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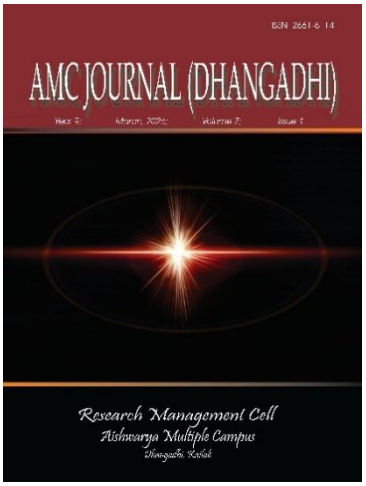
Conserving Suklaphanta Wildlife for Sustainable Local Development in Buffer Zone Area



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Abstract

This research evaluates the potential for buffer zone activities to contribute to sustainable local development and biodiversity conservation in the Suklaphanta Wildlife Reserve (Nepal). Data were collected from 287 randomly sampled households using mixed-methods.

The findings show that buffer zone activities have significantly increased the involvement of the local community in conservation activities, involving 85.4 percent of participants to raise conservation aware, and 65.9 percent to help improve eviction of these HER in community forests. This community involvement has manifested itself in ecological and socio-economic outcomes, with most households (70%) reporting improved populations of wildlife and 65 percent of households reported improved conditions of the forest. Economically, a majority of households (62.1%) reported increased income, and were able to build in asset construction for children's education (55% of households), livestock (45%), and healthcare access (40%). On the other hand, challenges remain, particularly the challenges of severe human-wildlife conflict (e.g. crop raiding) to 85 percent of households; governance issues, such as delays (60%) in fund disbursement; and (70%) using inadequate alternative livelihoods.

The study concludes that while the buffer zone model enables conservation and local development, the long-term sustainability of the initiative rests on effectively managing human-wildlife conflict via mitigation and compensation, improving than transparency and governance and diversifying the local economies/alternative livelihoods through eco-tourism and sustainable forest product use.

Key Words: Buffer Zone, Sustainable Development, Livelihoods, Human-Wildlife Conflict, Community Participation and Conservation.

Introduction

Located in the far-west of Nepal, the Suklaphanta Wildlife Reserve is a treasure of incredible diversity. This protected area of 305 sq. km, once a hunting area, is a home to the world's largest herd of swamp deer, along with royal Bengal tigers, elephants, rhinos, and over 424 species of birds (DNPWC, 2023).

Suklaphanta is an undiscovered treasure, failing to penetrate the barrier of limited access and promotion (SCP, 2013), but it has incredible experiences available, such as Elephant Safaris or birdwatching, with a local community to help provide artificial waterholes for wildlife. With the proper investment, its

ecotourism potential could enhance conservation as well as support sustainable and equitable development for local communities (Bajimaya, 2015).

Sustainable development aims to fulfill current needs without compromising the ability of future generations to meet their own needs, while also incorporating economic growth, social equity, and environmental protection (WCED, 1987). It advocates for responsible use of resources, improved access to education, improved healthcare, and equal opportunities to alleviate poverty and enhance the living standards of the whole society. On a global scale, the United Nations has proposed 17 Sustainable Development Goals (SDGs) as a path toward a more just and sustainable world by 2030. Locally, community participation and education are fundamental components to pursue sustainable development. For example, the Suklaphanta Play Group has engaged local communities in the use of creative tools, such as street dramas, to engage the public in discussions about human-wildlife coexistence and to address conflicts where wildlife and humans settle (Kathmandu Post, 2023). Acknowledging that we encounter many challenges, such as climate change, social inequities, and the depletion of resources, however, we can work together to develop projects and initiatives for equitable and sustainable communities for people and the planet using collective action and creativity.

Biodiversity, which includes genetic, species, and ecosystem diversity, is vital for ecological balance and human well-being. Its conservation underpins sustainable development by safeguarding services such as clean air, water, fertile soil, and climate regulation (Basnet, 1995; McNeely, 1990). In Nepal, legal frameworks like the National Parks and Wildlife Conservation Act (1973) and the 1992 buffer zone amendment have enabled community participation in conservation (Bhusal, 2017) Yet, challenges remain unclear jurisdiction and weak financing often limit effectiveness. A recent SIAS (2024) assessment highlighted the need for stronger community incentives and better wildlife damage compensation to ensure long-term success (Timsina et al., 2024).

Biodiversity is preserved in Nepal through national parks, wildlife reserves, and buffer zones. Buffer zones are a policy established in 1992 that attempts to link conservation with the needs of the local people by allowing the local people to benefit from the use of the resources while protecting the ecosystems. By 2010, buffer zones existed in 27 districts and within an area of 5,600 sq. km., with approximately one million people relying on them (Bhusal, 2017). Buffer zones promote sustainable land use with community-based conservation, often in collaboration with organizations like UNDP, WWF Nepal, CARE Nepal, and NTNC.

