The Quality of Life and Perceived Human-Wildlife Conflicts among Forest Communities around the Mountain Gorilla’s Virunga Landscape in Africa

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Abstract: This article examines the relationships between human perceptions of conflict with wildlife and satisfaction with the quality of life in the Virunga landscape in Africa where mountain gorillas live. In addition, it explores how determinants of quality of life may indirectly influence the perceptions of conflict between people and wildlife. Using the bottom-up spillover theory of life satisfaction, it is hypothesized that quality of life is determined by access to critical livelihood resources, such as food, healthcare, and income. Furthermore, socio-psychological conditions, such as emotional and psychological strength, may mediate the relationship between access to resources and quality of life. This study revealed that life satisfaction positively predicts perceptions of conflict between humans and wildlife. The findings also indicated that health and psychological conditions were the strongest predictors of life satisfaction compared to food and financial security. However, the findings revealed variations by country. For example, food security predicts life satisfaction in Rwanda but not in Uganda. Health security predicts emotional wellbeing in Rwanda but not in Uganda. These results indicate that the nature of the relationship between wellbeing indicators and perceived Human-Wildlife conflict is likely country-specific. Therefore, efforts to strengthen the quality of life to indirectly advance wildlife conservation goals may need to be different in Uganda and Rwanda. The findings also suggest that investing in improving the quality of life of forest communities may incentivize increased perceptions of Human-Wildlife conflict. This is likely a result of pervasive consequences of increased funding for community development programs to incentivize conservation, which risks associating conflict with funding. Additional implications for practice and research are discussed in the paper.

Keywords: Africa; quality of life; forest communities; mountain gorillas; Virunga; human-wildlife conflicts

1. Introduction

Globally, Human-Wildlife conflict has become one of the most intractable challenges in the conservation of wildlife [1]. The high levels of Human-Wildlife conflict (HWC) in Africa pose a serious threat to wildlife management [2]. While a significant amount of research has been conducted on HWC [1–4], practitioners of wildlife conservation still face challenges to address this issue [4,5]. Due to a limited understanding of the relationship between people’s living conditions and wildlife conflict, the HWC issue is likely to remain unresolved. Furthermore, HWC is exacerbated by a lack of understanding, which results in ineffective mitigation strategies [6]. Furthermore, a poor understanding of HWC exacerbates it and leads to ineffective mitigation strategies [6]. In the tropics, Human-Wildlife conflicts are strongly linked to poverty [7,8]. According to Bowen-Jones [9],
programs that aim to alleviate poverty through conservation need to understand HWC and its causes. In communities adjacent to forests in the tropics, protected areas have been sources of livelihood for generations [10]. Despite strict conservation policies prohibiting the extractive use of protected areas, forest communities have continued to depend on forest resources for their livelihoods [11].

The two conflicting goals of protecting wildlife and sustaining the wellbeing of forest communities have created conditions of conflict between people and wildlife in the tropics. Government institutions, especially in developing countries where some of the ecologically diverse forest landscapes remain, have the responsibility to protect forest resources [12]. While some developing countries attempt to conserve wildlife, economic growth constraints continue to hinder their efforts [13,14]. In spite of the growing interest in understanding the links between poverty and wildlife conservation [15–18], there is limited understanding of how poverty and Human-Wildlife conflicts are perceived by forest communities. In spite of this, forest communities’ perceptions will provide insight into the poverty aspects that might affect conflict between people and wildlife.

Thus, the study aims to examine the relationship between satisfaction with the quality of life and perceptions of conflict between humans and wildlife. Using a bottom-up spillover theory, the study hypothesizes that satisfaction with life, a cognitive dimension of wellbeing, is arguably influenced by objective and subjective aspects of wellbeing. Among the objective aspects of wellbeing are good health, food availability, and financial resources. Subjective aspects include socio-psychological conditions, such as one’s emotional and psychological strength. The study tests the hypothesized relationships using variance-based Partial Least Squares Structural Equation Modeling (PLS-SEM) tools, and data from communities adjacent to the Greater Virunga Landscape (GVL) in Uganda and Rwanda.

2. Theoretical Background

This study hypothesized relationships (Figure 1) based on the conceptual model. According to Hypothesis 1, improved quality of life is likely to reduce perceptions of conflict between forest communities and wildlife due to a dependence on forest resources for livelihoods [17]. Using the bottom-up spillover theory [19], we hypothesize relationships between quality of life and its determinants. In hypotheses 2–6, we consider the role of food, healthcare, and income in determining the quality of life [20], as well as strong socio-psychological conditions [20,21]. Hypotheses 7–12 are informed by the understanding that socio-psychological conditions are influenced by access to food, income, and other basic needs of life [20,22]. The conceptual background in the next sections provides additional support for the proposed and tested hypotheses in this study.

![Figure 1. The conceptual model.](image-url)
2.1. The Human-Wildlife Conflict Concept

Wildlife conservation is facing an uphill battle against Human-Wildlife Conflict (HWC) \cite{2,23}. HWC is a common problem across the African continent \cite{4}. This constraint is seen in rural Africa as a major challenge to human wellbeing \cite{24}, and protected area management \cite{2}. In particular, conflict occurs when organizations are perceived as asserting conservation interests over livelihood interests \cite{25}. As an example, the creation of Maasai pastoral lands as protected areas has led to perpetual disputes between the Massai people and the Kenya Wildlife Service \cite{26}. In addition, conflict can occur when human and wildlife interactions lead to harmful behavior or actions \cite{27}. Lamarque et al. \cite{5}, report that some countries in southern Africa lose over 100 people each year to wildlife attacks. Similarly, it has been estimated that Africa loses about 10% of its agricultural production to wildlife \cite{5}. As a result of retaliatory killings and habitat degradation, many wildlife species have been decimated, as well as other undesired ecological changes \cite{7}.

