IMPACT OF CLIMATE CHANGE ON INSURANCE RISK AND PRICING

A Dissertation Submitted to the Office of the Dean, Faculty of Management in partial fulfilment of the requirements for the Master's Degree

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CERTIFICATION OF AUTHORSHIP

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled "**Impact of Climate Change on Insurance Risk and Pricing**". The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor has it been proposed and presented as part of requirements for any other academic purpose.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

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REPORT OF RESEARCH COMMITTEE

Piyush Niraula has defended research proposal entitled "**Impact of Climate Change on Insurance Risk and Pricing**" successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestion and guidance of supervisor Rishi Ram Pantha and submit the dissertation for evaluation and Viva-Voce examination.

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APPROVAL SHEET

We have examined the dissertation entitled "**Impact of Climate Change on Insurance Risk and Pricing**" presented by Piyush Niraula for the degree of Master of Business Studies. We hereby certify that the dissertation is acceptable for the award of degree.

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ABBREVIATIONS

ANOVA	:	Analysis of Variance
CCR	:	Climate Change Regulations
FEWE	:	Frequency of Extreme Weather Events
F-value	:	Fishers' Value
GE	:	Geographical Exposure
IRMP	:	Insurer's Risk Management Practices
IRP	:	Insurance Risk and Pricing
P-value	:	Probability Value
SD	:	Standard Deviation
Sig.	:	Significance
SPSS	:	Statistical Packages for the Social Science
SWE	:	Severity of Weather Events

ABSTRACT

This study examined the perceptions of insured individuals in Kathmandu Valley, Nepal, regarding the impact of climate-related factors—including extreme weather events, climate change regulations, insurers' risk management practices, and geographical exposure—on insurance risk and pricing. A combination of descriptive and causal-comparative research designs was employed. Data were collected from 384 insured individuals using a structured online survey with a 5-point Likert scale and analyzed using SPSS version 25. The study applied descriptive statistics, correlation analysis, and regression analysis to evaluate relationships and test hypotheses.

Findings revealed that insured individuals perceived climate-related factors as influencing insurance risk and pricing, with significant correlations observed across all factors. However, regression analysis indicated that only insurers' risk management practices and geographical exposure significantly impacted insurance risk and pricing. Other factors, such as the frequency and severity of extreme weather events and climate change regulations, did not exhibit significant effects.

The study concludes that insurers in Nepal need to prioritize geographical exposure and risk management practices in their pricing models while enhancing their integration of climate-related factors. Practical implications include the development of comprehensive risk management strategies, while theoretical contributions expand the understanding of climate change's impact on insurance. Policy recommendations highlight the need for stricter climate regulations and incentives for resilience measures. Future research could explore the role of advanced technologies in climate risk modeling and extend the study to other regions in Nepal to address location-specific challenges.

Keywords: *Climate change, insurance risk, pricing strategies, risk management, geographical exposure*

CHAPTER I
INTRODUCTION

1.1 Background of the Study

Climate change has emerged as one of the most critical challenges for global economies, impacting multiple sectors, including agriculture, infrastructure, and financial systems. Among these, the insurance industry stands out due to its central role in managing and transferring risks associated with extreme weather events and other climate-related impacts. The increasing frequency and intensity of extreme weather events such as floods, droughts, and storms have created new risks for insurers, with implications for policy underwriting, risk management, and pricing strategies (Hamzeh et al., 2024). These changes have prompted insurers worldwide to re-evaluate their approaches to ensure sustainable operations in the face of evolving risks. This study focuses on the impact of climate change on insurance risk and pricing in Nepal, a country that is particularly vulnerable to climate-induced disasters due to its topography and socio-economic characteristics.

Several studies have identified the role of climate change in increasing the risks to insurance markets. Hamzeh et al. (2024) highlighted that insurers need to integrate climate risk into underwriting frameworks and adopt innovative strategies to assess and mitigate these risks. Their research, however, primarily focused on Iran and highlighted the lack of preparedness among insurers, with most failing to develop comprehensive mitigation plans or adopt effective repricing strategies. This gap underscores the necessity of investigating how insurers in other regions, particularly in developing countries like Nepal, are adapting to these challenges. Similarly, Kousky et al. (2024) explored the interplay between climate risks and policy interventions in the United States, emphasizing the need for long-term regulatory frameworks to stabilize insurance markets. While their findings provide valuable insights, the study was limited to a developed country context and did not explore the micro-level perspectives of insured individuals or the region-specific impacts of climate risks on insurance pricing.

Nepal’s unique geographical and socio-economic context makes it a compelling case for examining the relationship between climate change and insurance risk. The country experiences frequent natural disasters such as floods, landslides, and earthquakes,

which are exacerbated by changing climatic conditions. These events not only lead to significant economic losses but also increase the vulnerability of individuals and communities, placing additional pressure on the insurance sector to develop effective risk management and pricing strategies. However, there is limited research on how insured individuals in Nepal perceive the risks associated with climate change, such as the frequency and severity of extreme weather events, or how these perceptions influence their expectations regarding insurance products and pricing. Understanding these perceptions is critical for insurers to design policies that align with the needs and expectations of their clients while ensuring financial sustainability.

Moreover, the relationship between extreme weather events, geographical exposure, and insurance risk and pricing remains underexplored in the context of Nepal. Previous studies have primarily focused on macro-level factors such as regulatory interventions and market stability (Kousky et al., 2024), leaving a gap in understanding how these factors interact with localized risks and individual perceptions. For instance, Hamzeh et al. (2024) highlighted the importance of integrating disaster modeling and safe infrastructure into insurance strategies, yet their findings were based on a national-level analysis and did not account for the regional variations in climate risks and insurance needs. In Nepal, where geographical exposure to climate risks varies significantly across regions, a more localized approach is needed to assess the impact of these factors on insurance risk and pricing.

The role of regulatory frameworks and risk management strategies in mitigating the impact of climate change on insurance markets has also been widely discussed in the literature. Hamzeh et al. (2024) emphasized the need for insurers to adopt risk-based pricing and develop climate-related products that address the specific needs of their clients. However, they also pointed out that most insurers lack the capacity to implement these strategies effectively, particularly in developing countries. Similarly, Kousky et al. (2024) highlighted the importance of policy interventions in stabilizing insurance markets and promoting equitable adaptation strategies. Despite these insights, there remains a significant gap in understanding how regulatory frameworks and risk management strategies can be tailored to address the unique challenges faced by insurers in Nepal.

The impact of climate change on insurance pricing is another critical area of concern. The increasing frequency and severity of extreme weather events have led to higher claims, resulting in increased premiums and reduced coverage in many regions (Hamzeh et al., 2024). This trend poses significant challenges for both insurers and insured individuals, particularly in low-income countries like Nepal, where affordability is a major concern. Kousky et al. (2024) argued that long-term planning is essential to ensure market stability and affordability, yet their study did not explore the specific factors that influence pricing decisions in the context of developing economies. In Nepal, where access to insurance is already limited, understanding the impact of climate risks on pricing is crucial for developing policies that are both affordable and sustainable.

Given these gaps in the literature, this study aims to analyze the impact of climate change on insurance risk and pricing in Nepal, with a specific focus on the perceptions of insured individuals, the relationship between climate risks and pricing, and the role of regulatory and risk management strategies. By addressing these issues, the study seeks to provide insights into how insurers can adapt their practices to better manage climate risks and meet the needs of their clients. It also aims to contribute to the broader understanding of how climate change is reshaping insurance markets, particularly in developing countries that are disproportionately affected by climate-related disasters.

The findings of this study are expected to have significant implications for policymakers, insurers, and insured individuals. For policymakers, the study will provide evidence-based insights into the regulatory interventions needed to promote sustainable insurance markets in the face of climate change. For insurers, the findings will highlight the importance of adopting innovative risk management and pricing strategies that account for the unique challenges posed by climate risks in Nepal. Finally, for insured individuals, the study will shed light on the factors that influence their perceptions of climate risks and insurance pricing, helping them make informed decisions about their insurance needs.

While the existing literature provides valuable insights into the relationship between climate change and insurance risk, there remains a significant gap in understanding how these factors interact in the context of developing countries like Nepal. By addressing this gap, the study aims to contribute to the growing body of knowledge on climate

change and insurance, while providing practical recommendations for improving risk management and pricing strategies in Nepal's insurance sector. This is particularly important given the increasing frequency and severity of extreme weather events and the growing need for effective adaptation strategies to mitigate their impact on vulnerable communities and economies.

1.2 Problem Statement

The increasing frequency and severity of climate-induced extreme weather events such as floods, droughts, and storms have created unprecedented challenges for the global insurance industry. These events lead to significant financial losses and increased claims, putting pressure on insurers to re-evaluate their underwriting strategies and pricing models. Studies have highlighted the urgency of addressing these risks. Hamzeh et al. (2024) emphasized that insurers must integrate climate change considerations into their risk assessment frameworks, particularly in regions like Iran, where climate risks are intensifying. However, many insurers in developing countries, including Nepal, lack the capacity and tools to adequately address these challenges, leaving a critical gap in understanding how climate risks impact insurance pricing and risk management strategies.

In Nepal, the vulnerabilities associated with climate change are further exacerbated by its geographical characteristics and socio-economic conditions. The country's diverse topography increases exposure to climate-induced disasters such as landslides and floods, particularly in rural and mountainous areas. Despite this heightened exposure, limited research has been conducted to explore how insured individuals perceive the risks of climate change, including the frequency and severity of extreme weather events. Perception plays a crucial role in shaping demand for insurance and influencing the pricing and coverage of insurance products. Hamzeh et al. (2024) underscored that understanding insured individuals' perceptions is essential for designing effective risk management strategies. Yet, there is a lack of localized studies in Nepal that analyze these perceptions and their implications for insurance risk and pricing.

The relationship between extreme weather events, geographical exposure, and insurance pricing is another area that requires further exploration. While global studies, such as the one by Kousky et al. (2024), have examined the interplay between climate risks and insurance markets, these studies primarily focus on developed economies like

the United States. Their findings suggest that immediate policy interventions can stabilize markets and mitigate the impacts of climate change on insurance pricing. However, the dynamics in Nepal differ significantly due to the lack of robust regulatory frameworks, limited financial resources, and inadequate risk management infrastructure. This raises important questions about how insurers in Nepal can adapt their practices to account for region-specific climate risks and develop pricing strategies that are both effective and affordable.

Regulatory frameworks and insurer risk management strategies also play a pivotal role in mitigating the impacts of climate change on the insurance industry. Hamzeh et al. (2024) emphasized that insurers must adopt risk-based pricing and develop climate-specific insurance products to address the growing risks. Similarly, Kousky et al. (2024) highlighted the importance of long-term regulatory planning in stabilizing insurance markets and promoting equitable adaptation strategies. Despite these insights, there is a lack of research on how these principles can be applied in the context of Nepal, where the insurance industry faces unique challenges such as low market penetration and limited institutional capacity. Understanding the role of regulations and risk management in shaping insurance pricing in Nepal is crucial for addressing the broader challenges posed by climate change.

The affordability of insurance products in the context of climate change is another critical issue that warrants investigation. The rising costs associated with increased claims and higher risks have led to a trend of escalating premiums, making insurance less accessible to vulnerable populations (Hamzeh et al., 2024). In Nepal, where the majority of the population relies on agriculture and other climate-sensitive livelihoods, the affordability of insurance is a major concern. Kousky et al. (2024) highlighted that long-term policy planning is essential to ensure that insurance remains accessible and effective in managing climate risks. However, little is known about how frequency and severity of weather events, climate regulations, and geographical exposure influence pricing decisions in Nepal's insurance market. This study seeks to bridge this gap by examining the relationship between these factors and their impact on insurance risk and pricing, providing valuable insights for policymakers, insurers, and insured individuals.

The study deals with the following issues;

i. What is the perception of insured persons towards frequency of extreme weather events, severity of weathers events, climate change regulations, insurer's risk management, geographical exposure and insurance risk and pricing?

ii. Is there relationship between extreme weather events, severity of weathers events, climate change regulations, insurer's risk management, geographical exposure and insurance risk and pricing?

iii. Do frequency of extreme weather events, severity of weathers events, climate change regulations, insurer's risk management and geographical exposure have impact on insurance risk and pricing?

1.3 Objectives of the Study

The main objectives of the study is to analyze the climate change on insurance risk and pricing in Nepal. The specific objectives are as follows;

i. To analyze the perception of insured persons towards frequency of extreme weather events, severity of weathers events, climate change regulations, insurer's risk management, geographical exposure and insurance risk and pricing.

ii. To examine the relationship between extreme weather events, severity of weathers events, climate change regulations, insurer's risk management, geographical exposure and insurance risk and pricing.

iii. To assess the impact of frequency of extreme weather events, severity of weathers events, climate change regulations, insurer's risk management, geographical exposure and insurance risk and pricing.

1.4 Research Hypotheses

The alternative hypothec have been developed as per the theoretical framework of the study. The hypotheses for this study are formulated based on the theoretical framework, which examines the relationship between climate change factors and their impact on insurance risk and pricing. The study explores how extreme weather events, the severity of these events, climate change regulations, insurers' risk management strategies, and geographical exposure affect insurance pricing and risk. Drawing from established

theories in insurance and climate change, the alternative hypotheses seek to test the influence of these independent variables on the dependent variables (insurance risk and pricing).