Suklaphanta was originally a Royal Hunting Reserve (1969) before it was declared a Wildlife Reserve in 1973, and was subsequently declared a National Park in 2017. It is home to the largest area of grassland in Nepal (16 km²) and a 243.5 km² buffer zone was added in 2004 to encourage community-based conservation. It is now a success story where conservation of biodiversity, local livelihoods, and community cultural heritage (such as the Tharu community, which has a historical kingdom nearby at Rani Tal) can intersect.

Global conservation now emphasizes a nexus between protected areas and local development. This was highlighted by the Bali Conference in 1982, and experts in Nepal argue that involving communities in conservation produces long-term benefits (Adhikari, 1998; Sharma, 1991). However, tourism generated by national parks has not always produced equitable benefits for local residents. Tourism can support livelihoods and help preserve traditions, but it can also create tensions with cultural practices (Dhital, 2000).

When done well, ecotourism connects conservation and community benefits. In Suklaphanta, non-consumptive tourism like wildlife viewing or photography supports both local economies and conservation funding while minimizing ecological damage (Corazon, 2000). Ecotourism is also regarded as an essential mechanism for funding conservation in sensitive areas, and often in the context of a public private partnership (Chaudhary, 2001). the Suklaphanta journey from hunting reserve to protected area is both an example of, and representative of: exploitation to protection, exclusion to inclusion.

Research indicates that there has been progress with Nepal's buffer zone program but challenges remain connected to funding, clear authority, and human-wildlife conflict (Timsina et al., 2024). In Suklaphanta, tolerating wildlife creates outcomes for buffer zone communities: alternative energy, eco-tourism, and educational outreach by NTNC have enhanced local livelihoods while relieving pressure on forests (NTNC, 2023; Dhoj DC, 2023). Involving local cultures, communities, and households have also accepted creative measures (such as street drama) to promote coexistence; in addition, farmers were able to use utilities (such as electric fencing) to reduce damage to crops (Kathmandu Post, 2023).

Nevertheless, elephants, wild boars, and leopards are still causing significant losses, which suggests that greater incentives to reinforce the community and policy links are required (Bhatta & Joshi, 2020). Agro-biodiversity research emphasizes this, as Nepal holds tremendous genetic resources and farmer-based conservation strategies related to food security and income (Sthapit et al., 2001; Sapkota, 2001). Furthermore, tourism presents itself as both an opportunity and challenge. Eco-tourism can provide income and enhance conservation efforts (Chaudhary, 2001; Chattargee, 2008) however, the monetary exchange is not evenly distributed and there are still dangers of ecological damage (Phulara, 2009).

Organizations such as NCRTC/BCC, WWF, and CFUGs continue to serve an important role by combining biologically based research with community engagement, highlighting the important fact that conservation pertains to both sustaining people and culture, not just protecting wildlife (KMTNC, 2005; Gurung, 2006).

South Asian nations have signed international agreements and laws protecting biodiversity to leverage prospects for habitat protection and action against poaching. However, wildlife – pangolins, tigers, elephants, and rhinos – continue to be threatened by habitat degradation and trafficking of wildlife. Wildlife tourism is an important source of income and job creation, yet it is still challenging to healthily measure the reconciliation of conservation and economic development (Freese, 1996).

Nepal's story of conservation has transformed from highly constrained to active local involvement and increasing focus on sustainable financing (Aryal, 2020). After ratifying the Convention on Biological Diversity (CBD) in 1993, Nepal has also confirmed conformity with global legal frameworks such as CITES and WTO and progressed nationally with new strategies including the Biodiversity Action Plan. All of these were meant to stabilize endangered species, increase national parks, and enlist locals to participate in conservation.

Issues germane to conservation are also an international topic of concern, especially related to the health and the livelihoods of people. Biodiversity studies over the past three decades have increasingly underscored the place of biodiversity in the health of the global ecosystem and improving livelihoods of the poorest and disadvantaged people. The Convention on Biological Diversity (CBD, 1992), the Rio Earth Summit (United Nations, 1992), and the Johannesburg Summit (United Nations, 2005), as well as Tierra (1996), have all reconfirmed the role and contributions of diversity and biological systems.

Nepal on its part has responded to this international concern with various legally instituted reforms. Key legislative actions include the National Parks and Wildlife Conservation Act (1973), the Forest Act (2019), which replaces the 1993 version, and the CITES Act (2017), supported by various community-based approaches like Community Forestry (DoF, 2022). Today, biodiversity conservation is enshrined as a fundamental right and directive principle in the Constitution of Nepal (2015), and remains a significant element of its National Sustainable Development Strategy (NPC, 2023).

Considerable research in Nepal has focused on buffer zones, wildlife conservation, and community livelihoods (Silwal & Thapa, 2022; Widmann & Paudel, 2003). However, there remains a gap in understanding how these areas achieve conservation alongside sustainable development, particularly at the local level and in the context of Suklaphanta (Dahal & Dahal, 2025). Previous studies have often examined ecological and socio-economic impacts in isolation, leaving an integrated understanding lacking (Thapa & Paudel, 2023). It remains unclear how communities perceive and engage with buffer zone programs, and what the actual benefits or barriers are. While national legislation acknowledges the importance of community involvement, research describing its practical implementation is limited (Widmann & Paudel, 2003). This study aims to fill this gap by assessing the Suklaphanta Buffer Zone, focusing on successes and challenges in linking conservation with sustainable livelihoods (Silwal & Thapa, 2022).