In spite of the considerable amount of research conducted on HWC \cite{2–4,23,25}, wildlife conservation practitioners in Africa continue to struggle with HWC issues and their negative impacts \cite{4,5}. A lack of understanding of the causes of HWC is attributed to the persistence of the problem in Africa. People living in close proximity to wildlife areas have been targeted for understanding the causes. According to research, humans can influence ecological changes \cite{28,29}. Among others, Kofinas and Chapin \cite{30} attribute habitat fragmentation and biota mortality to human livelihood activities. According to Woodroffe and Ginsberg \cite{31}, humans are the primary cause of mortality in large carnivores. Moreover, human activities and behavior have been attributed to altered population structures and reduced home ranges of wild animals \cite{31}. Uncontrolled hunting has been reported to have brought about a decline in wildlife populations \cite{32}. (A typical example of this is the uncontrolled hunting of wildlife species and endangered species in Cameroon’s Dja reserve \cite{33}.

Several studies have linked Human-Wildlife conflict to the dependence of people in developing countries on forest resources for their livelihoods during times of scarcity \cite{17,34–36}. It is argued that forest areas provide resources, such as bushmeat, timber, and non-timber products \cite{10,11,34,37}. Despite the legal protection of forests, there is a conflict between people and government institutions because of the legal protections. There has been a growing body of literature explaining resource conflict as being linked to poverty \cite{17,38–42}. However, poverty results from a lack of resources, such as food, and from inadequate health needs \cite{43}. The quality-of-life research suggests that cognitive evaluation of a person’s quality of life can provide a more realistic state of wellbeing \cite{44}. This approach can be traced backwards to understand what is driving poor living conditions \cite{45}.

Therefore, we hypothesize that:

**H1a.** Satisfaction with life predicts perceived Human-Wildlife conflict.

**H1b.** The relationship between satisfaction with life and perceived Human-Wildlife conflict differs among residents adjacent to the GVL in Uganda and Rwanda.

2.2. The Quality of Life Concept

In the literature, quality of life is synonymous with satisfaction with life \cite{46}. According to Diener \cite{44}, life satisfaction is a cognitive evaluation of an individual’s quality of life. In this paper, we use the bottom-up spillover theory of life satisfaction \cite{47} to conceptualize the relationship between life satisfaction and its determinants. As Lee and colleagues \cite{19} point out, a person’s satisfaction with life is driven by how they feel about their health, jobs, and money. As Lee and Sirgy \cite{47} found using bottom-up spillover theory, satisfaction with life is hierarchically determined. King, Renó, and Novo \cite{48} argue that satisfaction with life depends on objective and subjective wellbeing. Additionally, subjective wellbeing is arguably a function of objective wellbeing \cite{48}. According to the hierarchy model, the
quality-of-life domains and subdomains, that is subjective and objective conditions, form a hierarchy with satisfaction with life at the top. Kim et al. [49] show that bottom-up spillover theory shows how certain effects accumulate and affect life satisfaction vertically.

At the bottom of the hierarchy is the objective wellbeing condition. Material and social aspects of wellbeing are included in objective wellbeing [49]. Which among others include access to basic needs, such as food, income, and health [48]. This paper uses food security, financial security, and health security as indicators of objective wellbeing. Subjective wellbeing, on the other hand, represents the socio-psychological condition where wellbeing is a function of perceived emotional state and feelings of satisfaction with life [23,48,50]. Subjective wellbeing is typically considered to be indicative of the quality of life [51], and as such, it encompasses the satisfaction with life dimension [44]. In fact, according to OECD [52], the concept of subjective wellbeing encompasses three dimensions, including life satisfaction, emotional wellbeing, and psychological wellbeing [53]. In this paper, using the bottom-up spillover theory of life satisfaction, the objective and subjective wellbeing dimensions above are hierarchically ordered, with life satisfaction dimensions at the top and objective indicators at the bottom, while emotional and psychological wellbeing are in the middle of the life satisfaction hierarchy.

Therefore, it is hypothesized that:

**H2a.** Food security significantly predicts satisfaction with life.

**H2b.** The relationship between food security and satisfaction with life differs among residents adjacent to the GVL in Uganda and Rwanda.

**H3a.** Financial security significantly predicts satisfaction with life.

**H3b.** The relationship between financial security and satisfaction with life differs among residents adjacent to the GVL in Uganda and Rwanda.

**H4a.** Health security significantly predicts satisfaction with life.

**H4b.** The relationship between health security and satisfaction with life differs among residents adjacent to the GVL in Uganda and Rwanda.

**H5a.** Emotional wellbeing significantly predicts satisfaction with life.

**H5b.** The relationship between emotional wellbeing and satisfaction with life differs among residents adjacent to the GVL in Uganda and Rwanda.

**H6a.** Psychological wellbeing significantly predicts satisfaction with life.

**H6b.** The relationship between psychological wellbeing and satisfaction with life differs among residents adjacent to the GVL in Uganda and Rwanda.

**H7a.** Food security significantly predicts emotional wellbeing.

**H7b.** The relationship between food security and emotional wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.

**H8a.** Financial security significantly predicts emotional wellbeing.

**H8b.** The relationship between financial security and emotional wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.

**H9a.** Health security significantly predicts emotional wellbeing.
H9b. The relationship between health security and emotional wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.

H10a. Food security significantly predicts psychological wellbeing.

H10b. The relationship between food security and psychological wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.


H11b. The relationship between financial security and psychological wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.

H12a. Health security significantly predicts psychological wellbeing.

H12b. The relationship between health security and psychological wellbeing differs among residents adjacent to the GVL in Uganda and Rwanda.

H13a. Financial security significantly predicts food security.

H13b. The relationship between financial security and food security differs among residents adjacent to the GVL in Uganda and Rwanda.

H14a. Financial security significantly predicts health security.

H14b. The relationship between financial security and health security differs among residents adjacent to the GVL in Uganda and Rwanda.

3. Methodology
3.1. Study Site
Data collection occurred in the GVL region of Rwanda and Uganda in the summer of 2016. The GVL comprises three contiguous protected areas, including Mghahinga Gorilla National Park (MGNP) in Uganda, Virunga National Park (ViNP) in the Democratic Republic of Congo (DRC), and Volcanoes National Park in Rwanda (VNP). The Greater Virunga Landscape is the focus of this paper for multiple reasons. First, it is one of the two remaining natural habitats for mountain gorillas, endangered species, according to the International Union for Conservation of Nature \[54,55\]. Second, it is also a primary attraction for high-spending tourists, seeking unique experiences, and generates substantial revenue for host countries \[56\]. Third, most of the local and international conservation investment, some of which is from tourism revenue, is directed toward supporting adjacent residents to improve livelihoods and incentivize conservation support \[56,57\].