H1: There is significant impact of frequency of extreme weather events on insurance risk and pricing.

H2: There is significant impact of severity of weathers events on insurance risk and pricing.

H3: There is significant impact of climate change regulations on insurance risk and pricing.

H4: There is significant impact of insurer's risk management on insurance risk and pricing.

H5: There is significant impact of geographical exposure on insurance risk and pricing.

1.5 Rationale of the Study

Climate change poses significant challenges to various sectors, with the insurance industry being one of the most directly affected. As the frequency and intensity of extreme weather events increase, insurance companies face growing difficulties in assessing risks and setting premiums accurately. In Nepal, where geographical exposure and socio-economic vulnerabilities exacerbate the impacts of climate change, understanding the dynamics of insurance risk and pricing is essential. This study focuses on these critical aspects to provide insights into how the insurance industry can better manage climate-related risks and offer affordable yet sustainable solutions to policyholders.

Nepal’s diverse geography, ranging from high mountains to low-lying plains, is uniquely vulnerable to climate-related disasters such as floods, landslides, and droughts. The increasing unpredictability of weather patterns further complicates the ability of insurers to effectively mitigate and manage risks. Despite these challenges, the understanding of how insured individuals perceive climate risks and how insurers address these risks through pricing and risk management strategies remains limited. This study aims to bridge this gap by exploring the perceptions of insured persons and examining the strategies employed by insurers to adapt to the changing climate.

The affordability and accessibility of insurance products in Nepal are critical factors in fostering climate resilience. Rising insurance costs, driven by the increasing frequency of extreme weather events and the higher probability of claims, threaten to make insurance unattainable for many vulnerable populations. This research aims to assess how factors like geographical exposure, the severity of weather events, and insurer risk management practices influence insurance pricing. By identifying these impacts, the study seeks to propose strategies that ensure fair and sustainable pricing mechanisms while promoting greater inclusivity in insurance coverage.

Regulations and risk management practices are integral to the insurance industry's capacity to adapt to climate change. Effective regulatory frameworks can encourage insurers to integrate climate risks into their underwriting practices while ensuring financial stability. This study examines the role of climate change regulations and insurer risk management practices in shaping insurance pricing in Nepal. By evaluating these elements, the research aims to provide recommendations for enhancing the regulatory environment and supporting insurers in developing innovative risk management solutions.

Ultimately, this study is significant because it addresses the intersection of climate change, insurance, and socio-economic development in Nepal. By analyzing the perceptions of insured persons and the practices of insurers, the research will contribute to a better understanding of the relationship between climate change and insurance dynamics. The findings will provide valuable insights for insurers, policymakers, and stakeholders to develop climate-resilient insurance products and strategies that protect vulnerable communities while ensuring the sustainability of the insurance industry.

1.6 Limitations of the Study

The study has the following limitations;

i. The sample of 384 insured persons may not fully represent the broader insured population in Nepal, limiting the generalizability of the findings.

ii. The study focuses solely on the Kathmandu Valley, which may not reflect the experiences of insured persons in other regions or rural areas.

iii. The reliance on self-reported data through online surveys may introduce bias, such as social desirability bias, affecting the accuracy of responses.

iv. The use of convenience sampling may lead to selection bias, as participants with easier access to online surveys may not represent the entire insured population.

v. The study focuses on specific variables, while other factors influencing insurance risk and pricing, such as economic conditions, are not extensively considered.

CHAPTER II
LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 The Theory of Risk and Uncertainty

The theory of risk and uncertainty is fundamental in understanding the dynamics of insurance pricing, especially in the context of climate change. This theory postulates that insurance companies base their pricing on the risk and uncertainty associated with future events, such as extreme weather events and climate-related risks (Hartwig, 2009). The increased frequency and severity of extreme weather events, driven by climate change, lead to greater uncertainty in risk assessments, compelling insurers to adjust their pricing models to reflect the higher probability of catastrophic events. This relationship between uncertainty and risk pricing is essential in understanding how climate change affects insurance premiums and underwriting practices. As highlighted by Kousky et al. (2024), insurance companies need to incorporate climate-related risks in their underwriting processes, especially when geographical areas become more exposed to climate-induced hazards, like floods or heat waves, thus increasing the overall risk profile of insured persons.

2.1.2 The Theory of Moral Hazard

Moral hazard theory suggests that insurance coverage can influence the behavior of policyholders, particularly in high-risk situations. As insurance companies provide coverage for climate-related risks, insured persons may perceive themselves as less vulnerable to the financial impacts of extreme weather events. This can lead to riskier behavior, such as inadequate risk mitigation efforts (Cutler & Zeckhauser, 2000). In the context of climate change, insured persons may fail to take preventive actions to reduce vulnerability to weather events, increasing the overall risk exposure for insurers. This theory is relevant to the objectives of analyzing the perception of insured persons toward the frequency and severity of extreme weather events, as it helps understand how policyholders' behavior may change in response to insurance coverage for climate-related risks.

2.1.3 The Theory of Risk Pooling and Diversification

The theory of risk pooling and diversification is central to understanding how insurance companies manage the risks associated with extreme weather events. According to this theory, insurers use diversification to spread risk across a broad portfolio of clients to mitigate the impact of catastrophic losses (Merton, 1995). However, with the increase in frequency and severity of climate-related events, the ability of insurers to effectively pool risk may be compromised. For instance, as more regions are exposed to climate risks, insurers might face difficulties in maintaining diversified portfolios, leading to higher premiums and altered pricing structures (Kousky et al., 2024). The theory thus helps explain how the geographical exposure of insured persons to climate risks influences the overall pricing structure of insurance products, as insurers may need to adjust their policies to account for heightened risks in certain areas.

2.1.4 The Theory of Market Efficiency

The theory of market efficiency posits that insurance pricing should reflect all available information about the risks associated with a policyholder's exposure to climate-related hazards (Fama, 1970). In the case of climate change, this theory suggests that insurers will adjust their pricing to account for the growing risks of extreme weather events, considering factors such as geographical exposure, past weather patterns, and climate forecasts. With the increasing uncertainty surrounding climate change impacts, insurance markets are likely to experience shifts in pricing strategies, as insurers incorporate new data on climate projections and extreme weather frequency. This theory is relevant to the objective of examining the relationship between climate change regulations, insurer's risk management, and insurance pricing, as it underscores the need for market prices to adapt efficiently to the evolving climate landscape.

2.1.5 The Theory of Adaptation to Climate Change

The theory of adaptation to climate change emphasizes the strategies that individuals and institutions adopt to mitigate the effects of climate change and reduce vulnerability (Adger, 2006). In the insurance industry, this theory suggests that insurers and insured persons must adapt to the increasing risks posed by climate change, which could include modifying underwriting practices, adjusting risk models, or investing in more resilient infrastructure. As insurers face new risks from climate-related events, adaptation

becomes key to maintaining long-term profitability and stability in the market. This theory is relevant to the objective of assessing the impact of climate change regulations and insurer risk management on insurance pricing. The increasing need for insurers to adapt to changing climate conditions through risk management practices is reflected in their pricing strategies, which may involve raising premiums for high-risk areas or offering incentives for adaptation measures such as flood-resistant properties.

2.2 Empirical Review

Hamzeh et al. (2024) evaluated climate change underwriting approaches in Iran's insurance industry. The study emphasized the increasing role of insurance in climate adaptation, particularly in regions like Iran, where decreasing rainfall and increasing temperatures pose significant risks. The authors argued that insurers must consider climate change when underwriting services and products, suggesting that climate adaptation strategies should be embedded into risk assessment frameworks. Through a survey of global insurance authorities and a questionnaire distributed to 35 experts in Iran, they found that while some insurance companies had begun integrating climate change into their risk management processes, most had not developed comprehensive mitigation plans or annual reprising strategies. The study highlighted the importance of pricing-based risk strategies, disaster modeling, and the creation of safe infrastructure to manage climate-related risks effectively.

Kousky et al. (2024) investigated the policy lessons for insurance and climate risks, focusing on the United States property insurance market. The authors identified the challenges posed by climate change, which is increasing the risks to property insurance markets. They explored three bounding scenarios to understand how policy and regulatory decisions, particularly in Florida, could influence insurance markets, disaster recovery, and local economic outcomes over the short and medium term. Their findings suggested that immediate policy interventions would have significant long-term effects on market stability, and that careful planning was needed to ensure more equitable adaptation strategies. The study highlighted the importance of considering the long-term impacts of current policies on both insurance markets and broader socioeconomic outcomes.

De Angelis et al. (2023) explored the impact of green investing on corporate behavior, specifically how it influences firms to reduce carbon emissions by increasing the cost

of capital for carbon-intensive companies. Their findings indicated that emissions decreased when the wealth share of green investors rose and when these investors demonstrated greater sensitivity to climate-related externalities. The study revealed that the effect of green investors on corporate emissions was most significant in the long term, particularly when these investors anticipated stricter climate regulations and technological advancements. However, they also found that heightened uncertainty about future climate risks diminished green investors' ability to influence firms, allowing them to increase emissions. This highlighted the limited but significant role of green investors, especially considering their current wealth share and practices in the United States.

Pankratz et al. (2023) examined the effects of heat exposure on firm performance, linking data on firms' heat exposure with financial performance indicators such as revenue and operating income. They found that increased exposure to extremely high temperatures negatively impacted firms' financial outcomes. Specifically, a one-standard-deviation increase in the number of hot days led to a 0.6% reduction in revenues and a 1.8% decrease in operating income. Their research suggested that capital markets did not fully anticipate the economic consequences of heat, revealing a gap in analysts' ability to forecast the direct physical risks posed by climate change.

Adhikari and Safaee Chalkasra (2023) analyzed the barriers and opportunities associated with private sector investment in climate adaptation. Their study highlighted several challenges that hindered increased private sector investment, including the high-risk profiles of climate adaptation projects, the lack of financially viable and bankable projects, and insufficient knowledge of climate risks. They concluded that a tailored approach was necessary to engage private investors effectively, and that public policy interventions would be crucial in facilitating the mobilization of private sector finance for climate adaptation.

Folqué et al. (2021) investigated the effectiveness of different Sustainable Investment (SI) strategies in managing Environmental, Social, and Governance (ESG) risks. Their empirical analysis revealed that funds employing negative screening strategies generally performed worse in terms of ESG risk scores and carbon risk. In contrast, funds that adopted a combination of various ESG criteria were more effective in managing sustainability and climate risks. This study contributed valuable insights into

how different SI strategies could lead to more favorable outcomes in terms of sustainability and risk mitigation, providing guidance for investors aiming to integrate ESG considerations into their portfolios.

Averchenkova et al. (2021) assessed the importance of strategic climate legislation, using the UK Climate Change Act as a case study. The Act, passed in 2008, was one of the first framework laws addressing climate change and has since influenced similar legislation globally. Through stakeholder interviews, the authors identified strengths of the Act, particularly its establishment of a long-term framework with clear policy directions. Respondents noted that the Act had successfully changed the institutional context and processes related to climate change, making the UK's climate policy more informed, forward-looking, and guided by statutory routines. However, opinions varied regarding the Act's ability to provide sufficient policy certainty and protect against political backsliding.

Kartini and Nahda (2021) explored the impact of behavioral biases on investment decision-making in Indonesia. They focused on both cognitive and emotional biases, such as anchoring, representativeness, loss aversion, overconfidence, optimism, and herding behavior. Using a quantitative approach with data from 165 individual investors in Yogyakarta, the authors found that all the examined biases significantly influenced investment decisions. Their study highlighted the importance of understanding behavioral factors in investor decisions and emphasized the need for investors to be more aware of these biases to make more informed and rational choices.

Ameli et al. (2020) investigated the role of climate finance and transparency for institutional investors, challenging the assumption that greater disclosure alone would align financial markets with the public interest. They argued that the "efficient market hypothesis" (EMH), which assumes markets will respond rationally to full disclosure, was inadequate in addressing the complexities of climate finance. The authors explained that while transparency could improve pricing and market efficiency, it was insufficient to address the strategic limitations that hindered institutional investors from aligning their actions with climate goals. Their findings suggested that addressing behavioral biases and adopting more strategic frameworks were essential to effectively mobilize institutional finance for climate action.

Nasir et al. (2019) examined the relationship between financial development, economic growth, foreign direct investment (FDI), and climate change, focusing on the ASEAN-5 countries. They employed panel data analysis techniques, including Dynamic Ordinary Least Squares (DOLS) and Fully Modified OLS (FMOLS), using data from 1982 to 2014. Their results showed that economic growth, financial development, and FDI were positively correlated with environmental degradation, particularly CO2 emissions. However, they also observed a negative relationship between economic growth and environmental degradation in the form of the Environmental Kuznets Curve (EKC), suggesting that after reaching a certain level of development, economic growth might reduce environmental harm. The authors emphasized the importance of policies that promote sustainable development and mitigate the environmental impacts of financial and economic growth.

