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**COMMUNITY RESILIENCE AND WILDLIFE CONSERVATION IN BUFFER
ZONES IN NEPAL: EXPLORING HANDMADE PAPERMAKING AS SUSTAINABLE
ECONOMIC SOLUTION FOR THEIR COEXISTENCE.**

A Thesis in
Education Development and Community Engagement

by

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ABSTRACT

This research studies the connections between community resilience and wildlife protection in buffer zones surrounding Chitwan National Park in Nepal, focusing on handmade papermaking's potential as a sustainable economic solution. Buffer zones, which serve as transitory areas between protected wildlife habitats and human settlements, are frequently the site of human-wildlife conflicts, resulting in economic loss and environmental damage. This study investigates whether manufacturing handmade paper from rhino dung and banana fiber is a viable solution to these disputes by providing alternative livelihoods and encouraging conservation efforts. The study takes a case study approach and employs qualitative methodologies such as auto-ethnography, direct observations, and interviews with local populations. The thesis examines a specific kind of sustainable entrepreneurship and how it helps communities become more resilient, addresses economic deficits, and supports wildlife conservation through sustainable business models and circular economy concepts. The study emphasizes the necessity of integrating economic growth with conservation aims by transforming waste materials into commercial products, minimizing the local community's reliance on resource-intensive practices that can contribute to human-wildlife conflicts. The results indicate that handmade papermaking has the potential to create jobs, empower marginalized populations, especially women, and minimize environmental waste, all while promoting peaceful coexistence between humans and wildlife. The paper concludes with policy recommendations for scaling up this business model and duplicating it in other buffer zones to promote sustainable development and conservation goals.

Keywords: Buffer zone, Human-Wildlife conflict, Sustainable entrepreneurship, Handmade paper manufacturing.

TABLE OF CONTENTS

LIST OF FIGURES	vii
LIST OF TABLES.....	viii
ACKNOWLEDGEMENTS.....	ix
Chapter 1 Introduction.....	1
1.1 Background and Context	2
1. Wildlife conservation and community resilience	2
2. Handmade paper making from rhino manure and Banana fiber.....	3
1.2 Statement of the Problem.....	4
1.3 Objectives of the Study.....	6
Research Questions.....	7
1.4 Significance of the Study.....	8
Scope and Limitations.....	9
Chapter 2 Literature Review.....	11
2.1 Human-Wildlife Conflicts	11
2.1.1 Causes of Human-Wildlife Conflicts.....	12
2.1.2 Impacts of Human-Wildlife Conflicts	18
2.1.3 Coexistence, Community Resilience, and Management Strategies.....	22
2.2 Conservation Efforts	30
2.2.1 Conservation History	30
2.2.2 Conservation Strategies	31
2.2.3 Effectiveness of Conservation Efforts	32
2.3 Sustainable Business Models.....	33
2.3.1 Sustainable Business Theories.....	33
2.4 Case Studies.....	41
2.4.1 Wildlife Tourism.....	41
2.4.2 Eco-friendly Products	42
2.4.3 Community-Based Enterprises	42
2.4.4 Challenges and Opportunities	43
2.5 Circular Economy	44
2.5.1 Principles of Circular Economy.....	45
2.5.2 Application in our model	46
2.6 Stakeholder Engagement in Sustainable Business Models.....	47
2.6.1 Stakeholder Theory.....	47
2.6.2 Value Proposition Framework	48
2.7 Theoretical Framework.....	49
2.7.1 Sustainable Livelihoods Framework.....	49
2.7.2 Human-Wildlife Conflict Framework.....	51
Chapter 3 Methodology	53

3.1 Research Design	53
Literature Analysis.....	54
Qualitative Methodology: Case Study Approach.....	54
3.2 Site Selection and Sampling Method.....	56
Sampling Method:.....	57
3.3 Data Collection Methods	57
3.3.1 Autoethnography.....	58
3.3.2 Direct Observations	59
3.3.3 Unstructured Interviews.....	60
3.3.4 Market Study Document Analysis	62
3.4 Data Analysis.....	63
3.4.1 Thematic Analysis:	63
3.4.2 Autoethnographic Analysis:.....	64
3.5 Validity	65
Internal Validity:.....	65
External Validity:.....	66
3.6 Ethical Considerations	67
3.7 Limitations	68
 Chapter 4 Proposed Business Model	 69
4.1 Introduction.....	69
Why are Rhino Dung and Banana Waste used?	70
4.2 The Process: From Poop to Paper.....	71
4.2.1 Collecting and Preparing Raw Materials	72
4.2.2 Paper Manufacture	73
4.2.3 Marketing and Branding	73
4.3 Significance of the Business Model.....	73
4.3.1 Win-Win-Win Impact of the Business Model	74
4.3.2. Alignment with Sustainable Development Goals (SDGs):.....	78
4.4 The Business Canvas Model.....	83
4.4.1 Introduction.....	83
4.4.2 Key Components of Business Model.....	84
4.5 Stakeholder Mapping and Value Proposition	88
4.5.1 Stakeholder Mapping	89
4.5.2 Stakeholder Value Proposition Analysis:	91
 Chapter 5 Results and Discussions.....	 95
5.1 Autoethnography	95
5.1.1 Personal Narratives	95
5.1.2 Analysis.....	100
5.1.3 Key Findings.....	102
5.2 Direct Observations and Unstructured Interviews.....	104
5.2.1 Direct Observations	104
5.2.2 Unstructured Interviews.....	106
5.3 Market Potential and Feasibility Analysis	110
5.3.1 Market Potential.....	110

5.3.2 Feasibility Analysis.....	116
5.3.3 Significance.....	118
Chapter 6 Conclusions and Recommendations	121
6.1 Conclusions.....	121
6.1.1 Key Findings.....	122
6.1.2 Implications.....	123
6.1.3 Limitations	124
6.1.4 Conclusion	124
6.2 Recommendations.....	125
6.2.1 Policy Makers	125
6.2.2 Conservationists.....	126
6.2.3 Entrepreneurs and Business Developers.....	127
6.2.4 Future Research	129
References.....	130
Appendix	153
Business Canvas Model.....	153

LIST OF FIGURES

Figure 1 Triple Bottom Line Concept.	37
Figure 2 Triangulation Method to Improve Internal Validity.	66
Figure 3 From Poop to Paper Process.	72
Figure 4 Win-Win-Win Impact of The Business Model.	74
Figure 5 How This Model Works?	77
Figure 6 United Nations 17 Sustainable Development Goals (UN, 2015).....	78
Figure 7 Stakeholder Relationships Mapping.....	90

LIST OF TABLES

Table 1 SDGs and Its Connection with the Business Model.....	79
Table 2: Stakeholder Value Elements in Handmade Paper Production	93
Table 3: Comparing Conventional Paper to Handmade Paper from Dung and Banana Waste	113
Table 4 Consumer Segments and Their Characteristics.....	114

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Chapter 1

Introduction

Growing up, I was always surrounded by nature's beauty and wildlife in the buffer zones of Chitwan National Park. In Nepal's subtropical lowlands, the park shelters various fauna, such as gigantic elephants and the endangered greater one-horned rhino (*Rhinoceros unicornis*). These creatures frequently wandered into our town, inspiring both fear and wonder. As a child, seeing these creatures brought me excitement and surprise, but it caused anxiety and economic insecurity in my family, particularly my mother.

Human communities and wildlife have been thriving together in buffer zones, and their coexistence requires a delicate balance of ecological, social, and economic factors (Lischka et al., 2018). Buffer zones are transition regions between protected habitats and human settlements that aim to reduce the negative impacts of human activity on conservation areas while fostering sustainable lives for local communities (Kumwimba et al., 2023). However, this proximity often causes human-wildlife conflicts, such as crop destruction, livestock predation, and loss of wildlife and human life (Braczkowski et al., 2023). This can impact local communities financially and trigger retaliatory actions (Ullah et al., 2024). Effective conservation involves measures that address these issues and establish a harmonious interaction between humans and nature.

The buffer zones are critical for biodiversity conservation in places like Chitwan National Park in maintaining ecological health as they provide additional habitats and migration corridors for species (Kandel et al., 2024). The situation of Nepal's Chitwan National Park illustrates this fragile equilibrium.

1.1 Background and Context

Chitwan National Park, founded in 1973, is known for its diverse wildlife, including the Bengal tiger and the one-horned rhinoceros. The buffer zones around the park, established in the late 1990s, seek to strike a peaceful balance between conservation and community livelihoods (Kandel, 2024). However, competing interests and resource consumption patterns frequently make it difficult to strike this balance (Tiwari et al., 2024).

Encouraging economic activity within buffer zones as a measure of conservation and sustainable development has recently gained popularity (Kandel, 2024). Handmade paper manufacturing using locally available materials, such as banana trash and rhino excrement, is an innovative way to create revenue while reducing environmental deterioration (Rajesh et al., 2024). This thesis explores the viability and impact of such economic solutions on community well-being and wildlife conservation initiatives.

1. Wildlife conservation and community resilience

Wildlife conservation protects and manages species and habitats to prevent extinction, enhance biodiversity, and maintain ecological equilibrium (Owens et al., 2024). The participation and collaboration of nearby populations that share a wildlife habitat are frequently necessary for effective conservation measures. The term "community resilience" describes these communities' capacity to adjust, bounce back, and prosper in the face of societal, economic, and environmental difficulties (Olcese et al., 2024). A comprehensive context analysis is necessary for evaluating a community's resilience (Matarrita-Cascante et al., 2017). Reducing conflicts and promoting pleasant interactions between humans and wildlife can be two ways; a resilient society might assist sustainable conservation initiatives.

The areas next to protected wildlife reserves that act as transitional regions between communities and core conservation areas are known as buffer zones, and they are crucial to conservation efforts. Studies reveal that buffer zones function best when they match community socioeconomic needs with conservation goals (Mishra et al., 2009). These zones provide critical wildlife habitat while offering resources and economic possibilities to neighboring residents, minimizing reliance on core conservation areas (West et al., 2006). Effective buffer zone management includes explicit land-use rules, community engagement in decision-making, and the development of sustainable economic activities, such as eco-tourism and non-wood-based enterprises (Ferraro, 2002; Joppa & Pfaff, 2011).

2. Handmade paper making from rhino manure and Banana fiber

Handmade paper manufacturing with rhino dung and banana waste is an innovative, environmentally sustainable business model that benefits communities in buffer zones. This technique converts locally available waste materials into a valuable product, all while supporting conservation and creating economic opportunities. Communities may create revenue, lessen environmental damage, and advance sustainable development by turning organic waste into profitable paper goods (Jain & Gupta, 2021). The paper-making method entails collecting rhino dung, high in plant fibers, and banana trash, a byproduct of banana production. The materials go through three stages: cleaning, pulping, and forming. The excrement and fiber are combined to make pulp, which is then spread onto frames and pressed into sheets.

This effort offers alternative livelihoods to residents by employing them, reducing environmental waste by utilizing banana fiber for paper, lowering reliance on production agriculture, and lessening human-wildlife conflict by developing economic value in rhino excrement. It also helps to reduce deforestation by encouraging non-wood-based paper

manufacture (Rajesh et al., 2024). In addition to the economic benefits, this effort encourages conservation by converting wildlife waste into a resource, which is especially valuable when it can replace lost crop value after animals have grazed in farmer's fields. The proceeds can be reinvested in local conservation efforts, including anti-poaching and habitat restoration programs. The company model promotes community resilience by providing long-term, ecologically responsible economic prospects (Matarrita-Cascante et al., 2017). Following lean startup concepts (Ries, 2011; Blank, 2013), this business model is constantly testing and improving the procedures for transforming wildlife waste and agricultural waste into paper. This iterative method reduces waste and ensures that the company remains adaptive and responsive to market trends.

Furthermore, the flexibility of the lean strategy allows it to reinvest earnings in conservation efforts, such as anti-poaching projects and habitat restoration, linking the business with sustainable, community-focused objectives. The handmade paper from rhino dung and banana fiber is consistent with sustainable development concepts since it promotes economic growth and encourages environmental conservation. This concept can be spread to other places, potentially resulting in a global network of sustainable paper products that benefit conservation efforts and the local economy.

Incorporating this strategy into buffer zones has the potential to improve efforts to conserve wildlife as well as promote community resilience.

1.2 Statement of the Problem

Communities residing in buffer zones frequently deal with issues such as diminished economic prospects, conflicts between people and wildlife, and deteriorating environmental conditions (Abukari & Mwalyosi, 2020). On one side, these difficulties have the potential to weaken community resilience and jeopardize the success of conservation initiatives. Moreover,

the need to balance protecting wildlife habitats and human activity makes wildlife conservation in buffer zones more difficult (Aryal, 2022). The survival of endangered species and the integrity of conservation areas are regularly threatened by poaching, habitat encroachment, and resource conflict (Zvidzai et al., 2023). Economic insecurity within local communities exacerbates these issues, emphasizing the need for long-term economic solutions that encourage coexistence and mutual gain.

Communities in buffer zones have serious concerns about economic sustainability (Gu et al., 2023). Typical means of livelihood like farming and herding animals are frequently susceptible to shifts in the environment and interactions with wildlife. Hence, it is crucial to identify substitute, sustainable economic ventures to enhance these communities' quality of life and bolster conservation objectives (Pasa, 2020). Due to a lack of viable economic options and regulatory restrictions limiting their access to natural resources, communities in wildlife buffer zones are frequently compelled to depend on limited local resources for survival. Jared Diamond's historical works, specifically *Collapse: How Societies Choose to Fail or Succeed* (Diamond, 2005), provide fascinating insights into how communities have historically adapted, or failed to adapt, to environmental impacts and resource scarcity. According to Diamond's findings, communities with resource constraints frequently turn to creative solutions to maximize the resources at hand. By creating sustainable economic models such as paper production projects, which repurpose waste materials into marketable products, these people can begin to transition away from resource-intensive practices that endanger both wildlife and their livelihood. Such innovative businesses not only act as a buffer against economic insecurity but also help to promote conservation efforts by offering economic incentives for natural habitat preservation. Using Diamond's paradigm, it is evident that the use of scarce local resources, when combined with sustainable business models, provides a path for buffer zone people to attain long-term economic security while maintaining biodiversity.

The study addresses this issue by investigating an innovative solution: the creation of eco-friendly paper from rhino dung and banana trash. This effort seeks to reduce human-wildlife conflict by providing communities with an alternate source of income, lowering their reliance on agriculture, and easing economic constraints. Furthermore, it provides a sustainable economic model consistent with conservation goals, converting garbage into a valuable resource while encouraging human-wildlife cooperation. The primary goal of this study is to determine how eco-friendly paper production might help reduce human-wildlife conflict, improve community livelihoods, and enhance environmental sustainability in Chitwan National Park's buffer zones through literature reviews and qualitative analysis.

1.3 Objectives of the Study

This study investigates the possibilities of sustainable business models that use natural resources like wildlife dung and banana trash and examines and develops techniques that effectively promote coexistence between communities and wildlife in buffer zones. The following are the major objectives of this study:

1. To identify obstacles and opportunities for promoting coexistence between communities and wildlife in buffer zones.
2. To develop a sustainable business plan model for premium paper wildlife dung and banana waste
3. To investigate this model's potential for reducing human-wildlife conflict and encouraging coexistence.
4. To investigate the socioeconomic and environmental effects of such programs on local communities.
5. To make policy recommendations and practical solutions for expanding the program.

This project studied the possibilities for sustainable business models utilizing wildlife dung and banana trash, as well as techniques for promoting coexistence between communities and wildlife in buffer zones. Analyzing data, the study identified hurdles and chances for cohabitation and created a sustainable business plan for making quality paper from these natural resources, assessing its viability and market potential. This thesis attempts to develop a comprehensive and well-rounded understanding of how waste products, such as rhino dung and banana trash, can be converted into useful resources by combining personal narratives, field observations, and stakeholder perspectives. The influence of this paradigm on minimizing human-wildlife conflict and promoting coexistence was investigated using case studies. The social and environmental impacts of these initiatives on nearby communities were assessed using secondary data from a range of sources, such as government publications, NGO publications, and journals. Finally, the study included policy recommendations and practical solutions for scaling up the program, ensuring that the findings were applicable and useful to both communities and wildlife conservation efforts.

Research Questions

This study aims to investigate novel approaches to human-wildlife conflict through sustainable actions and resource usage. The primary focus is on developing a model for converting wildlife manure and banana trash into premium paper, which has the potential to deliver both economic and environmental benefits. The following research questions will be addressed by the thesis to direct this study:

1. How can banana waste and wildlife dung be efficiently turned into high-quality paper?

2. What are the economic advantages of encouraging handmade paper manufacture in buffer zone communities?
3. How can this model affect wildlife conservation efforts, specifically in decreasing human-wildlife conflicts and supporting wildlife conservation?
4. What are the impacts of economic empowerment on community resilience, including economic, social, and environmental aspects?
5. What are stakeholders' perspectives on integrating economic solutions with animal conservation efforts?
6. What are the challenges to ensure the long-term sustainability and efficacy of economic activities in buffer zones?

1.4 Significance of the Study

The goal of this research is to enhance the scholarly understanding of sustainable economic approaches within conservation environments. The study will offer valuable insights into creative solutions for challenging socio-ecological problems by examining the relationship between economic sustainability, community resilience, and wildlife protection. First, it contributes to conservation efforts by providing a long-term use for rhino dung, which helps to preserve the larger one-horned rhino and other species in Chitwan National Park. The strategy directly contributes to the conservation of these species by lowering the motivation for poaching and building healthy relationships between local populations and wildlife. Furthermore, the initiative fosters community development by providing new sources of income and employment for local communities in the buffer zone. With the ability to become social entrepreneurs and contribute to the improvement of livelihoods in the area, this program is especially empowering for the local women.

Moreover, the findings have substantial policy consequences. The results can help conservationists and politicians create practical plans for resolving conflicts between people and wildlife and encouraging sustainable development in protected areas. Policymakers, practitioners of conservation, and community development groups can benefit from the study's practical implications. Ultimately, the accomplishment of the initiative shows how innovative and replicable it may be. It can act as a model for other areas with comparable problems, demonstrating how creative solutions can successfully handle challenging socio-environmental problems.

By illuminating the socioeconomic challenges and environmental consequences of such activities, this study aims to inform decision-making processes. This can boost conservation efforts, improve community livelihoods, and encourage the peaceful coexistence of people and wildlife. In a nutshell, this can contribute to the broader discussion on conservation and sustainable development.

Scope and Limitations

This study looks at the production of handmade paper from banana fiber and rhino dung in certain buffer zones next to animal conservation areas. It investigates how this practice affects local communities on an economic, social, and environmental level, with a particular emphasis on issues of wildlife protection and community resilience. The project will combine a case study approach to gather data via semi-structured interviews, direct observations, and document analysis. The objective is to obtain comprehensive insights into the experiences of individuals and communities involved in this sustainable economic activity.

There are a few restrictions on the research, as well. The sample size is constrained by the extensive nature of the techniques, which may limit the findings' generalizability to other buffer

zones or locations. Attempts to retain reflexivity and employ triangulation may not be enough to overcome the subjectivity inherent in story research and potential researcher bias in data interpretation. In addition, the temporal scope of the study might make it more difficult to track the long-term effects of handmade papermaking on wildlife conservation and community resilience. It would take longitudinal research to comprehend these long-term impacts completely.

Chapter 2

Literature Review

The chapter on literature review offers a thorough examination of previous studies and relevant conceptual perspectives. This chapter's seven main sections are the conflict between humans and wildlife, sustainable business models, conservation efforts, case studies, circular economy, stakeholder engagement, and theoretical framework. To establish a basis for understanding the background and importance of the research, each part will review the relevant literature.

2.1 Human-Wildlife Conflicts

Human-wildlife conflict (HWC) is a long-standing issue that has grown to be a major threat to the survival of numerous rare and endangered species worldwide (Ghimire, 2019). Any unfavorable interaction between humans and wildlife that has an adverse effect on human social, economic, or cultural life, wildlife population conservation, or the environment is considered to be Human-Wildlife Conflict (WWF, 2005; Bhatta et al., 2020). Conflict between humans and wildlife occurs when encounters have unfavorable effects on both sides. This conflict is caused by several important factors. Conflicts between humans and wildlife pose a significant challenge to wildlife conservation globally (Dowie, 2011). These conflicts vary depending on geographical location, land use patterns, human behavior, habitats of wildlife, and their behavior within the species (WWF 2007). Here, we will discuss about the causes, impacts, and management strategies of human-wildlife conflicts.

2.1.1 Causes of Human-Wildlife Conflicts

Expanding Human Population and Habitat Encroachment

Our ancestors numbered about 60,000 a million years ago, and we are about eight billion today—a growth trend that necessitates a mathematical formula to account for its gradual beginning, quick acceleration, and most recent slowing (Law et al., 2003). A vast range of wildlife taxa have been included in these conflicts, which have been documented around the planet in terrestrial, aquatic, and aerial contexts (Torres et al., 2018). According to an analysis of the factors contributing to extinction risk, the heaviest vertebrates are most at risk from direct human expansion. On the other hand, habitat loss and alteration, primarily from logging, pollution, and agricultural cropping, pose the greatest threat to the lightest vertebrates (Ripple et al., 2017). According to a study, human encroachment and habitat degradation for various economic purposes are increasing negative impacts on primates and other wild creatures (Fourie et al., 2015).

Human exploitation of wildlife habitats is rising because of population growth, placing enormous strain on wildlife populations (Barua et al., 2013). Furthermore, they show that if human activity continues unchecked, the size distribution of vertebrates worldwide will soon undergo a double reduction, radically altering the composition of life on Earth. Hence, human-wildlife conflict represents a global conservation concern (Karanth et al., 2020). According to König et al. (2020), it is the most significant and intricate problem facing conservationists worldwide now.

Wildlife habitats are being encroached upon because of the growing demand for land due to farming and urbanization. Because of their closer proximity, people and wildlife engage and clash more frequently (WWF, 2005). Communities inside the buffer zone are compelled to rely

on natural resources for energy and revenue due to a weak economy and a lack of economic options (Ghimire, 2019). This can endanger wild animals in two ways: it can fragment their habitat and draw more humans into the central region, which could increase wildlife poaching (Lamsal, 2012). Local people and wild animals compete fiercely for natural resources in these locations, leaving human populations vulnerable (Distefano, 2005).

