2.859	0.006
Transactional leadership style	0.153	0.060	0.320	2.553	0.014

a. Dependent Variable: Organization Commitment

The model summary table 8.1 shows that R square is 24.9%. It means that the 49.9% variation in organization commitment is explained by transformational and transactional leadership style. The ANOVA table 8.2 shows that the regression model is fitted well at 5% level of significance ( $p$ -value = 0.001). The table 8.3 coefficient of all independent variables like transformational leadership style ( $p$ -value = 0.006) and transactional leadership style ( $p$ -value = 0.014) are highly significant at 5% level of significance.

## 6. Discussion

This study set out to investigate the practices of leadership in higher education and the connection between organizational commitment and leadership styles. The findings indicate that transformational leadership has a mean of 4.06 and transactional leadership has a mean of 4.22. It was found that the mean for transactional leadership is higher than for transformational leadership, suggesting that there are more transactional leadership practices in Nepalese educational institutions.

Affective commitment and transformative leadership have a favorable association. As a result, the concept that transformative leadership and affective commitment are associated is accepted. Continuity and transformative leadership have a beneficial relationship. Therefore, the hypothesis is accepted and

there is a positive link between transformative leadership and continuous commitment. Normative commitment and transformative leadership are positively correlated. Therefore, the hypothesis is accepted and there is a positive correlation between normative commitment and transformative leadership.

Affective commitment and transactional leadership are positively correlated. As a result, the concept that transactional leadership and affective commitment are related is recognized. Similarly, continuing commitment and transactional leadership have a good association. Therefore, the hypothesis is accepted and there is a positive link between transactional leadership and continuous commitment. Normative commitment and transactional leadership are uncorrelated. Therefore, the hypothesis was not successfully rejected and there is no correlation between transactional leadership and normative commitment. In a similar vein, the regression demonstrates that normative commitment and leadership are unrelated. To be more precise, emotional commitment refers to the desire of employees to stay with a business (Allen and Meyer, 1990). Powell and Meyer's (2004) study found a substantial correlation between emotional commitment and four side-bet factors: expectations, self-presentation concerns, satisfactory conditions, and individual adaptations. Strong normative commitment among employees motivates them to remain with the company since it is right for them to (Meyer & Allen, 1991). Employees who feel that their employer expects them to be devoted will have a strong 40 normative commitment, according to Allen and Meyer (1990). If employees have been encouraged by others to value loyalty to the organization, they will likewise exhibit high normative commitment (Allen & Meyer, 1990). According to Cooper (2003), leaders don't want people to commit to continuous improvement because they want more from them than just compliance. To increase the success of the company, leaders anticipate that staff members will work harder and more diligently.

## 7. Conclusion

The conclusion is that more transactional leadership styles than transformational leadership styles have been used in Nepalese educational institutions. According to this study, there is a strong correlation between leadership styles and organizational commitment, indicating a positive association between the two variables. It indicates a correlation between organizational commitment and leadership styles. Commitment is favorably correlated with both transformational and transactional leadership styles. Many options exist for Nepalese students pursuing higher education to achieve academic excellence. Higher education institutions continue to be afflicted by the competitive environment that exists between individuals, groups, departments, divisions, schools, and universities, notwithstanding certain advancements. To accomplish the goal of that system, an atmosphere where everyone is cooperating as a system is required (Maguad, 2010, p. 73).



It also examined the necessity of academic leaders given Nepal's current circumstances. The leadership and their responsibility can bring about the kind of significant transformation that the Nepalese education system requires. It mostly depends on the kind and character of the leader. Thus, the two main styles of leadership used today are transformational and transactional. This is the reason why the study included these two categories of leadership philosophies. According to Luo and Tung (2007), academicians are recognized as thought leaders. This study is one of the first of its kind since it uses department heads and campus chiefs from Nepal's higher education system as sample subjects, opening up new avenues for research. This study promotes many perspectives on leadership styles and practices in Nepalese higher education sectors. It is one of the pioneer studies in research endeavors.

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## **Assessment of Awareness of Hygiene Practices During COVID-19 Pandemic in Kathmandu, Nepal**

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### **Abstract**

Adopting safety measures and adequate hygiene has been a priority strategy to slow down the transmission rate of COVID-19. This study assessed awareness of those hygiene practices among the general population during the COVID-19 pandemic in Kathmandu, Nepal. We conducted a web-based cross-sectional study among 273 participants of Kathmandu Valley, Nepal. A pre-tested, self-structured questionnaire was used to collect the data. The collected data were entered and analyzed using Python and Tableau. In this study, more than half of the respondents (57.5%) were female and most of them were students (66.7%). The majority of the respondents (85%) knew the proper hand washing recommendations provided by the World Health Organization; 13.6% of respondents were not sure and very few (1.5%) were unaware about it. The majority of the respondents (98.2%) were familiar with personal hygiene measures. About half of the participants (50.9%) washed their hands less than 10 times a day, 11.4% of them washed their hands more than 15 times a day and the majority of them (65.6%) used soap and water for hand washing. The female respondents were found more knowledgeable than male respondents. The satisfactory level of awareness and hygiene practice was found among the

respondents. Further health education programs would improve knowledge and awareness of the preventive measures against COVID-19 pandemic in Nepal.

**Keywords:** COVID-19, Hand Disinfection, Hand Hygiene, Preventive Measures, Public Health

## 1. Introduction

In the wake of COVID-19, the need for public health, hygiene, and sanitation have been appreciated more. Nepal is particularly vulnerable to COVID-19 for a variety of reasons, including inadequate health monitoring systems, low health literacy and awareness, open borders with India, migrant worker movement across the borders, insufficient healthcare workforce, infrastructure, and equipment to deal with public health emergencies. Limited national access to water, sanitation, and good hygiene practices also exacerbates ongoing public health emergencies. (United Nations, 2020)

The main objective of this study was to evaluate the awareness about the hygiene practices during the COVID-19 pandemic among 15 years or older residents of Kathmandu Valley. Considering the public health urgency, this study aims to understand the public awareness and practices with the easing of the lockdown's regulations and the growing wide variety of cases and identify the topmost concern about hygiene.

## 2. Literature Review

Men and women differ in their levels of knowledge, optimism, and COVID-19 good practice, according to a cross-sectional survey of the general population in the country of Saudi Arabia. It was discovered that men had less knowledge, more pessimistic views, and more ethical behavior than women. Furthermore, it was found that older individuals are probably more likely than younger individuals to have advanced knowledge and abilities (Al-Hanawi et al., 2020). A work of (Ngwewondo et al., 2020) in online survey to assess the knowledge, attitude and practice of/towards covid-19 showed that the majority of the respondents had good knowledge on COVID-19 and more than half of the respondents had high attitude towards health seeking behavior and good practice towards taking preventive precautions. Age >20 years was found to be associated with a high knowledge of COVID-19.

A study with a cross-sectional design involving 240 students from different universities. An online-based questionnaire was provided to them. The results of this survey show that while a majority of these tertiary students still exhibit a moderate level of awareness and practice when sneezing, a majority of them are still ignorant about proper hand hygiene. The study also portrayed that the majority of the respondents were found to be aware of personal hygiene and their personal hygiene practice is reported to have been changed due to COVID-19 pandemic (Hasan & Abdulqadir, 2017).

A study by (Dwipayanti et al., 2021) conducted in Indonesia showed that the majority of the female and male respondents reported practicing hand hygiene. The majority of respondents did improve the frequency of their hand hygiene routines during the pandemic. Sex, perceived susceptibility, and efficacy were significant predictors of hand hygiene habits. Participants who perceived themselves at higher risk of contracting SARS-CoV-2 had less negative perception toward the practice and perceived hand washing as an effective preventive measure, while female participants perceived a more supportive norm and noticed more barriers in access to hand washing facilities were more likely to engage in hand hygiene practice more frequently during the pandemic. In conclusion, the majority of the respondents increased the frequency of hand hygiene practice. A cross-sectional study of (Natnael et al., 2021) was conducted among 417 taxi drivers in Ethiopia during July to August, 2020 which showed that Educational level, place of residence and attitude towards COVID-19 prevention were factors associated with good knowledge about COVID-19. Further, age of the respondents greater than 30 years, educational level of

secondary or above, income, and knowledge about COVID-19 were factors associated with positive attitude towards COVID-19 prevention. In addition, attitude towards COVID-19 and educational level were the factors associated with good frequent hand hygiene practices.

In a (Mahdi et al., 2021) study which assessed hand hygiene knowledge, perception, and practices of visitors to the Prophet's Mosque in Al Madinah City, Saudi Arabia demonstrated that Males had a higher knowledge score than females and visitors who had no formal education scored higher than those with post-graduate education. Washing hands with soap and water was the predominant method practiced after a meal, followed by washing hands after toilet visits, after touching a surface, after waste disposal, and when hands were visibly dirty. It was noted that Al Madinah visitors had moderate knowledge about hand hygiene, but demonstrated some knowledge gaps and negligence in practice that are crucial to curb the spread of COVID-19.

(Dwipayanti et al., 2021) paper showed that the mean age of the respondents was 35 years old. And no significant association was found between age and hygiene practice in this study. Similarly, the study showed significant association between sex of the respondents and frequency of hand hygiene practice during covid-19 pandemic. From multiple paper, (Dwipayanti et al., 2021), (Park et al., 2010), (Lau, 2003), women were more likely to report a higher frequency of hand washing practice during COVID-19 pandemic compared to men. A study in Indonesia showed that the majority of the respondents were having university education and no association was observed (Dwipayanti et al., 2021). In a (Wise et al., 2020) study conducted in the USA, it was observed that the individuals who had completed college level education or higher reported their personal probability and severity of infection, along with that of the average person in their neighborhood, as higher than those who had not completed college-level-

education. Similarly in the same study which investigated the extent to which risk perception was predictive of reported engagement in protective behaviors, it was found to be associated with self-reported engagement in two primary protective behaviors i.e hand-washing and social distancing.

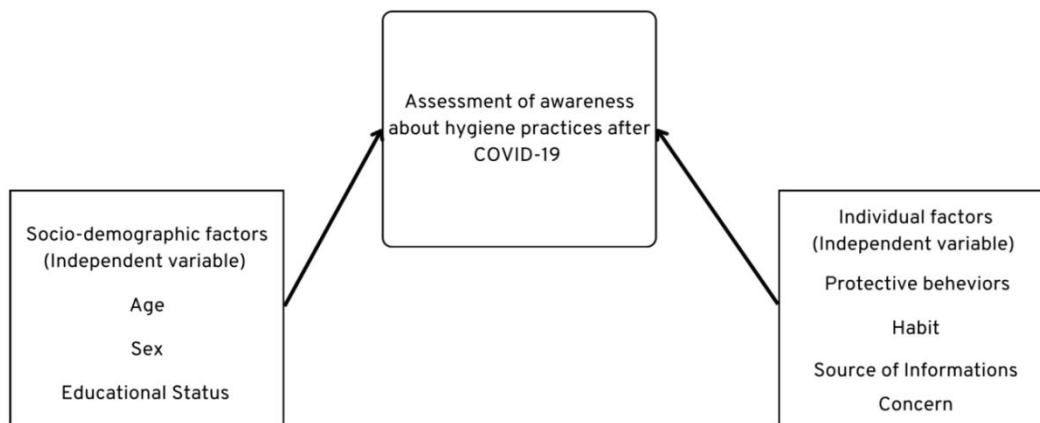
A study (Ajzen & Timko, 1986), found that when they looked at preventive and avoidance behaviors separately, household size (i.e., being surrounded by more people) and thinking that avoiding people is effectively predicted physical distance, whereas emotional responses like worry, fear, or concern, as well as media exposure, had a stronger influence on engaging in hygiene behavior. With regard to behavior, the majority of respondents stated that they had decreased or avoided going to public events (84%), using public transportation (74%), and going to stores (79%). The majority of individuals also admitted to washing their hands more frequently (92%) and thoroughly (92%), attempting to sneeze into the crook of their arm (86%), and attempting to keep more than one meter away from others who were coughing or sneezing was observed in a study conducted in Norway (Zickfeld et al., 2020). Similarly a study from Norway found in terms of information sources, the majority of respondents said they learned about the COVID-19 epidemic through a variety of sources. The main source of information for the majority of the people were news media followed by social media, all interviewees, friends and relatives. No participant admitted to depending solely on unreliable sources (Zickfeld et al., 2020). In the same paper, the participants reported being somewhat or highly concerned about the epidemic, with 32.4% of participants being very or extremely anxious. In a similar vein, respondents reported feeling the most dread, followed by sadness, hope, and anger.