Further, the Greater Virunga Landscape is one of the most biodiverse ecological regions globally \[58\]. In Africa, the Greater Virunga Landscape contains more terrestrial endemic and threatened wildlife species such as mountain gorillas than any other eco-region \[58\]. In this study, however, the analysis is limited to Mghahinga Gorilla National Park in Uganda and Volcanoes National Park in Rwanda due to armed conflict and insecurity in the DRC. Volcanoes National Park (VNP) is in northwestern Rwanda, bordering the DRC and Uganda. The park was created in 1992 and was part of the Albert National Park, Africa’s first national park created in 1925 \[59\]. VNP was established to ensure biodiversity conservation, including the critically endangered mountain gorilla \[60\]. Since its creation, the park has continued to experience Human-Wildlife conflict issues, primarily driven by human livelihood needs \[61\]. Mghahinga Gorilla National Park, on the other hand, is in southwestern Uganda, bordering Rwanda and the Democratic Republic of Congo. The
park was created in 1991 to protect wildlife [62] whose conservation was being challenged by human and wildlife conflicts.

3.2. Data Collection

Household interview surveys were conducted in the villages adjacent to Volcanoes National Park in Rwanda and Mgahinga gorilla NP in Uganda to participate in the study. Heads of sampled households were asked to respond to survey questions. The authors obtained the sampling frame from local administration offices in Rwanda and Uganda. Following Dillman and colleagues’ [63] suggested methods of sampling, a stratified random sample of 570 households participated in the study, including 224 participants who had access to tourism-based conservation incentives, and 346 who did not. Trained local field assistants administered the survey interviews under the close supervision of the authors. To ensure accuracy, experts in the field validated the surveys. In addition, the surveys were also pilot-tested among community members to ensure respondents understood the questions. Further, we revised unclear questions to make them more understandable.

3.3. Measures and Data Analysis

The survey methods applied in this study were developed in line with those previously applied in the literature to measure satisfaction with life, emotional and psychological wellbeing [64,65], food security, health security, and perceived forest dependence [66]. The questionnaire administered to residents included seven measures of psychological wellbeing, six measures of emotional wellbeing, and five measures of satisfaction with life (Table 1). The survey also included six measures of financial security, four measures of food security, and three measures of health security (Table 2). Some of the original measures were reworded for contextual relevance. Response choices representing the level of agreement with a given statement were measured against a 7-point scale (where 1 = strongly disagree, and 7 = strongly agree, or 1 = very low, 7 = very high, for perceived forest dependence measures). The questionnaire also included demographic questions, such as gender, age, education, and income.
Table 1. Reliability and convergent validity of subjective wellbeing measures.

<table>
<thead>
<tr>
<th>Constructs and Measures</th>
<th>Mean</th>
<th>SD</th>
<th>Convergent Validity</th>
<th>Composite Reliability</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standardized Loadings</td>
<td>Average Variance Extracted</td>
</tr>
<tr>
<td>Psychological wellbeing</td>
<td></td>
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</tr>
<tr>
<td>I lead a purposeful and meaningful life.</td>
<td>3.57</td>
<td>1.302</td>
<td>0.811 *** (53.165)</td>
<td>0.577</td>
</tr>
<tr>
<td>My social relationships are supportive and rewarding.</td>
<td>4.81</td>
<td>1.215</td>
<td>0.792 *** (43.126)</td>
<td>0.905</td>
</tr>
<tr>
<td>I am engaged and interested in my daily activities.</td>
<td>4.91</td>
<td>1.189</td>
<td>0.742 *** (34.360)</td>
<td></td>
</tr>
<tr>
<td>I actively contribute to the happiness and wellbeing of others.</td>
<td>3.88</td>
<td>1.595</td>
<td>0.722 *** (31.299)</td>
<td></td>
</tr>
<tr>
<td>I am a competent and capable in the activities that are important to me.</td>
<td>3.67</td>
<td>1.489</td>
<td>0.631 *** (22.118)</td>
<td></td>
</tr>
<tr>
<td>I am a good person and live a good life.</td>
<td>3.65</td>
<td>1.080</td>
<td>0.783 *** (53.384)</td>
<td></td>
</tr>
<tr>
<td>I am optimistic about my future</td>
<td>4.53</td>
<td>1.369</td>
<td>0.821 *** (57.154)</td>
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<tr>
<td>People respect me.</td>
<td></td>
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<tr>
<td>Emotional wellbeing</td>
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<tr>
<td>During the past 12 months, I have felt positive.</td>
<td>4.76</td>
<td>1.095</td>
<td>0.636 *** (22.781)</td>
<td>0.643</td>
</tr>
<tr>
<td>During the past 12 months, I have felt good.</td>
<td>4.05</td>
<td>1.237</td>
<td>0.809 *** (47.940)</td>
<td>0.914</td>
</tr>
<tr>
<td>During the past 12 months, I have felt pleasant.</td>
<td>4.19</td>
<td>1.322</td>
<td>0.885 *** (88.664)</td>
<td></td>
</tr>
<tr>
<td>During the past 12 months, I have felt happy.</td>
<td>4.37</td>
<td>1.251</td>
<td>0.832 *** (59.404)</td>
<td></td>
</tr>
<tr>
<td>During the past 12 months, I have felt joyful.</td>
<td>4.22</td>
<td>1.345</td>
<td>0.877 *** (78.740)</td>
<td></td>
</tr>
<tr>
<td>During the past 12 months, I have felt contented.</td>
<td>3.59</td>
<td>1.434</td>
<td>0.744 *** (34.327)</td>
<td></td>
</tr>
<tr>
<td>Satisfaction with life</td>
<td></td>
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<tr>
<td>In most ways my life is close to my ideal.</td>
<td>2.99</td>
<td>1.294</td>
<td>0.759 *** (32.058)</td>
<td>0.504</td>
</tr>
<tr>
<td>The conditions of life are excellent.</td>
<td>1.78</td>
<td>1.157</td>
<td>0.712 *** (28.733)</td>
<td>0.833</td>
</tr>
<tr>
<td>I am satisfied with my life.</td>
<td>2.74</td>
<td>1.375</td>
<td>0.533 *** (13.324)</td>
<td></td>
</tr>
<tr>
<td>So far, I have gotten the important things I want in life.</td>
<td>3.05</td>
<td>1.456</td>
<td>0.849 *** (76.557)</td>
<td></td>
</tr>
<tr>
<td>If I could live my life over, I would change almost nothing.</td>
<td>3.21</td>
<td>1.916</td>
<td>0.659 *** (21.756)</td>
<td></td>
</tr>
</tbody>
</table>

Scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree; *** indicates that the standardized loading of a measurement indicator was statistically significant at \( p < 0.001 \). AVE of 0.5 or higher is indicative of convergent validity [67]. Composite Reliability of 0.7 and higher is indicative of internal consistency [67], standardized loadings of 0.7 and above are indicative of a reliable indicator [67]. Standardized loadings lower than the typical threshold of 0.7 but above 0.4 (e.g., the loading of 0.533 in measures for satisfaction with life) are maintained following the suggestion that a loading above 0.4 in social science is acceptable [68].
Table 2. Reliability and convergent validity of objective wellbeing and perceived Human-Wildlife conflict measures.

<table>
<thead>
<tr>
<th>Constructs and Measures</th>
<th>Mean</th>
<th>SD</th>
<th>Convergent Validity</th>
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<tr>
<td><strong>Food security</strong></td>
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<tr>
<td></td>
<td>0.528</td>
<td>0.817</td>
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</tr>
<tr>
<td>We eat preferred food regularly.</td>
<td>3.56</td>
<td>1.314</td>
<td>0.709 *** (26.300)</td>
<td></td>
</tr>
<tr>
<td>We eat three meals a day regularly.</td>
<td>2.68</td>
<td>1.456</td>
<td>0.780 *** (44.082)</td>
<td></td>
</tr>
<tr>
<td>We eat meat regularly.</td>
<td>1.50</td>
<td>0.862</td>
<td>0.719 *** (27.499)</td>
<td></td>
</tr>
<tr>
<td>We eat fruits and vegetables regularly.</td>
<td>4.36</td>
<td>1.422</td>
<td>0.696 *** (23.735)</td>
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<tr>
<td><strong>Financial wellbeing</strong></td>
<td></td>
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<tr>
<td></td>
<td>0.534</td>
<td>0.873</td>
<td></td>
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<tr>
<td>If a close relative were having financial problems, we feel we could afford to help.</td>
<td>1.66</td>
<td>0.785</td>
<td>0.740 *** (27.983)</td>
<td></td>
</tr>
<tr>
<td>When we make plans, we are almost certain we can make them work.</td>
<td>2.34</td>
<td>1.053</td>
<td>0.795 *** (40.468)</td>
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</tr>
<tr>
<td>We would have no problem getting a loan if we wanted to.</td>
<td>2.14</td>
<td>1.048</td>
<td>0.708 *** (29.466)</td>
<td></td>
</tr>
<tr>
<td>We feel we have enough money on hand to cover small, unexpected expenses.</td>
<td>1.51</td>
<td>0.717</td>
<td>0.776 *** (38.725)</td>
<td></td>
</tr>
<tr>
<td>We feel we are able to make financial contributions to a good cause (i.e., church).</td>
<td>2.17</td>
<td>1.020</td>
<td>0.691 *** (25.006)</td>
<td></td>
</tr>
<tr>
<td>We feel confident that if our main income earner lost his/her job he/she could find another one.</td>
<td>1.66</td>
<td>0.785</td>
<td>0.666 *** (25.004)</td>
<td></td>
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<tr>
<td><strong>Health security</strong></td>
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<tr>
<td></td>
<td>0.623</td>
<td>0.832</td>
<td></td>
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</tr>
<tr>
<td>We have access to healthcare services.</td>
<td>3.69</td>
<td>1.712</td>
<td>0.731 *** (30.992)</td>
<td></td>
</tr>
<tr>
<td>We have government subsidized healthcare insurance.</td>
<td>4.26</td>
<td>2.579</td>
<td>0.824 *** (36.610)</td>
<td></td>
</tr>
<tr>
<td>We have access to clean water.</td>
<td>3.65</td>
<td>2.179</td>
<td>0.809 *** (39.161)</td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Human-Wildlife conflict</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>0.609</td>
<td>0.860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is your overall assessment of bamboo harvesting in the park today?</td>
<td>5.50</td>
<td>1.784</td>
<td>0.743 *** (20.157)</td>
<td></td>
</tr>
<tr>
<td>What is your overall assessment of human-caused forest fires in the park today?</td>
<td>4.31</td>
<td>1.611</td>
<td>0.868 *** (57.852)</td>
<td></td>
</tr>
<tr>
<td>What is your overall assessment of medicinal herbs harvesting in the park today?</td>
<td>4.00</td>
<td>1.832</td>
<td>0.861 *** (52.818)</td>
<td></td>
</tr>
<tr>
<td>What is your overall assessment of poaching in the park today?</td>
<td>5.50</td>
<td>1.560</td>
<td>0.626 *** (13.568)</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1 Scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree; 2 Scale: 1 = very low, 7 = very high. *** indicates that the standardized loading of a measurement indicator was statistically significant at p < 0.001. AVE of 0.5 or higher is indicative of convergent validity [67]. Composite Reliability of 0.7 and higher is indicative of internal consistency [67], standardized loadings of 0.7 and above are indicative of a reliable indicator [67]. Standardized loadings lower than the typical threshold of 0.7 but above 0.4 (e.g., the loading of 0.623 in measures for perceived Human-Wildlife conflict) are maintained following the suggestion that a loading above 0.4 in social science is acceptable [68].
Smart Partial Least Squares (PLS) III, a variance-based Structural Equation Modeling (SEM) software, was employed to estimate the measurement and structural parameters in the hypothesized model [69]. Analyzing the hypothesized model using variance-based Partial Least Squares Structural Equation Modeling (PLS-SEM) tools, such as Smart PLS III are preferred (compared to covariance-based SEM tools such as AMOS), for theory development-oriented exploratory models with over 25 complex relationships and variables [70]. The model hypothesized in this study is exploratory and is, to our knowledge, an initial attempt to explore the potential for human wellbeing conditions to interact with factors perceived to influence residents’ perceived Human-Wildlife conflict. The conceptualized mediation-moderation research model (Figure 2) has been developed by the study as a contribution towards understanding the complex relationship between residents and conservation areas.