The conflicts can become even more complex when there is legal protection for the species involved and economic value for the resources involved. In recent decades, conflicts have increased, mostly due to the potential increase in human populations and the subsequent expansion of human activities (Graham, 2005).

Competition for Resources

People and wildlife are in an endless cycle of competition for resources and space in an increasingly congested planet. The human-wildlife conflict dates to the dawn of human civilization. Still, in the present, it poses a significant environmental threat and has gotten worse over the last few decades (Anand & Radhakrishna, 2017). According to a study (Woodroffe et al., 2005), human-wildlife conflict (HWC) arises when conflicting circumstances arise between humans and wildlife, such as crop raiding, livestock depredation, and human killing. This reciprocal process harms humans and animals, making HWC a complex and pressing issue for wildlife management and conservation, especially outside protected areas (Frank et al., 2019; Woodroffe et al., 2005). The problem of HWC is not a new one. This competition frequently results in interactions between people and wildlife that could be detrimental (Mekonen, 2020). The conflict is intensifying in regions where the needs of humans and wild animals meet (Gandiwa et al., 2012).

With a population of around 8 billion, many living in systems that rely on continuous economic expansion, humans use natural resources at a scale never seen before (Turner et al., 2007). Thirty-nine Nobel laureates warned in 1960 that "there is in prospect a Dark Age of human misery, famine, under-education, and unrest which could generate growing panic, exploding into wars fought to appropriate the dwindling means of survival" due to the rapid growth of the human population (Connelly, 2006: pp.313). Rapid changes in land use, driven by the need to produce food (Godfray et al., 2010), frequently result in the conversion of natural or semi-natural areas into urban and agricultural areas.

For instance, Elephant populations in Nepal are dispersed over four small areas that were formerly a single, uninterrupted forest that stretched to northern India (Acharya, 2016). Human encroachment has generated habitat fragmentation, which has left these populations facing numerous difficulties, such as scarce resources and limited space (Sukumar, 2003; Sukumar, 1994). Elephant groups are now isolated from one another and have little to no interaction, which puts their survival at even greater risk due to fragmentation (Jackson, 1990). Historically, the eastern area of Nepal was connected to central Nepal and Meghalaya, India, by a seasonal migration route (Primack, 2013). Even though much of the connecting forest has been cleared for human settlements, elephants continue to use these pathways, resulting in their presence in human-dominated areas (Wilson et al., 2015). Elephant-human confrontations occur in December, during the dry season, when natural food supplies are scarce, making harvested crops such as rice a tempting target for elephants (Pant et al., 2015).

Contrary to popular belief, an increase in the human population is contingent upon Earth's resource availability, even without direct information on Earth's carrying capacity (Edwards, 2017). This pattern is comparable to that of other creatures, such as bacteria, which reproduce slowly initially, quickly thereafter, and finally slowly when they approach the limit of available resources (Vandermeer, 2010). While human growth patterns are almost linear, the

resource ceiling is always rising due to technical advancements (Boserup, 1981, 2005).

According to Malthus (1992), the growth of the population is exponential, but the quantity of food increases only linearly. It follows that feeding everyone will become unfeasible when population growth exceeds Earth's capacity to produce enough food. Population grows exponentially until it reaches Earth's carrying capacity, which technology can temporarily increase (Taagepera et al., 2024). High rates of land-use changes, which usually convert natural or seminatural areas to urbanized and agricultural areas, are associated with the requirement to produce food (Godfray et al., 2010; Foley et al., 2005).

Human Activities

Human activities, including road construction and harvesting timber and non-timber products, contribute to forest overexploitation. This diminishes forest coverage and causes primates and other wildlife species to abandon their traditional territories in search of survival resources. Due to the increasing demand for land, food, energy, and raw materials, forests, savannahs, and other ecosystems have been converted into agricultural land or urban areas, which has resulted in a major loss of wildlife habitats (FAO, 2009). The swift advancement of global civilization and population is a major factor in the devastation of natural habitats, resulting in a fierce struggle for survival between humans and animals. Animal-human conflicts become more common and severe as human populations grow and invade natural ecosystems, reducing the natural habitat available for wildlife. Human losses from these confrontations are frequently significant, involving harm to property, cattle, crops, and occasionally even human lives (Mishra et al., 2014). The invasion of natural habitats seriously threatens biodiversity and puts individuals and wildlife at risk, highlighting the pressing need for long-term solutions to control these interactions. Habitat loss and human-driven changes to forest structures threaten primate species

that survive on forests (Singh et al., 2018). These disruptions can lead to declines in primate populations as their natural environments are degraded or destroyed, making it difficult for them to find food, shelter, and breeding grounds. While habitat degradation and limited geographic ranges are major indicators of extinction danger for smaller species of vertebrates, direct human killing is the main hazard to larger species (Ripple et al., 2017).

In some situations, achieving coexistence between humans and wildlife can be particularly challenging. For instance, in areas affected by social conflicts and war, the mass movement of people can exacerbate human-wildlife conflicts. A notable example is the intensified human-elephant conflict around the Rohingya refugee camps in Bangladesh, where the sudden influx of people has led to increased encounters and conflicts with elephants (Mukul et al., 2019). This illustrates how large-scale human displacement can disrupt local ecosystems and escalate tensions between people and wildlife, making coexistence difficult to achieve.

Despite these complexities, it's critical to recognize that land use and human activity changes have brought many species extremely close to extinction. We must discover ways to coexist in a crowded world where climate change hastened the loss rate and divided humans against wildlife. It's time to step back and reconsider how we may work together to lessen and resolve human-wildlife conflicts and promote coexistence that benefits both.

Climate Change

It is critical to recognize the connection between climate change and conflicts between humans and animals to prepare for and eventually manage rare and intense human-wildlife encounters in this century and beyond (Abrahms et al., 2023). Due to the alteration of seasonal weather patterns and ecosystems brought about by climate change, people may find themselves in situations where they are ill-prepared to deal with or avoid confrontations with wildlife (McRae et

al., 2008). Small and big vertebrate species decline will truncate the size distributions defining these taxa, putting human ecosystem services at risk and creating a cascade of ecological and evolutionary repercussions on other species and processes (Ripple et al., 2017).

Because of alterations in human tolerance or climate change, wildlife species are also inherently returning to areas where they were previously exterminated. For instance, milder winters and altered agricultural methods that benefit their habitat have allowed Common Cranes (*Grus grus*) to flourish in northern Europe (Nilsson et al., 2016). Comparably, after being deliberately controlled for more than a century and primarily restricted to mountainous regions, grizzly bears (*Ursus arctos horribilis*) are progressively returning to the plains of North America (Morehouse et al., 2020). These movements demonstrate how shifting human attitudes, and environmental changes can help species return to their ancestral regions.

Pastoralists in central Kenya have typically responded to droughts by shifting their livestock to locations with more abundant fodder. During droughts, these moves frequently bring pastoralists to wildlife ranches and ecotourism assets, where animal protection is the primary focus, and land management practices are geared to that purpose (Blair & Meredith, 2018). This puts wildlife needs, which are given priority on these lands, in direct conflict with the needs of livestock, which are necessary for human livelihoods. These disputes are expected to worsen as climate change exacerbates weather patterns, such as the frequency and intensity of droughts increasing. Unfamiliar interactions between humans, cattle, and wildlife will become increasingly widespread as people adapt to these changing conditions (White & Ward, 2010; Svenning et al., 2016). These new relationships could exacerbate conflicts and test current livelihood and conservation plans, calling for new methods of managing shared landscapes in the face of climate change.

This relationship illustrates a larger trend in which human and wildlife populations have overlapping interests and needs due to climate-induced environmental changes. This calls for

more integrated management strategies considering conservation and human livelihoods (Blair & Meredith, 2018; White & Ward, 2010; Svenning et al., 2016).

2.1.2 Impacts of Human-Wildlife Conflicts

Economic Impacts

According to Regmi et al. (2013), human-wildlife conflict is a major global problem that has a detrimental effect on agricultural output and the livelihoods of those who depend on it. Crop and livestock productivity in developing countries is significantly impacted by wildlife (Gemeda et al., 2018). A major contributing factor to HWC is crop raiding by wild animals, which costs farmers and communities a lot of money (Hill, 2005). Predator attacks on livestock and crop damage are the primary causes of human-wildlife conflicts (Torres et al., 2018). Research indicates that this kind of conflict is especially difficult to resolve in areas where agriculture is the main source of income since wildlife damage to crops not only lowers the amount of food available but also strains the local economy (Dickman, 2010).

The increasing number of these occurrences emphasizes how urgently we need practical solutions to control and lessen interactions between people and wildlife. Lions, hyenas, and leopards regularly prey on cattle and goats in Tanzania (Kissui, 2008), whereas spotted hyenas kill oxen and donkeys in Ethiopia (Yihune et al., 2009). According to Marchant (2010), reported in Mwamidi et al. (2012), carnivores are forced to hunt domestic animals because of habitat loss, exacerbating these problems by decreasing wild prey. For instance, studies have demonstrated that leopards may thrive in habitats that have been modified by humans; nonetheless, the degree of conflict between panthers and humans is related to other circumstances (Odden et al., 2014). These include the loss of natural prey, the lack of water, and methods used in the guarding and

herding cattle. Leopards are more prone to turn to cattle when there is a shortage of natural prey, which increases the likelihood of confrontation with people (Constant et al., 2015). These disputes can also be made worse by unreliable water supplies and ineffective livestock management (Kabir et al., 2014).

Crop raiding lowers wildlife tolerance in the vicinity of human settlements and substantially negatively influences food security (Hill and Wallace, 2012). When crop damage prevention attempts fail, and there is no compensation for the losses incurred, frustrated farmers may kill the animals involved (Regmi et al., 2013). This reaction emphasizes the urgent need for effective mitigation techniques and compensation mechanisms that balance wildlife conservation with human livelihoods.

Social Impacts

Aside from economic losses, human-wildlife conflict has significant societal consequences. The possibility of damage or death from wildlife, such as elephants or rhinos, instills a widespread sense of anxiety in people. This psychological stress can result in a lower quality of life, disruptions in everyday activities, and even the relocation of entire populations to safer places (Thirgood, Woodroffe, & Rabinowitz, 2005). The social framework of these societies is frequently stretched as people deal with the continual threat of wildlife interactions, which can lead to internal conflicts about how to handle and respond to these threats

Several wild species, including Asian elephants (*Elephas maximus*), tigers (*Panthera tigris*), and leopards (*Panthera pardus*), pose serious risks to human settlements (Lamichhane et al., 2018). They inflict sickness, kill animals, destroy property, and occasionally even attack, harm, or kill humans (Shah et al., 2021). These interactions highlight the dangers of human-wildlife conflict, jeopardizing the safety and well-being of humans and wildlife. These

occurrences, particularly those that cost human life, might result in the retaliatory killing of wildlife, including species that are legally protected, endangered, or threatened (Acharya et al., 2016). Effective conflict management techniques are needed to preserve these endangered animals while simultaneously safeguarding human safety and livelihoods.

Crop raiding by wildlife not only causes immediate crop loss, but also has long-term consequences for the education and future of children in impacted communities. When crop raiding is severe, families are often forced to remove their children from school to defend their crops from predators. For example, research conducted in Uganda by Hill (2005) discovered that baboons seriously harm fields, placing a financial burden on families. Likewise, in several African nations, elephants are known to harm crops seriously. According to Mackenzie and Ahabyona (2012), many youngsters are compelled to drop out of school to protect their family's livelihood in areas where elephants often raid crops. This problem is especially common in African nations where elephants, such as Gabon, Ghana, Malawi, Uganda, and Zimbabwe, frequently cause crop damage. Crop raiding has long-term consequences for the communities affected, impacting their social and educational performance and acute food loss.

Biodiversity Conservation

The conflict between people and wildlife has a direct, often disastrous effect on wildlife populations, making it a danger to global biodiversity protection. Retaliatory killings, motivated by fear and frustration over livestock attacks, crop destruction, and property damage, are widespread in rural communities. These behaviors are especially destructive to endangered animals, which are already experiencing population declines due to poaching and habitat destruction. For example, in India, where disputes with residents nearby are common owing to livestock predation, retaliatory killings have been recognized as a substantial cause of tiger

mortality (Inskip & Zimmermann, 2009). Similarly, the greater one-horned rhinoceros in Nepal has long been a victim of similar confrontations. Despite being a conservation success story, with populations returning because of intensive conservation efforts, these rhinos are nevertheless threatened by human interference and retaliatory killings once they enter agricultural regions (Dinerstein, 2003; Talukdar et al., 2008).

One of the most serious outcomes of human-wildlife conflict is habitat fragmentation. Efforts to keep wildlife from intruding on human settlements frequently involve the construction of obstacles, such as fences, which can segregate wildlife populations. The larger one-horned rhinoceros' capacity to migrate and access varied habitats is hampered by habitat fragmentation in Nepal's Terai region, which has limited connection between protected areas such as Chitwan National Park and Bardiya National Park. In addition to reducing the amount of accessible habitat, this fragmentation isolates populations and limits migration and access to food diversity, which promotes inbreeding and lower genetic diversity (Fahrig, 2003). As a result, these populations become more vulnerable to environmental changes and disease, which might hasten their death (Frankham, 2005).

The challenge is aggravated by the fact that rhinos, like many large herbivores, require extensive territories to survive. Habitat fragmentation diminishes these territories, putting rhinos in closer contact with human populations and increasing the probability of conflict. In Nepal, rhinoceros attacking crops and inflicting property damage have heightened tensions between local populations and conservation officials (Sukumar, 2006). This dynamic might jeopardize conservation efforts because communities may be less ready to support rhino protection efforts if they see rhinos as a threat to their livelihood. Similarly, habitat fragmentation threatens the populations of top predators such as lions, leopards, and tigers while also disrupting entire ecosystems. Apex predators are crucial to environmental equilibrium because they control prey numbers and promote biodiversity. According to Ripple et al. (2014), their loss may result in

trophic cascades, which are ecological imbalances that spread widely because of changes at the top of the food chain.

Comprehensive conservation measures involving habitat restoration, conflict resolution, and community engagement are required to solve these issues. Establishing wildlife corridors has been one strategy used to link fragmented habitats for the greater one-horned rhinoceros in Nepal, enabling rhinos to move more freely between protected areas without entering areas dominated by humans (Chetkiewicz, et al., 2006). Furthermore, community-based conservation projects incorporating local people in rhino conservation efforts have demonstrated promise regarding conflict resolution and coexistence. These programs frequently involve education and awareness programs and crop and livestock loss compensation schemes, all of which contribute to local conservation support (Madden, 2004).

These solutions, which address both the ecological and social components of human-wildlife conflict, safeguard endangered species such as the greater one-horned rhinoceros and contribute to the overarching goal of conserving biodiversity. The success of these initiatives in Nepal shows that, with the appropriate strategy, it is possible to strike a balance between the demands of human communities and wildlife, assuring both groups' long-term survival (Western & Wright, 1994).

2.1.3 Coexistence, Community Resilience, and Management Strategies

The effects of climate change, habitat conversion, species recovery, and reintroductions are bringing people and wildlife closer together. As a result, it is critical to encourage coexistence with wildlife in shared multipurpose environments (Pooley et al., 2021). The term "human-wildlife coexistence" describes the cohabitation of humans and wildlife in proximity, whether peaceful, amicable, or productive (WWF, 2005). The word "coexistence" is rarely defined,

despite its increasing use in conservation research (Frank et al., 2019; König et al., 2020). According to Carter and Linnell (2016), coexistence is characterized as a dynamic but sustainable state in which wildlife and humans coadapted to coexisting in shared landscapes and where human-wildlife interactions are regulated by efficient institutions that guarantee the long-term survival of wildlife populations, social legitimacy, and manageable risk levels. However, coexistence may still impact both, and it is marked by a degree of tolerance on the part of people. Bhatia et al. (2019) reviewed the scientific literature on human-wildlife relations and found that 71% of 250 papers focused on conflict, 2% on coexistence, and 8% on neutral interactions. Although this study used keyword searches, it clearly shows an overwhelming emphasis on conflict in the literature on human-wildlife interactions (König et al., 2020). According to a study (Frank et al., 2019), there is a continuum between conflict and coexistence in human responses to wildlife, and both positive and negative interactions should be considered. Likewise, another study further on this by presenting a typology to enhance comprehension of the several elements that influence human reactions to wildlife (Bhatia et al., 2019). Coexistence does not, however, imply the lack of conflict. Life inevitably involves conflict, which can also serve as a spark for improvement (Madden et al., 2015).

The institutional frameworks influencing how people and wildlife interact are varied and localized. For instance, in rural areas of the global South, more informal and community-driven approaches usually provide the framework for coexistence (Broekhuis et al. 2018). In contrast, European approaches to coexistence frequently undergo formalization through international regulatory processes.

Compensation Schemes

Compensation programs are an important strategy in managing human-wildlife conflict, especially in areas where wildlife encroachment causes large economic losses to local people. These programs are intended to provide financial assistance to people or communities who have suffered losses due to wildlife activities such as agricultural destruction, livestock predation, or property damage. These programs seek to remove the economic motivation for retaliatory animal kills by providing compensation, thereby helping to the protection of endangered species and encouraging human-wildlife coexistence (Dickman et al., 2011; Nyhus et al., 2005).

The effectiveness of compensation programs heavily depends on their implementation, notably the timing and impartiality of the payouts. Reimbursement for wildlife can effectively lower tensions and deter retaliatory measures when given immediately and considered fair for the victims. For instance, in parts of Nepal, compensation plans have been implemented to cover damages caused by greater one-horned rhinoceroses and elephants. These initiatives are especially important in buffer zones surrounding protected areas, such as Chitwan National Park, where human settlements and animals regularly interact (Pant et al., 2016).

In Nepal, the government and different non-governmental organizations (NGOs) have launched compensation programs to minimize the consequences of human-wildlife conflict. These programs often cover damages caused by major species like elephants and rhinoceros, which are known to devastate crops and property. For example, the National Trust for Nature Conservation (NTNC) has helped compensate for rhino damage in the Terai region (Lamichhane et al., 2019). Similarly, the Terai Arc Landscape (TAL) program has helped to reduce elephant conflicts by compensating and implementing other mitigating measures (WWF Nepal, 2018).

However, issues persist in assuring the efficacy of these programs. Compensation payment delays, insufficient loss coverage, and administrative challenges can all impair the confidence and success of these schemes. In certain circumstances, affected individuals may believe that the compensation paid does not entirely compensate for their losses, leading to dissatisfaction and persistent hatred toward animals (Khadka & Nepal, 2010; Acharya et al., 2016). For example, in Chitwan National Park's buffer zones, there have been allegations of delays and disappointment among locals over the compensation offered for rhino-related losses (Neupane et al., 2017).

Recent research indicates that for compensation plans to be more successful, they should be a part of a larger conflict management plan that also includes preventative actions like barrier installation, community education, and alternative livelihood initiatives (Gross et al., 2020). Furthermore, there is a rising emphasis on including local communities in the planning and execution of these programs to ensure that they match the needs of the people they are supposed to assist (Barua et al., 2013). In Nepal, continued efforts to improve the effectiveness and transparency of compensation systems and increased community participation are crucial for achieving long-term cohabitation between humans and wild animals.

Mitigation Measures

Although interactions between humans and animals have always been beneficial and detrimental, new and intricate problems in human-wildlife conflict (HWC) are starting to arise. Designing sustainable management plans and policy instruments requires evidence-based information. However, providing objective decision support is challenging due to the diverse realities and perceptions of human-wildlife interactions across rural, urban, and peri-urban areas (König et al., 2020). Numerous causes contribute to these difficulties, one is human activity—

translocation, introduction, or reintroduction of wildlife—often into urban regions to intentionally shift it into new habitats. New conflicts also emerge as naturally recovered wildlife populations move back into their once-occupied regions. Changes in weather patterns are causing wildlife to come into greater contact with humans, which is another way climate change is changing human tolerance for wildlife. Conflicts are also worsening as humans expand into more and more wildlife-rich places. Finally, these relationships become even more complex due to the development of zoonotic infections, or illnesses that can spread from animals to people. Considering these new growing variables, innovative strategies are needed to control and lessen conflicts between people and wildlife.

Several mitigation measures have been designed to lessen the incidence and severity of human-wildlife conflict. Physical barriers like fences can deter wildlife from invading agricultural areas or human settlements. Another essential tool is wildlife corridors, which allow animals to travel between ecosystems without entering human-populated regions. Furthermore, community-based management initiatives that involve residents in the formulation and execution of mitigation techniques have been shown to improve cohabitation (Fernando et al., 2008). These techniques, when executed correctly, can dramatically lessen the unfavorable interactions between humans and wild animals

Wildlife attacks frequently result in deep-seated animosity and hostility toward the wildlife involved, reducing public support for conservation efforts. Even though Nepal has a proven track record of protecting its abundant biodiversity, in recent years, conflicts between humans and wildlife have become more serious (Acharya et al., 2016). The absence of comprehensive information on the spatial and temporal patterns of these conflicts at the national level presents a significant obstacle to their resolution. Developing and implementing successful conflict mitigation methods is challenging without this comprehensive information. It is essential to comprehend the locations and times of these confrontations to develop focused interventions

that can ease human-wildlife conflict and promote conservation objectives and the welfare of local communities.

Most of the time, it is still unknown how well international conservation matches will influence how people and wildlife interact (König et al., 2020). Most people agree that coexistence requires a holistic approach that fully considers ecological and socioeconomic factors (Nyhus 2016; Hill et al. 2017). Peace Parks and United Nations Educational, Scientific and Cultural Organization (UNESCO) Biosphere Reserves are two relatively recent ideas that are becoming popular as sustainable development model areas. Schoon (2013), Peace Parks, and Schultz et al. (2011) UNESCO Biosphere Reserves aim to balance economic growth, sociocultural activities, and the rigorous preservation and protection of natural environments. Peace Parks are transboundary protected areas created to promote conservation and peace by providing shared spaces that safeguard biodiversity while allowing for sustainable development. Similarly, UNESCO Biosphere Reserves are locations known for their distinct ecosystems and cultural legacy, with attempts being made to balance human activity with environmental preservation. These reserves seek to combine sustainable usage and conservation, offering a framework within which nearby populations can undertake eco-friendly activities that sustain their way of life.