For the source/period of information, less than half of the respondents knew when the disease began (December 2019) and 14.4% only knew in March 2020 when the first case was reported in Cameroon. Greater than half of the respondents got the information on COVID 19 for the first time via the television during the first and last 15 days of the study, the respondents got the information primarily through television followed by Whatsapp and websites (Ngwewondo et al., 2020).

### 3. Methodology



A web-based cross-sectional study was conducted from November to December in 2020 among the general population of Kathmandu Valley. Ethical clearance from the Ethical Review Committee (ERC) of Asian University for Women (AUW) in Chittagong, Bangladesh were obtained. The research maintained the confidentiality and privacy of the individual research participants throughout the study. The study aimed to answer the following two most priority research questions: what level is the awareness of hand hygiene on preventing COVID-19; what factors during a pandemic affect participants' knowledge and awareness, the researchers designed the semi-structured questionnaire by reviewing the relevant literature and previous studies and then finalized the questionnaire by consulting with expert epidemiologists at AUW. After the completion, the questionnaire to 25 AUW students were sent for pre-test. The finalized questionnaire was converted into an electronic form via Google Forms platform and distributed for data collection.



**Fig1: Conceptual Framework of the study**

All residents of Kathmandu Valley, who are 15 years or older were included in the study. Those who were not willing to participate and those who didn't have access to phone and internet are excluded. Due to COVID-19 restrictions, researchers had only the option to collect data online, and therefore, used a non-probability sampling method. The probability sampling was not feasible because a reliable sampling frame was not available. Researchers disseminated the questionnaire link through social media (Facebook, WhatsApp, and Viber) to all residents of the Kathmandu Valley. The online survey was able to collect 293 responses from the participants. Out of which some were missing the data, thus, only 273 responses were included in the study. Data cleaning and the cross-validation of the data was performed in the Excel. The statistical analyses were performed using Python Jupyter notebook with libraries, seaborn, pandas, numpy and supporting library. Some graphs were generated using Tableau 2020.1. A p-value less than 0.05 was examined statistically significant, with a confidence interval of 95% (McAneney et al., 2010).

**4. Results**

Female participants were 57.5% (n=157) and male were 42.5% (n=116). The majority of the respondents (63%) were among the 20-29 years age group, 22% of them were below 20 years, and the remaining 41% of the respondents were 30 years of age or above. The mean age of the respondents was 24.6 years, with a standard deviation of 7.5 years. The majority of participants were students (66.7%), followed by business owners (23.8%), unemployed (6.2%), house wives (2.9%) and self-employed (0.4%).

**Awareness of hygiene practices after COVID-19 pandemic**

Regarding the awareness of hygiene practices, the data portrays that the overwhelming majority of the respondents (98.2%) were familiar with personal hygiene practices. The data shows that almost all participants were more aware of hand washing or hand hygiene after the introduction of the COVID-19 pandemic. About half of the participants (50.9%) washed their hands less than 10 times a day, 11.4% of them washed their hands more than 15 times a day and the majority of them (65.6%) used soap and water for hand washing. Among all 273 participants, 241 (88.3%) always wear masks outside the home but only 79 (28.9%) of them had the habit of washing their mask regularly after using it.

Table 1: Awareness of hygiene practice after COVID-19 pandemic among the population residing in Kathmandu

S.N.	Questions	Answers	n	%
1	Are you familiar with personal hygiene activities?	a) Yes b) No	268 5	98.2 1.8
3	How often do you wash your hands after COVID-19 started?	a) Less than 5 times a day b) Less than 10 times a day c) Less than 15 times a day d) More than 15 times a day	51 139 52 31	18.7 50.9 19 11.4
3	How do you wash your hands?	a) Water and Liquid Soap b) Water and Bar Soap c) Water with soap and Sanitizer d) Use Sanitizer Only e) Water and Sanitizer f) Water Only	179 68 10 6 5 5	65.6 24.9 3.7 2.2 1.8 1.8
4	Which of the following options do you think is the better method to prevent yourself from COVID-19?	a) Proper hand washing with soap and water, minimum 20 seconds b) Using hand sanitizer Regularly c) Wear mask most of the Time	156 33 84	57.1 12.1 30.8
5	Do you regularly wear a mask outside of your home?	a) Always b) Frequently c) Sometimes d) Occasionally e) Never	241 24 3 1 4	88.3 8.8 1.1 0.4 1.5

6	Do you wash the mask after using it?	a) Always b) Frequently c) Sometimes d) Occasionally e) Never	79 66 41 16 71	28.9 24.2 15 5.9 26
7.	Since the pandemic, when do you wash your hands?	a) After coughing and sneezing b) Before eating c) Before preparing food d) After coming from outside e) After Handshake f) All of the above	36 61 41 68 24 212	13.2 22.3 15 24.9 8.8 77.7
8.	Do you wash your clothes when you come from outside during this pandemic?	a) Always b) Frequently c) Sometimes d) Occasionally e) Never	113 72 58 17 13	41.4 26.4 21.2 6.2 4.8
9.	How often do you clean your toilet in this pandemic of COVID-19?	a) Every day b) Every Week c) Every 2 Weeks d) Every Month	156 97 15 5	57.1 35.5 5.5 1.8
10.	Do you believe by practicing good (personal and environmental) hygiene we can combat COVID-19?	a) Yes b) No c) Not Sure	240 6 27	87.9 2.2 9.9

The data portrays that the participants were more conscious of the spread of disease while sneezing and thus they had a tendency of covering their face while sneezing. About 77.7% of the participants had the habit of frequently washing hands after coughing and sneezing (13.2%), before eating (22.3%), before preparing food (15%), after coming from outside (24.9%), and after handshakes (8.8%). Regarding washing the clothes, 41% of the participants had the practice of always washing clothes after coming from public places while 4.8% of them never had the habit of washing clothes when they came from public places. While 65.6% of them washed the bed sheets and towels every week, and 57.1% practiced cleaning toilets every day after the COVID-19 pandemic started. In this study, 240 (87.9%) participants believed that practicing good (personal and environmental) hygiene helped combat the COVID-19 pandemic.

### Participant's main source of Information on COVID-19

The data represents that about 54.9% of the respondent's main source of information was social media, followed by official government sites (18.3%), WHO (16.8%), television (6.2%), digital newspapers (1.8%), friends and family (0.7%), radio/FM (0.7%), and world meter (0.4%).

### Knowledge based on the proper hand washing recommendations provided by the WHO

The majority of the respondents (85%) know the proper hand washing recommendations provided by the WHO, 13.6% of respondents were not sure and very few 1.5% were unaware about it. The table shows that female respondents were more knowledgeable than male respondents.

### Participant’s topmost concern about hygiene in covid-19

The participant’s major concern about hygiene after the pandemic started was maintaining social distance with proper use of masks, proper hand washing with soap and water frequently and use of sanitizer, personal hygiene, and environmental hygiene to prevent the spread of COVID-19. The data portrayed that almost 66% of participants have a habit of cleaning bed sheets every week while only 6% do every day and 5% and 24% every month and every two weeks respectively. Almost 60.8% reported that they cover their face with elbows while sneezing, 21.6% with tissue, 12.1% with cloths and 2.9% reported they do not cover at all. 2.2% of participants reported that they cover their faces with their hands.

Participants stated that proper hand washing with soap and water for less than 20 seconds is the prime reason to prevent oneself from COVID-19, followed by wearing a mask, while using hand sanitizer regularly was rated least among the options. About 62.4% of female participants and about half of the male think of proper hand washing with soap and water as an important preventive measure. Almost 33%

responded using water and liquid soap for the hand washing approach, followed by 24.9% with water and bar soap. Interestingly, it was seen that almost 1.8% of people prefer to wash hands with water only and then use hand sanitizer.

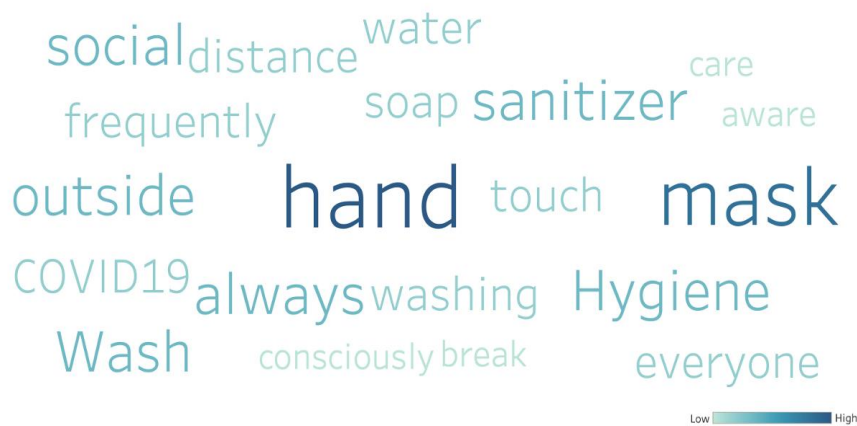


Fig 8: Topmost concern during the COVID-19

The word cloud in Figure 8 was developed from participants’ responses to open-ended questions regarding their topmost concerns during the COVID-19 pandemic. Each word’s frequency in the responses were noted and plotted as top twenty and that hand and mask were the top words the participants used mostly in their answers. The dark blue colors show higher frequency of use whereas the lighter shows lower frequency.

When performing statistical hypothesis testing over the independent attribute with the dependent attribute: “Are you familiar with personal hygiene activities”, the education level, status, washing time, source of info were found to be prime factors to have familiarity with personal hygiene.

### 5. Discussion

In this study, we assessed the awareness of hygiene practice of the respondents during COVID-19 pandemic in Kathmandu Valley. The study shows that the respondents had a good level of general awareness on personal hygiene along with satisfactory level of practice to prevent spread of COVID-19. The majority of the respondents (98.2%) were familiar with personal hygiene practice and its importance during the pandemic. About half of the participants (50.9%) washed their hands less than 10 times a day, 57.1% of the respondents think that proper hand washing with soap and water for a minimum 20 seconds is a better method to prevent the COVID-19. Similarly, about 77% of the respondents wash their hands

after coughing and sneezing, 24.9% wash their hands after coming from outside, 88.3% always wear masks outside, 85% know the proper hand washing recommendations provided by the WHO, (22.3% and 15%) wash their hands before eating and preparing food respectively. A similar study conducted in Saudi Arabia showed that the respondents who always washed their hands after coming back home (89.6%), used soap to wash their hands (90%), used a hand sanitizer outside (63.5%), wore a face masks while outside (59.2%) and washed their hands before preparing and/or eating food (89.1%) during the pandemic respectively and it showed overall improvement in hygiene practice after COVID-19 pandemic (Zakout et al., 2020). This might be due to the concern for the spread of COVID-19 as the number of cases are increasing day by day along with few deaths as well.

Unless and until there is a basic awareness or understanding level of public health and hygiene needs (Turner, 2007) , one cannot fully understand its benefits and risk factors. Therefore, the paper has taken familiarity with personal hygiene activities as a dependent variable for the fight with COVID-19. The majority of the respondents (98.2%) had a good knowledge level on personal hygiene.

In the study female students obtained a significantly higher average familiarity score (99.4%) than the male (96.6%) regarding the knowledge of personal hygiene. This finding correlates with the studies from UAE (Ghanim et al., 2016) and India (Sarkar, 2013), but is in disagreement with the findings from Egypt (Anderson et al., 2008). This discrepancy in knowledge scores could be due to variation in family orientation, socio-cultural differences, and a physiologically higher need for cleanliness among adolescent females.