Protected areas are integral to rural livelihoods, as communities rely on biodiversity for goods and ecosystem services (Dahal & Dahal, 2025). These areas require management to mitigate negative impacts of human activities, such as unregulated tourism (Pandey & Pandey, 2025). Conservation in national parks and buffer zones supports local development and sustainability when designated management is adhered to (Thapa & Paudel, 2023). Community-based conservation programs in Suklaphanta buffer zone contribute to community well-being by providing socio-economic benefits and addressing wildlife-related conflicts (Silwal & Thapa, 2022; Dahal & Dahal, 2025). Understanding these dynamics demonstrates how conservation can protect nature while supporting rural development (Pandey & Pandey, 2025).

Methodology

This study employed a mixed-methods approach, integrating qualitative and quantitative techniques to holistically explore the complex linkages between sustainable tourism, biodiversity conservation, and rural livelihoods surrounding the Suklaphanta Wildlife Reserve (Silwal & Thapa, 2022; Thapa & Paudel, 2023). Field-based research incorporated direct observation, focus group discussions (FGDs), and case studies to capture in-depth local perspectives and contextual understanding (Widmann & Paudel, 2003). These were complemented by structured household surveys and checklists to quantitatively assess key socio-economic indicators and levels of community engagement in conservation initiatives (Dahal & Dahal, 2025; Pandey & Pandey, 2025). The sampling framework purposively included buffer zone households in Bhimdatta Municipality, as well as representatives from government agencies, community forest user groups, tourism operators, and environmental NGOs. This diverse, multi-stakeholder approach enabled robust data triangulation, significantly enhancing the study's validity, reliability, and its practical relevance to sustainable development policy (Thapa & Paudel, 2023).

To ensure a representative sample for the household survey, a random sampling design was employed to select 287 households from Ward number-2 of Beldandi rural municipality for interviews and observations. Given the large geographic area of the study and limited timeframe, this probability

sampling method was chosen to minimize selection bias and allow for generalization of findings to the broader population (Silwal & Thapa, 2022). Using the Raosoft online sample size calculator for a finite population, given a total buffer zone household of 1,149 from the total household of 1496 of ward number-2 in Beldandi rural municipality (Census, 2021), a sample size of 287 households was determined at a 95 percent confidence level with a 5 percent margin of error.

Result and Discussion

Contribution of buffer zone initiatives to sustainable development

In Suklaphanta, buffer zone interventions aim to help mitigate human-wildlife conflict, create extra-income opportunities, and engage local people in conservation. These interventions aim to improve access to health, education, and environmentally-friendly livelihoods, thereby contributing to the quality of life in the local area. Based on the 287 households that we surveyed, the majority are reliant on natural resources, making these interventions an important part of economic security and reducing pressure on wildlife areas. Assessment of these projects will help us understand how conservation and community-based development can be complementary in contributing to sustainable positive change.

Demographic Profile

To relate local development with the conservation of wildlife, it's important to be knowledgeable about the dynamics in the communities around Suklaphanta. Aspects to consider include characteristics of the household such as age, gender, level of education, occupation, family size, and where income is generated, as these all serve as factors that affect households' use of ecological resources. A socio-economic approach that analyzed 287 households across nine communities demonstrates the link between socio-economic realities and the conservation of wildlife, and identifies pathways for linking community development with protection of wildlife.

Table 1

Distribution of Households by Demographic Profile

Demographic Variable	Distribution of Respondents	Percentage
Gender		
Male	159	55.6
Female	128	44.6
Age Group		
18-35 Years	102	35.5
36-55 Years	143	49.8
Above 55 Years	42	14.2
Years of Residence		

Less than 10 Years	85	29.6
10-20 years	95	33.1
20-30 Years	60	20.9
Above 30 Years	47	16.4
Total	**287**	**100.0**

Source: *Field Survey, 2025*

The demographic profile of 287 respondents from the buffer zone surrounding Suklaphanta is shown in Table 1. With 44.6 percent of women and 55.6 percent of men, the gender ratio is fairly balanced. Middle-aged respondents (49.8%) make up the majority, followed by young adults (15–35 years, 35.5%) and older adults over 55 (14.2%). In terms of residency, roughly one-third have been in the area for 10–20 years, 29.6 percent for less than 10 years, 20.9% for 20–30 years, and 16.4 percent for more than 30 years. This blend of recent and long-term residents represents a range of local connections and viewpoints. The profile as a whole shows a vibrant, gender-balanced community with a range of settlement histories that probably affect local development and conservation strategies.