The measurement model: A PLS-SEM model mirroring the conceptualized path model in Figure 2 was estimated in Smart PLS 3 software. Overall, according to Hair et al. [69] recommended threshold values, the estimated measurement model was an excellent fit to the data (SRMR = 0.07). Furthermore, the model output generated measures for each construct, which were sufficiently reliable and valid (Tables 1 and 2). For example, after removing items with standardized loading less than the threshold of 0.5 [69], the composite reliability values, measuring the internal consistency of measures, are above Fornell and Larker’s [71] threshold of 0.7 suggesting that measures of constructs are reliable [71]. The Average Variance Extracted (AVE) was above the recommended threshold of 0.5 [71], indicating evidence of convergent validity [67]. Discriminant validity was assessed by determining whether the square root of AVE values does or does not exceed the inter-construct correlation values [71]. Table 3 provides evidence of the discriminant validity of the measures used.

![Figure 2. Location of Greater Virunga Landscape [72].](image-url)
Table 3. Evidence of discriminant validity.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Wellbeing.</td>
<td>0.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Security.</td>
<td>0.50 ***</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Security.</td>
<td>0.40 ***</td>
<td>0.42 ***</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Security.</td>
<td>0.53 ***</td>
<td>0.54 ***</td>
<td>0.32 ***</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Human-Wildlife Conflict.</td>
<td>0.23 ***</td>
<td>0.33 ***</td>
<td>0.18 ***</td>
<td>0.52 ***</td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Wellbeing.</td>
<td>0.74 ***</td>
<td>0.46 ***</td>
<td>0.35 ***</td>
<td>0.28 ***</td>
<td>0.15 ***</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Satisfaction with Life.</td>
<td>0.68 ***</td>
<td>0.56 ***</td>
<td>0.51 ***</td>
<td>0.59 ***</td>
<td>0.41 ***</td>
<td>0.54 ***</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Note: Square root of Average Variance Extracted values are bold and diagonal; Discriminant validity occurs when the Average Variance Extracted value in bold exceeds the inter-construct correlations [71]. *** indicates that all correlations were statistically significant at \( p < 0.001 \).

The Structural Model: A structural equation modeling approach was used to estimate the suggested structural model presented in Figure 1. The model estimated the relationship between objective wellbeing indicators (e.g., financial security), emotional wellbeing, psychological wellbeing, satisfaction with life, and perceived Human-Wildlife conflict. The estimated structural model showed evidence of strong predictive power, according to Hair et al. [69] threshold. For example, the R-square for the satisfaction with life ranged was 0.85, indicating that the model explained 85% of the variance in the satisfaction with life construct. The bootstrapping procedure was performed to test the hypotheses and estimate the size and significance of parameters in the structural model.

4. Results

A total of 570 questionnaires were administered to communities that live adjacent to Volcanoes National Park in Rwanda (n = 293) and Mgahinga National Park in Uganda (n = 278). To determine if the results supported the hypotheses formulated earlier, the responses for each of the wellbeing domains were run through structural equation modeling (Table 4). To understand the spatial disparities that may exist in the GVL, analysis was further conducted on data segregated according to those collected in Rwanda and Uganda (Table 5). As a result, the study was able to compare the results of the two countries and see how they could be used to enhance tourism conservation management in the countries as well as the GVL in general.

Table 4. Hypothesis Testing Results (n = 570).

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Hypothesized Relationship</th>
<th>Path Coeff (( \beta ))</th>
<th>Bias Corrected CI</th>
<th>Effect Size (( f^2 ))</th>
<th>Hypothesis Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a</td>
<td>SWL → HWC</td>
<td>0.420 *** (10.932)</td>
<td>(0.338, 0.492)</td>
<td>0.201</td>
<td>Supported</td>
</tr>
<tr>
<td>H2a</td>
<td>FS → SWL</td>
<td>0.110 *** (2.952)</td>
<td>(0.043, 0.182)</td>
<td>0.019</td>
<td>Supported</td>
</tr>
<tr>
<td>H3a</td>
<td>FIS → SWL</td>
<td>0.211 *** (7.524)</td>
<td>(0.153, 0.260)</td>
<td>0.089</td>
<td>Supported</td>
</tr>
<tr>
<td>H4a</td>
<td>HS → SWL</td>
<td>0.282 *** (6.449)</td>
<td>(0.191, 0.364)</td>
<td>0.099</td>
<td>Supported</td>
</tr>
<tr>
<td>H5a</td>
<td>EWB → SWL</td>
<td>0.090 NS (1.921)</td>
<td>(0.003, 0.180)</td>
<td>0.008</td>
<td>Not supported</td>
</tr>
<tr>
<td>H6a</td>
<td>PWB → SWL</td>
<td>0.325 *** (6.200)</td>
<td>(0.235, 0.437)</td>
<td>0.101</td>
<td>Supported</td>
</tr>
<tr>
<td>H7a</td>
<td>FS → EWB</td>
<td>0.374 *** (9.175)</td>
<td>(0.289, 0.450)</td>
<td>0.117</td>
<td>Supported</td>
</tr>
<tr>
<td>H8a</td>
<td>FIS → EWB</td>
<td>0.191 *** (5.292)</td>
<td>(0.115, 0.259)</td>
<td>0.039</td>
<td>Supported</td>
</tr>
<tr>
<td>H9a</td>
<td>HS → EWB</td>
<td>0.013 NS (0.301)</td>
<td>(−0.068, 0.098)</td>
<td>0.000</td>
<td>Not supported</td>
</tr>
<tr>
<td>H10a</td>
<td>FS → PWB</td>
<td>0.239 *** (6.457)</td>
<td>(0.157, 0.306)</td>
<td>0.057</td>
<td>Supported</td>
</tr>
<tr>
<td>H11a</td>
<td>FIS → PWB</td>
<td>0.187 *** (5.792)</td>
<td>(0.122, 0.248)</td>
<td>0.045</td>
<td>Supported</td>
</tr>
<tr>
<td>H12a</td>
<td>HS → PWB</td>
<td>0.335 *** (9.417)</td>
<td>(0.271, 0.405)</td>
<td>0.125</td>
<td>Supported</td>
</tr>
<tr>
<td>H13a</td>
<td>FIS → FS</td>
<td>0.439 *** (12.076)</td>
<td>(0.360, 0.505)</td>
<td>0.240</td>
<td>Supported</td>
</tr>
<tr>
<td>H14a</td>
<td>FIS → HS</td>
<td>0.326 *** (8.887)</td>
<td>(0.248, 0.392)</td>
<td>0.120</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Note: HS = Health Security, FS = Food Security, FIS = Financial Security, EWB = Emotional Wellbeing, PWB = Psychological Wellbeing, SWL = Satisfaction with Life, HWC = Human Wildlife Conflict. Path Coeff (\( \beta \)) = Standardized regression coefficients; \( f^2 \) = Effect size indicated by small (0.02), medium (0.15), and large (0.35) (Cohen, 1988 cited in Chin, 1998); scale: 1 = Strongly Disagree to 7 strongly Agree. R-Square (PWB = 0.493, EWB = 0.351, SWL = 0.854, HWC = 0.246, FS = 0.329, HS = 0.187). *** \( p < 0.001 \) = statistical significance of correlations, NS = not significant at 0.05; t-values in parentheses.
Hypothesis Hypothesized
H10b FS → HS → H12b HS → H11b FIS → H13b FIS → H14 FIS