Hand hygiene is an effective way of preventing the spread of infectious diseases and the spread of antimicrobial resistance (Shen et al., 2017), as recommended by the World Health Organization (Ahmad & Murad, 2020). About 87.9 % of females reported knowing proper hand washing recommended by WHO while 81.0% male has. However, in comparison, we saw that 16.4% of the male participants responded “not sure”, and 2.6% responded “don’t know” to proper hand washing techniques provided by the WHO. Proper hand washing with soap and water for more than 20 seconds was reported (female: 62.4 % and male: 50.0%) as the best option for preventing oneself from COVID-19, followed by wearing a mask most of the time. This finding corroborates with other studies (Wang et al., 2020), (Lopez-Quintero et al., 2009), (McAneney et al., 2010)]. Interestingly, male participants responded to wearing masks all the time by 16.9% as the best option of preventing oneself from COVID19. Additionally, on the sneezing habits, it was found that (60.8%) cover the elbow while sneezing and 2.9% do not cover the face at all.

Source of info does affect familiarity with personal hygiene (0.00). This observation corroborates with the previous studies (Hernández-García & Giménez-Júlvez, 2020), (Chan et al., 2020), (Li et al., 2020). The internet makes information on COVID-19 more accessible, especially for those staying indoors due to the pandemic, with the websites of official public health organizations being the highest-quality source of online information on COVID-19 (Bin Abdulrahman et al., 2019) The use of social media is increasing; it is taken as one of the go-to sources for many day-to-day activities. Regarding COVID-19 information center, the study found that social media was taken as the main source of information on it by 54.9% while 18.3 % uses official government sites. Only 0.7 % use radio and FM. This finding corroborates with the study done in Iraqi Kurdistan in 2020 (Sajed & Amgain, 2020). A similar study conducted in Pakistan showed that the participants’ main source of knowledge is the Internet (53.5%). This might be because of the similar nature of study and study population which suggests that social media platforms should be utilized more for health promotion and reporting the myths associated with COVID-19 (Ali, 2020).

Regarding bed changing habits, 66% of participants have cleaned their bed sheets and towels every week since the pandemic started and only 5% do every month. The study also shows that 65.6 % use water and soap for washing hands while only 2.2 % use sanitizer only and 1.8 % water only. 3.7 % reported that they use water and soap along with sanitizer for washing their hands, which is similar to the findings of

the study done at Bogota, Colombia (Lopez-Quintero et al., 2009). In this study, 90.5% of the participants reported washing their hands with water and soap and half of them (50.9%) washed their hands less than 10 times a day after covid-19 started. This finding is similar to the study conducted in the UK (Barrett & Cheung, 2021). This might be because of the similar nature of the study population. Hand hygiene is regarded as a major preventive strategy to break the chain of the spread of COVID-19.

We found that education level ( $p: 0.016$ ) was one of the prime factors for being familiar with personal hygiene and age ( $p: 0.846$ ) and gender ( $p: 0.086$ ) was not regarded as the prime factor for being familiar with personal hygiene. On top of that, employment status was also an important factor for being familiar with personal hygiene ( $p: 0.001$ ).

## 6. Conclusion

This study presents evidence from Nepal that could contribute to the public health promotion measures against COVID-19 pandemic. The research concludes that being familiar with personal hygiene, education level, employment status, hand washing time, and source of information are prime factors. This study assessed that the respondents had a good knowledge and a satisfactory level of hygiene practice during the COVID-19 pandemic. Along with that, it was also found that social media has been the main source of being familiar with COVID-19 which does affect being familiar with personal hygiene. Since social media platforms were a major source of being familiar with COVID-19, there is a need for adequate utilization of social media to provide necessary and correct information regarding COVID-19, and eliminating false messages and myths. The paper also concludes that the female students obtained significantly higher average familiarity scores compared to males regarding the knowledge of personal hygiene. The research advocates increasing health education and health literacy programs, using social media more effectively to disseminate validated information to promote personal hygiene level in Nepal and other countries of the global south.

Nonetheless, these results must be interpreted with caution, as several limitations should be borne in mind. A total of 273 participants consisted of non probability samples responded via online survey; a better estimated probability sampling might change the results of the study. The socio-economic status of the participants, which might be related to the state of personal hygiene, was not inquired. Furthermore, the participants were mostly from city areas where social media consumption is high, thus some results might be biased. The study was undertaken among the participants in the area of Kathmandu Valley, Nepal due to which findings of the study might not corroborate with similar studies from rural areas of Nepal, as the low socio-economic condition and the compromised living situation in a village community along with inadequate primary health care services do not allow those people to adopt proper hygienic behavior. As COVID-19 is prevailing in the society, further studies in this domain would help to understand the benefits, weaknesses, and challenges of adopting personal hygiene and fighting the COVID-19 for better results.

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## Assessing the Potential and Constraints for Urban Forestry Development in Butwal Sub-Metropolitan City: A Biophysical Analysis and Community Perspective

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### Abstract

Urban forestry is essential for creating green and healthy cities. In the context of rapid urbanization, it has become more important to manage urban forests. Butwal City faces a significant lack of trees in open spaces, which makes it challenging for pedestrians to walk in the unbearable hot climate. This research aimed to investigate the existing conditions and people's perception of urban forestry in the Butwal sub-metropolitan city, identify opportunities and constraints for urban forestry planning, and assess the biophysical information of the existing urban forest. The study used focus group discussions (n=7), key informant surveys (n=13), and GPS to collect data on parks and street trees. The family-wise species richness inside the parks showed that *Shorea robusta* of the *Dipterocarpaceae* family is dominant, followed by the newly introduced *Polyalthiya longifolia* of the *Annonaceae* family. The study found 30 species of 18 families in 4.124 km of road, indicating less diversity of species. The study also found low participation (32.5%) of respondents in urban forestry programs. Respondents seem aware of the visible functional significance of urban forests but not of their hydrological characteristics. The lack of responsible organizations was the major constraint for urban forestry development identified by respondents from various sectors. The study revealed that the most dominant species accounting for the genus - *Polyanthia* 12%, family - Fabaceae 16% of Ward 2, and family - *Annonaceae* 29%, and Moraceae 19% of Ward 9 meet the proposed benchmark 10/20/30. The study suggests that urban forestry has enormous expansion potential through an appropriately integrated management approach in Butwal sub-metropolitan city. People seem interested in urban forestry development if their involvement is considered. In the future, effective urban forestry initiatives can be implemented with the participation of local residents and the collaboration of various stakeholders.

Keywords: *Urban Forestry, Species diversity, Butwal, Hydrological, Forestry*

### 1. Introduction

Urbanization has been a trend throughout human history, with people moving from rural areas to urban areas as they become wealthy (Ritchie & Roser, 2018). Currently, over half of the world's population resides in urban areas, and this proportion is projected to increase to 66% by 2050 (USDESA, 2014). However, this unprecedented population growth and urbanization have led to various health problems, such as mental illness, chronic or lifestyle diseases, and respiratory diseases, as well as social and environmental problems (Harpham & Molyneux, 2001; MoEST, 2001).

Urban green spaces, including parks, woodlands, nature areas, and other green spaces, can help alleviate some of these problems. Numerous studies have highlighted the benefits of urban green spaces, including stress reduction, mental fatigue reduction, mortality reduction, and increased physical activity (Kaplan, 2001; Mitchell & Popham, 2008; Grahn & Stigsdotter, 2003; Ulrich, 2006; Nielsen & Hansen, 2007). Urban forestry, the integrated approach to planting, caring for, and managing trees and forests in and around the city to secure multiple environmental and social benefits for urban dwellers, has become an indispensable part of urban ecology (Yilmaz & Irmak, 2004; McPherson et al., 2016). Urban forests and green spaces are part of nature-based solutions that

contribute to ecological integrity, sustainability, biological diversity, and conservation of urban landscape (James et al., 2009; Acar et al., 2007).

In Nepal, urban forestry has deep religious and social origins dating back several thousand years, with the planting of *Ficus* spp (*religiosa* & *beghalensis*) in the name of the plantation (Pandey & Luitel, 2020). In ancient Nepal, trees were planted along walking streets and wells during the regime of Jayasthiti Malla (1380-1395 AD), and the tradition continued with the plantation of *Araucarias*, *Eucalyptus*, *Calistemon*, and *Gravillea robusta* species on palace premises throughout the Rana regime (Baral & Kurmi, 2017; Bhatta et al., 2017). In recent years, the Government of Nepal has emphasized urban forestry by promoting afforestation in public and private land with initiatives such as "one house: one tree, one village: one forest, and one town: several parks," including the "Nepal Clean Environment Grand Expedition 2075" and the "Forest Decade Program (2014-2023)" (Gautam, 2018). However, despite these efforts, urban forestry planning has not been very successful in achieving the expected results (Bista, 2009). Urban forestry has been observed to some extent in the form of parks and roadside plantations in major cities like Kathmandu, Butwal, Hetauda, and Pokhara (Sapkota et al., 2020). The Department of Forests, the Department of Forest Research and Training Center, and the Department of Plant Resources have taken an initiative in urban forestry through research and studies. Additionally, some universities provide grants to conduct research for pursuing theses (Lamichane & Thapa, 2012). Recently, the Nepal Government has placed increasing emphasis on urban forestry by acknowledging "Urban forestry development and Management" in the Forest Act 2019, whereas before that, there was no separate section for urban forestry in government organizations.

Urbanization is a growing concern in developing countries like Nepal due to the rise in population attracted by economic opportunities and modern comforts (Sharma, 2003; Poudel, 2013). Unplanned urban growth has resulted in issues such as cramped public space, encroachment, and pollution (Pradhan, 2004). Industrialization in urban fringe areas and land transformation has also resulted in the rapid depletion of existing tree covers (Ansari, 2008). Urban forestry has been recognized as an important component for improving the quality of life of urban inhabitants for millennia (Nepali and Gyawali, 2001; Rijal et al., 2020). Butwal, a rapidly urbanizing city, has been hard hit by the rapid growth of population, unplanned development, and impacts of climate change (Nepali and Gyawali, 2001; Rijal et al., 2020). Accessing tree diversity will help to predict the urban ability to support urban forest health (Isbell et al., 2011; Morgenroth et al., 2016; Ordonez & Duinker, 2014). This research aims to find the opportunities and constraints for urban forestry planning in Butwal Sub-Metropolitan city by establishing baseline data that can draw the attention of concerned stakeholders and find possible measures applicable not only for the study sites but also in other areas having similar characteristics. The research gap in scientific research for urban forestry development needs bridging to reconnect urban dwellers with nature (Devkota, 2013; Thapa & Poudel, 2018). As policymakers' interest in urban forestry establishment continues to grow, more research is needed to launch urban forestry in different parts of Nepal.

## **Objectives**

The overall objective of this research is to evaluate the current state of urban forestry in Butwal Sub-Metropolitan city and identify its potential for further development. To achieve this, the study has two specific objectives:

- To assess the existing status and people's perceptions of urban forestry.
- To analyze the issues (opportunities and constraints) of the urban forest in the study area.

## 2. Research Methodology

### Study Area

The study focuses on urban trees in Butwal sub-metropolitan cities, which is located in the Lumbini province of Nepal, covering an area of 101.61 km<sup>2</sup>. The city is situated between 27° 70' North latitudes and 83° 46' East longitudes and is located near the Tinau River, with an elevation ranging from 100 meters to 1229 meters. The population primarily follows the Hindu religion and speaks Nepali and English, with Gurung, Magar, and Tharu people speaking their native language. The city

experiences a tropical climate with an average annual rainfall of 2,374 mm and temperatures ranging from 7.5°C in January to 42°C in June. The study area chosen is a rapidly growing urban area with expanding infrastructure. The study area has been purposively selected as it represents one of the fast-growing urban areas with the rapid expansion of development infrastructure. Wards no 2, and 9 were selected for detailed study. The study area covers the roadside plantation of wards no 2 and wards no 9 with a distance of 2,324m and 1,800m respectively. The road of Ward no 2 was an old highway named Mechi-Mahakali Highway and that of Ward no 9 was a newly expanded highway named Siddhartha Highway. Manimikunda sen park and Duno River are situated in ward no 2 in which tree inventory was done.