Along with these deliberate attempts, several countries are undergoing rewilding in less organized ways. For instance, deliberate attempts are made in some areas to restore wild areas, as demonstrated by the European rewilding initiatives (Pereira & Navarro, 2015; Perino et al., 2019). Conversely, nations such as Japan are seeing unplanned wildlife species range expansions and population increases, especially in areas of abandoned farms and forests (Tsunoda & Enari, 2020). The intricate and varied interactions between human activities and natural processes—which can occasionally result in unanticipated ecological changes—are highlighted by this spontaneous rewilding.

There is an immediate need for species-specific conservation plans, especially for elephants and leopards. The findings in the review research show that common leopards and Asiatic elephants are the most frequently occurring and dangerous animal species that people attack (Acharya et al., 2016). Bengal tigers attacked more often than one-horned rhinoceroses and bears, but tigers killed more people. Elephant attacks were more common in human settlements outside of protected zones and peaked in the winter. Similarly, leopard attacks occurred nearly completely outside protected areas, mostly in human settlements.

Preserving wildlife's natural prey in community forests is crucial for reducing human-wildlife conflicts. This can be accomplished by prohibiting the hunting of wildlife and by aggressively maintaining and protecting habitats (Kabir, 2014). Further steps to reduce conflicts include constructing safe shelters for livestock, especially at night, and preventing cattle from grazing in forests (Odden, 2014; Constant, 2015). By guaranteeing that wildlife has access to its natural food sources and minimizing its dependency on livestock, these measures seek to address the underlying causes of conflict (Acharya, 2016).

Parker and Osborn (2006) pointed out that research has demonstrated that growing unappealing cash crops (like *Capsicum annuum*) on private property can lessen conflicts between people and elephants in Zimbabwe.

Community Involvement

Disconnected regulations and differing degrees of community tolerance for wildlife frequently worsen the complexities of human-wildlife conflict (HWC). Wildlife intrudes into farms and villages next to Protected Areas (PAs), frequently causing disputes and disturbances for the local communities (Martínez-Jauregui et al., 2020). People's attitudes toward deer in metropolitan areas vary; some may feed or encourage them, while others prioritize undamaged

property. Like this, the migration of Polish bison into eastern Germany has both advantages and disadvantages. On the one hand, it improves grassland ecosystems and promotes tourism and conservation, but it also puts farmers, foresters, and motorists at risk (Koerner et al., 2014). The ecological basis for these disputes is landscape connectedness, in which the movement of animals across regulatory boundaries drives interactions between humans and wildlife. This interconnectedness underscores the importance of coordinated policies and management techniques that consider both ecological dynamics and the various human perspectives arising from these interactions.

Renewed initiatives for restoring wildlife to extinct places, including wolves in Yellowstone (Fortin et al., 2005), bison in Canada (Steenweg et al., 2016), and European bison in western Poland (Kuemmerle et al., 2018), raise crucial governance issues. This reflects that these initiatives give rise to questions about the financial management for these rewilding initiatives and the extent of local communities' control over the management of these reintroduced species. Large animals must frequently be reintroduced with substantial financial support, typically from governmental, non-profit, or private organizations. However, these efforts may not always serve the needs or interests of the community at large (König et al., 2020). As a result, there may be differences in the degree of community participation and decision-making authority when it comes to managing these new ecosystems, which could result in disputes and call for more inclusive governance frameworks.

2.2 Conservation Efforts

2.2.1 Conservation History

The greater one-horned rhino's conservation history includes accomplishments and failures, which are critical for understanding the current condition of conservation. Historically, poaching and habitat loss have resulted in significant population losses for the greater one-horned rhino. Their numbers had dropped to a few hundred by the early 20th century (Dinerstein, 2003). However, there has been a notable recovery because of coordinated conservation efforts; according to recent estimates, populations have increased to about 3,500 individuals in the wild (Talukdar et al., 2008). These initiatives show how adaptable the species is and how successful focused conservation efforts can be.

International and National legal frameworks are essential to the conservation of the greater one-horned rhino. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has had an important role in regulating and frequently prohibiting the trade of rhino horns, which is a major source of poaching (CITES, 2020). Apart from global accords, nations such as India and Nepal have implemented stringent legislation for safeguarding wildlife, which heavily penalizes acts of poaching and trafficking. According to Dinerstein (2003) and Khadka & Nepal (2010), these legislative safeguards have been vital in lowering poaching rates and assisting with population recovery initiatives.

2.2.2 Conservation Strategies

Protected Areas

The greater one-horned rhino's survival depends on protected areas like Kaziranga National Park in India and Chitwan National Park in Nepal. These regions offer crucial habitat, protecting rhinos from poaching and enabling them to flourish in a largely unaltered setting. To ensure that conservation efforts do not compromise local livelihoods, the management of these parks places a strong emphasis on striking a balance between community needs and conservation activities (Rookmaaker, 2000; Talukdar et al., 2008). The stabilization and growth of rhino populations have been greatly aided by the creation and upkeep of these protected areas.

Anti-Poaching Measures

Anti-poaching approaches are at the cutting edge of rhino conservation efforts. These include regular patrols by armed guards, the use of surveillance technologies such as drones, and the participation of local groups in monitoring and reporting unlawful activity. Higher rhino populations demonstrate these activities' success in places where such regulations are strictly implemented (Leader-Williams & Albon, 1988). Furthermore, incorporating community-based initiatives has increased the success of anti-poaching activities by encouraging trust and collaboration between conservation authorities and local communities (Adams & Hulme, 2001).

Community-Based Efforts

The local community's involvement in conservation activities is critical to the survival of long-term rhino conservation. Education campaigns that emphasize the value of rhinos and the

dangers they face are frequently a part of community-based conservation efforts. Furthermore, livelihood projects that provide alternative revenue sources, such as ecotourism or sustainable agriculture, help lessen reliance on resources that may threaten rhino populations (Adams & Hulme, 2001). By integrating communities into conservation activities, these projects increase local support for rhino protection and foster a sense of shared responsibility.

2.2.3 Effectiveness of Conservation Efforts

Population Recovery

The recovery of rhino populations and the preservation of genetic diversity are indicators of conservation success. Conservation efforts that emphasize habitat protection, anti-poaching initiatives, and community engagement have successfully sustained and even expanded rhino populations in several areas (Foose & Van Strien, 1997). For example, these concerted efforts have steadily increased the rhino population in Chitwan National Park.

Challenges and Future Directions

Despite these accomplishments, numerous challenges persist. Poaching remains a severe danger, fueled by the strong demand for rhino horns in underground markets. Furthermore, habitat fragmentation and human-wildlife conflict represent continuous threats to rhino populations. Addressing these problems necessitates adaptive management systems that can respond to emerging risks and assure the viability of conservation initiatives (Talukdar et al., 2006; Khadka & Nepal, 2010).

As the issues of coexisting with animals grow in the future decade, it is critical to reconsider established approaches. The notion that certain wildlife management practices are not sustainable is growing. Examples include shooting wildlife, fencing off huge regions, such as Protected regions (PAs), and not properly sharing the costs and benefits of wildlife management. Local stakeholders are also excluded from decision-making processes. Rather than encouraging true coexistence, these methods can exacerbate already existing problems by failing to address the complex dynamics of interactions between humans and wildlife (König et al., 2020). Therefore, more inclusive, equitable, and adaptive techniques are required to manage these connections in a way that benefits both humans and wildlife.

Future Directions

Future conservation efforts must prioritize habitat expansion and restoration, increased international collaboration to combat poaching, and the development of novel community engagement techniques. By tackling these issues, conservationists can build on previous victories and safeguard the greater one-horned rhino's long-term existence (Khadka & Nepal, 2010).

2.3 Sustainable Business Models

2.3.1 Sustainable Business Theories

This section investigates theories and case studies concerning sustainable business practices, specifically concentrating on rural and wildlife-rich locations. This investigation will show how businesses might benefit local communities and preserve natural resources while being successful and ecologically conscious. This section will look at important theories of sustainable businesses like Sustainable Entrepreneurship, Corporate Social Responsibility (CSR), and the

Triple Bottom Line (TBL), along with case studies that show how these ideas are used in real-world situations.

Corporate Social Responsibility

Corporate Social Responsibility (CSR) is an approach to business strategy that highlights a company's responsibility to act in ways that benefit society and the environment in addition to profit (Carroll, 1999). CSR covers various activities, such as ethical business practices, conserving the environment, and proactive involvement in community advancement. With the growing expectation from stakeholders and customers for enterprises to make beneficial contributions to society, the notion has undergone tremendous change throughout time (Dahlsrud, 2008).

Corporate Social Responsibility (CSR) is more than just following the law or being philanthropic; it's about incorporating social and environmental issues into a business's operations and stakeholder relationships (Porter & Kramer, 2006). Businesses operating in environmentally sensitive locations or close to protected areas, where business operations might significantly impact local people and wildlife, should pay special attention to this strategy (Moser & Prasad, 2013). CSR initiatives in such circumstances involve lowering the company's environmental impact, participating in conservation projects, ensuring fair labor practices are followed, and boosting regional economies. By implementing these strategies, businesses can improve their reputation and forge closer bonds with stakeholders, all while reducing their negative effects on the environment and society (Freeman & Hasnaoui, 2011).

CSR application to our model:

The concepts of corporate social responsibility are ingrained in every facet of our sustainable paper production methodology. In keeping with CSR's emphasis on environmental stewardship, the model focuses on utilizing waste resources like banana waste and wildlife dung.

This project can lessen its influence on the environment and encourage sustainable resource usage by converting these waste products into a useful resource (Hart, 1995).

Also, the model prioritizes social responsibility by strengthening the community and generating jobs, especially for women frequently marginalized in rural areas. This is consistent with CSR's emphasis on promoting equitable economic growth and enhancing societal well-being (Jenkins, 2009). According to Visser (2010), the concept fosters long-term social sustainability by mitigating poverty and promoting community development by providing work opportunities and skill training.

CSR activities are also important for developing positive relationships with local communities and stakeholders. According to Luo and Bhattacharya (2006), the company may cultivate goodwill and trust by showcasing its commitment to social and environmental values. These elements are critical for the enterprise's long-term success and sustainability. Additionally, such efforts can help the business stand out from the competition and improve its reputation, giving it a competitive edge and allowing it to uphold its moral responsibilities (Branco & Rodrigues, 2006).

Triple Bottom Line (TBL)

John Elkington developed the Triple Bottom Line (TBL) concept in 1997. It refers to a comprehensive strategy for corporate sustainability that highlights the necessity of striking a balance between three important goals: social, economic, and environmental. According to Slaper & Hall (2011), this strategy, sometimes called "people, planet, and profit," changes the typical business goal from boosting profit to a more holistic consideration of greater responsibilities. The TBL framework contests the conventional wisdom that says firms should only concentrate on making money—the so-called "bottom line". Rather, it promotes a more expansive perspective in

which companies are held responsible for their effects on both the environment (environmental sustainability) and people (social equity) (Elkington, 1997), which is depicted in Figure 1 and described below.

A. Profit (Economic Impact):

Although profitability is crucial to a successful firm, the TBL framework promotes aligning economic, social, and environmental goals. Businesses are urged to pursue growth and financial stability to benefit society and the environment (Norman & MacDonald, 2004).

B. People (Social Impact):

The social aspect of TBL is centered on the welfare of individuals, encompassing staff members, clients, and the larger community. It places a strong emphasis on social equity, community involvement, and fair wage standards. In areas with fragile ecosystems, such as biodiversity hotspots, the TBL method encourages enterprises to help local populations by creating jobs, raising living standards, and ensuring that their operations do not disrupt social structures (Savitz & Weber, 2013).

C. Planet (Environmental Impact):

In regions with abundant biodiversity, the environmental component of TBL is especially important. This framework promotes sustainable business practices that reduce environmental damage, preserve natural resources, and safeguard ecosystems. As suggested by Hart & Milstein (2003), it is particularly crucial for companies working in or close to protected regions, considering environmental sustainability is essential to both long-term corporate viability and conservation efforts.

The TBL framework has acquired a lot of popularity in a variety of industries and is thought to be crucial for companies looking to run sustainably in the twenty-first century. Businesses that have successfully incorporated TBL concepts into their business strategies like,

Unilever and Patagonia, show that it is possible to be profitable and still have a positive influence on the environment and society (Epstein & Buhovac, 2014; Willard, 2012).



Figure 1 Triple Bottom Line Concept.

Adopted from (Dalibozhko & Krakovetskaya, 2018)

TBL application to our model:

Figure 1 depicts the Triple Bottom Line concept, which demonstrates how social, environmental, and economic goals are integrated into sustainable business models. The TBL framework applies to situations where companies operate in environmentally delicate locations, like areas with a high concentration of wildlife. Here, businesses are urged to adopt strategies that benefit the local community and biodiversity and produce economic benefits. This sustainable paper production process model, which uses banana waste and wildlife dung as raw materials, is extremely adaptable to the TBL paradigm. Economically, this approach establishes a successful and long-lasting business by producing revenue and job opportunities for nearby communities.

Converting waste materials into useful products, the company boosts the local economy and improves the community's financial stability. Regarding the environment, using rhino dung

and banana fibers minimizes pollution, conserves resources, and fosters a circular economy, all of which help to preserve regional ecosystems and limit environmental harm. Job creation and the empowerment of residents, especially women, the concept promotes social responsibility. The business improves the community's well-being and promotes equitable societies by creating economic possibilities and encouraging collective growth. This demonstrates that companies may succeed financially while positively influencing the environment and society, as per TBL values. This all-encompassing strategy benefits all parties involved by guaranteeing the company's long-term viability.

In conclusion, the TBL framework provides a complete strategy that encourages firms to broaden their concept of success beyond monetary gains. It highlights the significance of striking a balance between social and environmental obligations and commercial goals, making it especially pertinent for companies doing business in environmentally delicate areas or places with marginalized populations.

Sustainable Entrepreneurship

Sustainable entrepreneurship expands upon the principles of Corporate Social Responsibility (CSR) and the Triple Bottom Line (TBL), integrating sustainability into the heart of new business operations while emphasizing innovation and opportunities. Sustainable entrepreneurs start businesses that value ecological, social, and economic goals, frequently working in places where economic growth must be balanced with conservation and community development. This part will look at sustainable entrepreneurship, how it applies to enterprises in environmentally sensitive and rural communities, and how it may be used to develop creative models such as the sustainable paper production method that uses wildlife dung and agricultural waste.

According to Shepherd and Patzelt (2011), sustainable entrepreneurship is the search for business initiatives that generate value for the economy, society, and environment to support sustainable development. These initiatives aspire to profit and address important global issues such as climate change, biodiversity loss, and socioeconomic inequity (& Winn, 2007). The core of sustainable entrepreneurship is the proactive search for and pursuit of opportunities that promote sustainability, which is the state in which commercial endeavors promote the long-term well-being of society and the environment (Dean & McMullen, 2007). According to Terán-Yépez et al. (2020), sustainable entrepreneurship differs from traditional entrepreneurship models in that it emphasizes eco-friendly innovations, social justice, and environmental resilience. This transition has resulted in an emerging generation of entrepreneurs who actively contribute to the SDGs by redefining businesses with products and services that benefit the environment and society (Schaltegger & Wagner, 2011).

Key Theories

Sustainable entrepreneurship is based on a range of theoretical frameworks prioritizing sustainability in business operations. These include ecological modernization theory, which proposes that environmental challenges can be tackled with innovation and advancements in technology (Mol & Sonnenfeld, 2000), and stakeholder theory, which emphasizes the significance of balancing the necessities of various stakeholders, such as communities, employees, customers, and the natural environment (Freeman, 1984).

According to Schaltegger et al. (2016), sustainable entrepreneurship differs from CSR and TBL in the fact it focuses directly on developing new business models and technologies that fundamentally modify current consumption and manufacturing patterns. These models frequently encourage circular economies and zero-waste initiatives, which reduce companies' environmental

effects while also promoting social advantages such as generating employment and development of communities.

Importance of Sustainable Enterprises in Rural Economies

Sustainable entrepreneurship is especially important in rural and wildlife-rich areas, where economic development must coexist with environmental protection. Entrepreneurs in these areas frequently focus on enterprises that use local resources responsibly, such as eco-tourism, organic farming, or sustainable artisan production. These enterprises are designed to create economic opportunities for local communities while also conserving the environment (Kirkwood & Walton, 2010).

Case studies have demonstrated that sustainable entrepreneurship might be a feasible solution to human-wildlife conflicts in rural areas. Businesses that create items from agricultural waste or wildlife feces, for example, not only reduce environmental damage but also provide new income streams for local communities (Hall et al., 2010). In this approach, sustainable entrepreneurship contributes to local communities' socioeconomic development while supporting conservation efforts.

Application to our model:

The sustainable paper production--business model exemplifies the core principles of sustainable business by generating value from waste materials like banana fibers and wildlife excrement. This unique approach aligns with the broader goals of sustainable entrepreneurship by tackling environmental and social issues while creating economic opportunities for rural people. The business approach repurposes local resources that might have been regarded as waste, transforming them into valuable items that can be marketed locally and abroad. This decreases the environmental impact of waste disposal and provides an alternative means of livelihood for local populations, specifically women who are frequently excluded from traditional labor

markets. This project helps to reduce poverty and promote gender parity, both essential components of long-term development (Brundtland, 1987).

Also, by including local people in the production process and guaranteeing that the business has a low environmental impact, this program strengthens the connection between the community and conservation efforts. In this context, sustainable entrepreneurship empowers people by maintaining biodiversity and fostering the sustainable use of natural resources (Patzelt and Shepherd, 2011).

2.4 Case Studies

2.4.1 Wildlife Tourism

Wildlife tourism is a sustainable enterprise that uses the natural environment to create revenue while encouraging conservation. Well-run wildlife tourism enterprises frequently work closely with nearby communities and conservation groups to guarantee that tourism operations are carried out ethically and that the advantages are distributed fairly.

African eco-lodges are one example of how tourism and wildlife conservation are combined. Such businesses promote the community by creating jobs, sponsoring anti-poaching campaigns to prevent poaching, and educating visitors about the value of biodiversity. According to Honey (2008), tourism-related revenue contributes to the funding of conservation programs and offers financial incentives for communities to safeguard wildlife.

2.4.2 Eco-friendly Products

Creating and marketing environmentally friendly goods derived from recycled materials or agricultural waste is another way to do sustainable business. These goods lessen the environmental impact of production processes and appeal to consumers who care about the environment.

Companies that make goods from agricultural waste or recycled materials, such as paper made from banana fiber, are good examples of incorporating sustainability into product design. Businesses can stand out in the market and support environmental conservation by promoting these items based on their sustainability credentials (Hart & Milstein, 2003).

2.4.3 Community-Based Enterprises

Enterprises owned and run by local communities are referred to as community-based enterprises. These businesses usually include local resources and expertise to achieve sustainable development through community empowerment and equitable distribution of economic gains. Community-based forestry and agriculture projects have been successful in producing sustainable livelihoods and protecting natural resources in various regions of the world. To foster long-term sustainability and resilience, these businesses frequently entail the collaborative management of resources, with revenues being returned to community projects (Berkes, 2004).

According to Sutter et al. (2019), Díaz et al. (2019), and Bawa et al. (2007), rural entrepreneurship plays a critical role in mitigating extreme poverty and addressing disparities in places with poor institutions. Additionally, it is essential for promoting sustainable and inclusive development, especially in developing nations (Mishra, 2021; Mishra et al., 2020). Rural entrepreneurship fosters resilience and prosperity in rural areas by enabling local business owners to add value to their communities (Pato & Teixeira, 2016). Social entrepreneurship promotes

economic growth, which is crucial for sustainable livelihood and development (Rani & Vaithianathan, 2023).

2.4.4 Challenges and Opportunities

Economic viability

Sustaining economic viability while upholding environmental and social obligations is one of the fundamental issues facing sustainable enterprises. Financial resources may be strained by the upfront costs associated with sustainable practices, frequently associated with infrastructure, technology, or training (Porter & Kramer, 2011).

Despite these obstacles, companies that effectively incorporate sustainability into their core business practices can attain long-term profitability by standing out from the competition, cultivating customer loyalty, and cutting expenses through operational efficiencies like waste or energy conservation.

Market Access

Due to logistical challenges, awareness of consumers, and competitiveness, it can be challenging to access markets for sustainable goods and services. Sustainable products frequently have greater production costs, making it difficult to compete with less sustainable, less expensive options.

To break through these obstacles, it's frequently necessary to use strategic alliances, efficient marketing techniques, and occasionally, the establishment of niche markets tailored to the needs of environmentally concerned customers. Businesses have a higher chance of success if

they can inform customers about the advantages of sustainable products and establish reliable distribution systems (Pacheco et al., 2010).

Scalability

A crucial factor to consider is the scalability of sustainable business models. Effective models in one setting can spur comparable activities in other areas, encouraging a wider adoption of sustainable measures. However, expanding markets, gaining access to capital, and replicating effective community involvement approaches are just a few of the major obstacles that must frequently be overcome to scale up sustainable practices (Jenkins, 2009).

Enterprises that have successfully scaled sustainable models frequently do so through collaboration with NGOs, governments, and other stakeholders, as well as by tailoring their models to local settings. Scaling up also demands striking a balance between economic development and environmental sustainability and ensuring that the expansion does not jeopardize the company's essential principles.

2.5 Circular Economy

Here, the purpose is to investigate the circular economy ideas and examine how they may be implemented in situations like the sustainable paper production model, which uses wildlife dung and banana waste. The circular economy aims to close all resource loops on several levels. Recycling and other resource-optimizing methods help the circular economy. Ideally, all resource loops would be completely closed. In its flawed form, using virgin resources is unavoidable (Figge et al., 2023).