Kefi et al. (2018) assessed the tangible direct flood damage in the urban watershed of the To Lich River in Hanoi, Vietnam, under the effects of climate change. They employed a spatial analysis approach, integrating data on flood depth, land-use classes, property values, and damage rates. The authors simulated future flooding scenarios for 2030, considering the effects of climate change and land-use changes. They also analyzed two flood control scenarios to explore the effectiveness of adaptation strategies. Their findings indicated that climate change, combined with the expansion of built-up areas, significantly increased the vulnerability of urban areas to flooding and economic damage. The study revealed that climate change would increase flood damage by 26%, while the implementation of appropriate flood mitigation strategies, such as restoring lakes and adopting water-sensitive urban design (WSUD), could reduce damage by 8% and 29%, respectively. This research highlighted the importance of quantifying flood damage and identifying flood-prone areas to inform regional flood risk reduction strategies.

Flood et al. (2018) conducted a systematic review of ‘serious games’ for climate change adaptation, aiming to bridge the gap between public understanding, scientific knowledge, and adaptive behavior. They assessed how serious games could enhance social learning and foster positive climate adaptation actions. Their evaluation framework, grounded in cognitive, normative, and relational learning, helped identify the factors that contribute to successful outcomes. The review found that the effectiveness of these games in influencing behavior and catalyzing learning depended

on the establishment of trust among stakeholders, strong debriefing and evaluation practices, and the use of experienced facilitators. The authors suggested that these insights could inform the design of future serious games and research methodologies to enhance climate resilience.

Huang et al. (2018) examined the impact of climate risk on firm performance and financing choices through an international comparison. Using the Global Climate Risk Index, they investigated how extreme weather events, such as storms and floods, affected firm profitability, financing decisions, and cash flow volatility. They found that companies in countries with higher exposure to severe weather events tended to hold more cash, reduced their short-term debt, and preferred long-term debt. Additionally, these firms were less likely to distribute dividends. The study highlighted that certain industries were less vulnerable to extreme weather, thereby facing lower climate-related risks. The results remained robust even when alternative measures of climate risk and different statistical approaches were used, emphasizing the financial resilience strategies of firms in climate-vulnerable regions.

Thistlethwaite and Wood (2018) explored the role of the insurance industry in managing climate change risk through a framework of rescaling, which addresses the temporal and spatial uncertainty associated with climate risks. Their content analysis of responses to the U.S. National Association of Insurance Commissioners Climate Risk Disclosure Survey revealed that most insurers did not integrate climate change into their risk management practices. However, reinsurers showed greater evidence of rescaling their risk management practices compared to primary insurers. This study suggested that the spatial and temporal dimensions of climate change created resistance to climate change risk management (CCRM) within the insurance industry. The authors proposed the concept of rescaling as a valuable framework for understanding and measuring organizational responses to climate risks, thereby contributing to the scholarship on organizations and climate change.

Pregnolato et al. (2017) investigated the impact of climate change on urban transport networks, focusing on the disruption caused by pluvial flooding. Their study presented an integrated framework that coupled flooding simulations with transport data to assess disruption costs, which are typically calculated using crude methods. By using a function that related flood depth to vehicle speed, their approach was more realistic

than traditional methods that categorize roads as either blocked or free-flowing. The framework, applied to Newcastle upon Tyne in the United Kingdom, revealed that by the 2080s, disruption from a 1-in-50-year flood event could increase by 66%. They also developed a criticality index, which was effective in prioritizing intervention options within the road network. Their results indicated that just two adaptation measures could reduce travel delays by 32% across the city.

Runting et al. (2017) reviewed the incorporation of climate change into ecosystem service assessments and decisions. The authors found that climate change predominantly had negative impacts on ecosystem services, with 59% of studies reporting negative effects, 24% showing mixed results, and only 13% indicating positive outcomes. Their review highlighted substantial gaps in the incorporation of uncertainty and decision-making processes, pointing out that few studies integrated decision-making frameworks or sought solutions robust to uncertainty. They argued that an integrated approach, accounting for multiple drivers of change and uncertainties, was necessary to manage ecosystem services effectively in the face of climate change.

Belay et al. (2017) examined smallholder farmers' adaptation to climate change in the Central Rift Valley of Ethiopia. Their study used a multinomial logit model to identify the determinants influencing farmers' adaptation strategies. The results indicated that 90% of farmers perceived climate variability, with 85% adopting adaptation practices such as crop diversification, soil and water conservation, and tree planting. Factors such as education, farm size, access to climate information, income, and gender were significant in shaping farmers' adaptation decisions. The study concluded that the capacity to adapt was influenced by household demographics and access to resources, with a need for institutional support to enhance the effectiveness of adaptation strategies, particularly for vulnerable groups.

Chen et al. (2016) assessed the economic and environmental impacts of high-speed rail investment in China using a dynamic computable general equilibrium (CGE) model. Their analysis captured long-term effects through drivers such as land use conversion, output expansion, and induced transport demand. The study found that high-speed rail investment had a positive economic impact, driven primarily by induced demand and output expansion. However, it also led to a significant increase in CO2 emissions, largely due to output expansion and lowered rail transport costs, which offset the

environmental benefits from substituting other transport modes. The study highlighted that while rail investment stimulated economic growth, the environmental benefits were limited, particularly in terms of emissions reduction.

Table 1

Meta-Analysis

Author(s)	Title	Objectives	Methodologies	Findings
Hamzeh et al. (2024)	Climate Change Underwriting in Iran's Insurance Industry	To evaluate climate change underwriting in Iran's insurance industry	Survey of global authorities; questionnaire to 35 experts in Iran	Some insurers integrating climate change, but no comprehensive plans or repricing strategies; importance of pricing-based strategies.
Kousky et al. (2024)	Insurance and Climate Risks: Policy Lessons	To explore policy lessons on insurance and climate risks in U.S.	Analysis of three scenarios focusing on Florida's insurance market	Policy interventions affect market stability and require long-term planning for equitable adaptation.
De Angelis et al. (2023)	Climate Impact Investing	To examine how green investing influences carbon emissions mitigation	Model based on U.S. data, analyzing wealth share of green investors	Green investing spurs emissions reduction, but uncertainty reduces investor pressure.
Pankratz et al. (2023)	Climate Change, Firm Performance, and Investor Surprises	To analyze the impact of extreme heat exposure on firm financial performance	Empirical analysis of 17,000 firms in 93 countries (1995-2019)	Extreme heat negatively impacts revenues and income, underestimating heat as a risk.
Adhikari et al. (2023)	Mobilizing Private Sector Investment for Climate Action	To investigate barriers to private sector investment in climate action	Case studies of SMEs, MNCs, and impact investors	Private sector willing to invest but constrained by risk profiles and lack of viable projects.
Folque et al. (2021)	Sustainable Development and Financial System	To analyze how Sustainable Investment strategies	ANOVA method for sustainability and carbon risk assessment	Funds with negative filters show worse ESG and carbon risk scores, highlighting the

		manage ESG risks		importance of integrated strategies.
Averchenkova et al. (2021)	Strategic Climate Legislation: Evidence from UK Climate Change Act	To assess effectiveness of UK Climate Change Act	Expert interviews with stakeholders	The Climate Change Act established a long-term framework, but some uncertainties remain.
Kartini, Nahda (2021)	Behavioral Biases on Investment Decisions	To tnvestigate cognitive and emotional biases in investment decisions	Survey of 165 investors, analyzed with a One-Sample t-test	Biases like loss aversion and overconfidence affect investment decisions.
Ameli et al. (2020)	Climate Finance and Disclosure for Institutional Investors	To explore why transparency in climate-related financial disclosures is insufficient	Survey of institutional investors and theoretical frameworks	Transparency alone is inadequate; strategic changes beyond improving efficiency are necessary.
Nasir et al. (2019)	Role of Financial Development and FDI in Climate Change	To assess impact of financial development , economic growth, and FDI on emissions	OLS and FMOLS for panel data analysis (1982-2014)	Economic growth, financial development, and FDI lead to higher CO2 emissions.
Kefi et al. (2018)	Assessment of Flood Damage in Hanoi Urban Watershed	To evaluate future flood damage in Hanoi due to climate change	Spatial analysis for future flooding scenarios in 2030	Climate change and urbanization increase flood vulnerability; mitigation can reduce losses.
Flood et al. (2018)	Adaptive Climate Futures: Serious Games for Engagement	To evaluate the role of 'serious games' in climate adaptation and decision-making	Systematic literature review on serious games	Serious games enhance social learning, trust, and stakeholder engagement for climate adaptation.
Huang et al. (2018)	Climate Risk on Firm Performance and Financing Choices	To investigate how climate risk affects firm performance	Global Climate Risk Index, propensity-score matching	Firms in high-risk countries hold more cash and reduce short-term debt for resilience.

		and financing		
Thistlethwaite, Wood (2018)	Insurance and Climate Change Risk Management	To assess how insurers manage climate risk and adapt to uncertainty	Content analysis of responses to U.S. Climate Risk Disclosure Survey	Insurers largely fail to integrate climate change, while reinsurers adapt better.
Pregnolato et al. (2017)	Impact of Climate Change on Urban Transport Disruptions	To model climate change impact on urban transport disruptions due to flooding	Flood simulations and transport analysis	Urban transport disruptions due to flooding could increase by 66%; adaptation could reduce delays by 32%.
Runting, et al. (2017)	Climate Change and Ecosystem Service Assessments	To review literature on climate change's impact on ecosystem services	Systematic literature review	Climate change negatively impacts ecosystem services in most cases; few studies address uncertainty comprehensively.
Belay et al. (2017)	Smallholder Farmers' Adaptation to Climate Change	To explore smallholder farmers' adaptation strategies and decisions	Multinomial logit model with primary and secondary data	Farmers perceive climate variability; key strategies include crop diversification and water conservation.
Chen et al. (2016)	High-Speed Rail Investment and Environmental Change in China	To evaluate the economic and environmental effects of high-speed rail investment	Dynamic CGE model	Rail investment boosts economy but increases CO2 emissions.

2.3 Research Gap

The existing body of literature highlights the growing challenges climate change poses to the insurance industry, focusing on risk management, policy frameworks, and underwriting practices. Hamzeh et al. (2024) emphasized the importance of embedding climate adaptation strategies into underwriting practices and risk assessment frameworks. However, their study primarily concentrated on Iran, leaving a significant

gap in understanding the implications of these strategies in countries with different socio-economic and geographical contexts, such as Nepal. Similarly, Kousky et al. (2024) explored the impact of regulatory and policy interventions on insurance markets in the United States, emphasizing the need for long-term planning to ensure market stability. While their research provides valuable insights into policy-driven responses, it fails to address how individual insured parties perceive climate risks and how these perceptions influence pricing and risk management strategies in developing economies.

Despite the comprehensive analyses of climate change risks in global insurance markets, little attention has been given to the interplay between extreme weather events, geographical exposure, and the pricing of insurance policies in countries like Nepal, which face unique vulnerabilities due to their topography and climate. Moreover, studies such as those by Hamzeh et al. (2024) and Kousky et al. (2024) primarily focus on macro-level risk management and policy frameworks, overlooking the micro-level impacts, such as how insured individuals perceive climate regulations, frequency of extreme weather events, and the severity of climate-related risks. This gap necessitates a detailed examination of these factors to better understand their influence on insurance risk and pricing, particularly in regions with limited climate adaptation resources and differing regulatory environments.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a combination of descriptive and causal-comparative research designs to comprehensively address the objectives. The descriptive research design is employed to examine the perceptions of insured individuals regarding factors such as the frequency and severity of extreme weather events, climate change regulations, insurer's risk management practices, geographical exposure, and their influence on insurance risk and pricing. This approach provides a detailed understanding of how these variables are perceived and understood by stakeholders, forming the basis for further analysis.

The causal-comparative research design is utilized to investigate the cause-and-effect relationships between independent variables—extreme weather events, climate regulations, geographical exposure, and risk management practices—and the dependent variable, insurance risk and pricing. This design enables the study to assess how specific factors linked to climate change impact the formulation of insurance strategies. Together, these designs allow for a comprehensive exploration of both the descriptive and analytical aspects, ensuring a nuanced understanding of the relationships and their implications for policy and practice.

3.2 Population, Sample and Sampling Technique

The population for this study comprises insured individuals associated with both life and non-life insurance companies operating within the Kathmandu Valley, Nepal. These individuals represent a diverse group of policyholders exposed to varying degrees of climate-related risks, which directly impact their perceptions and experiences regarding insurance risk and pricing. This population is relevant to the study objectives as it provides insights into how insured individuals perceive the frequency and severity of extreme weather events, the adequacy of climate change regulations, the effectiveness of insurers' risk management practices, and geographical exposure to climate risks.

To achieve a representative analysis, a sample of 384 insured individuals has been selected using the convenience sampling technique. This method ensures the inclusion of accessible respondents, facilitating the collection of data within the study's resource and time constraints. While convenience sampling may limit generalizability, it provides a practical approach for gathering primary data to analyze perceptions, relationships, and impacts of climate change-related factors on insurance risk and pricing. This sample size aligns with statistical requirements for reliability and validity, offering a foundation for meaningful conclusions and recommendations.