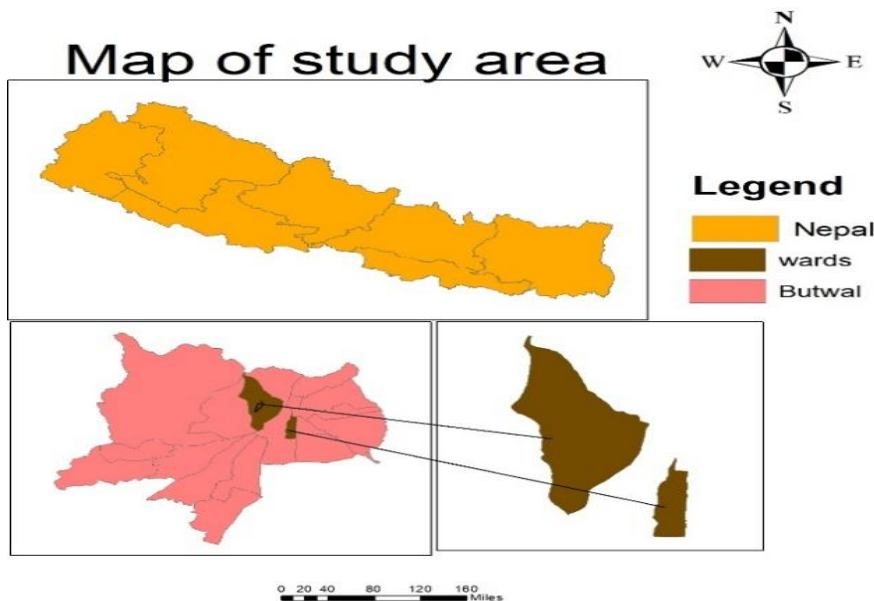


Figure 1: Map showing the study area

### Data collection

#### Primary data collection:

Data collection was divided into two-phase. In the first phase, the status of urban forestry including (urban park, and road-side plantation) was surveyed, and in the second phase focus group discussion and key informants survey was carried out for the opportunities, activities to be prioritized as well as constraints of developing urban forestry specific to the study area.

### Tree inventory inside the park

As the exact area and boundary of the park were unknown, the boundary of the park was digitized with stakeholder consultation using ArcGIS within which sampling was conducted. The Park area is small (approx. 6 hectares) and only 7 plots were surveyed. Within a park, sample plots of 20m\*25m were laid to record the status of the trees within the park including species, height, Dbh, quality, and origin were recorded.



Fig 2: Mani-Mukunda Sen Park

### Road-side species inventory

For the roadside survey, linear measurement using a systematic sampling method was performed, in which linear sample plots of 200m were laid out alternatively on both sides of the road at intervals of 100m along the main road starting from the entry point and exit point of wards no 2 and 9 respectively as shown in figure 3. All the trees within the 14 plots were examined, measured, and recorded individually for their species name, Dbh, height, origin, and quality in the month of April-May 2021. The same method was administered for the river-side tree inventory.

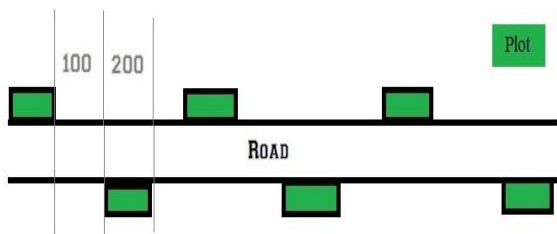


Figure 3: linear measurement on the roadside plantation

### Plant Identification

Most of the native species were identified in the field by the researcher, the rest of the exotic species were collected photographed, and taken to the park management committee for the verification of

species. It was learned that plants for the roadside plantation were supplied from the Gupta plant nursery. So, the photographs of unidentified species were taken to the nursery for confirmation. Additionally, The Plant List (<http://www.theplantlist.org/>) and World Flora Online (<http://worldfloraonline.org/>) were followed for the botanical nomenclature of the recorded species.

### Quality assessment of urban park trees and street species

In order to assess the quality of trees encountered during the survey a self-developed criteria was used as given in Table 1. In this criteria, the quality of the tree was split into 3 major conditions viz. Good, Average, and Poor. For an individual tree to be of good quality according to this criteria, it should be devoid of visible symptoms of defects and insect attack, along with straight bole. Trees having forked bole heavily leaned trees and trees with low to moderate infestations of insects and defects were categorized into the average condition and so on.

Categories	Descriptions
Good	Trimming is not affected by any kind of defect
Average	Fork, leaning, buttress, affected by termite, cracked, less spacing
Poor	Dead, broken, die-back

Table 1: Health status assessment of species

### Secondary data collection

The issues, opportunities, and constraints relating to the development of urban forestry are diverse and location-specific. The general issues of urban forestry were explored from the published papers from different parts of the world with a particular focus on Nepal and its surroundings. Issues, opportunities, and constraints are listed in their order of importance (identified by many scholars, researchers). For this, scientific papers, research reports, thesis, etc were reviewed systematically. It is assumed that some issues identified elsewhere are generic and can be applied in the context of this study.

### Questionnaire survey:

Urban forestry problem impacts entire communities rather than just individuals, so based on the secondary data, issues, opportunities, and constraints were listed out and the semi-structured question was prepared to administer to the focal group.

### Focus group discussion:

Focus group discussion was conducted with school teachers, Community Forest user groups, local organizations, the *Tol* Development committee (*Tol sudhar samiti*), and Park committee members. We mainly conducted focus group discussions with local people to know about the opportunities, issues, and major constraints. Altogether, 5 group discussions were organized, 2 in ward 9 and 3 in ward 2, which were participated by 40 individuals.

### Key informant interview:

The discussion was also made with 15 key informants groups including the division forest office, Department of Road, Wards, Municipality, and Ministry of industry tourism forest and Environment about the issue, opportunity, and way forward. A checklist was prepared for key informant interviews.

### Data analysis

The raw data obtained from the tree inventory and focus group discussion was coded, computed, analyzed, and visualized using the statistical software SPSS (Statistical Package for Social Sciences). To understand the descriptive characteristics of the data, we calculated frequency, percentage, and the weighted mean of the data. Shannon index(H), Simpson index(D) were calculated to examine the species diversity. Relative abundance, calculated with stem counts at species, genus, and the family

level was used to find how well each road scored on the two diversity benchmarks (10/20/30 and 5/10/15) (Kandel et al.,2015; Morgenroth et al.,2016; Santamour,1990)

**3. Result and discussion**

**Respondents' participation in UFP (Urban forestry program)**

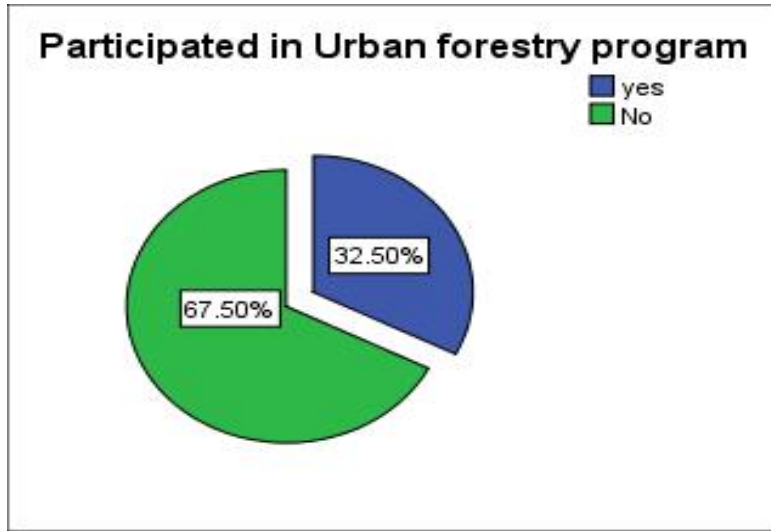


Figure 4: Percentage of people who participate in UFP

52.5% of the survey respondents were male and 47.5% were female. The most represented age group was between 20 to 30 years (55%). 37.5% of respondents were in government service, 20% in the private sector, 12.5% were students, 10% were retired, and 20% were farmers. We asked the respondents if they participated in any program related to urban forestry, they stated,32% of the respondents have engaged in urban forestry programs, while the remaining 67.7% of the respondents didn't engage in UFP which is shown in Figure 4. It shows that there is low participation of the respondent in UFP which was similar to (Gurung et al., 2012; Devkota,2018). They reported that except in some plantation programs organized by Community Forest, and Schools, there haven't been many programs that seek public participation. Only the Rotary Club, Lion Club, Federation of Nepal Gold and Silver Dealers, and Butwal Gold and Silver Dealers' Association planted urban trees, not municipalities, wards, or other official entities. The urban forest cannot simply be the planting of trees in the urban area; its success may necessitate collaboration among botanists, foresters, soil scientists, gardeners, city planners, and landscape architects (Lamichhane & Thapa,2012) which seems lacking in butwal city. Local people and planners must work together to nurture at least two mature trees per person (Singh et al.,2010).

**Status, the existing condition of species in park, river, and roadside plantation**

**Park status**

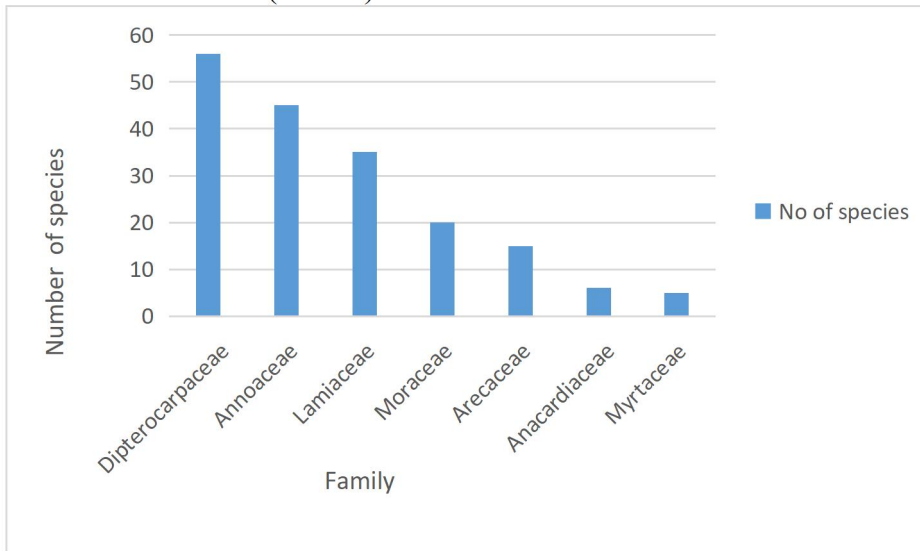


Figure 5: Family-wise species richness

Family-wise species richness indicates that, out of 183 total count trees in the park within the sample plot, seven families were the most dominant families. Family wise species richness shows that the Dipterocarpaceae family is dominant mainly *Shorea robusta* followed by newly introduced Annonaceae mainly *Polyalthiya longifolia* and other families as shown in Figure 5. The present condition of the park management is oriented toward aesthetic beauty but gives little attention to urban forestry. The result shows that there were about 47% of native species and 53% of exotic species in terms of abundance which is lower than in Bangalore city (Nagendra &Thapa,2019) but it is more when contrasted with south korean cities comprises of exotic species less than 30%of the population (Zerba et al.,2004) To increase the aesthetic beauty, people were oriented towards *Polyalthiya longifolia* plantation. Their growing form and final size in the urban park were remarkably similar. All forms of urban parks represented the city's historical geography as well as economic and cultural development (Maurer et al., 2000).