Livelihood Resources

In the Suklaphanta buffer zone, households primarily depend on farming, livestock, forest products, and wage labor which indicates a high reliance on local resources. The research of 287 households provides an understanding of this dependency, an assessment of buffer zone goal setting and programming to support sustainable development, and opportunities to discuss potential income diversification, so as to accommodate different factors related to the household and its opportunity costs while also thinking about wildlife conservation.

Table: 2

Distribution of Households by Primary Livelihood Sources (Multiple Responses Possible)

Livelihood Source	**Distribution of Respondents**	**Percentage**
Agriculture	265	92.3
Livestock Rearing	220	76.6
NTFP Collection from Buffer Zone	201	70.0
Daily Wage Labour	172	59.9
Employment in Buffer Zone Program	43	15.0
Tourism/ Tour Guide	28	9.8
Remittance	35	12.2
Business	42	14.6

Source: *Field Survey, 2025*

Household dependence in Suklaphanta was similar across agriculture (92.3%), livestock (76.6%), and non-timber forest products (70%). The majority of households also supplemented incomes through various daily wage labor jobs (59.9%). Non-traditional income sources such as businesses, remittances, buffer zone employment, and tourism were less relied upon among households. This suggests that buffer zone programs focused on renewable resources and alternative incomes play an important role in addressing ecosystem service use while building household resilience.

Involvement in Buffer Zone Initiatives

Engagement with buffer zone initiatives is critical to creating connections between wildlife outcomes and local development outcomes. In Suklaphanta, households are involved with community forestry, sustainable livelihoods and awareness initiatives that addresses human-wildlife conflicts. We study 287 households, assess existing compliance with these programs, illustrate gaps in participation, and describe the actual and potential contributions of community engagement to well-being and sustainable development.

Table: 3

Distribution of Households by Participation in Buffer Zone Initiatives (Multiple Responses)

Buffer Zone Initiatives	Participating Households	Percentage
Community Forestry User Group (CFUG)	189	65.9
Conservation Awareness Program	245	85.4
Infrastructure Project (eg. Water tap. school)	172	59.9
Skill Development Training	115	40.1
Tourism Related Activity	46	16.0
Not Participated in Any	23	8.0

Source: *Field Survey, 2025*

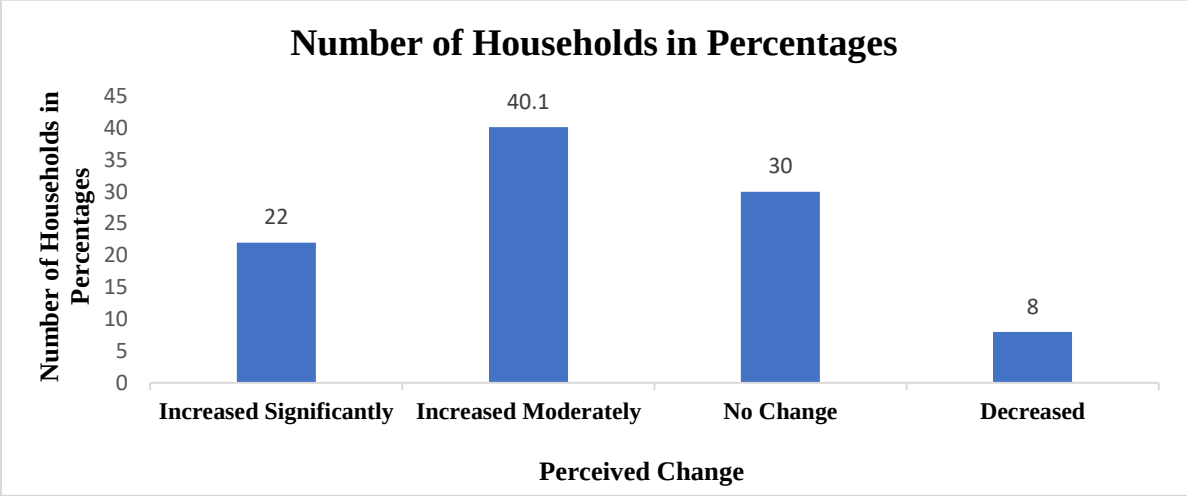
As seen in the Table 3 of this study, household engagement in Suklaphanta's buffer zone programs was notable, as indicated by 85.4 percent participation in conservation awareness, 65.9 percent in community forestry programs, and 59.9 percent in agriculture infrastructure activities. However, fewer households attended skills training (40.1%) or tourism programs (16%), and 8 percent did not take part in any of the programs. While there is strong household engagement in programs for conservation and local livelihood development, there's opportunity and room to increase household participation in skills training and tourism programming to improve local livelihoods.

Households Income due to Buffer Zone Programs

The buffer zone initiatives in Suklaphanta protect wildlife while improving livelihoods in surrounding communities. Community forestry activities, infrastructure improvements, skills-building, alternative income opportunities, and conservation projects help households increase income and reduce pressure on forests. The best way to understand where and how income is changing is to evaluate 287 households directly involved in the buffer zone initiatives. In this way, we can determine which of the initiatives has the greatest impact on well-being, and policy can prioritize these projects as the buffer zone strategy aims to balance conservation and community development.