2.5.1 Principles of Circular Economy

A. Resource Efficiency

The circular economy is built on resource efficiency, emphasizing the significance of optimizing material utility throughout its existence. The circular economy seeks to reduce the extraction of new resources by emphasizing reuse, recycling, and waste reduction. The circular economy minimizes environmental impact, protects natural resources, and decreases carbon emissions by extending the useful lifespan of products and materials (Ellen MacArthur Foundation, 2013). This strategy contradicts the conventional linear economy, which employs a "take, make, dispose" paradigm that frequently results in resource depletion and environmental damage" (Stahel, 2016).

Resource efficiency is especially important in businesses where raw materials are limited or have large environmental footprints. For example, the manufacturing industry has significantly implemented circular practices by producing goods that are durable, repairable, and recyclable (Ghisellini et al., 2016). This not only increases the lifespan of items but also reduces the requirement for virgin resources, resulting in more sustainable manufacturing and consumption practices.

B. Economic Models

Building sustainable systems requires using economic frameworks that promote the circular economy, like supply chains with closed loops and product lifecycle management. A closed-loop supply chain designs and manages goods so that their components can be reused, rebuilt, or recycled at the end of their life cycle, resulting in a continuous cycle of resource consumption (Genovese et al., 2017). This methodology decreases waste and resource

consumption while providing economic benefits, including lower material costs and new business prospects in recycling and remanufacturing.

Product lifecycle management (PLM) is another important economic model that supports circular economy ideas. PLM entails managing a product's whole lifecycle, from design and manufacturing to usage and disposal, focusing on sustainability (Mendoza et al., 2017). By incorporating circular economy principles into PLM, businesses can ensure that products are developed with end-of-life reuse or recycling in mind, reducing waste and environmental impact. The usage of these economic models is obvious in areas such as electronics, where corporations are implementing take-back initiatives and remanufacturing procedures to recover valuable materials from discarded items (Lieder & Rashid, 2016). These methods not only reduce environmental impact but also improve the sustainability and profitability of companies.

2.5.2 Application in our model

Our approach to sustainable paper manufacture using banana trash and wildlife excrement directly applies the circular economy principles. Our model exemplifies resource efficiency and closed-loop systems by utilizing organic waste materials that might otherwise contribute to environmental damage. Transforming waste into a valuable product is consistent with the circular economy's goal of reducing waste while maximizing resource utilization (Kirchherr et al., 2017).

Furthermore, the economic model for our manufacturing system contains features of product lifetime management. We can extend the life of our paper products and lessen their environmental impact by making them recyclable or biodegradable. Furthermore, this technique can generate economic opportunities in the community, such as jobs in the gathering, processing,

and distributing of these sustainable products, contributing to both environmental sustainability and equality in society.

2.6 Stakeholder Engagement in Sustainable Business Models

2.6.1 Stakeholder Theory

Stakeholder theory is essential for understanding the dynamics of multi-stakeholder efforts, particularly in sustainable business, which frequently incorporates community development, conservation, and government policy. According to Freeman's stakeholder theory (1984), companies that want to prosper in the long run need to consider every stakeholder impacted by their operations, not just shareholders.

Stakeholder theory enables the handmade paper production model to analyze how key stakeholders—such as local people, conservationists, government agencies, and non-governmental organizations (NGOs) interact and contribute to the project's success. Each stakeholder assures the project's economic viability, social responsibility, and environmental sustainability. Local communities contribute raw materials and gain economically, while conservationists and NGOs work to promote the project's environmental sustainability by reducing human-wildlife conflict. Government authorities regulate the project and provide policies and incentives matching national conservation goals. Retailers and consumers, on the other hand, promote and buy environmentally friendly items, which adds value to the business. Stakeholder theory assures these diverse groups contribute to the project's economic feasibility, social responsibility, and environmental sustainability.

2.6.2 Value Proposition Framework

Lanning and Michaels (1988) designed the Value Proposition Framework, which highlights the significance of clearly articulating the distinctive benefits that a business model provides to stakeholders. A value proposition is a collection of benefits or values a business provides to its consumers and other stakeholders. It acts as a guarantee of the value that stakeholders can anticipate receiving, making it critical for ongoing stakeholder engagement.

For handmade paper production, the value propositions differ for each stakeholder group. Local communities benefit from alternative livelihoods and employment development, while environmentalists and non-governmental organizations (NGOs) see the project as preventing human-wildlife conflicts. Government agencies see the value in fostering sustainable growth and lowering poverty rates in rural areas. Retailers and consumers are drawn to the eco-friendliness of the products, while investors are motivated by the prospect of long-term financial rewards. By defining these value propositions, the business model maintains stakeholder involvement while meeting their needs and expectations.

Including stakeholder theory and value proposition frameworks into the handmade paper production model ensures that all stakeholders are actively involved in the project and get concrete advantages. These frameworks give the tools required for analyzing the relationships between various stakeholders, their interactions, and the value they gain from the organization. Applying these theories makes the company model more equitable, sustainable, and adept at addressing stakeholders' economic, social, and environmental concerns. Both stakeholder theory and the value proposition framework emphasize the necessity of engagement, mutual benefit, and sustainability in ensuring project success.

2.7 Theoretical Framework

Two conceptual models, the Sustainable Livelihoods Framework (SLF) and the Human Wildlife Conflict Framework, are used in this study. They are explained below:

2.7.1 Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework (SLF) is a conceptual tool designed to help individuals and communities understand how they mobilize and use different types of capital—natural, social, financial, human, and physical—to build and maintain their livelihoods. Since its introduction by Gordon Conway and Robert Chambers in 1992, this paradigm has become an essential component in analyses of rural livelihoods and development studies. This study uses the SLF to examine the effects on the livelihoods of villagers living in the buffer zones of Chitwan National Park of an eco-friendly paper production effort that uses banana trash and rhino dung. The initiative's contributions to social cohesiveness, environmental sustainability, and economic stability are evaluated by applying the five types of capital (Natural, Social, Financial, Human, and Physical capital) lens to the analysis. These five types of capital are explained below:

Resources from nature that people can use to sustain their livelihoods, such as land, water, and biodiversity, are referred to as natural capital. Since it frequently supports forestry, agriculture, and other resource-based businesses, access to natural capital is crucial in rural areas (Chambers & Conway, 1992). The model uses natural components—such as banana and wildlife (Rhinoceros and Elephant) dung—that would otherwise be considered trash to create valuable products. This procedure enhances the community's natural capital by decreasing environmental waste while producing revenue from renewable resources.

The social networks, connections, and establishments that support collaboration, group efforts, and resource access are referred to as social capital. Strong social capital can improve community resilience by allowing people to share resources, information, and support (Pretty & Ward, 2001). The initiative encourages cooperation between local businesses, stakeholders from outside the community, and people of the community. The program builds social capital, essential for group action and resilience in the face of difficulties like human-wildlife conflict, by creating strong networks and trust.

Financial capital refers to the economic resources individuals and communities can employ to invest in their future. These resources include income, savings, and credit. Access to finance is necessary for investing in new projects, buying inputs, and weathering economic downturns (Ellis, 2000). The strategy strengthens the financial capital of participating households by generating new revenue streams from the manufacturing and selling environmentally friendly paper. Community members can invest in their health, education, and other means of subsistence thanks to the economic stability, which enhances their general well-being.

The abilities, information, health, and education people need to follow different career paths are collectively called human capital. Building human capital enables communities to take advantage of new opportunities and adjust to changing conditions (Bebbington, 1999). Through training and capacity-building opportunities, this model also improves the skills and knowledge of local artisans and businesses. This human capital investment is crucial to the initiative's long-term viability and to participants' ability to adjust to changing circumstances.

The instruments, machinery, and infrastructure that sustain livelihood activities are called as physical capital. The essential elements for improving efficiency and interconnectivity include housing, vehicles, equipment, and communication networks (Scoones, 1998). Establishing physical infrastructure, such as manufacturing plants and warehouses, ensures the eco-friendly

paper effort runs smoothly. Expanding into new markets, enhancing product quality, and increasing production volume all depend on this infrastructure.

The SLF highlights how critical it is to fully understand the context of vulnerability, which encompasses outside variables, including alterations in policy, economic patterns, and climate change that may influence livelihoods. The framework also emphasizes supporting policies and organizations that can help people manage their resources wisely and pursue sustainable livelihoods. In a nutshell, the SLF informs how the environmentally friendly paper project supports the community's sustainable growth by reinforcing various types of capital and resolving the vulnerabilities related to the conflict between humans and wildlife (Scoones, 1998).

2.7.2 Human-Wildlife Conflict Framework

The Human-Wildlife Conflict Framework is an analytical framework intended to investigate the intricate relationships between populations of humans and wildlife, with a particular emphasis on the causes, effects, and conflict management techniques. This concept is especially applicable when conflicts over resources, space, and safety arise from the intersection of human activity with wildlife habitats (Woodroffe et al., 2005).

Conflicts between humans and wildlife are frequently caused by resource rivalry, habitat invasion, and particular human activities like farming and livestock grazing. Population increase, changes in land use, and the loss of natural resources are some causes that worsen these conflicts (Treves & Karanth, 2003). Conflict's aftereffects include financial losses, human injuries or deaths, and retaliatory wildlife killing. Conflicts between humans and wildlife can have serious repercussions. These results jeopardize local communities' means of subsistence as well as conservation efforts by decreasing wildlife populations and disturbing ecosystems (Dickman, 2010). A comprehensive strategy that incorporates loss compensation plans, community

involvement in conservation efforts, and mitigation measures (such as fencing and wildlife corridors) is necessary to manage human-animal conflict effectively. The framework highlights the necessity of adaptable management techniques that take stakeholder demands and local realities into account (Madden, 2004).

This study examines how the eco-friendly paper production project contributes to a decrease in human-wildlife conflict in the buffer zones of Chitwan National Park using the Human-Wildlife Conflict Framework. The methodology facilitates the assessment of the initiative's ability to offer substitute means of subsistence, so mitigating the financial strains that give rise to conflict and fostering harmony between people and wildlife.

The program lessens the community's reliance on agriculture, which frequently causes conflict with wildlife, by making money by manufacturing and selling environmentally friendly paper. Conflict is lessened when people choose this other means of subsistence because it lessens the financial incentives for taking revenge on wildlife. By highlighting the importance of wildlife in producing economic advantages, the effort encourages a positive interaction between the community and wildlife. The project illustrates the possibility of a mutually beneficial coexistence between humans and wildlife by converting garbage into a marketable commodity. The project ensures that local expertise and perspectives are integrated into conflict management tactics by including the community in its execution. This participatory method increases its efficacy by bringing the project into line with community needs and interests. Thus, the effectiveness of initiatives such as the eco-friendly paper effort in promoting sustainable lifestyles and conservation results can be evaluated through the lens of the Human-Wildlife Conflict Framework (Dickman, 2010).

Chapter 3

Methodology

3.1 Research Design

According to Lincoln and Guba (1985, pp. 221), "research design is the plan, structure, and strategy of investigation conceived to obtain answers to research questions and to control variance." In addition, Creswell & Creswell (2017) distinguished between three categories of study designs: mixed methodologies approaches, qualitative, and quantitative.

This study utilizes primary qualitative case study techniques to support literature-driven research through secondary quantitative data measures (Brennan & Dodd, 2009). As explained by Creswell (2013), "emerging qualitative approach to inquiry, data analysis that is both inductive and deductive and establishes patterns or themes, and data collection in a natural setting sensitive to the people and places under study" are the methods used by qualitative researchers (pp. 44). The case study method was relevant, providing an appropriate methodology that matched the study's unique setting. The study intends to investigate the socioeconomic, environmental, and cultural factors of human-wildlife conflict and the impact of sustainable business models in minimizing conflict while building community resilience.

This research design integrated literature analysis and qualitative methodologies, resulting in a more comprehensive understanding of the context of Chitwan National Park's buffer zones. This methodological integration guarantees a comprehensive, contextual investigation of the relationship among community development, economic empowerment, and wildlife protection.

Literature Analysis

A comprehensive review of the literature forms the basis of the research. A comprehensive analysis of scholarly literature, reports, as well as relevant case studies was carried out to assess:

- Sustainable business strategies about environmentally friendly products, with an emphasis on programs that uses waste from agriculture and animals.
- Human-wildlife conflict resolution methods in conservation areas, particularly in Nepal and other similar geographical situations.
- Handmade paper manufactured using alternative fibers such as banana waste and wildlife dung, based on previous studies in Southeast Asia and India.

Google Scholar, JSTOR, and ScienceDirect were among the databases used to gather the literature. The goal of the study was to highlight important themes, including the function of locally driven conservation initiatives, the profitability of eco-friendly goods, and the wider consequences for biodiversity and sustainable development.

Qualitative Methodology: Case Study Approach.

The qualitative case study technique and the literature review emphasize the distinct socioeconomic and environmental dynamics of Chitwan National Park's buffer zones. The potential of the case study method to offer a comprehensive and contextual analysis of the effort to make handmade paper from rhino dung and banana fiber led to its selection. This study takes a qualitative case study approach to investigate the nexus of human-wildlife conflict, sustainable business strategies, and community empowerment by producing eco-friendly paper from rhino dung and banana waste. The case study technique is appropriate for in-depth analysis of complex

phenomena in their real-world context, providing for a thorough understanding of the specific dynamics at work in Chitwan National Park's buffer zones (Yin, 2018). This methodology made it possible to fully comprehend complicated phenomena in real-life settings, especially when it was difficult to distinguish between the phenomenon and the context. The case study approach was especially appropriate for examining the complex relationships existing in buffer zone animal conservation, economic sustainability, and community resilience.

Rationale:

According to Simons (2009), a case study technique is an analysis of diverse perspectives that bring the uniqueness of a given feature in a 'real life' context. The case study provides for an in-depth analysis of the intricacies defining the distinct socio-economic and environmental setting in which the handmade papermaking venture functioned in this specific context, as buffer zones around Chitwan National Park represent a distinct socio-cultural and economic landscape. Second, the case study method's versatility in data collecting made it possible to use a variety of data sources, such as document analysis, observations, and interviews. This made triangulation easier, which improved the findings' validity. Purposive selection ensures a diversified representation of participants, providing the study with different points of view. Importantly, the case study technique emphasizes cultural sensitivity, recognizing and honoring local customs, which is critical in an environment where cultural elements are important.

Finally, an important consideration was the applicability to real-world scenarios. Creswell (2013) defined case study research as a qualitative approach in which "the investigator investigates a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, using detailed, in-depth data. (page number)" The findings of this methodology have immediate policy consequences, allowing for informed decisions that are contextually appropriate and responsive to the diverse realities of buffer zone communities. The case study yielded valuable insights that might be

utilized to educate feasible approaches for promoting community resilience and sustainable economic ventures in adjacent buffer zones.

3.2 Site Selection and Sampling Method

Several variables were taken into consideration when choosing the case study location. The location of the site had to be in a buffer zone next to a protected wildlife area as well. Another crucial factor was accessibility since comprehensive data collecting required frequent access to the site. Finally, a wide range of perspectives could only be provided by the presence of varied stakeholders, such as local officials, conservationists, and members of the community.

The study was carried out in the Chitwan National Park (CNP) buffer zone of Nepal. It is situated in south central, Nepal, has a total area of 952.63 km², crosses four provinces, and is located between latitudes 27°16.56' - 27°42.14'N and longitudes 83°50.23' - 84°46.25'E. Founded in 1973, CNP is Nepal's first national park and a UNESCO World Heritage Site. With almost 600 birds, 126 fish species, 54 herpetofauna species, and approximately 70 mammal species, it is well renowned for having a high level of biodiversity (CNP 2013). According to Subedi et al. (2017) and Walston et al. (2010), CNP is home to the second largest population of greater one-horned rhinoceroses and is one of the 42 tiger source sites in the world. The CNP is comprised of four buffer zones: Madi-Bagai, Kasara, Sauraha, and Amaltari. Chitwan, Parsa, Makawanpur, or East Nawalparasi provinces comprise portions of the park, accounting for 74.04%, 15.45%, 6.97%, and 3.54% of its total area, respectively. By 1996, an additional 750 km² had been approved to surround the park as a buffer zone (Bhandari et al., 2019).

Sampling Method:***Purposive Sampling***

A purposive sampling technique was used where participants for this study were carefully selected to ensure a diversified sample of participants and stakeholders of buffer zone communities (Andrade, 2021). Criteria included background and potential roles and responsibilities influencing wildlife conservation efforts and community experiences. Purposive sampling aims to collect a variety of viewpoints and experiences when different sociocultural and other factors influence the results, offering a comprehensive picture of the economic constraints and opportunities experienced by rural women (Andrade, 2018).

Snowball sampling

The sample was increased through recommendations using snowball sampling (Adeoye, 2023). The initial respondents were invited to recommend others with relevant insights or experiences (Nyimbili & Nyimbili, 2024). This method made it possible to find more community members and stakeholders who may not have been initially apparent but had important viewpoints. Snowball sampling enhanced the data set and ensured the effort's effects were understood more thoroughly.

3.3 Data Collection Methods

The study design incorporates qualitative and quantitative techniques, such as direct observations, autoethnography, unstructured interviews, and market analysis. This multimethod

approach guarantees rich, nuanced, and culturally grounded findings by enabling a thorough investigation of the research topic from several angles.

3.3.1 Autoethnography

In this research, autoethnography is used as one of the methods. It is a good alternative that helps to build understanding and knowledge by constructing substantial ideas about a specific subject (Poerwandari, 2021). By relating my story to more general social and environmental challenges, the autoethnographic approach adds the research with a deeply personal dimension (Ellis, Adams, & Bochner, 2011). According to Ellis and Bochner (1996), autoethnography is a type of research in which investigators analyze their own relationship to a specific event or subject within a specific scientific field. The human-wildlife conflict was every day in the buffer zone surrounding Chitwan National Park, where I grew up. Hence, I have included autoethnography as one of the qualitative methods.

While study methods such as questionnaires, standardized scales, and interviews can collect data on specific populations, the depth of knowledge and insight ingrained in the lived experiences of those directly involved in the phenomenon is frequently limited (Poerwandari, 2021). The intricate psychological framework within which individuals see events might provide valuable insights that are not readily captured by typical study instruments. In autoethnography, the researcher resides or works within the setting under study, in contrast to classical ethnography, which involves external observation. They use their personal experiences, ideas, and access to acquire data, making the research closely linked to their context and perspective. The crucial difference is that the principal site of study is the researcher's surroundings rather than an outside or strange location (Alvesson, 2003, pp. 176).

3.3.2 Direct Observations

During several visits to the buffer zone settlements, direct observations were made in December 2024. Daily activities like farming, livestock management, and interactions with wildlife were observed. A special emphasis was placed on the community's involvement in the environmentally friendly paper production process. Since these techniques don't demonstrate a cause-and-effect relationship—they merely require watching and documenting naturally occurring events—they are referred to as descriptive techniques. The purpose, as with indirect assessments, the purpose is to find natural behavior-environment interactions. On the other hand, descriptive analysis entails routinely observing and quantifying behavior and environmental events directly, in contrast to indirect methods (Thompson & Borrero, 2011).

The activities and the surrounding area were captured in the thorough field notes, photos, and videos that were used to record the observations. Firsthand observations of the papermaking process, community interactions, and wildlife activity were conducted in selected localities of buffer zones. Seeing locals engage in community activities and interact with wildlife offers a personal understanding of their difficulties when living near dangerous wildlife and the methods they use to reduce conflicts (Creswell & Poth, 2016). Contextual information obtained from observational data aided in the triangulation of interview results. These observations aimed to collect data on how HWC conflict occurs in daily life and how the community deals with these issues. Additionally, observations shed light on the practical issues of implementing the program for environmentally friendly paper production (Angrosino, 2007).

Both sole-owned and community-owned banana paper businesses were observed, with variations noted in operational models, obstacles related to scaling production, quality control, and market access, in addition to the role of community enterprises in promoting local employment and economic resilience, particularly among women. Furthermore, insights were

gained from meetings with organizations and enterprises involved in paper production, value addition, and marketing about supply chain issues and the potential to develop the market for banana and wildlife dung paper. Retailers in the United States, such as Ten Thousand Villages, were visited over six months from August to December 2023, and participated in trade shows organized by the New York Chamber of Commerce, promoting handmade paper products such as lokta paper, on September 22nd, 2023, enabled the observation of consumer preferences for eco-friendly items. Key product features, such as quality, sustainability, and affordability, have been recognized as influencing consumer decisions. These observations gave a thorough insight of the socio-economic situation in the buffer zones, as well as how local and international markets could support long-term business strategies to enhance livelihoods and reduce human-wildlife conflict.

3.3.3 Unstructured Interviews

Gathering multiple perspectives on the implications and difficulties of the project is made possible by interviewing 30 participants, including a range of stakeholders. Key informants and stakeholders, such as local government representatives, NGO representatives engaged in community development and conservation, members of the handmade papermaking project, conservation officers, wildlife experts, market experts (Wholesalers, retailers, and distributors), and representatives of local communities, were interviewed in an unstructured manner.

Stakeholder mapping and value proposition analysis were utilized to interact with various stakeholder groups, allowing us to understand their responsibilities and contributions. These tools helped us understand how each participant contributed to and profited from the handmade paper production process (Freeman, 1984; Lanning & Michaels, 1988). Furthermore, the unstructured interview was very adaptable, enabling the exploration of a broad range of subjects without being restricted by preset rules. This adaptable approach allows interview subjects to freely share their

opinions and supply detailed information (Kvale & Brinkmann, 2009). This comparatively unstructured method has the advantage of fostering stronger relationships and allowing for greater empathy with responders. The interviews centered on understanding:

- Community perceptions on conflicts between humans and wildlife.
- Perceptions of using rhino dung and banana fibers for papermaking.
- Effects of the suggested business model on the environment and economy.

Participants were able to address topics that were most important to them because of the unstructured style, which promoted in-depth, conversational conversations. The interviews attempt to capture a diversity of viewpoints on the initiative's impact, the issues faced by the community, and the broader implications for conservation and sustainability (Kvale & Brinkmann, 2009). The responses were noted in a detailed manner. In this research, we used unstructured interview techniques because of their unique benefits. Higher face validity, more favorable responses from the interviewee and interviewer, validity levels equivalent to those of structured interviews, and increased applicability in various organizational contexts are some of these benefits (Chauhan, 2022). Particularly in dynamic or complicated contexts, unstructured interviews offer advantages that structured interviews might not. As opposed to concentrating just on the respondents' particular issues, this unstructured technique gives ample opportunity to collect general information from respondents and gives an in-depth description of their experiences (Mueller & Segal, 2014).