Figure 6: Status of the tree inside the park

Results of the study depicted that 35% of the trees encountered were of good quality i.e some recently introduced exotic species were trimmed and are in good condition, and 55% are of average quality for example most of the *Shorea robusta* and *Tectona grandis* encountered were highly affected by the termite's infestation, buttress formation. and 10% are of poor quality as some trees were broken, dead, and affected by diseases as shown in Figure 6. Moreover, there were old big trees whose Dbh is more than 40 cm that needs to be removed from the park as they were infested by the termites and buttress formation. The management is solely done by the park committee with no

collaboration with the municipality and other local organizations. Similar problems were reported in urban forestry management in other areas of Nepal (Baral & Kurmi, 2005; Gautam et al., 2006; Lamichhane & Thapa, 2012; Devkota, 2018). We should be aware of the fact that parks not only hold the potential to attract leisure and nature lovers but they are considered biodiversity hotspots in urban areas (Konijnendijk et al., 2013). Therefore, it could be better if they felled the old affected tree and introduced plants with large canopy cover and fast-growing species.

### Road and riverside plantation status

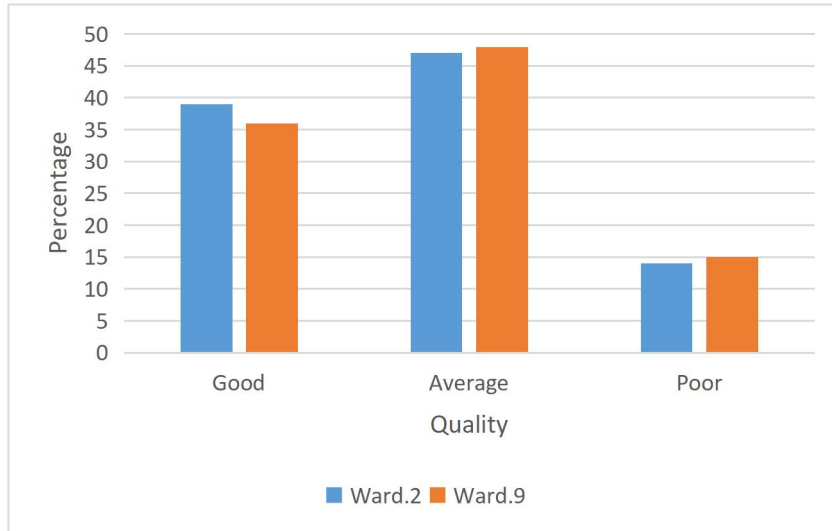


Figure 7: Status of roadside plantation

Out of 173 stem counts, 30 species 18 families were encountered which indicates less diversity of species in the plantation section as compared to the result obtained from the research done on the Kathmandu Street tree by (Pandey et al., 2020; Nagendra & Gopal, 2010). Our study reveals that 47% of the total species on the Mechi-Mahakali highway, and 48% of the total species on the Siddhartha highway are of average quality shown in Figure 7. There might be several factors affecting the growth of the species in the urban area such as root zone temperature (Arnold & McDonald, 1996; Hodge & Boswell, 1993; Graves, 1991), pavement cutout (Day & Amatesis, 2011; Grabosky & Gilman, 2004; Nowark et al., 2004), soil quality (Rahman et al., 2011; Grabosky et al., 2009), invasion of the weed and pest (Bennett & Graton, 2012; Meineke et al., 2013; Moore & Gregory, 1998; Alexis & Alvey, 2006). However, in the case of butwal, there was an inappropriate selection of species for example, within the 5m of distance mixed species like *Ficus religiosa*, *Ficus beghalensis*, and *Ficus bejamina* were planted which was similar to the study done in Kathmandu (Pandey & luitel, 2020), less spacing between recently planted species, less pavement out cuts are seen in a street-side plantation, grazing by stray domestic animal So, we should fence properly while planting trees, since the larger the tree and the closer it is to the pavement, the more likely it is to cause infrastructure damage (Francis et al., 1996). Furthermore, environmental stress, pests and pathogens, nutrition insufficiency, day-light stress, pollution, and vandalism are also some similar issues in urban forestry management in Nepalese urban areas (Baral & kurmi, 2005; Gautam et al., 2006).

### Plant species diversity in Butwal sub-metropolitan city

Shannon wiener index(H) and Simson index(D) of the roadside plantation at species-level at ward no 2 and ward no 9 are shown in fig 8 and fig 9.



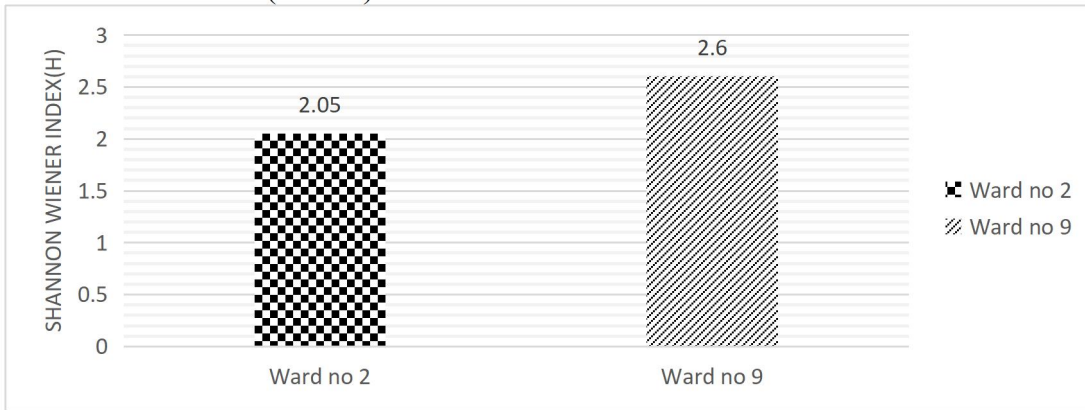


Figure 8: Shannon wiener index(H) of a roadside plantation at species-level at ward no 2 and ward no 9.

\*Higher number indicates a more diverse community

As illustrated in Figure 8, the Shannon index at the species level was found to be 2.05 and 2.6 which means, there is more diversity, and less evenness inwards no 2& 9 respectively. This might be because of newly planted species on newly expended road i.e., Siddhartha highway.

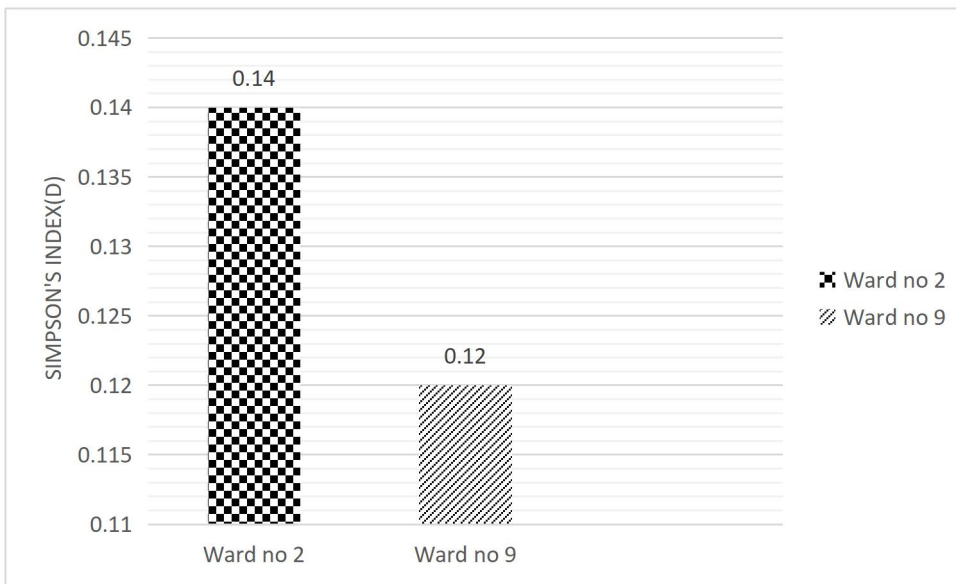


Figure 9: Simpson's index(D) of the roadside plantation at species level at Ward no 2 and Ward no 9.

\*Higher number indicates a more diverse community

Simpson index at species level found 0.14 and 0.12 in ward no 2 and ward no 9 respectively as shown in Figure 9, this indicates that there is evenness/abundance of species in the Mechi-Mahakali highway. This could be due to the existence of old plantations, which appear to be less abundant than in the Kathmandu Valley. (Pandey &Luitel,2020) also seems less than other Asian countries (Sudha&Ravindranth,2000; Thaiusta et al.,2008; Jha et al.,2019).

Area	Stem count	Most abundant species %, Name	Most abundant genus %, Name	Most abundant family %, Name
Ward no 2	49	<i>Ficus religiosa</i> L. 30% <i>Ficus benghalensis</i> L.14%	<i>Ficus</i> ,53% <b><i>Polyanthia</i>,12%</b>	Moraceae 53% <b>Fabaceae 16%</b>

Ward no 9	124	<i>Polyanthia longifolia</i> (sonn.) Thwaites, 29% <i>Ficus benjamina</i> L. 8%	Polyanthia, 29% Ficus, 24%	<b>Annonaceae 29%</b> <b>Moraceae 19%</b>
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Table 2: Diversity benchmark of street tree inventories across ward no 2 and ward no 9 which is calculated using the stem count.

Species diversity in an urban forest is often lacking. Although some of the most popular species are frequently overplanted, urban areas may also serve as deposits for a variety of tree species (Watson, 2018). To understand the diversity of street trees, the most abundant species, genus, the family were calculated using the stem count method which was adopted by (Santamor, 1990). Our study reveals that, most dominant species accounting genus **-Polyanthia 12%, family Fabaceae 16% of Ward 2** and family **Annonaceae, 29%, Moraceae, 19%** of Ward 9 meet the proposed benchmark

10/20/30 (Kandel et al., 2014) as shown in table 2, while none of the wards meet the 5/10/15 benchmark (Galle et al., 2021; Watson, 2018). A 5/10/15 rule would give more variety, although it might not be feasible at all scales (Watson, 2018), most of the studies conducted in Great Britain, Nordic cities, and India none of the research meet 5/10/15 benchmark (Monteiro et al., 2020; Sjomani et al., 2012; Nagendra & Gopal, 2010). The 10/20/30 standard is more well recognized in North American cities—Cambridge, US, and Vancouver, Canada, both use it in their respective urban forest management (Galle et al., 2021). Although we discovered 8% of *Ficus benjamina* species in street-side plantations, these are unsuitable for that location because of their size which may crack the pavement with their root (Pandey & Luitel 2020; Lamichanne & Thapa, 2012). Street trees tend to have low life spans compared to trees in more "natural" situations and, especially, to the stress of the urban environment, compared to trees in other urban areas such as parks (Nagendra & Gopal, 2010). As a result, insects and other pests attack these stressed plants more often. High species variety is one approach to fight against pest infestations, hence places with a wide mix of species would be more resilient than those dominated by a few species (McPherson & Rowntree, 1989; Galvin, 1999; Thavista et al., 2008). From this analysis, we conclude that it could be better if we plant the species following the 10/20/30 rule purposed by (Santamor, 1990).

### Issues (opportunities, constraints, and activities to be priorities)

#### Perception of the people towards opportunities of UF

Considerable Statements	Disagree (%)	Neutral (%)	Agree (%)	Weighted Mean	Std. Deviation
Change in microclimate	10%	5%	85%	2.75	0.630
Pollution control	10%	22.5%	67.5%	2.57	0.675
Provide shelter	5%	15%	80%	2.75	0.543
Recreation	2.5%	10%	87.5%	2.85	0.427
Amenity	7.5%	25.0%	67.5%	2.60	0.632
Employment opportunities	0%	17.5%	82.5%	2.83	0.385
Oriented toward	5%	17.5%	77.5%	2.72	0.554

<b>park construction</b>					
<b>Rainfall interception</b>	17.5%	35.0%	47.5%	2.30	0.758
<b>Regulation of atmospheric carbon</b>	0%	27.5%	72.5%	2.72	0.452
<b>Stress reduction</b>	0%	20%	80%	2.80	0.405
<b>Provide settings for meditation</b>	10%	22.5%	67.5%	2.57	0.675

Table 3: Showing the opportunities for urban forestry

From the survey, it was found that for the statement of "Recreation "and "Employment opportunities, "the weighted mean is "2.85" and "2.83" respectively which is more than the rest of the statements which result is similar to the (Gurung et al., 2011; Devkota,2018) which indicates the majority of people believe that urban forestry offers recreational and job options. This might be because they feel that they go to the park to relax and take a walk, and many people are hired to maintain the plantation, whether it is in the park or on the street. However, the weighted mean was 2.30 for the statement "Rainfall interception". It suggests that people seem aware of the visible functional significance not about the hydrological characteristics of the urban forest.