Figure 1

Perceived Change in Households Income due to Buffer Zone Programs



Source: *Field Survey, 2025*

Results in Figure 1, most households (62.1%) feel that buffer zone programs have increased their income, with 22 percent reporting a large increase and 40.1 percent reporting a moderate increase, and 30 percent reporting no change, and 8 percent reporting a decrease, compared to before they participated. The overall perceived impact on livelihoods has been positive, but some households may require additional support to fully benefit economically.

Contribution of Buffer Zone Programs to Asset Building

Buffer zone programs in Suklaphanta support families in building assets through infrastructure, offering skills training, introducing income-generating activities to improve families' economic security and provide well-being in the future and shift conservation into a broader framework of local development.

Table 4

Distribution of Respondents by Contribution of Buffer Zone Programs to Asset Building

Tyes of Assets	HHs Reporting Improvements in Percent	Main Reason Cited (Open Response)
Livestock Quality/Quantity	45.0	Better Access to folder and grazing
House Construction	30.0	Income from Buffer Zone Activities
Agriculture Tools	25.0	Support from Buffer Zone Committee
Children's Education	55.0	Scholarship/ Support from BZ Fund
Access to Healthcare	40.0	Construction / Upgrading of Health Post

Source: *Field Survey, 2025*

Table 4 indicates that buffer zone programs have contributed to improvements in key household assets, particularly education for children (55%) and livestock (45%) healthcare (40%), housing (30%), and farm tools (25%) also increased. Improvements have occurred through scholarships, income-generating opportunities and buffer zone committee support. This shows how conservation efforts at the community level can strengthen outcomes for both livelihoods and well-being.

Access to Forest Resources

Suklaphanta buffer zone programs influence household use of forest resources by creating an alternative and enhancing sustainability practices. Examining people's views on changes in access allows us to better understand how these programs balance the demands of local communities with wildlife conservation, while promoting livelihood security and local development opportunities.

Table 5

Percentage Distribution of Households by Perceived Change in Access to Forest Resources

Resource	Easier Access	No Change	More Restricted
Fodder and grass	70.0	15.0	15.0
Firewood	65.0	20.0	15.0
Timber for House Repair	25.0	40.0	35.0
Medicinal Herbs	60.0	30.0	10.0
Thatch and cane	75.0	15.0	10.0

Source: *Field Survey, 2025*

The findings presented in Table 5 illustrate how households see changes in their access to forest resources under buffer zone programs. Most say their access to thatch and cane (75%) and fodder and grass (70%) has become easier, followed by firewood (65%). Sixty percent of respondents said they have easier access to medicinal herbs, while thirty-five percent reported some restrictions in accessing timber for house repair. Overall, households reported that the programs increased access to everyday resources but precisely managed resources that were in high demand. The programs reflect a balance between community needs and sustainable forest use.

Infrastructure Project

These infrastructure projects in Suklaphanta's buffer zone, like schools, water taps, and health posts, bring enhancement to the daily lives of local communities. Grasping the level of satisfaction held by the household toward these development activities will convey the actual meaning of supporting the livelihood of local people toward sustainable development and tying conservation activities with the needs of the local people.

Table 6

Percentage Distribution of Households by Satisfaction Level with Buffer Zone Infrastructure Project

Types of Projects	Very Satisfied	Satisfied	Neutral	Dissatisfied	Total Percentage
Drinking Water Supply	75.0	20.0	5.0	0.0	100.0
School Building Support	60.0	30.0	8.0	2.0	100.0
Irrigation Chanel	40.0	35.0	15.0	10.0	100.0
Rural Road /Tril Bridge	50.0	40.0	7.0	3.0	100.0
Community Building	65.0	25.0	8.0	2.0	100.0

Source: *Field Survey, 2025*

Table 6 indicates that a majority of households express satisfaction with buffer zone infrastructure projects, particularly in relation to drinking water (75%), schools (60%), and community buildings (65%). Satisfaction levels are lower for irrigation channels at 40 percent and rural roads at 50 percent. However, these projects are generally perceived as enhancements to daily life, bolstering livelihoods, and linking community needs with conservation initiatives.

Perception of Change in Social Cohesion

The buffer-zone programs in Suklaphanta foster community linking through forestry activities, awareness campaigns, and local infrastructure projects. When looked at through the lens of household perception of social cohesion, these programs build stronger community ties, foster cooperation, and contribute to the perpetuation of development and wildlife conservation.

Table 7

Percentage Distribution of Households by Perception of Change in Social Cohesion

Aspect of Social Cohesion	Strongly Agree	Agree	Neutral / Disagree
Buffer Zone Program have Improved Community Cooperation	85.0	35.0	10.0
Decision Making in Buffer Zone Committee is Inclusive	30.0	40.0	30.0
Conflicts Over Resources Have Decreased	40.0	35.0	25.0

Source: *Field Survey, 2025*

Table 7 shows that strong majorities of the households believe the buffer zone programs have improved community cooperation (85% strongly agree) and diminished resource conflicts (75%). Some 70 percent also uphold a view that the committee is inclusive in its decision-making. Generally, these programs enhance social ties and cooperation so that sustainable development and wildlife conservation can be pursued.