3.3 Nature and Source of Data

The study relies on primary data, which was collected through an online survey designed using Google Forms. This method was chosen to efficiently gather data from insured individuals across Kathmandu Valley while minimizing logistical challenges and ensuring a broad reach. The survey questionnaire was structured using a 5-point Likert scale, where respondents were asked to rate their agreement with various statements related to climate change, extreme weather events, and the impact on insurance risk and pricing. This scale, ranging from "strongly disagree" (1) to "strongly agree" (5), allows for a nuanced understanding of participants' perceptions and attitudes.

The questionnaire is composed of closed-ended questions to streamline data analysis and ensure consistency in responses. Closed-ended questions are particularly suitable for this study, as they facilitate a focused exploration of specific themes, such as the relationship between climate change regulations, risk management strategies, and insurance pricing. By employing this approach, the study aims to capture reliable, quantifiable data that directly addresses the research objectives. This primary data source ensures the accuracy and relevance of the findings, providing valuable insights into the impact of climate change on insurance practices in Nepal.

3.4 Data Collection Procedure

The data collection for this study was carried out using an online questionnaire developed through Google Forms. The questionnaire was shared across various social media platforms, including WhatsApp, Viber, Messenger, Instagram, and Gmail, ensuring a wide reach to the insured persons within Kathmandu Valley. This approach

facilitated easy access and encouraged participation from a diverse group of insured individuals, thus enhancing the representativeness of the sample. After gathering the responses, the collected data was classified and coded to prepare it for further analysis. The use of an online survey ensured that the process was efficient and cost-effective while maintaining the anonymity of the respondents.

To ensure the reliability and validity of the collected data, Cronbach's Alpha was tested, which helps in assessing the internal consistency of the questionnaire. For data analysis, SPSS version 25 was employed, which provided robust tools for conducting frequency distribution, descriptive analysis, correlation analysis, and regression analysis. These analytical techniques were used to answer the study's research questions and assess the relationships between the variables, including extreme weather events, climate change regulations, insurer risk management, geographical exposure, and their impact on insurance risk and pricing. The findings from these analyses were used to draw meaningful conclusions regarding the insurance industry's response to climate change in Nepal.

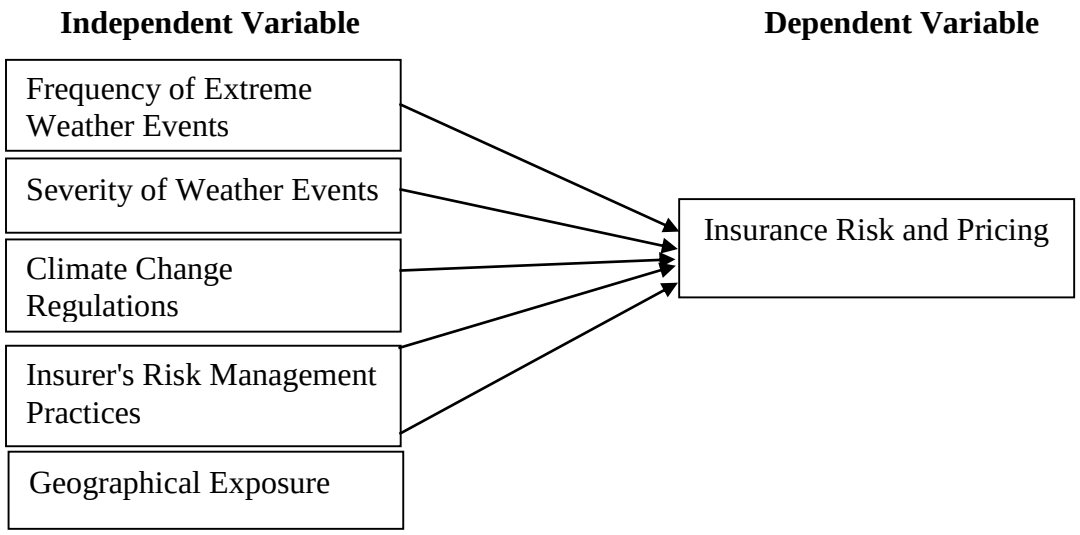
3.5 Instruments of Data

After the data collection process, the collected data was classified and coded to facilitate its analysis. SPSS software (version 25) was employed to perform the necessary statistical analysis for this study. SPSS was selected for its reliability and ability to handle large datasets efficiently, which is essential for analyzing the complex relationships among the variables related to climate change, insurance risk, and pricing. The software was used to conduct descriptive analysis, frequency distributions, correlation analysis, and regression analysis, which were necessary to explore the study's objectives and hypotheses.

The output generated by SPSS was presented in table formats to make the findings more accessible and interpretable. These tables were then analyzed in accordance with the study's objectives to evaluate the perceptions of insured persons regarding extreme weather events, climate change regulations, and the role of insurers' risk management. The data analysis provided valuable insights into how these factors influence insurance risk and pricing in Nepal. The use of SPSS allowed for a systematic and quantitative approach to answering the research questions and drawing conclusions about the impact of climate change on insurance practices.

3.6 Theoretical Framework and Definition of Variable

The framework for this study is primarily based on the approach outlined by Thistlethwaite and Wood (2018), which focuses on the identification of independent and dependent variables in understanding complex relationships. The authors emphasize the importance of clearly distinguishing between the factors that influence the outcome (independent variables) and those that are affected by these influences (dependent variables). This framework serves as a foundation for examining how various factors, such as extreme weather events, climate change regulations, and insurers' risk management strategies, impact insurance risk and pricing. By aligning the research with this structured framework, the study aims to systematically assess the dynamic relationship between climate change factors and the insurance industry, particularly in the context of Nepal.



Source: Thistlethwaite and Wood (2018)

Figure 1. *Theoretical Framework*

Frequency of Extreme Weather Events

The frequency of extreme weather events refers to how often occurrences such as floods, storms, droughts, and heatwaves happen over a defined period. As climate change continues to intensify, the frequency of these extreme events has been observed to increase globally (IPCC, 2021). This increase directly impacts the insurance sector, as frequent occurrences of catastrophic weather events lead to a higher number of claims, which in turn increases the risk exposure of insurers. Insurance companies must account for these frequent events when formulating risk management strategies, as

more frequent events generally increase the likelihood of large-scale payouts, thereby influencing the pricing of insurance policies (Kousky et al., 2024). The frequency of extreme weather events is integral to determining how insurers will adjust their underwriting processes and premium structures, as they seek to balance the risk exposure with the need to maintain profitability (Hamzeh et al., 2024).

Severity of Weather Events

The severity of weather events refers to the magnitude and intensity of the damage caused by extreme weather phenomena, such as the extent of flooding or the strength of a hurricane. Severe weather events result in significant destruction, loss of life, and infrastructure damage, making them critical to understanding the financial risks that insurers face (Kousky et al., 2024). When the severity of these events is high, insurance companies are required to pay out larger claims, which increases the overall risk to the insurance industry. As a result, insurance providers often adjust their pricing models to reflect the increased likelihood and severity of potential losses (Hamzeh et al., 2024). Insurers must also adapt their risk management strategies to address the higher costs associated with these extreme and severe weather events, as failure to do so can lead to financial instability within the industry (Thistlethwaite & Wood, 2018).

Climate Change Regulations

Climate change regulations refer to the laws, policies, and frameworks established by governments and international bodies to mitigate or adapt to the impacts of climate change. These regulations can influence how insurance companies assess risk by setting standards for coverage, pricing, and the integration of climate risks into insurance practices (Kousky et al., 2024). For instance, countries may impose regulatory requirements that mandate insurers to account for climate-related risks when determining premiums or may offer incentives for insurers to develop products that promote environmental sustainability (Hamzeh et al., 2024). Climate change regulations also affect the availability of insurance, as they can mandate coverage for specific climate-related events or create new markets for insurance products related to disaster resilience. The role of such regulations in shaping the insurance sector's response to climate change is pivotal, as they can drive the industry toward more sustainable and adaptive risk management practices (Thistlethwaite & Wood, 2018).

Insurer's Risk Management

Risk management by insurers refers to the strategic approaches and tools used by insurance companies to assess, mitigate, and manage the risks associated with climate change-related events. This includes the use of actuarial models to predict future climate risks, catastrophe bonds to spread risk, and reinsurance to limit exposure to large-scale losses (Kousky et al., 2024). Effective risk management ensures that insurers can remain solvent in the face of increasing claims resulting from climate-related disasters. Insurers who fail to adapt their risk management strategies to account for climate change may face financial instability due to an overestimation of their ability to absorb high-frequency and high-severity risks (Hamzeh et al., 2024). As the insurance sector faces a growing number of climate-related claims, it is essential for insurers to continually refine their risk management frameworks to protect both their businesses and policyholders. This evolving strategy directly influences pricing and the overall stability of the insurance market (Thistlethwaite & Wood, 2018).

Geographical Exposure

Geographical exposure refers to the physical location and vulnerability of insured properties to climate change-related risks such as floods, hurricanes, wildfires, or sea-level rise. Areas that are more prone to these hazards, such as coastal regions or low-lying areas, tend to have higher geographical exposure, making them more susceptible to climate-related damage (Kousky et al., 2024). Insurance companies must carefully assess the geographical exposure of properties when determining premiums, as areas with higher exposure to natural disasters are considered higher risk. This increases the likelihood of claims and the potential cost to insurers (Hamzeh et al., 2024). Geographical exposure is an important factor for insurers because it helps them determine the level of risk associated with insuring properties in specific locations. It also influences the development of tailored products that address specific regional risks, such as flood insurance or wildfire coverage (Thistlethwaite & Wood, 2018). As climate change exacerbates geographical risks, insurers must continuously adapt their pricing models to reflect the growing exposure in certain areas (Kousky et al., 2024).

Insurance Risk and Pricing

Insurance risk refers to the potential for an insurance company to incur financial losses due to claims arising from extreme weather events and climate-related disasters (Kousky et al., 2024). Insurance pricing is influenced by the perceived risk level, with higher risks leading to higher premiums. As climate change increases the frequency and severity of extreme weather events, the risk exposure for insurers rises, leading to more frequent and larger claims. This, in turn, prompts insurers to adjust their pricing strategies to ensure that they can cover potential losses while remaining financially stable (Hamzeh et al., 2024). Insurers must balance the need to adequately cover the cost of claims while ensuring that their pricing remains competitive in the market. Climate change, therefore, directly impacts insurance risk and pricing by making it more challenging to predict future losses and by increasing the overall risk faced by insurers (Thistlethwaite & Wood, 2018). As a result, insurers are likely to employ more sophisticated models and risk management strategies to assess and price these risks accurately.

3.7 Methods of Analysis

Prior to analysis, data was gathered and reviewed for accuracy and consistency. Both descriptive and content analysis techniques were utilized. The respondents' opinions were evaluated using content analysis, and responses were categorized through a coding process. Data was presented in tables and other graphical formats for better comprehension and analysis.

Data analysis was performed using the Statistical Package for Social Sciences (SPSS). Inferential statistics were applied to examine the relationship between the dependent and independent variables using Pearson correlation, ranging from -1 to +1. Descriptive statistics, including mean values, frequencies, and statistical tests such as regression analysis, t-tests, F-tests, and adjusted R^2, were employed to derive conclusions. The influence of independent variables on the dependent variable was determined using a multiple regression equation.

3.7.1 Descriptive Analysis

Descriptive analysis was used to summarize data characteristics related to the dependent variable (IRP) and independent variables (FEWE, SWE, CCR, IRMP, and

GE). The arithmetic mean, a central tendency measure, was calculated to understand the average values of these variables (Sharma & Chaudhary, 2008). The weighted mean was utilized when specific observations, such as variations in FEWE or SWE, had differing levels of significance (Sharma & Chaudhary, 2008). Standard deviation, a measure of dispersion, was calculated for the independent variables (FEWE, SWE, CCR, IRMP, GE) and the dependent variable (IRP). A high standard deviation indicated greater variability in the data, while a low standard deviation suggested homogeneity and uniformity (Sharma & Chaudhary, 2008).

3.7.2 Correlation Analysis

Correlation analysis assessed the strength and direction of the relationship between the dependent variable (IRP) and the independent variables (FEWE, SWE, CCR, IRMP, GE). Pearson's correlation coefficient was used to evaluate the degree of linear association between these variables:

Pearson's correlation coefficient, which ranges from -1 to +1 in statistics, quantifies the linear connection between two variables. A value of 1 indicates a complete positive correlation, a value of 0 indicates no correlation, and a value of -1 indicates a whole negative correlation. Correlation analysis includes methods and strategies for examining and quantifying the degree of the link between the two variables. Bivariate Parsons' correlation statistical tools have been used to determine the relationship between variables. The following formula is used to calculate the coefficient of correlation, or r:

If $r = 0$, then there is no correlation between variables.
If $r > 0$, then there is positive correlation between variables.
If $r < 0$, then there is negative relation between variables.

3.7.3 Regression Analysis

Regression analysis was employed to predict the dependent variable (IRP) based on the independent variables (FEWE, SWE, CCR, IRMP, and GE). This method was crucial for understanding the relationships and the extent to which each independent variable influenced the dependent variable. The dependent variable's unknown value is estimated or predicted using the independent variable, which has a known value. A linear equation, which simulates how changes in the independent variable affect the

dependent variable, is often used to explain this connection (Sharma & Chaudhary, 2008).