Participants were asked for verbal agreement before and after the interviews to ensure that the participants were adequately informed of the confidential and voluntary nature of this study. Each participant was asked for their consent, which ensured that all parties understood the goal of the study, interviewee involvement, and participation criteria. Both in-person communication and the Zoom Platform were used to interview the respondents.

3.3.4 Market Study Document Analysis

Scientific papers like project reports, economic statistics, conservation plans, and historical records were examined to enhance and provide context for the narrative and observational data; this study aims to assess the marketability and potential demand of the environmentally friendly paper product by identifying future opportunities and obstacles to its successful commercialization (Kotler & Keller, 2016). This includes looking over market reports, examining customer groups, and determining possible obstacles to entering the market (Kotler & Keller, 2016). Understanding the consumer buying decision process is crucial for marketers, as it encompasses the steps a consumer takes before, during, and after purchasing goods or services (Lumen, n. d.).

Market Demand:

By examining industry data and market studies about sustainable products and eco-conscious consumer trends, the market potential for eco-friendly paper products was evaluated. This knowledge helps marketers effectively sell their products by aligning their strategies with consumer behavior (Qazzafi, 2019). When marketers accurately interpret these decision-making processes, they are more likely to succeed in selling their goods or services (Keller & Kotler, 2022).

Consumer Segmentation:

Several potential consumer segments were discovered, such as enterprises aiming to be sustainable, educational institutions, and environmentally sensitive consumers. A thorough

analysis was conducted to determine how the product may satisfy these sectors' needs and preferences.

Competitive Analysis:

The competitive landscape was examined to determine current products and possible rivals in the market. The unique value proposition of the banana wastepaper and rhino and elephant dung was evaluated with the aid of this analysis.

3.4 Data Analysis

Qualitative data from in-depth interviews was thematically evaluated, while autoethnography analysis was also done (Squires, 2023).

3.4.1 Thematic Analysis:

This research followed thematic analysis to organize and interpret qualitative data as it helpful to highlight the major findings and contributions of the study. This approach allows for a comprehensive data analysis while maintaining the analytical process's flexibility (Nowell et al., 2017). This process entailed looking for repeating patterns, themes, and meanings in the data. In previous studies, authors have defined thematic analysis, situating it to other qualitative analytic methods that seek themes or patterns, as well as different epistemological and ontological positions, and argue that it provides an accessible and theoretically flexible approach to qualitative data analysis (Barun & Clarke, 2006).

Data from interviews and observations were coded to identify important themes and trends. This procedure was carried out manually, with hand-categorized notes and quotes from the interviewees. The first familiarization step entailed meticulously studying interview transcripts and observational notes to become intimately familiar with the data. Following that, the coding process was executed by determining the major areas, which included "wildlife conservation," "economic sustainability," and "community empowerment." These codes were then categorized into more general topics that complemented the goals of the study, with an emphasis on how human-wildlife conflict affects local livelihoods. This manual method made it possible to interact with the data in a personalized and thorough way. Together with developing a thorough grasp of the research findings, the coded data were synthesized to make linkages between various themes. Overarching themes, like the need for community involvement in conservation efforts, were discovered through the synthesis process (Braun & Clarke, 2006).

3.4.2 Autoethnographic Analysis:

The autoethnographic analysis is to supplement the more formal data obtained from observations and interviews with a nuanced and personal point of view. An in-depth, contextual understanding of the research issue was obtained by analyzing personal narratives gathered through autoethnography and other qualitative data. According to Chang (2008), autoethnographic analysis enriches formal research by adding a layer of the researcher's personal reflections, adding depth and nuance to the data. Drawing connections between the narratives' emotional and experiential elements and more general societal and environmental concerns was part of the analysis process.

The personal narratives were combined with thematic analysis findings to provide a comprehensive understanding of the research topic. With this integration, the researcher's

experiences can be included as a useful source of information and understanding (Ellis, Adams, & Bochner, 2011).

3.5 Validity

Validity relates to how successfully the questionnaire measures what it is intended to measure. The content validity of this study was verified by a panel of experts comprised of faculty members.

Internal Validity:

As illustrated in Figure 2, triangulation of data was used to ensure the internal validity of the research (Donkoh & Mensah, 2023). The research will ensure that findings are consistent across multiple data-gathering procedures by using qualitative measures like in-depth interviews and autoethnography. If similar patterns appeared from the data, internal validity was strengthened, offering a more robust understanding of rural women's economic empowerment. Internal validity was also determined from the consistency of response across multiple data-gathering methods (Sciberras & Dingli, 2023). If participants gave similar information, that indicated the research accurately captured their experiences and viewpoints. Any conflicts or contradictions were thoroughly investigated and addressed to improve the study's internal validity.

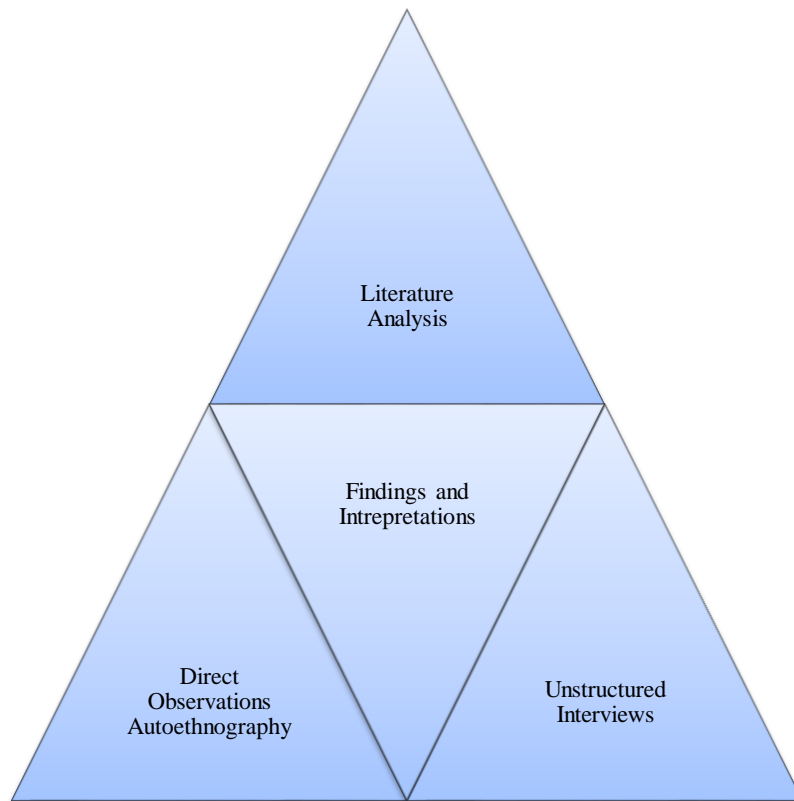


Figure 2 Triangulation Method to Improve Internal Validity.

External Validity:

The findings were then contextualized from the perspective of communities of buffer zones' socio-cultural and economic dynamics. This included describing the local setting in detail, including cultural traditions, economic situations, and social conventions. This was intended to improve the study's external validity by making the findings more relevant to such contexts (Lambert et al., 2024).

3.6 Ethical Considerations

The importance of ethics in research cannot be overstated, and this study also highlighted key ethical principles. To begin, the idea of informed consent was strictly enforced. Before conducting the study, all participants were provided with detailed information about the study's objectives, potential impacts, and benefits. Participants had the opportunity to ask questions and express any concerns. This guaranteed that individuals were fully aware of the objectives and ramifications of the research, preserving their autonomy and freedom to make an educated decision about their participation. According to Creswell and Poth (2017), the goal is to protect participants' autonomy and rights while ensuring they understand the nature of the research and their part. As discussed in an article, individuals should be treated with dignity and respect for human subjects' autonomy, as well as the significance of protecting vulnerable individuals is always crucial (Moon, 2009).

Furthermore, the idea of confidentiality was strictly enforced. The participants' identities were kept private, and all data collected will be anonymized. The objective is to protect participants' privacy and ensure their personal information is not exposed without explicit authorization (Israel & Hay, 2006). This protects participants' privacy and confidentiality, creating trust and openness in their participation in the study process. Participants' anonymity also protected them from any potential negative effects of their participation.

Another key ethical aspect of this study was cultural sensitivity and minimizing harm. Local cultural norms and traditions were actively respected and integrated into the research. Belonging to the same community with good cultural understanding, respectful engagement with participants was ensured. To minimize any possible harm to participants, every effort was made to guarantee that participants in interviews and observations did not experience any distress or discomfort. According to Orb, Eisenhauer, and Wynaden (2001), ethical research aims to put

participants' well-being first and prevent any detrimental effects on their lives. This helped to reduce the likelihood of cultural misunderstandings and insensitivity by building a collaborative and mutually respectful relationship between researchers and participants.

The research outcomes will also be disseminated to the community, guaranteeing that the participants gain insights from the knowledge produced. The goal was to ensure that the study serves society and that participants share its advantages fairly (Buchanan, 2000). Discussions about the findings and potential applications for enhancing regional practices and policies will be held at community meetings.

3.7 Limitations

Pen and paper were used to conduct thematic analysis manually. Although this method made it possible to work closely and in-depth with the data, it is not as accurate or effective as computer-assisted qualitative data analysis software (like NVivo). The reliability of the analysis may be impacted by biases and inconsistencies introduced by manual coding (Nowell et al., 2017).

The results may not be applied widely because only one case study from the buffer zone of Chitwan National Park was used. Even though the study offers a profound understanding of the socioeconomic and environmental situation, it's possible that the conclusions won't apply to other areas with different circumstances (Yin, 2018).

Given that participants were selected using predetermined standards and suggestions, selection bias may have been introduced by the purposive sample and snowball sampling methods utilized in this study. This reduces the sample's diversity and could impact how broadly the results can be applied (Creswell, 2013).

Chapter 4

Proposed Business Model

4.1 Introduction

The suggested business plan addresses important environmental and socioeconomic issues by utilizing wildlife dung—particularly from rhinos—and banana waste for the sustainable production of paper in the Chitwan National Park buffer zones. Crop damage by rhinos has long been one of the major sources of conflict between humans and wildlife in Nepal, particularly in the area surrounding Chitwan National Park, where rhino conservation initiatives are ongoing. Such conflicts promote unfavorable local perceptions of wildlife conservation initiatives, emphasizing the need for innovative approaches that benefit conservation and the local community (Nepal and Weber, 1995). Incorporating banana waste into the paper production process solves another environmental issue: agricultural residue disposal. The model helps conserve biodiversity by minimizing deforestation and generates income, especially for indigenous women artisans, by turning this trash into a sustainable resource. By converting this garbage into a sustainable resource, the strategy promotes biodiversity conservation by minimizing deforestation while providing economic advantages, especially to local women artisans, in line with SDGs 8, 9, 10, 11, 12, 13, and 15 (described later in the chapter).

Additionally, buffer zone initiatives surrounding Chitwan National Park have shown how effective it is to include nearby communities in conservation activities, enhancing economic resilience, and reducing conflict between humans and wildlife. These projects underline the significance of combining community-led activities with biodiversity protection, making this economic model a feasible option (Lamichhane et al., 2019). The manufacturing of eco-friendly paper using wildlife dung and banana waste also encourages waste reduction and sustainable

consumption practices, which are critical for long-term conservation success in buffer zones (Budhathoki, 2004).

Why are Rhino Dung and Banana Waste used?

The business model has selected rhino dung and banana waste as its raw materials because of their distinct qualities and accessibility in the buffer zones of Chitwan National Park. Banana waste and rhino dung are two readily available, sustainable, and eco-friendly substitutes for wood pulp that can help lessen deforestation and reliance on forests. This project uses rhino behavior, specifically their patterns of communal defecation, to develop a sustainable solution. Rhinos use specific locations known as middens, which act as hubs for social interaction and communication between rhinos. While crucial for rhino communication, these middens have traditionally been utilized as a tracking tool by poachers for rhino horns. Rich in cellulose fibers, essential to producing paper, rhinos may produce up to 50 pounds of dung every day. As rhino dung contains a large amount of undigested plant material, it is a perfect raw material for generating environmentally beneficial paper. Rhino dung offers an alternative to cellulose from trees, which lessens the need for deforestation and encourages the preservation of biodiversity. Utilizing this waste product can enhance the value of a resource that would otherwise be discarded and address an environmental issue (human-wildlife conflict resulting from crop damage).

The banana plant, particularly its pseudo stem, offers a great possibility for sustainable paper production within a circular economy framework, as observed in places such as Nepal's Chitwan National Park. Because of their high cellulose fiber content, banana stems—which are frequently thrown away as agricultural waste—are perfect for generating paper products. These fibers have important qualities that can improve paper quality while lowering dependency on

conventional wood-based sources, such as high tensile strength, durability, and biodegradability. By keeping agricultural waste out of landfills and open burning, this process of turning banana stems into paper reduces deforestation and promotes sustainability by cutting carbon emissions (Jayaprabha et al., 2011; Kumar et al., 2013). The business model promotes sustainable economic growth by utilizing a renewable resource, reducing waste, and creating jobs, especially in rural agricultural areas.

In conclusion, rhino dung and banana trash were chosen for their fiber content, availability, and potential to minimize deforestation while transforming human-wildlife conflict into a conservation-driven commercial opportunity. This unique concept demonstrates how local materials may be converted into long-lasting products that benefit the environment and local communities. This concept encourages sustainable development while simultaneously encouraging human-wildlife coexistence, making it a model for creative conservation techniques (Mishra, 1992).

4.2 The Process: From Poop to Paper

The business model primarily focuses on collecting and processing two key raw materials: rhino dung and banana fibers. Usually regarded as waste materials, these materials are recycled to make sustainable, high-quality paper. Figure 3 below, shows the step-by-step method of converting wildlife dung and banana fibers into handmade paper. This strategy shows the utilization of sustainable raw materials to create economic opportunities for local people.

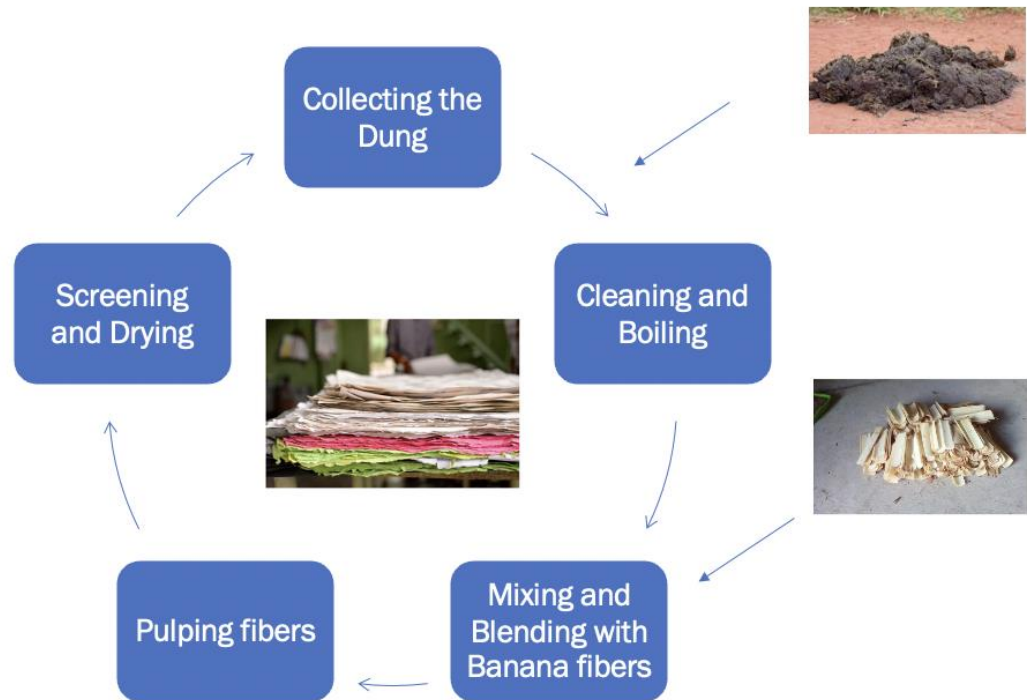


Figure 3 From Poo to Paper Process.

4.2.1 Collecting and Preparing Raw Materials

Rhino dung is gathered in the buffer zones surrounding Chitwan National Park, particularly from communal dung piles known as "middens" where rhinos routinely defecate. Local people then will safely collect the dung, causing minimal disturbance to wildlife. Before turning into pulp, the dung is first cleansed, sanitized, and dried. Another important raw material is banana waste, mainly from the stems and leaves that are usually thrown away after harvesting banana fruit. Local farms provide this waste to be collected, giving farmers another source of revenue. The banana fibers undergo processing and are combined with rhino dung pulp to improve the durability and quality of the finished product.

4.2.2 Paper Manufacture

The raw materials are cleaned and shredded in a multi-step production process. Banana fibers and rhino dung are cooked and pulped separately to guarantee a smooth consistency and eliminate contaminants. Afterward, the pulps are mixed proportions based on the kind of paper that will be made. Once blended, the material is placed onto screens to create paper sheets, which are dried and compressed to get the right consistency and thickness. Natural methods are used in this chemical-free manufacturing process to clean and process the materials. The absence of harsh chemicals means that the paper-producing process is environmentally friendly.

4.2.3 Marketing and Branding

The finished product is advertised as environmentally friendly, handcrafted, and sustainably developed paper. The target audience consists of environmentally conscious consumers, businesses devoted to environmentally friendly practices, and educational institutions keen to endorse green products. Its production is conservation-focused, directly addressing conflict between humans and wildlife and supporting wildlife conservation activities, which makes it stand out from the competition. The branding emphasizes the paper's origins, emphasizing rhino conservation and agricultural waste reduction. Being unique from other eco-friendly products, its unique story enhances its market appeal.

4.3 Significance of the Business Model

The proposed business model adheres to the Triple Bottom Line (TBL) framework and the win-win-win model by providing economic, environmental, and social value, ensuring long-term outcomes for multiple stakeholders. Most importantly, this business model could help

replace lost income for farmers as their crops are frequently damaged by wildlife raiding, especially rhinos. In addition, the proposed business model also significantly contributes to wildlife conservation by encouraging local communities to have a positive outlook on animals. The community's dissatisfaction is replaced with admiration for wildlife when the dung, once regarded as waste or "trash", is turned into an appealing resource.

4.3.1 Win-Win-Win Impact of the Business Model

This business strategy addresses the economic, social, and environmental aspects by utilizing the triple bottom-line methodology. Figure 4 depicts a Win-Win-Win business model highlighting the multifaceted benefits of sustainable papermaking. The breakdown of how each dimension affects the overall impact is provided below:

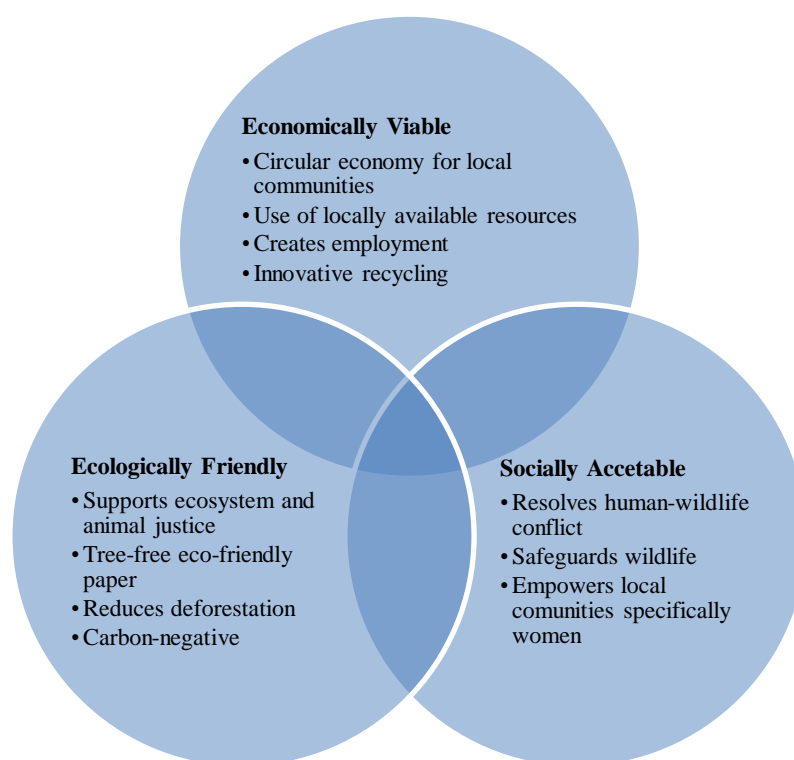


Figure 4 Win-Win-Win Impact of The Business Model.

Economic Dimension (Economically Viable)

The strategy adds economic value by giving local populations stable sources of income. This also changes the local people's attitudes towards wildlife, such as rhinos, as contributors to their livelihoods through the dung they leave behind. Considered an annoyance in traditional farming contexts, rhino dung collection turns into a reliable source of money. Turning "trash" into treasure allows communities to regard wildlife as a resource rather than an imminent threat to their livelihoods. Likewise, local farmers benefit by selling banana trash, which would otherwise have little economic value. In contrast, local artisans involved in rhino dung collection and paper production get a consistent year-round income. The community business model can diversify its income sources by using agricultural waste (banana fibers) and wildlife waste (rhino dung), minimizing reliance on crops prone to wildlife invasions. This economic advantage lessens anti-wildlife attitudes in the community, fostering better ties between humans and wildlife.

Environment Dimension (Ecologically Friendly)

Environmentally, using rhino dung and banana fibers provides a sustainable, tree-free alternative to traditional paper manufacture, minimizing deforestation and encouraging forest conservation. It offers a creative solution that promotes ecosystem health, lowering deforestation. Utilizing banana waste, which normally degrades and emit methane, contributes to a circular economy, whereas using wildlife dung helps minimize environmental footprints. Paper manufacturing highlights the complementary roles of agriculture and wildlife conservation, where human and natural resources are valued and utilized to their fullest potential. Both rhino dung and banana fibers are produced without the use of chemicals, which guarantees the discharge of no

hazardous residues and promotes a more environmentally friendly and sustainable manufacturing method.