Buffer Zone Program's Contribution to Sustainable Local Development

Buffer zone initiatives help households in the Suklaphanta area by improving infrastructure, livelihoods, access to resources, and community ties. Knowing how they view these programs overall demonstrates how well they promote local growth, save wildlife, and improve community well-being.

Table 8

Percentage Distribution of Households by Overall Perception of Buffer Zone Program's Contribution to Sustainable Development

Aspect of Social Cohesion	Strongly Agree	Agree	Neutral	Disagree
Buffer Zone Programs Have Improved Our Quality Life	25.0	50.0	15.0	10.0
The Benefits Outweigh the Costs of Living Near the Reserve	20.0	45.0	20.0	15.0
Buffer Programs Contribute to Sustainable Development	30.0	55.0	10.0	5.0

Source: *Field Survey, 2025*

According to Table 8, the majority of households have a positive opinion of buffer zone programs; 75 percent say their quality of life has improved, 65 percent think the advantages outweigh the disadvantages, and 85 percent acknowledge their role in sustainable local development. This implies that the initiatives not only improve livelihoods but also aid in striking a balance between wildlife conservation and community well-being.

Table 9

Distribution of Households by Severity of Human-Wildlife Conflict (HWS) Incident (Last 12 Months)

Types of Conflict	Households Affected in Percent	Average Economic Loss	Ranked Severity
Crop Raiding (Wild Boar, Deer)	85.0	15000	1
Livestock Depredation (Leopard, Tiger)	25.0	4500	2
Property Damage (Elephant)	15.0	25000	3
Human Threat or Injury	8.0	-	4

Source: *Field Survey, 2025*

The effects of conflicts between people and wildlife during the past 12 months are shown in Table 9. With 85 percent of households affected and an average loss of 15,000 NPR, crop raiding by wild boar and deer is the most common. Livestock attacks (25%) and elephant-caused property damage (15%) follow. Human threats are less frequent (8%). Crop raiding is the largest problem, according to these findings, highlighting the necessity of buffer zone strategies that protect wildlife and community livelihoods.

Effectiveness of Existing HWC Mitigation Measures

Examining the effectiveness of human-wildlife conflict mitigation strategies in the Suklaphanta area reveals how households are safeguarded, losses are minimized, and wildlife coexistence is encouraged. It also demonstrates how well buffer zone policies strike a balance between livelihoods, community safety, and conservation objectives.

Table 10

Percentage Distribution of Households by Effectiveness of Existing HWC Mitigation Measures

Mitigation Measures	Very Effective	Somewhat Effective	Ineffective
Scaring (Firecrackers, watchtower)	20.0	45.0	35.0
Trenches/ Solar Fences	50.0	30.0	20.0
Compensation Scheme	15.0	35.0	50.0
Community Patrol Groups	65.0	25.0	10.0

Source: *Field Survey, 2025*

Table 10 shows how households view the effectiveness of methods to reduce human-wildlife conflict. Community patrol groups are seen as the most effective, with 65 percent rating them as very effective. Trenches and solar fences follow, with 50 percent considering them very or somewhat effective. In comparison, scaring methods and compensation schemes are viewed as less effective. Overall, methods that involve the community are more successful than those that do not. This underscores the importance of local participation in protecting both livelihoods and wildlife.

Challenges in Buffer Zone Management (Perception)

Listening to households about the challenges they face in buffer zone management helps identify obstacles that might hinder conservation and development efforts. It also shows how local issues, resource conflicts, and program limitations impact the balance between community well-being and wildlife protection.

Table 11

Percentage Distribution of Households by Challenges in Buffer Zone Management (Perception)

Challenges	Major	Moderate	Minor
Delay in Buffer Zone Fund Disbursement	60.0	30.0	10.0
Inequitable Benefit Distribution	55.0	30.0	15.0
Lack of Transparency in BZ Committee	40.0	35.0	25.0
Inadequate Alternative Livelihoods	70.0	20.0	10.0
Poor Market Access for Products	65.0	25.0	10.0

Source: *Field Survey, 2025*

Table 11 shows households' views on the difficulties in buffer zone management. The main concerns are limited alternative livelihoods at 70 percent and poor market access for products at 65 percent. This is followed by delays in fund disbursement at 60 percent and uneven benefit sharing at 55 percent. Around 40 percent also mention a lack of transparency in the buffer zone committee. Overall, these views emphasize the need to strengthen livelihood support, ensure fair distribution of benefits, and improve governance. This will make buffer zone management more effective and support sustainable local development.

Perception of Wildlife Conservation Regulation

Seeing how households view wildlife conservation regulations helps us understand how people receive, accept, and practice these rules. It also reveals whether buffer zone programs effectively protect wildlife while supporting local livelihoods and sustainable development.