Relationship

\[ H_8b \text{ FIS} \rightarrow H_9b \text{ HS} \rightarrow H_7b \text{ FS} \rightarrow H_6b \text{ PWB} \rightarrow H_5b \text{ EWB} \rightarrow H_4b \text{ HS} \rightarrow H_3b \text{ FIS} \rightarrow H_2b \text{ FS} \rightarrow H_1b \text{ SWL} \rightarrow H_14 \text{ FIS} \rightarrow 15, 2248

Table 5. Differences in the hypothesized relationships between Rwanda and Uganda.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Hypothesized Relationship</th>
<th>Path Coeff (β)</th>
<th>Path Coeff (β)</th>
<th>Path Coefficients-Diff (Rwanda—Uganda)</th>
<th>p-Values (Rwanda vs. Uganda)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H10b</td>
<td>FS → PWB</td>
<td>0.227 *** (4.198)</td>
<td>0.406 *** (5.222)</td>
<td>0.179 ns</td>
<td>0.057</td>
</tr>
<tr>
<td>H11b</td>
<td>FIS → PWB</td>
<td>0.177 *** (3.525)</td>
<td>0.211 *** (4.443)</td>
<td>0.034 (0.498)</td>
<td>0.057</td>
</tr>
<tr>
<td>H12b</td>
<td>HS → PWB</td>
<td>0.469 *** (9.242)</td>
<td>−0.017 ns (0.207)</td>
<td>0.486 *** (5.048)</td>
<td>0.000</td>
</tr>
<tr>
<td>H13b</td>
<td>FIS → FS</td>
<td>0.557 *** (13.916)</td>
<td>0.320 *** (4.957)</td>
<td>0.237 ** (3.157)</td>
<td>0.002</td>
</tr>
<tr>
<td>H14</td>
<td>FIS → HS</td>
<td>0.430 *** (9.335)</td>
<td>0.314 *** (5.795)</td>
<td>0.116 ns (1.637)</td>
<td>0.102</td>
</tr>
</tbody>
</table>

Note: HS = Health Security, FS = Food Security, FIS = Financial Security, EWB = Emotional Wellbeing, PWB = Psychological Wellbeing, SWL = Satisfaction with Life, HWC = Human-Wildlife Conflict. * p < 0.05, ** p < 0.01, *** p < 0.001 = statistical significance of correlations, ns = not significant at 0.05, t-values in parentheses.

To determine if satisfaction with life predicts perceived Human-Wildlife conflict, Hypothesis 1 was tested and the results indicate a significant relationship (β = 0.42, t = 10.93, p < 0.001, f2 = 0.2). The effect size suggests that the relationship between satisfaction with life and perceived Human-Wildlife conflict is between moderate and strong. The path coefficient difference test indicates evidence of no significant difference in the relationship between satisfaction with life and perceived Human-Wildlife conflicts in Uganda and Rwanda, as shown in Table 5 (β Difference = 0.032, t = 0.385, p > 0.05).

Hypotheses 2, 3, and 4 were tested to determine if objective wellbeing indicators predict satisfaction with life. The results indicate that food security (β = 0.11, t = 2.95, p < 0.001, f2 = 0.02), financial security (β = 0.21, t = 7.52, p < 0.001, f2 = 0.1), and health security (β = 0.28, t = 6.45, p < 0.001, f2 = 0.1) significantly predict satisfaction with life. The effect sizes indicate that health and financial security are relatively moderate predictors of satisfaction with life compared to food security which appears to be a weak predictor. The path coefficient difference test reveals a nuanced trend. The results in Table 5 show that health and financial security predict satisfaction with life in Rwanda and Uganda, and there is no significant difference in these relationships across both countries. However, there are significant differences in food security as a predictor of satisfaction with life between Uganda and Rwanda (β Difference = 0.2, t = 2.248, p < 0.05). Specifically, the results show that food security predicts satisfaction with life more in Rwanda, than in Uganda.

In addition to objective wellbeing domains, analysis was conducted to determine the relationship between subjective wellbeing domains and satisfaction with life. The results from testing Hypothesis 5 indicate that emotional wellbeing does not predict satisfaction with life (β = 0.09, t = 1.92, p > 0.05, f2 = 0.01), while on the other hand, Hypothesis 6 indicates that psychological wellbeing does predict satisfaction with life (β = 0.33, t = 6.2, p < 0.001, f2 = 0.1). The effect size shows that the relationship between psychological wellbeing and satisfaction with life is almost moderate. The path coefficient difference test does not show a significant difference in these relationships between Uganda and Rwanda (H5: β Difference = 0.14, t = 1.28, p > 0.05, H6: β Difference = 0.06, t = 0.55, p > 0.05).