Social Dimension (Socially Acceptable)

The concept strongly empowers local women by offering them training and job possibilities. Many of the jobs produced in paper collection, processing, and production are aimed at women, which helps to overcome gender inequities in the local sector. Women who are empowered not only have better economic standing but also play a more important role in the community.

Reducing the community's dependence on crops that are frequently attacked by wildlife is an important way that the strategy lessens conflict between humans and wildlife. Crop raiding instances decrease human-wildlife conflict, fostering a more peaceful coexistence and advancing long-term conservation objectives.

Overall WIN-WIN-WIN Model

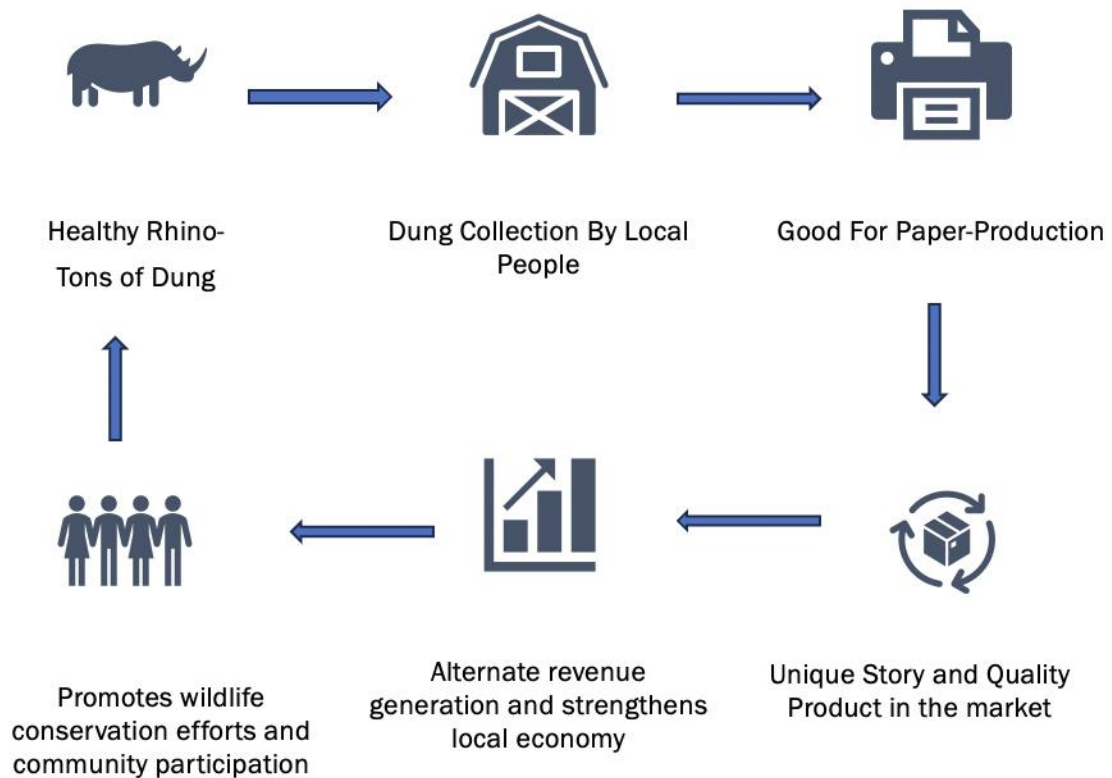


Figure 5 How This Model Works?

Figure 5 depicts how the sustainable papermaking business model works within the buffer zone. It emphasizes the flow of resources, community engagement, and market integration, producing a sustainable system that benefits both humans and wildlife. Aligned with the triple bottom line, this business strategy generates a value proposition for all parties involved. It enhances local communities' economic security, protects the environment by cutting down on trash and deforestation, and advances social justice by empowering women and reducing conflict. Together, these elements create a win-win-win situation that benefits wildlife and people, promoting social, environmental, and economic sustainability.

4.3.2. Alignment with Sustainable Development Goals (SDGs):

This section investigates how the handmade paper production business that uses wildlife dung and agricultural waste complies with major Sustainable Development Goals (SDGs). The links below suggest how this company model actively promotes sustainable development by fostering inclusive growth, innovation, and environmental preservation.

Figure 6 represents the 17 Sustainable Development Goals (SDGs) proposed by the United Nations, providing global context for this research (United Nations, 2015). This business model is aligned with these sustainable goals, with a particular emphasis on SDGs 8, 9, 10, 11, 12, 13, and 15, focusing on sustainable economic growth, environmental stewardship, and community empowerment.

THE SUSTAINABLE DEVELOPMENT GOALS



Figure 6 United Nations 17 Sustainable Development Goals (UN, 2015).

Table 1 illustrates the specific Sustainable Development Goals (SDGs) addressed by the handmade paper production business model. This table establishes a clear link between the business model's actions and global sustainability goals.

Table 1 SDGs and Its Connection with the Business Model.

SDGs	How it connects?
SDG 8: Decent Work and Economic Growth	Creates job opportunities for affected local people, particularly women.
SDG 9: Industry, Innovation, and Infrastructure	Uses agricultural waste and wildlife dung as useful resources to produce paper. Uses innovative methods to produce paper sustainably by utilizing the excrement of wildlife.
SDG 10: Reduced Inequalities	Minimizes deforestation by providing alternatives to traditional wood-based paper manufacture. Empowers vulnerable populations, particularly women, through environmentally responsible economic opportunities.
SDG 11: Sustainable Cities and Communities	Offers economic advantages in places experiencing significant human-wildlife conflict. Promotes sustainable consumption in both rural and urban settings via industries associated with wildlife protection.
SDG 12: Responsible Consumption and Production	Improves local resilience by using community-based solutions to combat deforestation and wildlife conflicts. Uses waste products (wildlife dung, agricultural waste) as raw materials.
SDG 13: Climate Action	Reduces carbon emissions by producing carbon-negative paper. Prevents deforestation to mitigate climate change.

SDG 15: Life on Land	<p>Reduces conflict between humans and wildlife by transforming animal waste into useful resources.</p> <p>Promotes biodiversity conservation and endangered species protection through sustainable techniques.</p>
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SDG 8: Decent Work and Economic Growth

SDG 8 strives to promote long-term, inclusive, and sustainable economic growth, as well as full and productive employment. This purpose is strongly tied to the paper production business model by creating job opportunities for local people, particularly women in rural areas. This business model provides meaningful employment while reducing poverty in areas affected by human-wildlife conflict by training indigenous artisans and involving them in sustainable production methods based on wildlife dung and agriculture waste. This fits with the UN's aim for inclusive growth and creating employment in developing regions, is essential for attaining economic resilience.

SDG 9: Industry, Innovation, and Infrastructure

This SDG is focused on encouraging innovation, developing sustainable industrialization, and creating resilient infrastructure. Utilizing wild animal dung and agricultural waste as raw materials in the paper-making process lessens the need for conventional wood-based paper, minimizes deforestation, and promotes sustainable practices. This creative method encourages ecologically sustainable enterprises while converting waste into useful resources. The company

helps achieve SDG 9 by utilizing innovative recycling techniques that promote ecological preservation and sustainable infrastructure development.

SDG 10: Reduced Inequalities

SDG 10 aims to lessen inequality by giving marginalized communities—especially women and vulnerable groups—economic opportunity to strengthen them. This business plan contributes to this providing training opportunities to local artisans and fair trade-certified jobs. By emphasizing gender inclusion and ethical labor practices, the income gap in rural and wildlife-conservation areas is reduced, and with this process, an equitable society is reinforced, and vulnerable populations can access sustainable economic alternatives.

SDG 11: Sustainable Cities and Communities

SDG 11 underlines the need to make cities and human settlements more inclusive, safe, resilient, and sustainable. This company connects the economic gains of wildlife conservation with sustainable consumption and production methods in both rural and urban settings. The business promotes community resilience and enhances economic prospects in areas impacted by conflict between humans and wildlife by developing industries around wildlife dung and agricultural waste. Through fair trade programs and environmentally friendly goods, the approach aids in the growth of sustainable local economies.

SDG12: Responsible Consumption and Production

The goal of SDG 12 is to guarantee sustainable production and consumption patterns. The company aligns with the objective since it contributes to a circular economy by utilizing waste resources, such as wildlife dung and agricultural waste, as raw materials for papermaking. The company encourages responsible consumption by upcycling trash into profitable, environmentally friendly items and lessens the environmental impact. Closed-loop production techniques enhance resource efficiency, promoting community members to adopt sustainable practices.

SDG 13: Climate Action

The company supports climate action by creating carbon-negative paper, eliminating deforestation, and lowering emissions caused by traditional paper manufacturing. The strategy not only reduces the consequences of climate change but also assists local populations in adjusting to its effects through sustainable land-use practices by turning agricultural waste and wildlife dung into a marketable commodity. This is consistent with SDG 13's emphasis on lowering carbon footprints and strengthening resilience to the effects of climate change.

SDG 15: Life on Land

Protecting, restoring, and advancing the sustainable use of biodiversity and terrestrial ecosystems are the goals of SDG 15. This business strategy resolves human-animal conflict and turns trash into an economic resource by employing wildlife dung to create paper. It promotes wildlife protection efforts and lessens the demand for forest resources for the traditional paper industry, both of which contribute to biodiversity conservation. Consequently, this helps to preserve

wildlife and encourage sustainable means of livelihood in the communities surrounding the buffer zone.

This business strategy not only meets local communities' pressing economic needs by creating jobs, but it also prioritizes ecological sustainability. The initiative is a model for combining sustainable business practices with climate action, wildlife conservation, and community resilience since it is aligned with numerous Sustainable Development Goals (SDGs), particularly SDGs 8, 9, 10, 11, 12, 13, and 15. This method highlights how innovative ideas can promote equitable growth and long-term development across multiple sectors.

4.4 The Business Canvas Model

4.4.1 Introduction

The Business Canvas Model is a strategic management tool that helps entrepreneurs and enterprises visualize and arrange their business models in an organized way. Alexander Osterwalder (2010) developed this paradigm, which offers a comprehensive understanding of how important components of an organization work together. It allows for a thorough yet clear assessment of how an organization develops, delivers, and collects value by dissecting a business model into nine basic components. For this specific initiative, the utilization of rhino dung and banana waste to produce eco-friendly paper production, the Business Model Canvas assists in mapping out each component, from partnerships and resources to customer segments, ensuring the project remains both commercially feasible and environmentally sustainable.

4.4.2 Key Components of Business Model

The Business Canvas Model offers a strategic framework for examining essential components of an enterprise. Nine crucial elements make up this framework: Value Propositions, Channels, Customer Segments, Cost Structure, Key Partners, Key Activities, Key Resources, and Revenue Streams. Together, these elements show how the company produces, provides, and acquires value in the marketplace (Osterwalder & Pigneur, 2010).

Key Partners

Strategic cooperation is critical to the success of any business model. When it comes to obtaining wildlife dung and banana waste, local communities are essential. Conservation groups and non-governmental organizations (NGOs) such as the World Wildlife Fund (WWF) provide expertise and ethical alignment. At the same time, suppliers and traders help disseminate eco-friendly paper to consumers and businesses worldwide. Strong collaborations with local groups and organizations have been shown to increase the likelihood of success of the initiatives (Osterwalder & Pigneur, 2010). These collaborations also help spread eco-friendly paper products worldwide and contribute to biodiversity conservation by reusing agricultural and wildlife dung that normally goes to waste (Geissdoerfer et al., 2017).

Key Activities

This business model is innovative and the policies regarding the use of wildlife dung in buffer zones aren't common. Hence, it requires policy debates and the establishment of clear guidelines before setting up a proper profitable business. Therefore, the initial and crucial phase in this initiative is to engage stakeholders, including community leaders and government officials.

Advocacy activities are centered on raising awareness of the benefits of using sustainable resources that would otherwise go to waste and ensuring that adequate guidelines are established to promote this cause. Collaboration with stakeholders is critical to the project's success because it addresses policy gaps, secures buy-in, and aligns objectives toward a sustainable future for both communities and wildlife

Once the foundation is established, key tasks include sourcing raw materials, training local artisans (especially women), production, quality control, and marketing. Previous studies have extensively established the significance of sustainable supply chains, particularly focusing on mitigating environmental impacts and advancing circular economy methodologies (Ries, 2011). Training local women to produce quality products also contributes to broader gender empowerment and poverty reduction activities in rural communities (FAO, 2021). Targeted marketing techniques assist in reaching environmentally conscious consumers worldwide, while Fair Trade certification programs guarantee ethical activities (Kumar et al., 2013).

Key Resources

Key resources for the company include banana fiber derived from agricultural waste and wildlife dung, both tree-free alternatives to typical paper materials. Utilization of such byproducts promotes the circular economy model by converting trash into valuable production inputs (Geissdoerfer et al., 2017). Production infrastructure and workers with the necessary skills, and technical know-how of the paper manufacturing process are essential to guarantee scalability and quality. These resources keep the organization scalable, efficient, and capable of delivering high-quality products while reducing environmental impact (FAO, 2021).

Value Propositions

The company provides environmentally friendly, carbon-negative, and ethically produced paper products that adhere to Fair Trade guidelines. By using non-wood materials, this model helps minimize deforestation and contributes to global sustainability goals. According to research, value propositions centered on sustainability and social impact are particularly appealing to environmentally conscious consumers (Payne, Frow, and Eggert, 2017). It creates economic opportunities, especially for underrepresented groups like women and local artisans, and supports the circular economy by recycling trash from agriculture and wildlife (Osterwalder et al., 2014)).

Customer Segments

The target market comprises environmentally concerned customers, sustainable businesses, conservation organizations, and educational institutions. These client demographics increasingly seek items that reflect their ideals toward sustainability and environmental stewardship (Bocken et al., 2016). Educational institutions and non-governmental organizations (NGOs) looking to promote sustainability in their operations are also important consumer categories, as they frequently prefer to buy items that support ethical and environmental goals.

Channels

Products will be marketed through environmentally conscious retailers, alliances with non-governmental organizations, and direct sales at sustainability-themed trade exhibitions and events. Furthermore, e-commerce sites and social media platforms will be crucial avenues for connecting with clients throughout the world. Osterwalder and Pigneur (2010) highlighted the

necessity of choosing the right channels to increase customer reach and engagement. This business model guarantees that eco-friendly items are available to a wide range of customers by combining physical and digital channels.

Customer Relationships

Developing great customer relationships is critical to long-term business success. Workshops, awareness-raising initiatives, and customer feedback systems will all be employed to promote interaction with nearby communities and consumers. Studies show that companies with a strong focus on community involvement and transparency have higher brand strength and customer loyalty (Blank & Dorf, 2012). Through transparency and community involvement, these initiatives will educate customers about the social and environmental effects of the products they buy and foster long-lasting relationships (Winston, 2014).

Cost Structure

Acquisition of raw materials, labor and production costs, and certification procedures like Fair Trade are major expenses. Sustainable business concepts frequently have greater upfront expenses due to ethical labor practices and environmentally appropriate sourcing. However, these costs are mitigated by the possibility of charging a premium in eco-conscious markets (FAO, 2021). Furthermore, expenditures in research & development contribute to increased efficiency and innovation, assuring the enterprise's long-term existence.

Revenue Model

In addition to partnerships with companies looking for sustainable products, revenue will be generated through business-to-business (B2B) and consumer (B2C) sales. The model also anticipates revenue from advising services on eco-friendly production methods, which will assist other businesses in adopting comparable sustainability practices. Non-profit organizations and government programs may also offer financial help. Diversified revenue streams are crucial to the long-term viability of sustainable firms, allowing them to weather demand and economic volatility (Ries, 2011).

Sustainability and Social Impact

The strategy directly aids wildlife conservation efforts by repurposing dung as a resource, reducing human-wildlife conflicts. The utilization of natural byproducts helps to reduce waste and fosters the circular economy (Geissdoerfer et al., 2017). Furthermore, the approach has considerable social benefits, particularly in rural areas, where it empowers local populations by providing long-term income prospects. In this way, the model balances economic, social, and environmental sustainability.

Thus, this model takes a balanced approach to economic, social, and environmental sustainability by innovatively using natural resources, implementing circular economy methods, and empowering communities.

4.5 Stakeholder Mapping and Value Proposition

Stakeholder engagement is critical to business model success, especially in sustainable entrepreneurship, which depends on resource optimization, community participation, and

conservation initiatives. The handmade paper production business model, which combines rhino dung and banana fiber, involves several stakeholders, each with a crucial function in the supply chain and value generation process.

This section describes the important stakeholders engaged in this business model, as well as the unique value propositions they acquire from their participation. Stakeholder mapping (Freeman, 1984) represents stakeholder interactions, whereas the stakeholder value proposition framework (Lanning & Michaels, 1988) focuses on the unique benefits each group receives.

4.5.1 Stakeholder Mapping

Stakeholder mapping assists in identifying and understanding the roles of multiple stakeholders in the handmade paper production process. Figure 7 depicts the primary stakeholders involved in this papermaking business model. The map below highlights the interconnected roles of the stakeholders in this economic model, which include local communities (farmers), conservationists, government agencies, non-governmental organizations (NGOs), distributors, retailers, and end customers. Each group has a unique relationship with the business model and interacts with it according to their interests and demands.



Figure 7 Stakeholder Relationships Mapping

Adapted from Freeman, 2010.

In the map,

- Local communities (farmers) supply raw materials like rhino dung and banana fibers, which are required to manufacture handmade paper.
- Conservationists adhere to the program because it reflects their goals of decreasing human-wildlife conflict and fostering environmental sustainability.
- Government agencies serve as regulators and supporters, offering policy frameworks, financial incentives, and infrastructure support.

- NGOs contribute to social entrepreneurship by providing direction, finance, and technical assistance to ensure the project's social and environmental sustainability.
- Investors benefit financially from supporting good business strategies.
- Consumers and retailers play critical roles in bringing the products to market, ensuring the model's economic viability by providing market access and demand for eco-friendly products.
- Research institutions both contribute to and gain from innovation in sustainable entrepreneurship.
- Community leaders guarantee that local communities participate, thereby encouraging economic development.

Every stakeholder has an interconnected role and feedback loops that affect the business model's scalability and sustainability.

4.5.2 Stakeholder Value Proposition Analysis:

A value proposition is the unique advantage each stakeholder gains from participating in the handmade paper production model. This section examines the value propositions for important stakeholders to show how the model fits their needs and encourages engagement. As illustrated in Table 2, the handmade paper production strategy has significant benefits for diverse stakeholders. This table summarizes the economic, social, and environmental benefits perceived by each group, supporting the model's viability and acceptance. The value proposition analysis for this model as adapted from the working manuscript (Gagnon et al., 2024) is presented below with an explanation of key columns:

- Stakeholders: the primary parties involved in the handmade paper-producing business model.

- The number of entities (if quantifiable);
- Entity Definition (Segmentation): Describes the role or segmentation of each stakeholder.
- Value Drivers: The primary motives that motivate each stakeholder's participation in the business model (for example, financial returns, environmental conservation, and community empowerment).
- Value Creation: How value is created for stakeholders or businesses (for example, income generation, policy support, and environmental advantages).
- Value Delivery: How the value created is given to the stakeholder (for example, products, policy outcomes, financial returns).
- Value Capture (Compensation): The direct or indirect rewards or benefits that each stakeholder derives from their participation (e.g., revenue, public money, ROI).

Table 2: Stakeholder Value Elements in Handmade Paper Production

Stakeholders	n	Entity Definition	Value Drivers	Value Creation	Value Delivery	Value Capture (Compensation)
1. Local Communities/Farmers	7	Communities that supply raw materials and manage manufacturing.	Economic empowerment via employment creation and alternative livelihoods.	Provide raw supplies and manage preliminary production.	Eco-friendly handmade paper products	Revenue from raw materials and employment
2. Conservationists/ Wildlife Authorities	2	Individuals/organizations promoting wildlife conservation and sustainability.	Minimizing Human-Wildlife conflict and conserving wildlife	Encourage sustainability and provide technical support.	Encouragement for conservation-based business models	Positive environmental impact and prospective research funding
3. Government Agencies	2	Entities that provide policy, regulatory, and financial assistance.	Sustainable development and poverty alleviation	Regulation and provides support through policies, infrastructure and incentives.	Regulatory compliance and sustainable business models	Tax incentives, government subsidies for development
4. Non-Governmental Organizations (NGOS)	2	Nongovernmental organizations that advocate for social and environmental issues.	Promoting social entrepreneurship and sustainable community development.	Support capacity building, marketing, and financing	Assistance in project development and capacity building	Funding from donors and public acknowledgement of social impact
5. Retailer and Distributors	4	Companies that distribute and market handmade paper products.	Increase the range of environmentally friendly products offered	Advertise and market goods	Handmade paper sold in eco-friendly or artisanal stores.	Profit from selling environmentally friendly products
6. End Consumers	4	Individuals buying handmade paper products.	Promote sustainability and conservation	Purchase eco-friendly, handcrafted paper products	Improved consumer satisfaction with sustainable alternatives.	Payment for environmentally friendly products.
7. Investors	3	Parties offering financial support to grow the business with return expectations	Economic gains, promoting Sustainable business models	Offer financial support to expand the business	Funding for scalable and environmentally friendly company models	Return on investment and sustained financial success
8. Research Institutions and Universities	3	Universities and research organizations working together on sustainability research	Innovation in sustainable enterprise and resource management	Work together to improve productivity and sustainability	Collaboration to enhance production practices and sustainability	Academic contributions and grants for sustainable innovation
9. Local Leaders	3	Local leaders fostering cooperation among communities and the project.	Local revenue generation and community engagement	Encourage collaboration between the project and communities.	Promoting community integration in business activities	Community development, reputation, and social cohesiveness.
Total	30					

Adapted from (Gagnon et al., 2024)

Here, in the table, the handmade paper production model benefits different stakeholders which are described below:

- Local communities gain from increased job opportunities and economic empowerment.