Table 12

Percentage Distribution of Households by Perception of Wildlife Conservation Regulation

Perception	Agree	Neutral	Disagree
Conservation rules are necessary	80.0	10.0	10.0
Current rules are too restrictive	60.0	20.0	20.0
I understand the reasons for the rules.	75.0	15.0	10.0
The reserve management listens to our concerns.	35.0	25.0	40.0

Source: *Field Survey, 2025*

Table 12 shows how households view wildlife conservation regulations. Most people recognize the importance of the rules (80%) and understand their purpose (75%). However, 60 percent think the regulations are too strict, and only 35 percent feel that reserve management listens to their concerns. This indicates that while people value conservation, there is a need for more inclusive and community-focused ways to make buffer zone governance more effective and engaging.

Opportunities for Future Livelihood Development

Exploring opportunities for future livelihood development is important to boost household income, ease pressure on forest resources, and encourage community participation in conservation. This helps ensure that buffer zone programs continue to support both sustainable development and wildlife protection.

Table 13

Percentage Distribution of Households by Opportunities for Future Livelihood Development

Potential Opportunity	High Potential	Moderate Potential	Low Potential
Eco tourism (Homestay, Guide)	70.0	20.0	10.0
Sustainable NTFP Harvesting & Marketing	75.0	15.0	10.0
Apiculture (Bee-keeping)	60.0	25.0	15.0
Organic Agriculture	50.0	30.0	20.0
Conservation-Based Enterprises	55.0	30.0	15.0

Source: *Field Survey, 2025*

Table 13 shows how households feel about future livelihood opportunities. Most see strong potential in sustainable NTFP harvesting and marketing at 75 percent, and eco-tourism at 70 percent. This is followed by apiculture at 60 percent, conservation-based enterprises at 55 percent, and organic agriculture at 50 percent. Overall, communities recognize encouraging options for alternative, conservation-friendly livelihoods. These options could increase income, reduce pressure on natural resources, and support sustainable development around Suklaphanta.

Community Willingness to Engage in Future Initiatives

Understanding how willing households are to participate in future buffer zone initiatives is crucial for maintaining strong community support for both conservation and sustainable development. It also aids in creating programs that meet local needs, work well, and link livelihoods with wildlife protection.

Table 14

Percentage Distribution of Households by Community Willingness to Engage in Future Initiatives

Initiative	Very Willing	Willing	Not Willing
Participate in Community-Based Anti-Poaching	75.0	20.0	5.0
Start a Conservation-Linked Business	40.0	45.0	15.0
Adopt HWC Mitigation Technologies	80.0	15.0	5.0
Attend Advanced Skill Training	70.0	25.0	5.0

Source: *Field Survey, 2025*

Table 14 shows how willing households are to participate in future initiatives. Most are eager to adopt HWC mitigation technologies, with 80 percent interested. Seventy-five percent want to join community-based anti-poaching efforts. Many are also open to attending skill training, which stands at 70 percent. Starting conservation-linked businesses has slightly less interest, with 40 percent very willing and 45 percent willing. Overall, this indicates strong community interest in conservation and livelihood activities. It suggests great potential for future programs that connect local involvement with sustainable development around Suklaphanta.

Support Expected from Different Stakeholders

Understanding what support households expect from various groups is crucial for improving buffer zone programs. It ensures that government agencies, NGOs, and community groups offer the right advice, resources, and teamwork to aid in wildlife conservation and sustainable local development.

Table 15

Percentage Distribution of Households by Support Expected from Different Stakeholders (Multiple Response)

Stakeholder	Form of Support Expected (Top Response)	Percentage Citing
Buffer Zone Committee	Transparent & equitable fund management; quicker project implementation	80.0
SWR Management	Better HWC mitigation & compensation; more livelihood options	75.0
NGOs/INGOs	Market access; skill training; seed funding for enterprises	65.0
Local Government	Infrastructure développement ; agriculture extension services	60.0

Source: *Field Survey, 2025*

Household expectations from various stakeholders are highlighted in Table 15. Most (80%) look to the buffer zone committee for timely project implementation and transparent fund management, while 75 percent expect SWR management to increase livelihood options and improve HWC mitigation. 65 percent of respondents believe that NGOs and INGOs are essential for market access, skill development, and seed funding, while 60 percent believe that local government will support agricultural services and infrastructure.

Perception of Trends in Key Indicators

Understanding how buffer zone initiatives are influencing sustainable development over time, it is critical to understand how households view shifts in important domains such as income, resource accessibility, and conservation results. It facilitates the monitoring of advancements, identification of deficiencies, and planning of future initiatives that promote wildlife conservation and community well-being.

Table 16

Percentage Distribution of Households by Perception of Trends in Key Indicators

Indicators	Improved	Stable	Worsened
Wildlife Population	70.0	20.0	10.0
Forest Condition (BZ)	65.0	25.0	10.0
Household Income	45.0	35.0	20.0
Human-Wildlife Conflict	10.0	20.0	70.0

Source: *Field Survey, 2025*

Households' perceptions of the main Suklaphanta trends are shown in Table 16. The majority believe that forest conditions (65%) and wildlife populations (70%) have improved. About 45 percent of respondents say their household income has increased, 35 percent say it has remained constant, and 20 percent say it has gotten worse. However, only 10 percent of households report an improvement in human-wildlife conflict, while 70 percent report an increase.