<b>Considerable Statements</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Weighted mean</b>	<b>Std. Deviation</b>
<b>Sensitization program about the importance of urban forestry</b>	5%	12.5%	82.5%	2.78	0.530
<b>Tree plantation along the roadside</b>	5%	32.5%	62.5%	2.58	0.594
<b>Allocation of the budget for the urban forestry</b>	15%	17.5%	67.5%	2.53	0.751
<b>Park development at the ward level</b>	15%	17.5%	67.5%	2.52	0.751
<b>Coordination among local organizations</b>	12.5%	32.5%	55%	2.43	0.712
<b>Appropriate</b>	7.5%	22.5%	70%	2.63	0.628

<b>selection of species</b>					
<b>Species selection according to the people's desire</b>	5%	20%	75%	2.70	0.564
<b>Remove unnecessary trees and new suitable species</b>	2.5%	12.5%	85%	2.82	0.446
<b>Coordination between DoR and Municipalities</b>	7.5%	22.5%	70%	2.62	0.628
<b>Interested in expanding tree</b>	12.5%	20.2%	67.5%	2.55	0.714

Table 4: Showing the statement of the activities that needed to be prioritized

The ranking of the statements in Table 4 shows, people ranked more in the statement of "Remove unnecessary trees and new suitable species", which indicates that people think planting new suitable species is good but this obsession with more suitable trees needs to be balanced with managing the existing unnecessary trees. Paradoxically, for the statement "Coordination among the local organization, respondents ranked least as they believe that, they can't expect from the local organization if municipalities and wards aren't doing anything to promote urban forestry.

### Respondents' perception of constraint factors to promote and develop urban forestry

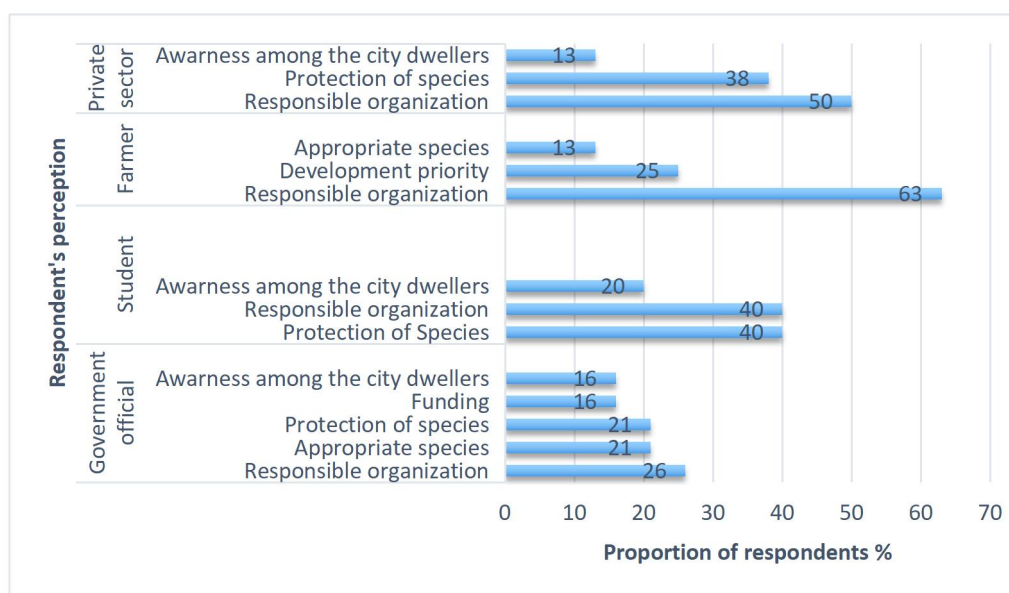


Figure 10: Constraints to Urban Forestry Development (UFD) based on their top priority. Similarly, to understand the major constraint of urban forestry development, respondents were asked to rank the government officials. Students and farmers according to their priority as shown in Figure 10, we found that 50% of the respondents were from the private sectors category, 63% of the respondents from the farmer's category, 40% of the respondents from the student category, and 26%

of the respondents from the government officials all ranked responsible organization as the major constraints for urban forestry development which was in contrast with the research conducted in Gaidakot municipality by (Sharma & Ghimire, 2019). This might be due to the lack of a legal plan of action for urban forestry. The particular role of the organization is not mentioned in the written forest policy document.

#### 4. Conclusion and Recommendations

The findings of this study revealed that urban forestry has potential through an appropriately integrated management approach in the Butwal sub-metropolitan city. In some places like Kalikagar road plantation appears to have been completed with little regard for spacing. Land acquisition appears to be their primary goal, rather than creating a favorable environment through proper spacing and proper species selection. Large tree species are being planted despite the lack of clear guidelines, instructions, and legislation. On Siddhartha- highway, the roadside plantation was not in satisfactory condition throughout the road. Within the 200m distance species like *Ficus religiosa* L., *Ficus*

*benghalensis* L., and *Ficus benjamina* L. were recently planted which are not suitable at that place. These species' roots can cause carked which results in damaging the structure of newly expanded roads, so they should be uprooted and replaced. People seem interested in urban forestry development if their involvement is considered. This circumstance suggests that effective urban forestry initiatives can be done through local people's participation soon in the future. Studying the diversity and distribution of the street tree, and park tree, we discovered that the tree diversity in the streets of Butwal is comparatively low as compared to other cities. The present study provides evidence that from private, student, and government official perspectives, lack of responsible organizations, species protection is the major constraint for UFD as lack of responsible organization create confusion about their responsibility towards urban forest management such information is important for several management implication sections to develop sustainable urban forestry. Additionally, the importance of urban forestry is well known by urban dwellers than others. Unfortunately, the budget for urban forestry development does not reflect the same level of importance. Therefore, The UFD program must be prioritized and included in national plans and programs.

The recommendations from this study are;

1. It is recommended to plant medium-sized trees in roadside plantations in order to minimize the risk of damage caused by trees to infrastructure and humans in case of accidents.
2. Pavement cut-outs should be made wide to boost the life expectancy of a tree.
3. Species diversity guidelines should be taken into account to maintain the urban ecosystem before plantation because wisely planting a tree can lead to decreased mortality and ultimately reduce the higher expenses when they need to be removed or replaced.
4. Urban forestry normally seems unsystematic plantation, so the plantation needs to be selected by experts.
5. The urban forest awareness program should be stepped up with the combined involvement of municipalities, local people, and private organizations.
6. Abandoned domestic animals seem problematic for plant growth so, their management should be prioritized.
7. Municipalities should have a particular section with qualified technical expertise to take responsibility for promoting UF.
8. There is a lack of silviculture management, roadside plantation seems dependent on rainwater only. Communities people/local organizations should be mobilized to care for that plantation.

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## The Missing Opportunity in the Climate Change Adaptation Policy: Insights from Nepal

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### Abstract

*Amidst the escalating global vulnerability and threat of climate change, the prevailing discourse, policies, and practices predominantly centred on its adverse impacts. This paper contends that despite the overshadowing focus on negative consequences, positive impacts of climate change exist on the ground in various forms, scales, and nature, which are less explored. In this context, the paper probes some intriguing questions: What are the positive impacts of climate change? Why is knowledge of these impacts necessary? Do they serve any practical purpose? And, do positive impacts hold any significance in the realm of climate change policy? Employing a desk-based approach and utilizing content analysis, the paper delves into the cases of Nepal's climate change policy, extending its integration with adaptation plans in discussing how they have recognized the positive effects and the interface between policy and practice. The paper concludes that while the negative impacts outweigh the positive, neglecting or underestimating discussions on, capitalizing on, and incorporating positive impacts may lead to a missed opportunity in the design of more effective and efficient adaptation strategies.*

**Keywords :** adaptation, climate change, opportunity, policy and practice gap, positive impact

### 1. Introduction

Climate change has emerged as a prominent global developmental challenge, and its risks are across both human and natural systems (IPCC, 2014; Pörtner et al., 2021). The adverse impact of climate change on agriculture alone is projected to increase poverty by 35 to 122 million by 2030 (FAO, 2016). Recognizing the gravity of these challenges, international efforts to address climate change have been formalized through a series of crucial platforms, evolving from the Kyoto Protocol to the more recent Paris Agreement. This represents a significant collective commitment among nations to limit global temperature increases well below 2 degrees Celsius, with aspirations to further restrict the rise to 1.5 degrees Celsius.

Nepal stands particularly vulnerable, not solely due to its fragile geology, sensitive ecosystems, icecaps, and climatic diversity, but equally due to acute poverty, a dearth of adaptation capacity, and a high reliance on natural resources. According to the Global Climate Risk Index, Nepal ranks fourth in terms of climate risk (Eckstein et al., 2018), projecting a 2.2% reduction in the country's annual GDP by 2050 under business-as-usual scenarios (Ahmed and Suphachalasai, 2014). Government reports asserting that climate-triggered calamities account for approximately 65 percent of all annual fatalities attributed to disasters in Nepal. These climate-induced disasters incur an average annual economic toll equivalent to approximately 0.08 to 2% of the GDP (MoPE, 2016; MoFE, 2021). Water-induced disasters alone accounted for 1.5 to 2 percent of the national GDP in 2013, a figure that could escalate to 5 percent in an extreme flood year (IDS-Nepal, PAC and GCAP, 2014). The 2017 flood, for instance, incurred estimated losses of USD 584.7 million, approximately 3 percent of Nepal's GDP (NPC, 2017). These challenges underscore the critical imperative for robust climate change adaptation strategies in the Nepalese context.

Thus, both from a scientific and practical standpoint, there is unequivocal evidence that climate change has severe global negative impacts. Given that the predominant discourse on climate change often emphasizes its negative impacts, it's essential to acknowledge that some regions and sectors may experience certain positive effects in various forms, scales, and nature. However, these positive aspects are

frequently overshadowed or neglected and inadequately explored in mainstream climate discourses, policies, and practices.

The policy landscape concerning climate change impacts grapples with several notable gaps, impeding the effective incorporation of scientific understanding into actionable strategies. One prominent shortfall lies in the challenge of integrating complex climate science into policy frameworks (Watson, 2005), resulting in a gap between scientific assessments and tangible policy initiatives. The lack of localized impact assessments further exacerbates the issue, making it difficult to tailor policies to the specific vulnerabilities faced by diverse regions. Additionally, the interconnectivity of climate change impacts with other environmental, social, and economic risks is often overlooked (Weart, 2013), leading to a gap in comprehending cumulative effects and potential cascading impacts. Short-term political cycles contribute to a further policy gap, as policymakers may prioritize immediate concerns over the sustained and gradually escalating impacts of climate change, hindering long-term planning. Within this context, the oversight of positive impacts in mainstream climate discourse further widens the gap, particularly in adaptation policies.

Against this backdrop, this policy review poses thought-provoking questions: What are the positive impacts of climate change? Why is understanding these positive impacts essential? Does information on the positive impacts and benefits offered by climate change have policy significance? How is this issue considered at the policy and practice level in Nepal? The attempt here is not to engage in a discourse comparing the relative merits of positive and negative impacts or to conduct a technical analysis to scientifically prove them. Instead, the primary objectives are to draw attention to the tendency to overlook or disregard the positive effects of policy and adaptation plans, to show how capitalizing positive impacts can be an opportunity and to highlight the gap between policy provisions and the actual implementation of adaptation plans. While Nepal's climate policy exhibits numerous positive aspects, this review identifies areas requiring improvement.

Through content analysis methods, the review puts forth two arguments within the broader context of adaptation policy for climate change. Firstly, there is a crucial need to comprehend and identify the positive impacts of climate change, and secondly, this knowledge and evidence can serve as a valuable tool for developing a more effective adaptation strategy if employed wisely and proactively.