- Conservationists and non-governmental organizations (NGOs) gain from reduced human-wildlife conflict and environmental sustainability.
- Government agencies benefit from sustainable development and poverty reduction.
- Investors benefit financially from supporting good business strategies.
- Retailers and consumers respect environmentally friendly product options that support conservation efforts.
- Research institutes both contribute to and gain from innovation in sustainable entrepreneurship.
- Community leaders guarantee that local communities participate, which promotes economic development.

Chapter 5

Results and Discussions

This chapter covers the results of a multi-method research study that included autoethnography, direct observations, unstructured interviews, and market analysis. The findings offer a thorough grasp of the conflict between humans and wildlife, the socioeconomic context of the local communities, and the potentiality of implementing sustainable business practices through producing environmentally friendly paper. Every part will present the results and provide insights supporting the research's goals.

5.1 Autoethnography

The autoethnography in this study is based on personal reflections from growing up in the buffer zone of Chitwan National Park, Nepal, where frequent encounters with wildlife were a way of life. These personal narratives provide insight into the real-world consequences of human-wildlife conflict and provide an opportunity for examining sustainable economic models, particularly the prospect of transforming wildlife dung into handmade paper.

5.1.1 Personal Narratives

Imagine growing up in a small rural village with fields filled with yellow mustard flowers and wildlife, such as rhinos and elephants, walking down your streets like it's no big deal. I would jump with joy every time I saw them. That was my childhood in Nepal, near Chitwan National Park, established in 1973 as Nepal's first national park. This park has been a sanctuary

for endangered species like the Bengal tiger and the greater one-horned rhinoceros. I was fascinated by these majestic creatures, sneaking away with my friends just to catch a glimpse of them up close. But while I saw wonders, my mother saw dangers. My father was frequently away looking for work, leaving my mother to care for us. She was continually concerned about safeguarding her children and farm from wildlife. I still remember the despair in her eyes when a herd of rhinos and elephants raided our banana farm, wiping off our family's only source of revenue for the whole year. This was my childhood in the early 2000s when the buffer zone covering 750 square kilometers around Chitwan National Park was already established in 1996 to mitigate conflicts between humans and wildlife and involve local communities in conservation initiatives (NTNC, 2019). I spent my childhood in this zone, and wildlife encounters were not an occasional event but a regular part of daily life.

The buffer zone is home to nearly 45,000 households, many of which rely on agriculture for a living. Since wildlife makes up more than 55% of the buffer zone, these creatures regularly stray into populated areas and cause serious financial losses (NTNC, 2019). In our village, we did not have the luxury of large-scale security measures. We used conventional techniques, such as building bamboo fences, lighting fires, and creating noises to frighten the animals away. However, these tactics frequently failed. Farmers, including my mother, would remain up all night safeguarding the fields, trying to scare away any elephants or rhinoceros that may raid the crops. We weren't the only ones. This terror persisted throughout the village. The economic consequences were disastrous. Losing crops meant not just financial hardship but also a threat to our survival as a community with agriculture as the main source of livelihood. The government offered no assurance that damages would be compensated, and even when it did, the payout was minimal and took a long time. Having gone through this myself, I experienced firsthand how families were frequently faced with difficult choices, such as whether to spend money rebuilding or think about moving to a place where they would be less likely to come across wildlife.

Migration was not a viable option for most, leading to a growing sense of dissatisfaction and disappointment throughout the communities. Things went worse when we witnessed our friends losing everything, even their lives, because of human-wildlife conflict. Everyone suffered greatly from this lack of financial stability, and eventually, animosity towards wildlife started growing.

However, there was an evident sense of satisfaction in living near such a thriving biodiversity hotspot. Chitwan National Park is well known worldwide for its conservation work, particularly for its part in preserving threatened species like the Bengal tiger and the greater one-horned rhino. Despite the difficulties, we recognized that the park contributed greatly to Nepal's economy through tourism. Many of the young people in the area, including a few of my friends, were employed as tour guides or in the expanding hotel sector in Sauraha, a popular tourist destination. Life in the buffer zone was marked by an ongoing conflict of emotions: adoration for wildlife and frustration with the damage they caused.

Conversely, the IUCN red list classifies the greater one-horned rhino as "threatened" (Ellish and Talukdar, 2019). The species used to travel freely over the subcontinent, but it is now restricted to fewer than a dozen protected places in Nepal and India (Rookmaker et al., 2016). The greater one-horned rhino is the largest rhino species and is suffering major problems such as habitat loss, increased human population density, and, most devastatingly, poaching (Tomanska et al., 2023).

In Chitwan, locals frequently interact with wildlife, specifically rhinos. These frequently happen as locals carry out their daily tasks, such as farming, gathering firewood, or gathering fodder (Lamichhane et al., 2018). Every interaction poses a risk, not only to humans but also to rhinos. Sadly, some of these encounters result in deaths, whether the victims are rhinos or villagers. Locals try to avoid rhinos through "midden" sites, which are communal pooping grounds used by rhinos for communication, marking their territory, and finding a mate. They use the same pooping spot for ten days at a time, and every adult rhino produces about 50 pounds of

dung every day (Dinerstein, 2013). However, poachers use the same midden to track rhinos and hunt them down for their valuable horns. The poaching happens as the illegal market for rhino horns can fetch millions of dollars, and they are highly prized in traditional Asian medicine (Milliken, 2014).

As I grew older, my perspective on the problem shifted. While the initial reaction to crop loss was anger, there was a deeper realization that wildlife was not a real problem. It was a lack of sustainable approaches to mitigate the conflict. My village had employed the same techniques to safeguard crops for years, while wildlife had evolved. Although the buffer zone was a fantastic idea in concept, it frequently felt like a thin line separating survival from catastrophe in real life. It was a tragic day in 2015 when a close friend's mother was murdered by a rhino while harvesting fodder from the wild.

Being from a humble agricultural family that relied on agriculture, I had always wanted to contribute to similar communities. That ambition drove me to a bachelor's degree to study agriculture and animal sciences from 2016 to 2020. During that time, I investigated several business models connected to supply chains and value chains for agricultural products and waste management. Working as chief operation officer in a food company, followed by government extension officer after my graduation, I got the opportunity to develop a deeper understanding of Nepal's rural landscape, including its prospects and challenges, through my visits to over 50 districts out of 77. Upon enrolling in Penn State's Master's program in 2022, I learned about supporting communities like mine through different required and entrepreneurship courses. At the same time, having supportive advisors and professors was a blessing. I always knew I wanted to help, but I was exploring what and how the scenario could change. I was doing need assessments and market analysis of different potential sustainable products that can be exported from these buffer zones. One of the courses included an opportunity to receive mentorship from industries, and this mentorship became a turning point.

I can vividly remember the moment when a distributor inquired whether I could make rhino dung paper instead of banana paper along this journey. The distributor stated she would be willing to purchase it if it were possible. When I discovered the possibility of using wildlife dung, once considered a nuisance, to manufacture handmade paper, I saw a ray of hope. This effort proposed a way to change our relationship with wildlife. I imagined a scenario in which the same rhino dung, which had previously been used to track and hunt them, could now save their lives. This dung has the potential to be turned into something useful, providing revenue and a means of subsistence for families such as mine.

Elephants and rhinos might be seen as allies rather than enemies, with the potential to boost our economy. Their dung, formerly a byproduct of crop raids, might now be used as a resource to produce paper sustainably. The species with whom local inhabitants had long battled to coexist may start benefitting them. Once a sign of devastation, rhino dung now has the potential to strengthen communities. Picture this: someone like my mother is now a social entrepreneur, creating eco-friendly paper from what was once a cause of anxiety.

In 2022 alone, human-wildlife conflict in Chitwan's buffer zone resulted in 19 fatalities, many of which were caused by rhinos, elephants, and tigers (Chitwan National Park, 2023). Growing up in the buffer zone taught me that the solution was not isolation or retaliation but rather innovation and shared benefits. We may ease the financial strain and lessen hostility between people and wildlife by making wildlife dung a valuable resource.

Since there are only about 752 rhinos in Nepal (WWF, 2021), we can use banana fiber to scale up paper production. As bananas grow in the same tropical locations as rhinos, they make great combinations, providing banana and dung fiber for paper production. Furthermore, bananas have a brief life cycle, finishing their growth in 9–12 months, and each tree blossoms and bears fruit just once. Following banana harvesting, the pseudo stem of the plant is cut off, and a new

banana plant emerges (Amutha et al., 2022). Normally, the tree would then be thrown off as trash, but we can collect this waste for paper production.

This new approach may alter the dynamics of interactions between humans and wildlife in buffer zones. We can transform conflict into opportunity by providing communities with a long-term source of revenue from wildlife dung and agricultural waste. Villagers who were worried about the safety of their crops and means of subsistence now regard wildlife as an asset to their financial security. This alteration in viewpoint is critical for promoting long-term coexistence between humans and wildlife. The objective is to develop an economic model that empowers underprivileged people and safeguards threatened animals, such as the greater one-horned rhino. Our goal is to create a future where people and wildlife coexist peacefully by combining sustainable development with conservation.

5.1.2 Analysis

The results of this autoethnographic reflection highlight several important aspects of HWC conflict. These conclusions are substantiated by existing literature analysis, unstructured focus groups, and interviews with local community members, conservation officials, and stakeholders in Chitwan National Park's buffer zone. The autoethnographic approach gives a personal yet reflective story of growing up in a village dealing with the issues of human-wildlife conflict in Chitwan National Park's buffer zones. Through the perspective of these lived experiences, the analysis digs into the emotional and economic toll that wildlife invasions impose on rural agricultural communities, emphasizing both systemic difficulties and possible conflict resolution alternatives. The autoethnography reveals several significant themes as follows:

Human-wildlife Conflict and Economic Hardships

The personal story highlights the significant financial impact that wildlife intrusions have on subsistence farming households. In buffer zone communities, losses from crop-raiding by rhinos and elephants pose serious risks to food security, financial stability, and possible harm to human life. This is a common problem in developing areas where people and animals coexist, and the lack of proper compensation mechanisms can have disastrous economic effects (Lamichhane et al., 2018).

Emotional Toll

Existing close to wildlife presents substantial economic and psychological hardships for families. In the researcher's own experience as well as in the experiences of the larger community, anxiety, frustration, and a sense of powerlessness are frequently fostered by the ongoing threat of crop loss and livestock raiding. The ongoing threat of wildlife raids, combined with insufficient resources to prevent damage, fosters a sense of fear and dissatisfaction among families. The emotional toll, particularly on primary caregivers such as my mother, indicates a wider problem where conflict between humans and wildlife jeopardizes the welfare of entire communities. Although it is frequently overlooked in conservation discussions, this emotional impact is essential to comprehending how local communities react to wildlife and conservation initiatives.

Transforming Perceptions Through Innovation

The autoethnography's pivotal moment occurs when it is realized that wildlife, especially rhinos, can be a resource rather than an imminent threat. The suggested project, which involves

converting rhino dung into paper, signifies a profound psychological shift. The community may now consider rhinos as partners in a sustainable business strategy, rather than just as crop destroyers. This change in perspective from conflict to coexistence emphasizes how innovation has the power to modify human-wildlife interactions and promote sustainable solutions.

5.1.3 Key Findings

The following are the main conclusions drawn from the autoethnographic analysis:

Complex Human-Wildlife Relationship

There exists a paradoxical relationship while there is continuous interaction between local communities and wildlife, where coexistence brings both admiration and economic hardship. Although wildlife is valued for biodiversity and essential to conservation efforts, it is also perceived as a direct threat to livelihoods and safety, demanding the need for balanced sustainable solutions that meet the dual need of the community as well as conservation goals.

Community Resilience and Social Cohesion

To deal with the difficulties caused by wildlife, communities in buffer zones mainly rely on unofficial social networks and collaborative efforts. While these initiatives are crucial to managing conflicts between people and wildlife, they also emphasize the lack of official support networks from conservation authorities.

Conservation of Endangered Species

Engaging the community in the creation of rhino dung will have ripple effects. Since 82% of Nepal's large carnivore and herbivore habitats occur outside of protected areas, this business model assists in converting wild animals from a liability to an asset for a nearby community. More people in the community feel encouraged in wildlife monitoring and anti-poaching initiatives as financial incentives match with conservation activities (Lamichhane et al., 2018). This notion encourages cohabitation rather than conflict by coordinating conservation efforts with local economic interests (Milliken, 2014). It may be possible to duplicate this concept of sustainable coexistence in other buffer zones facing identical challenges.

Potential for Economic Innovation and It's Scalability

The effort to produce sustainable paper has potential as a model for diversifying livelihoods in buffer zones. This strategy offers an innovative solution to the Human-wildlife conflict by converting wildlife dung into a resource, simultaneously promoting economic empowerment and conservation. Banana fiber, a commonly accessible agricultural byproduct in the area, is included in the business method to solve the restricted supply of rhino dung. According to Amutha et al. (2022), using banana pseudo-stem waste not only increases output but also lessens the environmental impact of banana cultivation. By doing this, the business model is guaranteed to be sustainable and not overly dependent on wildlife waste.

In summary, this autoethnographic reflection offers a uniquely personal viewpoint on the intricacies of human-wildlife conflict, anchoring broader study in lived experience. The results imply that communities that are having difficulty coexisting with wildlife in buffer zones may be

able to move forward with sustainable economic alternatives, such as the production of paper from dung. The transition from conflict to coexistence, achieved by establishing sustainable livelihoods, highlights the significance of coordinating conservation objectives with economic development. The results indicate that this project may enhance the economic stability of localities, promote a positive perception of wildlife, and promote in the long-term preservation of threatened species such as the larger one-horned rhino.

5.2 Direct Observations and Unstructured Interviews

5.2.1 Direct Observations

Direct observations were done multiple times in December 2024 to understand the changing scenario and get acquainted with community activities and their interactions with Wildlife.

Community Activities

Upon close inspection, the buffer zones of Chitwan National Park exhibit a local population that is intricately linked to its surrounding ecosystem. Daily activities such as farming, livestock rearing, and resource collecting are done with a keen awareness of the possibility of encountering wildlife. Based on observations, farmers in the area frequently employ traditional techniques, including establishing barriers or keeping night watches, to keep wildlife away from their crops. However, crop raiding is still a persistent threat, and these efforts are not always successful. This dynamic may start to shift with the advent of environmentally friendly paper

manufacture, which offers a substitute means of subsistence that lessens dependency on risky agricultural methods.

It was also noted that the community is already involved in banana paper and yarn projects. Using the collection of banana trash, their processing into pulp, and their crafting into paper products are the tasks performed by local artisans and employees. In addition to generating jobs, this method promotes a feeling of community pride by producing commercially and environmentally viable goods. It was found that some organizations conducted training on banana yarn and paper production, distributed some machines, and never followed up. One of the sole entrepreneurs involved with banana paper production said,

“I have the skills to produce it, and it doesn’t require much production cost. But I cannot sell those in the local markets and have no access to channels to reach the international market.”

There was a significant difference in experience and satisfaction between sole and community enterprises. Community Enterprises were seen thriving well, whereas most of the sole enterprises had to shut down despite having resources to operate. Upon asking about the challenges, most sole entrepreneurs cited the lack of appropriate marketing skills and low production volume, hindering them from attaining market assurance and sustaining the business.

Human-Wildlife Interaction:

Wildlife interactions are an everyday occurrence in the communities studied. Although wildlife are important to a culture, their existence often causes conflict and fear. In Nepalese tradition, rhinos and elephants are highly revered and have symbolic meanings related to strength, protection, and wisdom. Elephants are honored in religious rituals and are frequently connected to

Lord Ganesh, a deity worshipped in Hinduism. On the other side, rhinos are strongly associated with conservation efforts and are regarded as majestic icons of Nepal's abundant biodiversity.

These contacts might vary from minor encounters to significant clashes involving property damage or threats to one's safety. Rhinos and elephants have been observed frequently passing through the community's agricultural fields, especially during seasons when food is short in the forest. Both proactive efforts, like crop guarding, and reactive tactics, such as quickly organizing community members to stop animals from causing harm, are part of the community's adaptation techniques to the presence of wildlife. However, these tactics frequently fall short, which prolongs disputes

Significance:

The results of firsthand observations offer important new perspectives on the day-to-day experiences of residing in a wildlife-rich region. These findings draw attention to the community's difficulties and emphasize the value of alternate sources of income, like the environmentally friendly paper project, in lowering the country's economic dependency on agriculture, which is vulnerable to interference by wildlife (Angrosino, 2007).

5.2.2 Unstructured Interviews

Several recurrent themes that are essential to comprehending the socioeconomic and environmental processes at work were discovered through unstructured interviews with 30 interviewees both in-person and online, including members of the community, local leaders, conservationists, government officials, and market specialists.

Perspectives on Human-Wildlife Conflict

Community members who participated in interviews frequently voiced concerns about how wildlife affects their ability to make a living. Many discussed the monetary losses brought about by crop devastation and the ongoing preparedness needed to save their crops. Some community members also expressed a sense of resignation, seeing wildlife encounters as an inevitable aspect of living in the buffer zone (Dickman, 2010).

According to conservationists interviewed, it's critical to identify long-term solutions that respect local people's rightful complaints while also protecting species. They emphasized how important it is for the community to get more involved in conservation efforts and how projects like the creation of eco-friendly paper could help to lessen conflict by offering alternate sources of income. One of the environmental professionals stated,

“It's an interesting idea to explore dung to make paper. I never thought such products could have market demand. If this is successful, the community can have a good economic advantage out of it.”

Sustainable Business Models and Comparative Analysis

Insights into how the suggested business model stands up alongside other sustainable business projects throughout the world were gained through interviews with conservationists and market experts. Benchmarks include similar projects like eco-friendly product manufacture in Southeast Asia and community-based tourism in Africa were discussed. These models illustrate the triple benefits of financial gain, social empowerment, and environmental preservation (Carroll, 1999; Elkington, 1997).

Although the environmentally friendly paper effort has these advantages, it also faces unique hurdles, such as requiring specialized waste processing knowledge and the difficulty of scaling up production in rural areas. Interviewees emphasized that success will depend on effectively tackling these difficulties through capacity building, strategic collaborations, and continual innovation. One of the marketing distributors of sustainable products in the United States highlighted the problem,

“I am always supportive of sustainable products and empowering rural communities, but quality control has always been a major challenge. I love supporting them, but I cannot buy a purse that’s defective or doesn’t fit my credit cards.”

Stakeholder Engagement and Value Propositions Analysis

The stakeholder mapping process demonstrated the crucial responsibilities that multiple stakeholders, including local communities, NGOs, government entities, and investors, play in advancing the handmade paper production model. Freeman's stakeholder theory (1984) directed the inquiry into how these connections developed and what contributed to the project's success. Local communities support the initiative by providing raw materials and labor, resulting in economic empowerment through job creation. Local leaders supporting such initiatives will promote a sense of ownership in the community for conservation efforts while also benefiting people by providing sustainable livelihoods. Conservationists and non-governmental organizations (NGOs) are focused on the project's broader impact on minimizing human-wildlife conflict and encouraging environmental sustainability, which aligns with their aim of protecting the natural habitats of wildlife. Government agencies play an important role in supporting the program, developing legal frameworks, and providing financial incentives to encourage sustainable development methods. Investors, seeing the potential for long-term financial gains,

fund the initiative, which would allow it to expand its activities. Retailers and consumers contribute to the success of the initiative by selling one-of-a-kind, environmentally friendly products that meet the growing consumer demand for sustainable goods.

The value proposition framework (Lanning & Michaels, 1988) strengthens the project by defining the distinct benefits that each stakeholder gains. The benefit for local communities resides in the establishment of new jobs and other income sources. Conservationists and non-governmental organizations (NGOs) benefit from the project's contribution to minimizing human-wildlife conflict, which enhances community-environmental relationships. Government agencies fulfill their objectives of sustainable development and poverty reduction in rural areas, while retailers and customers embrace eco-friendly, ethical items that meet the expanding market demand for sustainable goods. Investors are drawn to the project's financial returns and long-term viability, which is fueled by rising global demand for environmentally sustainable products. By outlining these value propositions, the business model fosters strong stakeholder engagement, assuring mutual benefit and long-term success for everyone involved.

Policy Support and Institutional Frameworks

Local leaders and government authorities emphasized the importance of supportive policies for the initiative's long-term survival. However, there are currently no clear guidelines and regulations permitting the use of Rhino dung in the community area. Given the threatened status of rhinos, any use of byproducts is a sensitive issue, and they cannot be used commercially under existing laws. One of the government officials remarked,

“This business model is innovative. Since we are utilizing rhino dung sourced from communities in buffer zones and not directly from the National Park, this initiative could

potentially ignite policy discussion for sustainable commercial use of rhino dung for paper production.”

Similarly, they talked about the value of government incentives, like reductions in taxes for environmentally friendly companies and funding for conservation-related projects, and the necessity of having explicit laws governing the taking and use of wildlife byproducts. Strong institutional collaboration between government agencies, non-governmental organizations, and private businesses is essential to the business model's success. Government officials also underlined that such a partnership is vital for providing technical support and market access.

In conclusion, interviews involving local communities, conservationists, and government officials highlight the necessity of recognizing stakeholder roles and expectations. The stakeholder mapping process found that, while local communities are optimistic about the economic potential, government agencies are concerned with maintaining regulatory compliance. Conservationists underlined the necessity of reducing human-wildlife conflict, proving that stakeholder value propositions coincide with business model objectives.

5.3 Market Potential and Feasibility Analysis

5.3.1 Market Potential

Eco-Friendly Product Market Worldwide

Growing consumer willingness to support sustainable business practices and awareness of environmental sustainability have been the main drivers of the constant rise of the eco-friendly products market worldwide. In this context, the need for environmentally friendly paper products is especially important since both businesses and consumers are looking for alternatives to

traditional, resource-intensive paper production methods. Research shows that there is an increasing demand worldwide for environmentally friendly stationery and packaging, with eco-friendly materials emerging as the material of choice in sectors such as office supplies, packaging, and education (Chiellini, 2008). Nes, Antonioli, and Ciaian (2024) found that sustainability claims and labels (SCLs) on new food products in Europe rose from 3% in 2005 to 50% in 2021, with variations by country and product type. This increase reflects companies' response to consumer demand and regulatory changes. The manufacturing of paper from rhino dung and banana fibers is an innovative alternative in the eco-friendly goods industry. This product responds to the growing consumer desire for sustainability by providing a paper substitute that doesn't require the destruction of trees. It also helps to conserve wildlife. Studies reveal that consumers and companies are becoming more appreciative of sustainable product innovation, especially from companies that have made clear promises to uphold their corporate social responsibility (CSR) (Dangelico & Pujari, 2010).