Multiple Regression Model,

$$IRP = \beta_0 + FEWE\beta_1 + SWE\beta_2 + CCR\beta_3 + IRMP\beta_4 + GE\beta_5 + ej$$

Where,

IRP	= Insurance Risk and Pricing
β_0	= Intercept of the dependent variable (constant value)
$\beta_1, \beta_2, \beta_3, \beta_5, \beta_5$	= Beta coefficients of independent variables
FEWE	= Frequency of Extreme Weather Events
SWE	= Severity of Weather Events
CCR	= Climate Change Regulations
IRMP	= Insurer's Risk Management Practices
GE	= Geographical Exposure
ej	= Error Terms

3.8 Reliability Test

The reliability test was conducted to ensure the internal consistency of the research instrument, measured using Cronbach's Alpha. Cronbach's Alpha is a standard reliability measure that assesses whether the items within each variable are consistently capturing the same underlying construct. A value above 0.7 is generally considered acceptable, while values closer to 1 indicate higher reliability (Tavakol & Dennick, 2011). The table highlights that all variables meet the minimum threshold for Cronbach's Alpha, confirming the questionnaire's overall reliability.

This ensures that the collected data is dependable for subsequent statistical analyses and provides a solid foundation for addressing the research objectives. The high reliability values support the validity of the study's conclusions and indicate that the instrument can effectively capture the complex dynamics of climate change and its impacts on insurance risk and pricing.

Table 2

Reliability Test

Variables	Cronbach's Alpha
Frequency of Extreme Weather Events	.725
Severity of Weather Events	.701
Climate Change Regulations	.736
Insurer's Risk Management Practices	.706
Geographical Exposure	.752
Insurance Risk and Pricing	.759

The reliability test, as shown in the table, evaluates the internal consistency of the variables using Cronbach's Alpha. This measure assesses whether the items in each variable consistently capture the same underlying construct. An overall Cronbach's Alpha of 0.900 for the 30 items indicates excellent reliability, demonstrating that the research instrument is highly consistent. This high value ensures that the questionnaire is suitable for analyzing the constructs of interest related to climate change and insurance risk and pricing. Each variable's Cronbach's Alpha also exceeds the acceptable threshold of 0.7, confirming the reliability of individual constructs. This consistency ensures that the data collected is dependable and robust for addressing the research objectives.

Breaking down the results for individual variables, the Frequency of Extreme Weather Events had an Alpha value of 0.725, while the Severity of Weather Events scored 0.701. Both indicate acceptable reliability for measuring perceptions related to climate risks. Climate Change Regulations and Insurer's Risk Management Practices recorded values of 0.736 and 0.706, respectively, showing consistent measurement of regulatory and risk management constructs. The Geographical Exposure variable demonstrated strong reliability with an Alpha of 0.752, and Insurance Risk and Pricing scored 0.759, reflecting reliable measurement of financial implications of climate factors. These results confirm that the questionnaire items effectively capture the intended variables, ensuring valid and meaningful data for subsequent analysis.

CHAPTER IV
RESULTS AND DISCUSSION

4.1 Results

This study utilized descriptive statistics to summarize the data, correlation analysis to assess relationships between variables, and multiple regression analysis to identify key predictors of insurance risk and pricing (IRP). Reliability testing ensured data consistency, while ANOVA was used to evaluate the overall model significance. These statistical tools provided insights into how factors like extreme weather events, climate change regulations, and insurer's risk management practices influence IRP.

4.1.1 Respondent's Profile Analysis

The respondent's profile analysis provides detailed demographic insights into the study participants, covering gender, age, education level, employment status, annual income level, and work experience.

Table 3

Respondent's Profile Analysis

Category	Sub-Category	Frequency	Percentage (%)
Gender	Male	237	61.7
	Female	147	38.3
Age	Below 20 years	28	7.3
	21-30 years	218	56.8
	31-40 years	102	26.6
	Above 40 years	36	9.4
Education Level	High School	78	20.3
	Bachelor's Degree	185	48.2
	Master's and Above	121	31.5
Employment Status	Self-Employed	115	29.9
	Employed	188	49.0
	Unemployed	81	21.1
Annual Income Level	Below Rs. 5 Lakhs	191	49.7
	Rs. 5-10 Lakhs	127	33.1
	Above Rs. 10 Lakhs	66	17.2
Work Experience	0-4 years	200	52.1
	5-10 years	145	37.8
	10 years and above	39	10.2
	Total	384	100.0

Source: Survey, 2024

The table indicates that out of 384 respondents, 61.7% are male, while 38.3% are female, reflecting a male-dominant participation. This gender distribution suggests that men might have been more accessible or willing to participate in the survey, though the inclusion of a significant proportion of females ensures gender diversity in the dataset.

Regarding age distribution, the majority of respondents (56.8%) fall within the age group of 21-30 years, followed by 26.6% in the 31-40 years category. Only 7.3% are below 20 years, while 9.4% are above 40 years. This indicates that the sample is predominantly young to middle-aged, which may align with the active working population and their engagement with insurance products. The lower representation of individuals below 20 years and above 40 years may reflect limited insurance involvement or accessibility among these groups.

Educational qualifications of respondents show that 48.2% hold a bachelor's degree, while 31.5% have a master's degree or higher, and 20.3% have a high school education. This distribution demonstrates a well-educated sample, with a significant proportion holding advanced degrees, which is beneficial for understanding insurance concepts and climate change-related risks. The high level of education among respondents enhances the reliability of the responses, as it suggests a higher likelihood of informed and thoughtful participation.

Employment status analysis reveals that 49.0% are employed, 29.9% are self-employed, and 21.1% are unemployed. The dominance of employed individuals suggests that the survey participants primarily belong to the working population, who may have better access to and understanding of insurance products. The presence of self-employed and unemployed individuals ensures diverse perspectives, reflecting varying financial stability and risk perceptions among respondents.

Annual income levels indicate that 49.7% of respondents earn below Rs. 5 lakhs annually, 33.1% earn between Rs. 5-10 lakhs, and only 17.2% earn above Rs. 10 lakhs. This distribution suggests that a majority of respondents belong to lower-to-middle-income groups, which may influence their affordability and willingness to invest in insurance products. The smaller proportion of high-income individuals highlights the potential need for targeted insurance strategies to cater to different income groups.

Work experience analysis shows that 52.1% of respondents have 0-4 years of experience, followed by 37.8% with 5-10 years, and 10.2% with over 10 years of experience. This indicates that the sample is dominated by relatively less experienced individuals, possibly reflecting a younger demographic. The diversity in experience levels contributes to understanding varied perspectives on insurance and climate risks across career stages. In conclusion, the profile analysis provides a statistically diverse sample that supports the study's objectives by incorporating respondents with varied demographics, income, and work experience levels, ensuring comprehensive and representative findings.

4.1.2 Descriptive Analysis

The descriptive analysis of the six variables reveals a strong consensus among respondents on the significant impact of climate change on the insurance industry. Respondents indicated that extreme weather events are increasingly frequent and severe, driving higher premiums, affecting insured properties, and influencing risk management practices.

Climate change regulations are seen as influential, raising operational costs and premiums while encouraging sustainable practices. Risk management strategies, such as better risk analysis tools and data analytics, are viewed as crucial for insurers' resilience, while geographical exposure is acknowledged to increase premiums and affect coverage availability in disaster-prone areas. Overall, these findings highlight the crucial role of climate change in shaping insurance risk assessments, pricing, and coverage strategies.

Table 4

Perception towards Frequency of Extreme Weather and Events

Frequency of extreme weather and events	Mean	SD
Extreme weather events are increasing.	4.25	0.79
Such events have affected insured properties.	4.04	0.70
Rising frequency increases insurance premiums.	3.92	0.78
Insurers limit coverage due to frequent events.	3.82	0.87
Extreme weather affects underwriting policies.	3.86	0.89
Weighted average	3.98	0.81

The table presents the respondent's perceptions regarding the frequency of extreme weather events and its impact on insurance-related aspects. The data is summarized using the mean and standard deviation (SD) of responses for each statement. The weighted average mean across all items is 3.98, indicating that respondents generally agree with the statements, albeit with some variation as evidenced by the standard deviation (0.81). This suggests a strong recognition of the increasing frequency of extreme weather events and its effects on insurance dynamics.

The highest mean score (4.25) is observed for the statement, "Extreme weather events are increasing." This suggests a widespread consensus among respondents about the rising frequency of extreme weather events. The relatively low SD (0.79) further indicates that most responses were clustered around the mean, reflecting uniformity in opinion. This finding aligns with global observations of more frequent and severe climatic disruptions in recent years.

The second-highest mean (4.04) corresponds to the statement, "Such events have affected insured properties." This highlights the perceived direct impact of extreme weather on insured assets. With an SD of 0.70, responses were closely aligned, underscoring a shared understanding among respondents that these events lead to tangible losses and increased claims in the insurance sector.

The statement "Rising frequency increases insurance premiums" has a mean of 3.92 with an SD of 0.78. This reflects a high level of agreement that the increasing frequency of extreme weather events directly influences premium rates. However, the slightly higher SD indicates more variability in respondents' opinions, possibly influenced by individual experiences with premium adjustments or regional differences in insurance policies.

For the statement, "Insurers limit coverage due to frequent events," the mean score is 3.82, indicating agreement with this sentiment, though to a slightly lesser degree compared to the previous statements. The SD of 0.87 suggests greater variability in perceptions. This variability could stem from differing insurance policies and practices, as well as variations in respondents' personal experiences with coverage restrictions.

Lastly, the mean score for "Extreme weather affects underwriting policies" is 3.86, with a standard deviation of 0.89. This indicates a general agreement that extreme weather

impacts underwriting policies, though the higher SD points to some divergence in opinions. This variability could be attributed to differing levels of awareness or exposure to underwriting practices among respondents.

In conclusion, the statistical findings reveal that respondents recognize the increasing frequency of extreme weather events and their significant impacts on insured properties, premiums, and underwriting policies. The weighted average mean of 3.98 supports the notion that extreme weather events are a pressing concern in the insurance sector. However, the observed variability in responses for certain statements suggests the need for further exploration of regional and demographic factors influencing perceptions. These insights highlight the critical importance of adaptive risk management and pricing strategies in response to climate-related challenges.

Table 5

Perception towards Severity of Weather Events

Severity of Weather Events	Mean	SD
Severe weather events cause significant damage.	4.10	0.85
High severity raises insurance pricing.	3.96	0.83
Severe events increase insurers' risk exposure.	4.07	0.80
Policies now exclude severe weather claims.	3.80	0.91
Severe events drive claims and premiums higher.	3.98	0.86
Weighted average	3.98	0.85

The table illustrates respondents' perceptions regarding the severity of weather events and their implications for the insurance sector. The mean and standard deviation (SD) of responses are presented for five specific statements, with a weighted average mean of 3.98 and a standard deviation of 0.85. This indicates that respondents generally agree that severe weather events significantly affect insurance dynamics, with moderate variability in their opinions.

The statement, “Severe weather events cause significant damage,” received the highest mean score of 4.10, with an SD of 0.85, indicating strong agreement among respondents. The relatively low SD shows consistency in responses, reflecting a shared

acknowledgment of the destructive impacts of severe weather events. This finding emphasizes the direct link between severe weather and extensive property and financial damages, aligning with global trends of intensifying climate impacts.

The second-highest mean score (4.07) corresponds to the statement, “Severe events increase insurers’ risk exposure.” This reflects a general consensus that as the severity of weather events rises, insurers face greater challenges in managing risks. The SD of 0.80 indicates relatively low variability in responses, suggesting a common understanding of the growing vulnerability of insurers due to such events.

The statement, “Severe events drive claims and premiums higher,” has a mean of 3.98 and an SD of 0.86. This highlights agreement that severe weather not only increases the number of claims but also drives up premium costs. The slightly higher SD indicates moderate variability, potentially influenced by differences in respondents’ experiences with insurance claims or regional pricing policies.

The mean score for “High severity raises insurance pricing” is 3.96, with an SD of 0.83. This shows strong agreement that severe weather events lead to higher insurance premiums, reflecting the financial strain imposed on insurers due to increased risks. The SD suggests a relatively uniform perception of the direct correlation between event severity and pricing adjustments.

The lowest mean score (3.80) is for the statement, “Policies now exclude severe weather claims.” While respondents generally agree with this statement, the slightly lower mean and higher SD (0.91) suggest that opinions are more varied. This variability could be due to differences in individual experiences with policy exclusions or a lack of uniformity in insurers’ approaches to handling severe weather-related claims.

In conclusion, the statistical findings indicate that respondents recognize the significant damage caused by severe weather events and their cascading effects on insurers’ risk exposure, claims, and premium pricing. The weighted average mean of 3.98 underscores the broad agreement on these impacts, while the variability in certain responses highlights potential differences in regional insurance practices or individual experiences. These findings emphasize the need for insurers to adopt proactive risk management strategies to address the increasing severity of weather events.