Programs for buffer zones are generally seen as helping forests and wildlife while also generating some revenue, but growing conflicts between people and wildlife show that more needs to be done to safeguard communities and conservation objectives.

SWOT Analysis

A SWOT analysis brings together households' insights to reveal the strengths, weaknesses, opportunities, and threats of buffer zone integration. It helps understand how well conservation and community development are balanced, points out areas that need improvement, and guides strategies to support sustainable local development while safeguarding wildlife.

Table 17

SWOT Analysis of Buffer Zone Integration (Synthesis of Data)

Category	Factors
Strengths (S)	High community participation; Strong social capital; Successful infrastructure projects; Improved Forest condition.
Weaknesses (W)	Severe HWC; Inequitable benefit sharing; Bureaucratic delays; Lack of sustainable livelihoods.
Opportunities (O)	High potential for eco-tourism & NTFP enterprises; Strong willingness to engage; Growing wildlife population.
Threats (T)	HWC eroding support; Climate change impacts; Market volatility; Potential for elite capture of benefits.

Source: *Field Survey, 2025*

The SWOT analysis for Suklaphanta buffer zone reflects its strengths, which include healthy forests, successful infrastructure, strong social networks, and community involvement. Weaknesses include human-wildlife conflict, inequitable benefit sharing, bureaucracy that is slow to act, and a lack of sustainable livelihoods. Opportunities lie in increasing wildlife populations, ecotourism, NTFP enterprises, and engaging as a community, while threats are market changes, climate change, increased conflict, and elite capture of benefits. Overall, while the buffer zone program improved environmental health and enhanced community involvement in decision-making, progress will only be possible if conflict is managed, officials are made accountable, and communities have good livelihood opportunities.

Suggested Strategies for Improved Integration

Enhancing buffer zone integration requires paying attention to community-suggested tactics. These concepts guarantee that development and conservation initiatives take into account local requirements, increase involvement, address issues like livelihood disparities and conflict between people and wildlife, and direct realistic planning for sustainable development in the Suklaphanta area.

Table 18

Percentage Distribution of Households by Suggested Strategies for Improved Integration (Community Suggestions) (Multiple Responses)

Strategies Related Stakeholders	Specific Community Proposal	Advocating
HWC Management	Faster and full compensation; Improved solar fencing; Community insurance scheme	85.0
Governance	More transparent BZ committee; Greater inclusion of marginalized groups; Regular public audits	70.0
Livelihoods	Support for homestays; Training and market for NTFP products; Bee-keeping cooperatives	75.0
Capacity Building	Advanced guide training; Agricultural support; Entrepreneurship development	65.0

Source: *Field Survey, 2082*

Table 18 shows the recommendations from households regarding ways to improve buffer zone programs. The majority (85%) focus on managing human-wildlife conflict through community insurance, better solar fencing, and speedy compensation. The second highest recommendation is to strengthen livelihoods (75%) by supporting beekeeping, marketing of non-timber forest products (NTFP), and homestays.

There was also some emphasis on capacity building (65%) when it comes to supporting entrepreneurship and agriculture, and a call for better governance (70%) through transparency, inclusion, and regular audits. In summary, the community has strongly endorsed the idea of getting practical advice and strategies for reducing conflict, increasing income, developing capacity and governance, and, in turn, using the results of their all-community engagement to further develop more inclusive conservation and development programs.

Discussion and Implications

The buffer zone of the Suklaphanta Wildlife Reserve showcases how conservation and community development can coexist. There is also strong engagement of local communities, where 85 percent of citizens are involved in conservation awareness and just under two-thirds in community forestry, resulting in positive changes in forests (65 percent participants reported improvements) and wildlife (70 percent participants indicated positive changes).

At the socio-economic level, 62 percent of households indicated they are better off financially, with improvements in children's education, livestock, healthcare, and community infrastructure such as schools and drinking water. Additionally, social cohesion has improved, with 85 percent of participants indicating they work better with their neighbors.

However, challenges persist including pervasive human-wildlife conflict, management issues including delays in funds and inequitable sharing of benefits, and heavy reliance on agriculture, livestock, or forest resources. Sustainable livelihoods continue to be limited, which keeps some families vulnerable.

The research clearly indicates that strong governance in addition to trust, transparency, engagement yields equitable distribution of benefits. Additionally, to promote sustainable management and reduce the human-wildlife conflict, including fencing, compensation, insurance along with alternative livelihoods such as organic farming, bee-keeping, eco-tourism, and developing forest resource products are important. Facilitating access to markets, training, and systems of support by local business, organizations, or the government will help contribute to sustainable livelihoods for these communities.

Further, it is important for the planning process to be inclusive of women, youth, and marginalized groups as part of community involvement, and ongoing monitoring to create equitable, sustainable, and resilient buffer zone programs.

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