As conceptualized in the model, there is a need to understand the relationship between objective wellbeing domains and emotional wellbeing. Testing Hypothesis 7 and 8 indicates that food security (β = 0.37, t = 9.18, p < 0.001, f2 = 0.12) and financial security (β = 0.19, t = 5.20, p < 0.001, f2 = 0.04) predict emotional wellbeing. However, the results of Hypothesis 9 show that health security does not significantly predict emotional wellbeing (β = 0.01, t = 0.03, p > 0.05, f2 = 0.04). The effect sizes indicate that the relationship between food
security and emotional wellbeing is relatively moderate, while the relationship between financial security and emotional wellbeing is weaker. The path coefficient difference test revealed significant differences in these relationships between Uganda and Rwanda. For example, results show that the impact of food security on emotional wellbeing is significantly different across the two countries ($\beta$ Difference = 0.27, $t = 2.79, p < 0.01$), and so is the impact of financial security ($\beta$ Difference = 0.31, $t = 4.05, p < 0.001$), as well as health security ($\beta$ Difference = 0.23, $t = 2.3, p < 0.05$). The results shown in Table 5 reveal that the impact of food security on emotional wellbeing is significantly stronger in Uganda compared to Rwanda. The impact of financial security on emotional wellbeing is significant in Rwanda, but not in Uganda. Similarly, the positive impact of health security on emotional wellbeing is higher in Rwanda compared to Uganda.

Hypotheses 10, 11, and 12 were tested to determine the relationship between objective wellbeing and psychological wellbeing. The results indicate that food security ($\beta = 0.24, t = 6.46, p < 0.001, f^2 = 0.06$), financial security ($\beta = 0.19, t = 5.79, p < 0.001, f^2 = 0.05$), and health security ($\beta = 0.34, t = 9.42, p < 0.001, f^2 = 0.13$) significantly predict psychological wellbeing. The effect sizes show that the impact of health security on psychological wellbeing is relatively moderate, while the impact of financial security and food security is weaker. The path coefficient difference test results show that the impact of financial and food security on psychological wellbeing is not different among residents in Uganda and Rwanda. However, the relationship between health security and psychological wellbeing is significantly different across Rwanda and Uganda ($\beta$ Difference = 0.49, $t = 5.05, p < 0.001$). Particularly, health security significantly affects psychological wellbeing among residents of Rwanda, but not as much among residents of Uganda.

Lastly, Hypotheses 13 and 14 were tested to determine the impact of financial security on food and health security. The results indicate that financial security significantly predicts food security ($\beta = 0.44, t = 12, p < 0.001, f^2 = 0.24$) and health security ($\beta = 0.33, t = 8.89, p < 0.001, f^2 = 0.12$). The effect sizes indicate that the impact of financial security on food security is between medium and large. In contrast, the impact of financial security on health security is relatively modest. The path coefficient difference test results (Table 5) suggest that the impact of financial security on food security is significantly different among residents in Rwanda and Uganda ($\beta$ Difference = 0.24, $t = 3.16, p < 0.01$). Specifically, the impact of financial security on food security is considerably stronger among residents in Rwanda compared to Uganda. The effect of financial security on health is relatively similar among residents from both countries ($\beta$ Difference = 0.12, $t = 1.64, p > 0.05$).

5. Discussion

HWC presents several challenges globally, and a number of studies have been conducted to examine the drivers of the conflict and evaluate mitigation measures. At GVL, most studies have mainly focused on evaluating interventions that address issues such as revenue sharing [57,73,74] crop raiding [75–77] resource management [72,78] among others. However, there have been limited attempts to understand community perceptions of HWC and life conditions potentially influencing perceptions of conflict between people and wildlife. Therefore, the findings discussed previously and below contribute to closing this gap.

5.1. Relationship between Objective and Subjective Wellbeing

The results from the analysis of the relationship between financial security, food, and health security reveal that financial security significantly impacts food and health security. This is in line with other studies that acknowledge the role financial benefits play in integrated resource conservation and rural development [79,80]. Households with a stronger financial base are more likely to invest in owning more land and growing more food. In addition, they may also be able to buy foods from the market that they cannot grow themselves. Similarly, financially able households are health secure because they can afford to pay for health care. However, the results reveal that the impact of financial security on
food security is not homogenous in the GVL—it is significantly stronger among residents in Rwanda than in Uganda. Previous studies reveal that communities around Volcanoes National Park have faced food insecurity resulting from factors such as limited land for cultivation and reduced soil productivity, which are further compounded by animal crop raiding [57]. Even though similar situations may pertain in some parts of GVL in Uganda, the impact of food insecurity is more likely to be felt on the Rwandan side of the GVL where there is more land scarcity due to the higher population density of approximately 467 people per square kilometer than on the Ugandan side with less population density of approximately 351 people per square kilometer [81–83].

The results revealed that financial security had a moderate influence on health security compared to food security among residents of the GVL in both Uganda and Rwanda. This is most probably because residents in both countries rely heavily on the health services provided by their governments. In Rwanda, a universal healthcare program has enabled the community, including the poorest and most vulnerable members, to access subsidized healthcare [84]. In Uganda, government-funded health centers across the country provide residents with basic health care. Consequently, access to health services in both countries is not directly related to financial security. Although some resources generated from conservation have been invested in improving some health centers [85], some community members argue that such resources should be invested in ventures that would enable them to enhance their financial security, since the provision of healthcare is a duty of the government irrespective of whether tourism generates benefits for them. In Rwanda, the relationship between financial security and health security was higher compared to Uganda, most likely due to the annual healthcare insurance fee contribution required of every Rwanda citizen [86]. This suggestion implies that the implementation of HWC mitigation strategies should focus more on how to enhance communities’ financial capacity, especially in the form of financial knowledge and skills, taking into consideration the variations in findings in both countries.

Although several studies have been conducted on measuring objective and subjective wellbeing [44,47,53,87–89], there are limited studies that analyze how objective wellbeing influences the subjective wellbeing domains, particularly when attempting to understand how it affects perception of satisfaction with life and HWC. With reference to the GVL, this study contributes to addressing this knowledge gap. For example, the results reveal that food and financial security significantly predict emotional wellbeing. However, health security does not significantly predict emotional wellbeing, though at varying levels in Uganda and Rwanda. The results also show that health security does not strongly predict emotional and psychological wellbeing and overall satisfaction with life as compared to food and financial security. As previously mentioned, this is most likely caused by the fact that health services are mainly provided by the government to all residents and therefore do not greatly influence residents’ subjective wellbeing.