Table 6

Perception towards Climate Change Regulations

Climate Change Regulations	Mean	SD
Regulations impact insurers' practices.	4.02	0.87
Stricter policies increase premiums.	3.91	0.80
Compliance raises operational costs.	3.93	0.86
Policies encourage sustainable practices.	3.90	0.85
Weak regulations create pricing uncertainties.	4.02	0.91
Weighted average	3.96	0.86

The table presents respondents' perceptions of climate change regulations and their impact on the insurance industry. The mean and standard deviation (SD) are provided for five statements, with a weighted average mean of 3.96 and an SD of 0.86, indicating general agreement among respondents that climate change regulations significantly affect insurers, but with some variability in their opinions.

The highest mean score of 4.02 is associated with the statements, “Regulations impact insurers’ practices” and “Weak regulations create pricing uncertainties.” Both these statements received the same mean, indicating strong consensus among respondents that climate change regulations shape insurers' practices, and the lack of strong regulations introduces uncertainties in pricing. The SD of 0.87 and 0.91, respectively, shows moderate variability in responses, suggesting that while most respondents agree on the influence of regulations, there may be differences in how regulations are applied across different insurers or regions.

The second-highest mean score (3.93) pertains to the statement, “Compliance raises operational costs.” This suggests a strong agreement that regulatory compliance increases the financial burden on insurance companies. The SD of 0.86 shows moderate variability, which could be attributed to differences in the cost implications of compliance among different types of insurers or varying regulatory environments across regions.

The statement “Stricter policies increase premiums” has a mean score of 3.91 with an SD of 0.80. This indicates that respondents generally agree that more stringent climate regulations lead to higher premiums. The relatively low SD reflects a consensus that stricter policies are a direct factor in raising insurance costs. This result aligns with

broader industry trends, where regulatory pressures often translate into increased operational costs, which are passed on to consumers through higher premiums.

The statement “Policies encourage sustainable practices” received a mean of 3.90 and an SD of 0.85. This score suggests that respondents recognize the role of climate change regulations in promoting sustainable practices within the insurance industry, though there is slightly more variability in responses. This might be due to differing opinions on the effectiveness or enforcement of sustainability policies, as well as varying levels of commitment to sustainability across insurers.

In conclusion, the findings suggest a strong consensus that climate change regulations have a significant impact on insurers, especially in terms of influencing their practices and creating pricing uncertainties in the absence of clear regulations. The weighted average mean of 3.96 further emphasizes the general agreement that regulations affect operational costs, premiums, and sustainability practices. However, the moderate variability in some responses indicates that opinions on the degree of impact may differ depending on the specific context or type of insurer, highlighting the need for more tailored regulatory approaches in the insurance industry.

Table 7

Perception towards Insurer's Risk Management Practices

Insurer's Risk Management Practices	Mean	SD
Insurers use better tools for risk analysis.	3.93	0.90
Risk strategies enhance insurer resilience.	3.93	0.84
Climate risks shape risk management policies.	3.90	0.79
Data analytics improves risk assessments.	4.09	0.83
Strong risk practices stabilize pricing.	3.91	0.89
Weighted average	3.96	0.85

The table presents respondents' perceptions of insurers' risk management practices, with the mean and standard deviation (SD) for each of the five statements, along with a weighted average mean of 3.96 and an SD of 0.85. These findings suggest a generally favorable view of how insurers incorporate climate risks into their risk management processes, with some variability in individual responses.

The highest mean score of 4.09 is associated with the statement, “Data analytics improves risk assessments.” This suggests strong agreement among respondents that insurers increasingly rely on data analytics to enhance their ability to assess and manage risks. The relatively low SD of 0.83 indicates a fairly uniform view of the importance of data analytics, reflecting its growing role in shaping risk management decisions across the industry.

The other two statements with a mean score of 3.93 are, “Insurers use better tools for risk analysis” and “Risk strategies enhance insurer resilience.” Both these findings suggest that respondents agree insurers are improving their risk analysis tools and strategies, contributing to better resilience in the face of climate-related challenges. The SD for these statements is 0.90 and 0.84, respectively, with moderate variability, indicating that while the majority of respondents agree with these claims, some differences in the responses exist, possibly due to variations in risk management practices across insurers.

The statement “Climate risks shape risk management policies” has a mean score of 3.90 and an SD of 0.79. This indicates that respondents generally agree that climate risks are an important factor influencing insurers' risk management policies, though there is slightly less consensus compared to the other statements. The relatively low SD reflects a fairly uniform agreement, but some respondents may feel that climate risks are not yet fully integrated into all insurers' policies.

The statement “Strong risk practices stabilize pricing” received a mean of 3.91 and an SD of 0.89. This suggests that insurers' strong risk management practices are generally seen as helping to stabilize insurance pricing in the face of climate-related uncertainties. The SD indicates a moderate level of disagreement, possibly reflecting differences in how effective various insurers' risk practices are at stabilizing premiums, depending on their specific strategies and market conditions.

In conclusion, the overall findings, with a weighted average mean of 3.96, indicate a strong consensus that insurers are improving their risk management practices, particularly through the use of data analytics and better risk analysis tools. These practices are perceived to enhance resilience and stabilize pricing, while also ensuring that climate risks influence policy decisions. However, moderate variability in some responses suggests that not all insurers are perceived to be equally advanced in their

risk management practices, pointing to potential areas for improvement and a need for broader industry adaptation.

Table 8

Perception towards Geographical Exposure

Geographical Exposure	Mean	SD
Riskier locations face higher premiums.	4.09	0.85
Insurers charge more in disaster-prone areas.	3.97	0.90
Location impacts coverage availability.	3.94	0.86
High-risk areas increase claim uncertainties.	3.93	0.87
Geographical exposure drives policy pricing.	3.93	0.89
Weighted average	3.97	0.87

The table presents respondents' perceptions of geographical exposure and its impact on insurance practices, with the mean and standard deviation (SD) for each of the five statements, alongside a weighted average mean of 3.97 and an SD of 0.87. The results suggest that respondents largely agree that geographical factors significantly influence insurance pricing and coverage, although some variation exists in individual responses.

The statement with the highest mean score of 4.09 is “Riskier locations face higher premiums.” This indicates strong agreement among respondents that insurers charge higher premiums for properties located in riskier areas, such as those prone to natural disasters or other climate-related risks. The relatively low SD of 0.85 further suggests that there is broad consensus among respondents regarding this view, reinforcing the importance of location in determining insurance costs.

The statement “Insurers charge more in disaster-prone areas” has a mean of 3.97 and an SD of 0.90. This finding suggests that respondents believe insurers are more likely to impose higher premiums in areas prone to disasters. While the mean score indicates general agreement, the slightly higher SD implies that there may be some variation in perceptions of how disaster-prone areas are identified and how much this affects insurance pricing.

The statement “Location impacts coverage availability” received a mean of 3.94 and an SD of 0.86. This indicates that respondents generally agree that geographical location affects not only the cost but also the availability of insurance coverage. The SD suggests

moderate variability, indicating that some respondents may believe insurers are more flexible or conservative in offering coverage depending on the location's risk profile.

The statements “High-risk areas increase claim uncertainties” and “Geographical exposure drives policy pricing” both received a mean of 3.93 and an SD of 0.87 and 0.89, respectively. These findings show that respondents perceive high-risk areas as increasing the uncertainty of claims and influencing policy pricing. Although there is a consensus on this view, the slightly higher SD values suggest that there may be differences in how respondents view the degree of uncertainty and how much geographical exposure drives pricing decisions. In conclusion, the overall weighted average of 3.97 indicates strong agreement that geographical exposure significantly influences insurance premiums, coverage availability, and policy pricing. While most respondents view high-risk areas as resulting in higher premiums and coverage limitations, some variability exists in how they perceive the severity of these impacts. The findings emphasize the importance of geographical factors in shaping insurance practices, with implications for insurers' pricing strategies and coverage policies in areas with higher exposure to climate-related risks.

Table 9

Perception towards Insurance Risk and Pricing

Insurance Risk and Pricing	Mean	SD
Climate change affects insurance risk.	4.05	0.87
Pricing reflects climate-related risks.	3.87	0.91
Premiums rise due to climate uncertainty.	3.81	0.88
Risk assessments now include climate events.	3.88	0.87
Resilient practices lower risk and premiums.	3.89	0.90
Weighted average	3.90	0.89

The table provides insights into respondents' views on the relationship between insurance risk and pricing in the context of climate change. The weighted average mean score for the statements is 3.90, with a standard deviation (SD) of 0.89, indicating a general agreement with the statements while also showing some variability in

respondents' views. The responses suggest that climate change is perceived to have a notable impact on both insurance risks and the pricing of insurance premiums.

The highest mean score of 4.05 corresponds to the statement “Climate change affects insurance risk.” This result reflects strong agreement among respondents that climate change is a key factor influencing insurance risk. The SD of 0.87 indicates a relatively consistent perception across respondents that climate change introduces significant risk considerations into the insurance industry. This highlights the increasing relevance of climate-related risks in shaping insurers' strategies.

The statement “Pricing reflects climate-related risks” has a mean of 3.87 and an SD of 0.91, suggesting a strong consensus that insurance pricing takes climate-related risks into account. While most respondents agree with this view, the higher SD indicates some degree of variability in opinions, possibly reflecting differences in how respondents perceive the integration of climate risks into pricing models. This finding underscores the importance of climate change in influencing premium structures, though there is some uncertainty about the extent of this reflection in pricing.

The statement “Premiums rise due to climate uncertainty” shows a mean of 3.81 and an SD of 0.88, indicating moderate agreement with the idea that climate uncertainty drives higher premiums. The relatively lower mean suggests that, while most respondents acknowledge the impact of climate uncertainty on premium increases, the effect may not be as universally agreed upon. The SD suggests some variation in how much climate uncertainty is thought to affect premiums, with some respondents possibly viewing this effect as less pronounced.

The statement “Risk assessments now include climate events” has a mean of 3.88 and an SD of 0.87, signaling strong agreement that insurers are integrating climate-related events into their risk assessments. This result supports the growing importance of considering climate risks when evaluating insurance applications and setting premiums. The relatively low SD indicates a consensus among respondents that climate events are increasingly factored into risk evaluation processes.

Lastly, the statement “Resilient practices lower risk and premiums” has a mean of 3.89 and an SD of 0.90, indicating that respondents agree that resilient practices—such as risk mitigation and adaptation strategies—can reduce both insurance risks and

premiums. This suggests that insurers are rewarding resilience through lower premiums, and respondents generally perceive this as a beneficial factor in the insurance pricing process. The higher SD, however, indicates that some variation exists in how respondents understand the relationship between resilience and pricing.

In conclusion, the weighted average mean of 3.90 suggests a strong belief that climate change affects insurance risk, pricing, and premiums, although the exact impact may vary. Overall, the findings indicate that insurers are increasingly incorporating climate risks into their risk assessments and pricing strategies. However, there is some variability in how respondents perceive the exact effects, reflecting differing views on the role of climate uncertainty and resilient practices in shaping insurance risk and pricing. These insights have implications for insurers as they adjust their practices to account for the growing influence of climate change.

4.1.3 Correlation Analysis

The correlation table presented above highlights the relationships between the dependent variable, Insurance Risk and Pricing (IRP), and five independent variables: Frequency of Extreme Weather Events (FEWE), Severity of Weather Events (SEW), Climate Change Regulations (CCR), Insurer's Risk Management Practices (IRMP), and Geographical Exposure (GE). The results indicate that all correlations are statistically significant at the 0.01 level, as denoted by the asterisks next to the correlation coefficients.

This means that the relationships between IRP and each of these independent variables are highly unlikely to have occurred by chance. Moreover, the p-values associated with each correlation are 0.000, further reinforcing the statistical significance of these relationships.

These findings suggest that the frequency and severity of extreme weather events, the presence of climate change regulations, the risk management practices of insurers, and geographical exposure all play important roles in shaping insurance risk and pricing. The strength of these relationships varies, but all contribute to the overall understanding of the factors influencing IRP.

Table 10

Correlation Analysis

Variables	FEWE	SEW	CCR	IRMP	GE	IRP
FEWE	1					
SEW	.515**	1				
	0.000					
CCR	.398**	.556**	1			
	0.000	0.000				
IRMP	.345**	.494**	.624**	1		
	0.000	0.000	0.000			
GE	.339**	.463**	.465**	.518**	1	
	0.000	0.000	0.000	0.000		
IRP	.322**	.401**	.427**	.465**	.512**	1
	0.000	0.000	0.000	0.000	0.000	

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

First, the correlation between IRP and FEWE is 0.322**, indicating a moderate positive relationship. This suggests that as the frequency of extreme weather events increases, there is a corresponding increase in insurance risk and pricing. The relationship is statistically significant, meaning that insurers are likely to adjust their pricing strategies based on the rising frequency of extreme weather events.

Second, the correlation between IRP and SEW is 0.401**, which represents a moderate to strong positive relationship. This finding implies that as the severity of weather events increases, insurers' pricing strategies and risk assessments are also likely to become more pronounced. Severe weather events pose greater risk exposure, driving up insurance costs. This correlation also holds statistical significance, supporting the conclusion that severity plays a key role in insurance pricing.

Third, IRP shows a correlation of 0.427** with CCR, indicating a strong positive relationship. This suggests that the implementation of climate change regulations has a significant influence on insurance risk and pricing. Stricter regulations are likely to raise premiums and operational costs for insurers, driving the correlation with pricing up

further. The relationship is statistically significant, emphasizing the role of regulation in shaping the pricing models and risk strategies within the insurance sector.