## **2. Method**

The study is a desk-based review of global literature on climate change and adaptations. Employing a diverse array of keywords and synonym concepts, such as "positive impact/effects of climate change," "climate change opportunities," "positive livelihood impact," "benefits," "favourable climate and crop yield," and "biodiversity benefits," the review is designed to broaden the scope of the literature search. Furthermore, the review explores potential opportunities for leveraging the effects of climate change to enhance adaptation measures. This study is confined to a desk-based analysis, and its scope is not centred on providing scientific validation. Instead, its primary purpose is to draw attention to an overlooked opportunity within climate policy and adaptation plans.

In conjunction with the global literature review, this policy analysis delves into five pivotal national climate change documents in Nepal: i) the Climate Change Policy 2011, ii) the National Adaptation Programme of Action (NAPA) 2010, iii) the Local Adaptation Plans for Action (LAPA), iv) the National Climate Change Policy 2076 BS (2019), and v) National Adaptation Plan (NAP) 2021-2050. These documents have been selected due to their significance as seminal climate change policy frameworks and adaptation initiatives in Nepal. The review also references the 'National Technical Report on economic impact assessment of climate change in key sectors in Nepal 2014' as a fundamental source of information.

Employing content analysis methods, this paper systematically evaluates the extent to which climate change policies and adaptation plans in Nepal have acknowledged the positive effects of climate change.

The analysis scrutinizes the presence of positive affect words, themes, or concepts in these documents. Furthermore, a comparative examination is conducted between climate change policies and adaptation plans to identify potential gaps between policy intentions and their practical implementation. The

adaptation plans review focuses on five sections, namely, i) goal and objective, ii) identification of impacts, iii) thematic topic-wise discussion of the National Adaptation Programme of Action (NAPA), Local Adaptation Plans for Action (LAPA) and National Adaptation Plan (NAP), iv) adaptation measures and prioritization, and v) adaptation action plan, aiming to discern discrepancies between policy and practice.

### 3. Findings

#### 3.1. *What are the possible positive impacts?*

The prevailing discourse, policies, and practices surrounding climate change predominantly centre on its adverse effects, resulting in limited literature dedicated to exploring potential positive impacts. Furthermore, existing information concerning positive effects is often deficient in comprehensive explanations, substantiating evidence, and quantitative data. Nevertheless, this review strives to illuminate certain available literature discussing positive impacts (refer to Table 1) in an effort to offer insights into how these contexts can be leveraged to maximize benefits for the development of more effective adaptation strategies.

<b>Table 1: Positive impacts discussed in the literature</b>
<ul style="list-style-type: none"> <li>• Positive effects on crop yields in high-latitude regions (IPCC, 2014, p. 4-5)</li> </ul>
<ul style="list-style-type: none"> <li>• ‘climate change from 2005 to 2050 in North Cameroon or Madagascar will have a positive effect on cotton yields’ (Gérardeaux. et al. 2013)</li> </ul>
<ul style="list-style-type: none"> <li>• ‘crops such as wheat, rice and soybeans [known as C3 crops] responding positively to increased CO2’ (McGuigan et al. 2002. p 9)</li> </ul>
<ul style="list-style-type: none"> <li>• ‘With an increased level of CO2 in the atmosphere, the fertilization of crops is increased along with decreased energy requirements due to warming’ (Malhi et al., 2021. p 2)</li> </ul>
<ul style="list-style-type: none"> <li>• The results have shown that temperature adversely affects yield and cereal production, while precipitation has positive effect (Sossou et al., 2019 p 1)</li> </ul>
<ul style="list-style-type: none"> <li>• Possibility of double-cropping at high latitudes (Matthews et al., 1997)</li> </ul>
<ul style="list-style-type: none"> <li>• Expansion of agroecological belts into higher altitudes and increased length of growing period for some crop species (MoE, 2010)</li> </ul>
<ul style="list-style-type: none"> <li>• Positive livelihood impacts to farming communities as drying of swamps allows maize cultivation in off seasons (Bele et al., 2013)</li> </ul>
<ul style="list-style-type: none"> <li>• IDS-Nepal, PAC and GCAP (2014)                             <ul style="list-style-type: none"> <li>○ ‘relatively low precipitation and high temperatures during the fall and spring seasons seem to have a positive impact on net farm income (p. 45)</li> <li>○ ‘CO2 fertilization and from extended growing seasons in colder regions’ (p. 87)</li> <li>○ ‘In the Hill region, there is generally a more positive trend with productivity increases in the short-term (2030)’ (p. 88)</li> <li>○ ‘For irrigated wheat, CO2 had a clear positive benefit, and at 700 ppm CO2, yields go up by nearly 30%.’ (p. 98)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Malla, G. (2008)                             <ul style="list-style-type: none"> <li>○ ‘positive effect in yield of rice and wheat in all regions [of Nepal], but negative effect in maize, especially in Terai.’</li> <li>○ Increase in cultivable land at highlands due to increasing temperature</li> <li>○ ‘Tropical fruits (banana, mango, papaya) and other crop like (croton) has been adopted in mid hills’</li> <li>○ ‘increase of atmospheric CO2 will increase the greenery of the land or fodder and pasture for the livestock</li> </ul> </li> </ul>

- Chang (2002)
  - ‘temperature variations seem to be more favourable to yields, while precipitation variations are mostly yield-decreasing’ (p 57)
  - Temperature rise is favourable to Tomato, Ponkan, Tankan and Wentan
  - ‘Climate variations are found to have a significant yield impact on many crops like corn, peanut, sorghum, sugarcane, sesame, scallop bulb, bamboo, cucumber, cantaloupe, banana, etc.’ (p 59)

### **3.2. How and why are positive impacts beneficial?**

McGuigan et al. (2002), Sherchand et al. (2007), Malla (2008), Sossou et al., 2019 and Malhi et al., 2021 claim that climate change, particularly increasing temperature and CO<sub>2</sub>, has the potential to enhance the agricultural yield of major crops such as rice and wheat by promoting photosynthetic processes, improving water-use efficiency, shortening physiological period and enhancing soil microbial activities. Study shows the yield of rice and wheat increased by 26.6% and 18.4%, respectively, due to doubled CO<sub>2</sub>, and 17.1% and 8.6%, respectively, due to an increase in temperature (Malla, 2008). A positive correlation between CO<sub>2</sub> emissions and the production of wheat and sugarcane is also observed (Qureshi et al., 2016). According to the study, the impact on tomato and tropical fruits such as banana, mango, and papaya was impressive as production increased by 279 per cent and 205 per cent, respectively. Additionally, this altered climate allows the cultivation of tropical crops in hilly conditions previously deemed unfavourable, a notion supported by Chang's study (2002).

This favourable scenario suggests that rice and wheat could emerge as essential alternatives or priority crops in the formulation of adaptation strategies and programs for specific communities and locations where climatic conditions were historically unfavourable. Additionally, integrating cash crops and tropical fruits into livelihood components in adaptation strategies tailored to specific contexts and locations where previously climatically unsuitable could help bridge income gaps for farmers. Consequently, the positive correlation experienced by these crops presents an opportunity for strategic capitalization.

Similarly, certain lands at higher latitude regions, once deemed unsuitable for cultivation, may become arable with increasing temperatures and CO<sub>2</sub> levels, as indicated in the AR5 Climate Change 2014 report by IPCC (2014) and Matthews et al. (1997). For instance, in Nepal's Mustang region, characterized by high altitude and an arid landscape, crops like maize, chilli, tomato, and cucumber were once deemed uncultivable but now present possibilities due to rising temperatures (Malla, 2008). This insight is pivotal in identifying alternative agricultural options in high-latitude and arid regions like Mustang when devising adaptation strategies in Nepal or similar regions.

Further, warmer temperatures facilitate longer growing seasons and vegetation periods, potentially enabling a transition from single-cropping to double-cropping in specific locations. Additionally, the increased availability of green fodder, facilitated by favourable climatic conditions, could enhance livestock rearing. Local farmers, already engaged in experimenting and adopting innovative practices in response to climate change (Thapa et al., 2018), possess valuable local knowledge that can be harnessed to identify positive impacts. Thus, strategic capitalization on these positive impacts could lead to the development of more effective adaptation practices. This aligns with the vision outlined in Nepal's climate change policy of 2011, emphasizing the imperative to maximize benefits by leveraging positive impacts. The economic impact assessment of climate change in key sectors in Nepal in 2014 has similarly addressed certain positive impacts offered by climate change. However, a disparity emerges when translating these insights into practice, a subject discussed in the subsequent section.

### **3.3. Policy and practice gap**

To assess the alignment between policy commitments and practical realization of benefits stemming from the positive impacts of climate change, an examination is conducted by comparing the National

Adaptation Programme of Action (NAPA) and Local Adaptation Plans for Action (LAPA) documents with pertinent climate policy documents. This examination aims to shed light on any discernible gaps between stated policy objectives and the practical implementation of strategies to capitalize on positive impacts associated with climate change.

### 3.3.1. Climate Change Policy 2011

While the National Climate Change Policy of Nepal from 2011 has been succeeded by the more recent National Climate Change Policy 2076 BS (2019), a review of earlier policies remains imperative for a comprehensive understanding of the evolution of climate and adaptation discourse and its influence on policymaking.

Nepal's Climate Change Policy 2011 explicitly incorporates the concept of capitalizing on positive impacts. Among its seven policy objectives, the second objective distinctly articulates the aspiration:

*‘to implement climate adaptation-related programmes and maximize the benefits by enhancing positive impacts and mitigating the adverse impacts.’*

This articulation signifies a clear and precise intent in the policy, indicating that its objectives encompass not only the mitigation of adverse impacts but also the optimization of positive impacts during the design and implementation of adaptation-related programs. This commitment is further underscored in the 'study and research' section of the Climate Change Policy 2011, wherein it emphasizes the need to:

*‘conduct climate change-related research to expand the implementation of measures for adapting to adverse impacts and benefiting from positive impacts.’*

Moreover, one of the quantitative targets of the policy focuses on assessing the losses and benefits of climate change studies, and this target has been duly achieved. Therefore, the 2011 policy, to a certain extent, acknowledges the significance of capitalizing on positive impacts in the broader context of climate change adaptation.

### 3.3.2. National Adaptation Programme of Action (NAPA)

The National Adaptation Programme of Action (NAPA) for Nepal extensively addresses and prioritizes strategies for mitigating the adverse impacts of adaptation planning. While it briefly touches upon certain facets of positive impacts (refer to Table 2), the discussion is characterized by vagueness and brevity. Ambiguity surrounds its intent as it raises uncertainties due to a lack of substantial evidence and in-depth discussion verifying whether the overarching intention is to maximize the opportunities presented by climate change. Despite the NAPA and climate change policy 2011 were drafted at a similar period, the former fails to explicitly incorporate the overarching concept of maximizing the benefits derived from climate change.

Sections	Contents
Objective	Mentions in general objective 'opportunities posed by climate change but not on specific objectives.
Under the forest and biodiversity theme	It briefly mentions the positive impact, but an analysis of what and how to reap the benefits is missing.
NAPA thematic areas of impacts	Out of six themes, only the forestry and biodiversity section briefly mentions, 'In some cases, these changes have benefited communities by increasing the ecological range of cultivation for certain crops.' (p 13).

	However, no analysis, discussion or conclusion is drawn on what and how to capitalize on those benefits in all six thematic areas.
Identification of adaptation needs	<p>Briefly mention:</p> <ul style="list-style-type: none"> <li>• Agriculture and food security section: expansion of agroecological belts into higher altitudes and increases the length of growing period for some crop species.</li> <li>• Forest and biodiversity section: Harness the potential and economic benefits of forest management</li> </ul> <p>However, no analysis, discussion or conclusion was drawn on what and how to capitalize on those benefits in all six thematic areas.</p>
Prioritized activities	<p>Mention various concepts like:</p> <ul style="list-style-type: none"> <li>• Diversify livelihood options and income.</li> <li>• Promote sustainable farming practice</li> <li>• Provide technology, skill and support for increasing production and productivity</li> <li>• Promote highland-low land linkages</li> <li>• Improve pasture and rangeland management technique</li> <li>• Sectorial plan development</li> <li>• Sustainable resource management</li> <li>• Increasing access to the agriculture system</li> <li>• Promote ecosystem-based livelihoods etc.</li> </ul>

### 3.3.3. Local Adaptation Plans for Action (LAPA)

The LAPA serves as a pivotal implementation framework for local adaptation, aiming to seamlessly integrate climate change considerations into local development plans. Given its integral role, LAPA holds paramount importance as a document for evaluating the effectiveness of the adaptation instrument. In order to assess the effectiveness of this adaptation tool, a random review of five LAPA documents is conducted, encompassing various geographical regions, including mountainous, hilly, and plains areas (refer to Table 3).