These are significant findings given that most HWC strategies have, over the years, focused more on investing in infrastructure projects (such as schools and road restoration) that benefit the community [85]. In the short term, however, these projects are unlikely to directly or in a short time frame improve residents’ food and financial security since they do not give special attention to frontline communities affected directly by the parks, such as through crop raiding. Furthermore, some of the strategies advanced by the conservation agencies may in the long run end up threatening the food security of the community. For instance, given that food crops are mostly raided by wild animals, communities have been encouraged (and in some cases supported) to shift to growing crops such as tea and pyrethrum. Even though such crops may not be palatable to wild animals, residents could become more food insecure and financially insecure as a result, as they are unable to produce enough food for their households, and alternative crops are not available at competitive prices, enabling them to buy food year-round. This obviously would in the medium and long run ‘spillover’ and negatively affect not only their emotional but also their psychological wellbeing. This would in turn impact their satisfaction with life.
since results reveal that food and financial security significantly predict the psychological wellbeing of residents.

5.2. Predictors of Life Satisfaction

The results of this study indicate that objective wellbeing domains (food, financial, and health security) and the subjective domain of psychological wellbeing significantly predict satisfaction with life, with no significant differences across the GVL in Uganda and Rwanda. This finding is in line with other studies that highlight that community residents’ overall quality of life at tourism destinations is a function of their satisfaction in their major life domains [88]. The results also conform with the bottom-up spillover theory which explicates that life domains are in a hierarchy form where satisfaction with life domains on the top are influenced by lower levels of life domains that accumulate and vertically spillover [49]. However, contrary to what has been suggested [65], emotional wellbeing was not found to influence satisfaction with life, specifically among residents in Uganda. This finding suggests that affective aspects of wellbeing may not be of importance in understanding satisfaction with life, and therefore may not have a strong influence on perceptions of Human-Wildlife conflict.

The results provide significant insights for policy makers and implementers of conservation-based community development projects. They reveal that communities’ satisfaction with life is a direct outcome of the ‘spillover’ effects of secure food, health, and financial conditions, as well as psychological wellbeing conditions. The finding of a strong influence of psychological wellbeing on life satisfaction shows the importance of considering people’s sense of purpose and fulfillment in understanding wellbeing and its links to conflict between people and wildlife. The nuanced nature shown in findings between Uganda and Rwanda suggests community development efforts aimed at incentivizing conservation support may differ. For example, efforts in Rwanda could focus on ensuring food security, while in Uganda, the focus could be put on health security. In both countries, however, financial, and psychological wellbeing are important factors to consider.

These findings challenge the current community development approach at the GVL which places emphasis on monitoring and evaluating the objective than subjective wellbeing domains. As noted by [89] this is a gap that needs to be addressed if policies and investments in tourism destinations are to be successful. This implies that the continued lower emphasis on understanding and measuring the community’s psychological domains, that is, future aspirations, of people adjacent to the GVL will eventually become counterproductive to the success of HWC strategies and to sustainable resource conservation. Limited understanding of psychological wellbeing constraints most probably explains why negative sentiments towards gorilla conservation have persisted in the GVL despite the same residents benefiting from tourism revenue-sharing projects.

5.3. Relationship between Life Satisfaction and Perceived Human-Wildlife Conflict

Based on the results, perceived Human-Wildlife conflict is significantly predicted by Satisfaction with Life (SwL) with a moderate to strong effect size. Thus, GVL’s continued efforts to improve life satisfaction may increase communities’ perceptions of HWC rather than decrease them. It contradicts previous research that suggests a negative relationship—in which perceived HWC decreases as satisfaction with life increases [90–92].

Most likely, this positive relationship is explained by power relations in which communities feel marginalized and limited in their ability to directly benefit from tourism. As Laudat [77] noted from research in the Bwindi area, the communities have remained on the periphery of lucrative ecotourism based on gorillas because they lack the human and financial resources to invest in competitive tourism businesses (such as high-end lodges, tour companies, restaurants) or lack the skills to get employed in well-paying jobs in the hospitality sector. It is likely that the communities realize that only through the existence of HWC can they continue to benefit from tourism supported by government and conservation NGO initiatives.
This could partly provide an explanation for the continued negative perceptions about the HWC since revealing a positive perception would be self-defeating since conservation agencies and donor-funded projects would no longer see the necessity of investing in community development projects. There is scientific evidence supporting this scenario, where some economic incentives for conservation can counterproductively affect community development [80,93], creating local dependency. Ecotourism (which is inherently pro-community), as Laudati [77] observes, can become a predator by leading to new forms of control and vulnerability between the community and national parks, resulting in poverty and dependence instead of alleviation.

5.4. Conclusions

There is a significant relationship between wellbeing and perception of conflict between people and wildlife at the GVL, which underscores the need for a holistic and integrated approach to policy and implementation. Consequently, it is necessary to pay more attention to understanding the hierarchy of wellbeing domains and monitoring their bottom-up spillover effects. For tourism to contribute to the quality of life of residents, Uysal et al. [68] argues that it must meet both their basic and growth needs—this can be accomplished by improving access to resources, empowering individuals to take desired actions, and creating opportunities for local businesses and individuals. As a result of the positive relationship between SwL and perceived HWC in the GVL, the current approach, and strategies to mitigate HWC need to be reviewed. For communities to participate in and benefit from the tourism value chain, formal channels need to be expanded. When addressing community development interventions, attention should be paid to the constraints communities face while establishing competitive tourism businesses or seeking formal employment in the tourism and hospitality industries. To overcome the feeling that they are marginalized and at the fringe of the lucrative tourism industry, communities should be fully empowered to participate in decision-making processes. If the aforementioned issues are not addressed, chances are that communities will continue to perpetuate HWC. This is because it allows them to negotiate and legitimize their claims to benefit from tourism and conservation. Further research is needed to understand why Uganda and Rwanda reported different findings. Specifically, there is a need for research to understand why the relationship between food security and happiness in life varies, and why the relationship between food security and emotional wellbeing differs from the relationship between financial security and emotional wellbeing, health security and psychological wellbeing, and financial security and food security.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of Clemson University (protocol code 18075477 and date of approval: 14 March 2016).

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Data Availability Statement: Data is contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

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