Next, the correlation between IRP and IRMP is 0.465**, indicating a moderately strong positive relationship. This result indicates that better risk management practices within the insurance industry are associated with higher insurance pricing. As insurers adopt more comprehensive risk strategies, including data analytics and climate-related risk models, they may increase their premiums to cover the rising risks. The relationship is statistically significant, supporting the idea that improved risk management practices influence insurance pricing.

Lastly, the correlation between IRP and GE is 0.512**, which shows a strong positive relationship. This means that higher geographical exposure, particularly in areas prone to extreme weather events, correlates with higher insurance premiums. Insurers are likely to charge higher premiums in areas with greater risk exposure, ensuring they are adequately compensated for the heightened risk. This relationship is also statistically significant, further confirming the impact of geographical factors on insurance pricing.

In conclusion, the findings suggest that all five independent variables—FEWE, SEW, CCR, IRMP, and GE—have a statistically significant and positive relationship with IRP. These correlations highlight the importance of considering climate change, weather events, regulatory factors, risk management practices, and geographical exposure when determining insurance risk and pricing strategies. As these variables increase, so too does the likelihood of higher premiums and more comprehensive risk assessments within the insurance industry.

4.1.4 Regression Analysis

Table 11, 12 and 13 presents the results of the regression coefficients analysis, which explores the relationship between the independent variables—Frequency of Extreme Weather Events (FEWE), Severity of Weather Events (SEW), Climate Change Regulations (CCR), Insurer's Risk Management Practices (IRMP), and Geographical Exposure (GE)—and the dependent variable, Insurance Risk and Pricing (IRP). This analysis provides the unstandardized regression coefficients, which indicate the expected change in the dependent variable for a one-unit change in each independent variable, holding all other variables constant. Additionally, the table provides statistical

significance values (p-values) for each coefficient, which help determine whether the observed relationships are statistically reliable.

Table 11

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.583	0.340	0.331	0.51837

Predictors: (Constant), GE, FEWE, CCR, SEW, IRMP

The R-value of 0.583 indicates a moderate positive correlation between the predictors and the dependent variable. The R Square value of 0.340 means that approximately 34% of the variation in IRP can be explained by the independent variables in the model. The Adjusted R Square of 0.331 provides a more accurate measure of the goodness of fit, accounting for the number of predictors in the model. The Standard Error of the Estimate is 0.51837, which reflects the average distance between the observed values and the predicted values. In conclusion, the model explains a moderate portion of the variance in insurance risk and pricing, indicating that the independent variables significantly contribute to determining insurance premiums and risk assessments, although there are other factors influencing the dependent variable.

Table 12

Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.269	5	10.454	38.904	.000
	Residual	101.571	378	0.269		
	Total	153.840	383			

Dependent Variable: IRP

Predictors: (Constant), GE, FEWE, CCR, SEW, IRMP

Table 12 presents the results of the Analysis of Variance (ANOVA) for the regression model. The regression sum of squares (52.269) reflects the variation explained by the independent variables, while the residual sum of squares (101.571) indicates the unexplained variation. The F-statistic of 38.904 is calculated by dividing the mean square of the regression (10.454) by the mean square of the residual (0.269), and it is statistically significant with a p-value of 0.000, which is well below the 0.05 threshold. This suggests that the model as a whole significantly predicts the dependent variable,

Insurance Risk and Pricing (IRP). In conclusion, the results of the ANOVA indicate that the independent variables included in the regression model have a significant collective impact on IRP, confirming the model's effectiveness in explaining variations in insurance risk and pricing.

Table 13

Regression Coefficients Analysis

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	0.733	0.250	2.935	0.004
	FEWE	0.096	0.061	1.569	0.117
	SEW	0.081	0.063	1.282	0.201
	CCR	0.105	0.062	1.703	0.089
	IRMP	0.195	0.063	3.102	0.002
	GE	0.321	0.053	6.107	0.000

Dependent Variable: IRP

The constant (intercept) value is 0.733, indicating the baseline level of IRP when all independent variables are set to zero. The constant term is statistically significant with a t-value of 2.935 and a p-value of 0.004, which is less than the standard threshold of 0.05. This means that the baseline level of IRP is significantly different from zero, confirming that there is a non-zero starting point for the dependent variable even in the absence of the predictors.

The unstandardized coefficient for FEWE is 0.096, meaning that for each one-unit increase in the frequency of extreme weather events, IRP is expected to increase by 0.096, assuming all other variables are held constant. The t-value for FEWE is 1.569, and the p-value is 0.117. Since the p-value exceeds the 0.05 significance threshold, this relationship is not statistically significant. Although there is a positive association between FEWE and IRP, the result suggests that the frequency of extreme weather events alone does not significantly predict IRP at the 5% level in this model.

The coefficient for SEW is 0.081, suggesting a positive relationship between the severity of weather events and IRP. Specifically, for each one-unit increase in the severity of weather events, IRP is expected to increase by 0.081, keeping other variables constant. The t-value for SEW is 1.282, and the p-value is 0.201, which is also greater

than 0.05. This indicates that the severity of weather events does not have a statistically significant effect on IRP at the 5% level, although the positive direction of the relationship is still evident.

The coefficient for CCR is 0.105, indicating a positive relationship between the regulatory environment concerning climate change and IRP. For each one-unit increase in the stringency or impact of climate change regulations, IRP is expected to rise by 0.105. The t-value is 1.703, and the p-value is 0.089. This result is above the 0.05 threshold but below the 0.10 threshold, suggesting that while the relationship between CCR and IRP is statistically significant at the 10% level, it is not as strong as would be expected for a 5% significance level. Thus, CCR has a moderate effect on IRP, but it is not as robust as other predictors in this model.

The coefficient for IRMP is 0.195, which means that for each one-unit increase in insurers' risk management practices, IRP is expected to increase by 0.195, holding all other variables constant. The t-value for IRMP is 3.102, and the p-value is 0.002, which is well below the 0.05 significance level. This indicates that IRMP has a statistically significant and positive impact on IRP, suggesting that insurers with stronger risk management practices tend to charge higher premiums and assess higher risks.

The coefficient for GE is 0.321, indicating that for each one-unit increase in geographical exposure to risk, IRP is expected to increase by 0.321, holding all other factors constant. This is the highest coefficient among the independent variables, suggesting that geographical exposure is the most influential predictor of IRP in this model. The t-value for GE is 6.107, and the p-value is 0.000, which is highly significant and far below the 0.05 threshold. This result suggests that geographical exposure has a substantial impact on insurance risk and pricing, confirming that areas more prone to risks such as natural disasters or extreme weather events lead to higher insurance premiums.

The regression coefficients analysis reveals that the most significant predictors of Insurance Risk and Pricing (IRP) are Insurer's Risk Management Practices (IRMP) and Geographical Exposure (GE). Both of these variables exhibit strong positive relationships with IRP and are statistically significant at the 5% level. While Frequency of Extreme Weather Events (FEWE), Severity of Weather Events (SEW), and Climate Change Regulations (CCR) show positive relationships with IRP, they are not

statistically significant at the 5% level, indicating that these factors have less influence on IRP in comparison to IRMP and GE. These findings underscore the importance of robust risk management practices and geographical exposure in shaping insurance pricing and risk assessments in the context of climate change.

4.1.5 Hypotheses Test

Table 14 summarizes the outcomes of hypothesis testing regarding the impact of different factors on insurance risk and pricing (IRP). The table lists the alternative hypotheses and their respective p-values, and provides conclusions about whether each hypothesis is accepted or not based on the regression analysis.

Table 14

Summary of Hypotheses

Alternative Hypotheses	P-value	Remarks
H1: There is significant impact of frequency of extreme weather events on insurance risk and pricing.	0.117	Not Accepted
H2: There is significant impact of severity of weathers events on insurance risk and pricing.	0.201	Not Accepted
H3: There is significant impact of climate change regulations on insurance risk and pricing.	0.089	Not Accepted
H4: There is significant impact of insurer's risk management on insurance risk and pricing.	0.002	Accepted
H5: There is significant impact of geographical exposure on insurance risk and pricing.	0.000	Accepted

The first hypothesis (H1) suggests that there is a significant impact of the frequency of extreme weather events (FEWE) on insurance risk and pricing. From the regression analysis (Table 13), the coefficient for FEWE is 0.096, with a p-value of 0.117. This p-value exceeds the 0.05 significance threshold, indicating that the relationship between FEWE and IRP is not statistically significant. As a result, H1 is not accepted, meaning that, according to the data, the frequency of extreme weather events does not significantly influence insurance risk and pricing.

The second hypothesis (H2) posits that the severity of weather events (SEW) has a significant impact on insurance risk and pricing. Based on the regression results, the

coefficient for SEW is 0.081, with a p-value of 0.201. Again, the p-value is greater than the 0.05 threshold, suggesting that the severity of weather events does not have a statistically significant effect on IRP. Therefore, H2 is not accepted, indicating that while there is a positive relationship between SEW and IRP, it is not strong enough to be considered statistically significant.

Hypothesis 3 (H3) suggests that climate change regulations (CCR) significantly affect insurance risk and pricing. The regression analysis shows a coefficient of 0.105 for CCR, with a p-value of 0.089. This p-value is greater than 0.05 but less than 0.10, suggesting a moderate level of statistical significance. While the relationship between CCR and IRP is positive, it does not meet the stricter 0.05 significance level required for a definitive conclusion. Thus, H3 is not accepted at the 5% level, though it could be considered significant at the 10% level. This means that the influence of climate change regulations on IRP is not as robust as some of the other factors.

The fourth hypothesis (H4) posits that insurer's risk management practices (IRMP) significantly influence insurance risk and pricing. In the regression analysis, the coefficient for IRMP is 0.195, with a p-value of 0.002, which is well below the 0.05 threshold. This indicates that IRMP has a statistically significant positive effect on IRP. Therefore, H4 is accepted, meaning that insurers' risk management practices are a key determinant in pricing and risk assessments in the insurance industry.

The final hypothesis (H5) suggests that geographical exposure (GE) has a significant impact on insurance risk and pricing. The coefficient for GE in Table 13 is 0.321, with a p-value of 0.000, which is highly significant. This result shows that geographical exposure is the strongest predictor of IRP in the model, with a robust and statistically significant positive relationship. As such, H5 is accepted, confirming that areas with higher geographical exposure to risk (e.g., disaster-prone regions) lead to higher insurance premiums and a greater perceived risk.

4.2 Discussion

The present research explored the relationships between various factors such as the frequency of extreme weather events (FEWE), severity of weather events (SWE), climate change regulations (CCR), insurer's risk management practices (IRMP), geographical exposure (GE), and their impact on insurance risk and pricing (IRP). The

findings from the correlation and regression analyses revealed several significant relationships between these variables and insurance risk, which align with or diverge from previous studies.

The current study's findings show a significant positive relationship between geographical exposure (GE) and insurance risk and pricing (IRP). This result aligns with studies like Kefi et al. (2018) and Huang et al. (2018), which indicate that areas more prone to risks such as floods or extreme weather events tend to face higher insurance premiums and increased risk exposure. Kefi et al. (2018) found that climate change and urbanization increase vulnerability to floods, which leads to higher insurance costs. Similarly, Huang et al. (2018) observed that firms operating in high-risk areas hold more cash and reduce debt to withstand potential losses, reflecting the resilience strategies prompted by geographical risks.

The regression analysis also showed a significant positive impact of insurer's risk management practices (IRMP) on insurance risk and pricing (IRP). This aligns with the findings of Ameli et al. (2020), who highlighted that insurers' internal risk management strategies, beyond mere efficiency improvements, are crucial in determining pricing and risk resilience. The significance of IRMP in the present study supports the idea that insurers' proactive strategies to manage climate-related risks play a vital role in setting premiums and mitigating financial exposure.

The influence of climate change regulations (CCR) on insurance risk and pricing was also found to be significant but at a lower level. This result is somewhat consistent with Averchenkova et al. (2021), who discussed the establishment of long-term frameworks through policies, although with some uncertainties. However, Kousky et al. (2024) argued that policy interventions require long-term planning to stabilize markets, suggesting that CCR should be a more substantial factor in influencing insurance pricing, which might be a point for further exploration in the current study.

On the other hand, the findings of this study did not support a significant impact of frequency of extreme weather events (FEWE) and severity of weather events (SWE) on insurance risk and pricing, suggesting that these variables did not significantly contribute to the model. These results contrast with previous literature, such as Pankratz et al. (2023), who observed that extreme heat negatively affects revenues and income, thereby potentially increasing insurance premiums. Similarly, De Angelis et al. (2023)

argued that the unpredictability of climate events often causes heightened investor pressure, which might suggest that FEWE and SWE should have a more direct effect on pricing in this study.

The absence of a significant relationship between FEWE, SWE, and IRP in the current study could be attributed to the specific context of the data used in the research, which might not have fully captured the long-term effects of these variables. For instance, Hamzeh et al. (2024) highlighted that some insurers are integrating climate change into their pricing strategies, but the lack of comprehensive plans may explain the modest effect of FEWE and SWE in this context. This gap could point to the need for more granular data or a longer time horizon to assess the true impact of extreme weather events on insurance premiums.