Despite its pivotal role as a foundational adaptation tool, it is noteworthy that none of the LAPA documents or their constituent components explicitly reference positive impacts or engage in discussions regarding strategies for capitalizing on these potential benefits.

**Table 3: Reviewing LAPA to assess the acknowledgement of positive impacts**

Sections	LAPA Contents				
	Hilly Districts		Mountain District	Plains districts	
	Chumubri Rural Municipality, Ward No Six, Chumchet, Gorkha District	Marsyandi Rural municipality, ward no Five, Lamjung District	Lomangthang Rural municipality ward no Five, Mustang District	Dahakhani, Chitwan District	Daura, Nawalparasi District
<b>Goal and objective</b>	NM	NM	NM	NM	NM
<b>Identification of impacts</b>	NM	NM	NM	NM	NM

<b>NAPA Thematic topic-wise discussion</b>	NM	NM	NM	NM	NM
<b>Adaptation measures and prioritization</b>	NM	NM	NM	NM	NM
<b>Adaptation action plan</b>	NM	NM	NM	NM	NM
<p><i>* NM = not mentioned and discussed the positive impact of climate change</i>  <i>** The process and method of LAPA formulation are similar across each region. Hence, reviewing some LAPA documents reflect how other LAPA documents of Nepal are drafted.</i></p>					

Some components of LAPA in Chumnuhari and Marsyandi Rural Municipality touch upon minute issues such as a shift towards cash crops and herbs and a move towards crops resistant to drought, respectively. However, a substantial concern persists regarding the substantive basis for the intention to capitalize on beneficial impacts, as no explicit discourse or empirical substantiation is provided, raising questions about the validity of such interventions.

### 3.3.4. National Climate Change Policy 2076 BS (2019)

In comparison to the 2011 climate policy, the 2019 climate policy demonstrates a more comprehensive approach. Various sections, including background, problems/challenges, the rationale for a new policy, goals/objectives, etc., are richly loaded with information emphasizing high risks, adverse and negative effects, potential loss or damage, and climate-induced disasters. Despite the extensive coverage, the approach to framing the contents of 12 sectoral policies, strategies, and working policies appears predominantly inclined toward the notion of adverse effects, with a notable absence of explicit acknowledgement of positive impacts. While certain content in the policy aligns with the arguments presented in this paper, the intention behind these sections remains uncertain—whether they are intended to recognize positive effects or constitute arbitrary interventions akin to LAPA.

Regrettably, the 2019 climate policy discontinues the provision of maximizing benefits, a concept discussed in the 2011 climate policy, without undergoing any evident review or research. Consequently, this paper observes a lack of essence and guidance for capitalizing on the opportunities presented by climate change within the objectives and the entire framework of the 2019 climate change policy document.

<b>Table 4: Reviewing National Climate Change Policy 2019 to assess the acknowledgement of positive impacts</b>	
<b>Sectoral Policy, Strategies and Working Policy sections</b>	<b>Contents</b>



Agriculture and Food Security	<ul style="list-style-type: none"> <li>• ‘Agricultural crops suitable for dry and waterlogged areas will be identified and Promoted.’</li> <li>• ‘Technologies that protects crops from climate-induced disasters like drought and cold waves will be developed and expanded.’</li> <li>• ‘Traditional knowledge, skill and practice as well as innovative technologies related to climate-friendly agricultural system will be documented, promoted and expanded.’</li> <li>• ‘Energy efficient technologies will be promoted’</li> </ul>
Forest, Biodiversity and Watershed Conservation	<ul style="list-style-type: none"> <li>• 'Adaptation capacity of local community will be enhanced by incorporating best practices</li> <li>• 'Financial benefits received from carbon storage through REDD+ and the Clean Development Mechanism will be distributed in a just manner</li> </ul>
Water Resources and Energy	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Rural and Urban Habitats	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Industry, Transport and Physical infrastructure	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Tourism and Natural and Cultural Heritage	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Health, Drinking Water and Sanitation	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Disaster Risk Reduction and Management	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Gender Equality and Social Inclusion, Livelihoods and Good Governance	<ul style="list-style-type: none"> <li>• ‘Adaptation measures will be adopted in line with local and indigenous knowledge, skills and technologies</li> </ul>
Awareness Raising and Capacity Development	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
Research, Technology Development and Expansion	<ul style="list-style-type: none"> <li>• ‘Study and research on the effects of climate change in various thematic areas will be conducted regularly and their results will be integrated into decision-making process.’</li> <li>• ‘Development and use of climate-friendly traditional and nature-based technologies will be promoted.’</li> </ul>
Climate Finance Management	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>

### 3.3.5. *National Adaptation Plan (NAP) (2021 – 2050)*

The National Adaptation Plan (NAP) process was formally instituted in 2010 as part of the Cancun Adaptation Framework, arising from the 16th Conference of the Parties (CoP 16) to the UNFCCC. It aims to reduce the country’s vulnerability to climate change and facilitate the integration of climate change adaptation measures into government policies, programs, and activities across multiple sectors and the three levels of government in Nepal. The NAP extends its guidance to the private sector and other stakeholders, facilitating the creation of a climate-resilient society. Consequently, it holds a critical and strategic role in the country's adaptation response, providing a framework and facilitating the integration of adaptation across sectors and government levels.

This paper specifically scrutinizes key chapters of the NAP, focusing primarily on Chapter Four, titled 'Climate Hazards, Vulnerabilities, Risks, and Impacts,' and chapter seven, outlining 'Priority Adaptation Programs.' These chapters extensively delve into the discussion of climate hazards, both acute and chronic, risks and vulnerabilities affecting the country's economy, agriculture, livelihoods, and marginalized communities, with a specific emphasis on potential loss and damage. These chapters

extensively explore climate hazards, both acute and chronic, along with associated risks and vulnerabilities that impact the country's economy, agriculture, livelihoods, and marginalized communities. However, notably absent in these discussions are considerations of any positive impacts or deliberations on the strategic utilization or capitalization of positive influences. This void persists even within the priority actions outlined in the nine adaptation themes, as detailed in the subsequent section.

Furthermore, the conclusive list of 64 prioritized adaptation programs across all nine adaptation themes within the NAP document, carefully curated to address critical climate vulnerabilities and risks in the short, medium, and long term, remains conspicuously silent on the matter of positive impacts. This absence raises questions about the holistic inclusivity of the NAP, as it seemingly neglects a crucial aspect of adaptation planning by not acknowledging or strategizing around potential positive outcomes of climate change.

#### **4. Reflection and Conclusion**

A comprehensive understanding of the dynamics and characteristics of climate change impacts is essential for informed adaptation planning and response (Hallegatte & Corfee-Morlot, 2011; Becsi, et al., 2020). Unfortunately, there persists a pervasive lack of awareness and a tendency to disregard the potential positive effects of climate change, thereby missing valuable opportunities for strategic capitalization. This oversight not only hinders the design of more robust adaptation strategies but also represents a missed opportunity to develop more nuanced solutions. While it is undeniably essential to underscore the severity of climate change and the urgency for action, acknowledging positive aspects provides a more comprehensive understanding of the intricate interactions, fostering a more balanced approach to seeking solutions.

Despite the 2011 climate change policy briefly acknowledging the positive effects of climate change and advocating for their strategic utilization, there is a discernible lack of consistency and coherence in subsequent policies and plans. Consequently, this inconsistency is reflected in the National Adaptation Plan of Action (NAPA) and Local Adaptation Plan of Action (LAPA), which do not mirror the provisions of the policy.

This review identifies three plausible explanations for this omission in operational instruments. Firstly, climate change may exert no positive impact on the ground. Secondly, even if positive impacts exist, they might go unnoticed and remain unknown. Thirdly, the concept of positive impacts may not be factored into the discussion during the design of adaptation instruments. The review suggests that the latter two reasons are more likely to be the root causes. Existing literature indicates the presence of positive impacts in the context of Nepal; however, research and programs focusing on uncovering these impacts are scarce, with interventions predominantly centred on addressing adverse effects. This limited and skewed perspective may leave local communities and professionals at a crossroads without a clear understanding of, and connection to, positive impacts within the adaptation framework. Likewise, the initial step in formulating a Local Adaptation Plan of Action (LAPA) involves identifying the vulnerability of climate change. However, subsequent steps solely focus on recognizing and prioritizing adaptation activities exclusively based on identified negative impacts, leaving no room for acknowledging potential opportunities stemming from climate change. This approach leads to the formulation of adaptation strategies exclusively concentrated on identifying solely the detrimental impacts of climate change, constraining the exploration of potential opportunities. Unfortunately, this operational document also fails to reference the study 'Economic Impact Assessment of Climate Change in Key Sectors in Nepal 2014,' which delves into some positive impacts of climate change.

Furthermore, the 2019 climate policy has dropped the provisions present in the 2011 policy that focused on capitalizing on positive impacts, and this alteration has been implemented without undergoing any discernible review or research on the matter. This raises concerns about the extent to which Nepal's policies are grounded in empirical evidence and underscores the limited commitment to invest in and conduct research for informed policy formulation. Additionally, the National Adaptation Plan (NAP), the latest and pivotal implementation framework for adaptation, also remains silent on the exploration and capitalization of positive impacts.

The persistent disregard for the potential positive impacts of Nepal's climate policies hampers the development of comprehensive adaptation strategies, missing crucial opportunities for strategic capitalization. This oversight, reflected in the lack of consistency in subsequent plans and the omission of positive aspects in operational instruments, signifies a broader gap in recognizing and leveraging the potential benefits of climate change for more nuanced and effective solutions.

Lastly, Nepal serves as a unique laboratory for scientific research and experimentation on the effects of climate change, encompassing both positive and negative aspects. Despite possessing rich diversity, topography, and agroecological zones, Nepal has yet to fully capitalize on these assets to generate

evidence for climate solutions, including capitalizing on positive effects. By proactively utilizing this space, Nepal could become a global hub for study and evidence generation on climate issues. Such an approach not only contributes to Nepal's adaptation practices but also elevates its standing on the global stage in the pursuit of more effective climate solutions. It is, therefore, imperative to utilize this potential wisely and proactively in advancing climate discourse and solutions worldwide.

## 5. *Policy Recommendations*

- **Leveraging Positive Impacts for Effective Adaptation:** Understanding and tapping the positive impacts offered by climate change has the potential to contribute to designing better and more efficient adaptation strategies.
- **Engaging Government Actors for Awareness:** Policy actors at all three levels of government (federal, provincial, and local) must actively engage in promoting awareness and sensitization regarding the positive impacts of climate change.
- **Encouraging Open Dialogue:** Foster and encourage open discussions about positive impacts at both policy and practice levels with the explicit goal of capitalizing on the opportunities they present.
- **Integration into Policy and Practice:** The essence of capitalizing on climate change opportunities should not only be articulated in policy documents but also be integrated into adaptation plans and instruments to effectively bridge the policy-practice gap.
- **Commitment to Evidence-Based Formulation:** Future policy development and amendments should be grounded in further evidence-based formulations to ensure alignment with evolving understandings of climate impacts.
- **Incorporate in Future Initiatives:** Integrate the concept of positive impacts into future adaptation initiatives and comprehensive national adaptation documents with long-term implications such as the National Adaptation Plan (NAP), Local Disaster and Climate Resilience Plan (LDCRP), and other relevant adaptation plans.
- **Utilizing Nepal's Unique Assets:** Capitalize on Nepal's distinctive topography, ecological diversity, and rich agroecological zones as assets for generating empirical evidence for climate solutions. Actively use this space to advance climate adaptation practices and promote evidence-based policy formulation on a global stage.

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