The demand for sustainable packaging materials is expected to increase in the next years, with biodegradable and renewable materials gaining market share. According to studies, people are prepared to spend more on goods that support environmental sustainability (D'Souza, Taghian, & Lamb, 2015). Paper made from banana fibers and rhino dung not only meets this demand but also appeals to environmentally aware consumers who emphasize wildlife protection in their purchasing choices (Elrhino, 2020). Successful stories from India show that similar products, like elephant dung paper, have attracted niche customers by emphasizing environmental advantages and distinctive manufacturing processes.

Prospective Markets for Paper Produced from Rhino Dung and Banana Fiber

There is a high potential demand for wildlife dung and banana fiber-based paper, within fair-trade and niche markets, particularly in companies that prioritize unique, sustainable solutions. Such Packaging could be used for specialty packaging, like gift wine bags as this aligns with the selective appeal often found in eco-friendly packaging solutions. The demand from consumers and businesses for ecologically conscious products is expected to fuel the growth of the global market for eco-friendly packaging (Chiellini, 2016). Utilizing banana fibers and rhino dung, an innovative product is produced that not only minimizes deforestation but also builds on the increasing demand for biodegradable products. The unique use of rhino dung and banana fibers in paper manufacture appeals to environmentally aware consumers, particularly those concerned in wildlife protection. The success of projects like the elephant dung paper project in India, which drew environmentally concerned consumers eager to support environmental sustainability and conservation efforts, further supports this. Similarly, rhino dung paper provides both sustainability and conservation, leveraging the same customer engagement opportunities. Table 3 compares conventional paper production with handmade paper production from Rhino dung and Banana fiber. The table underlines the environmental advantages and cost-effectiveness of employing local resources over traditional approaches.

Table 3: Comparing Conventional Paper to Handmade Paper from Dung and Banana Waste

Aspects	Conventional Paper	Rhino Dung and Banana Paper
Raw Materials	Wood Pulp	Wastes: Rhino dung and Banana trash
Environmental Impacts	Deforestation, High water usage,	Conserves wildlife, reduces waste, lowers water usage,
Economic Impacts	Large-scale industrial outputs	Empowering local economies, jobs creation in buffer zones
Sustainability	Limited	Robust circular economy concept and waste material utilization

Thus, comparing conventional paper with handmade paper reveals that the latter is a substantially more sustainable option.

Consumer Segments

The paper products made from banana fiber and wildlife feces appeal to various customer groups, each with its tastes and motivating factors. Recognizing these consumer groups is essential to identifying target audiences and creating customized marketing plans. Table 4 highlights the consumer segments targeted by the handmade papermaking business plan. It offers insights into each group's preferences and characteristics, which are essential for efficient marketing and product positioning.

Table 4 Consumer Segments and Their Characteristics.

Consumer Segment	Characteristics	Supporting Research
Eco-Conscious Individuals	Consumers that place a high priority on the environment are willing to pay more for sustainable products. Rhino dung paper appeals to this demographic by providing conservation benefits.	D'Souza, Taghian, and Lamb (2015) found that eco-conscious consumers favor environmentally friendly items. Ottman, Stafford, and Hartman (2006): Consumers have grown more mindful about their environmental footprint.
Educational Institutions	A growing number of colleges and universities are implementing sustainable purchasing practices, emphasizing environmentally friendly office and classroom supplies.	Baldassarre et al. (2017): Educational institutions want sustainable resources that match with their sustainability objectives.
Corporate Buyers with Sustainability Goals	Companies with CSR goals, especially those striving for B Corporation status or ISO 14001 accreditation, look for environmentally friendly suppliers, such as wildlife dung paper.	Dangelico and Pujari (2010): Businesses incorporate sustainability within their supply chain to comply with environmental management standards.
Tourists	Tourists, particularly eco-tourists, want to buy things that benefit local communities	Nepal, Thapa, and Paudel (2021): Wildlife dung paper can be offered

	and conservation initiatives; hence wildlife dung paper is a popular souvenir.	in eco-tourism destinations, catering to travelers looking for sustainable products
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With each target group's unique environmental concerns and purchasing inclinations considered, this systematic understanding of customer segmentation will assist position the product effectively in the market.

Potential in Nepal

Eco-friendly paper goods in Nepal have shown substantial commercial potential, especially in areas with many tourists and conservation activity. The Lokta paper industry is a remarkable example, as it utilizes the renewable resource of Daphne shrub bark to manufacture paper. The desire for a handmade paper that is environmentally friendly is demonstrated by the success this business has had on a local and global level. The manufacturing of Lokta paper has supported rural communities and safeguarded the environment by utilizing sustainable resources. Similarly, the elephant dung paper initiative in the Sauraha region has demonstrated that products manufactured from wildlife waste can have a major economic impact while promoting conservation. This program draws environmentally concerned consumers and travelers looking for sustainable goods, boosting the local economy and protecting wildlife.

The growing awareness of environmental sustainability propels the steady growth of the eco-friendly goods market worldwide. Rhino dung and banana fiber-based paper products offer a unique chance to meet this need by providing a more sustainable substitute to conventional paper production. The proposed business model has the potential to build a significant market presence

by focusing on important customer segments such as eco-conscious consumers, educational institutions, organizations with sustainability aims, and tourists. It's clear link to Nepal's efforts to conserve wildlife makes the product more appealing and a cutting-edge example of sustainable product creation.

5.3.2 Feasibility Analysis

Although there is an enormous market for environmentally friendly paper goods, several issues must be resolved for the business model to be sustainably run over the long run and successfully commercialized.

Production & Scaling

Keeping the product's sustainability and quality intact while expanding production is one of the fundamental concerns. Although paper is currently produced manually and is environmentally beneficial, there may be limits to the capacity to fulfill the increasing demand. According to research, boosting production capacity without sacrificing the company's environmentally friendly practices will require investments in improved technology and employee training (Boons & Lüdeke-Freund, 2013). Moreover, Bocken et al. (2014) underline that sustainable business models must handle scaling difficulties through innovation that keeps environmental consequences to a minimum as production grows.

Logistical Barriers

For manufacturers of environmentally friendly paper, logistical obstacles pose serious problems, especially when expanding to international markets. Creating an economical and sustainable supply chain is crucial for quick product delivery, particularly as customers now demand that companies that practice environmental responsibility uphold their green principles in all aspects of business, including transportation. As emphasized by Bocken, Short, & Evans (2014), who emphasize the significance of matching logistics strategies with sustainability goals, effective logistics is crucial. To minimize the impact on the environment, distribution difficulties, including high transportation costs and limited infrastructure, must be solved, especially in long-distance shipping.

As stated by Ahi & Searcy (2015), incorporating technology into the supply chain can help overcome these obstacles by increasing overall efficiency, lowering emissions, and improving route planning. Furthermore, companies can use approaches such as local production and distribution centers, as demonstrated in successful sustainable packaging companies, to meet global demand while decreasing transportation costs.

Quality Control

The success of a product on the market depends on maintaining constant quality. It's critical to improve the production process to achieve industry requirements for usage, durability, and texture. Quality control procedures must be implemented at all stages, from raw material collection to final packaging, to gain consumer trust and encourage returning customers. Ensuring transparency and avoiding "greenwash" (businesses that overstate environmental benefits) is critical for retaining consumer trust (Chen & Chang, 2013).

Market Penetration

To effectively promote eco-friendly paper goods, a strong branding approach emphasizing their distinct environmental and social benefits is essential. Schaltegger, Lüdeke-Freund, & Hansen (2012) state that companies that prioritize sustainability can grow their customer base by collaborating with vendors, green brands, and environmental advocacy groups. Targeted digital marketing initiatives can also assist in connecting with a worldwide consumer base interested in sustainable goods.

Supportive Policies

The viability of the business model can be improved by supporting sustainable business practices with policies like tax incentives for environmentally conscious companies and funding for conservation efforts. According to Kiron et al. (2017), working with NGOs and government agencies is essential to overcoming regulatory obstacles and obtaining funding for growth.

5.3.3 Significance

According to the market analysis results, the suggested business model is not only environmentally friendly and economically feasible, but it also builds bridges between local communities and the international market, connecting service providers in Nepal with a worldwide network of fair-trade, eco-conscious consumers and research institutions. This business model sells the product and has a unique story and quality of life for people living in buffer zones. Consumers can now buy paper and help minimize human-wildlife conflicts.

While handling significant obstacles like market penetration, production scaling, and quality control, this initiative also demonstrates the power of leveraging community-university

partnerships to encourage sustainable development and build community resilience. With its distinctive value proposition drawing in a wide range of customers, the environmentally friendly paper product has the potential to carve out a significant niche in the expanding market for fair trade and sustainable goods (Bocken et al., 2014). By including stakeholders such as government officials, community leaders, and global scholars from universities and research institutions, this initiative promotes an interchange of ideas that crosses national boundaries and opens new potential for sustainable development. Collaboration with major research universities promotes innovation by guaranteeing that the project benefits from advanced insights, methodologies, and cutting-edge research ensuring its adaptability and relevance in the global sustainability landscape while also serving as a model for global application.

Furthermore, this business strategy is a reproducible model that can be used in other areas suffering comparable issues. Drawing on my experience in leadership development, program design and evaluation, and entrepreneurship and innovation, this showcases the strategic frameworks that support local economic empowerment, wildlife protection, and long-term sustainability. This multidisciplinary technique equips the model to contribute to global conservation and community resilience goals while also encouraging grassroots leadership, entrepreneurship, and innovation.

In conclusion, the suggested business plan for producing environmentally friendly paper using banana waste and rhino dung has major advantages for the economy, the environment, and society. In addition to providing local people with sustainable means of subsistence, the project empowers women, promotes wildlife protection, and meets the expanding market for environmentally friendly goods. The model's scalability and connections to international markets guarantee its impact goes far beyond Nepal's borders, demonstrating how innovative economic solutions may address human-wildlife conflicts and serve global sustainability objectives (Schaltegger et al., 2012). This model shows how university-community partnerships can drive

sustainable development and develop innovative economic solutions that can handle the conflict between humans and wildlife and global sustainability objectives.

Chapter 6

Conclusions and Recommendations

6.1 Conclusions

Human-wildlife conflict is an ongoing problem in the buffer zones surrounding Chitwan National Park, where wildlife, including rhinos, elephants, and Bengal tigers, routinely contact with locals. These interactions, particularly agricultural damage caused by wildlife, significantly influence the local livelihoods and create conflicts between communities and conservation initiatives. Agriculture is a major source of income for the communities in the buffer zones, and losses resulting from crop destruction by wildlife are substantial. These losses further undermine conservation efforts by threatening the survival of endangered animals such as rhinos and provoking retaliatory activities against wildlife (Acharya et al., 2016; Sukumar, 2006).

Beyond the economic consequences, this dispute produces social and psychological hardship in local communities. Families frequently spend overnight guarding their crops, and the economic instability induced by these clashes encourages negative attitudes toward wildlife (Hill, 2005; Regmi et al., 2013). Habitat encroachment, caused by human population expansion and land-use changes, exacerbates resource competition, making wildlife conservation and community livelihoods more difficult (Godfray et al., 2010; Ripple et al., 2017).

The primary goal of this research is to investigate sustainable business concepts, specifically the creation of handmade paper from rhino dung and banana trash, to solve the interconnected concerns of human-wildlife conflict and economic vulnerability. This concept intends not only to eliminate human-wildlife conflict by converting wildlife dung into an economically viable resource but also to enhance the socioeconomic situation of local

communities. It provides people with alternative livelihoods, fostering a good link between conservation and community resilience (Owens et al., 2024).

6.1.1 Key Findings

Utilizing wildlife dung, specifically rhino dung, with banana trash to make handmade paper provides a novel solution to human-wildlife conflict. This procedure converts waste materials into a marketable, environmentally beneficial product (Kumar et al., 2013). The collecting and processing of rhino dung for paper production transforms a cause of conflict—rhino crop damage—into an economic advantage, transforming local opinions of rhinos from a nuisance to a valued resource (Mishra, 1992).

The strategy generates long-term income-generating prospects for local communities, mostly benefiting women. Paper collecting, processing, and production operations provide jobs for women, who are frequently the most impacted by economic downturns. This reduces reliance on conventional agriculture, which is susceptible to conflicts with wildlife and empowers women while also enhancing the community's economic resilience (Jayaprabha et al., 2011; Bhandari et al., 2019).

The strategy of the purposed business model supports environmental sustainability in addition to its economic impacts. Integrating rhino dung and banana trash reduces deforestation caused by traditional wood-based paper manufacture, hence helping to habitat conservation (Lamichhane et al., 2019). Furthermore, the concept promotes waste management by converting organic waste into a marketable commodity, hence lowering methane emissions from agricultural waste. This is consistent with broader conservation efforts, as locals learn to recognize the benefits of living alongside protected animals (Budhathoki, 2004).

The effective incorporation of stakeholder theory (Freeman, 1984) and value proposition frameworks (Lanning & Michaels, 1988) into the handmade paper production model highlights the significance of managing multi-stakeholder relationships in sustainable entrepreneurship. Each stakeholder; whether a local community member, NGO, government body, investor, or consumer; played an important role in the project's success by demonstrating how their unique needs were handled.

The success of this concept is heavily dependent on community involvement. By involving local people in the gathering and production processes, they gain a direct interest in both economic and environmental advantages. This involvement promotes a shift in attitudes toward wildlife, as communities grow to view rhinos and other wildlife as assets rather than dangers (Ellis et al., 2011).

6.1.2 Implications

The business concept not only helps to conserve endangered species but also improves the economic resilience of communities in buffer zones. Offering alternate sources of income minimizes reliance on agriculture, which is extremely susceptible to wildlife damage. This, in turn, reduces the chance of retaliatory measures against wildlife, which aids long-term conservation efforts (Madden, 2004).

On a global scale, this approach provides important insights into how local economic empowerment may foster sustainable development and conservation. By combining community interests with conservation goals, the strategy creates a reproducible framework for other locations experiencing comparable issues. It highlights how economic incentives can promote positive relationships between communities and animals, helping to advance global conservation plans that prioritize both biodiversity and human well-being.

6.1.3 Limitations

This study had various limitations, including the manual method of theme analysis, which could have introduced bias or reduced the depth of analysis (Braun & Clarke, 2006). The scope of observations was also constrained in terms of time and geography, which may impact the findings' generalizability. Another key problem is assuring the long-term viability and scalability of the company model. While the early results are encouraging, there are worries about maintaining consistent production quality and expanding the model to reach new markets. The model's sustainability over time may also be jeopardized by its reliance on local participation and raw material availability (Chetkiewicz et al. 2006).

6.1.4 Conclusion

Incorporating conservation efforts with sustainable economic models is a significant step forward in tackling human-wildlife conflict. This strategy offers an efficient method to turn agricultural waste and wildlife dung into useful products that benefit local populations and further conservation objectives. The success of this method demonstrates the need to connect community interests with conservation efforts to create a peaceful coexistence between humans and wildlife. In the long run, the handmade paper business model offers a repeatable solution that may be tailored to other areas dealing with comparable disputes. This model demonstrates how local resources can be converted into long-term economic opportunities, providing a framework for tackling both environmental and socioeconomic concerns in protected zones around the world.

6.2 Recommendations

6.2.1 Policy Makers

Integrating Sustainable Business Models into National Conservation Policies

Suggest incorporating sustainable business models into national conservation strategies, such as using agricultural waste and wildlife dung to produce paper. These business models promote conservation efforts while also providing an income source for local populations, minimizing human-wildlife conflict (Acharya et al., 2016; Sukumar, 2006). Policies that encourage the employment of these sustainable practices could help to achieve broader biodiversity conservation goals while also meeting the economic demands of local communities.

Financial Incentives and Technical Assistance for Eco-Friendly Enterprises

Advocate for governments to offer financial incentives and technical support to nearby communities involved in environmentally sustainable businesses, such as creating handmade paper. Subsidies, low-interest loans, and grants for community-based enterprises can help assure their long-term viability. Additionally, technical assistance in the form of training, machinery, and market access will assist local populations in developing sustainable livelihoods, reducing their dependency on agriculture, which is frequently impacted by wildlife conflict (Bhandari et al., 2019).

Improve Compensation Structures

Suggest developing more effective compensation systems for communities impacted by human-wildlife conflicts. This involves delivering financial compensation for agricultural damage and livestock losses more quickly and efficiently. In addition to these compensating mechanisms, long-term conservation methods emphasizing coexistence between humans and animals, such as wildlife management training for farmers and other revenue options, should be implemented (Regmi et al., 2013; Hill, 2005).

6.2.2 Conservationists

Promote community-based conservation initiatives

Encourage stronger local participation in wildlife management to bolster community-based conservation initiatives. This can be accomplished through projects that involve local communities in conservation activity, such as tracking wildlife migrations or engaging in habitat restoration efforts. Conservationists can develop mutually beneficial relationships between humans and wildlife by actively engaging communities and instilling a sense of ownership and responsibility for wildlife in the area (Madden, 2004).

Create workshops and training on Sustainable Practices

Propose the creation of training programs to educate local communities about sustainable practices and environmentally friendly business models. This includes workshops on making paper from agricultural and wildlife waste and conservation education programs emphasizing the long-term benefits of preserving local ecosystems. Training communities in

sustainable resource management can enable them to start enterprises that support conservation aims (Jayaprabha et al., 2011).

Encourage the creation of wildlife corridors

Support the creation of wildlife corridors to reduce direct contact between humans and wildlife. Corridors provide a safe way for wildlife to transit between ecosystems, lowering the likelihood of wildlife encountering farmlands and settlements. These activities reduce the likelihood of human-wildlife conflict and can be included into community-led conservation efforts (Chetkiewicz et al., 2006).

6.2.3 Entrepreneurs and Business Developers

Engaging Stakeholders in the Projects

Prospective sustainable entrepreneurship initiatives should continue using stakeholder mapping and value proposition analysis to ensure all stakeholders are involved and committed to the project's objectives. As illustrated in this study, a comprehensive understanding of stakeholder responsibilities and the advantages they get is critical for long-term project sustainability.

Scale Up the Business Model

Consider expanding the handmade paper production model by targeting new markets, such as overseas purchasers looking for eco-friendly, fair-trade products. The unique story of paper made from wildlife dung and agricultural waste can be used as a marketing point, particularly among ecologically conscious customers. Expanding the reach of these products beyond local markets can have a big economic impact on communities (Mishra, 1992).

Improving Production Process and Reducing Costs

Further research should be conducted to improve the handmade paper production process to improve quality and minimize prices. This may involve experimenting with new fiber compositions or improving the methods for processing wildlife dung and banana fibers. Reducing production costs while maintaining product quality can help the company remain competitive in both domestic and international markets (Kumar et al., 2013).

Extending the use of Agricultural waste and Boosting Community Participation

Consider expanding the idea to incorporate other forms of agricultural waste and involving more community members in the production process. Using a greater range of waste products not only diversifies the product line and expands the number of community people who can participate in the business, extending the economic benefits throughout the region (Owens et al., 2024).

6.2.4 Future Research

Conducting Longitudinal Research

Conducting long-term research to evaluate how producing handmade paper affects community resilience and conservation efforts over the long run. Research should focus on assessing the business model's long-term viability, impacts on minimizing human-wildlife conflict, and broader social and economic impact on buffer zone communities (Braun & Clarke, 2006).

Investigate Similar Sustainable Business Models for Other Conservation Areas

Investigate comparable sustainable business concepts in other locations experiencing human-wildlife conflict. Comparative studies can assess the handmade paper model's scalability and replicability in various geographical and socioeconomic circumstances. This will aid in identifying best practices for expanding environmentally friendly firms that match with global conservation initiatives (Chetkiewicz et al., 2006; Ellis et al., 2011)

Thus, these recommendations for policymakers, conservationists, entrepreneurs, and researchers suggest a complete strategy for expanding the local impactful sustainable business concepts to expand beyond the paper-based case study while improving conservation outcomes and community resilience.

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Appendix

Business Canvas Model

Key	Key Activities	Value	Customer	Customer
Partners	Key Activities	Value	Customer	Customer
*Farmers and *Suppliers (Craft Producers) *Community groups (Esp. Buffer Zone) *Wholesaler and retailers *Government and donors	*Procurement and Partnerships (Farmer groups, local government, NGO/INGOs) *Empowering and Training Local Artisans *Production through community groups *Inventory Management *Quality Control and Inspection *Fair Trade Certification *Marketing and Outreach Efforts *Distribution Raw materials (rhino poop, banana stems) *Production facilities and equipment *Skilled labor *Partnerships with conservation organizations and local communities	Propositions *Tree-Free High- Quality Paper- Carbon Negative *Unique and eco- friendly alternatives to traditional paper *Use of locally available resources *Innovative recycling *Environmentally sustainable *Circular Economy for local communities *Empowerment of local communities	Relationship *Personal assistance *Community Engagement and Co- Creation *Customer's Education on eco-friendly, sustainable products *Feedback collection through social media /emails	Segments *Eco-conscious consumers *Sustainable businesses *Environmental organizations *Educational institutions

		*Fair Trade Certified products		
	<p>Cost structure</p> <p>*Raw material acquisition</p> <p>*Production Costs- Contracts</p> <p>*Training-Workshops</p> <p>*Research and development</p> <p>*Inspection and Certifications</p> <p style="padding-left: 40px;">*Administration</p> <p>And Distribution costs</p>		<p>Revenue stream</p> <p>*Selling raw materials b2b through premium pricing</p> <p>*Sales of paper products</p> <p>*Partnership from government and other potential organizations</p> <p>*Selling products b2c, b2b, (& white labeling)</p>	<p>*Consultation services for other eco- initiatives</p> <p>*Government Grants</p>