In conclusion, the findings of the current study are largely consistent with prior research, especially regarding the roles of geographical exposure and insurer's risk management practices in shaping insurance risk and pricing. These results reflect broader trends observed in earlier studies, such as Kefi et al. (2018) and Ameli et al. (2020). However, the study diverges from existing literature regarding the influence of extreme weather events and severity of weather events, suggesting that these factors may not have as direct an impact on pricing as expected. This discrepancy highlights the complexity of climate-related risks in the insurance sector and suggests avenues for further research to better understand how insurers perceive and respond to these factors over time. Further investigations could explore whether the impact of FEWE and SWE becomes more pronounced when considering different geographical or temporal contexts.

CHAPTER V
SUMMARY AND CONCLUSION

5.1 Summary

The primary objective of this study was to examine the perceptions of insured individuals in Kathmandu Valley, Nepal, regarding the impact of climate-related factors—such as the frequency and severity of extreme weather events, climate change regulations, insurer's risk management practices, and geographical exposure—on insurance risk and pricing. The study also aimed to investigate the relationships between these factors and insurance risk, as well as assess whether these variables influence insurance pricing strategies. By addressing these objectives, the study aimed to provide valuable insights into how climate change is shaping the insurance landscape in Nepal.

To achieve these objectives, the study employed a combination of descriptive and causal-comparative research designs. The descriptive research design was used to explore the perceptions of insured individuals about climate-related factors and their effects on insurance risk and pricing. The causal-comparative design was employed to assess the cause-and-effect relationships between independent variables (extreme weather events, climate change regulations, geographical exposure, and risk management practices) and the dependent variable, insurance risk and pricing. Data was collected using an online survey distributed across multiple social media platforms, ensuring a wide reach to insured individuals in Kathmandu Valley.

The sample for the study comprised 384 insured individuals who were selected using a convenience sampling technique. Primary data was gathered through an online questionnaire, which used a 5-point Likert scale to measure respondents' agreement with statements related to the study variables. The data was then analyzed using SPSS version 25, where descriptive statistics, frequency distributions, correlation analysis, and regression analysis were conducted to examine the relationships between the variables and test the research hypotheses.

The findings of the study revealed that the perceptions of insured individuals regarding the frequency and severity of extreme weather events, climate change regulations, and

geographical exposure were generally aligned with the belief that these factors significantly influence insurance risk and pricing. Correlation analysis showed that all the independent variables (extreme weather events, severity of weather events, climate change regulations, insurer's risk management practices, and geographical exposure) had significant relationships with the dependent variable, insurance risk and pricing. However, regression analysis indicated that only the insurer's risk management practices and geographical exposure had a statistically significant impact on insurance risk and pricing, while other factors, such as the frequency and severity of extreme weather events and climate change regulations, did not have a significant effect.

The study concludes that insurance companies in Nepal need to better integrate climate-related factors into their risk management strategies and pricing models. Specifically, geographical exposure and insurers' risk management practices emerged as critical factors in shaping insurance risk and pricing. While climate change regulations and the frequency and severity of extreme weather events were perceived as important by insured individuals, they did not appear to significantly affect insurance pricing in the current context. The findings suggest that the insurance industry in Nepal must enhance its adaptation strategies and consider long-term impacts of climate change to improve resilience against climate-related risks.

The study has several practical, theoretical, and policy implications. Practically, the findings highlight the need for insurers to develop more comprehensive risk management strategies and pricing models that consider geographical exposure and integrate climate change-related factors. From a theoretical perspective, the study contributes to the growing body of literature on climate change and insurance by demonstrating how specific variables impact insurance pricing and risk assessment. Policy-wise, the study suggests that government interventions, including stricter climate change regulations and incentivizing insurers to incorporate climate resilience measures, may be necessary to support the industry in adapting to the evolving risk landscape.

Finally, the study opens up avenues for future research. Future studies could explore the role of emerging technologies, such as big data and artificial intelligence, in improving climate risk modeling and insurance pricing. Additionally, research could expand beyond Kathmandu Valley to explore regional differences in climate-related

insurance challenges. Understanding the specific challenges faced by different areas of Nepal could help tailor more effective insurance solutions for diverse climate risks across the country.

5.2 Conclusion

The insured individuals exhibit a relatively high perception of the impact of extreme weather events, severity of weather events, climate change regulations, insurer's risk management practices, and geographical exposure on insurance risk and pricing. The average responses for most of these variables were above the mid-point, suggesting a strong agreement that these factors influence insurance pricing. Specifically, respondents perceived the frequency of extreme weather events as a significant factor affecting insured properties and premiums. Similarly, there was strong agreement regarding the severity of weather events causing substantial damage and driving up premiums. Respondents also indicated that climate change regulations, insurer risk management practices, and geographical exposure significantly shape insurance risk and pricing. The mean scores across these variables were consistently high, implying that insured individuals recognize the growing importance of these factors in the insurance market.

The correlation analysis reveals significant relationships between the independent variables (frequency and severity of extreme weather events, climate change regulations, insurer’s risk management practices, and geographical exposure) and the dependent variable (insurance risk and pricing). All correlation coefficients were statistically significant, indicating that the relationships observed between these factors and insurance risk and pricing are robust. Specifically, geographical exposure and insurer's risk management practices showed the strongest correlations with insurance risk and pricing, suggesting that these factors play a central role in determining how insurance companies assess and price risk. Additionally, the frequency and severity of extreme weather events, along with climate change regulations, were also significantly related to insurance risk and pricing, underscoring their influence in the current insurance landscape.

The regression analysis reveals that the independent variables, including frequency and severity of extreme weather events, climate change regulations, insurer's risk management practices, and geographical exposure, collectively have a significant

impact on insurance risk and pricing. Among these, geographical exposure and insurer's risk management practices were found to have the most substantial effects on the dependent variable, as indicated by their significant coefficients in the regression model. The results suggest that insurers' risk management practices and the geographical location of insured properties strongly influence how risks are priced and managed. However, while the frequency and severity of extreme weather events and climate change regulations had an impact, the effects were somewhat less pronounced in the regression analysis. Overall, the findings suggest that multiple factors interact to shape insurance risk and pricing, with geographical exposure and risk management practices playing critical roles.

5.3 Implications

Practical Implications

The findings of this study underscore the significant role that factors such as geographical exposure and insurer's risk management practices play in shaping insurance risk and pricing. Insurance companies should consider enhancing their risk management strategies to address climate change and extreme weather events more effectively. Insurers could invest in better tools for risk assessment, particularly in high-risk geographical areas, to ensure accurate pricing and long-term sustainability. The study highlights the need for insurers to incorporate climate change predictions and environmental changes into their underwriting policies to better manage the risks associated with extreme weather events. Furthermore, insurers should adopt flexible pricing models that account for the growing uncertainties related to climate change and geographical exposure.

Theoretical Implications

This study contributes to the existing body of knowledge by reinforcing the connection between climate-related factors and insurance risk pricing. The findings support and extend theories related to risk management and environmental economics, particularly in terms of how insurers incorporate external environmental factors such as extreme weather events and geographical vulnerabilities into their pricing models. The study further emphasizes the role of regulatory frameworks in shaping risk pricing, aligning with the theoretical discussions around the impact of government policies and climate change regulations on business practices. Additionally, the research offers insights into

how risk management theories can be adapted in response to the increasing unpredictability brought on by climate change.

Policy Implications

The findings of this study hold significant policy implications, particularly in the context of climate change regulations and the insurance industry. Policymakers should consider implementing more robust regulations that encourage insurers to integrate climate risks into their pricing and risk management practices. Government bodies could provide incentives for insurers who adopt transparent and adaptable risk management strategies, ensuring that climate change is adequately accounted for in insurance models. Additionally, policies that encourage sustainable practices, such as green investments or building resilience in disaster-prone areas, should be further developed. Policymakers could also play a role in fostering cooperation between the public and private sectors to enhance climate adaptation and disaster risk reduction strategies.

Future Scope

Future research could explore the dynamic relationship between climate change and insurance pricing across different regions and in the context of various types of insurance products. Investigating the long-term impacts of specific climate change regulations on the insurance industry, including a comparison of regions with varying regulatory approaches, could provide valuable insights. Furthermore, future studies could delve into the role of technology and innovation in risk assessment, focusing on how advancements in data analytics, machine learning, and climate modeling can enhance the insurance industry’s ability to predict and price risks more accurately. Exploring the behavioral aspects of insurance customers in the face of extreme weather events and how their perception of risk influences their insurance decisions could also be a promising area for future research.

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APPENDIX

SURVEY QUESTIONNAIRE

Dear Respondents,

I, Piyush Niraula, am an MBS student conducting a research study titled "Impact of Climate Change on Insurance Risk and Pricing." This survey is an integral part of my academic research requirement. The information provided in this questionnaire will remain confidential and will be used solely for academic purposes. Thank you for your valuable time and effort in participating in this study.

Section A: Demographic Information

A. Gender

☐ Male ☐ Female

B. Age Category

☐ Below 20 ☐ 21–30 ☐ 31–40 ☐ Above 40

C. Education Level

☐ High School ☐ Bachelor's Degree ☐ Master’s Degree and Above

D. Employment Status

☐ Employed ☐ Self-Employed ☐ Unemployed

E. Annual Income Level (in NPR)

☐ Below 5 Lakhs ☐ 5–10 Lakhs ☐ Above 10 Lakhs

F. Work Experience (in years)

☐ 0–4 ☐ 5–10 ☐ Above 10

Section B: Likert Scale Questions

The following statements are based on factors influencing insurance risk and pricing in the context of climate change. Each statement is measured on a 5-point Likert scale, where:

1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Neutral (N)
4 = Agree (A)
5 = Strongly Agree (SA)

Variable	Item	SD	D	N	A	SA
Frequency of Extreme Weather Events (FEWE)	Extreme weather events are increasing.					
	Such events have affected insured properties.					
	Rising frequency increases insurance premiums.					
	Insurers limit coverage due to frequent events.					
	Extreme weather affects underwriting policies.					
Severity of Weather Events (SWE)	Severe weather events cause significant damage.					
	High severity raises insurance pricing.					
	Severe events increase insurers' risk exposure.					
	Policies now exclude severe weather claims.					
	Severe events drive claims and premiums higher.					
Climate Change Regulations (CCR)	Regulations impact insurers' practices.					
	Stricter policies increase premiums.					
	Compliance raises operational costs.					
	Policies encourage sustainable practices.					
	Weak regulations create pricing uncertainties.					
Insurer's Risk Management Practices (IRMP)	Insurers use better tools for risk analysis.					
	Risk strategies enhance insurer resilience.					
	Climate risks shape risk management policies.					
	Data analytics improves risk assessments.					
	Strong risk practices stabilize pricing.					
Geographical Exposure (GE)	Riskier locations face higher premiums.					
	Insurers charge more in disaster-prone areas.					
	Location impacts coverage availability.					
	High-risk areas increase claim uncertainties.					
	Geographical exposure drives policy pricing.					
Insurance Risk and Pricing (IRP)	Climate change affects insurance risk.					
	Pricing reflects climate-related risks.					
	Premiums rise due to climate uncertainty.					
	Risk assessments now include climate events.					
	Resilient practices lower risk and premiums.					

Thank You for Your Participation!

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A Dissertation Submitted to the Office of the Dean, Faculty of Management in partial fulfilment of the requirements for the Master's Degree Submitted **By** Piyush Niraula Campus **Roll No** .: 63/075 Exam **Roll No** .: 13690/19 **T.U** . Registered **No.: 7-2** -196-2014 **Shanker Dev Campus** Specialization: Finance **Putalishadak, Kathmandu** December **2024**

ABSTRACT This study examined the perceptions of insured individuals in Kathmandu Valley, Nepal, regarding the impact of climate-related factors—including extreme weather events, climate change regulations, insurers' risk management practices, and geographical exposure—on insurance risk and pricing. A combination of descriptive and causal-comparative research designs was employed. Data were collected from 384 insured individuals using a structured online survey with a 5-point Likert scale and analyzed using SPSS version 25. The study applied descriptive statistics, correlation analysis, and regression analysis to evaluate relationships and test hypotheses. Findings revealed that insured individuals perceived climate-related factors as influencing insurance risk and pricing, with significant correlations observed across all factors. However, regression analysis indicated that only insurers' risk management practices and geographical exposure significantly impacted insurance risk and pricing. Other factors, such as the frequency and severity of extreme weather events and climate change regulations, did not exhibit significant effects. The study concludes that insurers in Nepal need to prioritize geographical exposure and risk management practices in their pricing models while enhancing their integration of climate-related factors. Practical implications include the development of comprehensive risk management strategies, while theoretical contributions expand the understanding of climate change's impact on insurance. Policy recommendations highlight the need for stricter climate regulations and incentives for resilience measures. Future research could explore the role of advanced technologies in climate risk modeling and extend the study to other regions in Nepal to address location-specific challenges. Keywords: Climate change, insurance risk, pricing strategies, risk management, geographical exposure

CHAPTER I INTRODUCTION 1.1 Background of the Study Climate change has emerged as one of the most critical challenges for global economies, impacting multiple sectors, including agriculture, infrastructure, and financial systems. Among these,